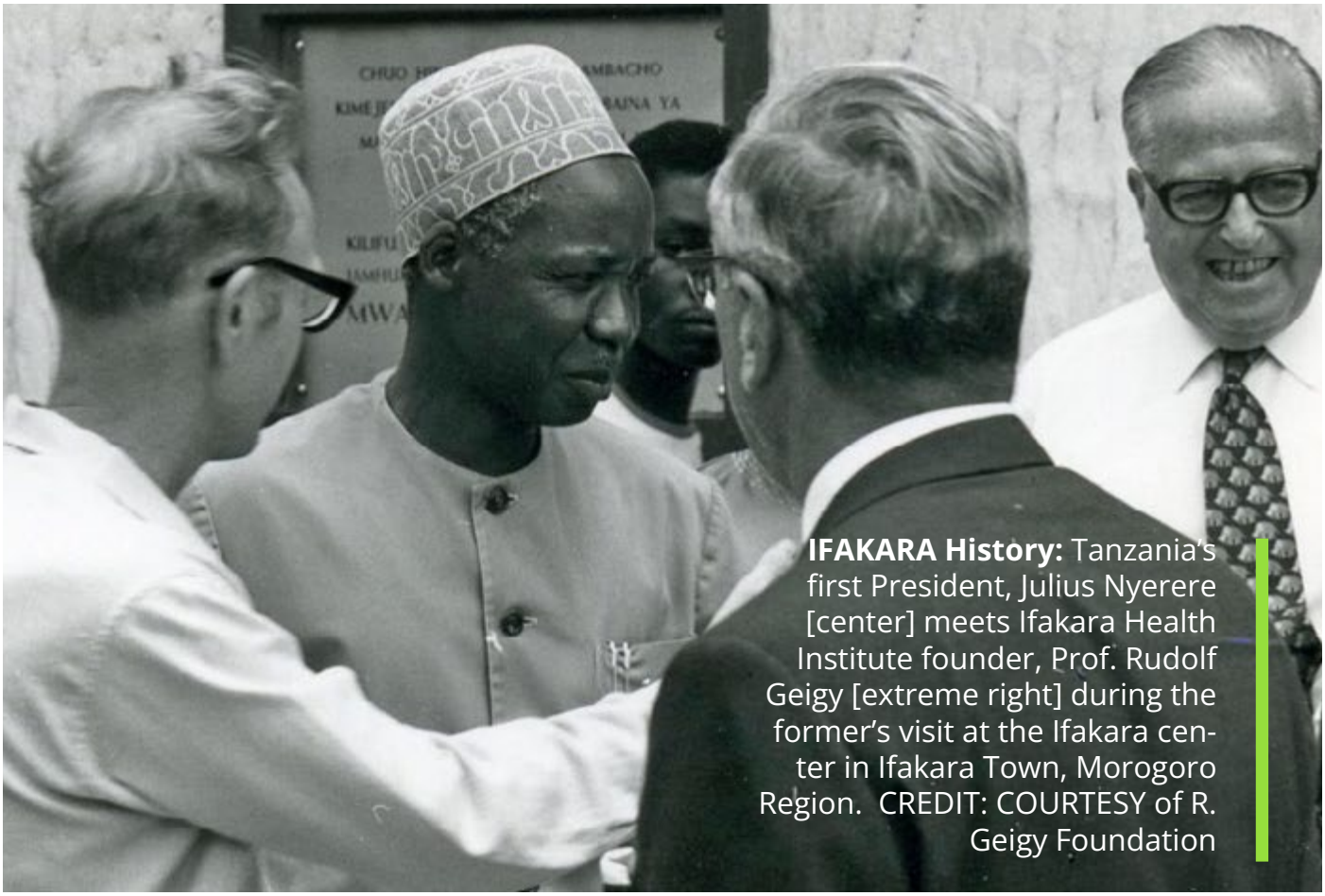
INFORMING THE FUTURE OF PUBLIC HEALTH

2022 ANNUAL SCIENTIFIC REPORT

ISO 9001: 2015 certified
IFAKARA HEALTH INSTITUTE
research | training | services



IFAKARA History: Tanzania's first President, Julius Nyerere [center] meets Ifakara Health Institute founder, Prof. Rudolf Geigy [extreme right] during the former's visit at the Ifakara center in Ifakara Town, Morogoro Region. CREDIT: COURTESY of R. Geigy Foundation

ABOUT IFAKARA

Ifakara Health Institute (IHI), also known as Ifakara, is a renowned research organization in Africa that is dedicated to improving the health and well-being of people. Established in 1956, Ifakara encompasses a broad range of scientific disciplines, spanning from basic biomedical and ecological sciences to clinical trials, health systems research, policy translation, and health program implementation.

The vision of Ifakara is to achieve a population that is both healthy and empowered, with access to evidence-based health services and solutions. The Institute aims to become a center of excellence that collaboratively informs health policies and delivers high-quality services through research, innovation, capacity strengthening, and program implementation. It takes great pride in upholding values such as integrity, initiative, equity, excellence, and accountability.

We are primarily a Tanzanian organization, but we have regional focus and a growing international footprint. We are located in Dar es Salaam, Bagamoyo, and our birthplace, Ifakara. We also maintain satellite sites and offices in various regions in Tanzania, facilitating research and implementation work.

Since 2021, Ifakara's management systems have been certified as ISO 9001:2015 compliant for the provision of health and research services. The Institute has developed and maintains world-class research platforms and strategic collaborations both regionally and internationally.

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INFORMING THE FUTURE OF
PUBLIC HEALTH

ABOUT THIS REPORT

This report, prepared by Ifakara Health Institute, highlights key milestones and progress of the work that we do to improve people's health and wellbeing in Tanzania and beyond. It provides valuable insights to our stakeholders about the key trends and activities in our research, training and services during 2021 and 2022.

The report begins with an introduction, including messages from the Chief Executive Director and Director of Science, along with an overview and acknowledgments. The main part of the report then provides a concise overview of trends and narratives on projects, scientific findings, research infrastructure, training initiatives, regulatory activities, public engagements, and funding details. These sections collectively offer a cross-sectional, yet comprehensive understanding of the progress we are making towards our ultimate goals.

HONORATI MASANJA, PhD

Message from the Chief Executive Director

Informing the Future of Public Health – this report's theme – focuses on the new Ifakara Health Institute Strategic Plan 2023-2028. This Report reflects on Ifakara's new vision and mission stipulated in the new strategy which envisions a healthy and empowered population with access to evidence-based health services and solutions.

We're a health research institute seeking to proactively create and share new knowledge. Ifakara witnessed tremendous developments in the past 1-2 years that add to already available body of knowledge aimed to inform policy and the delivery of quality services in Tanzania and beyond. The report provides an overview of what we did during the 2021-22 period and give you a glimpse of our strategic direction as well. I believe that you will find useful information about our research, training and services that will empower you to make informed choices and decisions.

Engaging communities in our research activities has helped to improve public health around IHI sites. However, influencing the lives of more people requires translation of the Institute's findings into broader policies. We have done this successfully for decades in international development policy, including those formulated by the WHO. We intend to double our efforts to ensure that more findings are communicated widely to influence health policies domestically as well.

Please, join me in learning about the contribution of the fine women and men working for and with Ifakara for the 2021-22 period that I strongly believe add more to your knowledge and the knowledge of the people and communities around.

We're all in one boat, and always moving forward.

H. Masanja

CHIEF EXECUTIVE DIRECTOR

FREDROS OKUMU, PhD, MBA

Message from the Director of Science

I am delighted to join our Chief Executive Director and the Ifakara community in presenting the Annual Scientific Report 2021-22. This report exemplifies our collective dedication to advancing science and improving community health. Together, we have continued on our remarkable journey of discovery, innovation, and impactful action.

During the reporting period, we witnessed significant growth and progress in our scientific endeavors. Our research portfolio expanded with over 120 active projects and nearly 30 million US dollars of grant funding. We maintained a strong publication record, with valuable contributions from both female and male researchers, continually pushing the boundaries of knowledge through collaboration.

Our achievements now extend beyond the laboratory. We established vital partnerships and engaged with public and private sector stakeholders, amplifying our reach and impact. In addition to our core research, we extended care and treatment services to thousands of families, supported translational work on communicable and non-communicable diseases, and spearheaded groundbreaking studies in treatments, diagnostics, vaccinations, and vector control. This relentless pursuit of excellence has positioned us as a leading health research organization in the region, reflecting the dedication, expertise, and passion of our entire team.

While celebrating our accomplishments, we acknowledge that our work is far from complete. We invite you to join us on this ongoing journey, as we strive to make an even greater impact on community health and well-being. Together, we can drive innovation, foster inclusivity, and transform scientific discoveries into practical solutions that address the urgent challenges we face.

We extend our heartfelt gratitude for your unwavering support, commitment, and collaboration.

Sincerely,

F. Okumu

DIRECTOR OF SCIENCE

OVERVIEW

During the 2022 calendar year, Ifakara witnessed significant growth in science portfolio with 120-140 active research projects at any point. There were 40 new projects acquired in the first half of the year and 20 in the second half. Our scientists also had a strong publication record, with 130 publications in 2022. Quarterly analyses revealed that 44-56% of the papers had female researchers as either the first or senior authors. Ifakara is currently ranked as the Number 1 scientific organization in Tanzania based on online citation records comparing 55 institutions in the country.

The management and staff have continued to make improvements in scientific ecosystems to maintain the quality of work and adhere to the mission. Throughout the year, several new areas of work and new partnerships were established. Ifakara laboratories have expanded HIV and COVID-19 testing services for over 6 million residents in Tanzania Mainland and Zanzibar, and the Health Systems, Impact Evaluation & Policy Department have continued their engagements with public and private sector stakeholders to support translational work around non-communicable diseases.

The Interventions & Clinical Trials Department enhanced its capacity for doing large-scale trials and established multiple studies on COVID-19 treatments, urine-based TB diagnostics for HIV-positive patients and improved malaria vaccines. The Environmental Health & Ecological Sciences Department is aggressively expanding work on climate change, genetically modified mosquitoes for malaria control and artificial intelligence for disease surveillance. An Institutional Biosafety Committee was established in October 2022 to oversee research on Genetically Modified (GM) mosquitoes.

An important development in the last quarter of the year was the start of large-scale implementation programs. In particular, Ifakara successfully competed and won the Tanzania Malaria Surveillance Activity (TMSA) award, a 5-year 18 million USD initiative funded by the US Agency for International Development (USAID) through the President's Malaria Initiative (PMI).

Ifakara also continues to provide care and treatment services to rural and urban populations. The Chronic Diseases Clinic of Ifakara (CDCI) continues to service more than 4000 people living with HIV yearly. Over 98% of these have HIV viral loads below a detectable threshold, and the rate of mother-to-child HIV transmission is nearly zero despite regular breastfeeding. Ifakara teams also offer care and treatment to Tuberculosis patients in Dar es Salaam and Ifakara, and the Heart-Lung Clinic, established jointly with the St. Francis Referral Hospital (SFRH), has matured into a centre of excellence in its own right. In 2022, the Clinic attended to 4,000 patients, providing specialized diagnostics and community outreach programs in villages.

Lastly, our training programs have flourished, covering both in-house training for staff and expanded training for the public. By the end of 2022, the master's degree program (MSc Public Health Research), which Ifakara offers jointly with the Nelson Mandela African Institute of Science and Technology (NM-AIST), has now enrolled a total of 71 candidates over five cohorts (51% Male; 49% Female). New courses are planned for the following years, and the training facilities are being expanded to accommodate more students.

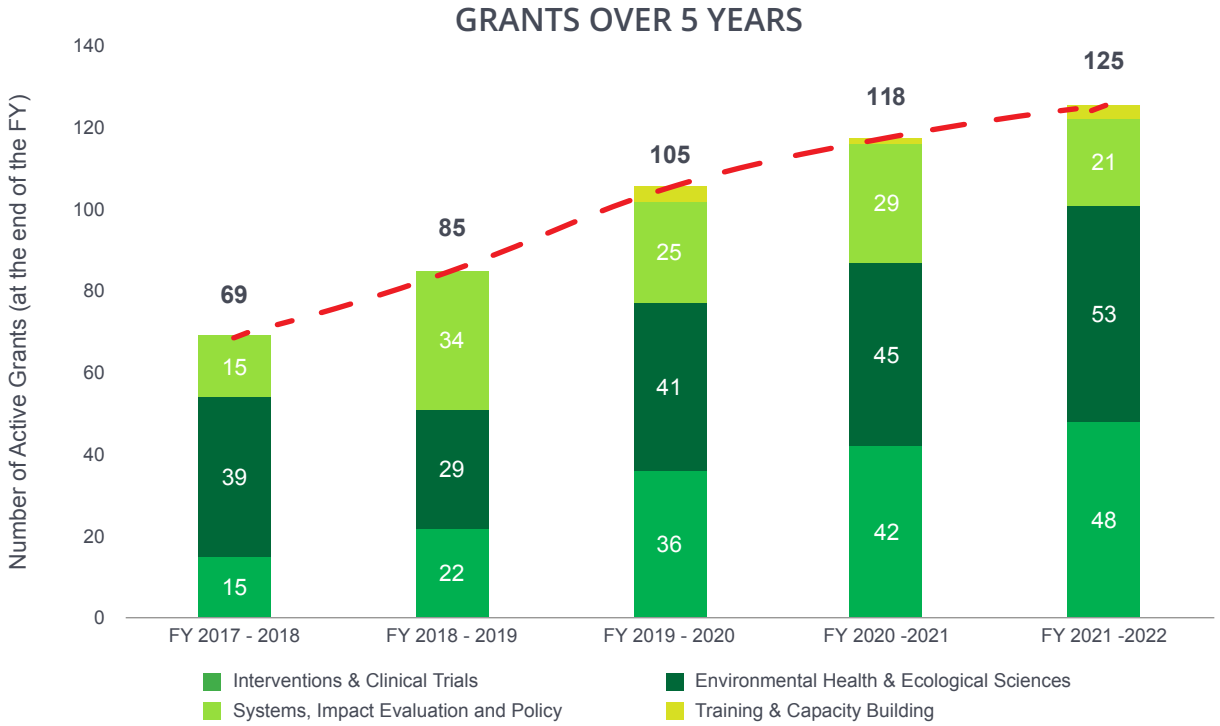
ACKNOWLEDGEMENTS

This document is the result of the collective efforts and contributions of numerous individuals. We extend our heartfelt appreciation to all our scientific and non-scientific staff, department and unit heads, as well as our external partners and communities. Without their invaluable support, our achievements would not have been possible.

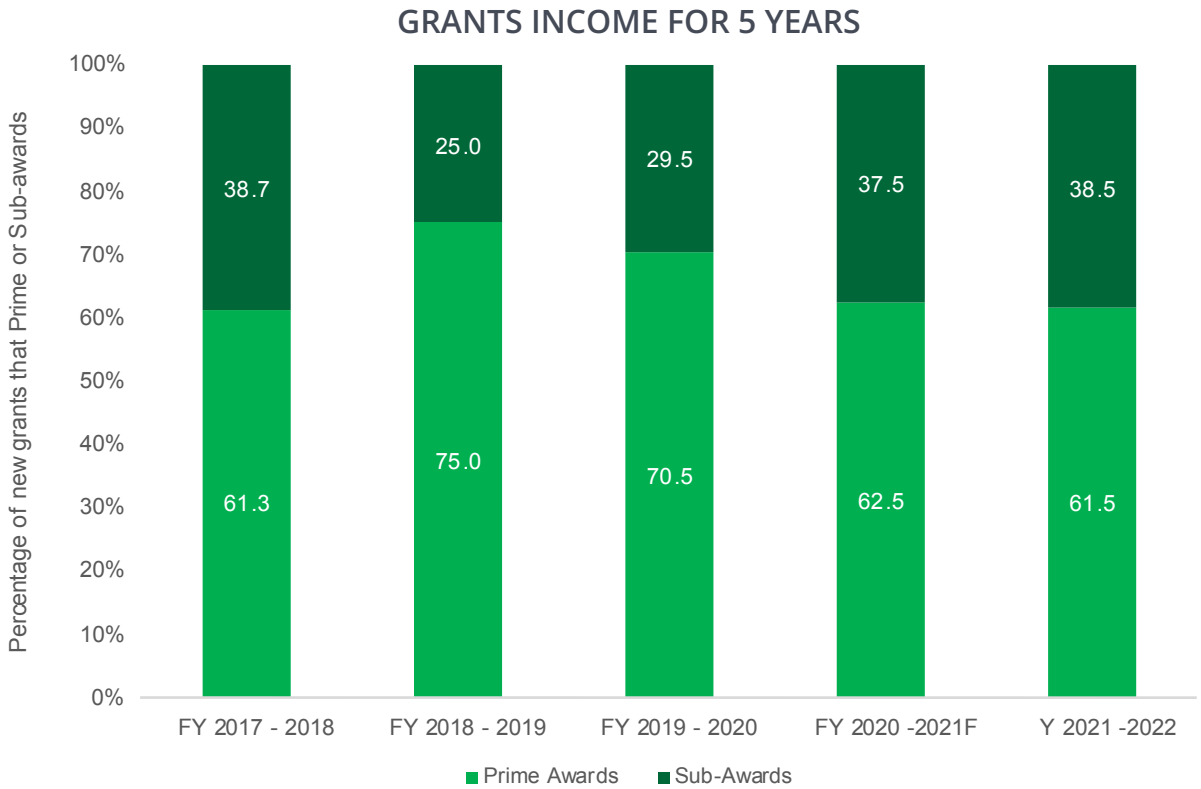
ANNUAL TRENDS & SUMMARIES

ANNUAL TRENDS & SUMMARIES

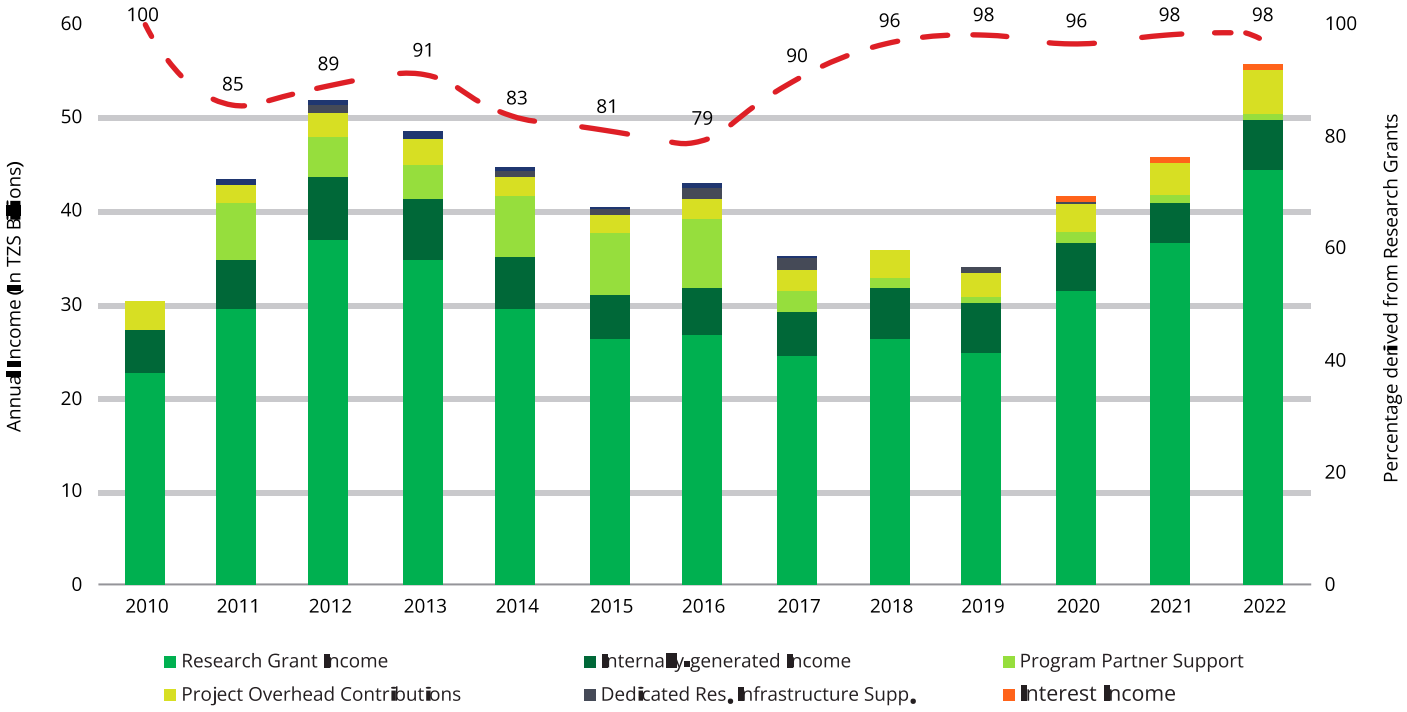
In the past 1-5 years, Ifakara has experienced significant developments that offer a clear glimpse into the current state of our science and the direction we are heading. The following key annual trends provide valuable insights and highlights, showcasing our current status and immediate trajectory.



