



EDCTP

*The power of sharing science*

# EDCTP Fellowship Programme 2003–2022



Supported by the  
European Union



## About EDCTP

---

The European & Developing Countries Clinical Trials Partnership (EDCTP) is a public–public partnership between 15 European and 21 African countries, supported by the European Union.

EDCTP's vision is to reduce the individual, social and economic burden of poverty-related infectious diseases affecting sub-Saharan Africa.

EDCTP's mission is to accelerate the development of new or improved medicinal products for the identification, treatment and prevention of infectious diseases, including emerging and re-emerging diseases, through pre- and post-registration clinical studies, with emphasis on phase II and III clinical trials. Our approach integrates conduct of research with development of African clinical research capacity and networking.

The second EDCTP programme is implemented by the EDCTP Association supported under Horizon 2020, the European Union's Framework Programme for Research and Innovation. Cofunding from the following organisations is gratefully acknowledged: Agence nationale de recherche sur le sida et les hépatites virales (ANRS, France), Botnar Research Centre for Child Health (BRCH, Switzerland), Bundesministerium für Bildung und Forschung (BMBF, Germany), Calouste Gulbenkian Foundation (Portugal), Coalition for Epidemic Preparedness Innovations (CEPI, Norway), Department of Health and Social Care (DHSC, United Kingdom), Fondation Botnar (Switzerland), Fonds National de la Recherche (FNR, Luxembourg), Foreign, Commonwealth & Development Office (FCDO, United Kingdom), Foundation for Science & Technology (FCT, Portugal), Fundación Mundo Sano (FMS, Argentina/Spain), GlaxoSmithKline (GSK, United Kingdom), Institut national de la santé et de la recherche médicale (Inserm, France), Instituto de Salud Carlos III (ISCIII, Spain), Joint Global Health Trials Scheme (JGHT, United Kingdom), Leprosy Research Initiative (LRI, Netherlands), Medical Research Council (MRC, United Kingdom), Ministère de l'Enseignement supérieur, de la Recherche et de l'Innovation (MESRI, France), Novartis International AG (Switzerland), NWO-WOTRO Science for Global Development (NWO-WOTRO, Netherlands), South Africa Department of Science and Innovation (DSI, South Africa), South African Medical Research Council (SAMRC, South Africa), Swedish International Development Cooperation Agency (Sida, Sweden), Swiss Agency for Development and Cooperation (SDC, Switzerland), Swiss National Science Foundation (SNSF, Switzerland) and The Special Programme for Research and Training in Tropical Diseases (TDR, Switzerland).

## Table of contents

---

<b>1. EDCTP Fellowship Programme 2003–2022</b>	<b>4</b>
<b>2. Background</b>	<b>6</b>
<b>3. EDCTP fellowship programme</b>	<b>8</b>
A question of equity	11
Alumni Platform	11
<b>4. The EDCTP fellowship programme in numbers</b>	<b>12</b>
EDCTP1	12
EDCTP2	12
EDCTP1 and 2 combined	14
<b>5. Outputs, outcomes and impact</b>	<b>18</b>
EDCTP1	18
EDCTP1 and EDCTP2	22
Career progression	23
Developing the next generation of African researchers	28
EDCTP fellows and the EDCTP2 Strategic Research Agenda	32
EDCTP fellows and COVID-19	38
<b>6. Conclusions</b>	<b>40</b>

# EDCTP Fellowship Programme 2003–2022

*Capacity development is a core EDCTP activity, complementing its support for clinical trials and product-focused implementation research. Effective capacity development requires a long-term perspective, an integrated system-wide approach, and strong partnerships with host countries to ensure sustainability. Guided by these principles, EDCTP is making a lasting contribution to the capacity of countries in sub-Saharan Africa. Apart from the capacity development investments in the research & innovation and the coordination & support grants, EDCTP invests in human capacity development through an extensive fellowship programme which is the focus of this report.*

The European & Developing Countries Clinical Trials Partnership (EDCTP), launched in 2003, supports international research partnerships tackling the key poverty-related infectious diseases affecting sub-Saharan Africa. From 2003 to 2022, EDCTP1 and EDCTP2 invested €1.01bn and €2.04bn, respectively, in research on these diseases.

A core element of both the EDCTP1 and EDCTP2 programmes has been **capacity-building** to strengthen the science base in sub-Saharan African countries. Central to capacity-building has been a substantial investment in human capacity through an extensive **fellowship programme**.



During **EDCTP1** (2003–2015), fellowship funding focused primarily on **Senior Fellowships**, 51 of which were awarded in total. One important goal was to counter the ‘brain drain’, by providing a mechanism to support reintegration of researchers who were working outside the region; 10% of Senior Fellowship awards were used for this purpose. Many of the researchers supported through the EDCTP1 fellowship scheme have gone on to assume leadership positions within African science and continue to generate high-quality research outputs on poverty-related infectious diseases.

A limited number of Career Development Fellowships were supported in the early years of EDCTP1 and the scheme was discontinued.

During **EDCTP2** (2014–2022), the remit of the fellowship programme was expanded significantly. The funding and duration of Senior Fellowships were increased. In addition, the **Career Development Fellowship** scheme was relaunched with an expanded scope and duration, ensuring that fellowships were better able to support highly promising early-career researchers with the potential to become the scientific leaders of the future and enabling them to establish themselves as independent researchers.

In addition, **Preparatory Fellowships** were introduced to support recently qualified researchers who are interested in developing research careers in sub-Saharan Africa but require further experience and skills development before they are potential candidates for Career Development Fellowships.

The Preparatory Fellowship scheme was developed in partnership with the African Research Excellence Fund (AREF), and

additional partnerships have enabled EDCTP to develop **fellowship schemes in niche areas where capacity development is required**. To build capacity in clinical trials and pharmaceutical evaluation, a **Clinical Research & Development Fellowship** (also known as Industry Fellowship) was run in partnership with the Special Programme for Research and Training in Tropical Diseases (TDR). This fellowship supported an extended training placement in industry, with product development partnerships (PDPs) or in clinical research centres involved in regulatory clinical trials aimed at product development and licensure. In addition, joint fellowship schemes were organised with **GlaxoSmithKline, Novartis and Fondation Botnar** focusing on interactions between poverty-related infectious diseases and non-communicable diseases and the need to develop paediatric researchers in sub-Saharan Africa. Most recently, a joint scheme was run with the Africa Centres for Disease Control and Prevention (**Africa CDC**) to build expertise in epidemiology and biostatistics as part of efforts to strengthen preparedness for disease outbreaks, epidemics and pandemics.

With EDCTP2 funding a further 45 Senior Fellowships and 125 Career Development Fellowships, **more than 200 fellowship grants** have been supported through these two schemes, and in total **418 researchers** have been supported through fellowship funding since 2003. In addition, nearly **1200 individuals** have been funded through master's, PhD and postdoctoral training during EDCTP1 and EDCTP2 outside the fellowship programmes.

Total funding for fellowships during the two programmes was €63.0m. Fellowships have been awarded for researchers studying all the key infectious diseases affecting sub-Saharan Africa and for research advancing diagnostics, drugs and vaccines, as well as studies aiming to provide a better understanding of pathogens and host responses to inform the development of new interventions.

As well as their own research, EDCTP fellows make a vital contribution to the development of research capacity within the region by **supervising and mentoring early-career researchers**. By late 2022, more than 400 individuals had benefited from mentoring or supervision by EDCTP fellows – creating an important multiplier effect. The flexibility provided by EDCTP fellowships has enabled some Senior Fellows to design their fellowships

specifically around training and development opportunities for early-career researchers. In this way, investment in EDCTP fellows has an important multiplier effect, helping to build the science base in sub-Saharan Africa and further strengthening research capacity.

