

ANNUAL REPORT  
2020



A CHAI staff member visits with a patient volunteer at Highfields Polyclinic, who shares his experiences with different tuberculosis preventive therapies.

Photo by Eugene Noube, Highfields Township, Harare, Zimbabwe

Cover photo by Sujata Khanna, Madhya Pradesh, India

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# MESSAGE FROM LEADERSHIP

In 2020, the global community faced an unprecedented challenge, coming together to combat the COVID-19 pandemic.

Since our foundation in 2002, CHAI has worked with urgency to address the most pressing health issues in low-and middle-income countries. This past year was no exception.

Using our strong relationships with government partners, we worked quickly to help countries respond to the pandemic while ensuring that other lifesaving programs continued. We helped global health leaders understand country needs and procure lifesaving diagnostics, treatments, and personal protective equipment (PPE), despite worldwide shortages. While equitable access to COVID-19 vaccines remains a profound issue around the globe, we have worked to support equitable access, helping low-and middle-income countries prepare for, acquire, and roll them out to their populations as they have become available. We know this work is far from done.

COVID-19 has had a devastating impact on families and communities worldwide, including our staff who have worked tirelessly to help countries prepare for and respond to the crisis. Our staff have carried out this work while looking after friends and family and even becoming ill themselves.

Since the pandemic began, we have lost beloved colleagues who dedicated their lives to serving others. CHAI is a family, and we will continue to remember their commitment and service as we mourn their loss.

Despite the devastation, this crisis has also enabled the global health community to rethink fundamental issues such as equitable access to lifesaving medical oxygen and strengthening critical supply chain networks.

It is our hope that we can use the lessons learned during the pandemic to bring more equitable health care to more people around the world. As we move forward, we will continue to work to ensure that lifesaving COVID-19 vaccines and treatments are available to everyone, no matter where they live. We will also support our partners to continue to strengthen health systems' resilience over the long-term.

While this year has tested us in so many ways, it has also recommitted us to our values and our mission to save lives.

**-CHAI Management**



A health worker washes his hands as part of COVID-19 protocols.

Photo by Keith Baptist, Uzumba Maramba Pfungwe (UMP) District, Mashonaland East Province, Zimbabwe

# OUR HISTORY

2002

CHAI is founded

## 2002: CHAI founded

CHAI is founded to help save the lives of millions of people living with HIV/AIDS in low- and-middle income countries.

## 2002-2003: CHAI's first program: HIV/AIDS

First programs begin in Africa and the Caribbean, aimed at scaling up HIV/AIDS care and treatment in entire countries. As a result of this work, 800,000 people are treated in these countries in five years, up from a total of 2,000 when the work began.

## 2003: HIV first-line agreement

CHAI negotiates lower prices for first-line HIV drugs by over 60 percent, enabling over 60 countries to access the new prices.

## 2004: Reducing CD4 test prices

CHAI negotiates 50 to 90 percent price reductions for CD4 diagnostic tests for AIDS patients worldwide and enables nationwide scale-up of CD4 testing in over 40 countries.

## 2004-2005: Pediatric HIV treatment

CHAI and Unitaid lead global effort to scale up treatment for children with AIDS in 34 countries, from around 75,000 on treatment to over 900,000, lowering the price of medications from over US\$600 to around US\$60 per child, per year.

2004-05

Pediatric HIV treatment

## 2005-2007: HIV second-line agreement

CHAI works with Unitaid to negotiate agreements to lower the price of second-line HIV/AIDS treatments by 75 percent and accelerate the roll out of these drugs to over 30 countries where patients were failing on first-line treatments.

## 2007: Expansion into malaria

CHAI launches a malaria program, which grows rapidly to help governments increase funding to combat malaria, improve access to quality diagnosis and treatment, and support evidence-based decision making to target resources and accelerate progress toward elimination.

## 2009: Scale-up HIV care and treatment in South Africa

CHAI assists the government of South Africa with the largest scale-up of HIV care and treatment ever attempted, from 800,000 people in 2009 to approximately three million today. CHAI helps negotiate agreements to lower HIV and TB drug prices that save the South African government almost US\$1 billion.

## 2010: Effective drugs to treat malaria

CHAI increases access to artemisinin-based combination therapies (ACTs). Over two years, we help get almost 300 million ACTs to patients in eight countries.

## 2011: Expansion into vaccines

CHAI begins work to lower costs and increase access to vaccines. Alongside the Bill & Melinda Gates Foundation, CHAI negotiates a landmark agreement to lower the price of the Rotavirus vaccine by 67 percent and the Pentavalent vaccine by 50 percent, saving the global community over US\$800 million and US\$150 million respectively.

## 2012: Long-acting reversible contraception

CHAI negotiates an agreement to lower the price of long-acting reversible contraceptives from US\$18 to US\$8.50 per implant and accelerates rollout of the products to save the lives of women.

## 2013: Treating childhood diarrhea

CHAI helps reduce mortality from diarrhea for children under five, scaling up access to lifesaving zinc/ORS treatment in India, Kenya, Nigeria, and Uganda. CHAI supports governments to lower the cost of zinc/ORS products, resulting in wholesale prices dropping by approximately 60 percent.

## 2014: Viral load diagnostics deal

CHAI negotiates a global access price for viral load diagnostics of US\$9.40 per test, which will save over US\$150 million over five years and dramatically improve the quality of care for HIV patients.

## 2014: Point-of-care CD4 price reduction

CHAI negotiates a 67 percent price reduction for service and maintenance of the first point-of-care CD4 diagnostic tool, called Pima, for HIV. CHAI accelerates the market entry of a second supplier, called BD FACS Presto, which will facilitate further price reductions for point-of-care CD4 tests.

## 2014: Scale-up of early infant diagnostic tests

With the support of Unitaid, more than one million HIV diagnostic tests for infants are performed globally, up from 80,000 tests in 2007.

## 2014: Ebola response in Liberia

CHAI helps lead case management and health worker training in response to the Ebola crisis in Liberia, serving as a critical link between the international emergency response and the Liberian government.

2014

Ebola response in Liberia

## 2015: Expansion into new programs

CHAI introduces new programs in hepatitis, pneumonia, and cancer.

## 2015-2016: Reducing mother and infant deaths in Nigeria

CHAI introduces a comprehensive community-based approach to save mothers and newborns in Northern Nigeria through improved outreach, treatment, and training of health workers, resulting in a sustained 37 percent reduction in maternal deaths, a 43 percent reduction in newborn deaths, and a 15 percent reduction in stillbirths within 12 months.

## 2016: Lowering the cost of hepatitis C treatment

CHAI helps reduce the cost of hepatitis C (HCV) treatment in seven countries by 71 to 95 percent, from US\$2,618 per patient to between US\$133 and US\$789 per patient treated.

## 2017: Increasing access to cancer medications

CHAI announces an agreement with the American Cancer Society, Pfizer Inc., and Cipla Inc. to expand access to 16 essential cancer treatment medications, including chemotherapies, in Kenya, Tanzania, Ethiopia, Uganda, Nigeria, and Rwanda, where 44 percent of cancer cases in sub-Saharan Africa occur.

2017

Increasing access to cancer medications

## 2017: Affordable single-pill HIV regimen with DTG

CHAI and partners announce a groundbreaking agreement to accelerate the availability of the first affordable, generic, single-pill HIV treatment containing DTG, a best-in-class HIV medication, to public sector purchasers in low- and middle-income countries at around \$US75 per person, per year.

## 2018: Lowering costs for lifesaving oxygen diagnostics

CHAI helped negotiate a 58 percent reduction, on average, for the price of handheld pulse oximeters—simple, life-saving tools that can help quickly diagnose severe pneumonia.

2018

Lowering costs for lifesaving oxygen diagnostics

**2019: Improving access to quality cancer treatment**

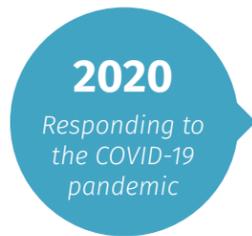
CHAI forms Allied Against Cancer with the American Cancer Society, the National Comprehensive Cancer Network (NCCN) and IBM. NCCN adapts cancer-treatment guidelines for use in African hospitals and IBM develops an online tool to help African oncologists use the guidelines more efficiently.

**2019: Expansion into cervical cancer**

CHAI begins work to scale up safe, effective, and affordable cervical cancer screening and treatment of precancerous lesions across partner countries.

**2020: Responding to the COVID-19 pandemic**

CHAI helps countries secure affordable supplies to safely and effectively treat patients with COVID-19, including personal protective equipment, biomedical devices for oxygen therapy, and diagnostics. This includes a global partnership to make available 120 million affordable, rapid diagnostic tests for low- and middle-income countries.



**2020: Price agreement drastically lowers cost for yearly pediatric HIV treatment**

CHAI and Unitaid announce groundbreaking agreement to make available first-ever generic pediatric formulation of WHO-recommended first-line HIV treatment DTG to low- and middle-income countries—the fastest-ever U.S. regulatory approval for a pediatric HIV drug. The agreement significantly lowers the cost for yearly pediatric HIV treatment from over \$480 per child to under \$120 per child.



Community health workers attend a COVID-19 awareness training-of-the-trainers session hosted by Countrywide Uncedolwabantu Projects.  
Photo by Earl Abrahams, Johannesburg, South Africa

# WHERE WE WORK

**Boston, MA, USA**  
Global Operations

Countries with a CHAI country office:

**31**

Countries where CHAI currently operates program activities:

**40**

Countries participating in CHAI access agreement activities:

**130**

## 2020 Country Offices

Countries where CHAI operated out of an office location.

Cambodia	Malawi
Cameroon	Mozambique
Congo, Dem. Rep.	Myanmar
Eswatini	Nigeria
Ethiopia	Panama
Ghana	Papua New Guinea
Guatemala	Rwanda
Haiti	Senegal
Honduras	Sierra Leone
India	South Africa
Indonesia	Tanzania
Kenya	Uganda
Lao PDR	Vietnam
Lesotho	Zambia
Liberia	Zimbabwe

## 2020 Program Countries

Countries where CHAI had programmatic engagement with the government.

Angola	Haiti	Panama
Bangladesh	Honduras	Papua New Guinea
Benin	India	Rwanda
Botswana	Indonesia	Senegal
Burkina Faso	Kenya	Sierra Leone
Cambodia	Lao PDR	South Africa
Cameroon	Lesotho	Tanzania
Congo, Dem. Rep.	Liberia	Togo
Côte d'Ivoire	Malawi	Uganda
Dominican Republic	Mali	Vietnam
Eswatini	Mozambique	Zambia
Ethiopia	Myanmar	Zimbabwe
Ghana	Namibia	
Guatemala	Nigeria	

## 2020 Access Agreement Countries

Countries that have access to CHAI-negotiated price reductions for high-quality medicines, diagnostics, vaccines, devices, or other life-saving health products and services.

Afghanistan	Cambodia	Eritrea	Kazakhstan	Moldova	Romania	Thailand
Albania	Cameroon	Eswatini	Kenya	Mongolia	Rwanda	Timor-Leste
Algeria	Central African Republic	Ethiopia	Kiribati	Montenegro	Samoa	Togo
American Samoa	Chad	Fiji	Kosovo	Morocco	Sao Tome and Principe	Tonga
Angola	Colombia	Gabon	Kyrgyz Republic	Mozambique	Senegal	Trinidad and Tobago
Armenia	Comoros	Gambia, The	Lao PDR	Myanmar	Serbia	Tunisia
Azerbaijan	Congo, Dem. Rep.	Georgia	Lebanon	Namibia	Sierra Leone	Turkey
Bangladesh	Congo, Rep.	Ghana	Lesotho	Nauru	Solomon Islands	Turkmenistan
Belarus	Costa Rica	Grenada	Liberia	Nepal	Somalia	Tuvalu
Belize	Côte d'Ivoire	Guatemala	Libya	Nicaragua	South Africa	Uganda
Benin	Djibouti	Guinea	Madagascar	Niger	South Sudan	Uzbekistan
Bhutan	Dominica	Guinea-Bissau	Malawi	Nigeria	Sri Lanka	Vanuatu
Bolivia	Dominican Republic	Guyana	Malaysia	North Macedonia	St. Lucia	Venezuela, Rb
Bosnia and Herzegovina	Ecuador	Haiti	Maldives	Pakistan	St. Vincent and The Grenadines	West Bank and Gaza
Botswana	Egypt, Arab Rep.	Honduras	Mali	Panama	Sudan	Yemen, Rep.
Bulgaria	El Salvador	India	Marshall Islands	Papua New Guinea	Suriname	Zambia
Burkina Faso	Equatorial Guinea	Indonesia	Mauritania	Paraguay	Tajikistan	Zimbabwe
Burundi		Iraq	Mauritius	Peru	Tanzania	
Cabo Verde		Jordan	Micronesia, Fed. Sts.	Philippines		

### Map key:

- Countries with offices, programs, and access agreements
- Countries with programs and access agreements
- Countries with access agreements

# OUR VALUES

## **We work with urgency.**

People are dying unnecessarily from AIDS, malaria, tuberculosis, and other preventable and treatable conditions. We recognize that every day we delay, people die. Therefore, we work with utmost speed to build a strong foundation for sustainable impact. The faster we act the more lives we can save.

## **We work in cooperation with and at the service of partner governments.**

We believe that to make programs sustainable and scalable we need to help strengthen the mainstream government health systems. This means that we align our program strategies with our partner governments to work in service of their priorities and goals. Partnering with governments enables transformational impact, as they are the strongest institutions in developing countries with long-term and expansive health policies and programs.

## **We are a mission-driven organization.**

We want people to work with us who believe in the mission and whose fulfillment comes from the fact that collectively we succeed in advancing the mission. This ensures our unity of purpose, with all leaders and managers and their staff at all levels working to a common cause.

## **We are frugal.**

Our offices are modest. We do not use donor money to travel lavishly. We maintain low overheads. We feel that the donor funds we raise should go as much as possible to saving lives directly rather than to compensating ourselves excessively or incurring elaborate expenses.

## **We operate with humility.**

We do not seek credit for our work and will only take it if it is necessary to fulfill our mission. We do not seek to publicize our work independent of publicity that our government partners or donors want.

## **We have an entrepreneurial and action-oriented culture.**

We hire good people and give them wide latitude to conceive of and execute programs. We have a culture of seeking out opportunities and then seizing them. Some of our greatest accomplishments, large and small, were not planned centrally. We are willing to take calculated risks to attempt to achieve goals that are substantial, challenging, and uncertain.

## **We operate based on trust and transparency.**

We expect employees and partners to make ethical decisions and to work hard and manage their own work. As an organization, at all levels, we uphold good governance with transparency and accountability.

## **We recognize that our staff is our greatest asset.**

Our successes are driven by the talent, creativity, and hard work of the people who work for us. We strive to support and protect our staff to grow and thrive within the organization and to enable them to have a major impact in fulfilling the mission.

## **We foster diversity and inclusion.**

We are an inclusive workplace and promote and integrate fairness, respect, equality, and dignity into CHAI's culture. We take a firm stance against discrimination and harassment and foster an environment where people with a multiplicity of personal characteristics, including race, color, religion, sex or gender (including gender identity and gender expression), sexual orientation, ethnicity, national origin, age, disability, HIV status, political or interest group affiliation, genetic information, veteran status, marital status, parental or pregnancy status or any other characteristic, are embraced and valued.



Children attend a nutrition program at an anganwadi centre.  
Photo by Satvir Malhotra, Sehore, Madhya Pradesh, India

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# IN MEMORIAM

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At CHAI, our staff is our greatest asset. They implement our mission on the ground to strengthen global health systems and improve access to testing, treatment, and care for millions of people living in low- and middle-income countries.

In 2020 and 2021, we lost several members of our CHAI family. We would like to acknowledge their contributions and honor their lives, which they spent in the service of others.



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## Mr. Birineh Aychew

Mr. Birineh Aychew joined CHAI Ethiopia in December 2006 as a senior driver. He was hard-working, dedicated, committed, and passionate in his work, always respecting CHAI values and operational principles. Mr. Aychew died in December 2020. He is survived by his wife, two daughters, and his 94-year-old mother.



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## Mr. Ashutosh Mishra

Mr. Ashutosh Mishra joined CHAI in July 2020 as a program manager on our immunization team in Uttar Pradesh, India. He led a team of project coordinators and community engagement officers to increase vaccination coverage in some of the most difficult to reach places in the state. Mr. Mishra spent much of his career working to improve public health in India. Before CHAI, he worked for the National Polio Surveillance Program, Pathfinder International and the state immunization program in Uttar Pradesh. Mr. Mishra died in May 2021. He leaves behind a loving family, including three children.



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## Mr. Wilberto Montalvan

Mr. Wilberto Montalvan joined CHAI as a subnational coordinator in Honduras in June 2021, following a brief retirement from the Health Secretariat of Honduras, where he served for 33 years. Mr. Montalvan was an advocate of the community health worker network for malaria elimination and committed to ensuring community volunteers were treated with dignity and respect. Mr. Montalvan died in September 2021. He leaves behind a wife and two daughters.



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## Mr. Wenzile Mthimkhulu

Mr. Wenzile Mthimkhulu first joined CHAI in 2011, in Eswatini, his home country. He returned in 2018 as a supply chain associate in Liberia. In the role, he was responsible for providing technical assistance to the government to meet commodity and supply chain needs for the country. Mr. Mthimkhulu was a calm and warm presence, beloved by his colleagues. He died in August 2021. He leaves behind his three children, as well as his mother, father, and sister.



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## Ms. Sidonie Uwimpuhwe

Ms. Sidonie Uwimpuhwe joined CHAI in 2018 as our first Rwandese national country director in Rwanda. Under her leadership, the Rwanda program grew almost threefold in funding and impact, launching significant work across CHAI's strategic focus areas. Before CHAI, she served in a series of leadership positions in the health sector and in the promotion of vulnerable women at the Rwanda Ministry of Health, the National AIDS Control Commission, Rwanda Biomedical Center, and Care International Rwanda. Ms. Uwimpuhwe died in February 2021. She is survived by her four children.



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## Mr. Edward Wood

Ed Wood joined CHAI at its inception and oversaw much of its operations in his over 10 years at the organization. He helped establish several country offices and mentored many of the people who are now country, program, and operations leaders throughout the organization. Mr. Wood's dedication, compassion, and leadership were essential to make CHAI the organization it is today. Mr. Wood died in September 2020. He is survived by his wife, two children, brother, and three grandchildren.



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## Dr. Tachi Yamada

Dr. Tachi Yamada was the Chair of CHAI's Board of Directors. He was a driving force in global health for decades. As a physician, professor, mentor, and leader of large and respected international institutions, Dr. Yamada's contributions to health and development touched billions of lives around the globe. Dr. Yamada's legacy lives on in the institutions he led, the patients he treated, and the countless people he helped along the way.

# INFECTIOUS DISEASES

For years, four infectious diseases drove the majority of illness and death worldwide—HIV, hepatitis, tuberculosis, and malaria. In 2020, a new illness—COVID-19—overtook these diseases as the largest cause of global mortality by an infectious disease. Throughout 2020, CHAI worked together with government partners and the global health community to quickly respond to the new virus, while ensuring that other lifesaving health services continued.



A CHAI staff member (right) talks to a patient volunteer about a new 3HP regimen at the Jointed Hands Welfare Organisation (JHWO) office.

Photo by Eugene Noube, Avondale, Harare, Zimbabwe

# COVID-19

Since CHAI’s foundation, we have worked with governments to build health systems, save lives, and reduce the burden of disease—2020 marked a new and unprecedented challenge with the spread of COVID-19 around the globe.

Working with our government partners, we acted urgently to ensure countries had the equipment and products they needed to respond to the crisis, health workers were protected and able to safely provide quality care to patients, and to enable governments to continue lifesaving services while addressing the pandemic. We helped governments ramp up capabilities to diagnose and treat the virus, track cases, and prevent transmission. In anticipation of the production of vaccines, we helped them prepare for, acquire, and roll them out to their populations.

Early in the year, the rapid spread of COVID-19 meant international public health institutions like the World Health Organization (WHO) needed to act quickly to understand the virus and provide guidance and assistance to countries to enable them to prepare and contain its spread. It was evident new tools and systems were required to plan for an appropriate response and enable informed decision making by governments, their ministries of health, and other key experts.

*The pandemic led to an acute shortage of PPE worldwide. CHAI identified hundreds of suppliers to fill the gap for our partner governments.*

Beginning in February 2020, CHAI has collaborated with WHO to build tools for supply planning and assisted efforts to share information with governments. The collaboration has included forecasting and quantification for personal protective equipment (PPE), COVID-19 diagnostics, and therapeutics. Over the course of the year, CHAI also supported WHO to deliver trainings on how to use the supply planning tools, reaching a diverse array of users across all WHO regions. Those efforts have allowed WHO and stakeholders to develop greater insights into global demand and to improve procurement decision making.

## Helping countries prepare and respond to COVID-19

Countries needed to quickly upgrade health systems to manage and track COVID-19 cases, supplies, testing, and treatments. CHAI worked with governments to develop systems to understand needs and target responses to prevent outbreaks so that hospitals and health workers could continue to safely provide quality care.

When the pandemic led to an acute shortage of PPE worldwide, CHAI assisted governments to source quality assured equipment locally and globally for both COVID and non-COVID needs, identifying over 300 reliable suppliers, collating standards for products, and streamlining PPE requests. We helped determine which equipment was suitable based on needs and reviewed performance and quality documents to ensure authenticity and validity so that all products met the appropriate performance standards.

Soon after the first case of COVID-19 was reported in **South Africa**, CHAI seconded 19 full-time staff to the National Department of Health (NDoH) at the request of the government. This team was tasked with overseeing provincial coordination

for preparedness planning, costing to quantify resource needs, developing content for COVID-19 preparedness, and supporting procurement of critical supplies.

With funding from the ELMA Foundation, CHAI helped oversee the development of one of the first epidemiological models for COVID-19 in the country, significantly increasing government visibility of the virus to effectively make decisions around the response. CHAI provided financial support to the COVID-19 Modelling Consortium (MASHA) to assist the government with projections and quantify the burden and impact of the virus. Within days of the first reported case, we worked with the NDoH’s technology partner to deploy an on-demand COVID-19 information service. This free service was disseminated through WhatsApp, allowing the government to deliver automated responses about COVID-19 to the public, including travel advice, daily situation reports, myth busters, and a tool to assess individuals’ risk.

As the sole implementing partner, CHAI was responsible for overseeing content development, moderating incoming messages from the public, and aligning content with NDoH guidance. Within the first week of deployment, the WhatsApp service reached nearly two million users with a user retention rate of nearly 55 percent. Today, the service has over 8.2 million users, representing nearly 14 percent of the total South African population. We also supported efforts to mobilize funds for translating the service into four official languages to ensure most communities across the country were receiving timely, accurate information in their language.

The service has since been adopted in seven other countries and inspired development of a version for the WHO which surpassed 12 million unique users within eight days of launch.

By mid-year, CHAI had officially established a program in South Africa to continue to support the government’s COVID response including, health system recovery, risk communication and community engagement, screening, and testing.

### South Africa’s COVID-19 information hotline



**8.2M**

Users



**55%**

Retention rate



**4**

Official languages

We supported the government’s containment and mitigation efforts by contributing to policy guidelines and recommendations for travelers accessing ports of entry and helped design and develop a digital screening solution, including introduction of rapid antigen testing, that allows travelers to complete a required health questionnaire on their personal devices ahead of their arrival.

In **Mozambique**, we helped the government replicate the South African WhatsApp tool to share COVID-19 updates with the public and health workers. Early in the pandemic, funding from the governments of Ireland and Canada and Mozambique’s National Institute of Health (Instituto Nacional de Saude, or INS) enabled rapid procurement of COVID-19 testing, PPE, and seroprevalence surveys to identify vulnerable

## INFECTIOUS DISEASES

populations and hotspots. CHAI also supported modeling of epidemiological projections and data collection to inform government decision making. This support permitted the government to implement activities to help identify and mitigate transmission.

In **Kenya**, CHAI is a member of the COVID-19 National Taskforce as well as the resource mobilization and oxygen committees supporting critical decision making on the development and roll out of the national COVID-19 testing strategy and the costed national strategy to scale up medical oxygen. CHAI seconded three members of our staff to the government and worked rapidly to mobilize resources, developing a real time COVID-19 resource tracking system in under a week. The system consolidates resources from the Ministry of Health, bilateral partners, local organizations, and others to track needs, such as testing supplies, oxygen, and PPE enabling the government to align resources appropriately. At the same time, we conducted a rapid assessment of the state of routine child health services across health facilities in the country to support guidance on how to manage sick children presenting to health facilities. We used this information to develop an algorithm for prompt identification and appropriate management of children suspected of having COVID-19. CHAI helped distribute the protocols to all 47 counties (over 6,000 facilities) as well as a virtual orientation for health workers. Similarly, in **Burkina Faso**, CHAI helped the Ministry of Health build a dynamic and contextually adapted resource mapping tool and expenditure tracking tool to inform resource mobilization efforts and reprogramming of existing funds.

In **India**, with support from the Bill & Melinda Gates Foundation and Unitaid, CHAI supported the Indian Council of Medical Research (ICMR), the nodal agency for COVID-19 diagnostics, and Department of Health Research (DHR) to rapidly scale testing across the country. We assisted the states of Madhya Pradesh, Punjab, Tamil Nadu, Uttar Pradesh, and Bihar to respond to the pandemic, including the creation of digital tools to

track and inform decision making, acquisition and distribution of treatments and health products, and case management.

In Madhya Pradesh, CHAI assisted the state of 85 million people to develop the “Sarhak Portal” to track key indicators including sample collection, testing, positivity rates, hospitalization, and recovery rates to enable rapid, evidence-based decision making by the state leadership. CHAI helped the state improve access to vital COVID-19 commodities during times of crippling scarcity by developing tools for quantification and inventory management and planning distribution of testing kits and consumables, PPE, drugs, oxygen, and other treatments. Similarly, in Punjab, CHAI supported the government to optimize its “Cova” portal to understand needs including bed capacity and treatment requirements.

In Madhya Pradesh, CHAI also supported the government to create a public awareness campaign for government officials and healthcare, frontline, and community health workers about the symptoms, risks, protocols, and best practices for mitigation. We did this through service provider trainings across health facilities. In Punjab, CHAI supported the government to manage COVID-19 cases by strengthening protocols for home isolation and standardizing guidelines for district oversight on patient management.

In Chennai, Tamil Nadu, we assisted the government to develop and roll out a fever camp and containment strategy, improve testing, and manage patients better through systems for rapid triaging and referrals.

In **Ethiopia**, we assigned nearly 60 CHAI staff to support the Ministry of Health. With funding from ELMA Foundation, the Bill & Melinda Gates Foundation, and PATH, we assisted the government’s national and subnational coordination efforts, including data management and analysis, expansion of testing, essential health service continuation, public and private health facility preparedness, multi-sectoral engagement, and oxygen supply mobilization.

Early on, CHAI assisted with preparation and printing of registries for isolation and treatment centers as well as referral slips and tools needed for daily reporting. We also worked with the Ministry of Health to recruit and deploy 12 data management officers for all regions to strengthen data management and reporting. CHAI helped assess multiple treatment centers in Addis Ababa. The assessments shaped the development of the Ministry’s COVID-19 response and its strategy for maintaining essential non-COVID services. The work also supported the establishment of a Private Health Facilities Desk under the Medical Services General Directorate of the Ministry of Health to engage private facilities in the COVID-19 response, leading to the creation of bi-weekly virtual forums between Ministry leadership and private health facilities including major private hospitals, medical and diagnostic centers, and private ambulance providers. The structured engagement improved trust and communication between the government and private health facilities. Through this effort 30 private facilities began collecting and sending COVID-19 test samples to the Ethiopian Public Health Institute (EPHI) and three private facilities began treating COVID-19 cases with more expected to start in 2021.

In seven regions—Amhara, Afar, Benishangul, Oromia, SNNPR, Somali, and Tigray—we helped with regional-level COVID-19 response. This work included coordination, planning, and monitoring of the virus, the creation of rapid-response teams, case management, and distribution of essential supplies.

In **Cameroon**, a weak supply chain with lack of visibility into stock levels, erratic distribution, and poor stock management practices resulted in frequent stockouts of diagnostics, equipment, and treatments, including PPE and therapeutics. To address this, CHAI supported the government to rapidly configure and deploy a lightweight electronic Logistic Management and Information System (eLIMS) which improved decision making, optimized distribution, and strengthened stock management practices. This system helped reduce

stockouts and led the government to recommend its use for the management of commodities across other programs including HIV, tuberculosis (TB), malaria, reproductive health, vaccines, essential medicines, cancer, and other diseases.

Similarly, in **Zambia**, CHAI helped establish and strengthen supply chain systems for COVID-19 commodities and diagnostics, including supporting development and training on the COVID-19 module in the eLMIS digital supply chain management system to manage pharmacy and laboratory supplies. We continue to provide technical support and coordinate supply chain meetings for the COVID-19 health commodities sub technical working group. Additionally, we supported the forecasting and quantification of COVID-19 treatments, products, and diagnostics using the WHO quantification tool and worked with the Ministry of Health and partners to coordinate COVID-19 commodity shipments.

In **Liberia**, CHAI seconded staff to help lead the Infection Prevention Control (IPC) pillar for the government’s Incident Management System (IMS). In collaboration with the IPC and the Montserrado county health team, we helped identify, deploy, and incentivize IPC monitors to oversee the provision of protocols in high-volume health facilities and treatment centers to ensure diligence, oversight, and reinforcement of best practices. We also supported IPC training for county and district supervisors and facility providers in Gbarpolu and Montserrado counties on the national COVID-19 IPC training package and facilitated field visits for the IPC staff. CHAI also assisted with the distribution of supplies and a donation of IPC materials such as handwashing buckets and bleach to health facilities in southeastern counties Sinoe, RiverGee, and Grand Kru.

In **Cambodia, Lesotho, and Sierra Leone**, CHAI worked with the government to create resource mapping dashboards, as well as dashboards that tracked procurement of medical equipment, supplies, and commodities. In Lesotho, this work helped detect gaps in resources and ensure adequate funding was available to address the

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need. As a result, the budget for COVID-19 response increased to US\$22.5 million from US\$3.6 million at the start of the pandemic. The dashboard also provided reports to the United Nations, the President's Emergency Plan for AIDS Relief (PEPFAR), the Global Fund, and others to help channel support where needed. In addition to this work, we facilitated donations of commodities and supplies, including oxygen-related equipment to the Ministry of Health such as pulse oximeters and oxygen analyzers from Rotary Club Australia.

In Cambodia, we assisted the WHO to develop a dashboard to track procurement of medical equipment, laboratory supplies, and PPE. We also created a database to record national and provincial needs as well as technical and financial support available across partner agencies in the country. We supported the WHO to assess the response from implementing partners across the provinces and escalate challenges and gaps to the national level when needed.

Similarly, CHAI worked with the government of Sierra Leone on the quantification, procurement, and distribution of IPC and PPE supplies, while closely monitoring the supply of other essential medicines. CHAI also facilitated radio discussions and two informational videos on COVID-19 in four districts—Moyamba, Pujehun, Kambia, and Freetown. In the same districts, we procured and distributed basic IPC materials worth over US\$5,000, including hand sanitizers, liquid soap, detergent, gloves, and facemasks.

In **Eswatini**, CHAI provided technical and operational support to the Ministry of Health to manage and mobilize resources and monitor cases. We helped develop a national COVID-19 case management manual as well as job aids for health workers.

CHAI supported the Schools Health Program to develop COVID-19 school data and surveillance guidelines and provided advice on safely reopening schools. We developed the first epidemiological models for COVID-19 in the country, significantly increasing government visibility on policy options

and response as well as modelling for short- and long-term scenarios for the country's expected COVID-19 caseload.

In response to growing community transmission of COVID-19 in **Mali** in April, the government requested CHAI's help to launch a new health cadre known as Sentinel-Community Health Workers (ASC-S) to conduct more targeted surveillance in the highest affected areas around the capital, Bamako. Within months, 564 ASC-S and 32 supervisors were recruited, trained, and deployed, conducting over 500,000 household visits between mid-September and December. They identified and referred nearly 1,000 suspected cases of COVID-19, as well as almost 14,700 suspected cases of malaria, 900 suspected cases of TB, and 13,600 cases of acute respiratory illness among children under five.

In **Uganda**, CHAI worked with national and district COVID-19 response teams to ensure effective decentralization of the national Covid-19 response plan. We developed and implemented templates for resource tracking and monitoring within each pillar of the response along with monitoring human resource deployment. These templates were first used in 14 districts where CHAI had existing programs and adopted for scale by the national taskforce. Using the templates, districts mobilized resources and secured an estimated US\$6million in funding from the government towards COVID response.

### Scaling up testing

High-quality testing is essential for identifying cases, preventing transmission, and eliminating disease. At the beginning of the pandemic, many low- and middle-income countries lacked access to high quality, rapid testing, leaving blind spots in understanding where the disease was present and how quickly it could be spreading. To contain the virus, it was critical to ensure testing quickly become widely available.

In March 2020, the WHO created a consortium to help secure COVID-19 tests for low- and middle-income countries. At the time polymerase chain reaction (PCR) tests were the only tests available, and high-income countries were buying up the world supply at high prices.

CHAI took the lead on behalf of the consortium to negotiate with PCR test manufacturers to secure allocations for low- and middle-income countries at more affordable prices than were available in high-income countries. In partnership with Unitaid, the Bill & Melinda Gates Foundation, WHO, the Global Fund to Fight Aids, Tuberculosis, and Malaria, UNICEF, the Pan-American Health Organization (PAHO), the Africa Centres for Disease Control and Prevention (CDC) and others, over 30 million tests were purchased and delivered to low- and middle-income countries between April and August through the CHAI negotiated deals.

When new, high-quality antigen tests became available in August of 2020, CHAI, in cooperation with the Bill & Melinda Gates Foundation and Unitaid, began negotiating with the manufacturers to ensure that there would be significant volumes of the tests available in low- and middle-income countries, despite high demand for the tests worldwide. In September, CHAI and partners including the WHO, Unitaid, Africa CDC, the Bill & Melinda Gates Foundation, FIND, and the Global Fund announced a partnership to make 120 million rapid antigen tests available to low- and middle-income countries at an affordable price.

These rapid tests have improved turnaround time for test results from days to minutes, enabling countries to target potential virus hotspots and limit transmission. The tests can also be used near points-of-care, which is beneficial in reaching rural areas or in countries without access to extensive laboratory systems. The tests are highly portable, reliable, and easy to administer, making them ideal for decentralized health settings. CHAI worked with partners to expedite the introduction of these tests with partner governments.



**120M**  
Affordable high-quality COVID-19 rapid antigen tests made available to low- and middle-income countries

In the **Democratic Republic of Congo (DRC)**, we helped the government establish national testing capacity. At the start of the pandemic, the public health system had limited testing for COVID-19, with only one national laboratory in Kinshasa capable of detecting cases. At the request of the government's COVID-19 task force, CHAI quickly worked to extend and decentralize diagnostics across the country. We supported the procurement and distribution of key commodities and trainings for lab technicians in priority provinces. With this support, the country's lab network expanded from one to 25 laboratories with an estimated testing capacity of 20,000 weekly reverse transcription polymerase chain reaction (RT-PCR) tests. We have further procured and distributed 100,000 rapid antigen tests within the country.

Zambia also faced a limited supply of diagnostic tests. CHAI worked with the government to include COVID-19 antigen-based testing in the national testing strategy and secured funding for the procurement of up to 1.5 million tests. We helped the Ministry of Health supply 15,000 automated PCR tests and 100,000 antigen-based tests to boost testing capacity and provided data management equipment at the largest COVID-19 testing laboratory to ease sample registration and results reporting. The successful introduction of antigen-based tests helped to decentralize COVID-19 testing to all 10 provinces.