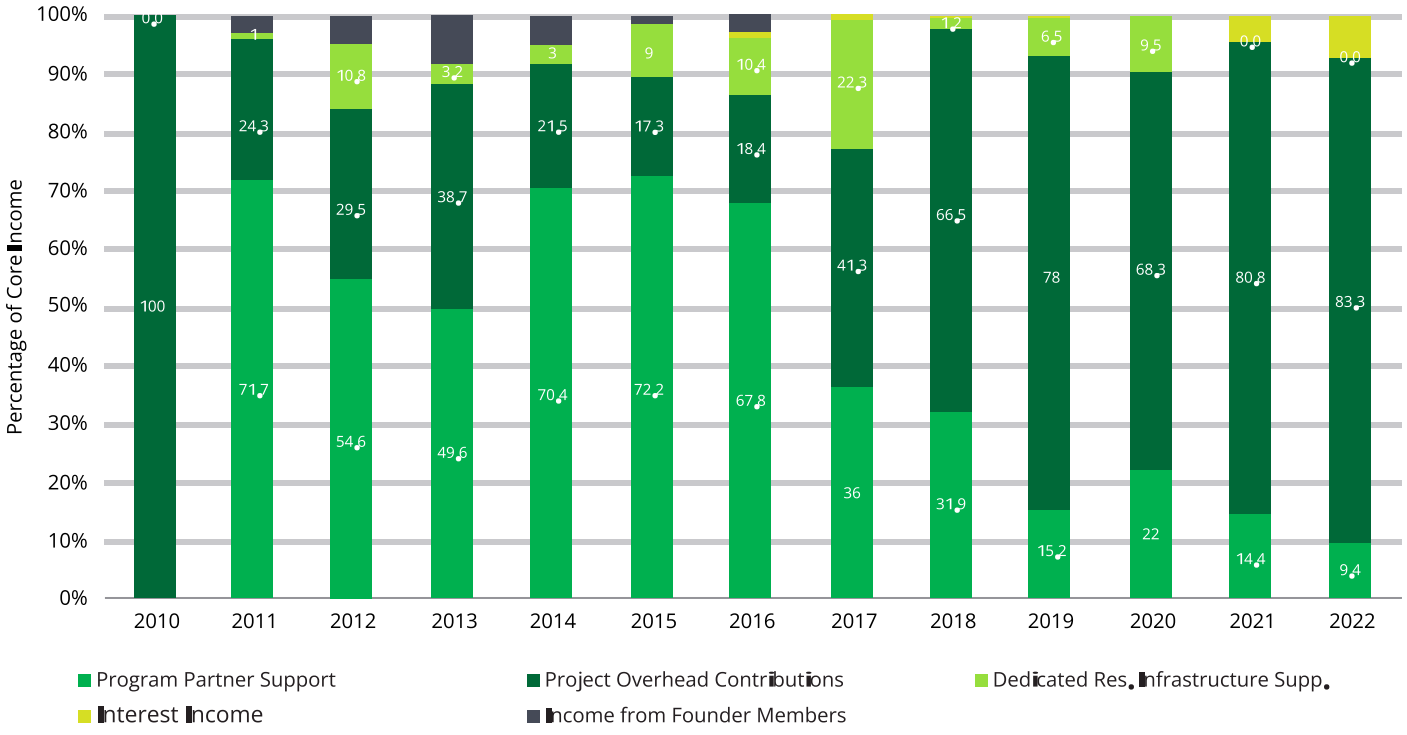
The number of active grants grew significantly during each financial year over the last five 5 years.



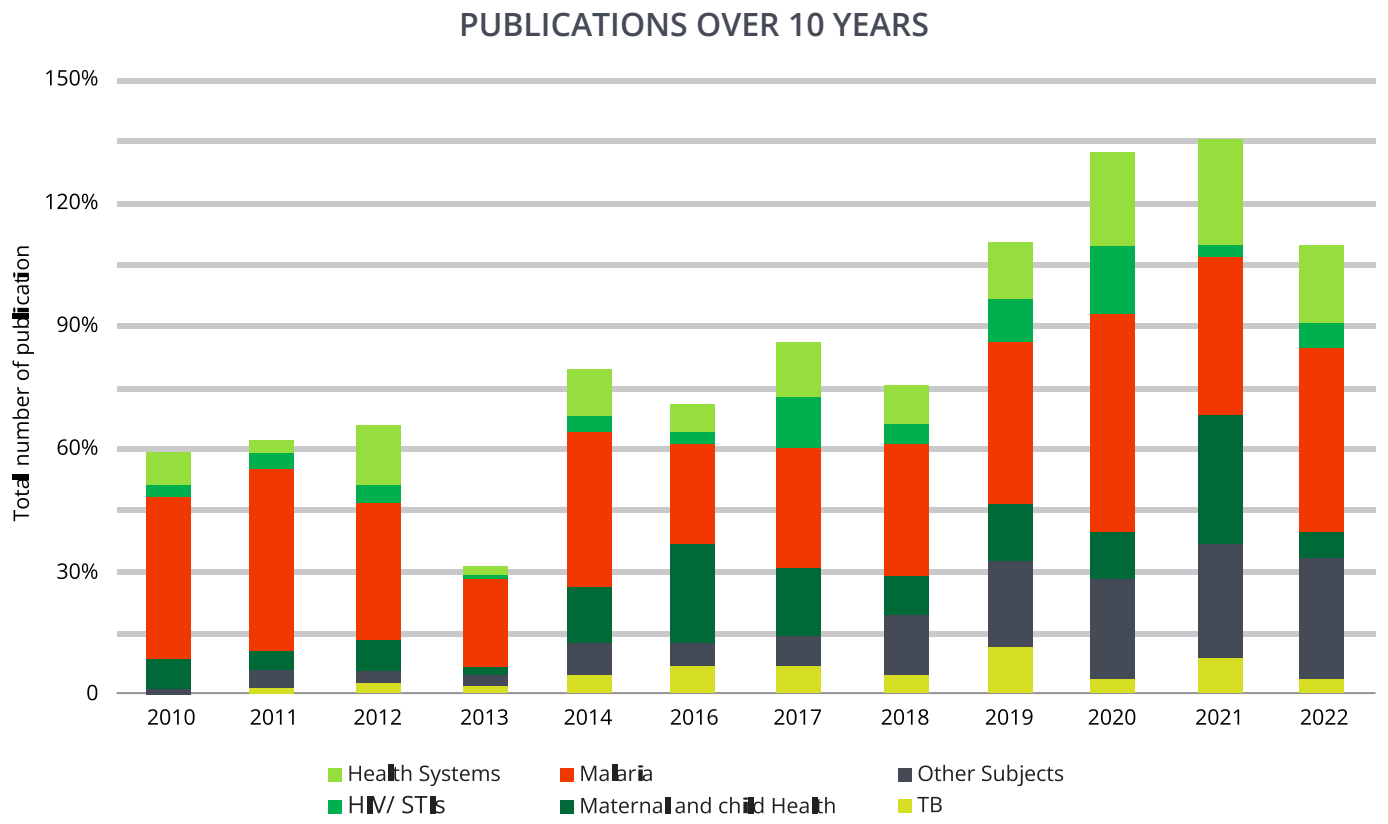
The proportion of research grants awarded directly to Ifakara Health Institute, rather than as sub-awards with other institutions as prime contractors, has consistently exceeded 60%.



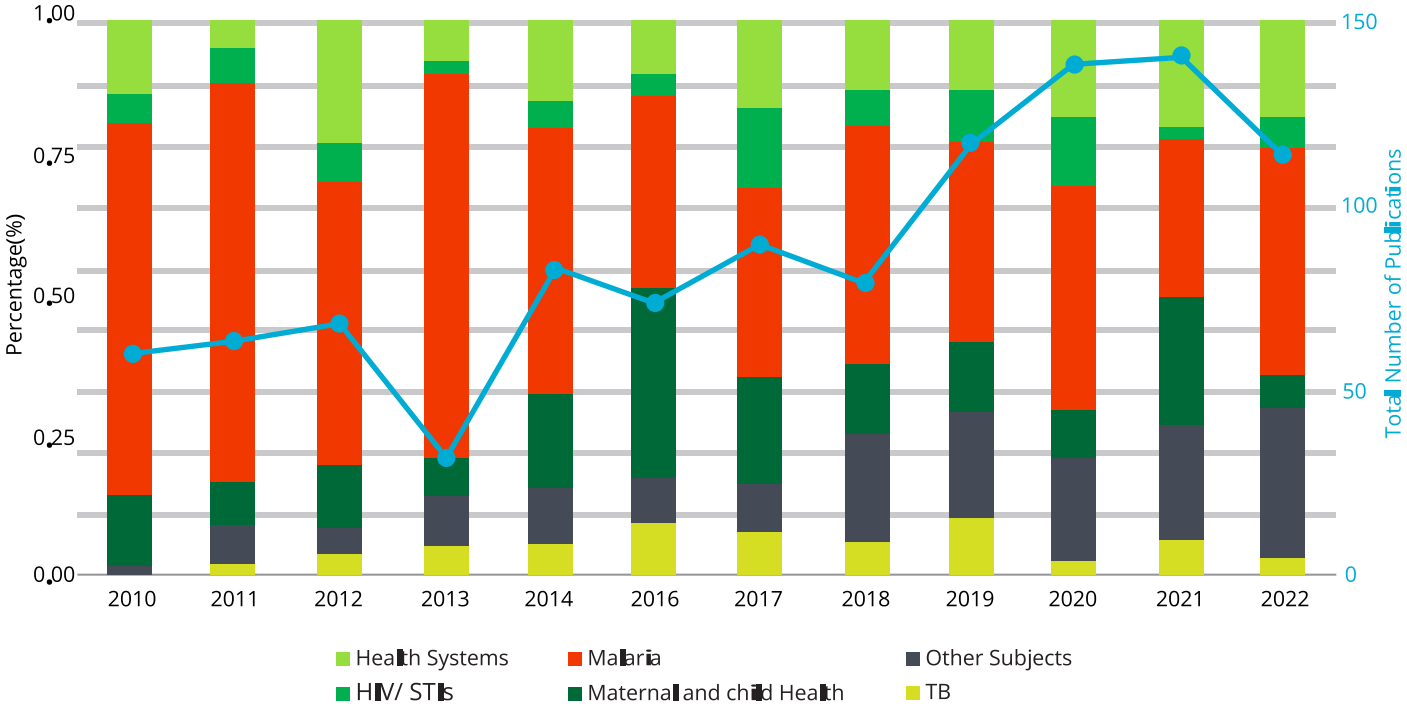
Over the past five years, Ifakara has experienced a consistent and steady growth in annual income. In 2022, we surpassed our previous highest income achieved in 2012, even when considering the substantial flexible core financing we had at that time. It is worth noting that more than 95% of our income is directly or indirectly contributed through research grants.



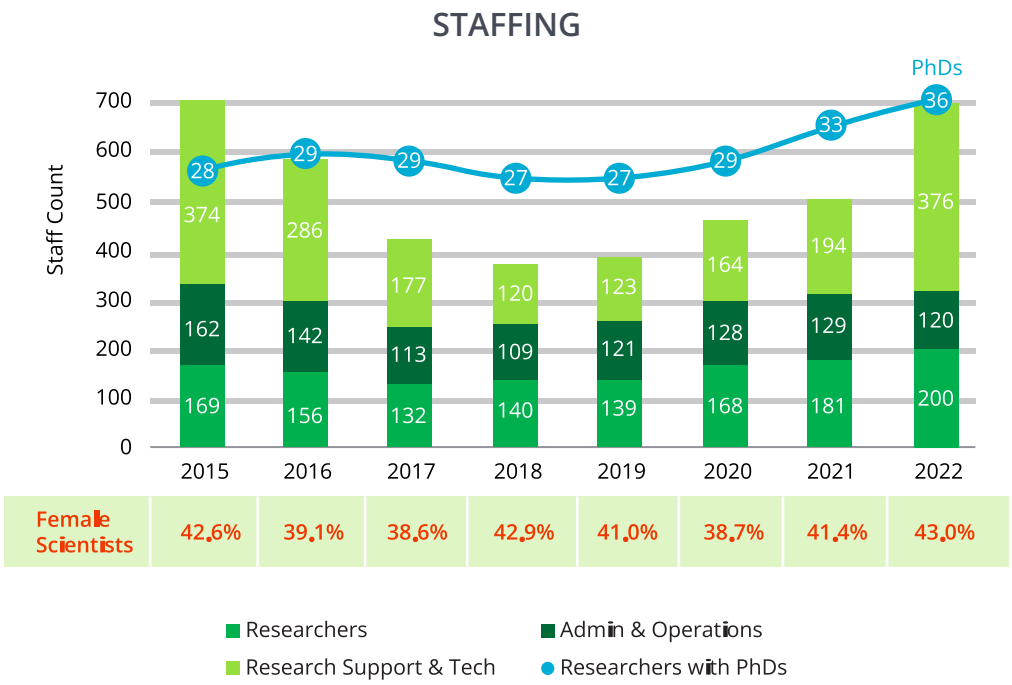
Over the years, there has been a proportional increase in project overhead contributions, while program partner support has decreased.



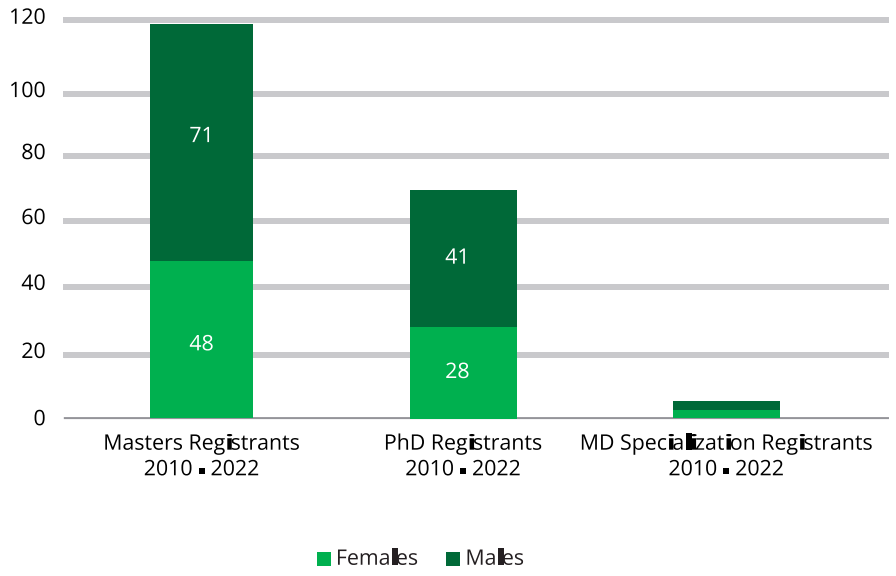
The total number of publications increased steadily over the last 10 years across all fields of study, particularly malaria.



We have responded to national and international priorities by diversifying our research projects and outputs. While health systems research and malaria continue to be major components of our work, we have significantly expanded our focus to include other priority areas such as HIV, tuberculosis, maternal and child health, and non-communicable diseases. This diversification is reflected in a substantial proportion of our research outputs and publications.



In the past five years, our staff numbers have steadily increased, reaching a total of 670 by the end of 2022. Among them, 200 were researcher scientists, and 120 worked in administration and operations. Notably, female scientists accounted for 43% of our staff, reflecting a significant increase since 2018.



At Ifakara Health Institute, we place a strong emphasis on staff training and institutional renewal at various levels. Each year, at least 10 members of our staff enroll in post-graduate training programs, pursuing Masters and PhD degrees to enhance their expertise and contribute to our collective knowledge base.

STRATEGIC PARTNERSHIPS

STRATEGIC PARTNERSHIPS

Over the past five years, Ifakara Health Institute has fostered a culture of collaboration through strategic partnerships. With a total of 40 active MOUs and 14 active consortia, our commitment to collaboration remains strong. In 2022 alone, we signed 8 new MOUs and 3 consortium agreements, further expanding our network. Additionally, we have engaged 64 times with academic and research institutions, 28 times with government agencies, and received funding from 80 funding partners since 2017, further strengthening our ability to address complex health challenges through collective efforts.

ACTIVE PARTNERSHIPS AS OF DECEMBER 2022

DETAILS	NUMBER
Active MOUs	40
MOUs signed during the year 2022	8
Active Consortium	14
The Consortium signed during the year 2022	3
Other Active Partnerships	10
Other Partnerships signed during the year 2022	6
Academic & Research Institutions	64
Government Agencies	28
Funding Partners	80

KEY HIGHLIGHTS – STRATEGIC PARTNERSHIPS

We have renewed our MOU with the Nelson Mandela African Institute of Science & Technology

The Ifakara Health Institute and the Nelson-Mandela African Institution of Science and Technology signed a new Memorandum of Understanding to further improve their partnership in training and capacity building of young university graduates interested in becoming public health researchers.

Currently, IHI and NM-AIST run a joint master's program in public health research that is taught at the Ifakara Health Institute's training Center in Kingani Bagamoyo. The partnership will foster capacity strengthening and appropriate human capital development of scientists for both institutions to sustains innovations for health. We are also beginning to discuss new masters programs and potentially a PhD program in the future.

Ifakara and the University of Glasgow (UoG) have celebrated 15 years of partnership by forming a more strategic alliance.

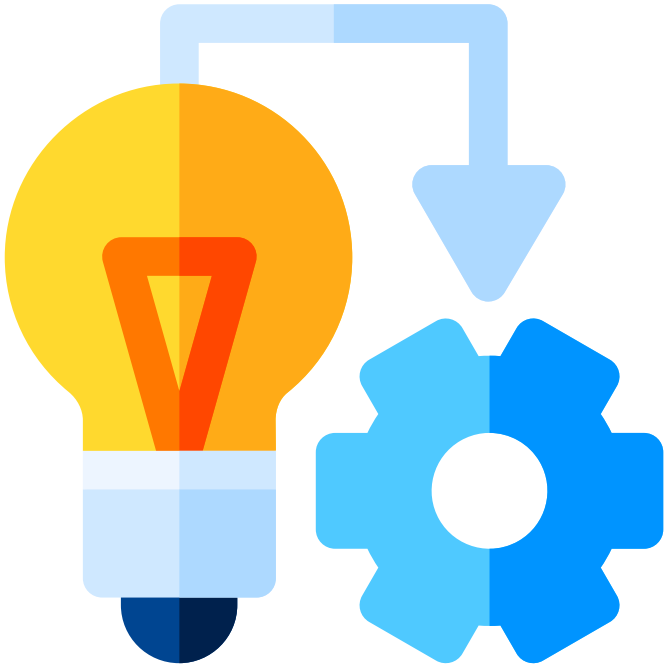
The partnership has been mostly project-based, focusing on key areas of mutual priority and complementary expertise, such as malaria vector ecology and control, statistical analysis, ecological modelling, surveillance and control of rabies, and more recently, various aspects of health systems and urban health.

Over the years, the partnership has generated over £17 million in funding from various donors, including the United Kingdom (UK), European Union (EU), and United States (US), leading to over 60 jointly authored publications. Individual research collaborators from both institutions have played a key role in the success of the partnership. Together, they have supported the postgraduate training of more than 15 IHI scientists, co-led research grant applications, and co-supervised postdoctoral researchers.

To capitalize on new opportunities, the leadership of both institutions, in 2022, approved a formal process to transition to a more strategic, long-term institutional partnership that will engage a wider community of researchers at both institutions. This will supplement and underlie, rather than replace, the ongoing project-based relationships.

This new alliance will provide a more comprehensive approach to addressing complex health issues, leveraging the strengths of both institutions to improve global health outcomes. Immediate benefits will include the enhancement of fee waivers and honorary appointments to enhance joint training of postgraduate students and early-career researchers.