During EDCTP2, fellowship grants have been awarded to **researchers from 39 countries** in sub-Saharan Africa; 40% of fellowship grants have been awarded to women. The innovative **Senior Fellowship Plus** scheme, introduced during EDCTP2, aimed to build capacity in countries with less well-developed health research systems, with Senior Fellows providing input into research projects managed by junior fellows in such countries. An initiative funded by the UK under the EDCTP umbrella is supporting the training of 32 female PhDs through funding awarded to EDCTP Regional Networks of Excellence.

EDCTP fellows have generated **400 papers** relating to work carried out during their EDCTP fellowships, as well as many others relating to additional projects they have been leading or contributing to. EDCTP fellowship funding has helped researchers to **leverage substantial additional funding** from EDCTP and other international funders, including more than €20m additional funding in 2021.

In conclusion, the investment in the fellowships programme has **increased by about five-fold** in the EDCTP2 programme compared to EDCTP1. The EDCTP fellowship schemes have provided opportunities for scientific leaders and promising early-career researchers to remain in Africa and develop their research programmes and international networks, helping to **strengthen the regional science base** and providing countries with vital **expertise in poverty-related infectious diseases**. This research capacity proved invaluable during the COVID-19 pandemic, with many EDCTP fellows making important contributions to the COVID-19 response in individual countries. In addition, the fellowship schemes are helping to **maintain the pipeline of scientific talent** that will provide the scientific leadership that the region will need in the future to define and address its health priorities and enhance the health and wellbeing of its populations.

**Dr Michael Makanga**  
*Executive Director*

## Background

*The European & Developing Countries Clinical Trials Partnership (EDCTP) was established in 2003 to support research collaborations between institutions in the European Union (EU) and sub-Saharan Africa. EDCTP was set up as a demonstration of the EU's commitment to the achievement of the Millennium Development Goals, through support for North–South research partnerships, and now encompasses 15 European and 21 African member countries.*

Initially focused on HIV/AIDS, tuberculosis (TB) and malaria, the second EDCTP programme (EDCTP2), launched in 2014 as part of the EU's Horizon 2020 Framework Programme for Research and Innovation, had an expanded remit that also included neglected tropical diseases, diarrhoeal disease, lower respiratory tract infections, and emerging and re-emerging infections. The programme also had the scope to respond to health emergencies, supporting projects on Ebola, yellow fever, Lassa fever and COVID-19.

With the global product-development landscape characterised by significant investment in discovery and early-stage clinical research, EDCTP2 has focused on clinical development, particularly later-stage **phase II and III studies**. Its remit has also included post-licensing studies, particularly **phase IV and product-focused implementation studies**. It has maintained a strong focus on **vulnerable populations** – pregnant women, children and adolescents, and people with co-morbidities.

**Capacity-building** is integrated into all EDCTP2 clinical research projects. This spans development of human capital, through short- and long-term training, as well as laboratory equipment and the infrastructure required to conduct high-quality clinical studies. Specific capacity-building grants have also been awarded. Strengthening the wider research environment was a priority, with grants that cover regulatory and ethical review capabilities, as well as pharmacovigilance. In addition, a large fellowship programme supported individuals at all stages of research careers.

Consistent with EDCTP's wider commitment to **working with partners** with common interests and to having strong relationships with key bodies within sub-Saharan Africa, several fellowship schemes have been jointly organised with global and regional partners. These have included key regional bodies such as the Africa Centres for Disease Control and Prevention (Africa CDC) as well as philanthropic and commercial organisations from the global North.

## The need for more researchers

Despite being home to 15% of the global population and accounting for 25% of the global disease burden, Africa produces only around 2% of global research outputs. This reflects a limited health research base: Africa as a whole has only 198 scientists per million population, far below the global average of approximately 1500 per million population. As health research expertise is unequally distributed across the continent, most sub-Saharan African countries have fewer than 50 scientists per million population. As a result, sub-Saharan Africa is home to around 15% of the world's people but only 0.7% of the world's researchers. According to the African Academy of Sciences, Africa will need to train one million new PhD students just to reach the global

average of researchers per million population. This can only be made a reality through long-term and collaborative efforts to implement multiple approaches to increase support for trainees, supervisors and mentors and to create an enabling research training environment. EDCTP is making an important contribution across several of these areas.

There are a multitude of reasons for this dearth of researchers. A critical challenge is the **limited funding** available for researchers within Africa. Domestic funding of health research is relatively low in sub-Saharan Africa by global standards. Therefore, the overwhelming majority of funding for research originates in the high-income countries of the global North. Only a



small proportion of this funding is dedicated to support of researchers in Africa and other parts of the global South.

Most countries in sub-Saharan Africa have **under-developed health research bases** and, compared to high-income countries, a relatively short history of health research. Much catching up needs to be done, including to primary, secondary and tertiary education systems. In addition, Africa has suffered a persistent **'brain drain'**, with highly educated individuals – including clinicians and health researchers – leaving to take up better-paid roles in high-income countries.

This has significant consequences for the battle against infectious disease in sub-Saharan Africa. Research leaders with a deep understanding of local diseases, populations

and health systems are essential for identifying key gaps in knowledge and establishing locally prioritised research agendas. They are also an essential source of knowledge and expertise for national disease control programmes to draw upon. Senior researchers also have a critical role to play as role models and mentors for the next generation of researchers.

All this leaves sub-Saharan countries reliant on funding for research from donors or external funders, whose interests and priorities may not be an exact match for those of national stakeholders. Unless it can build its intellectual capital in health research, sub-Saharan Africa will not be in a position to fully address its current and future health challenges and be in control of its own destiny.

## EDCTP fellowship programme

*Capacity-building was an integral part of the first EDCTP programme, EDCTP1, which ran from 2003 to 2015. For most of the programme, personal support at early career stages was integrated within grants for multicentre clinical studies, with separate funding devoted mainly to Senior Fellowships.*

The Senior Fellowship scheme was designed to provide a career route for mid- to senior-level African scientists with excellent track records in research, ensuring that they did not need to leave the region in order to progress. It also provided a mechanism enabling experienced researchers based outside the region to re-integrate into institutions in sub-Saharan Africa.