In Ethiopia, CHAI supported the rapid expansion of PCR testing across the country. We helped

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train health workers, procure testing components, materials for sample collection, and lab equipment. We assisted the government to convert laboratories at university hospitals and research institutions to COVID-19 testing sites, increasing the number of sites from 21 to 75. CHAI also helped procure critical materials for the vaccine cold chain such as centrifuge freezers, microfuges, heating blocks and mixer/shaker vortexes as well as establish a standardized lab and clinical COVID-19 data management system.

In Uganda, despite the availability of a national testing and surveillance strategy, testing capacity remained low and was centrally coordinated, resulting in long turnaround times. To quickly scale up COVID-19 testing capacity, CHAI worked with the government to quantify and roll out automated molecular testing at the central laboratory and donated over 100,000 antigen rapid tests. CHAI also helped train health workers on surveillance, sample collection, and testing and used lessons learned from the experience to update the national COVID-19 testing strategy. As a result, testing capacity was decentralized from Kampala to 32 districts and result turnaround time was reduced from five days to 12 minutes.

In India, CHAI provided catalytic support to the Indian Council of Medical Research (ICMR) to equitably scale up testing across the country from less than 10,000 tests per day to a high of around 1.5 million daily in September 2020. CHAI helped the ICMR ramp up capacity and better use testing platforms by helping develop a supply chain and inventory management system for commodity forecasting, timely distribution, and stock management of over 75 million RT-PCR testing kits, 52 million RNA extraction kits, and over 26 million viral transport media kits across over 2,000 COVID-19 testing labs.

CHAI also helped engage the private sector to enable increased testing in several states. In Madhya Pradesh, CHAI worked closely with the state leadership to augment diagnostic capacity of RT-PCR. We helped streamline the supply chain for RT-PCR consumables including bi-weekly

estimations of demand from state testing facilities. We also helped labs improve their resource use through regular monitoring and ensuring they received the best prices on products via discussions with suppliers. As a result, the state government reduced the overall cost of RT-PCR consumables by 50 percent.

Testing capacity was also limited and highly centralized in Cameroon at the outset of the pandemic. This contributed to the spread of COVID-19, particularly in underserved regions of the country. With funding from Unitaid, CHAI worked with the government to rapidly expand testing capacity from two sites to 15 by June of 2020. This expansion resulted in a 1000-fold increase in weekly testing capacity, which rose from under 5,000 in March 2020 to over 50,000 in June 2020, enabling the government to rapidly roll out its test, track, and treat strategy which helped limit the spread of the virus.

In Kenya, there were only four labs in the country offering RT-PCR testing at the beginning of the pandemic, all of which were manual. Manual testing can be more complex and time-consuming than automatic testing. CHAI had previously worked with the HIV program to set up robust molecular testing labs across 10 central testing centers to perform over three million tests annually. Leveraging this work to help the government increase COVID testing capacity nationally, we worked with Abbott and Roche, equipment suppliers for the 10 facilities, to help determine the availability of COVID assays. We assisted the Ministry of Health with an initial catalytic donation of 15,000 tests to introduce COVID-19 RT-PCR testing in these central testing sites. We then worked with the suppliers to support and train lab staff to process the tests on the available platforms. The data captured at these facilities was shared with the Ministry's national COVID-19 reporting systems. We also worked with key stakeholders to procure an initial order of over 200,000 RT-PCT tests for automated central testing sites. To date, more than a million tests have been procured through

funding by the Ministry, Global Fund, and PEPFAR to support RT-PCR testing in the country.

Similarly, when **Rwanda** began testing for COVID-19 early in 2020, it was using manual RT-PCR testing and access to high-quality diagnostics was severely limited. CHAI worked with the government to build its capacity for molecular testing, joining the government's COVID-19 response team to identify opportunities for leveraging existing lab infrastructure and set up additional systems to address the immediate need.

CHAI supported the Ministry of Health to scale up and decentralize COVID-19 testing at points-of-care with rapid antigen testing. We helped the government establish policy guidelines, sustainable procurement models, and integrate COVID-19 testing into routine services. Together with the African Health Diagnostics Platform (AHDP) we established the first major baseline assessment of the full laboratory network system to identify areas for improvement. This information helped provide the government with critical information to manage its COVID response while planning for investments in laboratory systems more generally.

CHAI also facilitated procurement of 15,000 RT-PCR test kits, 15,000 sample collection kits for PCR testing, and 100,000 antigen rapid tests kits. To date, around 14 PCR labs and over 550 sites at health centers have been activated and are routinely testing for COVID-19. To build staff capacity, we helped develop training manuals on antigen testing. These trainings are now being cascaded across sites with around 500 health workers trained.

### Supporting access to oxygen

Oxygen is a critical treatment for COVID-19, and the pandemic has stressed global supplies and health systems that were already struggling to meet the needs of their populations.

Early in the pandemic, CHAI began helping prepare the global community to increase access to

*Demand for oxygen has grown exponentially in low- and middle-income countries and CHAI is working with governments to meet increased needs.*

medical oxygen. Treatment for COVID-19 requires two to five times the amount of oxygen needed for other critical patients.

CHAI supported the WHO Clinical Care Consortium, which was set up to rapidly secure supply of critical equipment and products for low- and middle-income countries. Under the leadership of the Consortium, PATH and CHAI were asked to develop a rapid landscape of markets for oxygen products outside of the United States and Europe, including oxygen concentrators, pulse oximeters (for diagnosis of low-blood oxygen), and delivery interfaces such as masks. CHAI also directly supported the Consortium with a technical advisor in medical oxygen that helped assess products. This work also helped inform publication of a Respiratory Care Equipment Market Report published by CHAI and PATH.

CHAI supported the WHO to publish several technical documents to guide countries' procurement and implementation of medical oxygen, including technical specifications for pressure swing adsorption (PSA) oxygen plants, oxygen sources, and distribution for COVID-19 treatment centers, and an inventory tool for biomedical equipment for COVID-19 case management. CHAI and PATH are now developing a joint PSA plant database, which will be used to engage suppliers who have a track record of success and experience to help improve procurement, operations, and maintenance for these oxygen plants in low- and middle-income

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countries. We are also working to expand the use of liquid oxygen where it is appropriate.

In Uganda, CHAI leveraged its expertise in strengthening oxygen access to respond to the COVID-19 emergency. Having already established relationships with key stakeholders in oxygen, the government requested CHAI to lead and provide guidance for the review of the oxygen quantification assumptions for COVID. This guidance provided a critical step in defining the supply gap and helping secure additional oxygen equipment from donors and partners. This resulted in increased availability of oxygen at treatment units to more than 90 percent from less than 50 percent. The government also secured \$2.7 million in funding from the Global Fund to bridge the unfunded oxygen need.

In India, we helped Madhya Pradesh strengthen the existing oxygen supply chain and augment storage capacity at public facilities. CHAI supported the development of an online government

portal to view oxygen supply status across districts and facilities using real-time data and developed data tools to avoid stock outs. To set up alternate sources of medical oxygen, 1,000 concentrators were distributed across the state with procurement of an additional 1,000. Eleven liquid medical oxygen-based refillers were created, five defunct industrial Air Separation Unit plants were revived, and eight PSA plants are being developed in district hospitals by the Indian government. To augment storage capacity, the Department of Medical Education procured 2,000 additional D-type storage cylinders and installed an additional 92 metric tons of storage capacity through liquid medical oxygen tanks in public health centers.

CHAI supported the national government in **Nigeria** to strengthen respiratory care systems that can flexibly respond to need. Focused in Rivers, Lagos, and Kano states, CHAI helped the government provide respiratory care and response

coordination, rapid assessments to identify supply gaps and the supplier landscape, and support decision making.

Lagos state remains the epicenter of the COVID-19 pandemic in Nigeria, with around 34 percent of all cases reported in the country at the end of 2020. In response, and for long-term sustainable supply planning, the state has developed an oxygen strategy, which includes an ambitious plan to expand oxygen generation platforms by running state-owned plants using PSA technology. With funding from the Bill & Melinda Gates Foundation, CHAI is supporting the state to install an oxygen plant in the Infectious Disease Hospital (IDH), a major COVID-19 treatment facility, to boost oxygen supply. The plant will be fully operational in 2021. In addition, the Nigerian government has allocated US\$16 million for the procurement and installation of 38 new PSA plants to meet oxygen needs in the country. This work has helped strengthen the oxygen desk at the Department of Hospital Services in the Federal Ministry of Health, which is leading review and update efforts for the National Oxygen Strategy and its implementation.

In Ethiopia, CHAI assisted the Ministry of Health with overall national respiratory care planning and management for the COVID-19 response. With funding from the Bill & Melinda Gates Foundation and PATH, CHAI supported the Ministry to conduct national COVID-19 oxygen systems demand planning and design strategies to meet increased oxygen demand. We also supported mapping all national PSA plants (public and private), to better understand their potential versus actual production. Based on the mapping, the Ministry allocated a dedicated budget to help PSA plants better function and contribute to the demands of COVID-19 treatment.

CHAI also helped complete an inventory of COVID-19 respiratory care items in July 2020. The assessment covered 82 COVID-19 health facilities across all tiers of the system. Following the survey, CHAI supported the Ministry with the redistribution and procurement of additional oxygen systems.

We helped procure oxygen therapy equipment for COVID-19 facilities, in particular Millennium Hall Makeshift Hospital, a 1,100-bed treatment center. We helped procure and set up oxygen piping systems at the hospital, which now serves as a learning center for piping infrastructure. Additionally, CHAI procured 300 pulse oximeters, 258 oxygen concentrators, two PSA plants with total capacity of 100m<sup>3</sup>/hr, as well as items like oxygen and venturi masks for use at COVID-19 facilities.

Along with the Ministry and Regional Health Bureaus, CHAI trained 360 clinicians on COVID-19 critical care. In addition, we helped develop standard operating procedures for oxygen piping in facilities and a first-of-its-kind training manual for PSA plant operation and management for public facilities.

In Zambia, we helped the government procure pulse oximeters, oxygen cylinders, and concentrators, and in Kenya, we supported oxygen needs mapping, costing, and financing allocation to increase oxygen access to COVID-19 isolation facilities. Using data collected since 2017, we supported Kenya's national plan for increasing oxygen access, including advocating extending oxygen support beyond COVID-19 isolation wards and cover all health units in need of oxygen.

With emergency support from the Bill & Melinda Gates Foundation, we provided technical assistance to the Department of Hospital Services (DHS) in Cambodia to improve oxygen availability for COVID-19 treatment and strengthen the health system generally. Between July and December 2020, CHAI worked with DHS and partners to conduct a baseline assessment of oxygen equipment already available in the country, examining 57 out of 122 national, provincial, and district referral hospitals across eight districts. Using this assessment and other data sources, we helped plan for various COVID-19 response scenarios and helped the DHS forecast needs for lifesaving oxygen equipment—which is now being procured.

In Rwanda, with funding from the Bill & Melinda Gates Foundation, CHAI and PATH helped the



A CHAI-supported oxygen plant at the General Hospital Gbagada and Infectious Disease Hospital (IDH).

Photo by Victor Ogunsola, Lagos, Nigeria

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government develop a national strategy to rapidly scale production of medical oxygen in public hospitals. This work leveraged available private and public hospital-based PSA plants, sustainable financing to encourage production, distribution, and equipment maintenance, and strengthened providers' capacity to manage hypoxemia, or low blood oxygen. We also worked with the government to align prior plans to strengthen oxygen systems to meet urgent demands created by the pandemic. We helped the Ministry of Health provide oxygen therapy training to health providers from facilities in COVID-19 hotspots; conduct a nationwide respiratory care capacity assessment and quantify oxygen production and equipment needs; and coordinate partners to determine which procurements were already being made and advocate for additional needed purchases.

### Preparing for vaccines

Equitable access to immunization is a longstanding issue for low- and middle-income countries. Early in the pandemic, CHAI began work with partners and governments to ensure quality COVID-19 vaccines would be available to these countries. In the months since, we have helped accelerate vaccine introduction processes from years to only months.

At the global level, CHAI was instrumental in supporting COVAX, the vaccines pillar of the Access to COVID-19 Tools (ACT) Accelerator, and its partners, notably Gavi, the Vaccine Alliance, the Coalition for Epidemic Preparedness Innovations (CEPI) and the WHO, to ensure COVID-19 vaccines for low- and middle-income countries.

CHAI support included assessing demand for COVID-19 vaccines in the early days of the pandemic and assisting COVAX and Gavi to consider readiness guidance and criteria for countries. To prepare for cold chain needs, CHAI helped the WHO develop specifications and verification protocols for ultra-low temperature cold chain equipment and power systems.

In Uganda, CHAI worked with the Uganda National Expanded Programme for Immunization (UNEPI), to determine populations most vulnerable to infection and which type of vaccine should be prioritized for introduction based on WHO approval or Emergency Use Listing (EUL). As an extension of this work, CHAI joined the National Coordination Committee (NCC) for COVID-19 vaccine introduction as the Secretariat. The committee provided guidance on the vaccine introduction plan, drawing insights from emerging COVID-19 studies globally. We also helped UNEPI secure funding from Gavi to support national vaccine preparedness and analyze data to inform a national cold chain application to Gavi for COVID-19 vaccine introduction.

As a result of this work, the government secured US\$743,000 to prepare for the introduction of COVID-19 vaccines and inform the development of a deployment plan. The government also secured US\$1 million to bring current cold chain equipment up to standards needed for vaccine introduction as well as for official acceptance into the COVAX AMC facility, which guarantees doses for 20 percent of the target population.

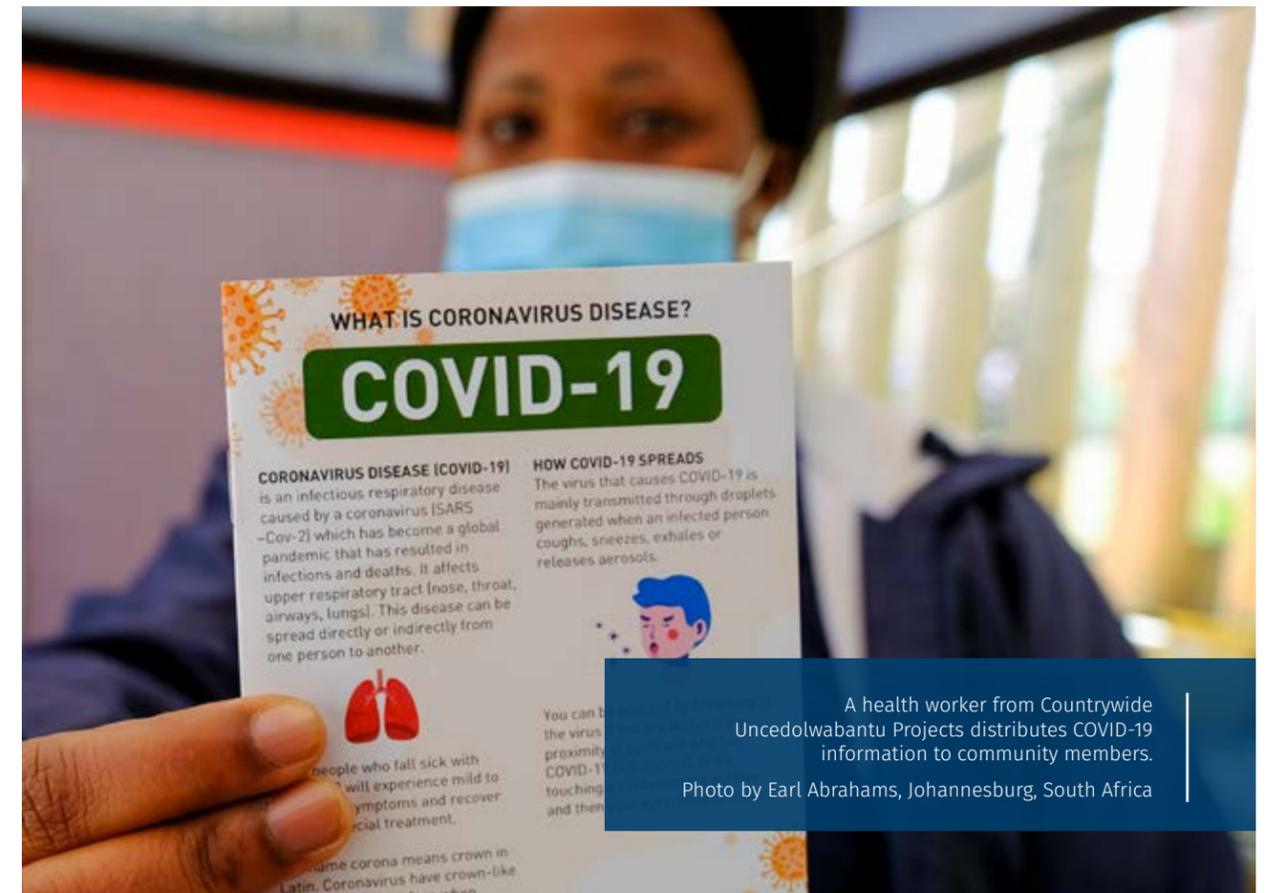
Similarly, in Kenya and Ethiopia, CHAI worked with ministries of health and partners to prepare for vaccine introduction when the COVAX funding mechanism was announced. In Kenya, we helped develop a deployment plan and supported the country's COVAX application. Leveraging existing cold chain work, CHAI supported the government to develop the cold chain requirements required to join COVAX. In Ethiopia, we helped prepare the application to Gavi for support with securing cold chain equipment, resulting in US\$2.09 million in funding toward this goal.

In India, CHAI supported vaccine rollout in Uttar Pradesh, Madhya Pradesh, and Bihar states, which account for around 31 percent of India's total population. CHAI helped develop an awareness campaign about the vaccine, capacity building to ensure it was efficiently rolled out, supply and distribution planning, needs analysis, private sector support, and field-based quality monitoring. CHAI team members were seconded

to immunization departments and worked closely with state health leadership to identify and accelerate coverage in low performing geographies. We also provided inter- and intra-country market intelligence and best practices to enhance stock availability and better coordinate private and public sectors and undertook a study to understand root causes of vaccine hesitancy to inform state strategy for mobilization and target government messaging.

### Looking ahead

In 2021, CHAI will continue to support partner governments to respond to the virus, increasing sustainable access to lifesaving treatments including oxygen as well as equitable access to vaccines. We will work with manufacturers to affordably increase access to medical oxygen low- and -middle income countries, both during the pandemic and beyond. And we will continue to improve access to testing, helping countries ensure it is integrated into routine health services.



A health worker from Countrywide Uncedolwabantu Projects distributes COVID-19 information to community members.

Photo by Earl Abrahams, Johannesburg, South Africa

## STAFF REFLECTION



### ROSEMARY KIHOTO

Deputy Country Director, Kenya

I joined CHAI in 2008 as the Pediatric HIV Program Manager in Kenya. This role aligned with my desire to work in an organization where I could directly impact lives.

Before entering college, I spent a lot of time visiting hospitals with my clinician sister. She was dedicated in serving others. I saw first-hand how satisfying her job was and I wanted to impact lives the same way. I just didn't know how at the time.

I trained in finance and accounting, worked in corporate Kenya, and after three years went back to school to study International Development. I started looking for roles in development upon completion of the program, and a friend recommended I apply to CHAI. The rest, as they say, is history. The learning curve was steep, with complex and numerous permutations of antiretroviral (ARV) regimens to master, but there was a real connection with the beneficiaries of our work which accelerated my desire to do more. Working with urgency was ingrained from the onset and I embraced it fully.

I joined CHAI at a time when the cost of pediatric antiretroviral medication had fallen to affordable levels and there was a push to get as many patients on treatment as possible, particularly children who still had limited access. We set a very ambitious target of getting an additional 100,000 on treatment across all countries where CHAI worked. We travelled the country searching for HIV positive children who were most at risk of dying before their second birthday or not likely to live into adulthood. We found some in plain sight in hospital

waiting bays, brought in for one opportunistic infection or the other. We visited numerous villages engaging communities on the importance of HIV services. We knocked on doors and spoke to parents who, once they accepted, took the long trips back to hospitals for that one assessment that would offer a chance for survival for these children. This gave me more reason to work harder at seeking practical solutions for the barriers we encountered.

Through the HIV program, I was involved in the formulation of policies and adoption of innovative interventions that have changed the way HIV is managed in Kenya. We also worked urgently to introduce better, more affordable, and easier to take fixed-dose formulations of pediatric ARVs. Mothers went from carrying baskets full of syrups to 30 or 60 tablets in a small tin that fits in a handbag, freeing them from stigmatization. Today, when I see these children who are now young adults and ambassadors influencing their generation, I feel honored to have been part of a team at CHAI and with the Ministry of Health that worked tirelessly for a future where children could thrive and survive.

CHAI is a place where you conquer one mountain and don't take a moment to celebrate; there are always more lives to be saved. In 2010, I transitioned from pediatric HIV to the essential medicines program. Again, children were dying from treatable and preventable diseases such as diarrhea. Very quickly, I learned a skin pinch on a child could determine levels of dehydration and make the difference between survival or death.

Our goal was to increase usage of simple and lifesaving treatments—oral rehydration salts (ORS) and zinc—by empowering health workers with the right knowledge and tools to appropriately assess children. I was introduced to the concept of local market shaping and thrown into the world of negotiations with the private sector. We worked with two local manufacturers to introduce the first ever co-packaged zinc/ORS product that would ensure these two treatments were dispensed to patients together. Today there are more than five co-packaged zinc/ORS products registered in Kenya at 30 percent of the standard cost of the products. Over two million co-packs are issued to health facilities across the country annually, enabling millions of children to receive this lifesaving treatment. Seven years later, I still feel satisfaction when I walk into a facility and spot the ORS/zinc co-pack on the shelves. That co-pack is evidence there is a child who will use it—a child who would not have survived that one bout of diarrhea.

The Kenya Demographic and Health Survey in 2014 showed a significant reduction in overall child mortality and diarrhea-related deaths in part due to the uptake of ORS and zinc. However, the fight wasn't over as the data also revealed more children under five were dying of pneumonia than diarrhea, malaria, or HIV. Effective treatments such as antibiotics and oxygen were recommended, but out of reach in many health facilities. CHAI embarked on another journey to provide solutions for the children in Kenya. We quickly learned how oxygen is manufactured across different sources, how it is delivered to patients, and identified key barriers to access. We visited over 2,500 facilities and local factories to better understand the issue. When we started our oxygen work in 2017, less than 20 percent of facilities had oxygen available. Where it was available, it was not optimally distributed. Priority was given to critical care, leaving newborns suffering asphyxia or a child with severe pneumonia unlikely to receive oxygen.

We have encountered many barriers, but they are not impossible to resolve. Our oxygen work has focused on driving a policy change that will see

oxygen managed as drug. We have lobbied for allocation of resources to centrally procure oxygen to increase coverage beyond hospitals, negotiated with suppliers to reduce oxygen costs for health facilities by over 80 percent, and aided them to adopt more cost-effective supply and distribution methods. We have also supported better use of new diagnostics to detect low oxygen levels and the installation of appropriate piping infrastructure at health facilities. These efforts prepared us for the daunting task that COVID-19 presented, as oxygen is the best available treatment for the virus. As COVID-19 cases quickly increased in the country, we needed to move with urgency to help the government consolidate its national plans and actualize them in the shortest time possible. We continue to work round the clock to turn around situation reports, mobilize resources, and offer support to health facilities to make oxygen available. These plans have started to materialize into availability of oxygen across specific treatment centers. The oxygen picture in 2021 will be different; there will be more oxygen for patients who need it.



Liquid oxygen training is provided for staff at Thika Level 5 hospital.

Photo by Carlos Kreative, Kiambu County, Kenya

# MARKET SHAPING & GLOBAL HEALTH SCIENCES

**Our programs aim to save lives and reduce disease, while helping governments create sustainable health systems. Our global teams of science, business, and technical experts support the entire organization in that goal.**

**These groups work with CHAI program and country teams as well as governments and companies around the world to fundamentally change the economics of global health. Throughout this year's Annual Report, we will be highlighting the collaboration between our cross-cutting groups and our program and country teams. In 2020, our Market Shaping, Lab Services, and Global Health Sciences teams were particularly focused on supporting CHAI's response to COVID-19.**

## Market Shaping

CHAI works on both the supply and demand sides of the market to lower costs and increase availability of the best health products for low- and middle-income countries.

Working with the public and private sector, we help realize savings for drugs, devices, and diagnostics across all of our programs. We help governments maximize the impact of their limited funding by negotiating agreements to make health products more affordable. Over the last 20 years, together with our partners, CHAI has negotiated over 125 agreements that have expanded patients' access to treatment and critical public health commodities, such as best-in-class HIV regimens and contraceptive implants.

At the same time, our staff are on the ground to help countries set up treatment protocols—which medications should be used, which diagnostic

tests should be done—as well as lab systems to do the testing, supply systems to deliver medicine and care, and training for health workers. We then work with ministries of health to measure the impact of these programs and respond as needed. CHAI's Global Markets and Lab Services teams help drive our market-shaping work across programs and countries.

## Global Health Sciences

The Global Health Sciences team aims to lower costs, improve quality, and accelerate and increase access to treatment for millions of people in resource-limited settings. The team develops less expensive and more effective versions of critical medications for adults and children; helps advance our understanding and management of diseases; and improves patient care.

There are five groups within Global Health Sciences: Analytics and Implementation Research; Clinical Sciences; Product Development and Regulatory Affairs; Process Chemistry; and Quality, Sourcing, and Costing. Scientists on these teams work closely with CHAI country and program staff as well as commercial entities, regulatory authorities, normative organizations, and academic partners.

## Increasing COVID-19 testing

The Global Markets team develops and negotiates access policies with major pharmaceutical, vaccine, and diagnostics companies. Meanwhile, the Lab Services team helps improve laboratories and testing infrastructure, with a focus on infectious disease. In 2020, this work expanded to meet the

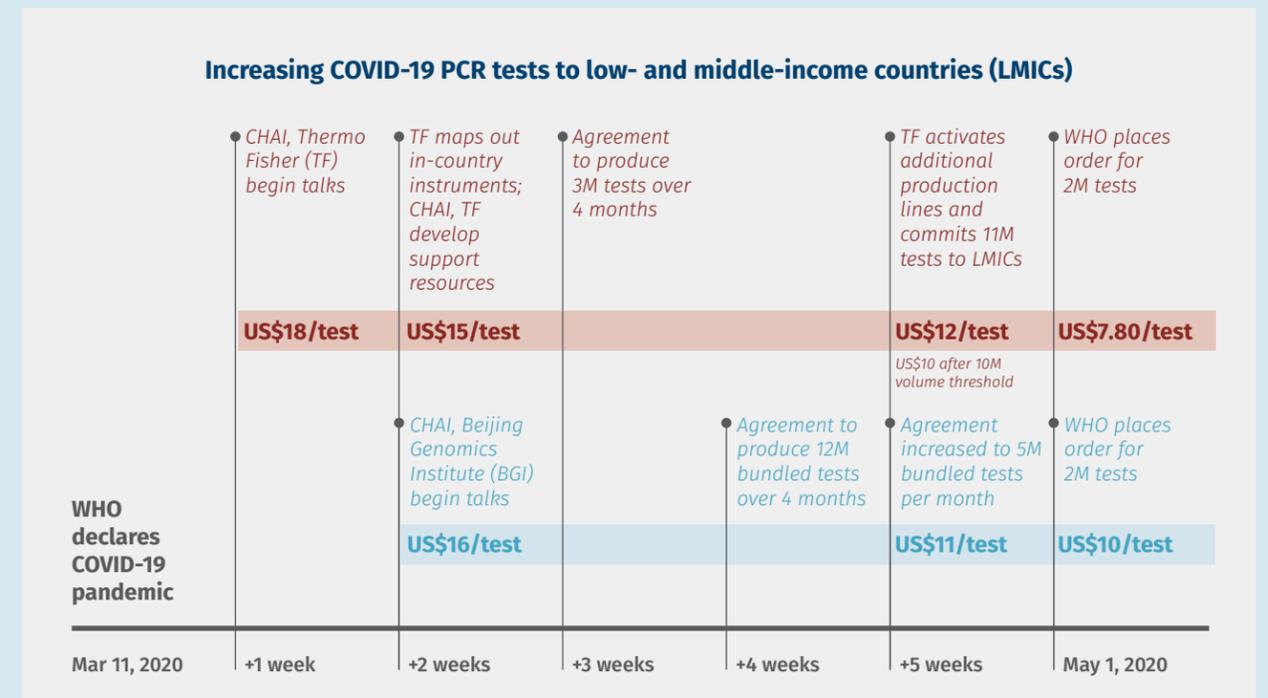
demand for COVID-19 testing—which at the onset of the pandemic was immediate and enormous.

In the early months of the pandemic, we worked with the World Health Organization (WHO) to quickly establish the WHO Diagnostics Consortium, a group of partners whose collective buying power secured test supplies for countries with less buying power. CHAI also helped countries tap into laboratories' existing testing capacity, by using polymerase chain reaction (PCR) testing, a common and previously established test for HIV and TB diagnosis in many low- and middle-income countries. PCR testing detects RNA that is specific to the COVID-19 virus and can detect the virus within days of infection, even if the patient has no symptoms. Results can arrive in as little as 24 hours, though more typically take several days, especially when demand is high.

At the same time, CHAI worked quickly to close the gap on available tests, working with companies that develop high-quality manual COVID-19 tests and sample collection kits, and could meet the

huge surge in demand. These included Thermo Fisher Scientific, Beijing Genomics Institute, and sample collection suppliers NEST, Miraclean, HCY.

Thermo Fisher Scientific is the largest provider of PCR instruments and reagents in the world. CHAI began conversations with the company in early March, asking for help supplying millions of COVID-19 PCR tests to low- and middle-income countries. Within the first week, Thermo Fisher secured a production line to begin manufacturing the tests and lowered the price from US\$18 to US\$15. They also identified over 500 instruments already being used in WHO-supported countries, which could run the new PCR tests, and provided deep discounts on new instruments. In the following month, CHAI, together with the Bill & Melinda Gates Foundation, negotiated a further 57 percent reduction to US\$7.80 per test kit. Thermo Fisher originally committed to producing a total of 11 million tests to low- and middle-income country buyers and can now provide an unlimited supply of product to 81 countries.



## CROSS-CUTTING EXPERTS

Similarly, Beijing Genomics Institute (BGI), moved quickly once contacted by CHAI and within a few weeks committed to five million bundled COVID-19 tests per month at a cost of US\$12.70, including sample collection kits and lab consumables for an extra US\$0.70 per test. That deal was further negotiated down by 45 percent, and today, an essentially unlimited supply of the bundled test kits is available for US\$10 to 89 countries.

### *Closing gaps in care amid COVID-19*

COVID-19 has called on health systems to provide timely, high-quality care—from diagnosing the disease to treating severe cases with oxygen therapy—often within environments that faced persistent gaps in access to care well before the pandemic.

In 2020, Global Health Sciences quickly adjusted its core role of providing technical guidance to respond to the rapidly evolving pandemic, while at the same time continuing to support wide-ranging, multi-country needs for other diseases like HIV and tuberculosis.

For example, access to oxygen, critical for treating COVID-19, is hindered by lack of physical infrastructure and training for health workers on the frontlines in many low- and middle-income countries. The Clinical Sciences team helped develop and review COVID-19 case management guidelines for CHAI partner countries based on our approach to patient care in other areas, such as HIV. In **Uganda**, we supported the development of a training curriculum on the basics of oxygen therapy, which provided a critical foundation for 358 frontline health workers in 15 COVID-19 treatment units.

The pandemic has led to a global shortage of quality-assured personal protective equipment (PPE). Increased demand means new manufacturers with little or no experience producing PPE, as well as suppliers and distributors offering counterfeit products, have entered the market in high numbers. While the World Health Organization (WHO) has developed a supply portal for countries to request quality PPE for COVID-19 response, there is no such portal for non-COVID-19 needs.

In 2020, the Quality, Sourcing, and Costing and Product Development and Regulatory Affairs groups, together with several CHAI program and country teams, helped source locally and globally made quality-assured PPE for our partner countries. Within a few days, the group identified over 300 reliable suppliers for all types of PPE.



A surgical mask delivery arrives in Uzumba-Maramba-Pfungwe (UMP) District, to be distributed to community health workers. Photo by Keith Baptist, Mashonaland East Province, Zimbabwe

# HIV/AIDS

In 2014, the global health community rallied behind the UNAIDS 90-90-90 Fast Track targets to ensure by 2020 90 percent of people living with HIV would be diagnosed, 90 percent of those diagnosed would receive treatment, and 90 percent of those on treatment would reach viral suppression. While significant progress was made across the globe to reach these ambitious targets (with some countries reaching them ahead of schedule), the HIV community fell short of meeting them globally. In 2020, these targets were updated to reach 95 percent of people in each category by 2025.

In 2020, over 27 million, or 73 percent, of all people living with HIV were receiving antiretroviral therapy (ART) worldwide. Yet, progress in reducing AIDS-related deaths globally has slowed over the last decade. Key populations, including sex workers and men who have sex with men, and their sexual partners, drove 65 percent of all new infections worldwide in 2020. The global community has fallen short of its prevention goals, slowing progress in controlling the HIV epidemic.

CHAI, in lockstep with our partner governments, is championing new and creative approaches to treat and prevent HIV to end the epidemic globally.

## Supporting HIV programs throughout the pandemic

When COVID-19 hit in early 2020, CHAI's HIV programs rapidly organized to support global and local responses while continuing our work to ensure prior gains in the HIV response were not lost. CHAI supported ministries of health by serving on taskforces, developing and disseminating guidance to ensure that care continued, and implementing novel strategies to keep people living with HIV safe. We helped governments monitor the pandemic's impact across HIV testing

and treatment programs and prevention efforts such as oral PrEP (pre-exposure prophylaxis) and voluntary medical male circumcision (VMMC). This work ranged from data analysis to facility assessments, identifying what was needed for program continuity and monitoring the implementation of COVID-related policies such as increased HIV self-testing, facilitating patient follow-up, and multi-month medication dispensing. We also supported the use of virtual platforms to build health worker capacity and enable facility-level monitoring to communicate and mitigate potential supply chain disruptions that could impact stock levels for lifesaving treatments or other products.

In other instances, we used innovative approaches to continue to reach patients. In **Myanmar**, CHAI worked closely with the National AIDS Program and Drug Dependency Treatment & Research Unit to improve access to HIV and harm reduction services among people who inject drugs.

During the pandemic, it was difficult for facilities to serve the hundreds of methadone clients each day due to efforts to avoid overcrowding. With funding from the Elton John AIDS Foundation (EJAF), CHAI strengthened the linkage between ART and Methadone Maintenance Therapy as a "one stop shop" to improve access to HIV services among people who inject drugs in Kachin and Sagaing.

CHAI developed an electronic Drug Treatment Information System (DTIS), to improve methadone program operations. In 2020 we scaled up the DTIS and provided virtual technical support for 12 major methadone clinics. The DTIS improved both clinical and operational outcomes, including quality of care, and reduced paperwork, patient wait times, and clinic overcrowding.