MAJOR IMPLEMENTATION PROGRAMS AND SERVICES



MAJOR IMPLEMENTATION PROGRAMS AND SERVICES

At Ifakara Health Institute, we understand the importance of translating research into action for the benefit of communities. To achieve this, we have developed and expanded a range of implementation programs that directly deliver healthcare services while advancing our research goals. This strategic approach allows us to accelerate our efforts in improving the health and well-being of individuals, effectively bridging the gap between our research outputs, as a knowledge-driven organization, and our ultimate mission. In the following sections, we highlight some noteworthy examples of our successful implementation programs.

Shinda Malaria Program

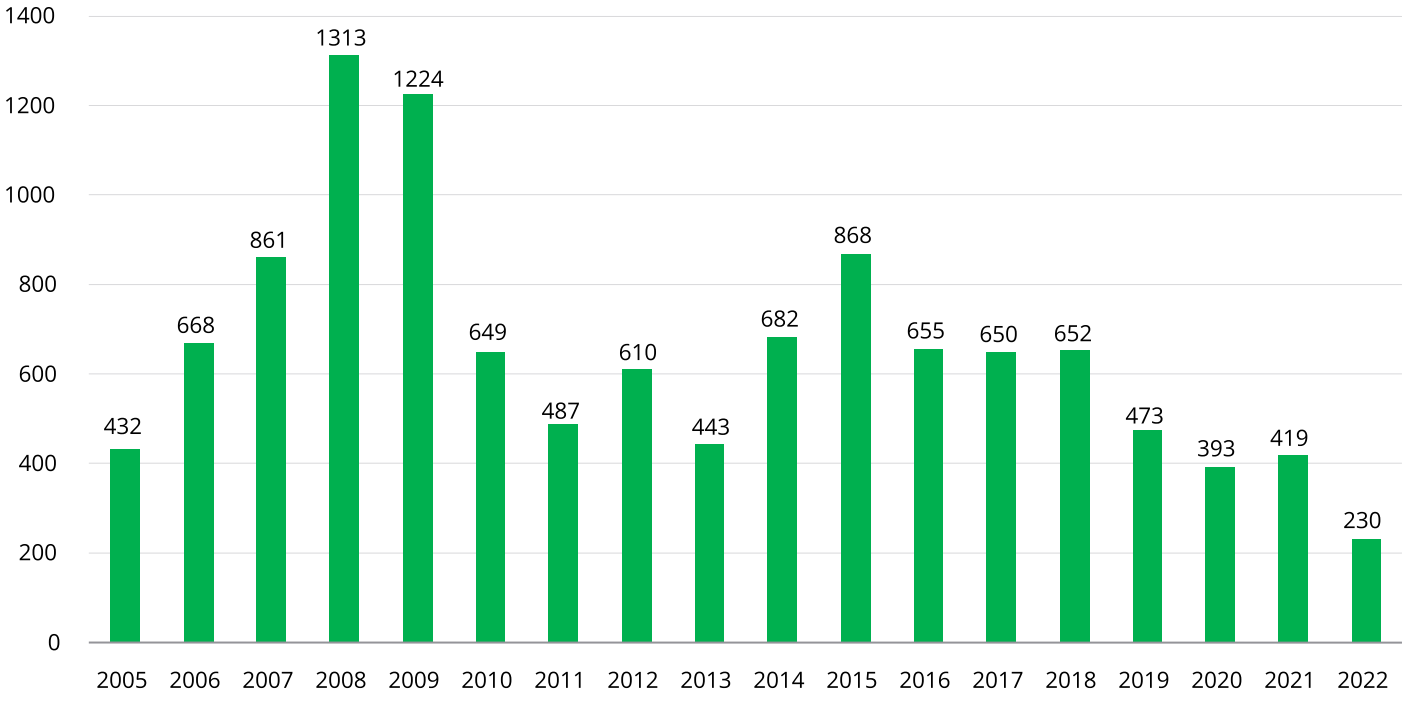
This five-year 18 Million Dollar program, funded by the United States Agency for International Development (USAID) through the US President's Malaria Initiative (PMI), aims to reduce the burden of malaria and work towards its elimination in Tanzania. Implemented by Ifakara Health Institute and partners, the program focuses on improving case management, Malaria-in-Pregnancy (MIP) services, promoting positive health behaviors, enhancing surveillance and information systems, conducting therapeutic efficacy studies, and evaluating the malaria program. Currently operating in five councils in the Katavi region, the program supports the National Malaria Control Program (NMCP) in conducting studies and surveillance nationwide. Launched in October 2022 by the Tanzanian Minister of Health, Hon. Ummy Mwalimu, the program has already accomplished various start-up activities, including baseline assessments, behavior analysis, and sample analysis for therapeutic efficacy studies, while preparing for a national malaria survey in schools.

Chronic Diseases Clinic of Ifakara (CDCI)

Together with our partners, we have been providing continuous services to patients at the St. Francis Referral Hospital (SFRH) in Ifakara, Morogoro since 2005. The Kilombero and Ulanga Antiretroviral Cohort (KIULARCO), which includes consenting patients attending the CDCI, is one of the largest rural cohorts in sub-Saharan Africa with a follow-up of up to 17 years and contains demographic, clinical, and blood sample data for over 12,000 patients, with 4,600 currently under active care. Despite serving hard to reach populations, 98.6% of the people visiting the CDCI's have seen their HIV viral load suppressed. Our laboratory in Ifakara also serves as a referral hub for viral load and early infant PCR testing for four districts in the Kilombero Valley.

In 2022, the CDCI piloted the implementation of CD4 point-of-care testing for the National AIDS Control Program and participated in the HIV Project ECHO, which connects all Care and Treatment Centers (CTCs) in Tanzania with weekly tele-mentoring meetings and continuous education. We were among the HIV Care and Treatment centers that were included in the piloting of the Visitect CD4. The CDCI also has a close partnership with the newly implemented Heart and Lung Clinic and Intermediate Care Project at the SFRH for specialized care of non-communicable diseases (NCDs).

The CDCI also partners with Sauti Ya Vijana project to support adolescents with HIV and implemented several initiatives targeting the improved management of opportunistic infections, tuberculosis, comorbidities in HIV patients, as well as the diagnosis and management of non-communicable diseases. Additionally, efforts are underway to enhance capacity among healthcare workers to achieve the 95-95-95 goal and promote good health for all by 2023. Furthermore, eight staff members are currently pursuing Master's and PhD degrees in various health fields, contributing to research and development at the CDCI.



Number of newly-diagnosed HIV-infected people enrolled at the CDCI clinic

Heart and Lung Diseases Clinic

In 2022, the newly established Else Kröner Center for Heart and Lung Diseases Clinic attended to 4,000 patients, providing specialized diagnostics and care to patients with chronic heart and lung conditions. Within Community outreach programs to remote villages in the area, an additional 1000 people were reached in 2022 and these are expected to expand in the next year. It has also held six training for healthcare workers and has established an open cohort of 395 active participants for NCD research.

The Heart and Lung Diseases Clinic, a collaborative effort between Ifakara Health Institute and St. Francis Referral Hospital in Ifakara, Tanzania, was established to address the increasing burden of non-communicable diseases (NCDs) in sub-Saharan Africa. With funding from the Else Kröner Fresenius Foundation and partnerships with various institutions, the clinic offers specialized care, healthcare worker training, community outreach programs, and a research platform for NCD studies. By providing previously unavailable services to the local population, the clinic plays a vital role in combating the NCD epidemic and improving community health in the Kilombero Valley.

Tuberculosis Clinics

Ifakara Health Institute and partners are making great progress in the fight against tuberculosis. We work with local hospitals and communities in Dar es Salaam and other parts of Tanzania to evaluate new diagnostic methods, develop new vaccines, and conduct clinical trials on new treatment regimens.

A major focus of the group is the development of new TB diagnostics that can be administered near the patient to improve case management. They have recently evaluated a urine-based point-of-care TB test for people living with HIV/AIDS and are also evaluating a new diagnostic platform for drug-resistant TB in a cluster randomized trial involving multiple health centers in Dar es Salaam and Pwani regions. This has the potential to enable same-day TB diagnosis and treatment initiation and change the TB diagnosis process in the future. The research group is also conducting a phase III trial to evaluate a new vaccine, which could replace the current BCG vaccine that has been in use for over 100 years.

A key highlight of the work by the Ifakara's TB research group in 2022 was the findings from a study in Dar es Salaam and Ifakara hospitals, which showed that incorporating an easily learned ultrasound examination increased the proportion of patients with microbiologically confirmed tuberculosis.

The Ifakara TB group is actively involved in assessing new TB treatment regimens alongside diagnostic and vaccine development. Currently, they are evaluating shorter treatment regimens containing Sutezolid and Delpazolid in two large trials. Additionally, the group played a role in the evaluation of the recently authorized Bedaquilline, Pretomanid, Linezolid, or BPaL treatment regimen, which received emergency authorization in June 2022.

Furthermore, the group is dedicated to enhancing our understanding of TB epidemiology in Tanzania. They secured new funding in 2022 for population-based active case finding, aiming to screen more than 10,000 individuals to explore subclinical TB in Dar es Salaam. Additionally, at the chronic care and treatment center in Ifakara, the team provides routine care and treatment services, catering to approximately 300 patients annually.

KEY PROJECTS & INITIATIVES

KEY PROJECTS & INITIATIVES

We Are Expanding Our COVID-19 Initiatives

Considering the remarkable success of our COVID-19 response Taskforce, established in early 2020, we have continued to offer direct laboratory support in mainland Tanzania and Zanzibar, benefiting thousands of individuals. Moreover, we have embarked on various COVID-19 research initiatives in collaboration with organizations in Tanzania and Zanzibar, with some projects securing additional funding to mitigate pandemic-related delays. Notably, our health systems group is spearheading a multi-country consortium funded by the Wellcome Trust, aimed at supporting COVID-19 responses.

In 2021 and 2022, our institute also initiated comprehensive COVID-19 programs to address research inquiries and provide vital information for the country's efforts in combating the pandemic. These include projects focused on assessing COVID-19 medications and vaccines, developing new diagnostics, studying immune responses, and gauging community perceptions of COVID-19 interventions. Funding for the program will be sourced from various entities, including FIND and DNDi, which have already provided financial support for projects related to COVID-19 rapid tests and treatment.

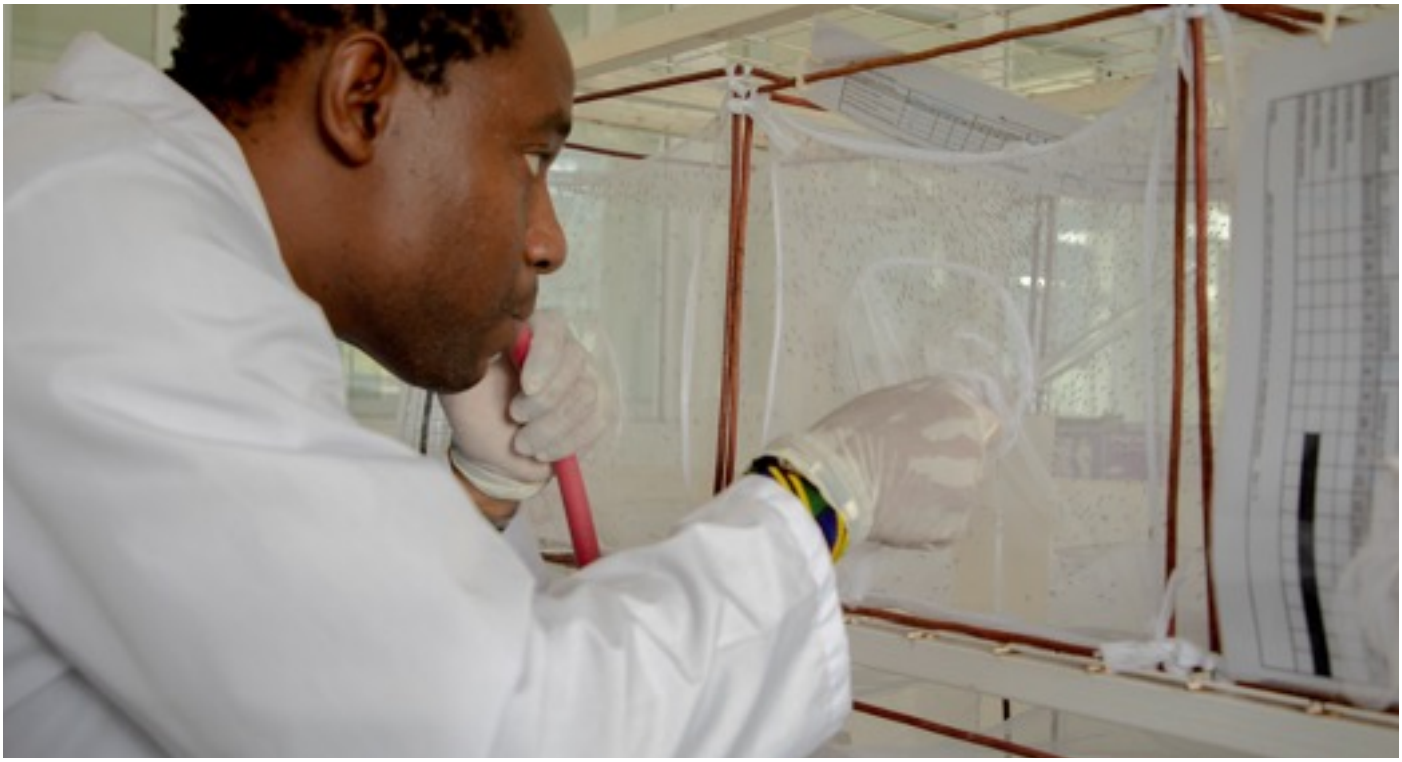
COVID-19:A laboratory scientist at the Zanzibar Institute of Medical Research, during a Training program offered by Ifakara Scientists

Ifakara Takes the Lead in Testing Genetically Modified Mosquitoes for Malaria Elimination in Africa

Ifakara Health Institute is actively engaged in establishing an ecosystem for testing genetically modified mosquitoes in East Africa, with a primary focus on gene drives technology. Gene drives enable the rapid dissemination of desired genetic traits within mosquito populations. By utilizing this technology, we can modify specific mosquitoes to either prevent malaria transmission or render them incapable of reproduction. These approaches hold immense potential for eliminating malaria, even in the poorest and hard-to-reach communities.

Our initiatives encompass three key pillars: a) technology development (as part of our a partnership with Imperial College London, we have established a biosafety laboratory in Bagamoyo where transformative research on genetically-modified mosquitoes is currently ongoing), b) stakeholder engagement (our scientists conduct stakeholder surveys to assess opinions on gene drives, provide essential training to various stakeholder groups and actively participate in local and international committees and meetings dedicated to the technology), and c) enhancing the regulatory environment (we are actively engaging with regulatory authorities in Tanzania and across Africa to ensure that the technology can be effectively and safely evaluated prior to and after any approvals.

The initial stages of our program have yielded remarkable successes. Our teams are making significant strides in developing local strains of transgenic mosquitoes and ensuring Africa possesses the technical knowledge and skills necessary for the successful implementation of gene drive mosquitoes in malaria elimination.



In 2022, we established an Institutional Biosafety Committee (IBC) to guide our work on gene drives and related technologies, and to work closely with the relevant government and international agencies on this technology. With generous funding from the Bill & Melinda Gates Foundation and the Foundation for the National Institutes of Health, we are at the forefront of continental endeavors to build the required capacity and engage key stakeholders in Tanzania. Through our stakeholder engagement program, we have directly interviewed stakeholders in 27 countries in Africa to assess baseline opinions and perspectives on this technology. We are actively working across various levels, from rural villages to policy-making arenas, and are positioning ourselves as a leader in technology development for gene drives in the region.

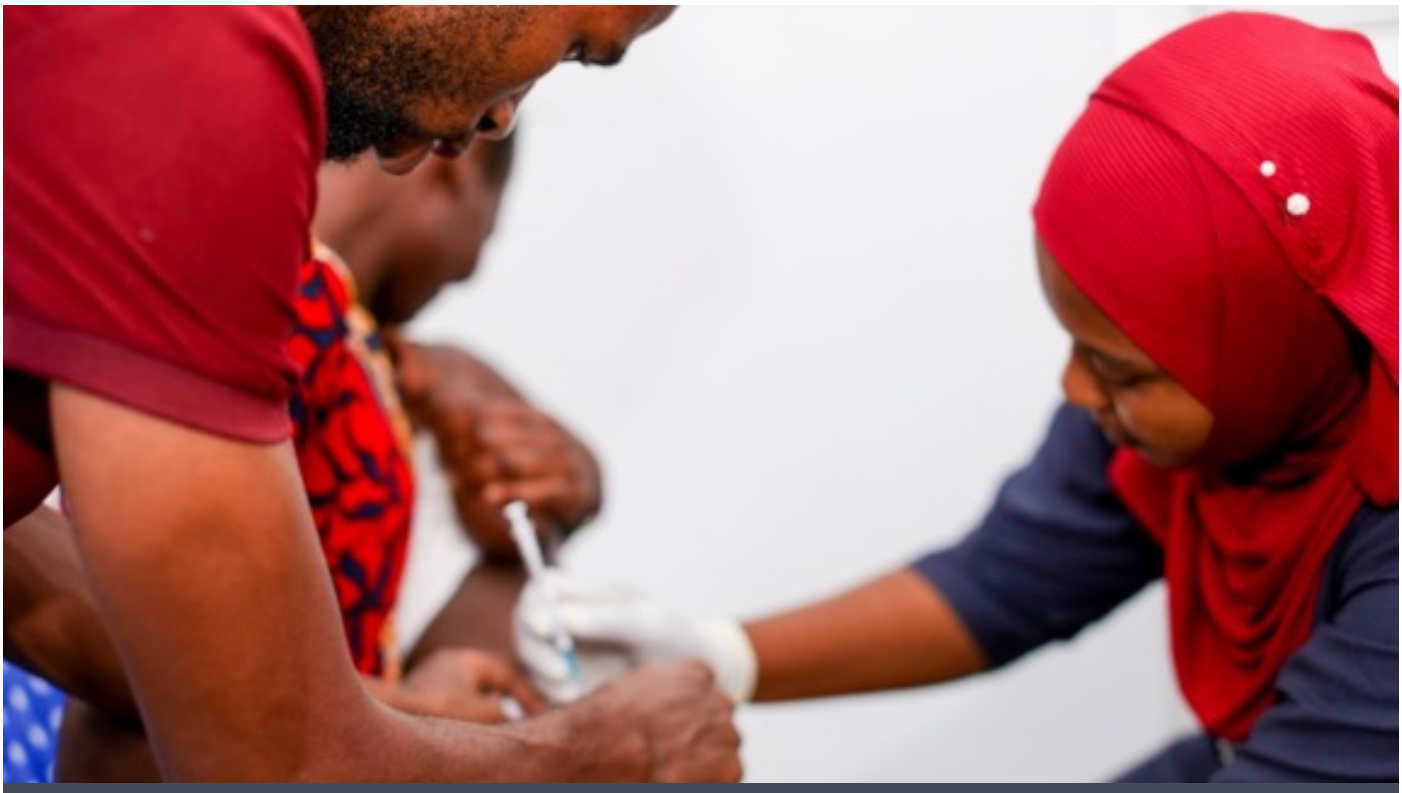
GENE DRIVES: A section of delegates from different corners of the region at the East African Policy Dialogue on Legal and Regulatory framework requirements for the Development and Testing of the Genetically modified mosquitoes for Malaria control and Elimination in East Africa held in Dar es Salaam.

Our Enduring Quest for Malaria Vaccines Bears Fruits - Set To Save Millions of Lives

Ifakara Health Institute takes pride in being a significant partner in malaria vaccine trials for several decades. Our scientists have actively participated in evaluating major malaria vaccine candidates tested in Africa, such as the original Colombian vaccine (SPf66), the recently approved RTS,S vaccine, attenuated sporozoite vaccines (PfSPZ), and the latest generation malaria vaccines including the R21 vaccine. These efforts are starting to bear fruits, as key regulatory approvals and policy discussions are completed.

Notably, Ifakara has played a crucial role in the development of the RTS,S/AS01 malaria vaccine, which received approval from the World Health Organization (WHO) in 2021 for use in children in areas with a moderate to high malaria burden in Africa. We participated in both Phase II and Phase III studies of the vaccine, as well as several consultative expert meetings and engagements. Subsequently, the RTSS vaccine was found to have effectively prevented a significant number of clinical malaria cases in young infants and children, both with and without a booster. Its potential for malaria control was deemed substantial, particularly when used alongside other control measures in areas with high transmission rates. After being administered to approximately 800,000 children in Ghana, Malawi, and Kenya during pilot studies to monitor feasibility and safety within national immunization programs, the vaccine received final endorsement from the WHO in 2021.