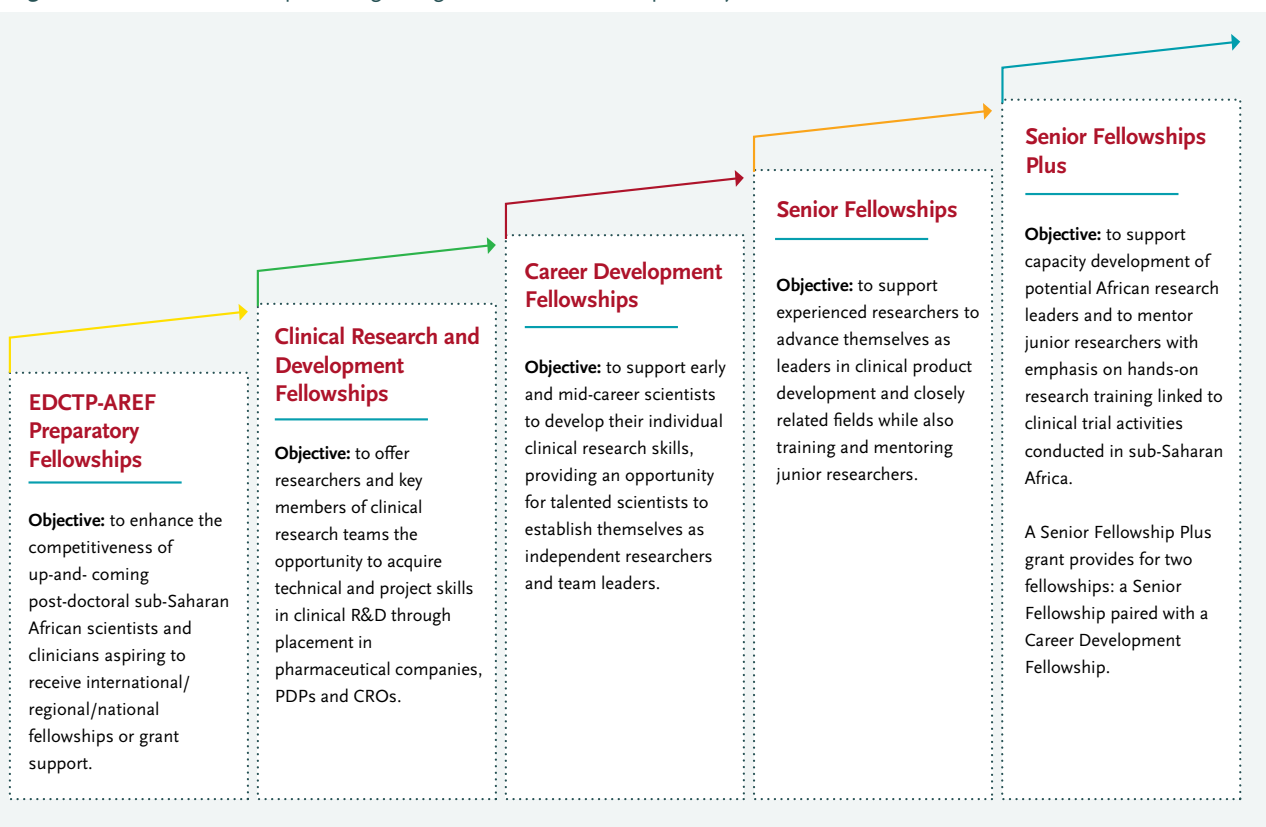
Within EDCTP1, individual capacity was also built through support for master's and PhD students, primarily as part of multi-centre clinical projects, and through two specific schemes supporting participation in master's courses in epidemiology and medical statistics and in clinical trials by distance learning. The latter was organised in partnership with the London School of Hygiene and Tropical Medicine, UK, which also supported the establishment of master's in clinical trials

courses at the University of Ghana (taught in English) and at the University of Bobo-Dioulasso in Burkina Faso (taught in French).

The second EDCTP programme, EDCTP2, was launched in 2014 and had an expanded remit. This included a focus on a wider range of poverty-related infectious diseases, including lower respiratory tract infections, diarrhoeal disease, and emerging and re-emerging infections, increased levels of funding, and a wider range of fellowship support.

The redeveloped **EDCTP2 Fellowship Programme** included support at key stages of the research career (Figure 1). Following a review of the EDCTP1 programme, it was recognised that specific support was needed for promising early-career researchers, to facilitate their transition to independence and management of their own

Figure 1: EDCTP2 fellowship funding along the research career pathway.





research programmes, leading to the re-launch of a modified **EDCTP Career Development Fellowships**.

The EDCTP2 Fellowship Programme continued with the highly successful **Senior Fellowship** scheme, with additional opportunities for outstanding researchers to develop their research programmes and to reintegrate after a period outside the region. Senior Fellows were also identified as having a critical role to play in supporting and mentoring up-and-coming researchers in their institutions and specialist fields.

During EDCTP2, it was recognised that an increasing number of African researchers were keen to take the next steps in research, having completed master's and PhD training, but were not sufficiently experienced to progress to Career Development Fellowship level. To support their further development, a **Preparatory Fellowship** scheme was organised in partnership with the African Research Excellence Fund (AREF), an independent charity established by the UK Medical Research Council (MRC) and led from sub-Saharan Africa.

The Preparatory Fellowship scheme addressed the issue that clinicians and early-career researchers often showed significant promise and had strong ideas but were not yet fully able to take these ideas and frame them appropriately as research questions, or to design studies and analytical strategies to generate answers. Working within a well-established research institution and mentoring framework provided this essential training in research methodology and made individuals more competitive for further fellowship support. The fellowships, targeted at those having completed a PhD within the past three years, provided support for one year and covered the development of both specific technical skills and generic research-conduct expertise.

EDCTP has also teamed up with other partners to support fellowship schemes addressing specific areas of need. These include the **Clinical Research & Development Fellowship** scheme organised in partnership with the Special Programme for Research and Training in Tropical Diseases (TDR) and the European Federation of Pharmaceutical Industries and Associations (EFPIA). This aimed to build capacity for intervention-focused clinical research meeting international regulatory requirements, thereby enhancing the capacity of countries to host

clinical trials and other research that meets the highest international research standards and accelerating the evaluation and introduction of new interventions.

An important aspect of the Clinical Research & Development Fellowship scheme was its breakdown into two stages. For the first year, fellows from sub-Saharan Africa spent time in partner institutions, academic or commercial, before reintegrating into their host institutions by undertaking a specific six-month project. The scheme targeted junior to mid-career researchers and clinical staff, including clinicians, pharmacists, medical statisticians, data managers and other health researchers. The scheme has specifically helped institutions build capacity in areas such as clinical trial planning and management, with fellows also passing on their learning to peers.

EDCTP has also partnered with organisations to address specific gaps in expertise through fellowship support. With **GlaxoSmithKline (GSK)**, EDCTP organised a joint Senior Fellowship call for proposals focused on the interaction between poverty-related diseases and non-communicable disease (NCD) co-morbidities, including prevention, therapeutic management and prognosis. The scheme was launched in response to the shortage of senior researchers in these areas, which are of growing importance as sub-Saharan Africa increasingly faces the 'double burden' of infectious and non-communicable diseases. Although often studied independently, in reality a high proportion of patients experience both concurrently, and in several cases they are interdependent, with infectious diseases increasing the risk or severity of NCDs (or vice versa).

To strengthen capacity, the partnership with GSK focused not only on key research questions but also on the development of fellows' ability to support and mentor junior researchers. Each fellow contributed to the training and mentoring of at least two further junior-level postgraduate researchers.

Similarly, in 2020, EDCTP organised a joint Career Development Fellowship call with **Novartis and Fondation Botnar**, a Swiss-based foundation that champions the use of artificial intelligence and digital technology to improve the health and wellbeing of children and young people in growing urban environments. This call focused on poverty-related diseases and child and adolescent health.



Novartis provided support for five fellows addressing maternal and child health and the interaction between poverty-related infectious diseases and NCDs. The fellowships were funded in response to the shortage of mid-career researchers in this area and the continuing importance of NCDs (including malnutrition) and infectious diseases to mortality and morbidity in mothers and their offspring.

Fondation Botnar's funding aimed to address the shortage of suitably trained early- to mid-career paediatric researchers in sub-Saharan Africa. It had a particular interest in improving the wellbeing, including mental health, and nutrition of adolescents affected by poverty-related infectious diseases, through the development, validation and/or implementation of new solutions, particularly those utilising scalable and sustainable digital technologies.

The most recent joint initiative, launched in 2021, was a partnership with the **Africa Centres for Disease Control and Prevention (Africa**

**CDC)** on a capacity-development scheme for **disease outbreak and epidemic response**. The aim of this partnership is to establish an African cohort of epidemiologists and biostatisticians, as part of Africa CDC's framework for public health workforce development, with ten grants supporting institutions in sub-Saharan Africa and Europe that provide master's degree training in epidemiology and biostatistics.

In October 2021, the [first eight](#) 'Epi-Biostat Fellows' enrolled in their master's training at the London School of Hygiene and Tropical Medicine in the UK. By the end of November 2022, a total of 151 'Epi-Biostat Fellows' had been enrolled. Ultimately, the programme will boost the capacity of national public health institutes, ministries of health and other institutions in Africa to conduct public health research and respond to disease emergencies.

## A question of equity

---

*Equity has been an important consideration in the development of the EDCTP2 Fellowship Programme. A range of activities have been carried out to ensure that researchers from French-speaking and Portuguese-speaking countries are not disadvantaged, including sub-regional grants workshops in French and Portuguese.*

Fellowship schemes are highly competitive and scientific excellence is a key criterion. This can put researchers from institutions and countries without a well-established health research base at a significant disadvantage. EDCTP has put in place a range of mechanisms to enable such researchers to compete, particularly by linking institutions to the four **EDCTP Regional Networks of Excellence**.