## Improving and accelerating treatment options for children

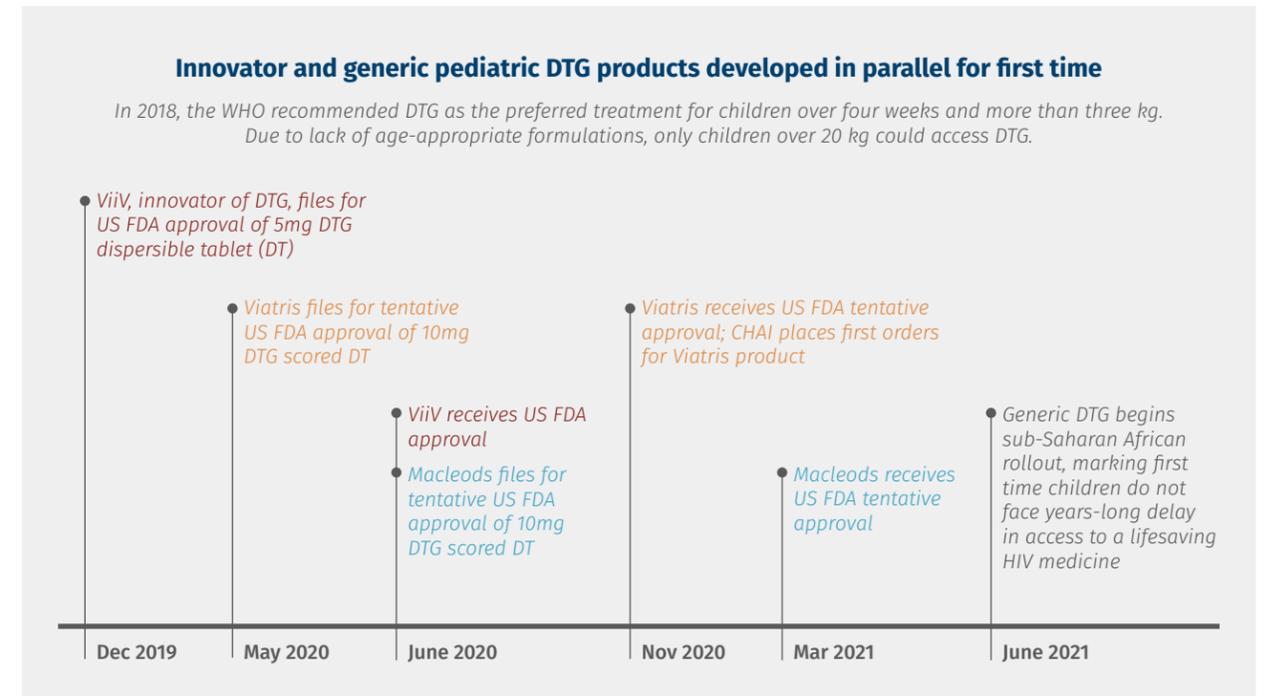
While there have been tremendous gains made in increasing access to HIV treatment, progress has been unequal among ages, sub-populations, and geographies.

Large treatment coverage gaps persist for children living with HIV. Of the approximately 1.7 million children living with HIV globally, just over half are on treatment and approximately 100,000 die each year. CHAI is working with our government partners to remedy these gaps and ensure all people, including the youngest and most vulnerable, have access to lifesaving treatment.

In 2018, the World Health Organization (WHO) recommended dolutegravir (DTG) as the preferred treatment for children over the age of four weeks and three kilograms (kg). However, due to a lack of age-appropriate formulations for younger children, only children over 20 kg were able to access the medication at the time the guidelines were updated.

Recognizing this as a major equity issue, CHAI, Unitaid, and ViiV Healthcare (the originator of DTG) joined together in a groundbreaking partnership to accelerate development of a pediatric formulation of DTG, specifically for young children, and accelerate access to affordable, generic versions of the medication. This partnership provided financial incentives through Unitaid's grant to CHAI, along with technical guidance from ViiV, to generic manufacturers Viatrix (formerly Mylan) and Macleods to develop the child-friendly, strawberry flavored medication.

The collaborative partnership and incentive program enabled the generic pediatric DTG product to be developed in parallel to ViiV's innovator product. The strategy for product development and registration involved an innovative regulatory filing strategy that set new standards for the development of pediatric HIV products. As a result, children in low- and middle-income countries will no longer face years-long delays to receive affordable, generic versions of the same brand-name medicines that save lives in high-income countries.





**US\$36**

*Yearly cost of treating a child with new generic dispersible pediatric DTG, a 75% reduction from standard of care*

In November 2020, CHAI and Unitaid announced a landmark pricing agreement with Viartis and Macleods to launch the new dispersible pediatric DTG formulation at a cost of US\$36 per child per year, a 75 percent reduction from the existing standard of care. The agreement also significantly lowered the cost of pediatric HIV treatment from US\$480 per child, per year to less than US\$120, for a savings of around US\$60-260 million over five years.

To further drive uptake, we engaged partners to plan and implement a catalytic procurement of pediatric DTG in **Benin, Kenya, Malawi, Nigeria, Uganda, and Zimbabwe**. This effort jumpstarted global interest in the product and expedited access for children living with HIV in need of better treatment options. CHAI also coordinated with the U.S. government's President's Emergency Plan for AIDS Relief (PEPFAR) and the Global Fund to Fight Aids, Tuberculosis, and Malaria to ensure a seamless transition to sustainable procurement and scale up after the initial catalytic procurement.

Beyond expanding access to pediatric DTG, CHAI is broadly working to ensure optimal HIV treatments are available to children in age- and weight-appropriate formulations that support adherence.

In **Tanzania, Zambia, Nigeria, and Uganda**, we are working through the FASTER project, a partnership between government, civil society, faith-based organizations, and other partners to catalyze progress toward achieving the UNAIDS 95-95-95 targets for children and adolescents. FASTER,

funded by PEPFAR through the U.S. Centers for Disease Control (CDC), is championing country-specific opportunities across the pediatric and adolescent testing and treatment cascade to reduce structural barriers, expand innovation, and scale up proven strategies.

To improve quality of care, CHAI worked closely with ministries under the FASTER project to routinize monitoring of weight-based ART data and implement virtual and in-person health worker trainings and mentorships, contributing to improvements in optimal ARV uptake and viral suppression. FASTER is also supporting the development of comprehensive pediatric quality of care dashboards in Nigeria, Tanzania, and Zambia to monitor key pediatric and adolescent HIV indicators and inform rapid action by district and facility managers to address service gaps. Further, we established pediatric and adolescent HIV Community Advisory Boards to engage and elevate community voices in generating demand for optimal drugs and diagnostics.

### ***Sustaining progress in adult treatment optimization***

Through grants from Unitaid, the Bill & Melinda Gates Foundation, and the UK Foreign, Commonwealth & Development Office (FCDO), CHAI is working with partner governments to increase and sustain access to the newest and best medications for adults living with HIV.

Since the first generic DTG-based triple combination therapies were tentatively approved by the U.S. FDA in late 2017, the global community has been focused on improving access to TLD in low- and middle-income countries due to its superior effectiveness and lower cost than other medications. In the four years since the first generic approval, over 10 million patients in nearly 90 countries have accessed TLD. CHAI has been involved in every step of this process to improve the quality of medicine available to patients. We supported the development of generic DTG, sought inclusion in global normative guidance, and

brokered a landmark pricing agreement, ensuring the product would launch at an affordable and sustainable price.

CHAI has supported governments in over 20 countries, from **South Africa to Cambodia** to the **Democratic Republic of the Congo (DRC)** to **Ethiopia**, to roll out TLD to patients, with multiple countries almost completely transitioning to the medication as a first-line treatment. This work continued during the pandemic, with country programs issuing guidance on continuing HIV care, monitoring stock levels, and dispensing multiple months of treatment at a time to reduce patient contact in clinics.

Second-line treatment optimization has also been a focus for CHAI and our partner governments as many countries are wrapping up their first-line transitions to TLD. Following WHO guidance, we are supporting governments in **Eswatini, India, South Africa, Zambia, and others** to evaluate and transition to DTG-based second-line regimens, which offer both clinical and cost benefits over the standard of care.

### ***Improving pediatric case finding and linking children living with HIV to treatment***

Identifying and diagnosing infants and children living with HIV is critical to linking them to lifesaving treatment. For over a decade, CHAI has supported governments to improve the rates of child diagnosis in a sustainable way.

Through support from FASTER and Unitaid, in 2020 CHAI supported efforts to enable quick and accurate testing and results delivery through strategic placement of point-of-care (POC) devices. Compared with centralized lab testing, POC early infant diagnosis (EID) dramatically decreases turnaround times from sample collection to when results are returned to the patient, as well as reduces the time to initiation on ART for HIV-positive infants.

In 2020, CHAI supported the Ugandan government to place and begin using 100 new m-PIMA devices for POC testing for infants and rolled out a comprehensive training and mentorship program for health workers. In Tanzania and Uganda, we helped leverage spare capacity on existing GeneXpert testing devices, initially purchased as part of tuberculosis (TB) testing programs, to improve access to POC EID testing. In Nigeria, we helped train 100 traditional birth attendants to strengthen demand for POC EID and maternal viral load testing and built and launched an electronic mother-infant-pair tracking system to improve testing and retention rates.

To implement the accelerated plan to reach the 90-90-90 targets, **Senegal's** government sought to address slow turnaround times for viral load monitoring and EID. CHAI supported the government to implement POC testing for HIV in districts and turn around results quickly. In collaboration with the civil society organization BOKK YAKAAR, we worked on a mitigation plan that helped maintain the demand for POC sites during the pandemic. A POC focal person has been nominated by the Ministry of Health to engage the government on a sustainable scale up plan for the devices. Sixteen out of the 47 GeneXpert platforms were optimized for HIV testing and four m-PIMA devices were installed which helped reduce turnaround time for results from 107 days at conventional sites to one day.

With funding from the ELMA Foundation, we are also supporting governments in Ethiopia, Malawi, Nigeria, South Africa, Uganda, and Zambia to institutionalize proven pediatric testing strategies, establish systems to strengthen linkage to care, and scale effective approaches to improve pediatric treatment and viral suppression.

In Ethiopia and Nigeria, CHAI supported national adoption and launch of the UNICEF Service Delivery Framework to guide targeted implementation of high-impact strategies across the cascade of care. In Zambia, we helped institutionalize national and facility level monitoring of pediatric services against national guidelines and standards. After

identifying gaps in viral load monitoring, CHAI helped establish Viral Load Committees in Ndola district, Zambia in 2019 to conduct reviews of data, manage samples, and provide clinical mentorship. As a result, viral load suppression has continued to increase in the district from 48 percent at the beginning of 2019 to 86 percent near the end of 2020, despite the additional challenges caused by COVID-19.

In Malawi, CHAI's support to the Ministry of Health and Population focused on sustaining gains made around pediatric identification and linkage to treatment and intensifying efforts to improve viral suppression for children. We presented evidence generated from a pediatric screening pilot to help institutionalize tools that improved targeted testing for children to enable better linkage to care. The pediatric screening tools are currently being adopted for use by the Ministry.

After identifying gaps in viral load monitoring, CHAI also supported the Malawi government to develop and roll out comprehensive viral load standard operating procedures. Same day POC viral load testing is also accessible for patients where rapid viral load results will significantly impact their clinical outcomes.

### **Making HIV testing affordable and accessible**

HIV testing services are vital for treatment and prevention, and critical to reaching the UNAIDS 95-95-95 goals. While great strides have been made to increase testing, there is much work to do to reach priority populations. For instance, only 89 percent of people who are HIV-positive in East and Southern Africa are aware of their status. Resources for testing are declining, and there is pressure across countries to dramatically reduce testing volumes and pursue highly targeted, high-yield strategies. The COVID-19 pandemic has compounded these challenges, severely disrupting key service delivery channels.

CHAI is supporting governments to address these challenges and close resource gaps for HIV testing services. In 2020, we worked with the governments of Kenya, Malawi, Uganda, Zambia, and Zimbabwe to ensure testing needs were well-defined and prioritized within their Global Fund applications. CHAI supported ministries of health to set evidence-based targets for national testing tied to those for treatment scale up. In Malawi, for example, rapid diagnostic tests were initially cut by more than 50 percent during the application process, but the Ministry successfully leveraged these evidence-based targets to include nearly the entire original amount in the final funding request.

In an increasingly resource-constrained environment, governments are looking for opportunities to increase efficiencies within HIV testing services—reducing volumes while increasing positivity rates to identify similar numbers of people living with HIV with fewer tests. Many countries are implementing risk-based screening tools to identify high-risk populations based on a combination of health and behavior-based criteria. However, these tools have been adopted with very little evidence on their impact, costs, and potential risks.

CHAI has generated critical evidence around the impact of screening tools on HIV testing program outcomes. An evaluation conducted with the Ugandan Ministry of Health showed that while such a tool may marginally increase the positivity rate, it would also screen out nearly 10 percent of people living with HIV who would otherwise be tested. Further modeling found that potential cost savings from lower testing volumes through screening would be largely offset by the increased human resource needs and the additional testing required to identify those missed. CHAI disseminated these results widely to stakeholders in Uganda and globally, informing national and global policy discussions.

Widespread distribution of HIV self-testing (HIVST), where individuals perform and interpret their own HIV test, presents an opportunity to expand testing coverage while also making current services more

efficient. Offering HIVST in facilities, along with a basic eligibility screening for testing, can be a highly effective way to expand access to testing services, reduce health worker time spent on testing, and reach those most in need of testing, especially among hard-to-reach populations such as men and youth.

Working with ministries of health and other partners, CHAI has built a compelling case for the expanded role of HIVST in national programs. CHAI and Malawi-based Partners in Hope completed a study investigating the impact of facility-based HIVST on HIV testing coverage and health worker time in the country. Results from the study showed that offering HIVST to clients at outpatient departments increased testing uptake by more than 250 percent, while significantly reducing health care worker time required, freeing up time to spend on other high-value activities. Building on this study and the evaluation in Uganda, CHAI modeled the comparative impact and cost-effectiveness of risk-based screening and self-testing, demonstrating how HIVST could be used as a more effective alternative to screening tools.

### **HIV prevention to reach the last mile in ending the epidemic**

Prevention is critical to ending the HIV epidemic. Despite tremendous progress within the global HIV response, the 2020 UNAIDS Fast Track target to reduce new HIV infections to below 500,000 per year was not met. Instead, new infections were triple that number in 2020 at 1.5 million. Achieving the 2025 target of 370,000 new infections per year will require effective, sustainable implementation and rapid scale-up of combination HIV prevention, including biomedical, behavioral, and structural interventions.

Current prevention interventions such VMMC and oral PrEP are highly effective, but more is needed to fully realize their potential as well as that of new products under development.

In 2020, through support from the Bill & Melinda Gates Foundation, CHAI began work in Zambia and Zimbabwe to strengthen local ownership and integration of HIV prevention, including continued support to ensure VMMC programs are sustained. We worked with both governments to develop clear and actionable plans to establish and enhance integrated, effective prevention programs. This work is systematically supporting both Zambia and Zimbabwe to maintain the gains of VMMC and other prevention programs, while generating broader lessons for the global community on effective transition, integration, and sustainability of public health programs. Lessons learned from this work will help support other countries to transition similar programs in the coming years.

### **Reducing mortality among people living with HIV**

Despite large increases in the number of people living with HIV accessing lifesaving ART, there were nearly 700,000 AIDS-related deaths in 2020. One in three people living with HIV who have begun treatment in low- and middle-income countries and all children living with HIV under five, are considered to have advanced HIV disease (AHD). People with AHD are at a higher risk of mortality and approximately 10 percent die within the first three months of starting ART, often due to complications from opportunistic infections such as TB or cryptococcal meningitis. Despite the vast numbers of AIDS-related deaths and people living with AHD, the diagnostic tools, treatments, and preventative services required to address AHD are virtually non-existent in most low- and middle-income countries.

To address this, Unitaid and CHAI are partnering to improve access to and affordability of new medicines and testing commodities in low- and middle-income countries by catalytically procuring tools to screen and treat AHD and build the skills of health workers and clinicians.

As a first major step toward improving affordability of optimal products, CHAI negotiated a 33 percent

## INFECTIOUS DISEASES

reduction in the price of flucytosine (5FC), a critical partner drug in the treatment of cryptococcal meningitis. In 2020, CHAI and Unitaid announced the Early Market Access Vehicle, an agreement with Omega Diagnostics to increase access to a new, instrument-free CD4 test for people living with HIV in over 130 low- and middle-income countries. The innovative agreement provides access to same-day testing at US\$3.98 per test—the lowest cost for such a test in the world. These tests will help providers make timely decisions on patient care and ensure patients with AHD are provided with the WHO-recommended package of care while minimizing loss to follow up.

The Unitaid-CHAI AHD Initiative also supported governments to develop comprehensive AHD programs and plans for implementation, including the development of a Global AHD Toolkit that has been used across multiple countries. In **Lesotho**, CHAI supported the launch of the AHD program by setting up a technical working group and developing an AHD manual and implementation plan. In 2020, CHAI catalytically procured commodities in the AHD package of care and supported the virtual training of over 270 health workers.

In South Africa, cryptococcal meningitis is a leading cause of HIV-related mortality. Following the successful catalytic procurement of 5FC through donor funding, there has been a remarkable expansion of the program, with 5FC now available in over 60 facilities, and the number is expected to grow in 2021. This is a key achievement for the National AHD Task Team, of which CHAI is a member, to enable widespread access to this lifesaving commodity.

The AHD Initiative has also worked to better coordinate the response globally. CHAI established the AHD Implementation Steering Committee, a forum to bring together the global AHD community to share lessons and discuss the latest developments. We also partnered with the CDC Foundation on a webinar series designed to provide continuing medical education on AHD

topics and build a virtual community of practice among AHD partners worldwide during COVID-19.

To help support children living with AHD, CHAI, WHO, Unitaid, and other partners co-authored an updated WHO brief on the pediatric package of care for AHD, known as STOP (Screen, Treat, Optimize, & Prevent) AIDS, to catalyze coordination and implementation of improved AHD care for children across sub-Saharan Africa. Finally, CHAI established the AHD Community Advisory Board that collaborates with community partner groups to help orient patient communities to the AHD care package. Community advocates are critical stakeholders and should continue to influence global and national AHD decision making.

### Looking ahead

In the coming year, we will continue to introduce and scale up the use of pediatric DTG, for the first time making this WHO-preferred first-line regimen available to the youngest and most vulnerable children living with HIV. We will ensure children are on appropriate formulations by institutionalizing weight-based monitoring, closely examining the impact of multi-month dispensing and care quality.

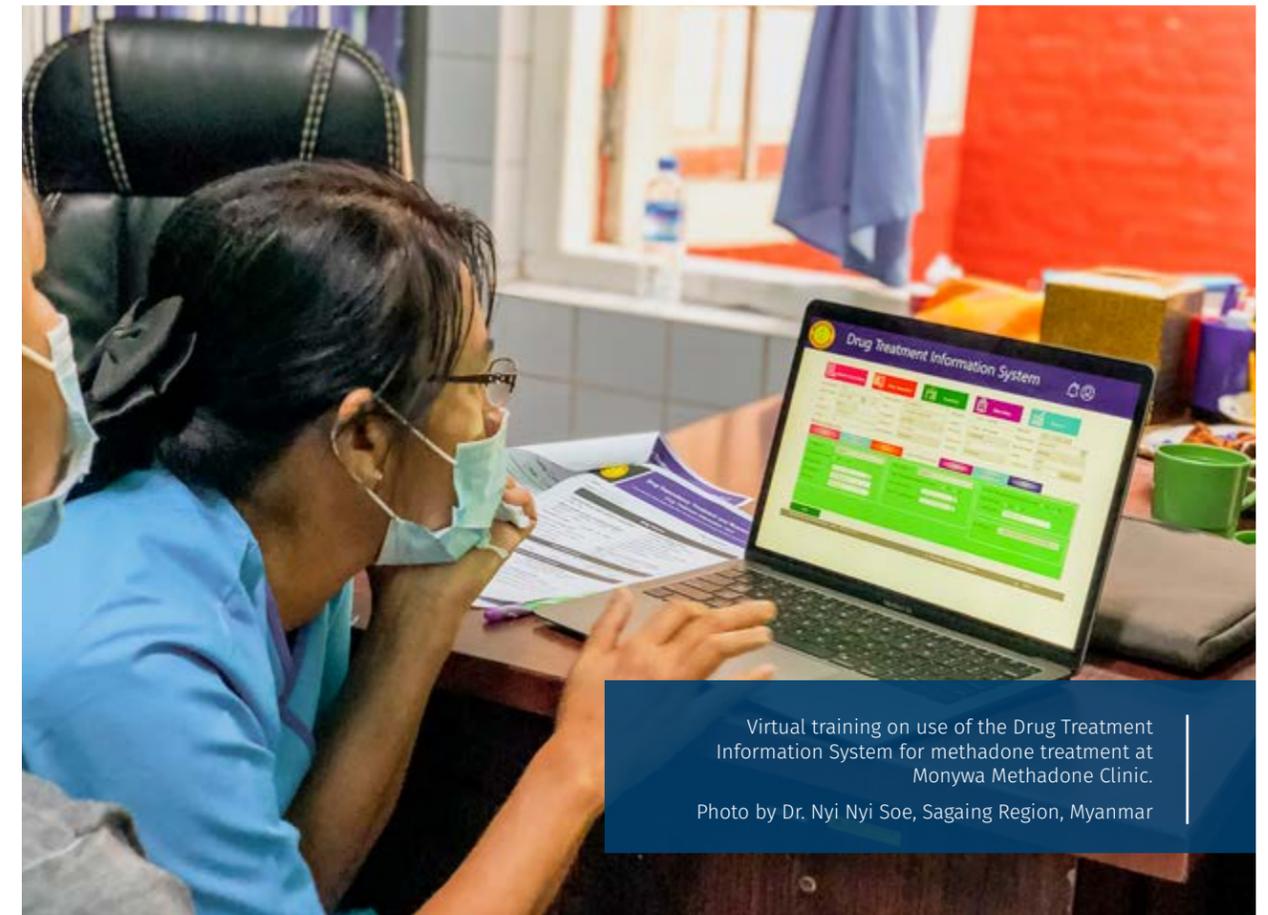
We will expand testing by scaling POC EID and generating evidence on novel testing strategies, such as caregiver-assisted HIV self-testing for children. We will also accelerate progress toward elimination of mother-to-child transmission of HIV by targeting additional diseases such as hepatitis B and syphilis.

To increase access to the best medications, we will continue to scale up the use of TLD and ensure it is equitably available in low- and middle-income countries without restrictions and accelerate access to best-in-class products currently under development. We will assist our partner governments with optimizing their second-line programs with best-in-class products.

To prevent HIV deaths, we will continue to support facility-level implementation and uptake of the WHO-recommended treatment

regimen for cryptococcal meningitis and work with governments to re-prioritize CD4 testing for inclusion in guidelines, procurement, and donor plans. We will also assist ministries of health to implement same-day CD4 testing and opportunistic infection screening at the start of ART and support the adoption of the pediatric AHD package of care in national guidelines.

As the pandemic continues, we will support ministries of health to refine COVID-19 policies that ensure continuity of all critical HIV services and prevent COVID-19 from erasing the progress the global community has made against HIV.



Virtual training on use of the Drug Treatment Information System for methadone treatment at Monywa Methadone Clinic.

Photo by Dr. Nyi Nyi Soe, Sagaing Region, Myanmar

## STAFF REFLECTION



### ANDREW C. MUSOKE

Country Director, Uganda

Some of my favorite undergraduate classes were those on the history of social movements in Latin America and the civil rights movement in the United States. These courses had many similarities to what I knew about our own independence movements in Africa. I was, and still am, in awe of those who sacrificed so much to make the world a better place. My post-graduation aspiration was to join an organization that embodied similar ideals. However, as life goes, I spent the first few years of my professional life in corporate America—the very opposite of my vision of being part of an impactful movement. It is not an over-dramatization to say that coming to CHAI saved me.

For the past 12 years, I have woken up to critical challenges every single day. I started out at CHAI's Boston headquarters in our global finance and operations division, where I designed and built systems to ensure seamless program operations for our frontline teams. Five years ago, I took on what has been a dream job—Country Director of the Uganda office. I have come to truly experience and love what makes CHAI unique: CHAI supports its staff with the right tools and strategic guidance to do their jobs, and then lets them get on with it without any of the bureaucracy that is rife at many global organizations. Because of this, staff are free to innovate and truly work at the service of the country governments that we support in building resilient health systems. The road to universal access to health care remains long, but CHAI consistently demonstrates that this is not an impossible feat.

I remember the challenge of introducing point-of-care early infant diagnosis for HIV in Uganda. The government had already invested so much in building up one of the best national sample transport networks in Africa, bringing tests from all over the country to the central laboratory in the capital city. Although decentralizing testing to the lower-level facilities was necessary, it felt like a cannibalization of the hard work that had gone into setting up the national public health laboratory system. Uganda had done extremely well in coverage of HIV treatment services for adults, but we still had an unacceptably large gap for infants and children. We were losing many babies during that crucial period from birth to end of breastfeeding, and the country urgently needed to introduce rapid testing at the point of first interacting with the baby. Returning results within 90 minutes ensured that HIV-positive babies began treatment as soon as possible. Every day lost on the sample transport journey from facilities to the central laboratory was one day closer to losing a baby.

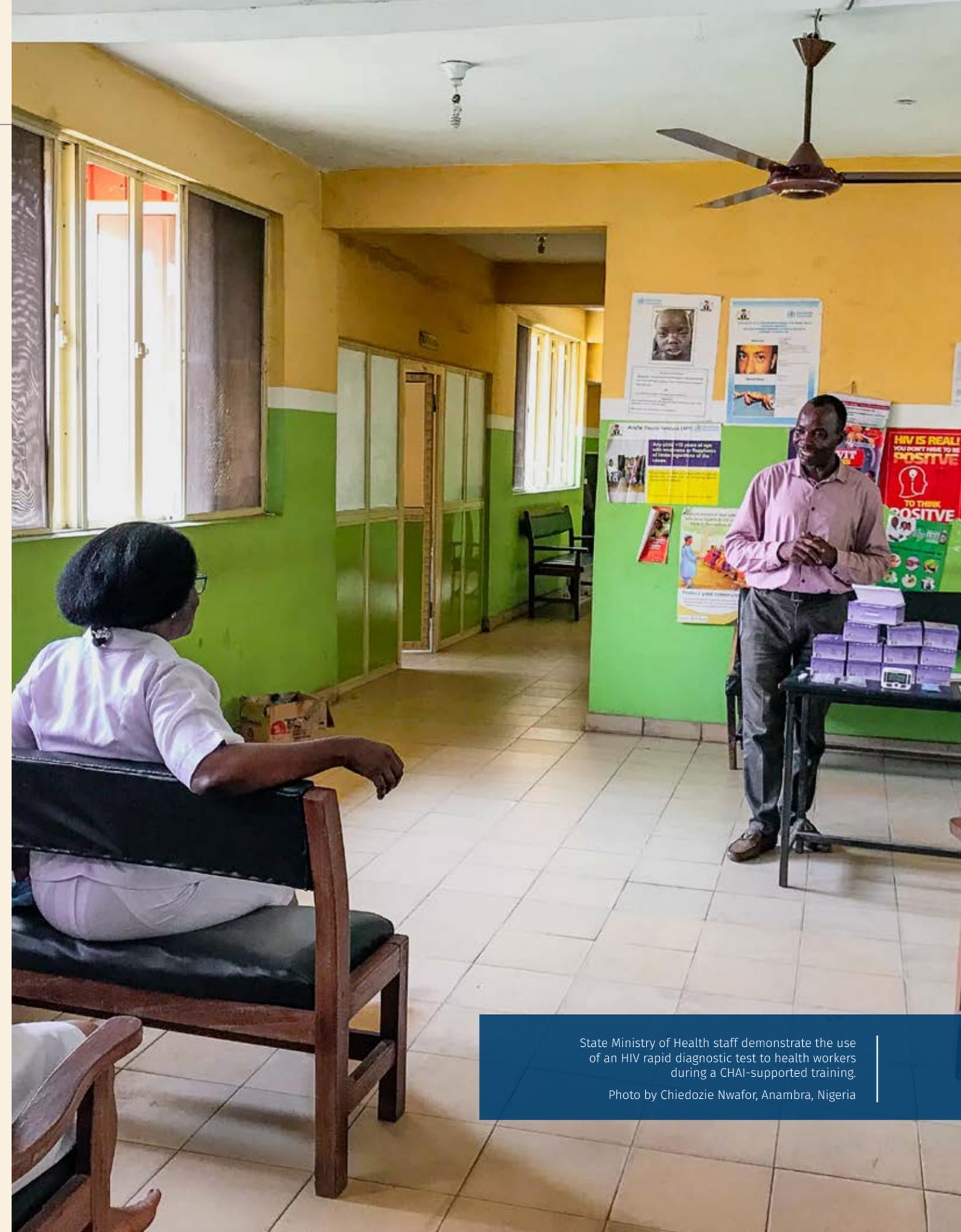


**CHAI supports staff with the right tools to do their jobs, and then lets them get on with it.**

—Andrew C. Musoke

Once, as we started a facility tour at one of our program sites, a 10-week-old infant was tested and the facility manager said that by the time we came to the end of our visit, the results would be ready. As we walked through the various wards, I could think of nothing but the impending results of that baby. I was struck by the remarkable reality that those 90 minutes could represent a life-or-death difference. That day at the health facility, the baby's results returned with good news after all!

I have had no greater honor than the privilege of returning to serve in my home country after almost two decades away. The resilience and passion of Uganda's health workers, coupled with the unrelenting drive of CHAI staff, have truly made this the kind of social movement I had always dreamed to be a part of.



State Ministry of Health staff demonstrate the use of an HIV rapid diagnostic test to health workers during a CHAI-supported training.

Photo by Chiedozie Nwafor, Anambra, Nigeria

# MALARIA

Nearly half of the world’s population is at risk of malaria. The disease kills over 400,000 people each year, with children under five representing most of those deaths. Pregnant women, people living with HIV, mobile populations, and travelers are also high-risk groups. Most malaria cases and deaths occur in sub-Saharan Africa, although Southeast Asia, the Western Pacific, and parts of the Americas are also at risk.

Interventions such as bed net distribution and indoor spraying of insecticides to kill or block the mosquitoes that transmit malaria, along with improved diagnostic testing and effective treatment, have resulted in a 30 percent decline in malaria deaths since 2010. However, progress is threatened by drug and insecticide resistance, higher prices for newer, more effective tools, and continued dependency on donor funding.

CHAI is supporting over 20 countries across Africa, Mesoamerica and Hispaniola, and Southeast Asia to strengthen surveillance systems for the timely collection and analysis of high-quality data, facilitate evidence-based planning processes to improve resource allocation, and increase the quality and coverage of case management services and vector control.

## Strengthening surveillance and data analysis

Routine surveillance systems are the backbone of an evidence-based approach to reducing malaria transmission. Integrating high-quality information on where malaria cases are occurring with high-resolution data on malaria vectors, interventions, and commodities allows a malaria program to monitor trends and transmission, assess gaps in intervention coverage and commodity availability as well as behaviors of mosquitoes

that are transmitting malaria, and evaluate what is working and where improvement is needed. CHAI helps governments increase the timeliness, completeness, and quality of reporting of malaria data by helping formulate surveillance policies, guidelines, and standard operating procedures; mapping geospatial data on points of care and populations at risk; and designing, developing, and rolling out improved health informatics tools for timely and complete reporting and data visualization.

In **Burkina Faso**, CHAI, in partnership with the Ministry of Health, the Programme National de Lutte Contre le Paludisme, local research institutions and other partners, assessed the national malaria surveillance system’s strengths and weaknesses to identify gaps in the current system and opportunities for new capabilities. The assessment, funded by the Bill & Melinda Gates Foundation, helped inform the government of systemic political, programmatic, technical, and operational challenges nationally, regionally, and in communities. Burkina Faso has adopted the findings into its new national malaria surveillance strategy and plans to make system upgrades based on the study recommendations.

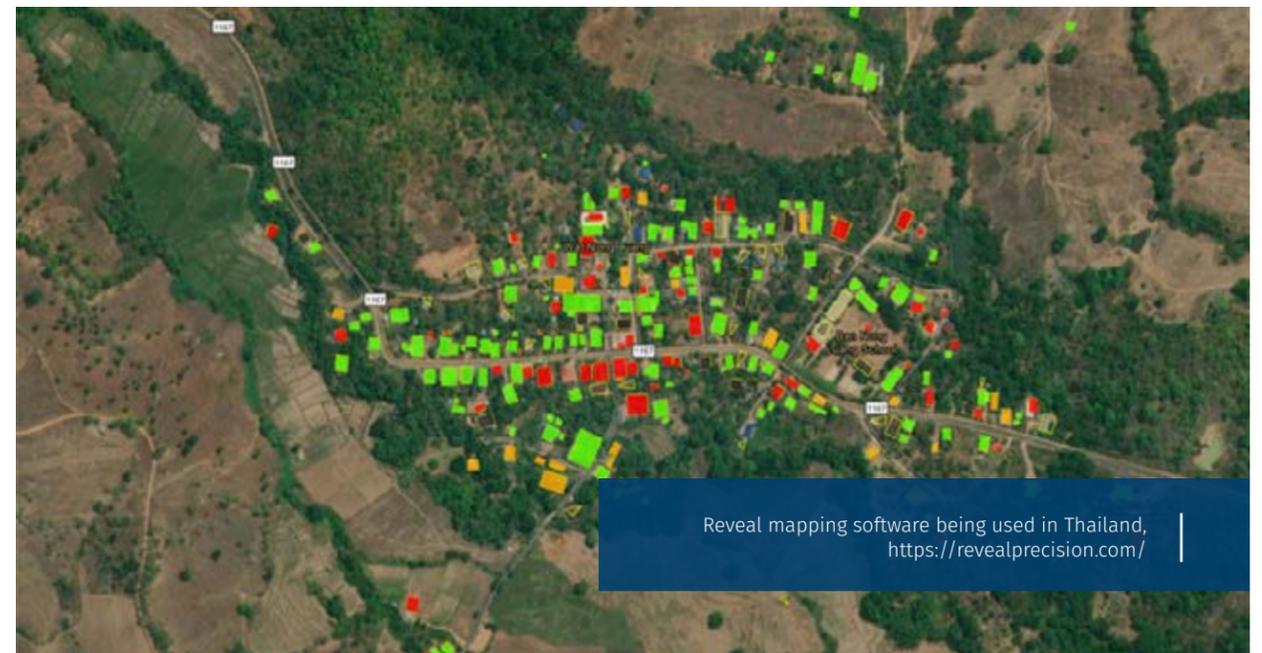
Similarly, in **Ghana**, CHAI is collaborating with Population Services International to support the National Malaria Control Program to conduct a surveillance assessment to identify priorities, including system strengthening activities and areas for future investments to reduce the disease burden in the country. The malaria surveillance assessment is expected to refine the national malaria program’s understanding of existing gaps in malaria surveillance, support the development of an integrated surveillance system, and improve disease monitoring, as well as encourage the deployment of targeted malaria interventions in hotspots.

In **Mozambique**, malaria surveillance has suffered from data fragmentation, poor quality, and lack of use. With support from Malaria Consortium, CHAI helped the national malaria program develop an integrated malaria storage information system to address these issues. To populate the new system, we digitized all paper-based data from the program and partners; developed automatized integration with Ministry of Health information systems; and trained central, provincial, and district level users on data entry and dashboard navigation. In total, 737 participants have been trained on the system, which will enable the program to review and analyze information on malaria cases, entomology, supply chain, and intervention coverage in one integrated system to improve disease intelligence and enable better decision making.

In **South Africa**, KwaZulu-Natal, Limpopo, and Mpumalanga provinces continue to experience low but persistent malaria incidence rates. In 2020, the National Department of Health (NDOH) and CHAI held a workshop to train health workers from these provinces to use a sub-classification algorithm to categorize the origin of local cases and better

understand transmission patterns. In December, the KwaZulu-Natal malaria team completed an analysis to finalize classification of all local cases for the last three seasons for King Cetshwayo District. All seven local cases were classified as introduced, meaning they could be directly linked to cases imported into South Africa from another country and thus do not represent ongoing endemic transmission. As a result, the province intends to demonstrate subnational elimination in this district to an independent panel and be declared malaria free by the NDOH, one of the first regions in sub-Saharan Africa ever to do so.