Our ongoing work involves the evaluation of the R21 Malaria vaccine in collaboration with the University of Oxford, as well as the Attenuated Sporozoite Vaccines in partnership with Sanaria Inc. Both candidates have demonstrated excellent results, and our scientists are eager to continue these collaborations to advance malaria vaccine development and deployment. Starting in 2023, we anticipate working with partners to evaluate new mRNA malaria vaccines in Africa.



R21 TRIAL: IFAKARA staff administers R21 vaccine to a child at Kiwangwa trial site in Bagamoyo.

We are Saving Thousands of Newborn Lives in Africa Through the NEST360 Consortium

Ifakara is an integral part of the NEST360 partnership, a consortium of 16 members dedicated to reducing newborn deaths in African hospitals by 50%. The team is collaborating with the governments of Malawi, Kenya, Tanzania, and Nigeria to develop, deliver, and sustain new medical tools for improved care of premature and sick newborns. These include equipment for temperature control, respiratory support, nutrition provision, infection prevention, and the diagnosis and treatment of jaundice.

In Tanzania, where Ifakara leads the project, we have implemented a comprehensive plan to enhance newborn care on a sustainable basis. Between 2021 and 2022, special training centers have been established to educate individuals on the proper utilization and maintenance of the new equipment. We are collaborating with local hospitals and the government to ensure smooth operations and sufficient resources for high-quality care for newborns.

The consortium also supports a community of innovators focused on developing new technologies for newborn care. We are working closely with the government to formulate policies and funding strategies, guaranteeing the continuity of this exemplary newborn care in the future.

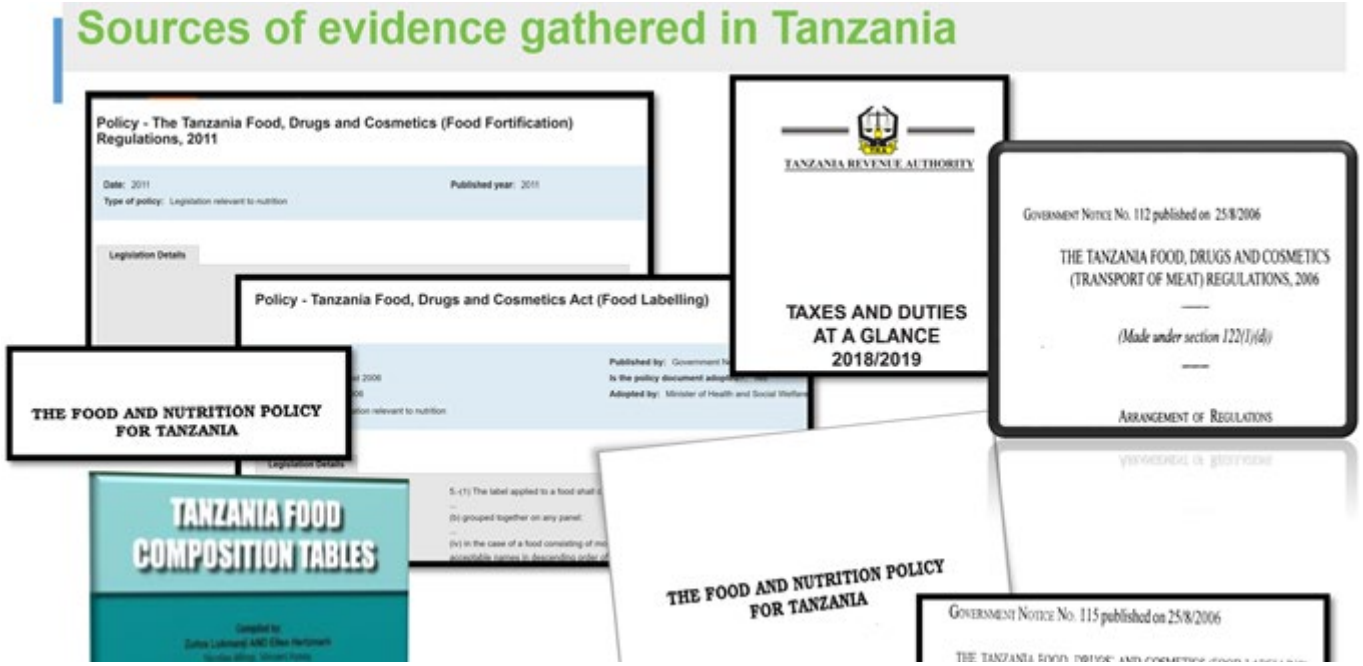
Overall, the NEST360 consortium is achieving significant strides in saving the lives of newborns in Africa. Their objective is to ensure that by 2025, the target countries have the essential resources and policies in place to deliver quality care and reduce newborn mortality. This aligns with the global goals outlined in the SDG - 2030 Agenda, aiming to improve newborn survival rates.

NEST 360: Equipment for new-born care installed at Amana hospital in Dar es Salaam.

Ifakara Joins the Global Regulatory & Fiscal Capacity Building Program (RECAP)

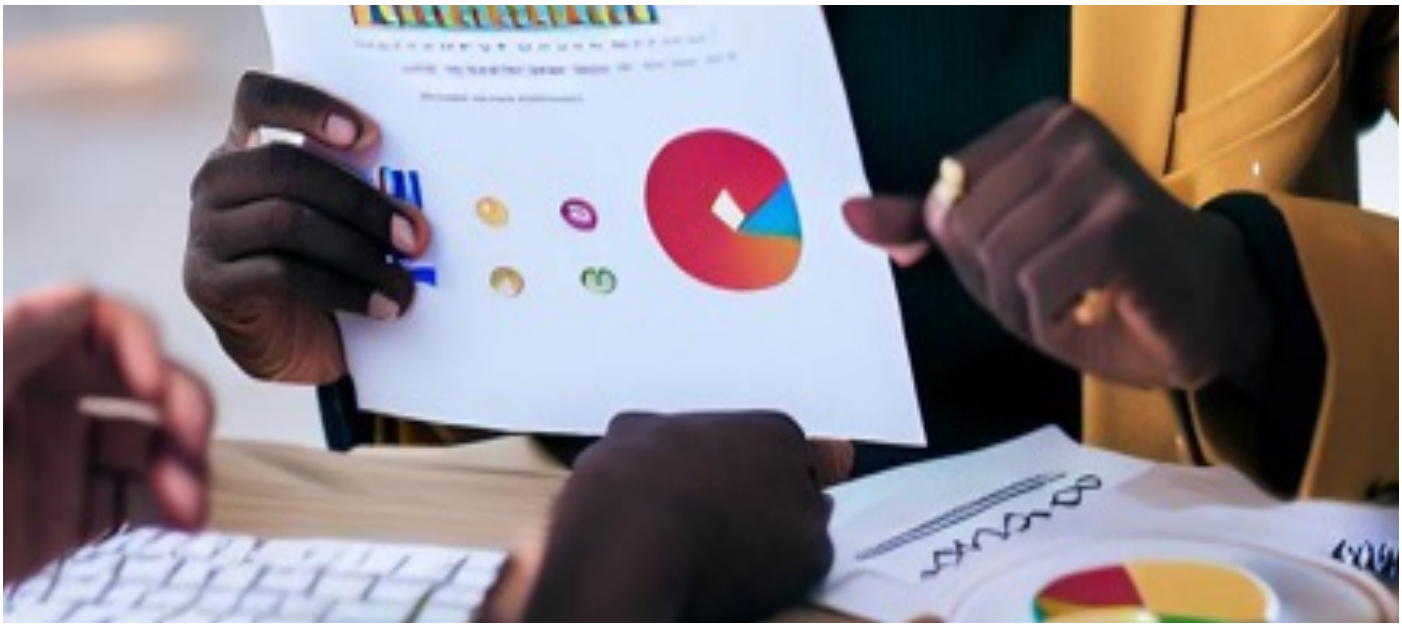
Ifakara Health Institute has been participating in the Global Regulatory & Fiscal Capacity Building Program, known as Global RECAP or the 'RECAP Project. The project has the objective of implementing policy-level interventions in Tanzania to tackle unhealthy food consumption and prevent nutrition-related non-communicable diseases. Led by our Health Systems and Policy group at the institute, this program has provided numerous high-level opportunities to actively engage with policy makers at national and sub-national levels.

In February 2022, a policy review workshop was conducted to assess the implementation of different policies in Tanzania aimed at promoting healthy food environments and reducing the levels of salt, sugar, and saturated fats in the market. Participants, including stakeholders from various government agencies and organizations, evaluated the progress of these policies in terms of their development stage and adherence to international standards.



We Have Taken Bold Steps to Advancee Data Science and Mathematical Modelling for Health

Ifakara's Data Science & Mathematical Modelling (DSCap) Team has emerged as a key research group in the past three years, making remarkable strides in advancing the field of data science and mathematical modelling in Tanzania and internationally. The team is actively engaged in several initiatives aimed at cultivating a skilled workforce proficient in applying data science and modelling to global health.



These initiatives encompass supporting MSc and PhD scholarship applications, offering mentorship and supervision, conducting training programs at the University of Dar es Salaam, and providing data analysis assistance to ongoing research projects. The goal is to nurture relevant expertise in data science and mathematical modelling among individuals and institutions.

Under the guidance of Dr. Samson Kiware,, the team also plays a crucial role in providing technical support to the Tanzanian National Malaria Control Program and the Zanzibar Malaria Elimination Program. Additionally, team members are placed at renowned international institutions, such as the University of Glasgow, University of California-Berkeley, and Swiss TPH modelling labs, which further enhances their technical skills and expertise.

DSCap: Dr. Amelia Bertozzi-Villa, Disease Modeler at the Gates Foundation's Institute for Disease Modeling (IDM) delivers a capacity building workshop on data. This is part of the DSCap group

IFAKARA Leads African Conversations to Shape Malaria Control with Gene Drives

The African Conversations project focuses on the use of gene drives to control and eliminate malaria in Africa. Gene drive modified mosquitoes have shown great promise in the laboratories and could potentially address some of the major challenges of malaria control, notably weak health systems, poverty, insecticide resistance, declining adherence to existing interventions. However, discussions on the technology rarely include African professionals and communities, who possess valuable knowledge and expertise for how gene drives may be tested or used.

The African Conversations program, which is led by Dr. Lina Finda and supported by the Foundations of the National Institutes of Health (FNIH), aims to engage key African stakeholders and communities in informing the research and development of gene drives for malaria elimination. In the first Phase (2019-2021), our scientists engaged stakeholders in 27 African countries and territories. This way, we established baseline awareness and perspectives for the continent regarding genetically modified mosquitoes, and also identified key gaps that should be urgently addressed. In the second Phase, which began in 2022, we are working with local experts to create more in-depth country-specific profiles relevant for gene drives in selected countries, including Kenya, Tanzania, Malawi, Mozambique, Nigeria, and Cameroon. Stakeholders from various groups, including scientists, policymakers, regulators, media reporters, and community leaders, have been involved.

By involving African stakeholders, the project seeks to ensure that any evaluation and future applications of gene drives in Africa align with local structures, values, and requirements. The findings will inform enhanced strategies for malaria control and elimination that are both effective and tailored to the African context. We seek to emphasize the consideration of both the benefits and risks associated with the technology, as well as the specific needs and perspectives of African stakeholders.

We are Testing New Biologics Against Emerging and Re-emerging Diseases

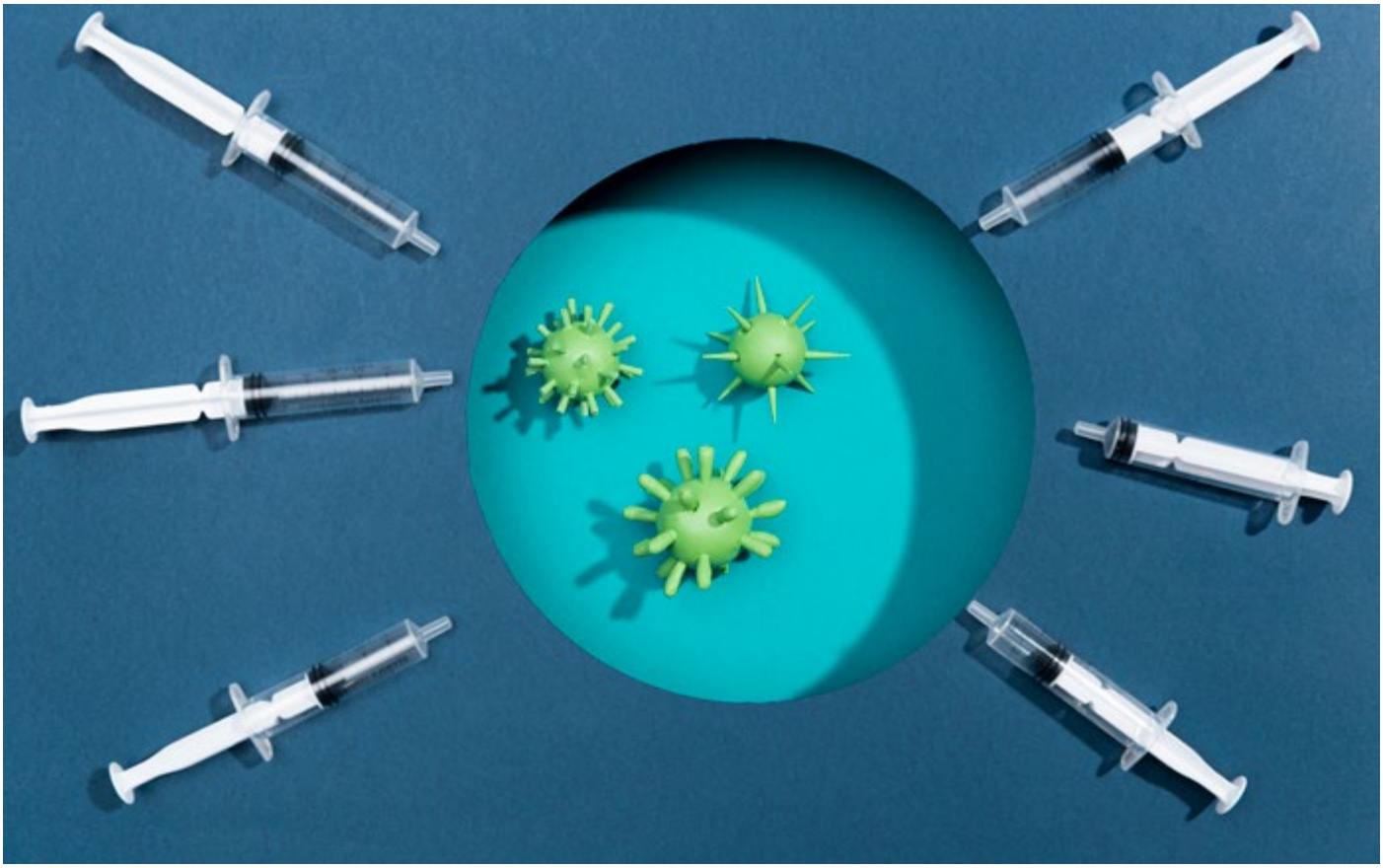
We are strategically expanding our program on biologics, by leveraging our vast expertise in malaria research to combat various emerging, re-emerging and neglected diseases. These efforts involve advancing the development and testing of innovative drugs, vaccines, monoclonal antibodies, and essential nutritional supplements

In the last two years, our scientists have began research on an Ebola vaccine that specifically targets the Sudan Strain, which caused a recent outbreak in Uganda. Additionally, we are actively involved in COVID-19 vaccine research, aiming to address various sublineages of the SARS-CoV-2 virus affecting East African adults. To combat neglected diseases, we are dedicated to developing a novel rabies vaccine utilizing a viral vector platform. Here, our aim is to provide long-lasting protection with a single dosage, thus potentially transforming this life-threatening disease.

Our scientists are also harnessing the potential of nanotechnology, and collaborating with partners to explore its applications for the delivery of anti-malarial drugs and vaccines, with an initial focus on investigating herbal remedies for malaria treatment. Our long-term objective is to establish a regional nano-hub to facilitate the commercialization of malaria drugs and vaccines.

Furthermore, we have continued our pioneering work on controlled human malaria infection models, enabling accelerated assessment of malaria vaccines and antimalarial drugs. Through partnerships with leading institutions such as the University of Oxford, we are driving research to better understand naturally acquired immunity to malaria, vaccine-induced protection, and pathogen-host interactions.

This strategic expansion of work on biologics will inform the development of better treatment and prevention of emerging, re-emerging and neglected diseases.



Ifakara Innovation Hub: Accelerating Transformative Change in Health and Livelihoods

The Ifakara Innovation Hub (IIH) is rapidly emerging as a significant catalyst for fostering innovation in rural and urban areas of southern Tanzania. With a strong focus on empowering local innovators and startups, the hub has achieved remarkable successes in recent years, demonstrating our dedication to uplifting low-income communities. Established by Ifakara Health Institute and partners less than five years ago, the Ifakara Hub has already become a prominent player within Tanzania's innovation ecosystem. We primarily offer vital funding, facilitating access to cutting-edge fabrication equipment and foster collaborations. In addition the hub actively advocates for essential policy changes in coordination with government agencies.

Notable successes in the past year include two startups that emerged from the ecosystem with significant milestones. Mkaa Safi Enterprises, a green energy startup has successfully introduced their revolutionary products to the local market in Tanzania. By recycling agricultural waste, specifically sugarcane remains from Kilombero, Mkaa Safi produces affordable and long-lasting alternative charcoal, addressing energy scarcity and promoting sustainable practices. Another standout success is NovFeed, which has pioneered a solution for converting food waste into high-protein feed and organic fertilizer. This innovative approach not only tackles waste management but also provides a sustainable and cost-effective solution for farmers. Their groundbreaking work was recognized on a global stage when NovFeed secured a remarkable $1 Million Grand Prize in the prestigious Milken-Motsepe Agritech Innovation Competition 2023.

These successes exemplify the transformative impact of the Ifakara Innovation Hub in unlocking the potential of rural and urban innovators in distant areas such as Ifakara. By nurturing local talent and fostering an enabling environment, the hub is not only driving economic growth but also creating a pathway for sustainable development in the Kilombero valley and beyond. For Ifakara Health Institute, the Hub is another pathway towards achieving our mission of improving people's health and wellbeing.

Ifakara Foundation

IFAKARA Foundation Established to Mobilize Resources for Sustainability.

The establishment of the IFAKARA Foundation marked a significant milestone in mobilizing resources for the sustainability of Ifakara Health Institute. As a charitable foundation, its main objective is to raise funds to support our research and training programs. The Foundation currently operates under the auspices of the Rudolf Geigy Foundation in Switzerland, paying tribute to Ifakara's historical connection with Prof Rudolf Geigy. Dr. Zawadi Mageni Mboma serves as the Secretary of the Foundation, while also holding the position of Grants and Contracts Officer. She will actively seek strategic partnerships to ensure the long-term sustainability of our work. Besides sustainable financing, the funds raised by Ifakara Foundation will also provide flexible resources to address new frontiers in healthcare.

KEY SCIENTIFIC FINDINGS AND DEVELOPMENTS

KEY SCIENTIFIC FINDINGS AND DEVELOPMENTS

The following represents a sample of the key findings and developments observed during the reporting period. While not exhaustive, the included information provides a concise overview of our major findings and areas of work, and how the research done here impacts on society.

IFAKARA Study Demonstrates Long-term Benefits of Insecticide-treated Nets

A study by Ifakara scientists and partners has shown that the health benefits of using mosquito nets treated with insecticides during childhood persist into adulthood. The 22-year study followed more than 6,700 children in Tanzania and found that those who habitually slept under the nets in their early childhood had a survival rate that was over 40% higher than those who slept under the nets less frequently.