A further key measure has been the introduction of the **Senior Fellowship Plus** scheme. Through this scheme, Senior Fellows provide advice and mentoring support to a promising early-career researcher from a country with less well-developed science base, in addition to the training and mentoring activities core to their own fellowship project.

**Women** are under-represented in the sub-Saharan African scientific labour-force. Despite accounting for more than 50% of the population, women make up fewer than 20% of the science and engineering workforce. At senior positions, the bias is even greater. This reflects a number of barriers that limit participation and progress of women in science, which were discussed at a workshop jointly organised by EDCTP and Africa CDC in 2019.

## Alumni Platform

---

*In 2018, EDCTP launched its Alumni Network Platform, which provides information about the fellowship programme and all fellows funded through the EDCTP1 and EDCTP2 programmes, as well as news about funding opportunities and other topics of interest to health researchers in sub-Saharan Africa. Information about fellows can be sourced by country or disease area.*

In 2021, EDCTP and the UK collaborated on a Participating States-Initiated Activity (PSIA) targeted at EDCTP Regional Networks of Excellence and focused on the training of early-career female researchers. Each network was invited to bid for up to €800,000 to support research training for eight female PhD candidates. The networks had to demonstrate how they would ensure adequate supervision and mentorship opportunities for PhD students, support their career progression, and ensure the participation of under-represented countries within their network. They were also expected to develop or refine a network policy on gender equality, diversity and inclusion to be implemented at each institution in the network.

Each network was successful in its bid. The [East African Consortium for Clinical Research \(EACCR\)](#) programme, led from Uganda, also covers Kenya, Rwanda and Tanzania; the [Trials of Excellence in Southern Africa \(TESA\)](#) programme, led from Mozambique, includes partners from Angola, Botswana, Eswatini, France, Malawi, Namibia, The Netherlands, South Africa, Spain, Zambia and Zimbabwe; the [West African Network for Tuberculosis, AIDS and Malaria \(WANETAM\)](#) programme, led from Senegal, also includes Ghana and the UK; and the [Central African Network on TB, HIV and Malaria \(CANTAM\)](#) programme, led from the Republic of Congo, has partners from Cameroon, Gabon, Germany and The Netherlands.

Over four years, the programmes will support the PhD training and wider development of 32 female researchers, helping to address health research workforce inequities at this early career stage.

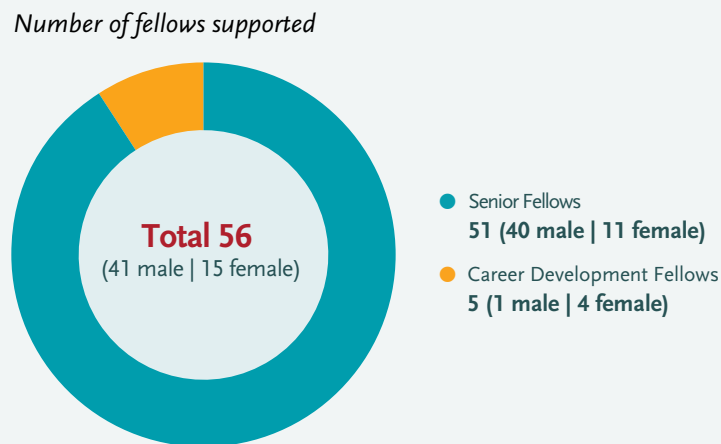
The platform has been designed to encourage networking, foster new collaborations and facilitate tracking of the career trajectory of fellows. It is a work in progress, with 108 fellows joining the platform between May and November 2022. By November 2022, 43.6% of fellows' profiles had been completed. A total of 152 EDCTP fellows visited the platform during November 2022.

## The EDCTP fellowship programme in numbers

### EDCTP1

During EDCTP1 (2003–2015), the programme supported the long-term training of 516 African researchers. This figure includes graduate and postgraduate studentships, which were initially funded through personal support schemes before being absorbed into grants for multicentre clinical project. A total of 51 Senior Fellowships and Career Development Fellowships were awarded (Figure 2). During EDCTP1, personal support funding also included funding for postdoctoral researchers (32), PhD students (172), Master's students (242), undergraduate students (7) and medical diploma students (7), amounting to €13.3m out of a total investment of €377.7m (3.5%).

**Figure 2:** Fellowship grants awarded in EDCTP1

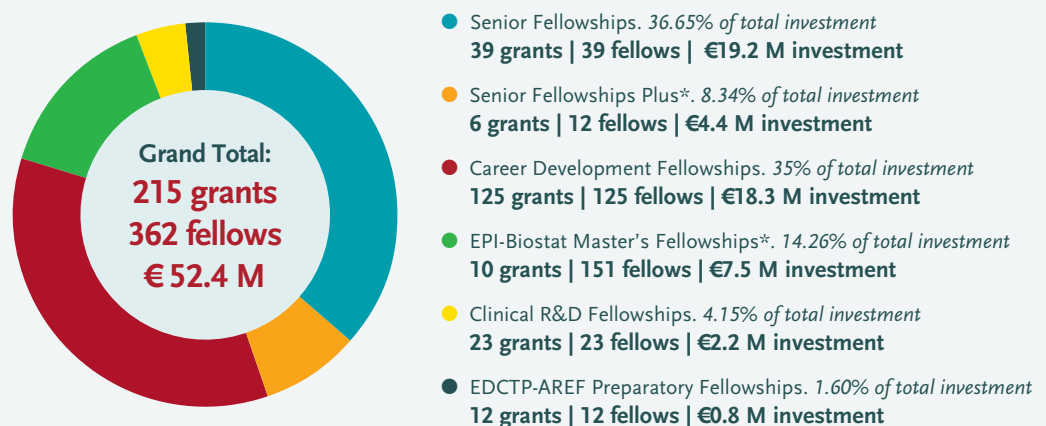


### EDCTP2

During EDCTP2 (2014–2022), the programme has supported the long-term training of 1080 African researchers (fellows and other long-term trainees). The programme saw a significant expansion of fellowship funding with about five-fold increase, focused on Senior Fellowships, Career Development Fellowships, Preparatory Fellowships and Clinical Research & Development Fellowships, and the specialist fellowship schemes discussed above.

In total, 45 Senior Fellowships were awarded, alongside 125 Career Development Fellowships, and 35 other fellowships, bringing the total number awarded to 215. The total EDCTP investment over this period was €52.4m (Figure 3).

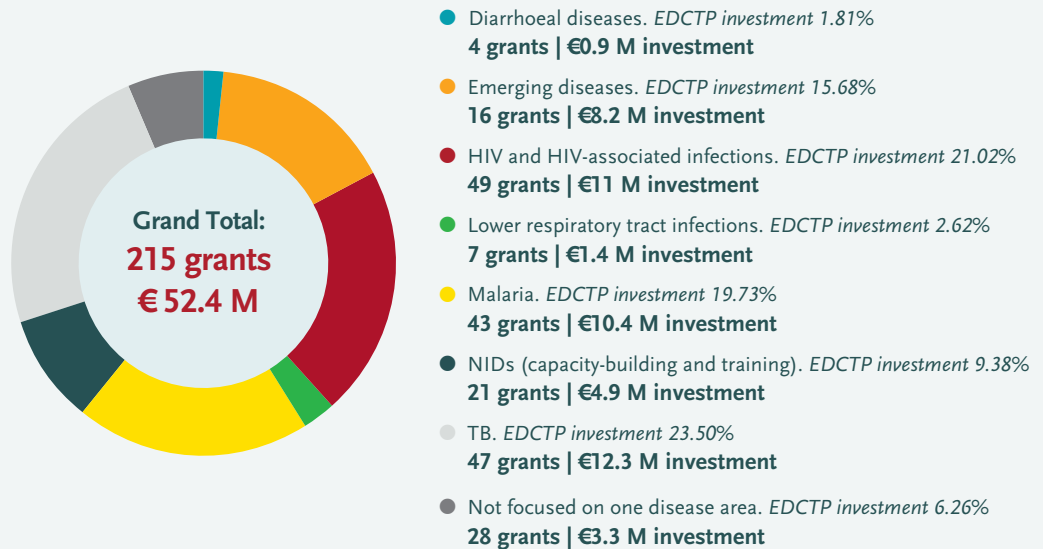
**Figure 3:** EDCTP2 fellowships by number of grants and number of fellows supported