In **Thailand**, CHAI helped the malaria program pilot a digital tool called Reveal to map and investigate the drivers of transmission in communities in which malaria cases have recently been observed (or where there is believed to be risk of malaria occurring) in the provinces of Trat, Ubon Ratchathani, and Tak. We helped conduct a total of 365 focus investigations during the pilot, registering 11,139 households and 33,611 individuals on Reveal, and testing 15,460 people for malaria. The malaria program also used Reveal to plan



Reveal mapping software being used in Thailand, <https://revealprecision.com/>

and implement distribution of 8,858 long-lasting insecticidal nets and 1,392 repellents. The digital tool allowed the malaria program to identify whether their interventions were reaching the right populations. Based on the pilot's success, CHAI supported the scale up of the tool nationwide. By December 2020, more than 40,000 households and 90,000 individuals had been registered on Reveal, with 449 of 501 known risk areas mapped and investigated.

In **Vietnam**, we are collaborating with the General Department of Preventative Medicine, the National Institute of Malariology, Parasitology, and Entomology, and the Institutes of Malariology, Parasitology and Entomology in Quy Nhon, Ho Chi Minh City, and Viettel to integrate the functionalities needed for malaria elimination into Vietnam's electronic Communicable Disease System. Trainings for the new system took place at the end of 2019, and the system was launched in 2020 across the country with more than 11,000 active users. To ensure uptake and usage, CHAI implemented internal and external monthly data reviews at multiple levels. By the end of 2020, the system showed that data reports for all province, district, and community levels were 100 percent complete and that over 90 percent of the digital entries matched with those from paper forms.

In **Panama**, following a pilot of an electronic surveillance system for malaria in the East Panama region, CHAI worked with the Epidemiology and Informatics Departments to finalize changes to the system based on findings and user feedback. We

then worked with the Ministry of Health to prepare practice-based trainings for national scale up. By the end of 2020, the module had been rolled out to a third of the health regions in the country. CHAI also worked with the Vector Control Department to develop a mobile tool using the DHIS2 platform to map households and identify which ones had received indoor residual spraying and bed net distribution.

### Facilitating evidence-based planning and budgeting

Robust data and analytics collected by the government and partners should enable smarter investment of limited resources in the highest impact activities in the most critical geographies. Government ownership of planning and financial management processes ensures sustainability and drives the creation of a single country-owned strategic plan and budget that can guide the actions of all malaria partners on the ground. CHAI works to facilitate the creation of government-owned, data-driven plans and budgets to optimize, manage, and increase the sustainability of available financial resources to achieve malaria elimination. We also support governments to secure financial resources to implement elimination strategies.

The biggest source of funding for malaria programs today is the Global Fund to Fight AIDS, Tuberculosis, and Malaria. Countries must apply for Global Fund resources every three years. In 2020, CHAI helped many of the countries it supports devise evidence-based plans and proposals for the Global Fund, securing US\$670 million for data-driven and financially sound malaria programming.

For example, with funding from the Bill & Melinda Gates Foundation, CHAI provided intensive strategic and financing support to national malaria programs in Southeast Asia to secure US\$230 million through the Global Fund's Regional Artemisinin Initiative, which aims to eliminate drug-resistant malaria in the region by 2030. CHAI helped several countries, including

**Cambodia, Lao PDR**, and Vietnam adopt a well-structured approach to developing strategic and operational plans, commodity forecasts, monitoring and evaluation strategies, budgets, and proposal narratives for building the national systems required to reach and maintain malaria elimination. By helping organize and manage this long, complex process with many stakeholders, we helped enable each country to identify high-priority activities, target them based on robust disease intelligence, and accurately quantify commodity needs for implementation.

In Africa, CHAI similarly supported strategic planning processes and Global Fund applications in **Namibia** and **Zimbabwe**. In Burkina Faso, CHAI supported the government in costing and optimizing its national strategic plan. For 2021-2023, this resulted in a detailed €430 million budget which includes all partner activities (with the single biggest cost driver being the distribution of bed nets) and identifying a gap of more than €85 million. CHAI subsequently helped the government prepare its Global Fund application to ensure that the government's key priorities benefit from adequate funding. In Mozambique, we helped the government analyze its malaria data, including information on mosquito resistance to different insecticides, to decide where to introduce next generation bed nets and insecticides. CHAI collaborated with the national program, the Swiss Tropical and Public Health Institute (Swiss TPH), the United States President's Malaria Initiative, and the WHO to model intervention approaches and decide on how best to allocate the US\$200 million proposal to drive the biggest possible reductions in malaria.

In the Americas, CHAI supported strategic planning and Global Fund applications in **Haiti** and **Honduras**. In Haiti, we helped the Ministry of Health update and cost their strategic plan at US\$48 million. We also collaborated with Swiss TPH and the Pan American Health Organization (PAHO) to target interventions for the US\$21 million proposal to the Global Fund that will support the country's malaria program activities. In Honduras,

CHAI supported a program review, microplanning, operational stratification, strategic planning, and budget development, allocating the US\$4 million in available resources to high-priority activities such as bed nets and insecticide spraying.

### Increasing quality and coverage of case management services

Curing those sick with malaria averts the burden of illness and the threat of death, while also preventing future transmission. The expansion of diagnostic testing needed to improve case management can be linked into better data systems, providing increasingly detailed information on where malaria is and is not occurring, and thus driving a virtuous cycle of system improvements. CHAI aims to increase access to quality diagnosis and treatment by helping countries prioritize, plan, and evaluate context-appropriate case management strengthening activities. Depending on the context, these efforts include helping governments streamline commodity distribution by integrating health information and logistics data systems, introducing tools and processes to improve case management practices in both the formal public sector and informal private facilities, and improving the design and management of community health worker programs.

In Lao PDR, stockouts of malaria diagnostic tests and drugs compromise quality case management. CHAI helped the government improve demand forecasting for these commodities with a better approach for calculating the need. Our work with the government on data system strengthening and making malaria stock information available in a national integrated system led to more accurate and timely data for program staff to monitor stock levels and plan distributions. In response to global supply interruptions from COVID-19, we helped the government convene a national forecasting technical working group to quickly revise supply plans and secure enough tests and treatments to prevent stock shortages. As a result, procurement



## US\$670M

Total CHAI-supported grants from the Global Fund for data-driven and financially-sound malaria programming

and distribution is ongoing to improve product availability in all facilities and ensure points of care can increase testing and treat all cases.

*Plasmodium vivax* (*P. vivax*) is the malaria species that causes 90 percent of malaria illness today. When *P. vivax* infections are found, the WHO recommends treatment with the drug primaquine, but it is often not received by patients. Primaquine is toxic to certain individuals who have low levels of an enzyme called G6PD, so before treatment is administered, it is critical to test for this condition. In Cambodia, before 2020, testing and treatment for patients with the condition was a challenge, creating a barrier for the country's goal of eliminating *P. vivax*. CHAI, with support from partners including PATH and Medicines for Malaria Venture, worked with the National Malaria Control Program to conduct a successful pilot in four provinces to demonstrate how G6PD testing and primaquine treatment could be introduced safely. As a result, the program has begun scaling up access to G6PD testing and primaquine treatment to the entire country. So far, the program has identified 3,239 *P. vivax* cases and 45 percent have received a G6PD test.

Similarly, in Lao PDR, CHAI worked with the government and partners to develop a roadmap for G6PD testing and curing *P. vivax* infections with primaquine. We also built a strong monitoring and evaluation framework to track scale up and adherence to these new case management procedures in health centers. In 2020, 57 percent of *P. vivax* patients were cured, an increase of 16 percent compared to 2019. The increasing proportion of patients who are now safely being cured of their *P. vivax* infections will further accelerate the country's progress towards malaria elimination: the 3,500 malaria cases confirmed in Lao PDR in 2020 were the lowest annual total in the country's recent history.

In **Democratic Republic of Congo (DRC)**, **Nigeria**, and **Uganda**, CHAI led a consortium of partners including UNICEF, the Swiss TPH, local research institutes, and governments to improve the management of severe malaria through community

health worker networks, with funding from Unitaid. In remote, high-endemic settings in these countries, where the burden is among the highest in the world, children sick with malaria may live hours from the nearest health facility. Community health workers can be a critical means of ensuring the availability of care for malaria and other common illnesses in these places, but they must be provided with quality diagnostic tools and know how to use them well.

After a strong start with research and implementation activities in early 2020 across the three countries, COVID-19 created significant hurdles to the consortium's efforts. Together, we worked to mitigate disruptions to the project, while also prioritizing the safety of staff, healthcare workers, and study communities. We were able to continue providing the community health workers with rectal artesunate, a pre-referral treatment given to children with severe malaria, in each of the project countries. By the end of the project in October 2020, 126,904 units of rectal artesunate had been procured across the three countries, and 91,189 units had been distributed to over 8,000 trained community health workers and other healthcare workers. Over 80 percent of children with suspected severe malaria at the community level now receive this potentially lifesaving drug.

CHAI also helped strengthen the community health worker network in Namibia through development of standard operating procedures and training materials. We created training videos to demonstrate how to transfer information from weekly paper records into the health information system, analyze the data, and prepare reports. Over 280 additional community health workers were trained, bringing the total to 525 since 2018. As a result, community health worker reporting for both suspected and positive cases has increased.

In Zimbabwe, CHAI worked with the Ministry of Health to safeguard community malaria testing and treatment services in three provinces affected by COVID-19. Community health workers substantially contribute to malaria case management in Zimbabwe, historically detecting and treating about

30 percent of the cases in the country. In 2020, the peak malaria transmission season coincided with the emergence of COVID-19. The travel restrictions instituted as part of pandemic containment measures coupled with inadequate availability of personal protective equipment (PPE) threatened to disrupt health service delivery across all levels of care. To overcome this considerable challenge, the National Malaria Control Program partnered with CHAI to mobilize resources to train over 1,200 community health workers on the safe delivery of malaria prevention and curative services and secured donations of PPE to be used by 5,200 community health workers operating in 10 high-burden malaria districts. After COVID-19 lockdowns were relaxed, community health workers provided with PPE tested 45 percent of the suspected cases and treated 50 percent of the confirmed cases recorded in the 10 high-burden districts.

### **Increasing quality and coverage of vector control and chemoprevention**

CHAI helps countries choose the right tools for the right places, including targeting next-generation vector control products based on rigorous entomological surveillance. CHAI also helps malaria programs strengthen their processes for implementing quality, efficient vector control interventions, including creating detailed operational plans, documenting procurement processes and timelines to navigate complicated tendering processes, and avoid delays in product delivery.

Escuintla has historically been one of the most endemic areas of **Guatemala**, accounting for more than 50 percent of the total malaria cases. In 2020, CHAI planned to help the government roll out an indoor residual spraying campaign in the region but found there was no WHO pre-qualified insecticide available. To address this challenge, we worked with various government bodies, including the Ministry of Health, national malaria program, and regulation and international cooperation departments, to obtain a waiver to quickly bring

a safe and effective insecticide into the country without the usual lengthy registration process. As a result, six communities were sprayed: Las Cruces, Las Playas, San José, Concepción, Chontel, and Las Flores, reaching over 80 percent of the population. In part due to these efforts, Escuintla saw its lowest malaria incidence on record in 2020 and is no longer the highest risk part of the country for malaria.

Amid COVID-19, we worked closely with the national program in Honduras to ensure planned indoor residual spraying campaigns were not disrupted or delayed, as it is critical to spray houses before the malaria season begins. As a result, the program managed to conduct its campaign in Islas de la Bahía, resulting in a 92 percent coverage rate—the highest coverage ever achieved in that region. CHAI also supported teams on the ground by ensuring they had appropriate PPE when carrying out the spraying.

In **Botswana**, CHAI conducted geospatial analysis to identify malaria transmission hotspots based on factors such as district-level malaria incidence and entomological data. The Ministry of Health used the map to inform targeted interventions in villages in priority districts. Before 2020, the government had never conducted spraying in Palapye district, but the revised mapping highlighted the region as a place where malaria cases had been dramatically rising. The Palapye health management team used the map to target indoor residual spraying in two villages with high transmission, covering 15,000 people and 10,000 rooms. Despite significant procurement and supply chain challenges due to COVID-19, CHAI worked with the government and partners such as UNICEF and Syngenta to ensure the arrival of all required insecticides prior to the start of the spraying campaigns.

Mozambique's Cabo Delgado region has the highest malaria prevalence in the country. Ongoing conflict in the region, coupled with COVID-19 lockdowns and travel restrictions, means access to health services has deteriorated in recent years. CHAI developed a strategy to respond with an immediate focus on malaria prevention

## INFECTIOUS DISEASES

within displaced populations. The strategy was supported by the national malaria program, which secured funds and implemented an emergency plan. Using time-limited mass drug administration and long-lasting insecticidal nets in the districts hosting the displaced populations, CHAI helped the government reduce malaria deaths. Over the long-term, we are working with the Ministry of Health and other partners to address the broader issue of health service access and delivery in the whole province.

In Zimbabwe, CHAI worked with the National Malaria Control program to pilot digital reporting tools in two districts for tracking information on malaria mosquitoes, their behavior and environment, and impact of control measures on them. CHAI also piloted digital tools for indoor residual spraying reporting in eight districts. The indoor residual spraying pilot proved the ease of using digital tools for daily reporting and identifying areas where an insufficient number of houses have been sprayed. Overall, 394,000 rooms with an estimated population of 500,000 people (94 percent coverage) were sprayed in the eight pilot districts and reported successfully in the electronic reporting system.

Meanwhile, the entomological data revealed that the insecticide the government uses for spraying is effective—to a certain point. It showed that the number of mosquitoes in districts like Hwange increased substantially between March and April 2020, when the insecticide efficacy dropped below the recommended level, which meant less protection for the population during peak malaria transmission season. As a result, the government is looking into using a different insecticide for the next malaria season.

### Looking ahead

Over the past several years, CHAI has helped governments dramatically accelerate progress toward regional malaria elimination in interconnected parts of the world. Our approach has focused on building stronger disease surveillance systems, supporting governments to better analyze data and target resources, strengthening systems for case management, and deploying evidence-based vector controls.

We are excited to apply the lessons of these data-driven efforts to increasingly reduce the burden of disease from some of the highest endemic parts of the world. With support from the Bill & Melinda Gates Foundation, CHAI is scaling up its support to governments in several high endemic countries, including Burkina Faso, **Benin**, and the Democratic Republic of the Congo. We will continue to assist malaria programs in these countries to further strengthen ongoing efforts to build strong disease surveillance, case management, and response systems, while spending resources as efficiently as possible to reduce the burden of this preventable, treatable disease.



Community health volunteers gather after making collections to create a baseline understanding of malaria-carrying Anopheles mosquitoes.

Photo by Nicholas Presley, Guna Yala Comarca, Panama

## STAFF REFLECTION



### LAY LING HIM

Operations Coordinator,  
Mesoamerica & Hispaniola

Growing up in a small town in Panama, a country where inequality is high, I found that something as simple and desirable as wanting to forge a more equitable world was reserved for the privileged. Where injustices and imbalances are the norm, many dream of making things better. Yet without access to an adequate education, the knowledge and tools to make effective change possible are far from reach.

Even though I was lucky to gain international experience at a young age by earning a scholarship to participate in an educational and cultural exchange program with young people from around the world, I never considered working for an international non-profit organization within my options. Eventually, going through graduate studies in business, I was faced with the fact that the main objective of most of my classmates was to become materially richer. In contrast, I was more attracted to becoming richer in understanding and experiences to be able to contribute to positive impact.

With this realization, my mind was set on finding administrative work in a non-governmental organization (NGO), and so I found CHAI, which had recently been established in the Mesoamerica and Hispaniola region. What first impressed me was how close CHAI's values were to my own and what I was looking for in an employer. The next thing that got my attention was their approach. In Panama and other countries in the region there is an ingrained culture of hopelessness, leaving things as they are and letting ourselves be taken by inertia, especially with regard to the public sector.

CHAI is set for change. This was confirmed in my recruitment process and in the trust they consistently put in their staff and partners in order to improve public health systems, and in some cases, bring attention to remote regions where infrastructure is limited and diseases thrive.

During my short tenure, I've confirmed that some people are waiting for an opportunity—a push—and once put in motion, it can be unstoppable. With a great combination of skills and drive, our teams have managed to create effective relationships with government partners and help build solid networks of highly motivated community health workers and technicians. This has eased the steps toward the goal of malaria elimination in the countries where we work: Guatemala, Dominican Republic, Haiti, Honduras, and Panama.



**Our teams have managed to create effective relationships with government partners [and] eased the steps toward malaria elimination.**

—Lay Ling Him

While the 2020 pandemic could have represented disastrous steps backward, our malaria programs proved resilient. As our teams were forced into their homes, we were required to work, operate, think, and share differently. In this panorama, we found imaginative ways to connect with partners and health workers to ensure trainings and knowledge transfer were continuing, while keeping spirits up. We focused on providing protection, support, and tools to staff and partners to carry on key activities and to deliver technical assistance. We became even closer to one another in the distance by realizing our shared human vulnerability and the importance of connectedness.

Working in the face of limitation can be challenging, but as long as we are mindful of our mission and our goals, new and more optimal avenues can be found. Looking to the future, I have confidence that the CHAI Mesoamerica and Hispaniola countries are prepared to achieve malaria elimination in the next years and that we, as a region, are ready to take on further ambitious projects.



Community health volunteers collect *Anopheles* mosquitoes to develop a baseline understanding of the malaria-carrying insect.

Photo by Nicholas Presley, Guna Yala Comarca, Panama

# TUBERCULOSIS

Despite being a preventable and curable disease, 1.5 million people die from tuberculosis (TB) every year—making it the world’s top infectious disease killer. TB is also the leading cause of death of people with HIV. The World Health Organization (WHO) estimates that about one-quarter of the world’s population has latent TB, which means they are not symptomatic or contagious. However, between five and 15 percent of these people will progress to active TB disease in their lifetime. Children and people living with HIV are particularly at risk of developing active disease.

Over 95 percent of TB deaths occur in low- and middle-income countries, where limited supply of and poor access to testing and treatment and delayed linkage to care remains a challenge.

Anti-TB medicines have been used for decades, but the regimens are long and complex. Treating TB can require multiple pills taken daily over six to nine months. A new treatment to prevent latent TB from becoming active requires a shorter three-month course, taken once weekly over 12 weeks. However, strains of the disease that are resistant to one or more of the medicines have emerged across the globe and are transmissible between individuals. Multidrug-resistant tuberculosis (MDR-TB) occurs when medicines are used incorrectly, drugs are of poor quality (for example, because of ineffective formulations or bad storage conditions), health providers offer incorrect prescriptions, or patients stop treatment too soon. MDR-TB is treatable and curable, but the medications are expensive and toxic and require up to two years of treatment.

CHAI is working with our partners to eliminate TB by helping governments better identify, diagnose, treat, and prevent the disease. This includes negotiating lower prices for optimal drug regimens that offer higher cure rates, shorter treatment courses, and fewer side effects; improving access

to preventative treatments for the most vulnerable; and tracking the disease through innovative technology to make data-driven decisions. In addition, we are working to increase government ownership, deepen private sector involvement, bring faster and more efficient screening and diagnosis, and foster patient and community centric services, research, and innovation to help our partner countries control, prevent, and eventually eliminate TB.

## Preventing TB with a shorter, more effective new treatment regimen

Key to ending the epidemic is reducing the incidence of TB. That is why CHAI is working to prevent latent TB from becoming active, with a focus on protecting those most at risk, including children under five and people living with HIV. To this end, we are helping partners in Africa and Asia scale up testing and introduce new preventive therapies, like 3HP, a short-course treatment to prevent active TB. The 3HP regimen is a once weekly dose of isoniazid and rifapentine taken for three months. 3HP treats latent TB much more quickly and safely than standard therapies, which include daily treatments for up to 12 months. Because of this, 3HP also has a completion rate of 90 percent—far higher than standard treatments.

While easier to complete, 3HP is also expensive, costing US\$45 per patient course. Through the Unitaid-funded IMPAACT4TB (Increasing Market and Public health outcomes through scaling up Affordable Access models of short Course preventive therapy for TB), CHAI engineered a development incentive to expedite the introduction of a generic fixed-dose combination and led negotiations to reduce the price for both the existing and new generic treatments to US\$15 per patient course.

Based on the lower 3HP price, PEPFAR and the Global Fund to Fight AIDS, Malaria, and Tuberculosis committed to buying significant volumes of the treatment from 2021 to 2023 for people living with HIV and children under six. The organizations also committed to helping accelerate uptake of 3HP among their partner countries.

In **Cambodia**, preventing latent TB from becoming active is a matter of urgency for two reasons: the country is one of 30 high-burden countries worldwide, and active TB is the number one cause of death for people living with HIV. With funding from IMPAACT4TB and Expertise France, CHAI and Institut Pasteur du Cambodge helped the government introduce 3HP for people living with HIV and for close contacts of TB-infected patients. CHAI helped the Ministry of Health register 3HP with the drugs and food regulatory department, supported updates to the national treatment guidelines, and helped set up study and scale up sites for treatment. In addition, we developed forecasting tools, trained health providers, and ensured supply chains were ready for the rollout of the medication.

About 43 percent of all TB cases in **Vietnam** are undetected. To address this gap, we continued to upgrade and scale the Access to Care Information System (ACIS) mobile app used to screen and refer people suspected of having TB in the community. In 2020, six government and partner projects in 18 provinces (of a total of 63 provinces) used ACIS to screen approximately 300,000 people. Of those screened, at least 200,000 received chest x-rays, and nearly 18,000 received GeneXpert testing. About 1,800 people were confirmed to have TB and put on treatment.

## Treating multidrug-resistant TB

MDR-TB is a form of TB caused by bacteria that do not respond to isoniazid and rifampicin, the two most effective first-line anti-TB drugs. MDR-TB is treatable and curable using second-line drugs. However, these drugs are limited, expensive, and



toxic to patients. MDRTB remains a public health crisis and a global health security threat.

In Vietnam, only 68 percent of patients receiving treatment for MDR-TB have been cured. To address this, we helped the Ministry of Health strengthen its procurement and supply chain management system for TB drugs and lab commodities to ensure optimal treatments were accessible to patients. As a result, 3,256 drug resistant patients were enrolled on treatment at public TB treatment facilities across the country. Additionally, we helped roll out Bedaquiline (BDQ) and a shorter treatment regimen, which are six-to-nine-month treatment solutions compared to longer treatment regimens that can take up to two years.

## Enhancing case finding

A CHAI study in **South Africa** and Vietnam revealed that approximately 50 percent of TB patients present with no symptoms, either because they are asymptomatic, pre-symptomatic, or they neglect to mention their symptoms. TB case finding based on disease symptoms misses at least half of patients, who will unknowingly further transmit the disease. A new approach to address this is to supplement symptom screening with digital x-ray and computer aided diagnosis or x-ray triage to identify lung damage consistent with TB.

**Lao PDR** has a TB case detection rate of 57 percent, much lower than the global average of 70 percent. With support from the Foreign, Commonwealth

and Development Office (FCDO), CHAI has been working to introduce new innovative approaches such as enhanced sample transportation, data use, high-risk mapping, and chest x-rays to improve TB case detection in the country. Building on the success of case finding pilot projects in two districts in Champasak province, we supported the National TB Program with a national scale up. In addition, we worked with health officials to start an ongoing proof-of-concept exercise exploring the use of digital chest x-ray as a triage tool borrowing equipment previously deployed for COVID-19 support.

### **Tackling the largest TB burden in the world**

**India** has the largest number of TB cases in the world—over a quarter of the global TB and MDR-TB burden. Every year more than 850,000 cases of TB go undetected, untreated, or diagnosed and treated with potentially substandard drugs and regimens. These drugs and regimens not only fail to eliminate the TB bacteria, but also contribute to the increasing incidence of drug resistant TB. CHAI has, since 2012, supported the Ministry of Health’s ambitious agenda to eliminate TB by 2025. We work with the government to provide support and technical assistance to broaden access to diagnostics; pilot and scale effective models for engaging the private sector, where most patients seek care; and support scale up of innovative digital tools for programmatic effectiveness. With support from the Global Fund and in partnership with FIND and Centre for Health Research and Innovation (CHRI), CHAI helped the National TB Elimination Program (NTEP) scale up private sector engagement across most states of India. This groundbreaking initiative led to over a 100 percent increase in notifications from the private sector over three years, from 2018 to 2021.

Digital tools remain key to improving program effectiveness and better serving the needs of patients. The NTEP has rapidly scaled up the use of a digital platform called Nikshay and expanded its use to monitor not just program efficiency, but the

effective management of supply chains. Recently, the platform has begun to be used to transfer cash subsidies directly to TB patients through the Direct Benefit Transfer (DBT). The DBT aims to reduce out-of-pocket expenses and additional hardships—such as the cost of nutritious food—that may occur during TB treatment.

CHAI helped the NTEP design and publish the Nikshay user manual and conceptualize training agendas; these resources have helped delineate roles and responsibilities of different stakeholders and map out process flows for clear use of the app at various levels. In addition to state level training, CHAI conducted national level trainings to create a cadre of master trainers with the skills needed to perform and teach specific tasks and activities associated with Nikshay. To mitigate the impact of COVID-19, we conducted virtual master-level trainings in six pilot states and trained approximately 2,600 NTEP staff. Additionally, to expedite digital payments under DBT, CHAI helped introduce digital signatures from all authorities responsible for transfers through the app. As a result of this work, the uptake of the DBT scheme and a total payout to beneficiaries has consistently increased in the last few years in the public and private sectors.

The Joint Effort for Elimination of Tuberculosis (JEET), undertaken by CHAI and supported by the Global Fund, engages the private health sector in the TB response. While an approximately 100 percent increase in TB notifications (defined as a diagnosis reported to the national surveillance system) from the private sector speaks to the project’s significant effectiveness, its impact will continue for years as the Ministry of Health has encouraged states to allocate and mobilize resources to involve the private sector in a more coordinated, structured, and sustainable way. To aid this effort, CHAI supported the states of Bihar, Madhya Pradesh, Rajasthan, and Gujarat to identify and hire agencies for scaling JEET in their respective states; our support ranged from helping draft proposals, assisting the bidding process, onboarding selected agencies, training these agencies, and developing comprehensive

review and monitoring frameworks for program execution. The states of Bihar and Madhya Pradesh executed contracts worth US\$9.3 million with private agencies for managing private sector engagement in selected geographies with a high TB patient load. CHAI also supported the state of Rajasthan in formulating a first-of-its-kind private sector engagement model wherein the state plans to directly engage with private sector providers and health institutions. These developments herald effective transition from external Global Fund support to domestic budgets, enabling a sustainable future for engagement with private health providers in the country’s pursuit of TB elimination.

The COVID pandemic has caused widespread disruption in delivery of healthcare; the WHO Global TB Report 2020 noted a 25 to 30 percent fall in TB notifications in India from January to June 2020 compared with the same period in 2019. COVID mitigation measures, such as lockdowns, also posed difficulties for patients in accessing diagnostics and drugs. To address this, CHAI is working with 1MG, a digital healthcare platform that aims to increase access to quality diagnostic tests through home-based delivery. This innovative model has been piloted in large urban centers of Delhi, Ahmedabad, Faridabad, and Surat to address drug delivery shortages and monitor refill challenges. As of January 2021, approximately 2,500 patients have been enrolled in the pilot across all four cities and nearly 250 TB tests and 4,500 regimens delivered. Findings from the pilot show that test results were delivered to patients within two and a half days of home-based sample collection. Prescriptions for TB drug regimens took close to one and a half days to deliver to patients’ homes or location of choice.

At present there are no standardized national guidelines on counselling and support for TB patients. There is also limited understanding of barriers to treatment adherence, particularly among private sector patients. With support from the Bill & Melinda Gates Foundation, CHAI led a patient-centered research study to better understand patient needs and design an

effective counseling program. The study began with a qualitative phase in three cities, followed by a quantitative validation of some of the key findings in eight cities. The recommendations acknowledged that patient behaviors evolve across critical treatment stages and communication nudges were suggested to improve engagement. In addition, the findings also defined attitudes of patients, key markers to identify them, and differentiated communication guidance. Apart from demographic profiles, a patients’ pre-diagnosis and sharing of diagnosis with family were found to be critical factors in their treatment journey. The study also found that treatment counselors who reach out to diagnosed TB patients and help them along the entire treatment journey needed to be better equipped to handle patients if they seek help to address side effects. In response to these findings, CHAI revised and piloted the communication scripts in one city for the treatment counselors provided through the project. They will be developed into treatment guidelines to create a holistic support mechanism for patients, including guidance on managing side effects.

### **Looking ahead**

CHAI will continue to examine, test, and scale innovative interventions in support of country TB elimination goals. Addressing the large burden of latent TB will be a key to this endeavor, CHAI is therefore working to facilitate the uptake of shorter, latent TB treatment regimens such as 3HP. Additionally, for ensuring patient-centric care, we are working to demonstrate triage innovations such as digital chest x-ray and artificial intelligence to improve both TB case finding and the management of lung health (including COVID-19).

## STAFF REFLECTION



### TREVOR PETER

Senior Director, Laboratory Services

I joined CHAI in 2004 and in those early days of our work, HIV testing was an area of need that the ministries of health we worked with consistently highlighted as they scaled antiretroviral treatment programs. So, we started CHAI's Laboratory Services Team. Since then, CHAI has worked non-stop to support improved access to essential diagnostics, initially in HIV and then across all major disease areas and in over 50 countries.

Before I joined CHAI, I was an epidemiologist in medical and veterinary research and managed the Botswana-Harvard HIV Reference Laboratory.

This experience brought me into the world of diagnostics. As a researcher, I always felt my work was too far from the frontline of impact on people's lives and their health. When I landed at CHAI, I realized there was no better organization to bridge that divide.

Diagnostics requires the right mix of technology and health systems to be efficient. Not only is it important to choose the right technologies for each healthcare setting, but there are also a number of essential health services that need to be functioning around the laboratory for testing to be delivered effectively. Many countries are still working to establish both the technology infrastructure and the associated health systems required, and so testing remains a critical gap for many diseases. This was brought into sharp focus over the past year with the COVID-19 pandemic. Providing COVID-19 testing rapidly became an enormous priority for countries, not only for individual patient care but also for pandemic control.

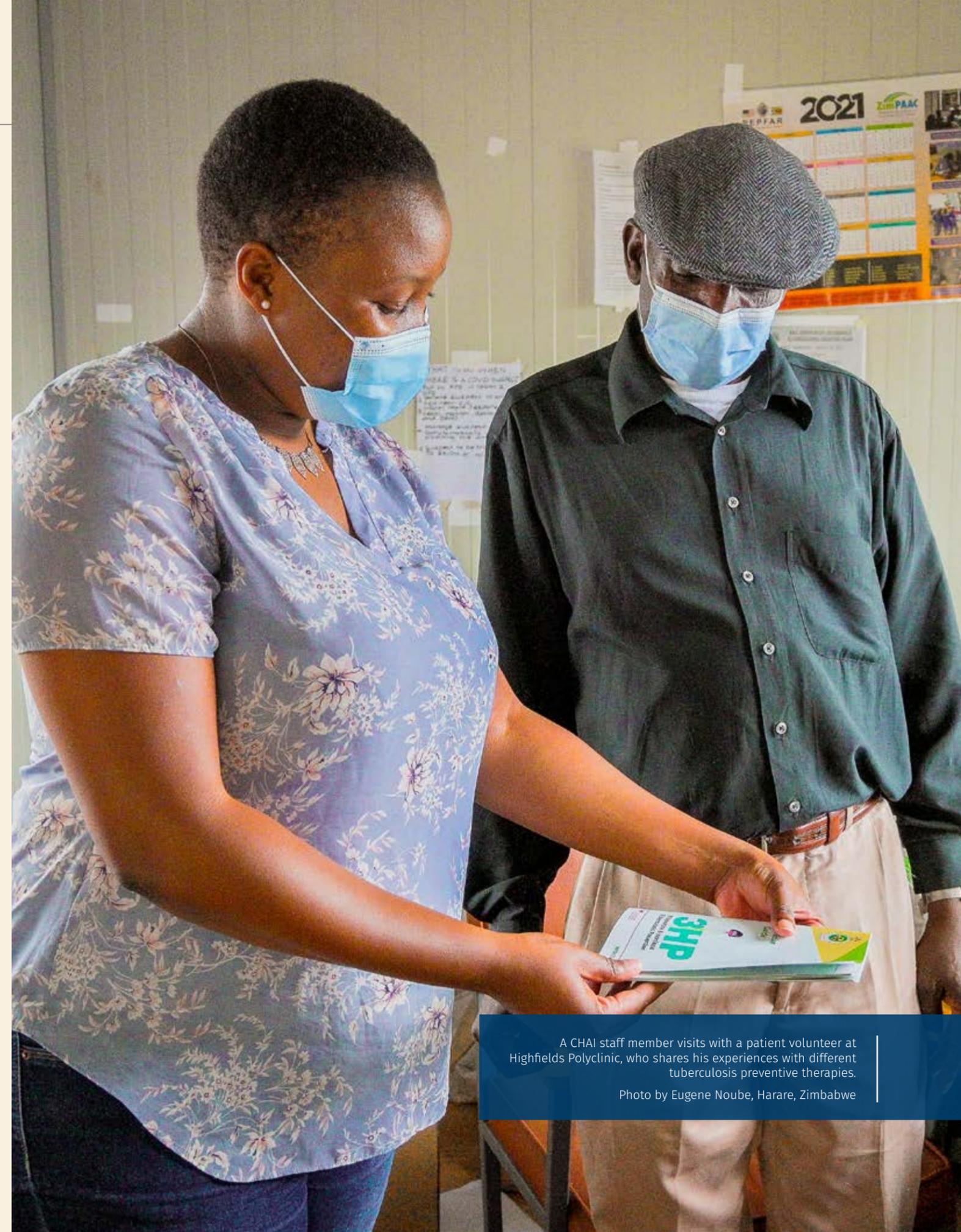
The Lab Services Team responded quickly, working with country and program teams at CHAI, to help secure critical supplies of tests for low- and middle-income countries when severe shortages emerged early in the pandemic. I'm proud of the work that was done, not only because I think it was effective, but also that it was carried out in an unassuming and efficient manner.

This work exemplifies the best of CHAI's values and is a reminder about why I choose to continue contributing to CHAI's mission. I am lucky to work in a team of highly effective professionals who are also dedicated to those values and mission.

Even before COVID-19, CHAI's work in diagnostics was always on the frontier of innovation and patient impact. For example, since 2006 we have helped many countries introduce molecular diagnosis for HIV, TB, viral hepatitis, and other infections. This infrastructure ultimately became the backbone for COVID-19 testing and also promises to be critical for HPV testing and cervical cancer elimination. CHAI's work in testing also spans almost every element of health system delivery, from infrastructure and human resources to price negotiation, quality assurance, and policy development.

I have seen countless examples of CHAI teams working alongside their government counterparts in trusted partnerships, resolving difficult problems and responding to what is needed. I believe that taking a flexible, entrepreneurial, and holistic approach that is respectful of the needs of countries is essential, and the reason why CHAI's work is impactful. This is also why I believe CHAI's mission and approach is as important today as it was when I first joined the organization.

As we move through this new era of COVID-19, the world of diagnostics will never be the same. Global health challenges are greater than ever before, however, I also sense greater impatience than ever before to address these challenges. Testing is the key to unlocking better access to healthcare for all diseases. Changes in technologies and delivery systems are already here and more are on the horizon. CHAI is working to help these tools reach people in need and that is why I am proud to work with my dedicated colleagues to tackle the coming challenges.



A CHAI staff member visits with a patient volunteer at Highfields Polyclinic, who shares his experiences with different tuberculosis preventive therapies.

Photo by Eugene Noubé, Harare, Zimbabwe

# HEPATITIS

Hepatitis C (HCV) and hepatitis B (HBV) affect over 354 million people worldwide and cause over a million deaths each year. By 2040, deaths from HCV and HBV are expected to exceed those of HIV, tuberculosis (TB), and malaria combined. The epidemic is growing, driven by unsafe injections in the case of HCV and, in the case of HBV, transmission from mothers to their babies in utero or during delivery. If left untreated, HCV and HBV can lead to significant liver damage, contributing to high rates of cirrhosis, liver cancer, and death.