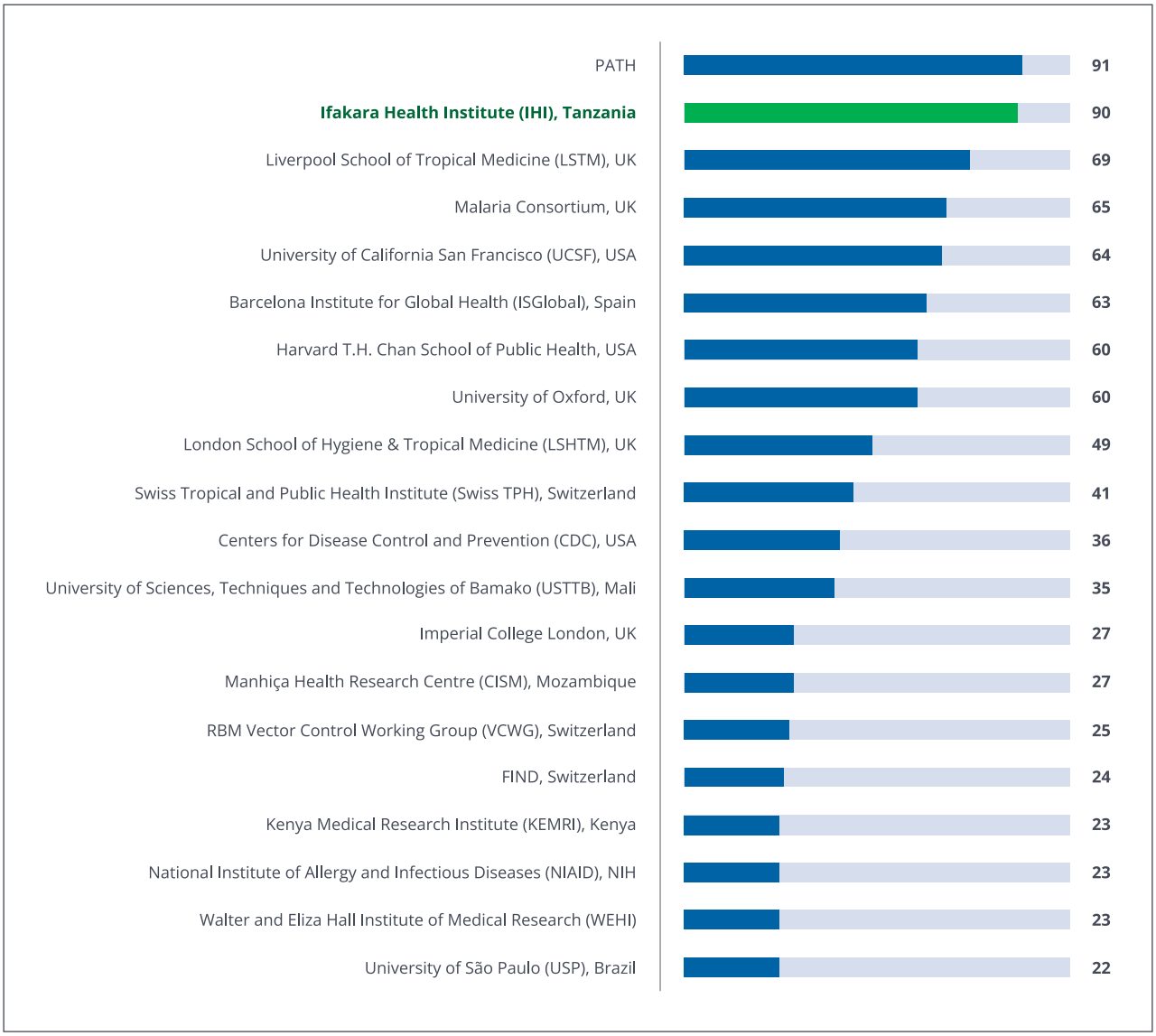
This is the first study to demonstrate that the survival benefit of early-life malaria control persists until adulthood. The study also highlighted the potential of long-term community-based research and the importance of strengthening civil registration (Citation: Fink et al N Engl J Med 2022; 386:428-436). A follow-up analysis of the same data further revealed that high ITN use in childhood was strongly associated with increased school completion in both men and women. ITN use during early childhood therefore clearly have long-term positive effects on both survival and socio-economic outcomes such as educational attainment (Citation: Mrema et al Malaria Journal 2023, 22,134).

Other Forms of Malaria Still Prevalent in Tanzania

Ifakara scientists have generated evidence that the rare type of malaria, Plasmodium ovale, might be widely circulating in the country. This type of malaria, which is more common in the Pacific region and the Arabian Peninsula, is known to hide in the liver before reappearing in the form of relapses. The researchers observed that this type of malaria was present in more than 10% of adult volunteers in a recent research study done in Tanzania, and tests showed that mosquitoes that fed on these infected individuals subsequently developed malaria, indicating that the Plasmodium ovale infections are highly infective to mosquitoes and could contribute to ongoing transmission.

Given this finding, it is important for surveillance systems to be expanded to more easily detect these other forms of malaria, as their presence could complicate efforts to eliminate malaria in Africa (Tarimo et al. 2022; Parasites & Vectors 15 (1): 56).

Ifakara Health Institute Now a Global Leader in Malaria R&D



Based on data archived by the Barcelona-based Malaria Elimination Scientific Alliance (MESA), Ifakara has been recognized as the leading institution in malaria research projects for a considerable period. However, in 2022, the Institute ranked second on the list, with PATH taking the top spot. Other prominent institutions such as the Liverpool School of Tropical Medicine, Harvard School of Public Health, London School of Hygiene and Tropical Medicine, and Swiss TPH also featured in the top ten. The database currently includes 576 global malaria research institutions.

While we acknowledge our position as the institution with the second-highest number of malaria projects in this database, it is important to note that the financial budgets allocated to these projects are significantly lower compared to many institutions engaged in malaria research in Europe and North America. This discrepancy suggests a need for greater equity in global health efforts.

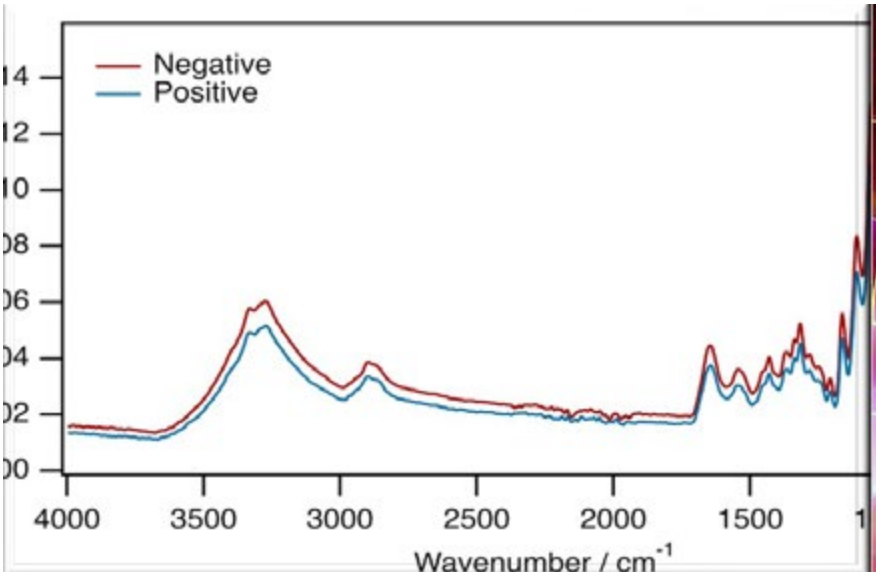
Scientists Use Artificial Intelligence and Infrared Spectroscopy to Measure Malaria Transmission.

Ifakara scientists and partners have developed a new method for evaluating the impact of malaria control tools on mosquito populations using deep learning techniques and infrared spectroscopy. The method involves scanning and analyzing the infrared spectra of mosquitoes and using artificial intelligence algorithms called convoluted neural networks to predict the species and age of the mosquitoes.

In a study involving more than 40,000 mosquitoes from Tanzania and Burkina Faso, the method demonstrated over 90% accuracy in predicting both the species and age of the mosquitoes. The method can also be used to determine the impact of interventions such as insecticide-treated nets on the demographic structure of mosquito populations (Siria et al. 2022; Nature Commss 13-1).

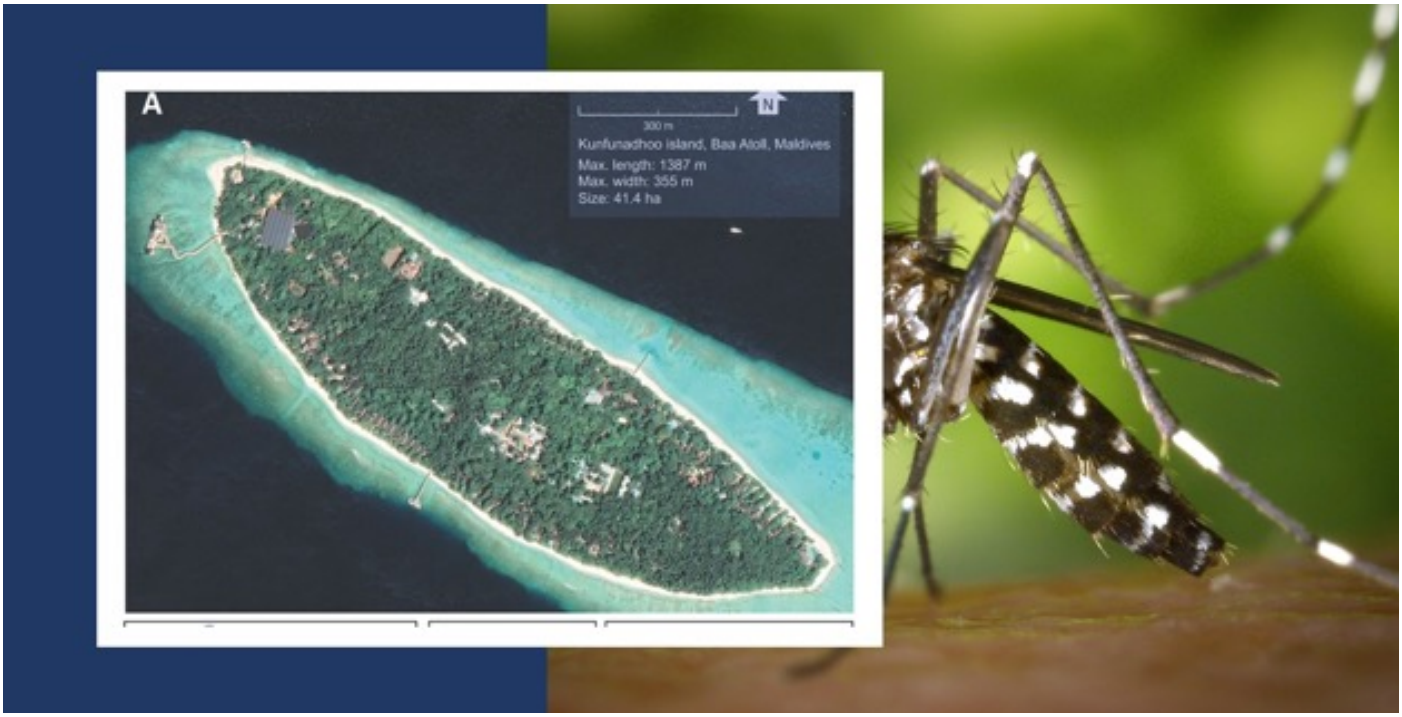
Following the success of this project, we have expanded this research portfolio to include broader applications of these technologies for both malaria field surveys and diagnostics in clinical settings. Studies are ongoing to assess the performance of these tools for detecting malaria parasites in dry blood spots and for detecting malaria parasites inside field-collected mosquitoes; as well to understand their limits when used in areas with high or low malaria transmission. We are also partnering with multiple stakeholder groups to provide essential training on this approach and to explore its integration for malaria surveillance efforts in low-income settings.

In 2021, we were awarded a $4 million grant from the Bill and Melinda Gates Foundation to further advance this technology and validate it evaluating malaria interventions in Tanzania. This project builds upon previous work to optimize these technologies for age determination, species identification, parasite detection, and analysis of mosquito blood history, both in laboratory and natural settings.



Ifakara-Supported Program Eradicates Dengue Mosquitoes from Maldivian Islands.

An Ifakara-supported program has successfully eliminated dengue mosquitoes from three Maldivian islands using a combination of trapping and larval source management. This eco-friendly approach, which was initially requested by the Maldives following a 2017 Ifakara TedTalk, has practically eliminated populations of both Aedes and Culex mosquitoes within a year on one island and within two months on another. The program was led by our collaborators, Dr. Bart GJ Knols and Akib Jahir, and was directly supported by Ifakara Scientists, Ms. Najat Kahamba, who spent three months in the Maldives to operationalize the program. The Initiative has since almost completely eliminated the risk of arboviral disease transmission for local communities and safeguarded tourism, a vital economic resource for small island developing states. It has also inspired greater initiatives in and around and beyond the Maldivian Islands and demonstrated the value of Ifakara science beyond our national borders (Citation: Jahir, et al 2022; Insects, 13(9), 805).



Effective Community-Based Approach Reduces Malaria Cases in Rural Tanzania

Ifakara Spearheads Multi-Country Agreement Evaluating the Chinese Approach to Malaria Case Management in Coastal Tanzania – Plans an Expanded Study To Demonstrate Wider Impact.

Between 2015 and 2018, a collaborative project conducted by Ifakara health Institute together with Researchers from China, explored a new model for reducing malaria burden, using a rigorous case finding and treatment approach previously used in China. The actual approach was called 1,7-malaria Reactive Community-based Testing and Response (1,7-mRCTR) approach and was locally-tailored for reporting febrile malaria cases in endemic villages.

The team worked closely with existing health facility data and locally trained community health workers to conduct community-level testing and treatment. Overall, in the wards that received the intervention, the team conducted 85 rounds of 1,7-mRCTR. Malaria prevalence in the intervention wards declined by 81% (from 26% at baseline to 5% at endline). The researchers, led by Yeromin Mlacha, Dr. Prosper Chaki and Dr. Salim Abdullah concluded that 1,7-mRCTR approach significantly reduced the malaria burden in the areas of high transmission in rural southern Tanzania. They argued that such a locally-tailored approach could accelerate malaria control and elimination efforts.

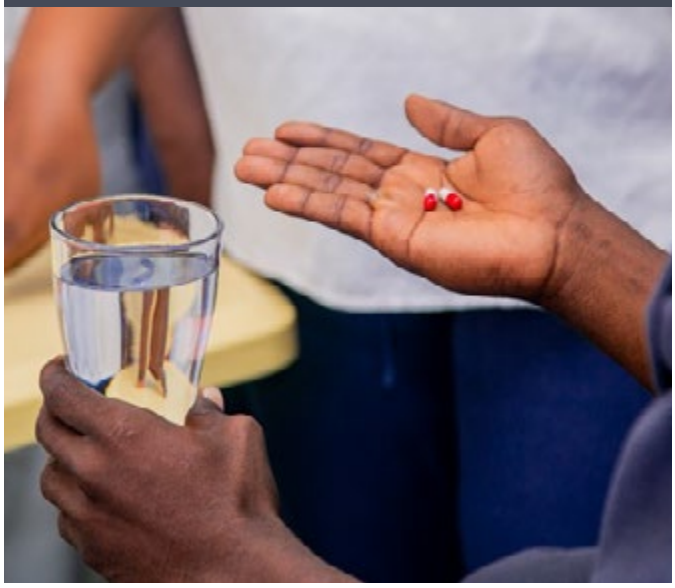
A follow-up evaluation conducted between 2019 and 2021 has since validated the effectiveness of this approach, and the team is preparing for a possible scale-up, pending financing, in other high malaria burden countries in Africa, including Tanzania. Citation: Mlacha, Y. P., Wang, D., Chaki, P. P., Gavana, T., Zhou, Z., Michael, M. G., ... Zhou, X.-N. (2020). Effectiveness of the innovative 1,7-malaria reactive community-based testing and response (1, 7-mRCTR) approach on malaria burden reduction in Southeastern Tanzania. Malaria Journal, 19(1), 292. https://doi.org/10.1186/s12936-020-03363-w

Exploring Africa's Herbal Wonders: Ifakara Scientists Complete Landmark Clinical Trial of a Medicinal Plant Against malaria

Africa is rich in herbal medicines, but these are rarely evaluated in formal clinical trials and therefore lack the basic safety and efficacy data. One such candidate is maytenus senegalensis, which is one of the medicinal plants widely used in traditional medicine to treat infectious and inflammatory diseases in Africa.

Ifakara scientists recently conducted a clinical trial to evaluate the safety and tolerability of this herbal medicine, as a potential treatment for malaria. The study, which was the first of its kind, found that the plant was safe and tolerable when administered at a dose of 800 mg every eight hours for four days, with no deaths or serious adverse events. The scientists suggested that this study design could be used to evaluate other herbal remedies (Citation: Kamaka et al: Trop. Med. Infect. Dis. 2022, 7(12), 396).

MEDICINAL PLANT:
The first study participant gets the pills.



Scientists Uncover Excessive Use of Antibiotics in Dar es Salaam Health Facilities

A recent study by Ifakara scientists found that there is extensive overuse of antibiotics in maternity and neonatal wards in hospitals in Dar es Salaam, Tanzania. The scientists conducted multiple surveys in three hospitals and recorded the use of antibiotics and infections in these wards. They found that the prescription of antibiotics was high in all the hospitals, with 90-100% of women who had cesarean sections being given antibiotics and as many as 63% of women who had normal vaginal deliveries also receiving antibiotics.

More than 90% of neonates were also given antibiotics, with medical prophylaxis being the most common reason for prescribing them. The researchers have called for urgent antibiotic stewardship programs in Tanzanian hospitals to address this inappropriate use and limit the spread of antimicrobial resistance. Antimicrobial Resistance & Infection Control volume 10, Article number: 142 (2021).

Study Sheds Light on Healthcare Barriers for Rural Households in Tanzania

In a research program concluded in 2022, Ifakara scientists analyzed the time and transport costs incurred by Tanzanian households in accessing health care, using data from 1,407 patients in rural Tanzania. They used data that had originally been collected in 2012. The scientists found that 71% of patients, mostly from the poorest and rural households, accessed care on foot, spending an average of 30 minutes and $0.41 USD per trip, and waiting 47 minutes for an average of 13 minutes of consultation with care providers. Although the average medical cost was $0.23 USD, only one in every five patients were actually able to pay for the care (a mere 18%).

The researchers concluded that there is a need for greater investment in primary health care to reduce access barriers and cost burdens, particularly for the worst-off households. Possible solutions include improving and expanding health facilities, increasing the healthcare workforce and medical supplies, and collaborating with other sectors (Citation: Binyaruka & Borghi Health Econ Rev 2022, 12:36).

Ifakara Study Explores Perspectives on Peer Support for Mental Health Care

In a recent study, Ifakara scientists and partners from various countries investigated the perspective of mental health workers on the use of peer support in mental health care. The study found an overall positive attitude towards peer support but also identified concerns about potential negative effects, such as negative role models and the possibility of providing inadequate advice to service users. Mental health workers in low- and middle-income countries described peer support workers as bridge-builders and emphasized the mutual benefits of peer support.

The researchers concluded that while attitudes towards peer support were positive, local adaptations may be necessary when implementing it, depending on the context, resources, and previous experiences. This study was particularly significant for Ifakara Health Institute, and for our partners, as we expand our research in the field of mental health and other non-communicable diseases. It is expected that this will become a priority research area in our next strategic period, 2023-28. (Citation: Krumm et al: BMC Psychiatry 2022, 22:604).

Ifakara Documents the Vital Role that Community Networks Play in Health Research - Sets Stage for Enhanced Stakeholder Engagement

Ifakara scientists have provided the first formal description of the community networks that are essential for successful health research in Tanzania. They studied the community networks involved in health research and asked people who have participated in research by Ifakara scientists for their thoughts on the functionality of the community networks.