\* Tandem fellowship grants supporting two fellows per grant

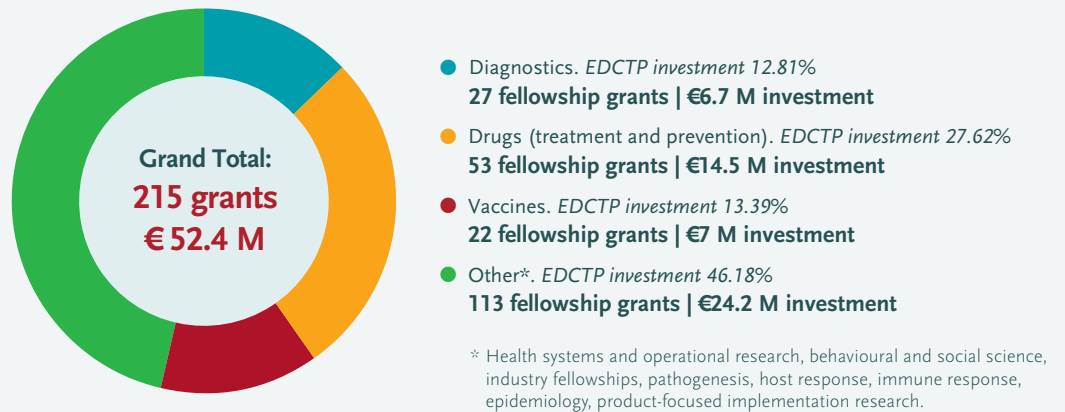
In addition to Fellowship grants, EDCTP2 also provided personal support to Bachelor's students (12), Master's students (275), PhD students (288), postdoctoral researchers (43) and other (100). Fellowship funding was well distributed over priority diseases, with the largest investment in TB (€12.3m, 23.5%), HIV and HIV-associated infections (€11m, 21%), and malaria (€10.4m, 19.7%).

**Figure 4:** EDCTP2 fellowship grants by disease area



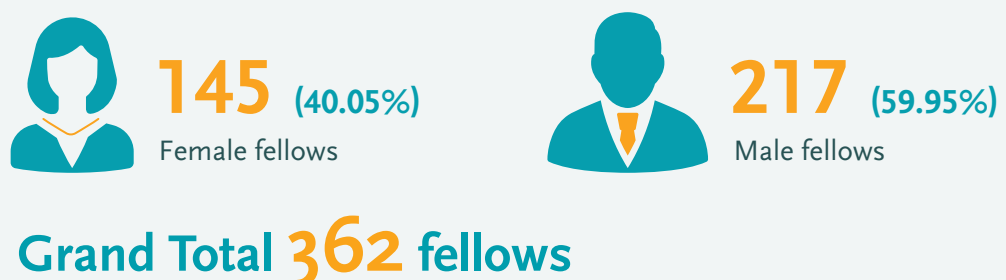
Similarly, Fellows have been working on a range of interventions, most commonly pharmaceuticals for prevention and treatment of disease (€14.5m, 27.7%). However, the research of around half of fellows is not focused on a specific intervention but on supporting epidemiological or laboratory research, social science, and health systems, operational and product-focused implementation research.

**Figure 5:** EDCTP2 fellowship grants by medical intervention



In terms of gender balance, 40% of EDCTP2 fellows are female researchers. This is a significant improvement over EDCTP1 (22% of EDCTP1 fellows were women).

**Figure 6:** EDCTP2 Fellowships by gender

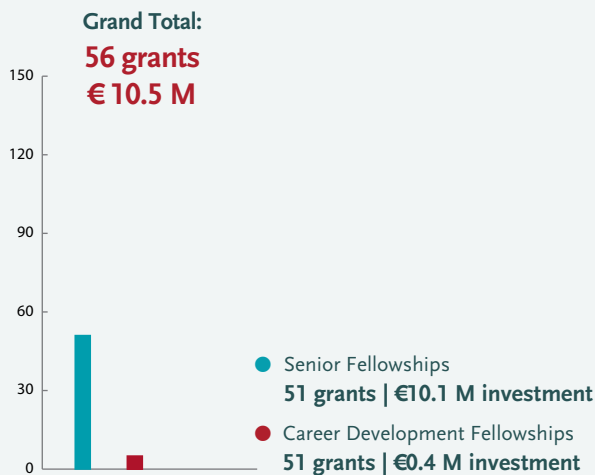


## EDCTP1 and 2 combined

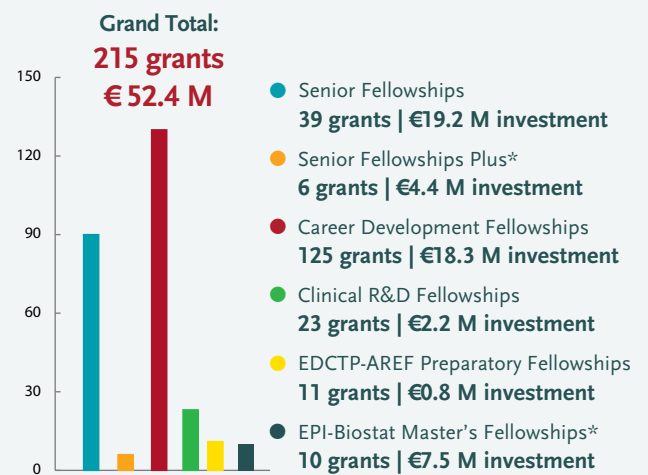
Across the two programmes, 271 fellowship grants were awarded, representing a total investment of €63m. The total number of fellows supported is higher as some fellowship grants (e.g. Senior Fellowship Plus, Epi-Biostat grants) support more than one fellow.