Fortunately, HCV can be easily diagnosed and cured through low-cost screening, confirmatory diagnosis, and a course of direct acting antiviral medications (DAAs) that can be taken orally. DAAs have been shown to cure more than 95 percent of patients who receive treatment.

Although costs of DAAs were a previously insurmountable barrier to care in low- and middle-income countries, dramatic price reductions in recent years have significantly increased access to this lifesaving treatment. At the same time, several new diagnostic products and licensed generic DAAs have received prequalification by the World Health Organization (WHO) for global use. More than nine million people worldwide have received treatment due to these advances since 2015, but with 1.5 million new HCV infections per year, prevention efforts will need to be scaled significantly to achieve elimination by 2030.

While there is no cure for HBV, it is preventable with vaccination and, similar to HIV, can be treated as necessary with lifelong therapy. Administering three to four doses of the HBV vaccine, with the first dose administered within 24 hours of birth, is highly effective at interrupting transmission of the virus from mother to baby.

In 2019, the board of Gavi, the Vaccine Alliance, formally approved support for the HBV birth

dose for new vaccine introduction in low- and middle-income countries. CHAI also supported the WHO to develop guidelines, published in 2020, on prevention of HBV transmission. These guidelines include information on interventions such as screening pregnant women and the use of tenofovir among those with active chronic infection. As a result of these developments, there are now significant opportunities to promote collaboration and integration with HIV and other sexually transmitted infections, maternal, newborn, and reproductive health, and vaccines systems for HBV prevention.

Despite this global progress, vulnerable populations, including people living with HIV, people who inject drugs, and prisoners continue to be severely impacted by HCV and HBV. As of 2019, only 21 percent of people presumed to be living with HCV have been diagnosed and only 62 percent of those diagnosed have received treatment. Similarly, only 10 percent of people estimated to have chronic HBV have been diagnosed and only 22 percent of those diagnosed have received treatment. Without intervention, lack of access to services for these populations will hinder progress toward the goal of elimination by 2030.

## Supporting hepatitis programs during the pandemic

Since 2016, CHAI has worked in seven countries—**Cambodia, India, Indonesia, Myanmar, Nigeria, Rwanda, and Vietnam**—to introduce and expand access to HCV testing and treatment by simplifying government hepatitis programs and shaping markets to reduce prices for critical treatment and tools for diagnosis. This work has enabled more patients to be treated with existing budgets. We are also supporting governments to strengthen HBV programs, building interventions upon the

backbone of HCV programs, and supporting efforts to eliminate transmission of HBV from mother to child. Despite the challenges created by the COVID-19 pandemic, this work adapted to continue to reach patients in 2020.

As significant resources were redirected to address the pandemic, health systems have been pushed to their limits. Lockdowns and social distancing restrictions have delayed HCV elimination efforts, disrupted HBV vaccination delivery, and are preventing patients from accessing essential services at health facilities and outreach to the most vulnerable communities. Countries have had to adapt to ensure that services continue.

In India, Nigeria, Indonesia, and Myanmar, governments piloted multi-month DAA prescriptions, ensuring that patients were dispensed full treatment courses to cure HCV. In some countries, virtual mechanisms were adopted to follow up with patients and continue program management. For example, hepatitis programs in India and Indonesia are now using digital platforms to enable remote meetings. In India, online meetings enabled the national HBV program to roll out as planned. In Indonesia, CHAI helped the Ministry of Health revitalize hepatitis care by supporting development of guidance on safety procedures, managing patients from screening to treatment, and monitoring and evaluation of district and provincial hepatitis programs. This guidance was disseminated to 34 provinces resulting in screening coverage increasing from



**>US\$130M**

*Savings generated from 2018 through 2020 for donors and MoHs based on CHAI market shaping efforts*

13,000 at the start of the pandemic to 21,000 at the beginning of 2021.

In June 2020, CHAI published our first-ever Hepatitis C Market Report to provide market intelligence on HCV diagnostics and drugs in low- and middle-income countries. The report, which is set to be released annually, provides governments, partners, and other stakeholders options for reducing costs for key hepatitis products and treatments as they expand programs toward elimination.

Our market shaping efforts have supported initiation of over 374,000 patients on HCV treatment from 2018 through 2020 and generated over US\$130 million in savings to donors and ministries of health. We also supported the development of a healthy market for quality approved licensed generic DAAs with five additional quality assured generic drugs coming to the market since 2018. Today, all key HCV treatment regimens have at least one pre-qualified generic product available.

Internally at CHAI, we worked to increase collaboration across our programs, developing a working group with our HIV, Maternal, Newborn, and Reproductive Health, and Vaccines programs to establish partnerships to increase HIV, hepatitis B, and syphilis testing and treatment for pregnant and postpartum women and infants.

In 2020, through our global advocacy and technical assistance, several countries, including



**>374k**

*Patients initiated on HCV treatment from 2018 through 2020*

Myanmar, Vietnam, Cambodia, and Rwanda, successfully submitted concept notes to the Global Fund, including a budget line for HCV diagnosis and treatment among people with HIV co-infection. Some countries are now considering including requests for support for HCV diagnosis and treatment as part of WHO-recommended comprehensive harm reduction interventions for people who inject drugs.

To share lessons learned and enable partners to replicate efforts, CHAI published an article in *BMJ Global Health* in December 2020 describing implementation models that were used to provide HCV services in our seven partner countries, supported by the United Kingdom’s SHAPE grant. The article reviewed progress over five years and underscored the importance of further strengthening public health approaches and increasing political commitment and funding to scale elimination efforts.

### **Enabling countries to move toward elimination**

In 2020, Rwanda again made significant progress toward its goal of HCV elimination. In 2018, the country announced its goal to eliminate HCV within five years, accelerating the target in 2019. That year, we supported the Ministry of Health to secure the availability of generic DAAs at US\$60 per 12-week patient course for sofosbuvir and daclatasvir, delivering substantial savings of over US\$30.5 million and accelerating scale up of the treatment.

Rwanda has now screened over four million people for hepatitis B and C and is on track to eliminate HCV in 2022. Due to the significant progress made, the WHO has invited Rwanda to be a pilot country for HCV elimination validation. This will support the formal certification process for having achieved elimination and allow other countries to learn from Rwanda’s experience.

In 2020, the Bill & Melinda Gates Foundation provided a US\$2.5 million investment through its African Diagnostics Platform “Closing the Loop”

grant—its first in viral hepatitis—to assist Rwanda to get over the finish line for HCV elimination. This funding will help the country put in place critical digital information systems to better track and sustain progress.

In 2020, CHAI helped the government to develop and scale a patient-level electronic health information system across all health facilities. This system, the DHIS2 tracker, will enable improved patient tracking and follow up. CHAI helped to equip facilities with IT equipment including tablets, modems, and internet, and trained trainers and end users on the use of DHIS2. The online training materials are accessible to health workers at any time. To help ensure that patients continue to receive care, the system also uses text messages to send health and appointment reminders.

DHIS2 will be further linked to the commodity management system to equip health providers with skills to manage stock levels for medications and health products at facilities. Gathering data in one place will allow the program to make informed decisions and monitor progress toward elimination.

India’s federal government is taking significant steps to facilitate roll out of a national program to screen five million people and treat 300,000. CHAI is helping the government scale up the program. In 2019, we helped launch an electronic monitoring and evaluation platform for HCV. This platform was expanded to HBV in 2020 and is now being used by 456 treatment centers across 362 districts nationally.

In 2020, we supported development of an inventory management tool to strengthen facility stock management and state procurement planning. Data from these platforms, combined with ongoing implementation research supported by CHAI, will help track performance, identify gaps, and target interventions as the program continues to grow. In 2020 we expanded our state level support to Madhya Pradesh, helping establish four model treatment centers and supporting the state to

develop a plan for rolling out viral hepatitis services to 53 additional sites.

In Nigeria, building off work begun in 2015, the Nasarawa state government committed in 2020 to developing and implementing an HCV elimination strategy. CHAI supported the state to create a five-year elimination costing plan that has received special project catalytic funding from the 2020 state budget. In 2020, the state government released US\$80,000 for procurement of products for screening and treatment, targeting HIV patients on antiretroviral therapy (ART). CHAI supported screening for over 4,800 patients across 13 ART sites. Of these patients, 15 percent screened positive for HCV and are being linked to further testing and care. We will continue to work with the state government to mobilize resources for its elimination program and scale up services over the next three years.

CHAI will also continue to provide technical assistance to the national viral hepatitis technical working group to update clinical guidelines to reflect the WHO’s new HBV guidance and other advancements as well as an updated viral hepatitis national strategic plan to cover the next five years. Nigeria is also on the path to develop a national monitoring and evaluation (M&E) framework, which will help provide insight into hepatitis cases in the country.

In Cambodia, 1,200 people die of HBV and around 1,600 die from HCV each year. Nevertheless, both domestic and international funding to fight the disease remains limited. In collaboration with the Ministry of Health, and with support of the World Hepatitis Alliance, CHAI completed development of a financing and investment case in 2020 with the goal of building a public program for HCV elimination. The report generated evidence that showed that investing in HCV elimination would result in US\$0.30 in savings for every dollar invested.

To prepare for the launch of a public program, CHAI supported the development of the National Strategic Plan for Viral Hepatitis B and C, clinical

guidelines, and a costed annual operational plan which is being used to support program advocacy for a national budget line and guide the program launch. We also supported the development of the HCV and HBV training curriculum and materials for the roll out of the program and services in facilities.

### **Targeted and integrated service delivery**

CHAI continues to support the HIV/HCV co-infection program in Cambodia. In 2020, we helped the national HIV program advocate for the inclusion of HCV services within the country’s Global Fund application, prioritizing support for the continuation and expansion of the HIV/HCV co-infection program that was launched in 2017. The next round of funding supports services to reach people living with HIV, their partners, and other groups vulnerable to infection.

The program has placed the country on track to eliminate HCV among people living with HIV. Lessons learned from the program have also assisted the Ministry as it develops a national HCV response for the country.

Vietnam secured funding from the Global Fund in late 2020 to diagnose and treat 16,000 people co-infected with HIV and HCV, using reprogrammed savings from its current grant, and advocated for additional financing from the Global Fund to treat at least another 5,000 patients from 2022 onwards.

In Indonesia, CHAI has supported the government with its national HCV program since 2017, where an estimated 1.3 million people are living with HCV. CHAI is helping to boost central and provincial capacity, including the continued development and use of an electronic health management information system called Sihepi as well as a program management guide that will be rolled out nationwide in 2021.

Prisoners are disproportionately infected with HCV in Indonesia. In 2019, we assisted the

## INFECTIOUS DISEASES

national hepatitis program to collaborate with the directorate of corrections under the Ministry of Law and Human Rights, a community-based organization called Yayasan Koalisi Satu Hati, and other partners to provide HCV care in seven prisons in Jakarta. By the end of the year, over 16,000 prisoners were screened and more than 450 started on treatment. As a result of these collective efforts, the government declared viral hepatitis a national priority program in 2020, with plans to scale up the program to all 34 provinces over the next two years.

To support national scale-up, particularly among key populations such as people who inject drugs, people living with HIV, hemodialysis patients, and prisoners, CHAI is developing a new three-year agreement with the government focused on ensuring strong program systems including management, supply chain, and data utilization as well as the selection of high-performing provinces for initial scale up. We are also supporting the national government to advocate for hepatitis support within its Global Fund application to target screening and treatment among people living with HIV.

In 2020, Myanmar secured funding from the Global Fund under its next grant (2021-2023) to treat 10,000 patients who are co-infected with HIV and HCV. In addition to encouraging more targeted case finding, this funding presents the opportunity for the country to decentralize HCV services to the primary care level, through HIV ART sites and methadone maintenance therapy clinics.

With support from FIND, CHAI also partnered with the National Health Laboratory on a pilot study to evaluate the feasibility and acceptability of integrating HCV and HIV viral load testing on a centralized Abbott viral load testing platform. The study was completed in April 2020 and demonstrated that with simple adjustments to laboratory human resources, workflow, and infrastructure, integration of this testing is feasible and does not have a negative impact. These results are a significant step in advocating for diagnostic integration both in Myanmar and

globally, presenting opportunities to leverage existing testing capacity to boost case finding and diagnosis efforts, which, in Myanmar, will potentially begin with the HIV/HCV co-infection program.

Efforts to strengthen program management and expansion, particularly between existing HIV/HCV co-infection sites and HCV mono-infection sites, were complemented with the dissemination of findings from an in-depth analysis of patient-level data collected as part of the initial launch of the national program from June 2017 to March 2018.

### **Lowering the cost of lifesaving medications in countries**

In Indonesia, CHAI is working to reduce the high cost of DAA treatment, which can cost as much as \$750 for a three-month course. Together with local community organizations, the Ministry of Health, and the WHO, CHAI advocated for more competitive pricing and transparency to lower the cost of treatment. As a result, the price of daclatasvir 60 mg fell 84 percent from US\$83 to US\$13 a bottle and 30 mg fell by 83 percent from US\$52 to US\$9 a bottle.

Due to the absence of a coordinated public program for HCV in Vietnam, patients must pay out-of-pocket for treatment, which is unaffordable for most patients. In 2019, the government implemented a new health insurance policy to include partial coverage of DAAs in national and provincial health facilities. In 2020, CHAI began a scope of engagement with the Department of Health Insurance and key partners to increase the coverage of DAAs in the national health insurance scheme, including collaborations with Vietnam Social Security and other partners, for greater clarity on health insurance implementation. We conducted studies to assess the cost-effectiveness and budget impact of increasing coverage of DAAs in the health insurance scheme and explored the inclusion of DAAs in existing pooled procurement mechanisms to support further reductions in pricing.

### **Looking ahead**

In 2021 and beyond, we will continue to support partner governments to strengthen and expand their public sector viral hepatitis programs with the goal of assisting more countries to reach elimination.

To enable better integration across programs to reach more patients, CHAI will focus on supporting HCV micro-elimination efforts among people living with HIV and key populations and improve access to the comprehensive package of harm reduction services for key populations to reduce HIV and HCV transmission.

We will continue to support countries to work toward HBV prevention including developing agendas for triple elimination of vertical transmission of HIV, hepatitis B, and syphilis with a focus on testing pregnant women and will support countries as they continue to adapt to COVID-19.



Nurses prepare to screen people for hepatitis C at a Rwamagana market.

Photo by Jeanine Nyinawabega, Rwamagana, Rwanda

## STAFF REFLECTION



### ZARNI HTUN

Deputy Country Director, Myanmar

In the spring of 2016, just before I finished my graduate studies in global health at the Harvard Medical School (HMS), I consulted with a senior faculty member to advise me on a suitable career that might match with my professional pursuits.

As a close mentor who supervised me throughout my HMS academic years, the faculty member fully recognized my career interests and potential and recommended me straightaway to try job opportunities at CHAI. She introduced me to an ex senior CHAI colleague in Boston who used to work in the South East Asia region, as I wanted to go back to Myanmar, my home country, and engage in work to support the health system.

After a conversation with the former CHAI colleague who explained to me what CHAI is and how it works, I was inspired. I realized CHAI was the place to invest my career going forward. When I returned to Myanmar, I actively reached out to the CHAI Myanmar office and presented myself with details of my career interests and experience. With dedicated and sustained efforts, it took me almost a year until I managed to join CHAI Myanmar in 2017.

My first position was a mid-level programmatic role to lead several work streams that supported national disease control programs in Myanmar. I always feel privileged as the position offered me the best opportunities to engage in CHAI's typical transformative work supporting national programs to establish and effectively scale up delivery of treatment services in the public sector.

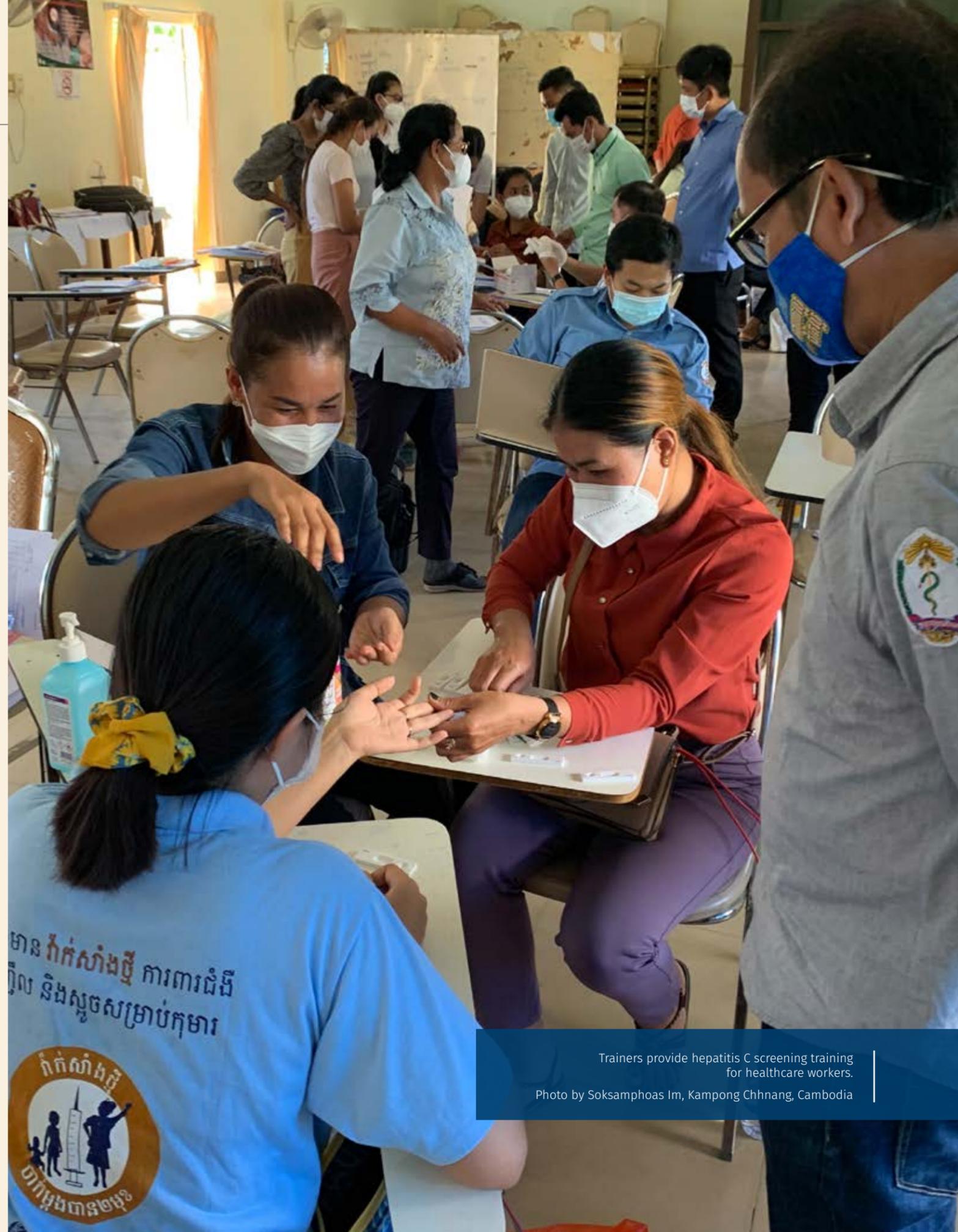
I learned how countries like Myanmar and others in the region could expand access to new medicines, such as direct acting anti-viral drugs (DAAs) for hepatitis C, in an efficient way that addresses the value for money. I also learned how global health organizations like CHAI could effectively assist governments in leveraging delivery of public health services to those most in need to treat major infectious diseases like HIV, tuberculosis (TB), malaria, and hepatitis C. I knew that this work was driven by CHAI's core mission to save lives, values that embrace working with urgency and entrepreneurship. It was also driven by CHAI's inherent culture of achieving transformation.

I spearheaded the introduction of a public-private partnership which was considered innovative for health programs in Myanmar at the time. Within a few months after its launch, the initiative—with the commitments of public hospitals, clinicians, private labs, pharmacies, and local distributors—guaranteed several hundred patients living with hepatitis C access to World Health Organization (WHO) pre-qualified DAAs at locally negotiated subsidized prices. The initiative contributed to better national coverage for hepatitis C treatment, where access to quality DAAs had been much constrained.

This was an example of CHAI's typical transformative success while working with urgency to save lives of the people.

After a year-long break from CHAI in 2018 to equip myself with senior management experience externally, I returned in early 2019 to accept the role of Deputy Country Director for Myanmar. My current role has opened further opportunities for me to learn about CHAI's programmatic and operational work.

Unlike my prior experience with other agencies who were working on humanitarian and emergency programs, I recognize CHAI's approach to working with urgency as a different but transformative way of saving lives. During the COVID-19 crisis in 2020, we adapted program operations to maintain our engagement with the national programs and provided necessary supports to ensure their vital services continued to be delivered despite growing demands and overload on the health systems. For me, working with CHAI for over three years has meant working with urgency in a way that could otherwise be unimaginable and impossible to save lives.



Trainers provide hepatitis C screening training for healthcare workers.  
Photo by Soksamphoas Im, Kampong Chhnang, Cambodia

# MARKET SHAPING

**Our programs aim to save lives and reduce disease, while helping governments create sustainable health systems. Our global team of science, business, and technical experts support the entire organization in that goal.**

## *Better access to affordable, quality lab services*

Many countries in Africa have clear goals for their public lab networks—to provide patients with affordable, quality access to diagnostic services. However, progress against these goals has been challenging and demand for public services is growing faster than many countries can deliver. Private companies have valuable experience and capacity that can help to fill the gaps and improve public laboratory networks’ ability to deliver quality services.

With funding from the Bill & Melinda Gates Foundation and the European Investment Bank, CHAI is partnering with **Ethiopia, Ghana, Kenya, Rwanda, and Senegal**, to build public-private partnerships that improve public diagnostic services. The initiative is called the African Health Diagnostic Platform (AHDP).

In 2020, through AHDP, CHAI worked with ministries of health and finance to evaluate the current system against governments’ goals and design public-private partnership opportunities to help deliver on these goals. In addition, CHAI helped governments rigorously assess priority public-private partnership opportunities for their legal, financial, environmental, and operational implications. These assessments, known as feasibility studies, typically take 12 to 18 months. However, because CHAI worked hand-in-hand with the governments so they could effectively own and drive the process, the countries completed the

feasibility study in less than a year. After listening to our government partners’ needs, CHAI also secured an expansion in scope of what AHDP can support—including a broader set of diagnostics, such as imaging services.

Rwanda’s public lab services are effective but are often disease siloed in their management while supporting systems remain underinvested. When instruments break down, it results in interruptions to service, while functioning instruments may see limited or delayed use because there is no formal national system for sample transportation or the timely delivery of results. The strain of COVID-19 has only made the situation worse. CHAI helped Rwanda evaluate its diagnostics network and assessed testing and referral needs across the country to inform instrument placement, staffing, and integrated testing of different diseases on the same diagnostic platforms. When the pandemic hit, CHAI joined the government’s COVID-19 response team to leverage existing lab infrastructure and set up additional systems for immediate testing needs. This included point-of-care devices and rapid antigen test kits that ensure timely results for clinicians and patients to make appropriate care decisions.

In **Zambia**, there was no approval process for the introduction of new diagnostic equipment and commodities in public labs. In 2020, CHAI created a multi-disciplinary committee to gather and review global best practices. We then supported the Ministry of Health to develop a national standard operating procedure (SOP). The SOP is now awaiting official launch and is expected to significantly reduce turnaround times for approval processes.

In **Nigeria**, CHAI worked with the government to decentralize testing for multiple diseases and reduce turnaround times for results, ensuring

patients get the treatment they need as quickly as possible. To that end, in 2020, CHAI facilitated the inclusion of point-of-care diagnostics for multi-disease testing within the National Treatment Guidelines. Regulatory approvals for diagnosis can be lengthy and complex, causing a bottleneck when introducing new technologies and commodities. We worked with the government to reinstitute the National Health Laboratory Task Team, which mapped out roles and responsibilities for key stakeholders and significantly streamlined the approval process.

*CHAI works hand-in-hand with governments to ensure their needs are driving project scope.*



A community health worker sets up rapid diagnostic tests at University College Hospital.  
Photo by Ade Adebajo, Ibadan, Nigeria

# WOMEN AND CHILDREN'S HEALTH

Far too few women and children worldwide have access to the essential, quality health services and nutrition they need not only to survive, but thrive. As a result, every year more than 300,000 women die of pregnancy and childbirth complications; another 300,000 die from cervical cancer; 2.6 million infants die within the first weeks of life, and millions more children and adolescents suffer avoidable deaths from malnutrition, pneumonia, diarrhea, or vaccine-preventable diseases.

CHAI, together with our partners, supports governments in low- and middle-income countries to reduce maternal and newborn deaths and ensure women have access to the tools they need to safely plan their families; scale up safe, affordable cervical cancer screening and treatment of precancerous lesions; increase access to recommended treatments for diarrhea and pneumonia, the largest killers of children under five; combat chronic malnutrition, and make vaccines that protect against childhood illnesses more affordable.



A data collector conducts exit interview with a client.  
Photo by MTE Photography, Kaduna, Nigeria

# CERVICAL CANCER

Cervical cancer is one of the most preventable types of cancer, but continues to be a leading cause of death for women in low- and middle-income countries. Ninety percent of the more than 300,000 global deaths from cervical cancer each year are in these countries, largely due to lack of access to affordable, high-quality services for both prevention and treatment.

With support from Unitaid, CHAI is working with partner governments to catalyze the use of newer high-quality, low-cost pre-cancer screening and treatment technologies.



**87,600**  
Patients reached with screening and linkage to treatment in the seven countries where we work

The launch of the World Health Organization's (WHO) cervical cancer elimination strategy in November 2020 renewed focus on the wide gap in prevention, treatment, and deaths from cervical cancer between high-income and low- and middle-income countries. It also showed the potential significant impact of scaling up cervical cancer services in these countries.

CHAI is helping to build on the substantial momentum created by the launch of the global strategy to advocate and support partner governments. Through this work, we are partnering with governments to help them reach their targets to significantly reduce cervical cancer cases and

save lives. Innovative technologies, such as self-sampled human papilloma virus (HPV) testing for screening and portable thermal ablation and loop electrosurgical excision procedure (LEEP) devices for treatment, offer the opportunity to make widespread scale up of screening and treatment for precancerous lesions affordable and achievable.

Despite the challenges of the COVID-19 pandemic, CHAI helped ensure this work continued in 2020. We supported governments to train health workers on screening and treatment technologies and expanded capacity and access to the new devices in health facilities, adapting to virtual trainings when possible, and ensuring COVID protocols were met when in-person training was necessary. This work created a pool of national and sub-national trainers and mentors, reaching 87,600 women with screening and linkage to treatment in the seven countries where we are working.

To help make these devices affordable, CHAI performed a detailed global product landscape and engaged with the two global suppliers of quality assured portable thermal ablation devices. With support from Unitaid, we negotiated pricing agreements that ultimately brought the price of thermal ablation devices down by about 50 percent, greatly improving affordability and potential for scale up.

In 2020, we worked with governments to review and strengthen health information systems for cervical cancer. In **Rwanda** and **Zambia**, we helped introduce or strengthen national-level electronic medical records systems for improved data quality and completeness. In **South Africa**, we partnered with an app developer to build a cervical cancer-specific module to facilitate communication between healthcare providers and strengthen and shorten the triage and referral process.



**50%**  
Price reduction of thermal ablation devices due to negotiated pricing agreements

We are also supporting a multi-partner effort to develop an artificial intelligence-based tool, Automated Visual Evaluation (AVE), to aid health workers in accurately screening for pre-cancer. During 2020, the AVE consortium made progress toward algorithm development, using hundreds of images from partner sites in Zambia. The consortium developed the on-phone AVE application, with input and feedback from government program managers, frontline clinical staff, and CHAI team members.

In 2021, CHAI will work to finalize development of the algorithm and initiate studies to assess AVE's performance in real-world screening settings.

## Scaling up screening and treatment

**Nigeria** contributes significantly to the global burden of cervical cancer cases with an estimated 14,000 women diagnosed each year. A quarter of women diagnosed with cervical cancer die from the disease, making it the leading cause of female cancer deaths in the country. These deaths are largely due to a lack of access to effective prevention services, such as routine screening and treatment at health facilities, low awareness about the disease, inadequately trained personnel for service provision, and poor follow up and linkage to care. Cryotherapy, which is commonly used for treatment of precancerous lesions, is cumbersome, expensive, and impractical at large scale.

Partnering with Unitaid, CHAI began work in 2019 to scale up routine screening and treatment of pre-cancerous lesions across public health facilities in Lagos, Rivers, and Kaduna states to reach 430,000 women with cervical cancer screening and treatment over two years. CHAI is working with the government to identify and bring optimal tools to market at affordable prices and make them widely available to trained providers at health facilities. We are helping generate demand to lower costs and build capacity for appropriate treatment provision and follow up in care.

In 2020, we worked with the government to develop a national training manual, job aids, and patient tracking and management tools for cervical cancer secondary prevention. These aids were adopted as national training materials. CHAI helped train 977 frontline health workers (including 162 doctors, 491 nurses, and 324 community health workers) to provide high-quality cervical cancer secondary prevention services across the three program states. We helped introduce newer and cost-effective technologies for treatment of precancerous lesions, distributing 412 thermal ablation and 43 LEEP devices to 177 program sites.

By the end of 2020, the program had screened over 2,000 women for cervical cancer. Of these, 130 were positive for pre-cancer and 117 were treated using the newly introduced treatment devices in the first month of program implementation.

Like many other programs, it was critical to quickly adapt during the pandemic, using virtual platforms for workshops and trainings to ensure disruptions were minimized. We supported the government to resume delivery of essential services, including cervical cancer screening and treatment, in line with COVID-19 protocols.

Health workers from 60 local government areas in Lagos, Rivers, and Kaduna were sensitized and trained on COVID-19 standard infection protocol and control procedures. In addition, we supported the 177 cervical cancer secondary prevention program sites with face masks, hand sanitizers, and soap to protect workers and patients.

## WOMEN AND CHILDREN'S HEALTH

CHAI also supported the WHO with costing the Nigeria National Strategic Plan on Prevention and Control of Cervical Cancer 2017-2021. The costed plan details the resources and expenditures necessary to eliminate cervical cancer. The completed report was launched in 2020 along with the global strategy for cervical cancer elimination.

Working in conjunction with CHAI's Laboratory Services team and country teams, CHAI's Analytics and Implementation Research team supported the roll out of pilot programs in **Uganda, Malawi, Zimbabwe, and Senegal** to provide HPV testing at the point-of-care.

Cervical cancer is also the leading cause of cancer death in Uganda. Traditionally, cervical cancer screening has relied on visual inspection of the cervix with acetic acid (VIA) in the country. This treatment is cumbersome and, as a result, not well-used, leading to screening of less than 10 percent of eligible women. Screening for HPV provided an optimal and effective tool due to its cost and ease of integration into the existing testing program.

CHAI supported the Ministry of Health to develop and pilot an optimal model that leverages GeneXpert diagnostic devices that are often used at lower-level facilities across the country and high throughput platforms at the Central Public Health Laboratories (CPHL) to integrate HPV testing into routine healthcare workflows, with the option for women to self-collect their own samples. We also helped enable a catalytic distribution of portable thermal ablation devices at active pilot screening sites to demonstrate the feasibility of using these novel point-of-care treatment devices for quicker and more effective screening.

Working with partners, we are using emerging evidence from the pilot to help inform government planning, quantification, and budgeting and to ensure there is partner buy-in on sustainable scale up and deployment of new screen and treat technologies. The project has demonstrated that HPV testing with self-collected samples were used by 97 percent of women and reached

more women with screening. Ninety-one percent of those screened were first time users. It also showed that integrating HPV testing on existing GeneXpert devices that conduct tuberculosis (TB) and early infant diagnosis (EID) for HIV is highly feasible and that portable thermal ablaters could be easily deployed to lower-level health facilities with less specialized health worker cadres in place of traditional cryotherapy devices that are complex and costly to use.

The evidence generated from this project informed the government's decision to adopt HPV testing nationally as the preferred primary cervical cancer screening tool and thermal ablation as the primary tool for treatment of eligible precancerous lesions. With support from partners including CHAI, PEPFAR, and the Global Fund, the Ministry of Health is now transitioning from traditional VIA-based screening and cryotherapy-based treatment and scaling up the novel, highly accurate and easier to deploy HPV tests and portable thermal ablation and LEEP devices. Consequently, 604 cervical cancer screening sites will be activated in 2021—a significant scale up from the initial 15 pilot sites.

In Senegal, CHAI supported the Ministry of Health to implement a three-month pilot to demonstrate the feasibility of HPV screening and treatment of precancerous lesions as a routine procedure in health centers. GeneXpert testing devices were optimized to perform HPV testing. We supported the Ministry to train staff, including 12 lab technicians, 56 midwives, and eight gynecologists, to perform HPV testing and treatment of precancerous lesions and procured 2,000 cartridges to test for HPV and four thermal ablation devices for treatment in four target districts. As a result, over 1,580 women were screened, 12 percent who were found to have HPV and 77 percent of them received further diagnosis or appropriate treatment.

**India** also contributes significantly to the global cancer burden with an estimated 1.7 million new cases and 800,000 deaths each year. It is the second leading cause of cancer deaths for women, much of which is driven by late-stage detection

and poor access to screening and treatment. Since 2010, the Indian government has initiated multiple programs to improve access to care for non-communicable diseases, including cancer. However, implementation on ground has been slow and systemic and operational challenges have hindered success. CHAI has engaged with key stakeholders at the national and state levels and partners to prioritize the need for secondary prevention of cervical cancer.

Guidelines developed by the Ministry of Health and Family Welfare in 2019 recommend the use of thermal ablation at secondary level health facilities. These devices, as well as LEEP, require approval from the Central Drugs Standard Control Organization (CDSCO). As such, access to treatment of precancerous lesions has been limited. Timely screening has also been hampered by a lack of awareness from patients on cervical cancer prevention and limited uptake.

CHAI is working in the state of Madhya Pradesh to strengthen and support interventions to improve access to screening and prevention. We are working with the state government to ensure availability of trained workers and tools to facilitate screening. To ensure services continue during the pandemic, we have helped the government repurpose trainings online and materials have been updated to include measures to minimize risk for COVID-19. We are also working to increase access to treatment by facilitating device manufacturers and in-country distributors to meet key regulatory requirements and approval from the CDSCO to enable importation of thermal ablation and LEEP devices into the country. At the same time, we are supporting the state government to build provider capacity and catalyze deployment of treatment devices to enable screen and treat services for cervical cancer at public health facilities.

CHAI is also helping strengthen monitoring and referral mechanisms to ensure all women in need are linked to treatment. We are also working with the government to develop a comprehensive demand generation strategy to raise awareness about cervical cancer prevention and mobilize

women to go for screening. As a result of this work, CHAI is now in discussion with other state governments and partners to scale this work nationally. Using work in Madhya Pradesh as a model, we are supporting deployment of treatment devices at select health facilities across other states to increase treatment capacity, facilitate decentralization, and improve access to newer and better treatments across the country.

In Zambia, CHAI is supporting the Ministry of Health to scale up and decentralize cervical cancer prevention and treatment services. In 2020, CHAI helped the government procure 110 thermal ablaters and 60 LEEP devices which were distributed at health facilities with a commitment of offering decentralized prevention services across the country. Despite the pandemic, CHAI supported the government to safely move forward with cervical cancer screening and treatment plans which continued to grow from 130 screening sites at the end of 2019 to 180 at the end of 2020, screening over 1,300 women in some of the most remote and underserved areas of the country.

To ensure these efforts are scalable and sustainable, we are supporting the government with a national cervical cancer resource mapping exercise to help establish clear roles for partners and avoid duplication of efforts. We supported the Ministry of Health in revising and aligning national cervical cancer training manuals and guidelines, supporting training for 18 cervical cancer screening and LEEP providers, 15 data managers, and 15 biomedical engineers to ensure that the program is sustained at the national level. Zambia also hosted a virtual National Cancer Conference shared lessons learned from the region with the global level.