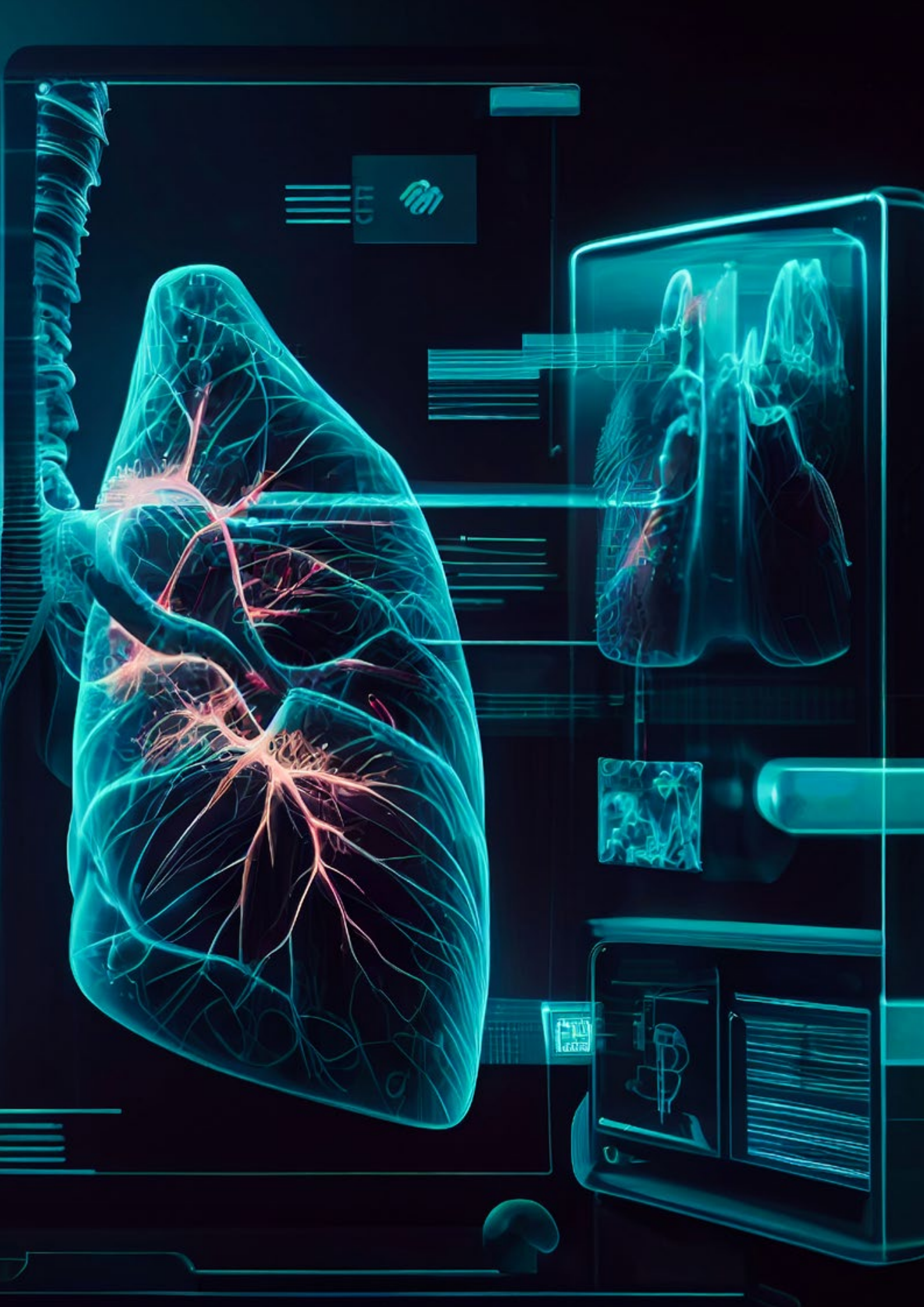
The researchers found that there is a need to further develop the Ifakara's Community Engagement Unit, to work across different projects to support engagement with the community. The unit would maintain continuous engagement with the community and conduct research to understand the relationship between the community and the Ifakara.

The findings of this research will contribute to ongoing efforts to improve stakeholder engagement across all areas of the IHI's work.

Study Shows That Directly Financing Health Facilities Can Improve Maternal Health Services

A study by Ifakara scientists has shown that a program called Direct Health Facility Financing (DHFF) can improve maternal health services in Tanzania. In Tanzania, there are nearly 400 maternal deaths per 100,000 live births, and despite various efforts, this problem has not been solved.

The DHFF program gives money directly to health facilities to deliver care, and the Ifakara study found that this helps reduce delays in getting essential medical supplies and improves outreach and engagement with the community. The DHFF program also led to an increase of 34% in the number of women giving birth at health facilities. The scientists recommend that the DHFF program be strengthened, and that staff receive further training (Citation: Tukay et al 2021: Int J Womens Health. 2021; 13: 1227–1242).



Scientists Estimate the Risk of Death Among People Infected with TB – Most Deaths Occur Within Two Months after Diagnosis

A recent study by Ifakara scientists examined data on adults in Tanzania being treated for TB from January 2017 to December 2017. The scientists found that most TB patients were males over the age of 40 and that more than half of all TB-related deaths occurred within the first two months of treatment, even though over 90% of patients were still surviving after 12 months.

The main factors associated with TB deaths included advanced age, having TB and HIV co-infection, and having unconfirmed TB results. The scientists have recommended targeted interventions to improve TB referral systems, diagnostic capacity in primary health facilities, and minimize delays and misdiagnosis in order to reduce TB mortality (Citation: Bukundi et al 2021 Journal of Clinical Tuberculosis and Other Mycobacterial Diseases 24).

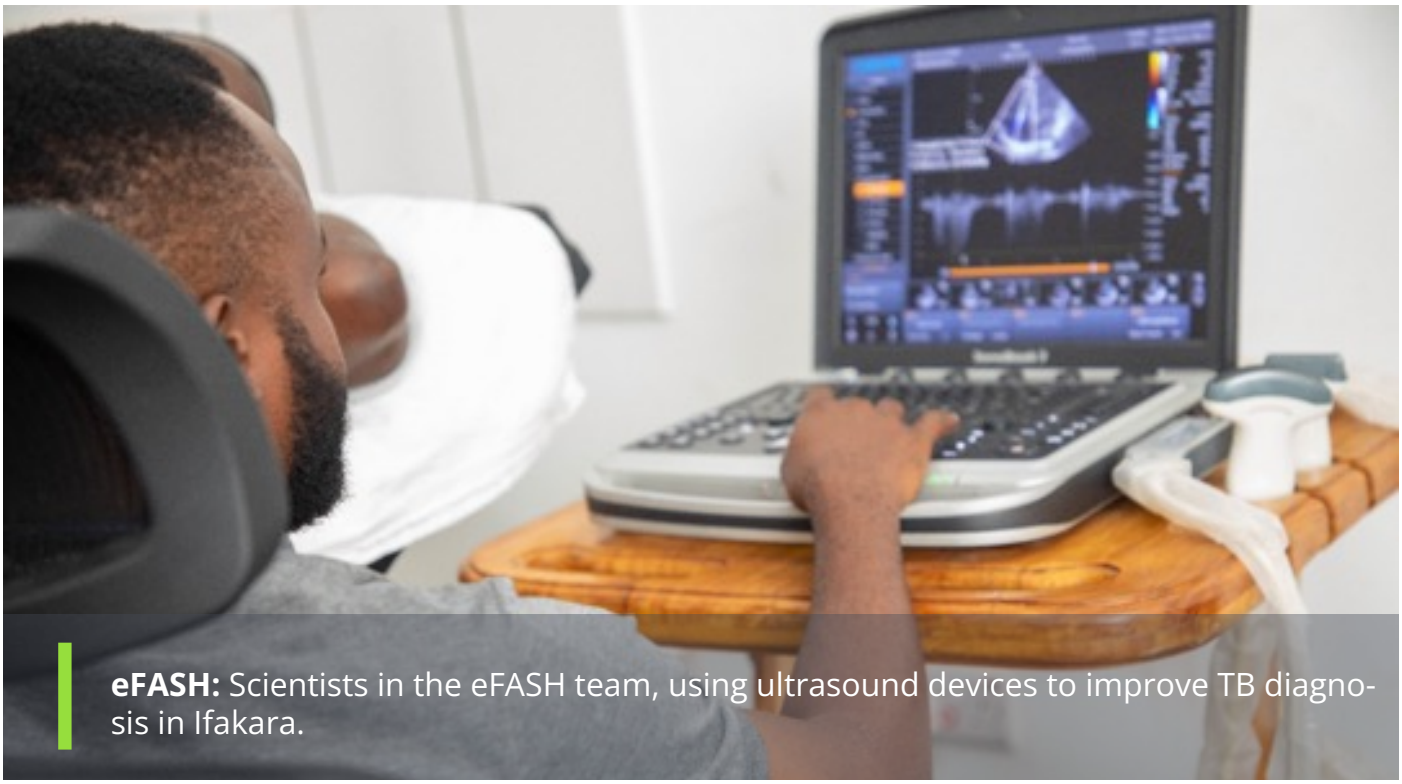
Transforming TB Diagnosis: Ifakara Scientists Pioneer Ultrasound Protocol to Enhance Accuracy and Management

Limited access to accurate TB diagnostics leads to a high rate of overtreatment and delays in diagnosis in low-income countries. To address this issue, combining multiple forms of diagnosis and integrating the results can help exclude TB and prevent overdiagnosis. This is important due to the high cost and potential side effects of TB treatments.

Following extensive research and evaluation done in Tanzania, Ifakara scientists and partners have now developed a protocol called extended Focused Assessment with Sonography for HIV and Tuberculosis (eFASH) which will be used to improve the diagnosis of extrapulmonary tuberculosis (TB), by incorporating simple ultrasound techniques. In a study conducted between 2018 and 2020, 701 patients with suspected extrapulmonary TB were randomized to either an eFASH intervention group or a control group examined using standard methods.

The eFASH protocol increased the percentage of definite TB cases; and therefore improved the management of TB in these settings, with no adverse effects observed. According to the researchers involved, the new protocol is a simple examination that takes about 15 minutes

per patient and combines sonography of the chest, axillary and cervical lymph nodes, and the inferior vena cava diameter with other tests to improve the diagnosis of TB and reduce over-treatment and delays in diagnosis (Citation: Ndege et al Clinical Infectious Diseases).



eFASH: Scientists in the eFASH team, using ultrasound devices to improve TB diagnosis in Ifakara.

Ifakara Outlines Major Causes of Death Among People Living with HIV in Tanzania – TB still Leads

Ifakara scientists conducted a study to understand the main causes of death among people living with HIV in rural Tanzania after 10 years of follow-up. They examined treatment outcomes among persons attending the Ifakara Chronic Diseases Clinic to identify the causes of death and determine whether these deaths were HIV-related or not.

The study found that tuberculosis was the leading cause of death among HIV-infected individuals, but cardiovascular and renal diseases became important in later stages. The researchers concluded that there is a need for improved screening and management to address these issues (Mollel et al BMC Infectious Diseases 22 (1): 37).

Scientists Partner with Local Communities to Accelerate Elimination of Rabies

Rabies is still a major concern in Tanzania, causing 59,000 deaths each year worldwide, and high coverage of dog vaccination is necessary to eliminate it. However, low participation in vaccination campaigns has previously been a challenge.

Fortunately, a 2022 study by Ifakara scientists and partners demonstrated the importance of community engagement for increasing their participation in dog vaccination campaigns for rabies elimination in Tanzania. The study found that engaging communities regularly on dog vaccination can improve their knowledge of dog behavior and handling techniques, leading to increased participation in vaccination campaigns.

The scientists involved key leaders of the target communities in planning and implementing mass dog vaccination campaigns. They also shared essential information through various methods to enhance engagement and awareness. In their final analysis, they found that community members' knowledge and participation in vaccination campaigns improved (Duamor et al 2022 Frontiers in Public Health, 10).

We Can Now Conduct Large Scale Dog Vaccination Campaigns Without Cold Chain

Ifakara scientists and partners have been working for several years to scale up vaccinations of dogs, in an effort to eliminate rabies in Tanzania Mainland and Zanzibar. The development of partially-thermostable rabies vaccines has greatly improved the reach and impact of large-scale programs against infectious diseases but has not previously been evaluated under natural field conditions. We have recently demonstrated that it is indeed possible to conduct large-scale rabies vaccinations of dogs without the cold chain process.

In a trial published in late 2021, the scientists compared the effectiveness of the Nobivac® Rabies vaccine stored under cold chain conditions to doses stored under naturally fluctuating temperature conditions. They found that the potency of the vaccine was not impacted by storage under elevated, fluctuating temperatures.

These findings have potential applications for scaling up mass dog vaccination programs in low- and middle-income countries, particularly in hard-to-reach areas with limited access to power and cold-chain vaccine storage. The researchers used a device called the Zeepot to maintain the vaccines under fluctuating temperatures. (Citation: Lugelo, et al 2021: Frontiers Vet Science 8 (September): 728271).

JAB: A lab technician prepares an anti-rabies jab ready for administering it to a dog.

RESEARCH PLATFORMS & INFRASTRUCTURE

RESEARCH PLATFORMS & INFRASTRUCTURE

Ifakara Millenium Cohort [Birth Cohort] - of Young Adults

The Ifakara birth cohort, also known as the Millenium Cohort, includes 6706 children born between January 1998 and August 2000 in the Ifakara Rural Health and Demographic Surveillance System in Tanzania. The children were recruited for the study during household visits from 1998 to 2003. The purpose of the birth cohort was to examine the long-term social and economic impacts of good child health, specifically the protection from malaria in early life.

In 2019, a follow-up survey was conducted to determine the survival status and demographic development of all participants. The survey was able to track 5983 participants, which is equivalent to 89% of all participants (including 604 deaths). The first findings from this long-term follow-up study were published in the New England Journal of Medicine in 2022 and showed that providing early-life malaria control through the use of insecticide-treated nets in a high transmission setting resulted in a survival benefit that persisted into adulthood.

Further analysis also indicated that increased use of treated nets in early childhood was associated with a significant increase in the likelihood of completing secondary school for both men and women. On average, only about a quarter of children who used nets infrequently in childhood completed secondary school, while the proportion was closer to one-third for children. This cohort continues to be extremely useful for long-term analysis of interventions and health outcomes, including not just malaria but also other infectious diseases and also non communicable diseases.

Clinical Trials Facility – Kingani, Bagamoyo

KINGANI CLINICAL TRIAL FACILITY: An observation ward at the Ifakara's Clinical Trials Facility at Kingani, Bagamoyo.

The Ifakara Clinical Trial Facility in Bagamoyo, Tanzania is a state-of-the-art center for cutting-edge clinical trials and research studies. We have a proven track record in meeting Good Clinical Practice standards for nearly a decade. Since 2020, we have successfully completed three trials in this facility; and there are currently six ongoing trials, including a groundbreaking first-in-human studies of new vaccines and therapeutics. Work in the facility spans diverse research areas such as malaria, SARS-COV2, ebola, neglected diseases, and micronutrient studies.

This facility has been instrumental in advancing clinical research in Tanzania. Notably, it hosted the country's first adaptive design study for evaluating SARS-COV2 treatments and introduced Africa's first Blood-stage Controlled Human Malaria Infection model. The facility houses a team of over 5 certified Principal Investigators, alongside skilled clinicians, pharmacists, nurses, and technical staff. Additionally, it features a secure physical data archive and an accredited laboratory, providing comprehensive support for trial operations.

Ifakara is seeking strategic collaborations to test advanced disease interventions, including conducting first-in-human trials of selected investigational products. We are committed to the highest quality standards and believe this facility has now become the natural home for research into new frontiers.

Research Laboratories at Ifakara & Bagamoyo

Ifakara operates two accredited laboratories in Ifakara and Bagamoyo, serving as essential pillars of our research endeavours. As part of our ongoing commitment to excellence, the labs are currently undergoing a transition to upgrade our accreditation from ISO 15189:2012 to ISO 15189:2022 for medical labs. Throughout this transition, we remain fully devoted to maintaining our Laboratory Quality Management System (QMS) and upholding the highest standards of quality. Key sections in the labs include Molecular Biology, Hematology, Clinical Chemistry, Immunology, Microbiology and Parasitology

The labs are equipped with advanced technology and resources, our laboratories provide comprehensive support for a wide range of laboratory-based research activities, including clinical trials, evaluations, and training. Our dedicated laboratory team continually enhances service provision for both internal and external projects, ensuring the delivery of reliable and precise laboratory results.

In 2022, the Institute began renovations and expansions to improve and streamline the services provided by the Bagamoyo laboratory. The laboratory was relocated to the Kingani area in Bagamoyo, which is more cost-effective and easier to manage. The expanded Immunology section now has the capacity to handle sample analysis for four to five projects simultaneously

BAGAMOYO LAB: A lab technician in action.

The renovated Molecular Biology lab also has room for genomic analysis using the Mi seq instrument to establish a next-generation sequencing platform. Once the renovations are completed, the new area will have space for a sample storage facility with room for up to 40 freezers, positioning the Institute to potentially establish a biobank in the future.

Both laboratories continue to provide support to the government of Tanzania in the areas of laboratory testing and capacity building. The Bagamoyo laboratory staff are actively supporting the governments of mainland Tanzania and Zanzibar with training and sample processing to perform critical diagnoses, including for COVID-19.

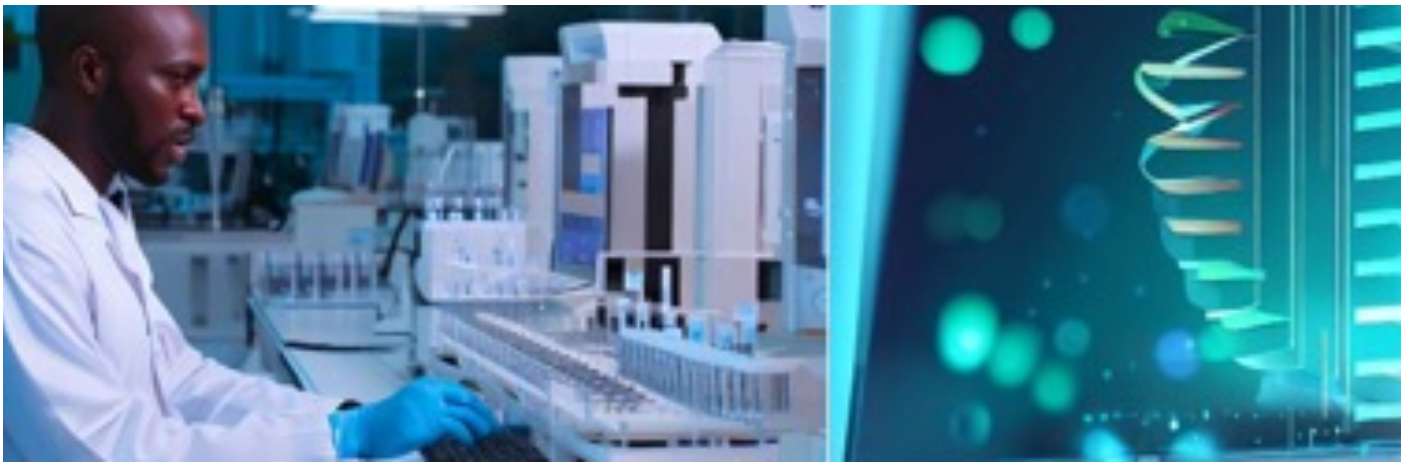
Meanwhile, the Ifakara laboratory continues to support the government of Tanzania by testing for HIV viral load in the national program, covering Kilombero, Ulanga, and Malinyi districts and often receiving referred samples from the Mtwara, Njombe, Songea, and Morogoro regions.

In 2022, we attained a major milestone in reducing the turnaround time for test results for HIV-Viral load. These previously took 1-6 months when testing was done at the Morogoro region referral hospital, but now only takes 1-2 weeks. With these efforts, our laboratories helping to improve access to vital testing services for a large and diverse population, reaching nearly 6 million residents in Tanzania.

Revolutionary Diagnostics and Sequencing Platform Set to Launch in Bagamoyo, Tanzania

Ifakara and its partners are set to launch a revolutionary Integrated Diagnostics and Sequencing Platform (IDSP) in Tanzania in 2023. This platform aims to combat the growing threat of emerging and re-emerging diseases and antimicrobial resistance by revolutionizing the way pathogens and antimicrobial resistance are characterized and monitored in the country. The IDSP, in partnership with St Francis Referral Hospital in Ifakara, Mwananyamala and Temeke referral hospitals in Dar es Salaam, and the University Hospital Basel, will strengthen integrated care and diagnostics by providing sequence-guided patient treatment and disease surveillance.

By establishing a pathogen-sequencing facility and strengthening collaboration networks, the project will support national health strategies in Tanzania, initially focusing on HIV, tuberculosis, and antimicrobial resistance. This groundbreaking initiative will not only enhance patient care and enable effective responses to emerging pathogens and drug resistance but also promote innovative science and capacity building in the country.



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Entomology Facilities in Ifakara - The VectorSphere, The Mosquito City & The Experimental Huts.