**Figure 7:** EDCTP1 and EDCTP2 fellowship grants by fellowship type

### EDCTP1



### EDCTP2

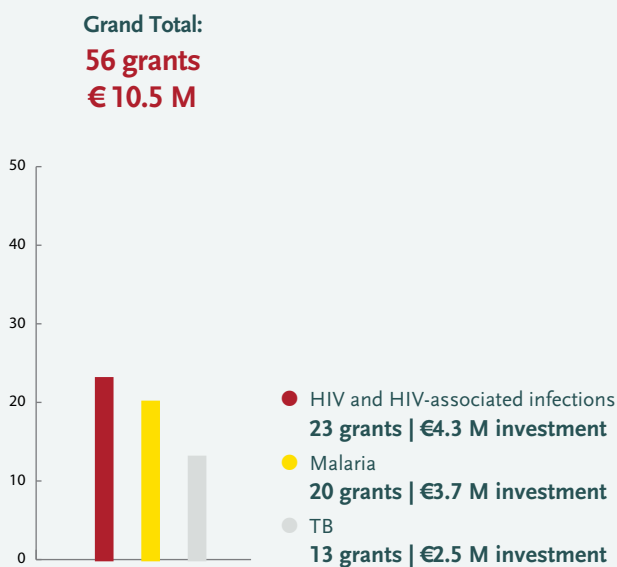


\* Tandem fellowship grants supporting two fellows per grant

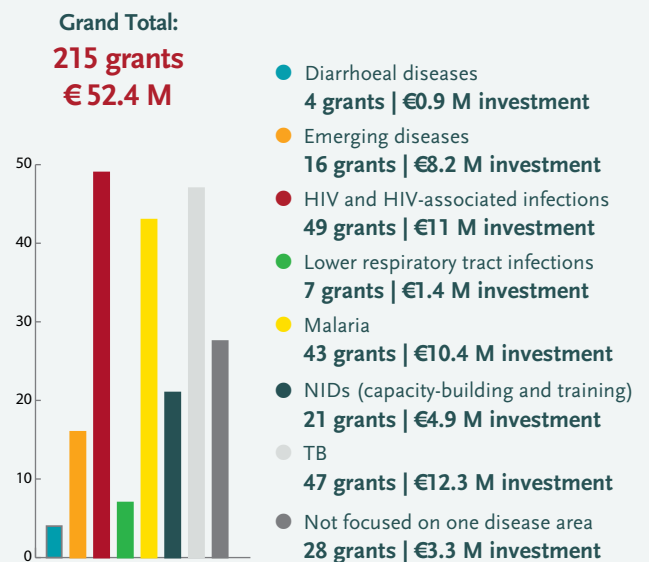
The highest fellowship funding was awarded for research on HIV and HIV-associated infections (€15.3m; 24.3%), TB (€14.8m, 23.6%) and malaria (€14.1m, 22.4%).

**Figure 8:** EDCTP1 and EDCTP2 fellowship grants by disease

### EDCTP1



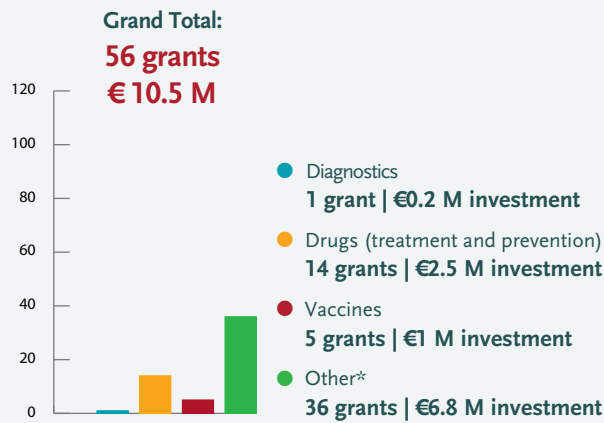
### EDCTP2



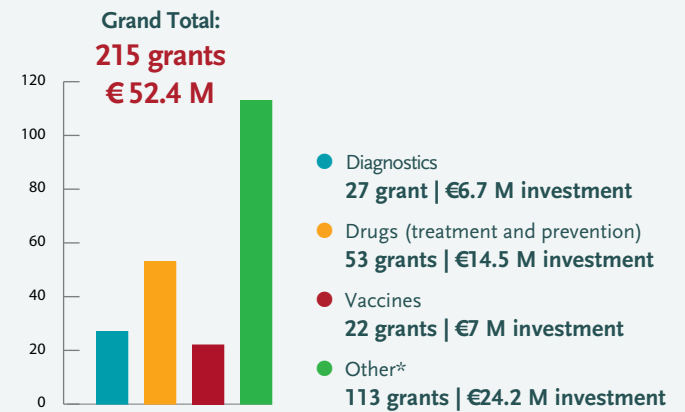
In terms of medical interventions, pharmaceuticals for prevention and treatment of disease were the most commonly studied by fellows (€17.1m, 27.1%) but nearly half of funding (€31.0m, 49.2%) is for work not relating to a specific intervention. Many fellows focused on deepening understanding of pathogen epidemiology, disease mechanisms and host responses to infection, laying the foundations for the development of new and improved interventions.

**Figure 9:** EDCTP1 and EDCTP2 fellowship grants by medical intervention

**EDCTP1**



**EDCTP2**

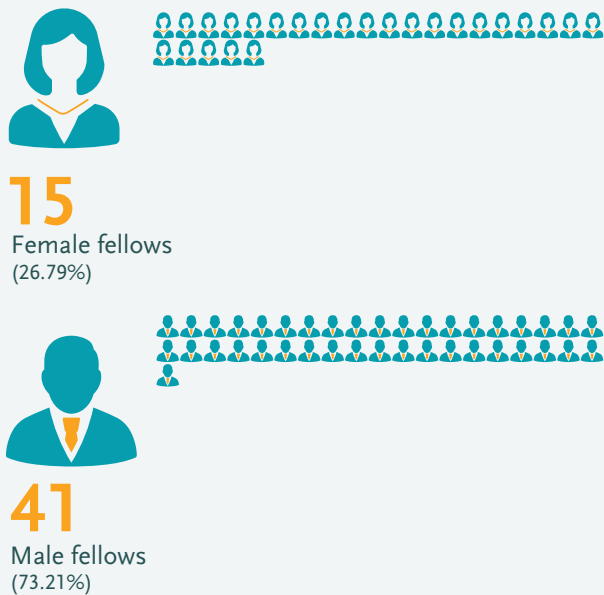


\* Health systems and operational research, behavioural and social science, industry fellowships, pathogenesis, host response, immune response, epidemiology, product-focused implementation research.

Across both programmes, female fellows accounted for 38.3% of fellowships and male fellows for 61.7% of fellowships.