In 2020, the government of Rwanda recommitted to the elimination of cervical cancer and participated in the WHO launch of the global strategy to accelerate the elimination of cervical cancer. With support from Unitaid, CHAI introduced cervical cancer screening with HPV tests, treatment of precancerous lesions with thermal ablation, and use of patient electronic records in three districts.

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Previously cervical cancer screening in Rwanda was done with VIA and the treatment of precancerous lesions was done with cryotherapy, which is only accessible at the secondary health care level and is not always available. Cervical cancer screening with HPV tests and treatment of precancerous lesions with thermal ablation is being integrated in the routine services provided at the primary health care level in five districts and it is planned to scale up the screen and treat model countrywide. Women who need advanced treatment are then referred to the secondary healthcare level for appropriate care. The project aims to screen around 70 percent of all women 30 to 49 years old. Patient data is recorded electronically using Open Medical Record System. Despite delays caused by the pandemic, thermal ablation devices with HPV test kits were distributed to 61 health facilities in targeted sites.

Integration of HPV testing on existing laboratory platforms has started in three out of the five targeted districts. In 2020, A total of 16,669 women were screened and 311 out of 369 women in need were treated for precancerous lesions. Out of 25 suspected cancer cases 21 have attended and received appropriate care. Training and post-training mentorship of providers on HPV testing and treatment with thermal ablation took place in three out of five districts and community health workers were trained on delivering key messages on cervical cancer for community mobilization. A total of 208 health providers working in 61 health facilities, 54 lab technicians, 60 data managers, and around 3,000 community health workers were trained. CHAI is planning to complete trainings in the remaining two districts and provide post-training and quarterly mentorship to health providers on screening and treatment.

### *Looking ahead*

In 2021, we aim to fully launch screening and pre cancer treatment services at all focal facilities in the project countries, with the goal of screening 400,000 women and strengthening linkages to treatment and follow-on care.

We will also launch the AVE app in a subset of early adopter countries to demonstrate its performance in real-life settings. We will continue to mobilize resources for cervical cancer services with an eye toward funding national scale up across the countries where we work.



A gynecologist speaks to a group of service providers about cervical cancer during an on-the-job training session.  
Photo by Izharuddin Qureshi, Madhya Pradesh, India

# DIARRHEA AND PNEUMONIA

Pneumonia and diarrhea are the largest causes of death for children under five globally. There are effective medicines and tools to diagnose and treat these conditions, but they are often unavailable in many low- and middle-income countries.

Fluid loss due to diarrhea kills over 400,000 children each year. Two simple, affordable treatments—zinc and oral rehydration salts (ORS)—can treat the illness. Together with the rotavirus vaccine, which prevents about 20 percent of deaths, we can put an end to nearly all deaths from diarrhea.

Pneumonia is a respiratory infection that kills over 800,000 children every year, with almost all deaths occurring in lower income countries. Preventing these deaths requires timely diagnosis and better treatment for both non-severe and severe pneumonia. Non-severe disease can be treated with Amoxicillin Dispersible Tablets (Amox DT). In severe cases, antibiotics are used to fight infection. However, children's lungs can fill with fluid quickly, and they will often die from lack of oxygen before the antibiotics take effect. Oxygen therapy can buy the body the time it needs to allow the antibiotics to work.

Many hospitals in the countries where CHAI works are not equipped to diagnose lack of oxygen or deliver oxygen to patients. Over 90 percent of facilities do not have pulse oximeters, simple handheld devices used to measure blood oxygen levels. Fewer than half of facilities have a reliable oxygen supply. Because of this, only 20 percent of patients who need oxygen are diagnosed, and less than half of those receive lifesaving therapy.

## Closing the oxygen access gap

CHAI has worked for years with partners and governments to sustainably increase access

to lifesaving treatments and diagnostics for pneumonia and diarrhea. In 2020, the worst pandemic respiratory illness in a century brought unparalleled attention to one aspect of that work—access to medical oxygen—and highlighted the life-threatening inequities facing millions of patients.

Medical oxygen is essential in fighting many respiratory illnesses, including pneumonia and COVID-19. But it is also used by patients in every corner of the hospital, from women in labor, premature infants, sepsis, or malaria patients, and those undergoing surgery. That is why CHAI has expanded our efforts on oxygen beyond the pediatric wards—we are working with our partner countries to increase access to oxygen to respond to COVID-19 today and build more resilient health systems for the future

## Improving pneumonia management

CHAI works across our partner countries to increase access to the drugs and tools needed to manage childhood pneumonia. Amox DT, which can effectively treat non-severe pneumonia, was not available in **Ethiopia** in 2015 when we started our market shaping work. Today, coverage is almost 100 percent. Further, 91 percent of admitted patients with severe pneumonia now have their blood oxygen measured by a pulse oximeter.

In **Kenya**, Amox DT was first introduced into the public sector in 2018. Doses distributed to counties across the country almost tripled in the first year from 688,000 to 2.03 million. Despite the complications introduced by COVID-19 in 2020, distribution of Amox DT increased to 2.3 million. The drug is now available in 61 percent of all health facilities, compared to two percent in 2018.

Across Ethiopia, **Nigeria, Uganda, Rwanda,** and **India** CHAI has focused on strengthening pediatric

oxygen systems. In 2020, this work, which has been ongoing for years, reached beyond children's health to support all patients fighting COVID-19.

In Nigeria and Uganda, CHAI worked with 56 hospitals to strengthen oxygen systems in pediatric wards—increasing oxygen and pulse oximetry coverage rates to at least 75 percent across all pilot facilities.

In Madhya Pradesh, India, CHAI supported improved access to oxygen for children at all public health facilities, including district hospitals, with oximetry screening rising from nine percent to 99 percent and oxygen administration from 24 percent to 88 percent. In addition, CHAI, along with UNICEF and the state department of health, launched Social Awareness and Action to Neutralise Pneumonia Successfully (SAANS), a national campaign to address childhood pneumonia. CHAI and UNICEF trained a cadre of master trainers to update doctors and nurses on the SAANS campaign, pneumonia management and oxygen therapy delivery. CHAI collaborated with AIIMS Bhopal to support the government of Madhya Pradesh to design the first-ever medical oxygen and fire safety guidelines for the state; including instructions on rational use of oxygen, equipment maintenance, facility infrastructure, clinical standards, and fire safety measures in hospitals. CHAI also supported the government to train healthcare providers on clinical use of oxygen and management of oxygen systems. Going forward, CHAI will redouble efforts to intensify care-seeking for children under five with pneumonia and resilient oxygen systems.

In Kenya, we began work with suppliers to reduce the cost of oxygen in 2017, after which we supported counties to invest in expanded oxygen coverage all the way down to primary health levels. As a result, oxygen coverage at primary health facilities in 26 counties increased from under 30 percent to 70 percent. Many counties also invested in more affordable and efficient onsite oxygen distribution systems, leading to 10 facilities installing bulk liquid oxygen and piping infrastructure. CHAI's work in the oxygen space set the foundation for our support of the national COVID-19 response in 2020. We provided technical assistance to the government, including the donation of approximately 2,000 handheld oximeters to over 1,000 health facilities, which pushed coverage rates from six to 48 percent within months. We also trained health workers on the use of the oximeters and correct use of oxygen to treat patients.

CHAI supported Rwanda to develop a national strategy to rapidly scale production of oxygen in public hospitals. In 2020, only five of seven oxygen plants at public hospitals were operational and these plants were only functioning at 64 percent of their total capacity due to maintenance challenges. Additionally, clinicians were underdiagnosing patients' oxygen needs. CHAI worked with the Ministry of Health to train providers and biomedical technicians to ensure the right amounts of oxygen were getting to patients and the equipment was functional. We also helped conduct a national respiratory care capacity assessment—in just one week—to quickly quantify



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real oxygen needs and inform production and procurement decisions.

Ethiopia saw the largest gains. CHAI helped the Federal Ministry of Health create its first oxygen roadmap in 2016. The ambitious goal was to establish 13 large oxygen-producing plants and enough portable oxygen devices—known as concentrators—to deliver oxygen to patients in every health center in the country. By 2019, Ethiopia had procured more than 3,000 concentrators and established five new plants.

Across 32 district hospitals in four regions, patients in pediatric inpatient departments now had access to pulse oximeters, up from 45 percent to 100 percent in 2019. Directly due to this, all children who needed it were prescribed oxygen therapy. By the end of the year, at least two health workers in every pediatric department or neonatal intensive care unit had been trained on how and when to provide oxygen therapy. At least one biomedical engineer at each facility had also been trained on maintenance of oxygen devices and pulse oximeters.

Then the pandemic hit. Demand for oxygen far exceeded Ethiopia's prior goals—as it did in all of CHAI's partner countries. But for Ethiopia, the investments already made to address oxygen shortages gave the country a head start. CHAI is working with our partners in Ethiopia and beyond to support countries' efforts to stay ahead of the pandemic by driving wider access to oxygen. In the process, we can build the systems necessary to avert tens of thousands of deaths from many conditions and medical complications, as well as childhood illnesses like pneumonia.

### Scaling up effective diarrheal treatment

CHAI has worked with governments in India, Ethiopia, Kenya, Nigeria, and Uganda since 2012 to scale up access to zinc and ORS. The program used a holistic approach to address both supply and demand barriers that countries faced.

In Uganda, CHAI transformed the market from relying on donor subsidies that crowded out local companies to a competitive market characterized by high volumes and affordable products. As a result, zinc and ORS coverage increased from under one percent in 2011 to 30 percent by 2016, which is one of the highest coverage rates among high-burden countries globally.

Nigeria has also made substantial headway in eight CHAI-supported states. We worked with the states to tailor demand generation, provider education, and supply chain interventions. CHAI also catalyzed national supply by helping introduce more than ten new zinc and ORS products to market. The increased competition led to a 70 percent decrease in wholesale prices—from US\$1.55 to US\$0.41. This work has helped increase national zinc and ORS coverage from under one percent in 2013 to 23 percent today.

Similar gains have been made in Kenya, India, and Ethiopia, where coverage, especially in rural and underserved communities, has increased exponentially. In Ethiopia, zinc and ORS are available in almost every single pharmacy, health clinic, or other facility where patients seek treatment.

In Kenya, ORS and zinc co-packs were introduced to the market in 2015 to address the disconnect in uptake of these two drugs together, which was driven by dispensing each as a single product. Currently, over two million co-packs have been issued in the public sector.

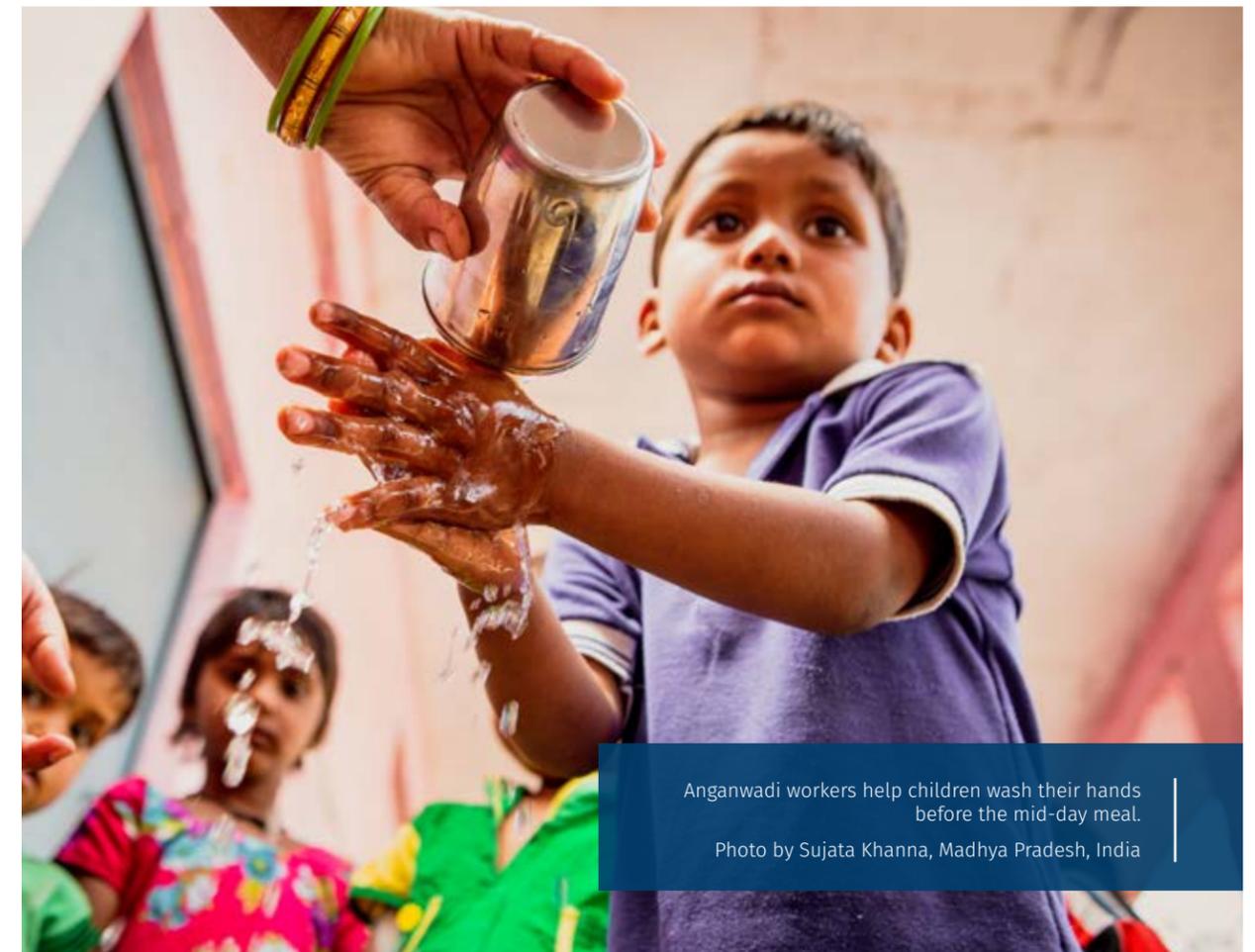
In addition, in India CHAI worked with the national Ministry of Health, UNICEF, and Save the Children to develop and launch guidelines for the management of pneumonia and diarrhea during COVID-19, as well as the Intensified Diarrhea Control Fortnight, a set of activities to prevent and control deaths due to dehydration from diarrhea. These guidelines helped frontline workers continue to raise awareness of diarrhea as well as recommended treatments, even during COVID-19 lockdown.

### Looking ahead

In the year ahead, CHAI will continue to expand our work to make medical oxygen more accessible to the patients who need it most—ensuring investments made to respond to COVID-19 will help create long-term, sustainable oxygen systems well into the future.

We will also continue our work to ensure children are treated for diarrhea and pneumonia. While many children have been spared the direct mortality impacts of COVID-19, there are many

indirect effects of the pandemic, such as overall strain on health systems, disruption of services such as immunization programs and antenatal care, that will result in increases in child deaths. This makes it more critical than ever to ensure children are able to access the essential medicines they need to fight the biggest killers of children in the world.



Anganwadi workers help children wash their hands before the mid-day meal.

Photo by Sujata Khanna, Madhya Pradesh, India

## STAFF REFLECTION



### ELIZABETH MCCARTHY

Senior Director, Analytics and Implementation Research team

My first job out of university was as a community health volunteer with the United States Peace Corps in rural Madagascar. This two-year experience, immersed in Malagasy culture and language, laid the groundwork for my career in global health.

Later, when I worked from the Peace Corps office in Antananarivo, I met people whose work was focused on prevention of HIV, particularly among women. The intersection of economic vulnerability, infectious disease, and limited resources in the health sector was the challenge I felt compelled to try to tackle with my career. After graduate school and a fellowship with the U.S. Centers for Disease Control and Prevention (CDC), in 2005 I moved to Boston and discovered CHAI.

CHAI's Chief Medical Officer at the time was pulling together a small operations research team focused on the scale-up of HIV treatment programs in low- and middle-income countries. The hope of using treatment as prevention and HIV as a blueprint for improving primary healthcare more generally drew me to CHAI. I was eager to work for this newly established fast-paced organization. I was hired to join the nascent operations research team, which expanded significantly over the years. Today, I lead that team—the Analytics and Implementation Research (AIR) team—and work on HIV along with almost all of CHAI's core programmatic areas.

In 2010, my husband and I moved to Zambia with our two small kids, planning to stay a year or two. Those two years turned into 11. Working alongside the CHAI Zambia

team has been an incredible opportunity that has deepened my understanding of CHAI as an organization. In Zambia, I have forged strong bonds with colleagues at the Ministry of Health and partner organizations. I was honored to be invited in 2018 to deliver one of the keynote speeches at the Zambia Health Research Conference on the topic of bridging the gap between research and policy. My role as a leader of a team that works across CHAI allows me to focus deeply on Zambia as well as the more than 30 countries where we work. CHAI's approach to achieving transformative success with urgency while working collaboratively across our many teams is energizing.

One example of this approach in action was work that my team did alongside the global HIV and Zambia country teams to avert HIV infections through the scale up of the voluntary medical male circumcision (VMMC) program. In March 2007, the World Health Organization (WHO) and UNAIDS issued a joint statement recommending that VMMC "be recognized as an additional important intervention to reduce the risk of HIV." The recommendation was based on strong evidence from three randomized control trials in Kenya, Uganda, and South Africa, showing that VMMC reduced the risk of heterosexually acquired HIV infection in men by approximately 60 percent. Modeling studies suggested that scale up of male circumcision could have a significant impact on the epidemic, preventing 5.7 million new cases and three million deaths over 20 years. There was no blueprint for transforming these clinical research trials into policy and practice.

In 2009, the VMMC program in Zambia was officially launched as a national program. CHAI was asked to work alongside the Ministry of Health and implementing partners to develop a 2012-2015 operational plan that would serve as a road map to national scale up. Using the CHAI values of urgency and transformative success, I helped lead the development of this plan that was precise and data-driven, establishing district-level targets and providing clear guidance on how to optimize service delivery. As of December 2020, over 2.7 million men in Zambia had been circumcised. Circumcisions conducted as of 2017 are projected to avert about 170,000 new infections through 2030 and about 520,000 infections through 2050.

CHAI's strengths have never been more apparent than this past year with our ability to react with urgency to the COVID-19 pandemic. CHAI's technical expertise in diagnostics, therapeutics, vaccines, epidemiology, mathematical modeling and supply chain along with our

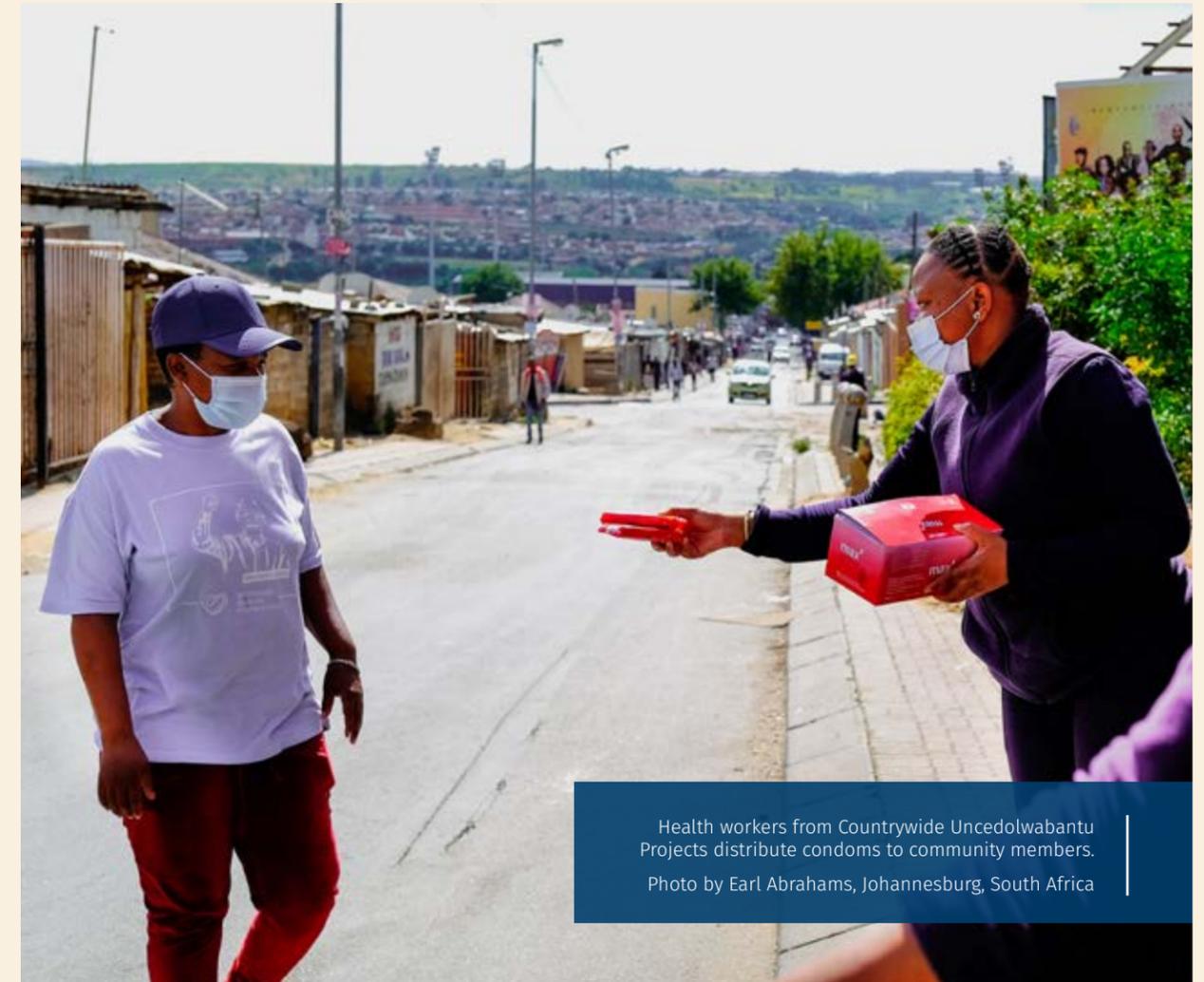
role as a trusted strategic partner in countries around the globe put us in a strong position to help countries prepare and respond to COVID-19.

For me, working at CHAI represents an opportunity to harness the strengths of an organization to collectively take on some of the hardest problems. Leading a team that sits at the cross-section of CHAI, my plan going forward is to continue to develop, test, and implement innovative strategies that address complex global health challenges.



**CHAI's strengths have never been more apparent than this past year with our ability to react with urgency to the COVID-19 pandemic.**

—Elizabeth McCarthy



Health workers from Countrywide Uncedolwabantu Projects distribute condoms to community members. Photo by Earl Abrahams, Johannesburg, South Africa

# MATERNAL, NEWBORN, AND REPRODUCTIVE HEALTH

Almost all women who die from pregnancy and childbirth complications—hundreds of thousands each year—do so in low- and middle-income countries. Unintended pregnancies, particularly among adolescents, significantly contribute to these deaths.

Simple and effective interventions can prevent unintended pregnancies, treat pregnancy and labor complications, and save the lives of newborns. However, many countries face challenges in implementing these interventions in a reliable and timely way. CHAI has developed an integrated approach to address these challenges, reaching women throughout their reproductive years with the education and resources to safely plan births, support healthy pregnancy and delivery, and allow newborns to thrive.

## Scaling up our approach to save the lives of women and newborns

CHAI's integrated approach to address maternal, newborn, and reproductive health was first piloted in **Ethiopia**, before being tested at scale in **Nigeria**. The program, with funding from ELMA Foundation and other donors, is now rolling out across several other countries to significantly and sustainably reduce mother and infant deaths.

CHAI has partnered with **Zambia** since 2018 to implement the program in two provinces. We currently operate in all 12 districts of Northern Province and one district in Western Province, covering 146 health facilities. The program focuses on building the health system's capabilities across the districts to ensure potential complications during pregnancy and delivery are identified

early to prevent them becoming life-threatening; applying simple interventions immediately to ensure survival; and quickly referring patients to the correct health system level for appropriate treatment.

In 2020, we began preparing for a gradual and systematic transition of the program to the government to sustain the gains made over the last three years. This included securing funding commitments to sustain key interventions beyond the program, including the use of non-pneumatic anti-shock garments (NASG), devices used to treat shock, resuscitate, and stabilize women suffering obstetric hemorrhage; a community motor bike ambulance (MBA) program, which has strengthened referral systems and increased access to transportation in emergencies; and a health worker mentorship program, which led to a significant increase in access points for basic emergency obstetric and newborn care from a baseline of zero percent to 80 percent.

In **South Africa**, CHAI is partnering with the government to significantly and sustainably reduce maternal and neonatal mortality as well as institutional stillbirths through a program running in four districts: Ehlanzeni, Mpani, Nelson Mandela Bay, and Sarah Baartman. The program is underpinned by a locally led Quality Improvement approach. The approach enables local health workers to target and strengthen quality of services tied to leading mortality drivers, including management of preeclampsia, hemorrhage (tied to provision of safe caesarean section), preterm births, and birth asphyxia.

Restrictions on travel due to COVID-19 presented a unique challenge for Quality Improvement teams

but the program quickly shifted to provide remote support through Zoom, WhatsApp, and email to ensure services continued. At the same time CHAI began working with the National Department of Health and partners to develop guidelines to support clinicians and frontline workers in decision-making for maternal and neonatal health during the pandemic.

The program in **Uganda** faced similar challenges as those in South Africa and Zambia during the pandemic. Initial lockdowns meant women had access to significantly fewer maternal, newborn, and reproductive health services. With transport options severely limited, women and girls struggled to travel long distances to health facilities. The ban on large gatherings necessitated a hold on program meetings, clinical and school outreach, and community engagement. By April 2020, the Ministry of Health was reporting nationwide decreases in institutional deliveries and more late referrals for obstetric emergencies due to transportation challenges.

Despite this, when the lockdown lifted CHAI worked with the Ministry of Health and six districts to maintain services and even improve family planning, antenatal care, and institutional delivery rates.

We strengthened primary healthcare services by developing a data-driven strategy to guide upgrades to primary health facilities. Upgrades comprised infrastructure, including new maternity wards and placenta and medical waste pits; supply chain and referral system strengthening; and

increasing staff capacity, including midwives. The approach is now being scaled nationwide.

We also supported the Ministry to institutionalize the Maternal and Perinatal Death Surveillance and Response (MPDSR) across all the districts. Through MPDSR, causes of death are identified and action taken to prevent future deaths. CHAI's clinical mentorship approach was also fully integrated and adopted into the Ministry's strategic plan.

CHAI piloted a community-owned motorbike ambulance model in Kibaale district, which has proven successful in other countries. Our broader referral interventions in Uganda included support for ambulance repair and clarification of referral routes in all six districts. As a result, facilities with a functional ambulance or access to one has increased from 24 percent to 45 percent within six districts. The number of patients who received emergency transportation within less than an hour and a half also increased from 12 percent to 23 percent.

Leveraging this success, we supported the construction and pending launch of the first national call and dispatch center to coordinate emergency medical services across Uganda during the pandemic and beyond. We are now working with the Ministry of Health to raise funds to set up regional call and dispatch centers across 13 other regions in the country.

A related emergency transportation system, called the m-mama program, was introduced in **Lesotho** in 2020. Funded by the Vodafone

 **>3,000**  
Women transported to nearest medical facility by motor bike ambulance in Zambia

 **21%**  
Increase in number of facilities with access to an ambulance in Kibaale district, Uganda

 **>5,000**  
Routes mapped out for emergency referrals as part of Lesotho's m-mama program

*Family planning services declined drastically due to COVID-19 restrictions. CHAI and governments worked quickly to help those services rebound when lockdowns lifted*

Foundation through Touch Foundation, the program launched in three districts to better connect 59 health facilities. Before the launch, CHAI was responsible for facilitating district and sub-district stakeholders' buy-in and ownership, setting up an emergency transport dispatch center, recruiting emergency drivers in the community, and raising awareness about the services in surrounding villages. As in many other countries, this work paused when Lesotho locked down in response to COVID-19. When the lockdown lifted, CHAI fast-tracked execution of the work to maintain the original deadline. As a result, in the last four months of the year, CHAI, working with district Emergency Transport Services teams, introduced the program to over 1,000 providers, village health workers, and facility management members; completed setup of the dispatch center; mapped out more than 5,000 routes for emergency referrals; and recruited over 700 community drivers in three initial program districts.

### **Supporting women's reproductive health during the pandemic**

The COVID-19 pandemic also threatened to limit access to essential, lifesaving reproductive healthcare for women and girls in 2020. Across CHAI partner countries, we observed a decline in services as initial lockdowns reduced clients' movement.

In response, CHAI quickly published guidance for ministries of health on maintaining access to services during the pandemic, while protecting the health of clients and clinicians. This included approaches to adapting service delivery, sharing key safety messages with clients, infection control and prevention, and supply chain considerations. As a result, we saw a rebound in services being provided. In Zambia, the rapid uptake of family planning services actually exceeded pre-pandemic numbers.

Use of long-acting reversible methods (implants and IUDs) also grew quickly across all partner countries, likely as clients chose options that required less frequent interactions with facilities due to the risk of COVID-19. Unlike many other contraceptives, long-acting reversible contraceptives can be provided to women immediately following birth, while they are still at a health facility.

In **Cambodia**, where only 39 percent of women use modern contraception, CHAI rolled out an enhanced mentorship program to increase health worker skills and confidence in providing reproductive health services including family planning, managing stock availability, and accurately reporting outcomes. In parallel, CHAI's supply chain support contributed to dramatic reductions in commodity stock outs: facility stock out rates of IUDs or implants in the past 90 days dropped from 91 percent at baseline to 1 percent at the end of 2020. As a result, there was a drastic increase in public sector access to services in CHAI's two focal provinces. The proportion of facilities providing long-acting reversible contraceptives increased by 510 percent between 2018 and 2020, resulting in a 30 percent increase in overall provision of family planning.

Subcutaneous injectable contraceptives (DMPA-SC) are another type of contraceptive, which women can inject themselves. CHAI supported the rollout of DMPA-SC in **Malawi, Myanmar, and Ghana**. In Malawi, CHAI's technical support enabled 100 percent of health facilities to offer the product. Malawi is the first country to reach this milestone.

More than 30,000 women are choosing DMPA-SC every month, with about 30 percent choosing self-injection. In Ghana, uptake of the product has more than tripled and in Myanmar, the injectable market grew by 48 percent.

In **India**, CHAI supported the state of Madhya Pradesh's response to COVID-19 with phone outreach to frontline workers. The team contacted over 32,000 workers and ensured maintenance of critical reproductive health commodity stocks as well as advised on protocols for community and home distribution to avoid disruption of services during initial lockdowns.

When lockdowns lifted, CHAI supported Madhya Pradesh to ensure that sexual and reproductive health services were reinstated and oriented district teams on the use of virtual platforms for capacity building. In fact, despite COVID-19 restrictions, there was a significant increase in service volumes, with a 191 percent uptake in injectable contraceptives.

Similarly, when **Liberia** locked down in March 2020, CHAI adapted support to address the Ministry of Health's needs during the pandemic. CHAI was the Ministry's lead partner in coordinating the infection prevention and control (IPC) pillar of the national response. This included developing IPC measures for services such as antenatal care, labor and delivery, postnatal care, and family planning.

Despite disruptions to routine services throughout the year, CHAI also continued to support the Ministry to improve sexual and reproductive health services, including mentoring providers, strengthen supply chains and establish national reproductive health guidelines. As a result, by the end of the year the seven counties where CHAI works saw total couple-years of protection (CYP) increase 27 percent between 2018 and 2020; the number of facilities providing long-acting reversible contraceptives jump 171 percent; and stockouts of these contraceptives drop from 83 percent in 2019 to 33 percent in 2020.

### **Increasing youth-friendly health services**

Globally, complications of pregnancy and childbirth are the leading cause of death among adolescent girls. Teenagers have a disproportionately high unmet need for contraception. Stigma related to contraceptive use and pregnancy outside of marriage often result in unintended pregnancies. Since 2018, CHAI has worked with several countries to increase access to reproductive health services for adolescents.

In Uganda, CHAI works with the Ministry of Health in six districts to train health workers to offer quality, judgment-free care to adolescents. Today, 90 percent of facilities in the districts qualify as youth-friendly sites. Outreach to communities has also proved successful, sensitizing leaders to the importance of teens' reproductive health and ensuring schools are able to refer students to nearby facilities. As a result, over the last two years, the number of new contraceptive users between 10 and 24 years old more than doubled.

**Eswatini's** adolescents report they are most likely to get their information about sexual and reproductive health from peers—an unreliable source. Additionally, studies have shown that youth access services at a variety of disconnected points, turning to pharmacies for emergency contraception, hospitals to manage sexually transmitted infection, and youth centers for general information. CHAI worked with the country's sexual and reproductive health unit to assess 35 facilities and highlight challenges to youth-friendly service delivery. Based on the findings, we supported the Ministry of Health to revise national adolescent youth service guidelines and train local service providers. In 2020, 93 nurses (six percent of all nurses in the country) and 433 support workers were trained on youth-friendly health standards, norms, and the barriers teenagers faced in accessing services.

In Zambia, addressing high rates of teenage pregnancy has been challenging in part due to

## WOMEN AND CHILDREN'S HEALTH

lack of information available about adolescents, which is needed to guide the development of solutions. In 2020, CHAI worked with the Ministry of Health to develop an adolescent health age disaggregated data tool. Disaggregated data breaks down information by detailed sub-categories, such as age, to reveal patterns that can be masked by larger data groups.

The tool was deployed in 146 facilities to track use of adolescent health services. With the data collected, CHAI identified districts with high rates of teenage pregnancies and launched a community awareness campaign in those districts to increase knowledge and demand for appropriate health services. As a result, in the targeted districts, births to teens 19 years old and under dropped from 29 percent in 2018 to 15 percent in 2020. The age disaggregated data tool has now been adopted by the Ministry of Health.

**Sierra Leone** has one of the highest rates of teenage pregnancy in the world at over 21 percent, with almost half of all deaths among adolescent girls related to childbirth complications. CHAI works with the Ministry of Health to increase access to and uptake of family planning, particularly for adolescents and postpartum women. In 2020, we worked together to increase uptake of long-acting reversible contraception by 61 percent, by strengthening provider training, developing national protocols, and increasing the number of facilities where women could access contraceptives.

We also introduced immediate postpartum long-acting contraceptive services within hospitals. CHAI introduced a human resources database to record all trainings and identify gaps in coverage. By the end of the year, 65 percent of hospitals had an implant trained provider and 70 percent had an IUD trained provider. CHAI also worked with national and district counterparts to strengthen reproductive health quantifications, distribution, and data visibility to substantially reduce stockouts in facilities.

### *Eliminating congenital syphilis*

Syphilis is the second leading cause of stillbirths globally. Each year, a million pregnant women are infected with the disease leading to about 350,000 stillbirths, miscarriages, newborn deaths, preterm births, and congenital anomalies. Benzathine penicillin G (BPG) is a low-cost, generic, and widely available drug that can effectively prevent congenital syphilis yet testing and treatment remains low for pregnant woman across sub-Saharan Africa and parts of Asia.

CHAI is catalyzing efforts to eliminate congenital syphilis globally. In 2020, we continued to work to ensure access to treatment, strengthening global supply security for BPG, contributing to an 85 percent reduction of countries reporting shortages. Together with WHO and others, CHAI is now documenting and sharing lessons learned to support an even wider scale up.

We are also working with six countries: India, Ethiopia, **Kenya**, Nigeria, South Africa, and Uganda. We are significantly improving syphilis diagnosis in mothers by catalyzing access to WHO prequalified rapid diagnostic tests (RDTs) and by leveraging existing national antenatal care programs. In many countries, almost all women are tested for HIV during these visits, but less than half are tested for syphilis.