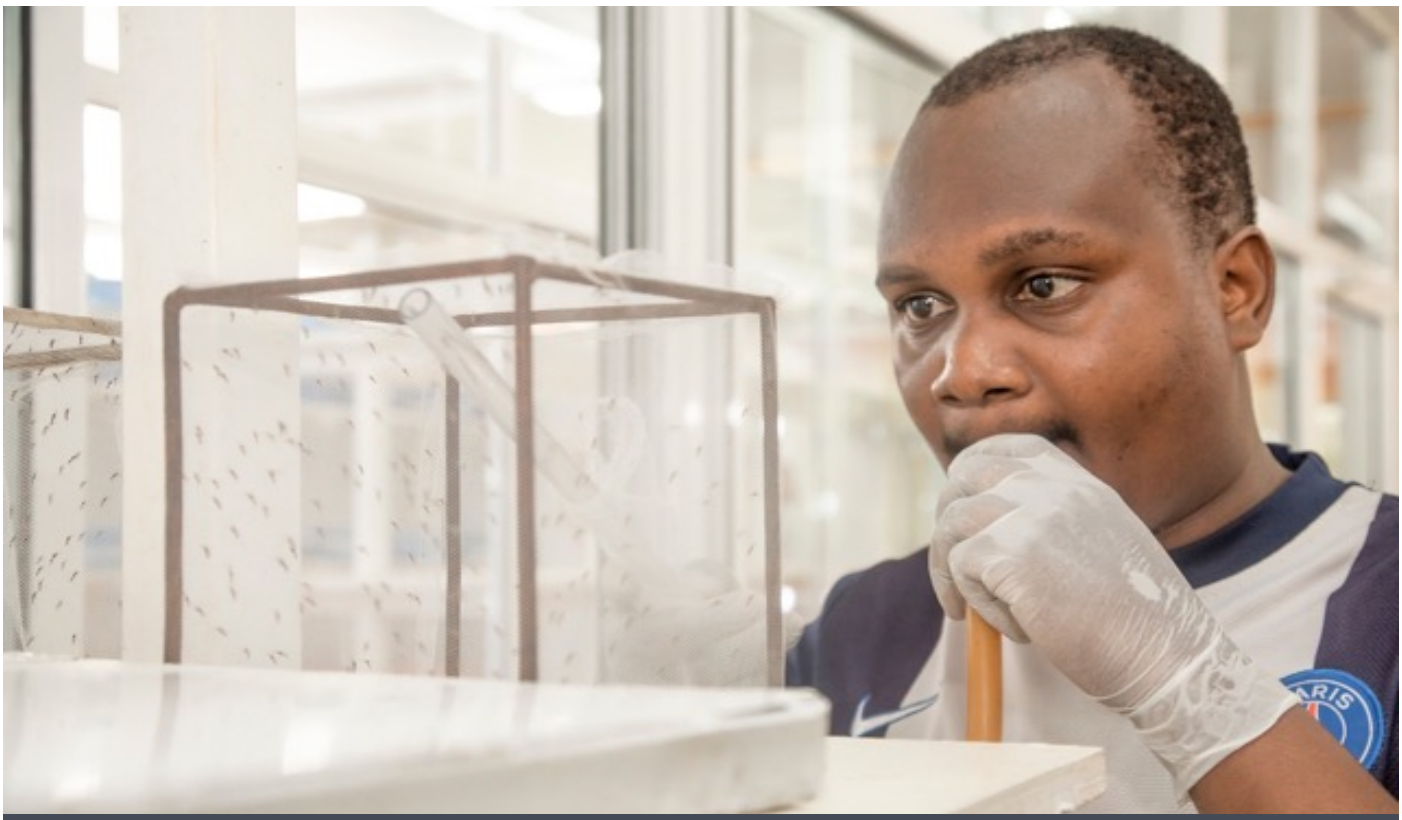
MOSQUITO CITY: A general view of the Mosquito City in Ifakara.

Our Environmental Health and Ecological Sciences (EHES) department boasts a diverse array of research facilities exclusively dedicated to the study of vector-borne diseases. These encompass over 20 experimental huts situated in rural Tanzanian villages, approximately 8000 square meters of screen houses for controlled mosquito experiments, a 110m mosquito tunnel for investigating medium and long-range mosquito olfactory responses, and multiple insectaries housing three major malaria vectors: Anopheles gambiae, Anopheles arabiensis, and Anopheles funestus, alongside local strains of the dengue vector, Aedes aegypti. Additionally, the department maintains an expansive vector biology laboratory furnished with various tools to aid mosquito identification and analysis. The semi-field facilities primarily reside in Mosquito City, located approximately 5km outside Ifakara town, while the insectaries and vector biology laboratories are based at the VectorSphere facility, our central hub for mosquito biology studies.

THE VECTORSPHERE: Guests taking a tour of a mosquito insectary inside the VectorSphere.

Recent expansions in the department's laboratory infrastructure include acquiring systems for infrared spectroscopy, machine learning, and camera technology to visualize mosquito responses. Ongoing efforts aim to expand entomology facilities with a Bio-computing facility that utilizes infrared and artificial intelligence for enhanced mosquito surveillance. Over the past three years, these facilities have supported research students, resulting in numerous publications and securing significant research grants. They have also facilitated training of district-based malaria vector control officers and the development of innovative technologies for controlling disease-transmitting mosquitoes. Notable technologies developed or tested here include:

1. Eave Ribbons technology: Deploys mosquitocidal or repellent substances around eave spaces to target malaria vectors entering human dwellings.
2. Attractive Toxic Sugar Baits (ATSBs) on malaria vectors: Uses attractive baits combined with toxic substances to effectively control malaria vectors.
3. Methods for mass colonization of An. funestus: Enables large-scale colonization and studies of An. funestus, a significant malaria vector, that is otherwise very difficult to rear inside laboratories
4. Mosquito-Assisted Larviciding (Autodissemination): Utilizes adult mosquitoes as carriers to deliver potent insecticides or sterilants to their own breeding sites, enhancing control of diseases transmitted by these mosquitoes.



VECTOR BIOLOGIST: Emmanuel Hape, working with malaria mosquitoes inside the VectorSphere. IFAKARA

The Vector Control Product Testing Unit (VCPTU)

The Ifakara Health Institute's VCPTU was established to test new chemistries and vector control products being developed to control malaria and dengue. It is currently the only Good Laboratory Practice (GLP) accredited facility in the world that tests all major categories of vector control tools, including space spray and larvicides. Between 2021 and 2022, the Unit was awarded over $3 million in funding from the Innovative Vector Control Consortium and CHF $600k from the Botnar Research Centre for Child Health to become financially stable. In the past calendar year, the unit published ten peer-reviewed papers and submitted seven more that have not yet been published.

The Unit directly contributes to policy by working with the World Health Organization (WHO) on various projects. These include writing guidelines for insecticide-treated net testing, providing training on how to design and analyze data for space spray and larvicides, and writing guidance on non-inferiority testing of new dual active ingredient insecticide-treated nets.

In 2022, the Unit achieved major milestones, including maintaining its GLP status, having 1 PhD and 3 MSc students successfully complete their degrees, generating over $1 million in service revenue, and contributing around $500k to IHI in overhead and infrastructure investments.

The VCPTU Unit currently has a team of 15 research staff, including four with PhDs, eight with MScs, and four with BScs, and has a growing number of female scientists. It has outstanding research facilities, including ambient chamber tests, semi-field systems, mosquito colonies, testing rooms, a spray laboratory, a wash facility, and a block room. It also has 60 experimental huts in Lupiro of Ifakara, Rapley, West and East African designs for comparison of product performance.

THE VCPTU: The VCPTU Insectaries in Bagamoyo, Tanzania.

Grants & Contracts Unit

Dr. Zawadi Mboma - Head of Grants and Contracts unit.

The Grants and Contracts Office (GCO) is responsible for pre- and post-award management of all institutional research grants and contracts. Grants are defined as funds being given to IHI to accomplish a specific task while contracts are legally binding documents that IHI enters into with another party as a promise to deliver a service (specified task).

The Office monitors and supports the implementation of all sponsored research projects, from the time these project ideas are conceived, through entire project life cycles, until the time when these projects are eventually closed. The Office is in the final stages of developing an online portal. The online system will maintain an archive of all project documentation from the conception of ideas to close-out reports and support online reviews of grant applications by heads of department and other institutional units.

The start of the year 2022 was slow for the Office with many grants still spilling over from the COVID-19 pandemic effects. Most grants were still operating under no-cost extension with fewer new grants being awarded. However, by the end of the year, there was a shift with increased grant attraction. Today, the GCO is one of our busiest units, handling more than 120 active grants at any one time.

The Office also observed a significant shift in the funding landscape with increased preference to fund local institutions directly rather than as sub-grantees of a northern partner. Hence, the Institute's grant portfolio has observed an increase in the value of grants awarded as well.

TRAINING AND CAPACITY STRENGTHENING INITIATIVES

TRAINING AND CAPACITY STRENGTHENING INITIATIVES

TRAINING AND CAPACITY BUILDING

We are committed to expanding our training and capacity strengthening initiatives, aiming to enhance our institution and contribute to the development of the national and global workforce in global health services. Our training programs align with our mission of improving people's health and well-being.

During the reporting period of 2021-22, Ifakara provided on-demand and strategic training programs for our staff and the public, often in collaboration with local and international institutions. Currently, nearly 50 staff members are enrolled in various higher learning institutions.

TRAINING: Proposal Writing Workshop for IHI Scientists in Bagamoyo.

Masters of Science in Public Health Research (MScPHR) program Jointly Conducted with The Nelson Mandela African Institute of Science and Technology

TRAINING: MscHR Students in their field visit at the Vector Sphere in Ifakara Health Institute.

The Master of Science in Public Health Research program (offered jointly with the Nelson Mandela African Institution of Science & Technology) has enrolled a total of 71 candidates over five cohorts. The aim of the program is to produce an essential research workforce with broad interests in public health. The quality of the training has continued to improve, and the students regularly publish their work in peer-reviewed international journals. While some of the graduates from this program have been absorved to work at Ifakara health Institute, several of them return to work for either the Government or other agencies, thus directly contributing to the global health workforce in our communities.

Following the success of this program, we have begun planning for a new MSc program , which will focus on Data Sciences for Health, and will be delivered together with partners.

Ifakara also continued to offer the internationally-acclaimed short course on malaria. To enhance the training ecosystem, Ifakara have begun constructing new student hostels in Bagamoyo, with the first three units expected to be completed by January 2023 and efforts underway to secure funding for another set of three units.

TRAINING: The Training and Capacity Building coordinator, Dr. Kafuruki Shubis in action.

Structured post-graduate supervision and career development program

Ifakara's Training & Capacity Building department is implementing a "structured post-graduate supervision and career development program and its monitoring" as a member of the Consortium for Advanced Research Training in Africa. The program aims to establish and sustain the implementation of postgraduate research supervision, create an online tool for monitoring the supervision process, and empower PhD-level scientists with career development skills in writing and information retrieval.

The program will be implemented through two training workshops facilitated by experienced supervisors, including CARTA PhD fellows, from IHI and collaborating universities. The workshops will cover content from the CARTA curriculum for PhD training methods. The program

aims to identify and mitigate any challenges that may arise during the supervision process and enable students to complete their dissertations/theses and published work on time and with quality.

Enhanced partnership with the University of Glasgow to expand post-graduate training

Ifakara has established a new strategic partnership with the College of Medical, Veterinary and Life Sciences at the University of Glasgow, UK. This partnership built on more than a decade of successful project-based collaborations, will not only strengthen our joint research portfolios but also provide new opportunities for post-graduate training for our students and staff. As part of this partnership, Ifakara will be able to offer 4-5 masters level fee waivers for Ifakara students per year, and currently, there is an open-ended policy for awarding PhD-level fee waivers to our staff as well. These arrangements are being implemented and will be reviewed annually, ensuring that the training opportunities continue to be available to our students and staff.

Ifakara anticipates that the PhD fee waivers will continue as long as the strategic collaboration is maintained, and we are confident that this partnership will have a positive impact on the education and career development of Ifakara students and staff.

UNIVERSITY OF GLASGOW: One of the Postgraduate Student from IHI presenting her work.

The Exceptional Rise of Interdisciplinary Research at Ifakara

The small but expanding group of early-career researchers based at our Ifakara branch has demonstrated exceptional performance, despite challenges presented by distance and even the COVID-19 pandemic.

Their unwavering dedication and resilience have yielded remarkable scientific productivity during the reporting period. Over a span of three years, the team has published more than 50 papers and secured over $7 million USD in funding from multiple agencies, with several young researchers acting as principal investigators. The team has also celebrated the graduation of over 10 MSc students and the completion of several PhDs within this timeframe. Notably, the team fosters an incredible spirit of peer support, as individual members take time to share their skills and recent PhD graduates assume the responsibility of supervising new MSc students.

Most importantly, there is a renewed enthusiasm for acquiring technical knowledge and a pursuit of diverse research disciplines beyond medical entomology, encompassing areas such as machine learning, mathematical modelling, biochemistry, social sciences, geographical information systems, and epidemiology, all of these backed by an extra-ordinary detail of community engagement.

The team's shift towards interdisciplinary research has expanded their understanding and enhanced the impact of their work beyond the realm of mosquito biology. With remarkable achievements and a promising future, their success serves as an inspiration and source of encouragement to all involved.

IFAKARA MasterClasses Boost Global Engagement and Knowledge Exchange for Malaria Control

In the ongoing battle against malaria, the online IFAKARA MasterClasses have risen to prominence as a highly influential global event. These classes, which began in 2021 have become a pivotal platform for knowledge exchange and networking for participants from around the world. Every 4-6 weeks, we bring together hundreds of experts, researchers, students, officials from National Malaria Programs, and dedicated advocates for long-form technical conversations on priority topics. This way, the MasterClasses greatly facilitate the sharing of best practices and valuable insights in malaria control. The initiative directly empowers participants with technical knowledge, while fostering collaboration on a global scale. The live Zoom sessions attract large audiences, and engagement takes place on YouTube.

With over 40 editions completed, the MasterClasses have featured the worlds most important conversations on malaria, two annual in-depth reviews of the World Malaria Report and the participation of world-renowned experts in various fields. Drawing in 150-350 participants per session and lasting three hours each, these captivating discussions have amassed over 25,000 participant-hours, demonstrating remarkable growth and impact.

Of particular significance is the MasterClasses' ability to transcend barriers and reach participants from low-income endemic countries, providing them access to top experts and insights they would otherwise be unable to access. In this way, the MasterClasses play a crucial role in democratizing knowledge, ensuring that the fight against malaria is inclusive and collaborative.

Going forward, the IFAKARA MasterClasses embody a positive vision for advancing scientific discourse and unifying global efforts in the relentless pursuit of effective malaria control. (Citation: Ciubotariu et al. (2023). Trends in Parasitology)

REGULATORY ACTIVITIES & QUALITY ASSURANCE

REGULATORY ACTIVITIES& QUALITY ASSURANCE

Engagements with the TMDA

Ifakara has had positive interactions with the Tanzania Medicines and Medical Devices Authority (TMDA) over the past two years. The TMDA, as the regulatory agency responsible for supervising and inspecting clinical trials in Tanzania, has been involved in several aspects of the Institute's projects, including pre-submission meetings, the submission of applications for regulatory approval, progress reports, and requests for extensions and permits.

During this time, TMDA officials also conducted inspections at the facility with good reports and only minor findings. Additionally, all trial proposals submitted by the Institute in the last two years were approved by the TMDA.

Though there have been some challenges, such as delays in the review process and difficulties in follow-up due to the move of TMDA offices to Dodoma, the BCTF team is working to address these issues and improve the situation. A meeting was organized with ethical and regulatory authorities on January 26, 2022, to discuss these challenges and find solutions, with the goal of creating a conducive environment for researchers. As a result of these interactions, all trial proposals are receiving timely evaluation by the TMDA.

Institutional Review Board

Ifakara Health Institute Review Board (IHI-IRB) was established in 2005 with the objectives of safeguarding the dignity, rights, safety, and wellbeing of all actual or potential research participants; defending the principle of justice, beneficence and respect for persons; providing independent, competent and timely review of ethics of proposed studies; and providing ethical oversight of approved projects.

For the year 2022, the IRB reviewed a total of 91 protocols. On average, at least 7 protocols were reviewed during normal monthly meetings of the Board.

IRB OVERSIGHT: Members of the IRB in action during an oversight field visit in 2022.

Research Quality Assurance

The Research Quality Assurance (RQA) Unit at Ifakara has been responsible for monitoring clinical trials to ensure the safety and protection of trial participants and the integrity of the data collected. In the past year, the RQA conducted routine quality assessments for four projects within the Institute, identifying and resolving minor issues.

The RQA also monitored clinical trials for malaria, ebola, and rabies vaccines, as well as a Phase I drug trial for anti-helminth treatment. In addition, the RQA unit has expanded its role as a Clinical Research Organization (CRO) by acquiring contracts from international partners to monitor clinical trials for two TB drugs at three different sites. Formal reports were prepared and shared with the sponsors and principal investigators after each visit, outlining any observations and errors identified and providing recommendations for corrective actions. This work provided the RQA with valuable experience in trial monitoring and working with international organizations.

The RQA team also provides essential training for our scientists on research quality and adherence to critical research standards. In 2022, through the efforts of the RQA, our Institute was able to maintain the desired outcome of having no major flaws observed in any of our research initiatives.

Institutional Biosafety Committee

Ifakara has expanded its research portfolio on control and elimination of vector-borne diseases to include genetic engineering technologies through modern biotechnology. To comply with international and national biosafety laws and regulations, and to follow international best practices, the Institute established an Institutional Biosafety Committee (IBC) in August 2022.

The IBC will be certified by the national biosafety focal point, the Vice President's Office, Division of Environment of the Government of United Republic of Tanzania. Following the formation of the IBC, Dr. Brian Tarimo was appointed as Secretary/Biosafety Officer for the committee, he, along with the Chief Executive Director, led the process of recruiting competent members for the IBC, 5 individuals were appointed, with 2 being from inside the Institute and 3 being from outside.

Currently, the IBC is composed of 7 members with a good mix of gender diversity. Formal appointment letters were sent to the members and the committee expects to hold its first meeting in late/early February 2023. Furthermore, the process of officially registering the IBC with the NBFC is ongoing, it is expected that this IBC will perform exemplary work to guide the institute in this new line of research and serve as a model for other IBCs in institutes inside and outside of the country.

EMERGING SCHOLARS SPOTLIGHT

SARAH MSWATA

Head of Laboratories in Bagamoyo

I admire Ifakara Health Institute as it has given me a platform to be Scientifically trained, gain skills and knowledge that made me rediscover myself in my carrier and different areas of expertise. Looking forward, I envision Ifakara leading the charge in malaria elimination within their study sites of Fukayosi, Yombo, and Kiwangwa in Bagamoyo, making a significant impact and ensuring a malaria-free future for the well-being of the community.

DR. EMMANUEL MRIMI

Epidemiology & Control of Intestinal Infections

Ifakara offers an extraordinary blend of research, innovation, and community engagement, surpassing what is commonly found worldwide. With a research center nestled in the heart of Ifakara town, it presents a rare opportunity for scientific breakthroughs to be directly applied to the community. I eagerly anticipate witnessing the transformative impact of my current research as it contributes to eradicating neglected tropical diseases through widespread treatment and universal access to clean water, improved sanitation, and hygiene facilities.

WINNIE MPONZI

Community-Driven Approaches to Disease Control

I hold a deep affection for Ifakara Health Institute as it grants me the chance to save lives in remote communities. Over the next five years, my vision is to witness these underserved communities residing in mosquito-proof homes, thereby reducing and ultimately eliminating mosquito-borne diseases. This achievement is not only possible but entirely within our reach.

DR. DEBORAH SUMARI

Scientist

I love IHI because it made me grow strong in research careers and featured me in the visibility of my research work both nationally and internationally in health improvement and well-being of Tanzanians. In the next 5 years, I envision Ifakara diversifying its core business to translatable technology and innovation. This will bridge a gap between scientific knowledge and practical implementation, thereby positively impacting society

ISSA MSHANI
PhD Candidate & Scientist

" Ifakara Health Institute (IHI) fuels my passion as a dynamic hub where curiosity thrives and dreams of a disease-free world come alive. I'm amazed by its unwavering commitment to empower young scientists with state-of-the-art technology. Over the next five years, I foresee IHI emerging as the central driving force, igniting malaria elimination in endemic regions. I imagine IHI developing a comprehensive roadmap for malaria elimination while revolutionizing malaria diagnosis and vector control, shaping a brighter and healthier future for all"

Applications of Machine Leaning Techniques for Malaria Surveys and Diagnostics

DR. ANDREW KATENDE
Clinician & Scientist

To uncover the hidden epidemic of noncommunicable diseases in rural Sub-Saharan Africa, a multidisciplinary research approach is crucial. Ifakara Health Institute provides an ideal platform to develop and test effective methods tailored to these rural areas. Let time reveal the story of our findings.