**Figure 10:** EDCTP1 and EDCTP2 fellowships by gender

**EDCTP1**



**EDCTP2**

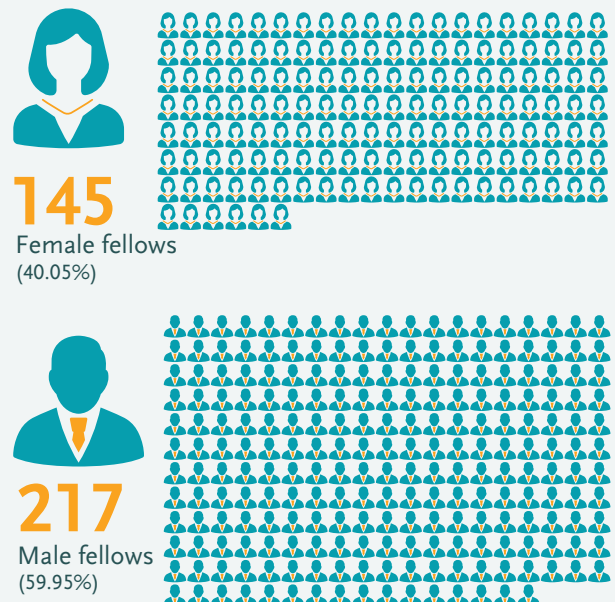
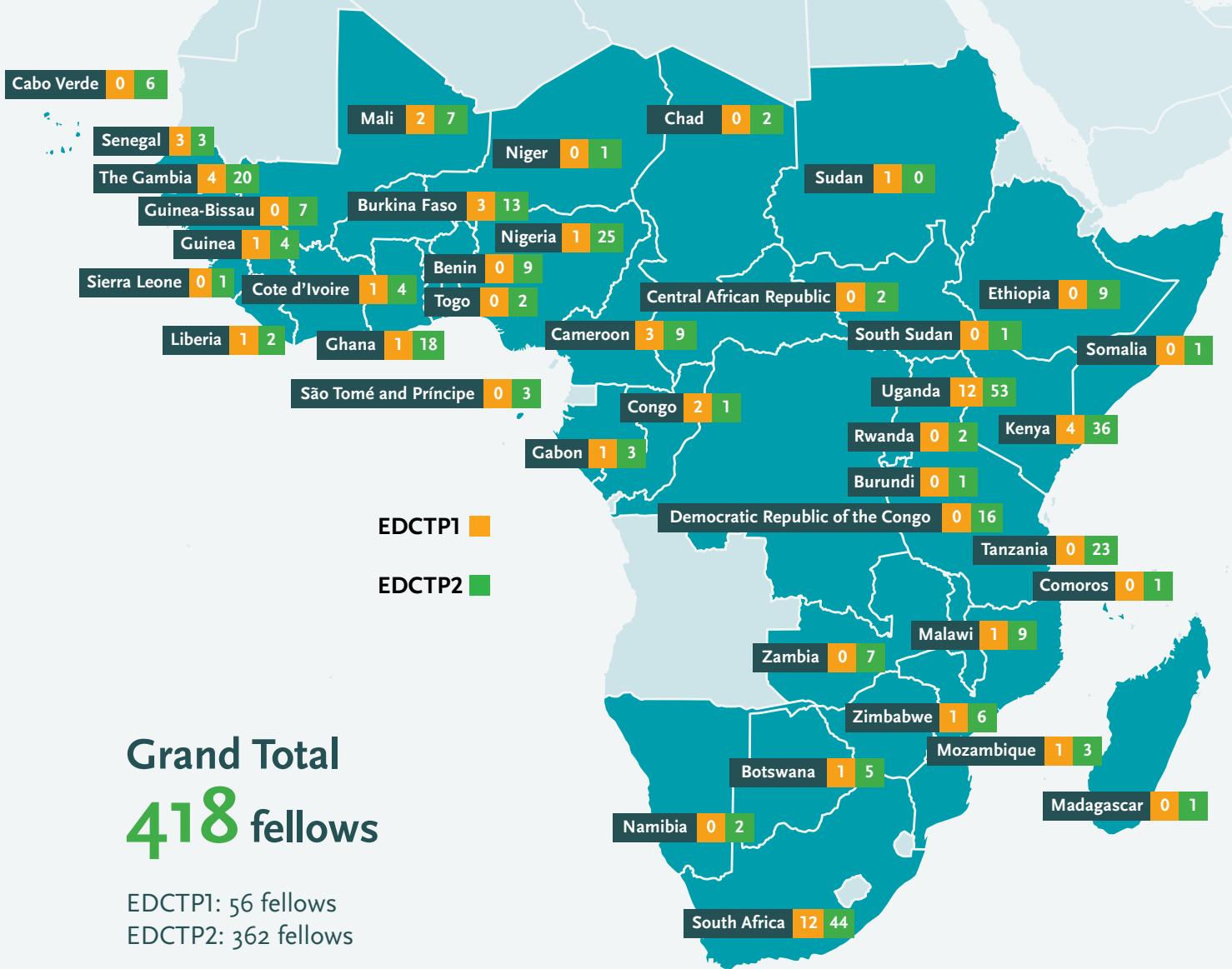


Figure 11: EDCTP1 and EDCTP2 fellowships by country



Across the two programmes, researchers from 40 countries received fellowship funding. The most successful countries in terms of number of fellows supported were Uganda (65), South Africa (56), Kenya (40), Nigeria (26), Gambia (24), Tanzania (23), Ghana (19), Burkina Faso (16), Democratic Republic of the Congo (16) and Cameroon (12).





## Outputs, outcomes and impact

### EDCTP1

*The bulk of EDCTP1 fellowship funding was dedicated to the Senior Fellowship scheme. This supported the research of many leading figures in health research in sub-Saharan Africa, several of whom have gone on to regional leadership positions. Five out of the 51 Senior Fellows (10%) used the scheme to facilitate their re-entry into their host countries and more than 90% of fellows remained in the region at the end of their fellowships, demonstrating its success at strengthening the science base in sub-Saharan Africa.*

In many cases, EDCTP1 fellows have gone on to become world authorities in their respective fields and continue to make major contributions to health research in the region and strengthening of research capacity. Examples include:

- **Professor Abdoulaye Djimdé**, Mali, 2009: One of the region's leading malaria researchers, head of the WANECAM malaria research network ([www.wanecam.org/home](http://www.wanecam.org/home)) and, since 2021, a member of the EDCTP Board (see Box).
- **Professor Cissy Kityo Mutuluza**, Uganda, 2009: Pioneered the introduction of antiretroviral drugs in Uganda, led early studies of HIV drug resistance in children, and contributed to landmark EDCTP1 studies (EARNEST and CHAPAS trials of HIV treatment). She is now Executive Director of the Joint Clinical Research Centre in Uganda and in 2022 was awarded Uganda's Golden Jubilee Medal for Outstanding Service and Loyalty, its highest civilian honour.
- **Professor Keertan Dheda**, South Africa, 2010: A globally recognised researcher on TB diagnosis, transmission and treatment who received the 2018 EDCTP Scientific Leadership Award (see Box).
- **Professor Wendy Burgers**, South Africa, 2009: An authority on T-cell responses to TB and the impact of HIV co-infections. Has also carried out critical work on T-cell responses to SARS-CoV-2, including the omicron variant.
- **Professor Christian Happi**, Nigeria, 2011: Pioneered the use of genome sequencing during the 2014–16 West African Ebola outbreak and has led efforts to use genomic surveillance to track the evolution of SARS-CoV-2 in Africa. In 2013, with funding from the World Bank and others, he established the African Centre of Excellence for Genomics of Infectious Disease at Redeemer's University, Nigeria.
- **Professor Pauline Byakika Kibwika**, Uganda, 2011: Has published extensively on drug treatments for malaria and interactions with drugs used for HIV and other infections, contributed to studies evaluating potential treatments for COVID-19, and is currently Head of the Department of Medicine at Makerere University School of Medicine, Uganda.
- **Professor Stephen Kennedy**, Liberia, 2010: Made important contributions to Liberia's response to the 2014–16 West African Ebola outbreak and was co-Principal Investigator of an Ebola vaccine trial.
- **Dr Nesri Padayatchi**, South Africa, 2013: An expert on management of TB and TB–HIV coinfections, is now Deputy Director the Centre for the AIDS Programme of Research in South Africa (CAPRISA), internationally renowned for its work on HIV and TB, and received the South African Medical Research Council Scientific Merit Award (Silver).
- **Professor Collen Masimirembwa**, Zimbabwe, 2011: Formerly a Principal Scientist at AstraZeneca, established the African Institute of Biomedical Science and Technology (AiBST), and is now a member of EDCTP's Scientific Advisory Committee (see Box).

EDCTP1 fellows published 161 papers directly related to their EDCTP fellowship projects. Most fellows were also able to continue working on previously funded research during the period of their fellowships, publishing additional papers. The overwhelming majority have continued to publish prolifically after the conclusion of their fellowships.

#### Senior fellowship:

Professor Abdoulaye Djimdé

**Professor Abdoulaye Djimdé** is Chief of the Molecular Epidemiology and Drug Resistance Unit at the [University of Bamako](#) Malaria Research and Training Centre, Mali. He has particular interests in the genetic epidemiology of [antimalarial](#) drug resistance.

Professor Djimdé was awarded a Senior Fellowship during the first EDCTP programme, covering the years 2005–2009. His fellowship project focused on evaluation of artemisinin-based therapies for uncomplicated malaria, specifically repeated use of artesunate–amodiaquine, artesunate plus sulphadoxine-pyrimethamine and artemether–lumefantrine. His work was important for demonstrating that ACTs could be used to prevent malaria in school-aged children through use of intermittent preventive treatment.

Since then, Professor Djimdé has made major contributions to the battle against malaria in sub-Saharan Africa, particular through monitoring for drug resistance to guide antimalarial drug use. He helped to establish the [Worldwide Antimalarial Resistance Network](#) (WWARN) and served on its advisory board.

Professor Djimdé is also coordinator of the EDCTP-funded **West African Network for Clinical Trials of Antimalarial Drugs (WANECAM)**, which has carried out important studies on the efficacy of ACTs in Africa. He has strong international links and is also a [Wellcome Sanger Institute](#) International Fellow.