In India, this gap is primarily due to the lack of point-of-care syphilis testing kits and laboratory support at primary and community health facilities. In response, CHAI worked with the Ministry of Health to introduce point-of-care dual HIV and syphilis RDTs to screen women during antenatal care visits. To ensure there was enough supply to meet the increased demand, we identified potential dual RDT suppliers and helped them navigate the product registration process.

As a result, eight states, representing approximately 25 percent of the national pregnancy burden, began procuring dual RDTs – four million kits to date. Between 2017 and 2020, syphilis screening among pregnant women

had more than doubled, reaching 60 percent. In addition, dual RDTs cost about the same as a single HIV or syphilis test, making it more cost efficient to offer universal screening of HIV and syphilis among pregnant women.

CHAI also piloted the introduction of dual RDTs in Nigeria. CHAI helped procure 55,000 dual RDTs and 1,000 vials of BPG for distribution across 31 antenatal care facilities. As a result, over 40,000 pregnant women were tested for HIV and syphilis. Of these, 106 women were diagnosed with syphilis and received lifesaving BPG treatment.

Based on the success of this pilot, PEPFAR Nigeria has committed to supply dual RDTs to all pregnant women accessing antenatal care services across PEPFAR-supported facilities, as part of the program's national scale up. Both dual RDTs and BPG have been included in national supply planning to ensure the program's sustainability.

In Uganda, CHAI increased syphilis testing during antenatal care visits from 57 percent in 2018 to 85 percent in 2020 with the introduction of dual RDTs. We supported national efforts to build a reliable supply of BPG treatment as well as the capacity of health workers to screen and treat syphilis.

In South Africa, we advocated for the first national tender for procurement of dual and single syphilis RDTs, marking the first time dual RDTs have been procured in the country and that syphilis RDT procurement has been pooled at the national level. CHAI is also working with the government's regulatory body to support three pharmaceutical suppliers in the process of registering BPG in the country.

We piloted dual RDTs in Ethiopia across 40 health facilities in four regions selected in collaboration with the government. In the process, CHAI procured 16,000 dual RDT test kits and trained over 150 health providers on syphilis screening and management. By the end of the pilot, 14,146 pregnant women were tested using the kits, of which 81 were diagnosed with syphilis and all but two received BPG. Based on the pilot, the

government has included dual RDT as part of its triple elimination strategy for HIV, syphilis, and hepatitis B. CHAI is working with the government to scale up testing and treatment nationwide.

The Kenyan Ministry of Health also introduced dual RDTs and committed funds to procure about a million tests. CHAI helped fill training gaps on the use of dual RDTs and BPG treatment across 11 counties. We also supported independent evaluations of suppliers to open the market in Kenya to more competition. We are currently working with the government to expand testing to additional population segments across the country.

### *Looking ahead*

As the ministries of health across CHAI's partner countries continue to respond to the unprecedented challenges caused by the COVID-19 pandemic, two common factors remain: women still want to manage their reproductive health and babies continue to be born. Tragically many mothers and their newborns continue to die during pregnancy and childbirth, exacerbated during a period of unique systemic stress.

Now more than ever, CHAI will support governments to strengthen their capabilities, sustaining gains made to date, responding to requests for support, and making progress toward sexual and reproductive health access. All with the ultimate objective of ensuring fewer maternal and newborn deaths.

# NUTRITION

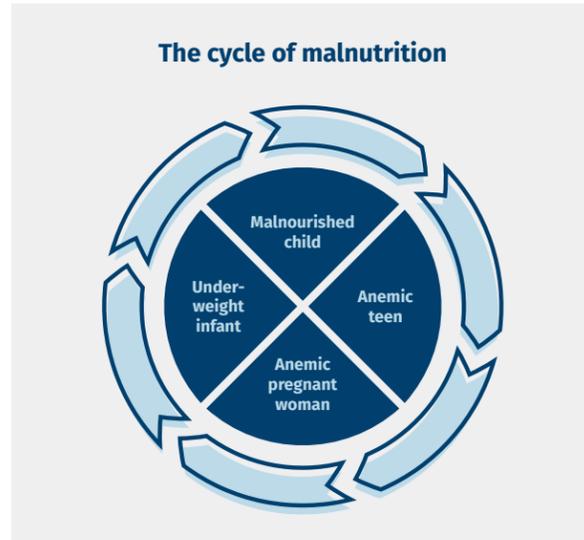
Malnutrition is a contributing factor in almost half of all childhood deaths globally. Approximately 149 million children under the age of five suffer from chronic malnutrition, which manifests in the form of stunting (low height for age) and an estimated 45 million suffer from acute malnutrition, which manifests in the form of wasting (low weight for height). But these are only outward signs of the damage that chronic malnutrition inflicts on a child. A lack of important vitamins and minerals in a child's diet also results in cognitive impairment and a less effective immune system.

Anemia—a lack of iron in the blood—can also be linked to malnutrition in both children and women, contributing to low birth weights and increasing the risk of serious complications during pregnancy. These two conditions, malnutrition and anemia, form an intergenerational cycle: a malnourished child is more likely to become anemic as a teen, who is more likely to have a risky pregnancy and deliver an underweight infant, who is more likely to grow into a malnourished child.

CHAI is working with governments to break the cycle of malnutrition and anemia. An important aspect of our work is improving access to high-quality, locally produced food and food production.

## Bolstering national supply chains

Since 2014, with the support of the UK Foreign, Commonwealth and Development Office (FCDO), New Zealand Ministry of Foreign Affairs and Trade (MFAT), and the Netherlands Development Finance Company (FMO), CHAI has worked with the government of **Rwanda** to improve access to locally-produced, high-quality blended foods for women and children. These nutrient-dense supplementary and complementary foods are distributed to children aged six to 23 months, pregnant women, and nursing mothers in the



poorest and most vulnerable households in the country to prevent the onset of stunting.

In 2020, CHAI helped the government ensure the nutrition program continued despite challenges introduced by COVID-19. During the country's lockdown early in the year, CHAI helped the national supply chain office manage distribution of the food supplements through home delivery. During the lockdown, CHAI conducted a rapid assessment to evaluate the program's effectiveness. Most beneficiaries (98 percent) received their supplement during the lockdown. Twenty-three percent received the delivery at home, while the rest traveled to the nearest distribution site to pick up their supplements. The survey also showed that 84 percent of children had eaten their supplement within the last week.

The data suggests that despite the challenges COVID-19 posed, the food supplements were accessible and being consumed by most beneficiaries. Throughout the year more than 190,000 children, pregnant women, and nursing

mothers received the supplements, compared to 117,000 the year before.

In **India**, CHAI, funded by the IKEA Foundation, works with Madhya Pradesh to address the burden of anemia and malnutrition among pregnant and lactating women, adolescents, and children. We supported Madhya Pradesh to improve the nutritional quality of food supplements distributed through the state's Integrated Child Development Services; increasing supplement availability at village health centers; and improving the formulation and availability of Iron Folic Acid (IFA) supplements distributed under the government-led anemia control program.

In 2020, CHAI helped deliver IFA supplements to 24 of the 51 districts in Madhya Pradesh with an innovative approach. We used excess capacity in the vaccines supply chain to deliver IFA supplements to communities in these districts. Based on the success of this approach, the state government decided to scale the solution to cover 28 drugs and commodities on the country's essential drugs list.

## Establishing centers of excellence to treat malnutrition

Over the last two years in **Mozambique**, CHAI, with funding from the FCDO, has helped establish 29 centers of excellence for childhood malnutrition.

The centers aim to ensure best practices are followed in the screening, diagnosis, case management, and treatment of moderate and severe malnutrition. A joint team of mentors from CHAI and the Ministry of Health helped train staff at health facilities in four provinces. The facilities also received equipment and nutritional supplements, which contributed to the treatment of over 113,000 children.

At the same time, we developed a simple database for hospitals with malnutrition wards, digitizing information that helped improve patient management.

Under the program, cure rates improved significantly. Almost all sites offering treatment for severe malnutrition attained cure rates above 75 percent, up from an average of 60 percent.

## Solving for contributing factors

In Madhya Pradesh, India, 36 percent of all child deaths under the age of 14 are caused by water-borne diseases, like diarrhea, associated with drinking contaminated water.

In 2018, CHAI partnered with Tata Trusts to pilot a community water treatment plant to provide safe drinking water to rural areas. The for-profit model engaged a local entrepreneur to co-invest in building and operating the plant. In its two years of operation, the plant has proved successful,



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servicing 3,500 people and employing four community members.

During the peak months of the pandemic, the plant was forced to close due to the country-wide lockdown. However, when restrictions were lifted, CHAI worked with the entrepreneur to resume services and generate demand among new customers, including schools and community health centers. Despite the challenges COVID-19 posed, the pilot's results have led the Madhya Pradesh government to scale up the model with 40 to 50 additional plants planned in other areas with poor water quality.

Globally, around one in 700 babies are born with a cleft lip or palate each year. A cleft lip or palate can impede adequate feeding or eating, resulting in severe malnutrition. Corrective surgery can improve children's diets and overall health.

Starting in 2019, CHAI, with funding from FCDO, supported the Ministry of Health in Mozambique's cleft lip and palate identification campaigns, partnering with community leaders and surgery teams composed of Mozambican doctors. As a result, community leaders and traditional healers identified 105 children in two provinces. They referred the children to two hospitals at which surgical teams were trained to perform corrective surgery. To date, the majority of the children have completed their operations. CHAI continues to support this initiative with the Ministry of Health to provide these life-changing surgeries.

### **Pivoting to support COVID-19 response**

During 2020, CHAI staff pivoted to support governments where help was needed most: responding to the outbreak.

In Rwanda, eight nutrition program staff helped organize the data flow of COVID-19 testing results, initially at the National Reference Laboratory and later expanding to district labs. This included the timely delivery of test results not only to patients,

but to the national contact tracing team. Results were shared within eight hours of testing to slow the spread of the disease.

The CHAI nutrition team in India supported the National Health Mission and Women and Child Development departments in Madhya Pradesh with policy formation, supply chain management, capacity building, and notably, awareness generation. CHAI worked with the State Rural Livelihood Mission to monitor and track dissemination of COVID-19 awareness training to self-help groups in selected districts. Prevention was the best strategy to avoid contracting COVID-19, and so it was crucial to inform both health service providers and the community at large about precautions they should take. Given the nationwide lockdown, CHAI used 130 of our government program coordinators, reaching out by phone to share facts about the mode of infection and ways to prevent it. This group, in turn, made over 125,000 calls over two months to relay the messages to frontline health providers and community representatives.

### **Looking ahead**

CHAI will continue to work with government partners to develop innovative solutions to reduce barriers in accessing nutritious food.

In India, 2021 is the last year of the IKEA Foundation-funded nutrition program. CHAI will therefore work toward a responsible transition to the government and other partners to ensure that interventions we helped introduce are sustainable long after CHAI steps back. In addition, we will disseminate the experiences and successes of our programs in Madhya Pradesh to other states to help them adopt best practices toward reducing anemia and malnutrition.



A woman prepares a food supplement ration, recently distributed in her village.  
Photo by Sujata Khanna, Madhya Pradesh, India

# VACCINES

Vaccines prevent an estimated two to three million deaths among children under five every year. Yet, one child dies every 20 seconds globally from vaccine preventable diseases such as tetanus, measles, and rubella because of poor quality cold chain infrastructures and a lack of access to lifesaving vaccinations among other reasons.

Immunization is key to preventing these deaths and is one of the most cost-effective public health interventions that exists, providing more than 16 times return on investment.

CHAI works with our partner governments and vaccine manufacturers to improve supply security and affordability of existing, second generation, and future vaccines for low- and middle-income countries, with an emphasis on new vaccine introduction. We also strengthen service delivery, supply chain management, and government capacity for sustained high performance of expanded immunization programs at both national and subnational levels. In addition, we enhance the performance of vaccine cold chain and logistics systems to increase effective immunization coverage while cutting total health system costs.

CHAI is supporting partner governments to increase access to lifesaving vaccines in 16 countries that represent over 50 million births per year. Overall, our market shaping work and support to improve global vaccine delivery policies benefit 73 countries, representing 78 million births each year.

## Supporting sustainable access to vaccines

In 2020, we also supported countries to prepare for, access, and roll out the COVID-19 vaccine. At the same time, CHAI supported countries to recover from drops in routine immunization coverage due

to the pandemic which had declined by nearly 30 percent compared to the same period in 2019. We helped resume routine immunization, enable health workers to provide vaccinations in-line with COVID-19 safety protocols, and improve vaccine cold chains and logistics systems.

Historically, **Papua New Guinea (PNG)** has the lowest rate of routine immunization coverage and the highest levels of child mortality in the Pacific region. In addition, difficult to access geographies and a critical shortage of health workers pose a challenge to health service delivery in the country.

In PNG, with support from the Bill & Melinda Gates Foundation, we successfully carried out operational research assessments at 67 healthcare facilities in the provinces of Morobe and Central to identify potential causes of low vaccine coverage and support the development of an enhanced, cost-effective, and sustainable model for outreach services. Using the results from the study, CHAI is helping the government implement a nation-wide outreach strategy to address the root cause of low routine immunization.

In 2020 we also helped the PNG government secure an additional US\$260,000 from Gavi, the Vaccine Alliance, to prepare a National Immunization Strategy (NIS) for 2021-2025 that will be critical to assist the government to strengthen the immunization system and transition from Gavi support. For this, CHAI conducted research at sub-national levels to generate evidence for policy-level decision making on vaccine rollouts including effective community outreach and service delivery strategy.

In 2020, we helped the government secure a US\$915,000 grant from PATH. Under the grant, we are working with the Central Province Provincial Health Authority (PHA), along with ChildFund and SuSuMaMas organizations to dramatically

improve routine immunization coverage, which was critically low in the Central Province. The partnership aims to strengthen the local health system, particularly the vaccine program, through a province-led approach to implement its annual and micro-plan activities in line with the National Health Plan. More than an estimated 7,000 children in the Central Province who have missed their vaccinations will benefit from outreach efforts from the campaign, saving thousands of lives.

The COVID-19 pandemic led to a 26-point drop in vaccination coverage in Yaoundé, **Cameroon**. This decline meant that over 10,000 children missed their routine vaccinations, leading to an outbreak of measles and vaccine-derived poliomyelitis. With funding from Gavi, CHAI supported the expanded program on immunization to develop guidelines on maintaining and sustaining immunization services amid the pandemic. We leveraged the guidelines to support the program in several areas, including in planning, trainings, supportive supervisions, mentoring of low performing sites, and tracking patients who discontinued treatment. These interventions contributed to a 12-point rise in coverage in Yaoundé, from 84 percent in May 2020 to 96 percent by September 2020.

Manoka health district in Cameroon has been registering low immunization coverage for the past two decades. In 2019, DPT-3—a combination of vaccines against diphtheria, whooping cough, and tetanus—coverage, was estimated at eight percent, which was the lowest coverage in Cameroon. Over 50 percent of the population of this district resides in CAP Cameroon, an islet which is home to nearly 900 “zero-dose” children, those that have never received any vaccination in their lives. This high number of unimmunized children makes this community highly susceptible to outbreaks of vaccine preventable diseases.

To address this inequity, CHAI, in collaboration with the expanded program on immunization, implemented targeted interventions such as placing a platform to deliver immunization services in the community, mapping of zero dose children, implementing community sensitization campaigns,

and supporting planning for an integrated outreach. As a result of these interventions, over 60 percent of zero-dose children received Pentavalent vaccines, which protect against five major diseases: diphtheria, tetanus, whooping cough, hepatitis B, and Hemophilus influenzae type b (DTP-hepB-Hib). In addition, over 500 children between the ages of 11 to 59 months received measles rubella vaccine.

In **Uganda**, the months of April and October are dedicated to Child Health Days, with the goal of reaching every child and woman with critical health services, such as catch-up vaccinations, deworming, nutrition supplementation, and family planning services. In 2020, we helped the National Immunization Program replan the Child Health Days missed in April due to COVID-19 lockdowns, increasing coverage for DPT3, measles and rubella virus vaccines to 90 percent up from below 80 percent during the lockdown period.

CHAI also supported the government to maintain a resilient supply and cold chain system during the pandemic. We worked with the government to secure US\$5.7 million for the 2019/2020 financial year for Bacille Calmette-Guérin (BCG) vaccine, used for the prevention of TB, (Bivalent Oral Polio) bOPV, measles, and (tetanus and diphtheria) Td vaccines through a data-driven advocacy approach which saw the overall government contribution increase by more than 100 percent. This injection of funding ensured that, despite the pandemic, vaccines used for routine immunization were never out of stock. We also worked with the government to develop grant applications securing US\$10.75 million in funding from Gavi to optimize existing cold chain capacity. Through these efforts, 608 new pieces of cold chain equipment (CCE) were deployed in 2019 and 996 in 2020. As a result, 97 percent of districts and 92 percent of health facilities across Uganda have sufficient cold chain capacity to meet their needs in 2021.

Similarly, in **Indonesia**, in response to service delivery disruptions due to COVID-19, CHAI supported the expanded program on immunization to develop a national guideline for conducting safe immunization sessions during the pandemic.

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CHAI disseminated the guideline to all 34 provinces via virtual meetings and continues to support monitoring of routine immunization coverage recovery. In places where the deployment of vaccines was lagging, we helped the ministry develop a vaccine catch-up plan to support the re-launch process. In addition to delivery disruption, COVID-19 also impacted budget allocation for routine immunization costs with more than 50 percent budget cut in most areas. CHAI introduced an immunization costing tool to strengthen subnational level EPIS' planning and budgeting skills. The tool helps them optimize their funding through activities prioritization, as well as identifying budget sources they could tap into.

In **Ethiopia**, CHAI, along with other immunization partners, supported the Federal Ministry of Health to conduct a measles campaign at the height of the pandemic. The campaign was critical due to a measles outbreak in the country, which if not controlled, could have led to a significant loss of life. The campaign reached more than 14 million children under five. The experience and lessons learned from the campaign were shared with other African countries during Eastern and Southern African expanded program on immunization managers meeting.

CHAI also conducted a rapid assessment to monitor the impact of COVID-19 on routine immunization during the months following the first reported COVID-19 case in the country. This assessment found the impact varied from region to region and we worked with the government to adapt WHO/UNICEF guidelines on routine immunization amid the pandemic. The guidelines were distributed to all health facilities with close supportive supervision to minimize disruption of services.

### Introducing new vaccines

CHAI helped national immunization programs in Uganda and **Kenya** plan for the introduction of lifesaving vaccines into their routine immunization coverage. We helped the countries submit new

vaccine support applications to Gavi for yellow fever and typhoid conjugate vaccines. In Kenya, CHAI also supported the government in switching suppliers of the pneumococcal vaccine from a European to an Africa-based manufacturer. This will lead to savings of up to US\$3 million dollars per year once the country transitions from Gavi support.

In **Sierra Leone** and **Lesotho**, we supported the introduction of the human papilloma virus (HPV) vaccine. Virtually all cervical cancers are caused by HPV, a common sexually transmitted infection. However, HPV vaccines and programs to screen and treat women for precancerous lesions offer the opportunity to eliminate cervical cancer.

In addition, in Sierra Leone, CHAI supported the expanded program on immunization to identify their HPV age cohort, complete a workplan, and establish an HPV technical working group to better plan, coordinate, and make decisions about rollout at all levels.

In Lesotho, the expanded program on immunization submitted a second Health System Strengthening (HSS2) grant proposal to Gavi. The original proposal was not approved and was recommended for review by the Gavi Independent Review Committee (IRC). CHAI was the technical lead in the review process, using a theory of change approach that responded to the feedback received from IRC.

Following this input, the IRC recommended the HSS2 grant for approval. Among the approved activities is the implementation of a last mile vaccine distribution program, which was first piloted by the expanded program on immunization and CHAI in 2018.

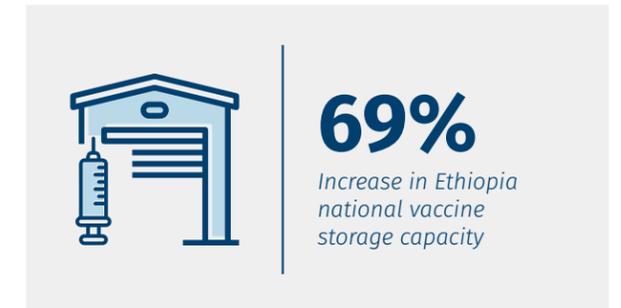
### Using data for decision making

CHAI, with Gavi support, has helped strengthen the Sierra Leone expanded program for immunization to use data for decision making in its routine immunization activities. CHAI developed a scorecard dashboard, which facilitated routine

immunization performance reviews at the national and sub-national levels. The scorecard is an Excel based tool, which allows users to compare the performance of facilities against each other based on select indicators, such as stock management, immunization rates, and reporting rates. CHAI also introduced monthly data review meetings in eight districts to measure progress against targets, identify challenges, and course correct. The data review meetings use the scorecard to assess vaccination performance at all public health units within a district, evaluate the quality of facility reports, identify challenges faced by poor performing facilities, respond, and resolve any issues that arise. To ensure sustainability, CHAI provided mentorship and training to over 400 immunization staff at national and sub-national levels on the use of reporting tools, data analysis, monitoring and evaluation, and periodic forecasting and quantification of vaccines.

With the introduction of the scorecard, it has become easier to track how much stock is available, which facilities to prioritize, when and by how much to replenish the stock across the country's 16 districts and in more than 1,600 public health units. Overall, the scorecard has helped improve immunization rates across all levels of care. Additionally, there has been an increase in stock reporting rates from an average of 43 to over 90 percent. The data review meetings have also improved communication between the district health management team (DHMT) and the EPI central team, resulting in a quick turnaround time in resolving stock management challenges, vaccine distribution, and training gaps, leading to improved immunization services.

In response to COVID-19, CHAI developed a COVID-19 Impact Tracker Dashboard to understand its impact on immunization services across the districts, chiefdoms, and facilities. The tracker informed a catch-up campaign strategy to address the lag in vaccine service delivery for the next year. CHAI played a leading role in the coordination of the COVID-19 vaccination rollout as well as the monitoring of vaccination data and stock management. CHAI supported the development of



the national vaccine deployment plan, setting up a monitoring and evaluation system, logistics, and distribution strategy for vaccines, identification of prioritized beneficiaries, as well as the production of situational reports, which are disseminated widely among partners, key decision makers, and the general population.

### Improving vaccine supply and cold chains

CHAI works to improve cold chain and vaccine supply security and negotiate better prices with manufacturers to make their temperature-controlled supply chains more affordable. Reliable cold chains are essential because when vaccines are exposed to high or freezing temperatures, they are likely to lose their potency and become ineffective.

In Ethiopia, the government's national cold storage capacity became insufficient when new vaccines were added to the immunization schedule. To solve the issue, initially, the Ethiopian Pharmaceutical Supply Agency (EPSA) rented cold rooms to store new vaccines arriving from manufacturers. However, this was not cost-effective in the long-term, so in 2020 CHAI worked with the government to install five new cold rooms and one freezer room on government property.

The installation of the cold rooms and one freezer room increased the national level storage capacity by 69 percent, saving the EPSA approximately US\$1.3 million in rental fees it paid annually. In addition, CHAI assisted with the relocation of two

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cold rooms from the Regional Health Bureau (RHB) to EPSA hubs in Mekelle and Bahir Dar, which also added to the overall increase in the storage capacity. We trained six EPSA technicians to do similar installations in the future.

In **Vietnam**, to maintain vaccine potency, it was important to replace aging vaccine refrigerators. CHAI supported the deployment of 590 new TCW4000 vaccine refrigerators, which come installed with ice lining and can act as the cold source during power cuts, to provincial and district level facilities in all 63 provinces in the country under the Cold Chain Equipment Optimization Platform (CCEOP). CCEOP is a Gavi-led project that aims to strengthen vaccine supply chains and achieve better immunization equity and coverage, particularly among low- and middle-income countries. We also collaborated with the expanded program on immunization to develop vaccine storage and management trainings for over 500 staff at district and provincial levels. Finally, we improved cold chain market visibility and decision-making for national and provincial governments by conducting a market study to map equipment availability in Vietnam's marketplace.

In Indonesia, CHAI supported the National EPI in calculating cold chain capacity at the primary healthcare level. Data collected is being used by the National EPI to procure necessary cold chain equipment for each work area. This cold chain equipment procurement was part of COVID vaccination preparation that was planned to start in early 2021.

In Sierra Leone, with support from The Global Fund, CHAI supported the Directorate of Pharmaceutical Services (DPS) to improve the Logistics Management Information Systems (LMIS), which the Ministry of Health uses to manage its vaccine supply chain. We developed analytic dashboards for the system and trained the DPS to use it to aggregate, analyze, validate, and display data from all levels of the logistics and supply chain system.

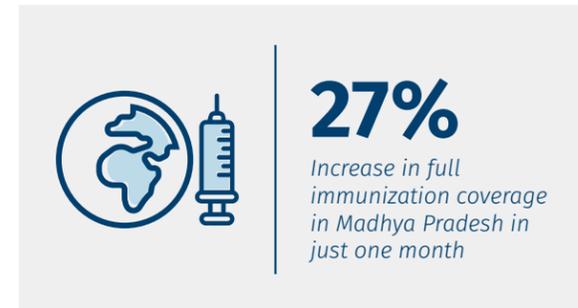
When COVID-19 hit, stock supply became a high-priority issue for the government. Working with our government and donor partners, we updated the

national health platform to better track vaccine stock availability for each disease program. CHAI supported the government to complete virtual trainings for district and program staff to ensure they understood all necessary information on the platform and could perform monthly data reviews.

To build the capacity of the National Medical Supply Agency (NMSA), which is responsible for the procurement, quantification, and distribution of medical commodities, we trained a team of super users, key decision makers responsible for vaccine supply chain troubleshooting of mSupply, a LIMS used to manage and track medical supplies from one warehouse to another. Subsequently, we helped roll out the system to three additional districts. We also regularly monitored the mSupply system usage at sites, providing feedback to the NMSA to help ensure up-to-date visibility of stocks within districts.

In **India**, CHAI works with the states of Bihar, Madhya Pradesh, and Uttar Pradesh, which account for 42 percent of annual births in the country, to strengthen childhood immunization systems. Among these states, Bihar's immunization coverage stood at 71 percent in 2019-20, while Uttar Pradesh's coverage was close to 65 percent in 2018. Given its population size, a high percentage of all under-immunized children in the world are from Uttar Pradesh. In all three states, lack of awareness regarding vaccinations and fear of adverse events following immunization are the biggest contributors to under-immunization.

In 2020, additional challenges were introduced with the temporary suspension of maternal and child health services, including immunization, during initial lockdowns due to COVID-19. When lockdowns lifted, CHAI supported the resumption of services. We worked with the states to establish a culture of evidence-driven decision making, helped managers identify challenges hindering the program's progress, and develop contextualized strategies and action plans to address low coverage rates. In addition, we provided robust and wide-ranging monitoring in priority communities to ensure the program reached its target.



In India, a community development block is a district subdivision, responsible for rural development and administration. In Uttar Pradesh, CHAI also conducted assessments in 48 blocks to better understand why children were not getting immunized. The assessments comprised data analysis and interviews with program managers, frontline workers, and the community. The exercise led to a nuanced understanding of the barriers that existed, including scarcity of community mobilizers and the lack of uniform immunization reporting formats. As a result, we helped district and block authorities develop action plans to address these challenges. In addition, we helped train more than 130 government supervisors to carry out supportive supervision of the routine immunization program in a particular district, which has since seen a manifold increase from zero to 400 supervision visits in two months.

In Bihar, CHAI worked under the guidance of the State Routine Immunization Cell to complete a comprehensive review of the program and craft long-term strategic plans to help the state reach its goal of 90 percent immunization coverage. The multi-year roadmap presents more than 40 high impact interventions across the program that are in line with government priorities, easily integrate with existing systems, and are sustainable, all phased over short-, medium-, and long-term horizons.

In Madhya Pradesh, CHAI supported the revision of service delivery protocols to align with WHO COVID-19 safety guidelines and developed a video to train 170,000 health and frontline workers. The video contributed to the rapid

recovery of immunization coverage rates, with full immunization coverage increasing from 38 to 65 percent in one month. We also developed and piloted an immunization wheel, which acts simultaneously as a job-aid for frontline workers and an information tool for caregivers, helping them calculate due dates for routine immunization. The wheel helps reduce dropout rates and improve timeliness of immunization, while also offering a visually appealing tool to drive retention.

### Looking ahead

We will continue working with partner governments to reach more children with lifesaving vaccines. We will help support countries to optimize outreach, identify unvaccinated and under-vaccinated children, understand the role of private sector facilities in immunization provision, and integrate immunization into other primary health services.

We will continue to support countries to introduce new vaccines in 2021 and beyond, as well as adjust new vaccine launch protocols in a COVID-19 context.

We aim to complete and disseminate CHAI lessons learned and tools, including scaling and sustaining performance management practices, financial and programmatic sustainability, primary healthcare integration, funding transition assessment, and risk analysis, to improve management practices and processes in our partner countries.

To improve vaccine supply, we will continue to look for solutions around vaccine stockouts at lower levels of the supply chain. We will also move forward with cold chain equipment deployments, trainings on cold chain planning and equipment maintenance and perform some larger assessments, which were delayed due to the pandemic.

Finally, we will continue to support all our partner countries to ensure their cold chains are ready for the rollout of COVID-19 vaccines.

## STAFF REFLECTION



### MEENAL KUKREJA

Manager, Immunization, India

I joined CHAI in a search of new opportunities in the development sector, but little did I realize that this would be an experience unlike any other. Before joining CHAI, I dabbled across a few sectors including legislative research, financial analytics, organization transformation, and government advisory. Most recently, I worked with a government advisory firm, where we supported a large municipality in streamlining and accelerating city development projects. This experience cemented my interest in working with the government on optimizing their resources and processes for better beneficiary facing outcomes. I was looking for a policy area to specialize and immerse myself when I came across upon an opportunity with CHAI India's immunization team.

During the first field visit that I undertook to Madhya Pradesh, I interviewed a medical officer in charge of the single public health facility in the rural town that we visited. He was the only doctor in the facility on call that day and patients from far away villages had come to be seen by him. While we asked him questions, a senior woman approached the doctor and asked him to examine her. The doctor politely asked her to wait and then turned to us to answer our questions. When the doctor turned back to us and spoke of the challenges he is facing, there was a look of utter exhaustion and helplessness on his face. That look stayed with me and has inspired me consistently to look for solutions to make the lives of our health workers easier as they work so hard to deliver critical services even in the most resource constrained situations.

I am happy to say that our team is actively working on tools and approaches that support medical officers and other frontline health workers to deliver services to the last mile, including building managerial capacity, utilizing effective data-based program reviews, and developing techniques to optimize resources. We are also working with the government to institutionalize rewards, recognition, and mentorship mechanisms that can acknowledge the hard work and provide frontline health workers on the job with functional and behavioral support.

“

**[I am] inspired to look for solutions to make the lives of our health workers easier as they work so hard in resource constrained situations.**

—Meenal Kukreja

The most memorable times that I have had at CHAI have been the end-to-end process of conceptualizing and setting up of immunization system strengthening projects in the states of Uttar Pradesh and Bihar, which account for approximately a third of annual births in India.

I say this often to new team members—and I mean it—that CHAI is one of the best organizations to work for. It has a culture that encourages individuals to think deeply, challenge themselves, stumble, fail, and even make a fool of themselves. Today, I am proud to say that I have failed several times during my tenure at CHAI, and each of these failures have brought to me critical life lessons and made me the person that I am today.



Accredited Social Health Activists (ASHAs) receive training at an anganwadi centre.  
Photo by Satvir Malhotra, Madhya Pradesh, India

## GLOBAL HEALTH SCIENCES

**Our programs aim to save lives and reduce disease, while helping governments create sustainable health systems. Our global team of science, business, and technical experts support the entire organization in that goal.**

### ***New products to fight persistent health challenges***

Long-acting injectable products provide an alternative to daily or weekly pill regimens and make it easier for patients to stay on their medication—especially for those who live in remote areas where accessing care can be difficult.

In 2020, with funding from Unitaid, CHAI began work with the University of Liverpool School of Pharmacy to develop long-acting injectable products to prevent malaria, treat latent TB infection, and cure hepatitis C. Currently, treatment for these diseases are daily oral regimens, in some cases of multiple pills per day, but an injectable medication would mean potentially a single dose of treatment.

Lack of quality, affordable, long-acting contraceptive products can also leave women without adequate family planning options. In 2020, CHAI's Product Development and Regulatory Affairs team worked with a generic supplier to expedite registration of a competitively priced and quality assured depot-medroxyprogesterone acetate intramuscular (DMPA) injection. The product is now registered in **Burkina Faso, Democratic Republic of Congo (DRC), Malawi, and Zambia** and is under review in five additional countries.

### ***Supporting point-of-care research***

CHAI supports countries to improve test turnaround times for multiple diseases by scaling up point-of-care diagnostics. This enables more rapid clinical decision making, treatment, and monitoring, which leads to better patient outcomes.

In 2020, the Analytics and Implementation Research team evaluated the effectiveness of point-of-care testing for early infant diagnosis of HIV compared to centralized laboratory-based testing in 52 facilities across DRC, **Cameroon, Ethiopia, Kenya, Senegal, and Zimbabwe**. With point-of-care testing, 72 percent of infants received their results on the same day and HIV-positive infants were six times more likely to start treatment compared to those who received their diagnosis one or more days later.



A community health assistant performs a malaria test on a boy at Chipeso Rural Health Centre.  
Photo by Jason J Mulikita, Chibombo District, Zambia

# UNIVERSAL HEALTH COVERAGE

Despite significant increases in access to healthcare over the past few decades, half the world still lacks basic health services. COVID-19 has only exacerbated pressures on health systems.

In 2020 alone, up to 124 million people were pushed into extreme poverty, the majority of whom live in sub-Saharan Africa and South Asia.

Many governments are committed to achieving universal health coverage. This means everyone, including the poor and vulnerable, has access to the essential services they need, when and where they need them, without paying more than they can afford.

Investing in primary healthcare is a crucial first step toward universal health coverage and the most cost-effective way to save lives.

CHAI is working with governments to build the capacity of local health workforces, and sustainably strengthen and finance health systems to achieve universal health coverage, beginning with primary healthcare. There is no one formula to design, plan, finance, and manage health systems. Every country is different. While the goals may be similar, the priorities and approaches to carry them out cannot be the same.



A nurse conducts a follow-up hearing consultation at the Lukomba Rural Health Centre.

Photo by Gareth Bentley, World Health Organization, Kapiri Mposhii District, Zambia

# HEALTH FINANCING

Regardless of the funding available, the way health is financed can have a massive impact on a country's health system and disparities in health outcomes. With support from Sida, the Bill & Melinda Gates Foundation, International Decision Support Initiative (iDSI), Irish Aid Ethiopia, the U.K. government's Foreign Commonwealth and Development Office (FCDO), Global Financing Facility (GFF) through the World Bank Group, the Global Fund, and others, CHAI works with governments to align external resources with government priorities and strengthen tax and insurance-financed systems to improve efficiency, equity, and sustainability.

## Adapting to COVID-19

Over the last year, CHAI has partnered with ministries of health to respond to COVID-19 and the impact of the pandemic on financing and access to essential services. This included response planning, resource mapping to track and allocate domestic and donor financial and in-kind support, and strengthening decision-making tools and processes to prioritize the use of limited resources.

In **South Africa**, CHAI partnered with academic institutions to set up a COVID-19 modelling consortium to equip decision makers with the information they needed to make difficult choices on policy, testing strategy, and targeting resources to increase funds dedicated to COVID-19 response while reducing the impact on other essential services. We also supported the National Department of Health to allocate US\$1.3 billion for COVID-19 and other health sector needs.