Heart and Lung Clinic team

NAJAT KAHAMBA
PhD Candidate & Scientist

At Ifakara Health Institute, I have been fortunate to pursue my passion for mosquito research, contributing to our understanding of their ecology and control. With years of experience and training from Ifakara, including a joint PhD program with University of Glasgow, my work now focuses on studying the aquatic ecology of malaria-carrying mosquitoes. I strive for a future where communities thrive in healthier environments, free from the burden of mosquito-borne diseases.

Aquatic Ecology of Malaria Vectors

ALPHONCE ASSENGA
Scientist

As a vector control biologist, I like the Ifakara Health Institute for its scientific platform. It has enhanced my science, expanded my network , and allowed me to make a positive impact in my community. In the next five years, I envision ifakara becoming a leading research institution in biomedical sciences in Africa"

DR. LINA FINDA
Scientist

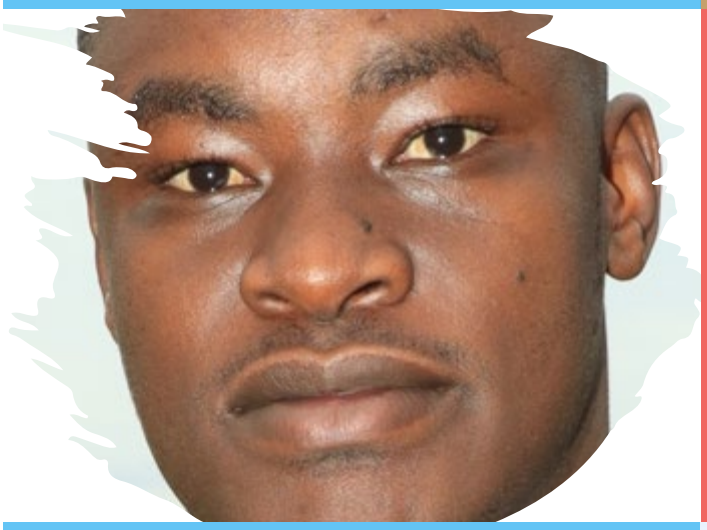
IFAKARA has enabled me to engage with a range of stakeholders in the fight against malaria, from the community members living in malaria endemic settings, to the top decision makers across Africa. For me and my colleagues, the struggle against malaria is personal. In the next 5 years, I hope to see more African stakeholders actively engaged in the efforts to eradicate this disease from our otherwise beautiful continent.

African Conversations on Gene Drives for Malaria Elimination

VICTORIA GITHU
Scientist

Ifakara is not just a place of work for me, it is a vibrant ecosystem of collaboration, innovation, and hope. It is a place where my passion for mathematics and my commitment to public health converge, empowering me to contribute to the greater good. Looking ahead, my aspirations extend beyond scientific advancements alone. I hope to witness a future in Ifakara where our collaborative efforts yield tangible results, where the burden of malaria is lifted from the shoulders of the community, and the once-frequent suffering and loss become distant memories.

Mathematical Models for Disease Control



PINDA POLIUS
Scientist

Since the day I joined this institute, I have felt a strong sense of belonging. The welcoming atmosphere and abundant opportunities have enhanced my expertise in studying the factors, spread, and management of infectious diseases, particularly those transmitted by vectors. I am dedicated to enhancing the health and welfare of individuals through evidence-based approaches.

Ecology of Disease Vectors

ALEX LIMWAGU
Scientist

Greetings and welcome to Ifakara, the ideal research environment. Our success stems from the strong collaboration between researchers and the community. Over the next 5 years, my goal is to further engage the community in introducing innovative technologies to address local health challenges. Together, we can make a significant impact.

Geospatial Analysis Techniques for Disease Surveillance

DR. HALFAN NGOWO
Scientist

Being a research scientist at Ifakara Health Institute, I highly appreciate the chance to make meaningful contributions to research, tackle pressing health issues, and collaborate with professionals from various disciplines. In the future, I envision sustained investment in essential resources, capacity development, secure funding, and partnerships. Such support would empower the institute to expand its influence, advance health outcomes, and create a positive impact not only in Tanzania but also on a global scale.

Bayesian Modelling of the Ecology of Disease Vectors

DR. ISAAC MARO
Scientist

I consider myself fortunate to be a part of IHI, a place I have aspired to work for many years. It is a truly exceptional environment where innovative research ideas are fostered and have the chance to give birth to groundbreaking scientific discoveries for the betterment of humanity

Improved methods for TB detection

BETWEL MSUGUPAKULYA
PhD Candidate & Scientist

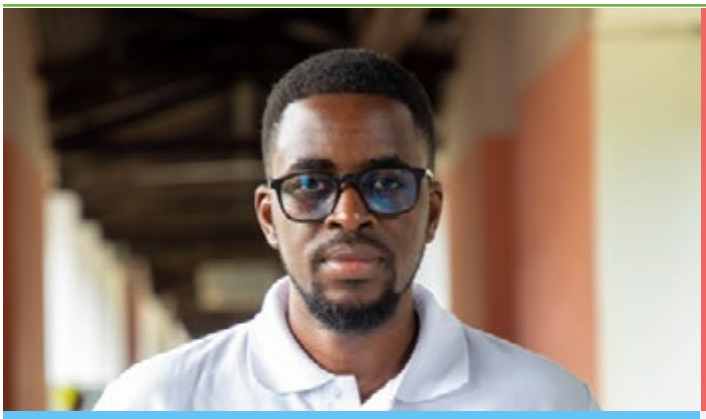
Ifakara Health Institute is more than just a workplace; it's a community of like-minded individuals committed to making a difference. Here, I've found opportunities for personal and professional growth to improve interventions for tropical disease elimination. Together, we foster a collaborative environment, pushing boundaries in disease control to create a lasting impact on health and well-being. Excited for the future, I look forward to achieving even more and expanding possibilities in our field

Strategies for Effective Larval Source Management Against Malaria

DR. GETRUDE J. MOLLEL
Clinician & Global Health Specialist

Ifakara gives me an exceptional opportunity of performing both clinical and research duties. In the next few years, I wish to see improvement in consumption of local research findings to improve clinical practices and decision making in Tanzania.

Child and Adolescent Health



DR. ROBERT NDEGE
Clinician & Scientist

Ifakara is a beacon of opportunity, where I am empowered to make a tangible difference in the diagnosis of tuberculosis in HIV, saving lives along the way. It's a place where my career in research thrives, propelling me towards greater heights of impact and innovation

TB Diagnostics & Treatment

DR. ESTER ELISARIA
Chief Research Scientist

I appreciate being part of the Ifakara Health Institute family due to the richness of knowledge and diverse talents. Initially, my focus was more on nutrition but cross-learning exposed me to malaria, ECD, process and impact evaluation, and implementation research. Another exciting aspect is the room for learning, growth, and working independently. I would like to see more engagement in research beyond the African continent and established branches beyond Tanzania to impact the lives of others

Nutrition,Epidemiology and Public Health

EMMANUEL MBUBA
Scientist

I like the way Ifakara is contributing to the fight against malaria. I am confident that our dream to end malaria is attainable

Vector Control Product Testing Unit

JOEL O. ODERO
Ph.D. Student and Scentist

My most rewarding experience at Ifakara Health Institute is the research culture and immeasurable opportunities that are beyond other institutions across the region. A community-centered approach to finding local solutions to local problems like Malaria anchors most research at the institute. With the current critical mass of young scientists being trained at the highest level, I cannot wait to see what the future holds for the institution. I am immensely privileged to pursue my doctorate degree here!

DONAT SHAMBA
Scientist

IHI provides space for research networks that build and strengthen local scientists to collaborate with partners. By doing so, IHI is able to draw on the wealth of knowledge and expertise and develop new insights and innovative solutions for global health challenges. This is one of many reasons I like this Institute".

Health Systems & Policy

PUBLIC ENGAGEMENT INITIATIVES

PUBLIC ENGAGEMENT INITIATIVES

The Public Engagement Unit endeavors to close the gap between the Institution and its surrounding communities by facilitating the exchange of knowledge and experiences between researchers and community members. This is achieved through researchers' active participation in public events and inviting community members to visit the institution's facilities, where they can learn about ongoing research projects and provide feedback on important issues to be addressed.

Ifakara has participated in several events, including Nane Nane Day, a national celebration that recognizes farmers' contributions to Tanzania's development, as well as receiving Mwenge wa Uhuru, the national freedom torch that symbolizes freedom and enlightenment. During these events, scientists from the Institution collaborated with representatives from the local town council to showcase various products and services available in the community, while also demonstrating tools and interventions for malaria control. Furthermore, the institution welcomed students from local schools to educate them about malaria control programs.

We bring you highlights of only key events. All Ifakara news and events are posted on the Institute's website – **see Appendix A.**

NEST360 GLOBAL MEETING

Ifakara hosted the NEST360 program's global meeting from June 14-16, 2022. NEST360 country teams from Malawi, Kenya, Nigeria, Ghana, Ethiopia, UK and US met to discuss progress of the program. The meeting brought together national stakeholders from UNICEF, WHO, the Ministry of Health (MoH) and President's Office – Regional Administration and Local Governments (PO-RALG) – giving all attendees the opportunity to discuss how to maximize the impact of NEST360 by June 2030 and beyond, through high-quality implementation for small & sick newborn care across all program areas.

GATES FOUNDATION VISIT

Ifakara Health Institute Chief Executive Director Dr. Honorati Masanja (center) poses for a group photo with the visiting BMGF team and their IFAKARA hosts at the Kingani Clinical Trials Facility during day one of the tour in Bagamoyo on June 13, 2022. The team visited the Institute on June 13th to 15th, 2022, to discuss potential partnerships in research and development (R&D) of malaria vaccines and monoclonal antibodies.

VACCINE ALLIANCE

On November 4, 2022, a delegation from GAVI, the Vaccine Alliance, visited the Institute's offices in Dar es Salaam. The delegation met with the Ifakara team and discussed ongoing vaccine trials and studies undertaken by the Institute and further discussed the COVID-19 vaccine uptake in Tanzania and how certain factors have influenced the progress thus far within various regions in the country.

ZANZIBAR STATE HOUSE VISIT

On January 15, 2022, the NEST360 visited to the Zanzibar State House. The NEST360's delegation, led by the program's Country Lead Dr. Honorati Masanja, held a meeting with Zanzibar President, Dr. Hussein Ali Mwinyi, to discuss the potential of implementing the NEST program in Zanzibar. At the meeting, the team briefed Dr. Mwinyi how the program is being implemented in Tanzania Mainland and its potential to save lives and improve the quality of newborn care.

PMI COORDINATOR VISIT

On December 7, 2022, the U.S. President's Malaria Initiative (PMI) Coordinator, Dr. David Walton, visited the Ifakara labs located in Bagamoyo to check the lab which will be used for activities supported by PMI in Tanzania.

US AMBASSADOR VISIT

On December 21, 2022, the U.S. Ambassador to Tanzania, Dr. Donald Wright, visited the Institute's molecular laboratory located at Kingani area in Bagamoyo District. The lab will be used for the U.S. President's Malaria Initiative (PMI) supported activities in Tanzania, including the Shinda Malaria project which is implemented by IHI and partners.

SC JOHNSON CEO H. FISK JOHNSON

On April 7, 2022, SC Johnson CEO H. Fisk Johnson visited the Institute to tour the Lupiro field site where evaluations of volatile pyrethroid spatial repellent (VPSR) products manufactured by his company were being conducted by the Vector Control Product Testing Unit (VCPTU). The VCPTU was evaluating a new VPSR product for submission to WHO PQ for registration as a malaria public health intervention.

DISTRICT ENTOMOLOGIST TRAINING

Ifakara scientists began providing training to district-based malaria surveillance officers from across Tanzania as part of a program called "The District Entomologist." The program is currently supported by the Bill & Melinda Gates Foundation and the Pan African Mosquito Control Association (PAMCA) and is aimed to improve the surveillance of mosquitoes that transmit malaria. The program is being implemented in partnership with the Tanzanian National Malaria Control program.

ANNUAL SCIENTIFIC CONFERENCE ON MATERNAL, NEWBORN AND CHILD HEALTH

Ifakara participated in the Annual Scientific Conference on Maternal, Newborn and Child Health held in Dar es Salaam from November 17-19, hosted by Ministry of Health. The PM and his entourage visited Ifakara booths where Two Ifakara projects, NEST360 program and Safe Delivery App (SDA) were showcasing. Among the top dignitaries in Majaliwa's entourage included Health Minister (then), Dr. Dorothy Gwajima, and Former Tanzania President Jakaya Kikwete.

UHURU TORCH EVENTS IFAKARA AND BAGAMOYO

Ifakara participated in two Uhuru Torch events in Ifakara and Bagamoyo where our teams showcased research, training and services offered by the Institute. The Ifakara team participated in Uhuru Torch activities at Mkamba area in Kilombero District on August 7, 2021, while that of Bagamoyo joined Bagamoyo District officials and residents at Lugoba Health Center for the event on August 11, 2021. At both events Ifakara teams, apart from showcasing research, training and services offered by the Institute, they offered testing services for malaria, HIV, and pressure free-of-charge.

MALARIA DAY EVENT

As one of the leading malaria research institutes globally, Ifakara teams of scientists and supporting staff participated in the Malaria Day event held on April 25, 2022 at Chinangali Park in Dodoma – where the commemorations are observed at the national level. The teams are: District Entomologist Unit from Ifakara and Mathematical Modelling and Data Science from Dar es Salaam.

INTERNATIONAL WOMEN'S DAY EVENTS

On March 21, 2022, Ifakara Women held simultaneous events to mark the International Women's Day. In Dar es Salaam, Ifakara Women came together to mark their day by giving back to underprivileged children admitted to Muhimbili National Hospital (MNH) where they provided daily consumables. In Ifakara and Bagamoyo, The Women celebrated their day by giving back to community where they donated Sanitary pads to underprivileged secondary school girls from Mlabani Secondary (Ifakara) and Matimbwa Secondary School (Bagamoyo).

GRAND CHALLENGES ANNUAL MEETING

Ifakara participated in the Grand Challenges Annual Meeting in Brussels, Belgium held on October 24, 2022. Dr. Omar Lweno, represented the Institute.

The Grand Challenges initiatives seek to engage innovators from around the world to solve global challenges on health and other sectors.

The meeting highlighted the need for high-impact R&D platforms, partnerships, and policies that effectively bridge the gap between innovation and equitable access.

SUSTAINABLE CITIES PROJECT DISSEMINATION

The Sustainable, Healthy and Learning Cities and Neighborhoods (SHLC) project held two events (March 29, 2022 in Dodoma and March 31, 2022 in Dar es Salaam) to disseminate findings of their four-year study which sought to assess urban growth and how it impacted health and education.

About 100 city stakeholders representing sectors under the study focus, ranging from health, education, land use, and urban planning, were invited to the meetings.

INNOVATION WEEK

The Ifakara Innovation Hub (IIH) hosted an Innovation Week Tanzania (IWTz2022) event from May 12-13, 2022. As a player in the innovation ecosystem, the Hub organized activities and events which complimented this year's IWTz2022 theme "Innovation for Sustainable Development." At the national level, the Innovation Week Tanzania was jointly organized by the UNDP Tanzania through FUNGUO and COSTECH under the Ministry of Education, Science and Technology.

FUNDING PARTNERS & COLLABORATING INSTITUTIONS

The Institute has accumulated over 60 years of experience working with diverse funding partners from around the world. Our primary funding and research partners and collaborators span across the US, the UK, Europe, Asia, and Africa. Equally important are our internal research and funding partners and collaborators, who have significantly contributed to the advancement of our research and funding efforts. For more information about our research and funding partners, please refer to Appendix A, which contains useful links related to Ifakara.

Ifakara possesses expertise in managing substantial grants from various funding agencies, including the Gates Foundation, USAID, CDC, WHO, Global Fund, and the European Commission/ Union. Currently, Ifakara is managing over 100 different projects with an annual portfolio value exceeding 20 million US dollars.

Over the past five years, the Institute has received and managed a total of 76.37 million US dollars (equivalent to §174.99 billion Tanzanian shillings) from various funding partners. Throughout the 2021-2022 period, the Institute collaborated with a total of 80 partners (refer to Appendix B) from different parts of the world.

APPENDINCES

APPENDIX A: USEFUL LINKS

1. Ifakara website: http://ihi.or.tz/
2. More about Ifakara: https://www.ihi.or.tz/our-research/
3. Ifakara funding partners: https://www.ihi.or.tz/our-partners/
4. Ifakara projects: https://www.ihi.or.tz/our-projects/
5. Ifakara events: https://www.ihi.or.tz/our-events/

APPENDIX B: LIST OF IFAKARA FUNDING PARTNERS

1. African Applied Chemical (Pty) Ltd
2. African Population and Health Research Center (APHRC)
3. Barcelona Institute for Global Health Foundation (ISGlobal)
4. Bayer AG (BAYER)
5. Bill and Melinda Gates Foundation (BMGF)
6. Botnar Foundation
7. Centre Hospitalier de l'Université de Montréal (University of Montreal Hospital Centre-CHUM)
8. Charité Universitätsmedizin Berlin (Charité)
9. Danish International Development Agency (DANIDA)
10. Disease Control Technologies LLC/NRS Moon Netting FZE
11. Drugs for Neglected Diseases initiative (DNDi)
12. Duke University
13. Else Kroner Fresenius Foundation
14. European and Developing Countries Clinical Trials Partnership Programme (EDCTP2)
15. European Union (EU)-Horizon 2020
16. Foundation for Innovative New Diagnostics (FIND)
17. Fundacao para a Ciencia e a Tecnologia
18. GlaxoSmithKline Investigacion y Desarrolo, S.L. (GSK)
19. Good Ventures Foundation
20. Hanako Foundation
21. Harvard University
22. Imperial College of Science, London
23. Innovative Vector Control Consortium (IVCC)
24. Institut de Recherche en Sciences de la Sante (IRSS)

25. International Development Research Centre (IDRC) Canada via African Population and Health Research Center (APHRC)
26. International Union for the Scientific Study of Population (IUSSP)
27. London School of Hygiene & Tropical Medicine (LSHTM)
28. Mathematic Inc
29. Medical Care Development International (MCDI)
30. Medical Research Council (MRC)
31. Medicine for Malaria Venture (MMV)
32. Meridian Institute
33. Muhimbili University of Helath and Allied Sciences (MUHAS)
34. National Institute of Parasitic Diseases-Chinese Centre for Disease Control and Prevention (NIPD)
35. National Institutes of Health (NIH)
36. New York University
37. Novartis South Africa (Pty) Ltd
38. Novo Nordisk Foundation
39. Pan-African Mosquito Control Association (PAMCA)
40. PATH
41. President's Malaria Initiative (PMI)
42. Results for Development Institute, Inc. (R4D)
43. Royal Danish Academy of Fine Arts
44. Royal National Lifeboat Institution (RNLI)
45. Scotish Funding Council
46. Serum Institute of India Private Limited (SIIPL)
47. SolidarMed
48. Stichting Radboud Universitair Mudisch Centrum (RUMS)
49. Swiss Federal Department of Foreign Affairs (FDFA)
50. Swiss National Science Foundation (SNSF)
51. SWISS Tropical and Public Health Institute (SWISS TPH)
52. Tanzania Health Promotion Support (THPS)
53. TB Alliance (Global Alliance for TB Drug Development)
54. The George Washington University
55. The Regents of the University of California, Berkeley Campus
56. The Royal Society
57. The Uganda Virus Research Institute (UVRI)
58. The University of Oxford
59. Triclinium Clinical Development (Pty) Ltd (TCD)
60. Trustees of Indiana University

61. U.S Agency for International Development (USAID) Tanzania
62. UK National Institute for Health Research (NIHR)
63. UK Research and Innovation (UKRI)
64. Ulm University (UUlm)
65. UNITAID
66. United National Children's Education Fund (UNICEF)
67. United Nations University- International Institute for Global Health (UNU-IIGH)
68. University College Cork-National University of Ireland, Cork (UCC)
69. University Hospital of Basel
70. University of Durham
71. University of Glasgow
72. University of North Carolina
73. University Research Co. LLC (URC)
74. Volkswagen Stiftung
75. Washington State University
76. Wellcome Trust
77. William Marsh Rice University
78. World Health Organisation (WHO)
79. World Vision Tanzania
80. Zhejiang Orient Gene Biotech Co. LTD China

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