We supported governments to use resource mapping—the tracking of donor and government funding flows to health—to quickly identify gaps and coordinate new resources to the areas of greatest need in the COVID-19 response. This

involved helping countries develop proposals to large donors, including successful submissions to the Global Fund COVID-19 response mechanism from **Eswatini, Malawi, Zimbabwe**, and **Burkina Faso**.

As funds were secured, CHAI worked with governments to increase visibility on how resources were allocated to maintain continuity of essential services. In Malawi, we supported the completion of a resource mapping exercise for COVID-19, which allowed the government to track the allocation of domestic and donor resources thematically and by geographic area to identify gaps in care and promote coordination in a context where there are many non-governmental organizations (NGOs) and donors working across the country. In Eswatini, CHAI developed a tool to track income from financial and in-kind grants against expenditures on the government's COVID-19 response to better allocate resources, ensure transparency, and reprogram any unspent resources to other areas.

CHAI also worked with governments to monitor the impact that COVID-19, and in particular, lockdowns, had on patients, continuity of services, and cash flow to frontline health centers and workers.

**India's** national health insurance scheme, which targets the country's poorest and most vulnerable, saw a nearly 60 percent decline in hospital admissions during initial COVID-19 lockdowns. CHAI worked with the National Health Authority to determine which types of services were in decline and which geographies and populations were most affected. The findings were used by state governments to target their response, including directing communication drives to the right audiences and fast tracking contracting of new private providers in underserved areas.

Finally, we worked with governments to strengthen the role of community health workers, local health centers, and the private sector to increase quality services closer to where people live. In Zimbabwe, for example, CHAI helped the government resource, train, and equip over 1,200 community health workers and provide them with essential personal protective equipment (PPE), to deliver primary care services to people's homes, stemming the disruption of services when there were movement restrictions in the country.

## Setting priorities in a more constrained environment

The core of CHAI's health financing work involves supporting governments to make decisions about how to allocate limited resources across their entire health system to maximize equitable health outcomes. In 2020, the economic impact of the pandemic made this work even more critical as governments faced more difficult trade-offs.

In South Africa, CHAI assisted the National Department of Health to address budget cuts due to the COVID-19 crisis (projected at between five and eight percent annually from 2021 to 2023). We worked to prioritize the most cost-effective services that address the greatest need for the most vulnerable, while continuing to focus on understanding and addressing financing and service delivery barriers. In Eswatini, CHAI supported the Ministry of Health to define priorities for the new financial year and provide evidence to strengthen the Ministry's 2020-2021 FY budget bid to allocate finances to these priorities. This resulted in a budget increase of 18 percent, even as total government revenues declined.

**Rwanda's** community-based health insurance (CBHI) scheme covers the majority of the informal sector in the country. While informal sector coverage is high relative to other settings, utilization is growing, and the country faces pressure to expand services, placing strain on the program's sustainability. In 2020, CHAI worked with the Ministry of Health and the Rwanda

Social Security Board (RSSB) to evaluate and improve sustainability, including developing a more robust process for deciding which services would be included in the benefits package. For example, we worked with iDSI to demonstrate a process to assess the potential for coverage of dialysis services and minimally invasive surgeries, engaging stakeholders across the public and private sectors. RSSB is working to integrate this participatory and evidence-based practice as part of routine government decision-making and use the approach to revise the benefits package in 2021 towards improved sustainability.

## Sustainable financing and better management of primary healthcare

Governments remain committed to the goal of universal health coverage beginning with primary healthcare. COVID-19 has only further illustrated the importance of primary healthcare systems to mitigate the impact of the next pandemic. In 2020, CHAI worked with national ministries of health and subnational governments to address barriers to the financing, management, and delivery of primary care.

CHAI is helping the **Mali** government implement ambitious primary healthcare reforms announced in 2019. Primary care is mainly delivered through community health centers. CHAI is working with the Ministry of Health and Social Development to strengthen access to quality care at these centers. This includes renovating the centers, rehabilitating their infrastructure, and procuring new equipment for them. We are also helping develop a national accreditation system to strengthen the centers' management, governance, and service quality. This supply side strengthening package will help prepare for eventually making health services free at points-of-care for priority groups, including children under the age of five, pregnant women, and those seeking family planning services.

In **Nigeria**, Kano state set out to finance and deliver an affordable minimum service package, which aims to deliver a basic set of essential

## UNIVERSAL HEALTH COVERAGE

services. CHAI is working with the state government to assess local service availability, quantify funding gaps, and develop phased approaches to upgrade and finance services over time. CHAI also worked with the State Contributory Health Management Agency to design and expand insurance coverage to those who need it most. In 2020, over 17,000 poor and vulnerable pregnant women and children were successfully enrolled in the program with funding from the World Bank Saving One Million Lives Performance for Results Project.

CHAI supports District Health Management teams in Malawi to improve finance systems, planning, and management of primary healthcare in a decentralized system. In 2020, CHAI scaled up support from two districts to seven, working closely with these teams to build leadership and management capacity as well as evidence-based budgeting and planning. This included the development of district implementation plans and an action tracker, which assesses progress against the district implementation plan goals. The tracker offers the government insight into the main barrier to service provision: bottlenecks in the financing systems at national and district levels, including diversion of resources toward financing debts and emergencies, delayed release of funds, and COVID-19 disruptions. CHAI is now working with the district teams to establish a community of practice that will share challenges and solutions between peers.

Many governments are increasing autonomy of districts and providers to respond to changing health needs, including by paying providers for services delivered or outcomes achieved.

For example, in **Ethiopia**, CHAI is working with the CBHI to pilot changes in how funds are pooled and providers paid, with the goal of improving equity, efficiency, and sustainability of the system, as well as the quality of care received. In 2020, CHAI supported the Ethiopian Health Insurance Agency to test a shift from paying providers for services delivered through a 'fee-for-service' model to paying providers ahead of time with a set amount per beneficiary through 'capitation.' CHAI and the

Insurance Agency, in collaboration with regional health bureaus, implemented the new model in four pilot and four control woredas across the Oromia and Southern Nations, Nationalities, and Peoples' (SNNP) regions. Initial feedback indicates that capitation is contributing to continuity of services by providing a more consistent source of funding, enabling participating health facilities to reduce stockouts and reliably procure drugs and needed supplies. This experience is being leveraged in work with other countries, including Rwanda.

### Looking ahead

As governments and donors face increasing resource constraints exacerbated by COVID-19, CHAI will continue our support to preserve access to essential health services and sustain momentum toward universal health coverage. This will include an increased focus on COVID-19 recovery and health systems resilience, with many governments prioritizing work to strengthen primary healthcare systems.

We will continue to partner with governments to assess existing primary healthcare and financing systems; align external and domestic resources against priority areas; strengthen domestic financing systems to efficiently and equitably manage a greater share of donor and domestic funds and sustainably finance services over time; and improve how services are delivered and managed.



A peer mentor provides feedback to a medicine vendor at his shop.  
Photo by MTE Photography, Kaduna, Nigeria

# HEALTH WORKFORCE

A skilled workforce is the backbone of every health system, yet the World Health Organization (WHO) estimates a shortage of 18 million health workers by 2030, mostly in low- and middle-income countries. COVID-19 has only made the situation worse.

While continuing to provide essential services during the pandemic, health workers have been at heightened risk of infection from COVID-19. The WHO estimates that health workers account for 14 percent of all COVID-19 cases globally, despite making up less than three percent of the population in most countries. The mental, physical, and emotional burden of the pandemic is also causing workers to burnout and leave their profession early.

As domestic resources are expected to contract in many countries, more than ever governments are thinking through how many healthy workers they can afford and how best to train, deploy, and manage those workers. CHAI works with governments to identify their health workforce needs and develop sustainable systems to plan, educate, train, and support national institutions to provide quality health services.

## Rapidly closing the health worker gap

In **Malawi**, 45 percent of all public health worker posts sit vacant. Typically, recruitment and hiring is a time-consuming process that takes months. In 2020, with the realities of the pandemic putting more pressure on an already strained health system, the government announced an emergency plan to hire thousands of health workers as quickly as possible.

To support the government, CHAI, with funding from The ELMA Foundation, leveraged already

completed graduate mapping data to identify how many unemployed or temporarily employed health workers were available, which informed data-driven recruitment and hiring plans. CHAI also developed a dashboard to organize candidate information, provide logistical support, and design an automated system to generate offer letters and other documents quickly. Using the system, the government hired and deployed over 4,000 health workers in just a few weeks.

**Zambia** faced similar shortages and worked with CHAI and the ELMA Foundation to recruit over 3,000 health workers to staff COVID-19 care sites in just a month. CHAI also helped ensure the workers were trained in COVID-19 management and provided with the personal protective equipment (PPE) they needed. This included procuring 1,500 N95 face masks, 5,000 surgical masks, 500 boxes of examination gloves, and 1,000 protective gowns for health providers at two children’s hospitals.



In addition, at the request of the government, CHAI helped establish a psychosocial call center for frontline health workers. The service targeted those directly involved in treating COVID-19 cases. A total of 25 counselors were trained to manage the center 24 hours a day, seven days a week. Counselors’ sessions focused mostly on anxiety, stress, and health providers’ concern for their families. CHAI also developed a reporting tool to improve data captured around these themes and provide counselors with a path to escalate issues as needed.

CHAI has partnered with **Rwanda** since 2011 to help close the health workforce gap in the country. The Human Resources for Health program, implemented from 2012 to 2019, built the capacity of the only government-funded university, the University of Rwanda—establishing 17 new academic training programs, including eight masters in specialty nursing. As a result, doctors more than doubled and specialists increased from 94 to 436. The country has been widely recognized for the transformation to its health education infrastructure.

However, in 2019, new analysis showed that many training programs are chronically under-enrolled; the new cadre of specialists are predominately located around Kigali; and the educational programs do not yet have enough faculty to consistently provide training. CHAI has begun work with our partners to address these issues. In 2020, we worked with the government and university leaders to understand faculty gaps and develop a national strategy for training the next generation of Rwandan faculty to independently run the programs. Over the next 10 years, the strategy expects to graduate 6,513 health professionals from 37 programs. Two new bachelor level training programs will also be launched as will 10 sub-specialty fellowship programs to close the gap in critically needed training and service areas.

Half of Zambia’s population is under the age of 18, but there is a shortage of child-specific health workers in the country. To address this gap, the government, with support from CHAI, developed

the Zambia Pediatric Workforce Training Plan 2020-2030. The plan will establish in-country training capacity for pediatric and neonatal nurses and pediatricians—including through two new training programs and 13 new specialty fellowship programs—while simultaneously expanding access to general and advanced pediatric and neonatal services. With key stakeholders from regulatory bodies, training institutions, and professional associations, CHAI and the Ministry of Health reviewed existing data to set realistic targets, which includes scaling production by as much as 575 percent for key pediatric cadres. The result was a national vision for a pediatric health workforce that can meet the needs of Zambia’s young population. After finalizing the plan, CHAI helped the government develop a resource mobilization strategy to find donor funding for the US\$107M needed to implement the work. By the end of 2020, using World Bank resources, the government began development of its first project: a neonatal nurse curriculum. This is a priority cadre due to the country’s high neonatal mortality rates.

## Investing in community health workers

Community health workers (CHWs) are lay members of the communities they serve. They support the local health system to improve access to basic services for their communities. CHWs can help mitigate the impact of the growing shortage of health workers, particularly in low-income countries.

In 2020, CHAI expanded our support for community health programs, while helping existing projects adapt to the changing operating conditions of COVID-19. This included procuring PPE for CHWs in Zambia and **Zimbabwe**, as well as preparing guidance on how to safely deliver routine services.

In Zambia, a government-led and highly trained cadre of CHWs, known as Community Health Assistants, form a critical link between communities and the formal health system. CHAI has supported the Ministry of Health to

## UNIVERSAL HEALTH COVERAGE

recruit, train, and deploy these workers to rural communities in the country. In 2011, CHAI helped establish two training schools, which have resulted in 3,191 graduates to date. However, due to Ministry fiscal constraints, only 1,354 were on government payroll at the beginning of 2020. Almost 800 others were funded by other partners, while 1,042 more were unemployed. With funding from the United States Agency for International Development (USAID), CHAI provided bridge funding for salaries for 600 community health assistants, who in turn were able to provide lifesaving primary healthcare for a million people in their communities. At the same time, CHAI worked with the Ministry of Health to establish a community health assistant coordinator position. Embedded with the ministry, the coordinator acts as a liaison and champion for fellow community health workers. In addition, CHAI helped build a Community Health Management Information System (c-HMIS) to train over 400 staff from six USAID-supported provinces on CHW supervision and mentorship.

In Zimbabwe, CHAI supported the Ministry of Health and Child Care to train more than 1,200 Village Health Workers (VHWs) on COVID-19 response in Mashonaland East province. CHAI helped procure and distribute PPE, trained VHWs on infection prevention and control, strengthened VHW supervision, and ensured continued access to essential services in communities. We also completed a baseline assessment of the VHW program in Mashonaland East that will inform key reforms in the coming year.

In **Uganda**, 41 percent of pregnant women are not assisted through delivery by a skilled birth attendant. Less than 35 percent of pregnant women make their first antenatal care visit in the first trimester. In response, CHAI designed a sustainable, low-cost approach to turn these statistics around. CHAI worked with CHWs, known locally as Parish Coordinators, to follow up with pregnant women in their communities with reminders, one-on-one meetings, and small group discussions. The CHWs encouraged mothers to access the services available to them, including that first trimester antenatal care visit, institutional

deliveries, and post-natal care within six days of childbirth. In six districts where CHAI worked, antenatal care visits more than doubled from 14 percent to 29 percent. Institutional deliveries increased from 45 percent to 55 percent, and post-natal care attendance improved from five percent to 19 percent.

We also helped develop a global Community Health Systems Leadership Competency Framework, which was developed through a participatory design process with the leaders of community health systems in low- and middle-income countries. The framework will be used to inform future curricula for the Community Health Academy, a digital training initiative affiliated with Last Mile Health. The framework is a new contribution to health systems leadership development literature and is unique in its focus on community health systems and the participation in its creation of community health leaders in low-resource settings.

### *Looking ahead*

CHAI's Health Workforce program will undergo a strategy refresh in the next year. This has been spurred in part by the impacts of COVID-19 on global economies and the anticipated impacts on health sector budgets and health systems. Our desire is to ensure that CHAI's health workforce programming continues to reflect current realities and government priorities, including making progress toward universal primary care. In addition to refreshing our own strategies, CHAI is creating an investment case for health workforce development. The case will summarize the costs and benefits of investing in health workers, recommend key areas of investment, and share successful initiatives. Our aim is to increase funding for governments from new and existing donors. Steering funding toward critical health systems investments will be an essential part of CHAI's support to governments to expand primary care.



A health worker attends to a patient at a government health care facility.  
Photo by Satvir Malhotra, New Delhi, India

# ASSISTIVE TECHNOLOGY

**Our programs aim to save lives and reduce disease, while helping governments create sustainable health systems. Our team of science, business, and technical experts support the entire organization in that goal.**

Assistive technology is an umbrella term related to the delivery of assistive products and services, such as wheelchairs, hearing aids, eyeglasses, prosthetics, and communication devices. According to the World Health Organization (WHO), worldwide, over one billion people need assistive technology. Yet, only about one tenth of the people who need these products have access to them.

The gap is most prominent in low- and middle-income countries. For example, in sub-Saharan Africa, more than 85 percent of people with poor vision do not have eyeglasses, compared to one percent of people in North America and Western Europe.

Contributing to this inequity, is that assistive technology in lower-income countries is primarily donated by charitable organizations, with limited involvement from the government. As a result, service delivery systems often operate in parallel to public systems, are unevenly distributed, and rely on unpredictable donor funding.

## ***A government-led approach to providing assistive products and rehabilitation services***

Ensuring quality assistive technology is widely and sustainably available to the people who need it requires a shift away from current siloed approaches. That is why CHAI is currently working with **Ethiopia, Indonesia, Kenya, Liberia, Malawi, Nigeria, Rwanda, Sierra Leone, South Africa,** and **Uganda** to better integrate assistive technology into public health systems.

As a result, in 2020, Ethiopia became the first country in Africa to develop a National Priority Assistive Product List, which includes 42 priority products for delivery in the public sector. Ethiopia also launched service guidelines for providing these products and overall rehabilitation services, ensuring people access the right product for their needs.

In Malawi, the first-ever National Medical Rehabilitation Policy was developed and launched. The policy integrates assistive technology and rehabilitation services with other national health priorities and provides Malawians with disabilities with the tools they need to live independently and participate fully in their communities. Completed in under a year, the policy is one of the fastest to ever be developed and signed in the country.

In South Africa, CHAI is helping transform access to eyeglasses in the public sector by increasing optical labs' efficiency and building digital order management systems. In Mpumalanga and Limpopo provinces, we developed a mobile-based ordering application for eyeglasses, designed to enhance productivity and provide management control of all aspects of production in the optical lab. We supported the KwaZulu-Natal provincial Department of Health to determine how much it would cost to provide glasses to its uninsured residents. The analysis helped the government mobilize the funding needed to get the project off the ground. In 2020, approximately US\$1.5 million was allocated in the provincial budget to provide coverage for residents across the province and to start building an optical lab at the McCord Provincial Eye Hospital. As a result, almost 30,000 people have received the eyeglasses they need to improve not only their vision, but their quality of life.

CHAI is supporting the federal government of Nigeria to develop a roadmap for scaling up

access to assistive technology in the country, which would serve an estimated 25 million people with disabilities. We are also supporting the government to define technical specifications for assistive devices to strengthen regulation of these products and inform public sector procurement. Finally, we are working with the government to catalyze resource mobilization for the assistive technology sector.

In Indonesia, CHAI is supporting an ambitious plan to address gaps in the assistive product supply chain by working with the government, civil society, and local manufacturers to establish and strengthen quality local production. Four pediatric wheelchair prototypes have so far been developed and are ready for manufacturing. In support of this work, Yogyakarta State University and the National Standardization Agency of Indonesia committed to improve the wheelchair design and develop national standards for wheelchairs respectively for its sustainability, affordability, and availability across Indonesia.

## ***Bringing vision screening to schools***

Approximately eighty percent of all learning during a child's first 12 years occurs through vision. Children with uncorrected visual impairment are less likely to enroll in school, finish primary school, or be literate, according to the World Bank. This can lead to negative outcomes later in life—including limited job prospects. Uncorrected visual impairment also causes serious health risks. Myopia, or near sightedness, is the most common visual impairment in children and can be easily corrected with glasses.

Evidence shows that introducing vision screenings in elementary schools can help identify children who need glasses early and link them to the care they need to thrive. If trained, teachers can effectively perform these screenings. Children with vision problems can be referred to an eye health professional who determines the prescription needed, and children are then provided with a pair of glasses. CHAI is working with partners to pilot

a government-led approach and introduce new tools to rollout this cost-effective and efficient model of care.

In South Africa, the government is working to integrate innovative screening tools in school health programs by partnering with social enterprises, such as hearX Group, who have conducted a pilot in collaboration with Gauteng provincial Department of Health and managed to: screen 15,219 patients; record a 6.2 percent referral rate; and train over 300 health workers in hearing and vision screening.

In Liberia, the government has worked for several years with EYElliance, a multi-sector global coalition working to close the eyeglasses gap, to roll out a national school eye health strategy. Three initial pilot counties provided teachers with training, supported optometric technicians to visit schools and provide appropriate eyeglasses to students as well as reading glasses to teachers who needed them. In 2020, the pilot expanded to three additional counties, training over 3,000 teachers to perform vision screenings and reaching 200,000 children. CHAI is now partnering with EYElliance to accelerate the adoption and scale up of this model in other countries.

# NON- COMMUNICABLE DISEASES

Each year, 15 million people, between the ages of 30 and 69, die from non-communicable diseases (NCDs). Over 85 percent of these deaths occur in low- and middle-income countries. Cardiovascular diseases account for most deaths, followed by cancers, respiratory diseases, and diabetes.



A community member is screened for diabetes during the COVID-19 vaccination process.  
Photo by Am Vichet, Tramkak District, Takeo Province, Cambodia

# CANCER

Cancer is a significant and growing issue in sub-Saharan Africa, with cases expected to almost double by 2030. In 2020, there were an estimated 800,000 new cases and 500,000 deaths in the region where patients are twice as likely to die from cancer than in the United States. Seventy percent of all cancer deaths occur in low- and middle-income countries.

CHAI is working with the American Cancer Society (ACS) and other partners to lower the cost of lifesaving anti-cancer medicines, increase access to diagnosis and treatment, and help governments develop plans to comprehensively manage the disease.

## Increasing access to lifesaving diagnosis and treatment

In June 2020, CHAI and ACS announced agreements with pharmaceutical companies Pfizer, Novartis, and Mylan (which later became Viatris) to expand access to 20 lifesaving cancer treatments in 26 countries in sub-Saharan Africa and Asia. Governments are expected to save an average of 59 percent for medicines procured through these agreements, which include recommended regimens for 27 types of cancer. The agreements will cover both chemotherapies, hormonal therapies, and supportive therapies, aligned to evidence-based guidelines harmonized for sub-Saharan Africa, and expand access to additional formulations, including those essential for treating childhood cancer. The agreements also enable complete chemotherapy regimens for the three cancers that cause the most deaths in Africa—breast, cervical, and prostate. These cancers are highly treatable and account for 38 percent of cancers in the countries covered in the agreements.



Along with the agreements, CHAI and ACS announced the creation of the Cancer Access Partnership (CAP), an initiative of Allied Against Cancer, to deliver newer and better cancer treatments to low- and middle-income countries. In 2020, CHAI worked with governments to identify opportunities to bring the medications to patients and linked participating companies to procurers of cancer medicines in nine countries.

In **Nigeria**, CHAI has been working with the government to expand the reach of the CAP to additional hospitals. Through this program, patients gain access to quality assured medicines in the hospital pharmacy. While COVID-19

hampered dissemination to hospitals, CHAI adopted the use of virtual workshops and virtual technical working groups to steer the national cancer response. After travel lockdowns in the country were lifted, CHAI staff visited multiple hospitals to introduce the program and explain the benefits and requirements of participation. These visits expanded the number of participating sites from six to 10 and laid the groundwork for significant expansion in 2021. We are supporting the government to execute the program including harmonization of treatment protocols, assisting stock monitoring to ensure consistent availability across manufacturers, and CAP awareness and demand generation activities with healthcare workers and patients.

In **Uganda**, the Uganda Cancer Institute leveraged the CAP price agreements during their annual procurement cycle. This resulted in cost savings of up to US\$700,000 that was utilized to increase the volume of anti-cancer medications purchased, therefore increasing the number of patients receiving treatment. CHAI also conducted a private sector market sizing assessment that informed consolidation of the private sector volumes for patients to access quality and affordable cancer treatment.

Despite a high cancer burden in **Cameroon**, the country lacks essential tools such as policies, guidelines, diagnostics, and medications to diagnose and treat cancer patients quickly and effectively. In 2020, CHAI supported the Ministry of Health to develop a five-year, US\$100 million National Strategic Plan for the Prevention and Control of Cancers. This plan outlines key priorities to improve cancer care and reduce deaths over the next five years.

## Supporting breast cancer treatment and care in Ethiopia

Since 2018, CHAI, alongside ACS and the Norwegian Cancer Society, has partnered with **Ethiopia's** Ministry of Health to decentralize breast cancer treatment in six regional hospitals. This work has

focused on training non-oncology specialist health workers such as general physicians and nurses to diagnose and treat breast cancer, and surgeons to specialize in breast surgery with ongoing clinical mentorship and supportive supervision. We have also helped provide training and technical assistance to the Ethiopian Pharmaceutical Supply Agency and hospital pharmacists to strengthen supply chain management.

In 2020, we expanded this work from six to eight hospitals where over 1,000 patients with breast cancer received treatment. Average waiting times to start treatment after diagnosis dropped from four months at central hospitals in Addis Ababa to one month and to one week or less at regional hospitals—a 90 percent reduction. CHAI provided pathology lab technicians in the expansion hospitals with on-the-job training and equipped them with standard operating procedures on specific staining techniques. In these hospitals, the average staining and reporting turnaround time for fine needle aspiration cytology (FNAC) decreased from 10 days to three days.

## Helping children access quality care

CHAI also began work in 2020, with support of the UBS Optimus Foundation, to address access to quality cancer care for children in Nigeria, **Ghana**, and Cameroon. CHAI began engagement with leading centers treating children in each country, along with the Ministries of Health, to collect data and understand current challenges in delivery of care and availability of medicine.

In Nigeria, CHAI assisted the government in carrying out a national assessment of barriers to cancer treatment across the four cancer treatment centers in the country. Based on this assessment, the Ministry of Health and CHAI agreed on a prioritized list of activities for 2021 to improve the availability and quality of pediatric cancer treatment.

In Ghana, the CAP helped support access to quality and affordable pediatric chemotherapies

## NON-COMMUNICABLE DISEASES

to increase the number of children receiving treatment. We assisted the government to update its National Strategic Plan for Pediatric Cancer Control and Prevention to improve care for childhood cancer patients, facilitated the procurement of affordable cancer medicines by Korle Bu hospital, one of the two main cancer treatment centers in the country, and updating the pediatric cancer patient handbook for caregivers and guardians. This was especially important in light of COVID-19 restrictions. We also helped the government to develop a pediatric cancer registry to track and monitor disease trends to inform decision making on pediatric cancer care.

CHAI will continue to strengthen this work in Ghana, focusing on national policy and coordination, in-country supply chain strengthening, hospital capacity building focused on quality of care, as well as patient education, tracking, and retention in care.

### Looking ahead

In 2021, we will continue to expand the reach of the CAP to additional countries, include additional products, and reach more patients, including children. We will also work to initiate pilot projects for two innovative cancer medications in two countries.

We will also continue to engage with the World Health Organization's (WHO) Global Breast Cancer Initiative launched in 2021, building on our experience in Ethiopia.

We will look to strengthen systems to help patients navigate their journey through cancer diagnosis and treatment thus improving retention and ultimately survival.



Health workers visit the cancer ward at National Hospital Abuja.  
Photo by Tony Ayenson, Abuja, Nigeria

# CARDIOVASCULAR DISEASE, DIABETES, AND OTHER NON-COMMUNICABLE DISEASES

Over the next decade, deaths from non-communicable diseases are expected to grow significantly in low- and middle-income countries. This is in stark contrast with high-income countries which have been experiencing a steep decline in mortality for decades due to a combination of decline in risk factors and improved response to cardiovascular emergencies.

Cardiovascular diseases (CVDs) caused 17.9 million deaths in 2016, representing more than 30 percent of global mortality. Low- and middle-income countries account for over 75 percent of these deaths, half of which take place in people under the age of 70.

Each year 4.2 million adults die from diabetes globally. While the vast majority of cases worldwide are the type 2 version of the disease, type 1 diabetes risks imminent death if not appropriately managed with insulin. In high-income countries, life expectancy for those living with type 1 diabetes is equal to the general population, but in low- and middle-income countries, it is under a year due to disparities in access to diagnosis and quality treatment. In 2020, CHAI began work to increase access to lifesaving treatment and disease monitoring for diabetes in low- and middle-income countries, engaging with manufacturers of insulin, diabetes medicines, and glucose monitors.

In **Eswatini**, non-communicable diseases, particularly cardiovascular disease, are expected to lead to more deaths than HIV, tuberculosis (TB), and malaria combined by 2030. One in three adults has hypertension, or high blood pressure,

and 14 percent of the population has diabetes. While both of these conditions are treatable, less than 20 percent of people in the country receives any treatment. The COVID-19 pandemic further exacerbated this issue by severely disrupting diagnosis, treatment, and rehabilitation for people living with these conditions, which also make them more susceptible to severe COVID-19.

With funding from the European Commission, CHAI has supported the Ministry of Health to adopt interventions laid out in the WHO Package of Essential Non-Communicable (WHO-PEN) Diseases to decentralize non-communicable disease services across the country. CHAI worked with the government to review the country's Standard Treatment Guidelines which had previously not allowed primary care facilities to offer non-communicable disease services. As a result of this review, medications for non-communicable diseases are now declassified and available at the primary care level.

The government also earmarked funding from the national budget to ensure that hypertension and other drugs for non-communicable diseases were prioritized during procurement to reduce shortages. The documents are giving health workers guidance on how to manage treatment for hypertension and other diseases such as type 2 diabetes at primary care facilities. The framework is helping to decentralize amenities to provide patients care closer to home and bring 80 percent of the population within walking distance of simple, affordable services that can save lives. This has resulted in improved coordination of

stakeholders in the clinical management of non-communicable diseases as well as monitoring and supervision of healthcare workers providing hypertension and diabetes services at primary care facilities.

CHAI also supported the Ministry of Health, through the Rural Health Motivator (RHM) Program, to conduct a pilot for an app to assist RHMs to collect community data in a timely manner and improve counseling and communication of diabetes and hypertension. We helped establish the NCD Clinical Management Technical Working Group to improve coordination across stakeholders on the clinical management of non-communicable diseases across all levels of care and to advise on policies, guidelines, and standards to improve clinical management of hypertension and type 2 diabetes.

In **Cameroon**, CHAI was selected by Partners in Health to lead the formation of the national NCDI Poverty Commission, part of a global network of commissions exploring NCD burden. This commission will harness data to describe how NCDs are affecting the population of Cameroon and create recommendations for a robust response.

In 2020, CHAI also began an informal partnership with Resolve to Save Lives to help increase access to hypertension medications in low- and middle-income countries.

## Improving services to diagnose and treat sickle cell disease

In **Ghana**, CHAI is supporting the government to strengthen coordination of critical stakeholders in Newborn Screening (NBS) across the country, understand the landscape and cost of this screening, and expand it to other regions to improve the care of newborns with sickle cell disease. This work will help establish comprehensive access to early, cost-effective screening and testing and ensure integrated care management that is sustainable at scale.

In 2020, CHAI worked with the Ghana Health Service and Ministry of Health to set up a steering committee to oversee the implementation of the national NBS strategy and plan. This committee will be led and directed by the Ghana Health Service. We also collaborated with the Sickle Cell Foundation of Ghana to establish 14 additional NBS sites in the country.

## Looking ahead

In 2021, we will continue to engage partners to increase access to lifesaving treatment and diagnosis for non-communicable diseases, aligning with global initiatives and the priorities of our partner governments. We will seek to build dynamic partnerships to ensure that our engagement on non-communicable diseases adds to existing initiatives, drawing from CHAI's experience and expertise.

## STAFF REFLECTION



### VIVIENNE MULEMA

Senior Manager, Global Cancer

I joined CHAI at a pivotal time in January 2013. The Ministry of Health in Uganda was spearheading efforts to decentralize HIV care and treatment services, transitioning from a “Centre of Excellence” model to one in which lower-level public health facilities could manage HIV positive patients. During this same period, the World Health Organization (WHO) released recommendations encouraging initiation of all HIV positive children on antiretroviral therapy (ART), a significant shift from previous guidelines where treatment was dependent on the child’s immune status.

Uganda was keen to adopt the new guidance to improve the retention of HIV positive children in the health care system and ultimately increase their survival. There was a palpable urgency to execute now that the WHO had approved what the Ministry already knew would work. Despite this momentum, as one of the first countries to attempt universal treatment for HIV positive children, there was considerable hesitancy from several stakeholders. CHAI, true to the values of working at the service of government and with urgency, immediately stepped in to support the Ministry to roll out the new guidelines, compiling evidence to convince partners and mobilize resources, rapidly developing and operationalizing robust scale-up plans to ensure that facilities had the capacity to treat additional patients, assessing and accrediting new facilities countrywide to start providing quality treatment, and ensuring medicines were available for the projected new patients.

Within two years, the country registered a two-fold increase in the number of patients on treatment. There were over 800,000 patients receiving antiretroviral medicines in 1,000 facilities, up from 600. Today, when I travel across the country, I am encouraged to see HIV clinics in some of the most remote areas providing care that enables patients to have more time with their loved ones and remain productive with an improved quality of life than they otherwise would have experienced.

When CHAI started the cancer program in 2015, I knew that this was where I wanted to focus my energy next. The work was particularly appealing because of personal experience—my father and a few close relatives died from the disease—and for the potential to turnaround the fate of patients from what is seen as a death sentence to a cure in some instances.

I have had the great opportunity to negotiate access agreements for quality-assured anticancer medicines and then support governments to take advantage of these price reductions. CHAI’s capacity to respond to and support governments’ aspirations with urgency is demonstrated by our work with the Federal Ministry of Health in Nigeria. In a period of two years, we have worked with the Federal Ministry of Health to implement system improvements including a web-based digital platform at seven tertiary cancer hospitals that enables patients across the country to access better quality medicines at more affordable prices, while addressing some of the institutional procurement barriers at the treatment centers.

Throughout my eight-year journey at CHAI, I have witnessed the resilience of healthcare workers, keen to deliver care to patients under some of the most difficult working conditions. I have also seen patients travel for miles to access services believing in the system’s ability to deliver good health. It is upon us to continuously think about how to improve service delivery to the patients that come from the furthest corners of our countries.

When I think about how I want to continue to serve humanity, CHAI’s sense of urgency resonates strongly with my desire to see patients’ lived experience become better now and not sometime in the future.



Health workers attend a meeting at National Hospital Abuja to disseminate cancer patient education materials.  
Photo by Tony Ayenson, Abuja, Nigeria

# FINANCIALS

Clinton Health Access Initiative, Inc. and subsidiaries. Years ended December 31, 2019 through 2020.

## Consolidated statement of activities

	2020	2019
<b>Revenues</b>		
Contributions	632,088	898,252
Grants	196,994,197	187,828,375
In-kind contributions	4,773,269	1,921,338
Other	302,800	1,124,356
Net assets from restriction	444,005	2,465,016
<b>Total revenues, gains, and other support</b>	<b>203,146,359</b>	<b>194,237,337</b>
<b>Expenses</b>		
Program services	186,996,041	175,781,700
Management and general	15,909,953	13,048,395
Fundraising	538,820	587,305
<b>Total expenses</b>	<b>203,444,814</b>	<b>189,417,400</b>

## Consolidated statements of financial position

	2020	2019
<b>Assets</b>		
Cash and cash equivalents	17,310,119	11,076,829
Cash and cash equivalents limited as to use	92,964,395	80,537,603
Accounts receivable	1,222,518	725,767
Grants receivable	3,381,471	7,173,112
Prepaid expenses	1,488,518	2,552,041
Property and equipment, net of accumulated depreciation	193,775	305,224
<b>Total assets</b>	<b>116,560,796</b>	<b>102,370,576</b>
<b>Liabilities and net assets</b>		
Accounts payable	5,539,686	6,366,218
Accrued expenses	8,192,417	5,304,001
Deferred revenue	92,627,321	79,914,694
<b>Total liabilities</b>	<b>106,359,424</b>	<b>91,584,913</b>
<b>Net assets</b>		
Without donor restriction	9,864,298	10,162,753
With donor restriction	337,074	622,910
<b>Total net assets</b>	<b>10,201,372</b>	<b>10,785,663</b>
<b>Total liabilities and net assets</b>	<b>116,560,796</b>	<b>102,370,576</b>

# ACKNOWLEDGMENTS

CHAI's work is possible thanks to a committed network of donors and partners.

Abt Associates Pty Ltd	Grand Challenges Canada	Social Finance Limited
Access to Health Fund	Ian Speers	Solina Centre for International Development and Research
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Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH	National Center for HIV/AIDS, Dermatology and STD	United Nations Population Fund (UNFPA)
Duke University	National Emergency Response Council on HIV/AIDS, Eswatini	United States Agency for International Development (USAID)
ELMA Group of Foundations	Nelson Madubuonwu	University of California, San Francisco
Embassy of Ireland	Norwegian Cancer Society (NCS)	University of Cape Town
Foundation for Innovative New Diagnostics (FIND)	Paediatric Aids Treatment for Africa	University of Liverpool
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GAVI Alliance	PATH	University of Nebraska
Global Affairs Canada	Population Services International	VillageReach
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