In addition, Professor Djimdé has a strong commitment to capacity building. He is Director of Developing Excellence in Leadership and Genetics Training for Malaria Elimination in sub-Saharan Africa (DELGEME), which provides training in malaria genomics and bioinformatics. In 2021, he was appointed a member

In 2021, he was one of the first recipients of a Calestous Juma Science Leadership Fellowship, which is building on the Pathogen Genomic Diversity Network Africa (PDNA) established by Professor Djimdé to foster collaborative research across 16 countries on the genetic diversity of human pathogens to inform disease control and elimination strategies. Through this fellowship, he is setting up a PDNA Pathogens Genomics Institute in Mali.

- Barger B, Maiga H, Traore OB et al. Intermittent preventive treatment using artemisinin-based combination therapy reduces malaria morbidity among school-aged children in Mali. *Tropical Medicine and International Health*. 2009;14(7):784-91.
- Maiga H, Barger B, Sagara I et al. [Impact of Three-Year Intermittent Preventive Treatment Using Artemisinin-Based Combination Therapies on Malaria Morbidity in Malian Schoolchildren](#). *Trop Med Infect Dis*. 2020;5(3):148.
- West African Network for Clinical Trials of Antimalarial Drugs (WANECAM). [Pyronaridine-artesunate or dihydroartemisinin-piperaquine versus current first-line therapies for repeated treatment of uncomplicated malaria: a randomised, multicentre, open-label, longitudinal, controlled, phase 3b/4 trial](#). *Lancet*. 2018;391(10128):1378-1390.
- Sagara I, Beavogui AH, Zongo I et al. [Safety and efficacy of re-treatments with pyronaridine-artesunate in African patients with malaria: a substudy of the WANECAM randomised trial](#). *Lancet Infect Dis*. 2016;16(2):189-98.
- Amambua-Ngwa A, Amenga-Etego L, Kamau E et al. [Major subpopulations of Plasmodium falciparum in sub-Saharan Africa](#). *Science*. 2019;365(6455):813-816.



#### Senior Fellowship:

Professor Keertan Dheda

**Professor Keertan Dheda** was awarded an EDCTP Senior Fellowship during the first EDCTP programme, for the years 2008–2010. His initial fellowship research focused on the identification of immune biomarkers associated with susceptibility to multidrug-resistant TB (MDR-TB) and response to treatment.

Based at the University of Cape Town, and with a joint appointment at the London School of Hygiene and Tropical Medicine, UK, Professor Dheda has become one of the world's leading experts on the diagnosis and treatment of TB, including MDR-TB.



After his Senior Fellowship, he secured additional EDCTP funding for the **TB-NEAT** project, which provided key data on DNA- and urine-based point-of-care testing and informed WHO recommendations on the use of the urine-based lipoarabinomannan (LAM) test. Professor Khertan's work showed that its use reduced mortality of hospitalised patients, and this test is recommended for patients with HIV-related disease.

He also received EDCTP funding for the **XACT I study**, which demonstrated the feasibility of active TB case finding in high-risk urban communities. Subsequent XACT studies have refined the approach, reaching into communities through a panel van-based mobile diagnostics set-up. In the ongoing EDCTP-funded **XACT-19** trial, the use of computer-assisted X-ray diagnosis and other triage tools is being evaluated to determine if they can further enhance the cost-effectiveness of the active case-finding strategy.

In 2017, Professor Dheda was awarded a second EDCTP Senior Fellowship. This fellowship focuses on the development of Professor Dheda's leadership skills as well as the strengthening of research capacity, supporting multiple early-career researchers' projects embedded within an existing trial investigating novel regimens for MDR-TB.

Professor Dheda has received multiple awards in recognition of his contributions to TB research, including the **2010 International Union Against Tuberculosis and Lung Disease Scientific Award**, the **2019 South African MRC Scientific Achievement Award (Platinum Medal)**, and the **2018 EDCTP Scientific Leadership Award**.

- Patel VB, Singh R, Connolly C et al. [Cerebrospinal T-cell responses aid in the diagnosis of tuberculous meningitis in a human immunodeficiency virus- and tuberculosis-endemic population](#). *Am J Respir Crit Care Med*. 2010;182(4):569-77.
- Theron G, Zijenah L, Chanda D et al. [Feasibility, accuracy, and clinical effect of point-of-care Xpert MTB/RIF testing for tuberculosis in primary-care settings in Africa: a multicentre, randomised, controlled trial](#). *Lancet*. 2014;383(9915):424-35.
- Peter JG, Zijenah LS, Chanda D et al. [Effect on mortality of point-of-care, urine-based lipoarabinomannan testing to guide tuberculosis treatment initiation in HIV-positive hospital inpatients: a pragmatic, parallel-group, multicountry, open-label, randomised controlled trial](#). *Lancet*. 2016;387(10024):1187-97.
- Calligaro GL, Zijenah LS, Peter JG et al. [Effect of new tuberculosis diagnostic technologies on community-based intensified case finding: a multicentre randomised controlled trial](#). *Lancet Infect Dis*. 2017;17(4):441-450.
- Pooran A, Theron G, Zijenah L et al. [Point of care Xpert MTB/RIF versus smear microscopy for tuberculosis diagnosis in southern African primary care clinics: a multicentre economic evaluation](#). *Lancet Glob Health*. 2019;7(6):e798-e807.



#### **Senior Fellowship:** Professor Collen Masimirembwa

**Professor Collen Masimirembwa** has a long-standing interest in the effects of genetics on drug metabolism, effectiveness and safety (pharmacogenomics), making key discoveries on the genetic factors affecting antiretroviral drug metabolism in African populations.

He spent nine years at AstraZeneca, gaining valuable experience of pharmaceutical development, before returning to Africa in 2007. On his return he set up the African Institute of Biomedical Science and Technology (AiBST) in Zimbabwe, to create a centre of excellence specialising in the application of genomics to healthcare and building of capacity in pharmaceutical R&D, particularly pharmacogenomics.

In 2018, he began a five-year EDCTP Senior Fellowship. Part of the fellowship focuses on continuing the development of Professor Masimirembwa's pharmacogenomics expertise and global networking. In addition, a major objective is to develop a range of pharmacogenomics training opportunities for clinical researchers in Africa at AiBST. These include a five-week course in advanced concepts in clinical pharmacogenomics and an 18-month master's course in genomic medicine. The courses are run in conjunction with the University of Zimbabwe.

In 2021, Professor Masimirembwa was awarded a Calestous Juma Science Leadership Fellowship through the Global Grand Challenges initiative organised by the Bill and Melinda Gates Foundation. Through this fellowship, he will establish three centres of excellence in Zimbabwe, Kenya and Nigeria to help build R&D biotechnology industry capacity in Africa by building partnerships with other stakeholders and training industry-focused scientists. He has also been appointed to the EDCTP Scientific Advisory Committee.

- Gutierrez MM, Pillai G, Felix S et al. [Building Capability for Clinical Pharmacology Research in Sub-Saharan Africa](#). *Clin Pharmacol Ther*. 2017;102(5):786-795.
- Rajman I, Knapp L, Morgan T, Masimirembwa C. [African Genetic Diversity: Implications for Cytochrome P450-mediated Drug Metabolism and Drug Development](#). *EBioMedicine*. 2017 Mar;17:67-74.
- Dhoro M, Zvada S, Ngara B et al. [CYP2B6\\*6, CYP2B6\\*18, Body weight and sex are predictors of efavirenz pharmacokinetics and treatment response: population pharmacokinetic modeling in an HIV/AIDS and TB cohort in Zimbabwe](#). *BMC Pharmacol Toxicol*. 2015;16:4.
- Nyakutira C, Röshammar D, Chigutsa E et al. [High prevalence of the CYP2B6 516G-->T\(\\*6\) variant and effect on the population pharmacokinetics of efavirenz in HIV/AIDS outpatients in Zimbabwe](#). *Eur J Clin Pharmacol*. 2008;64(4):357-65.



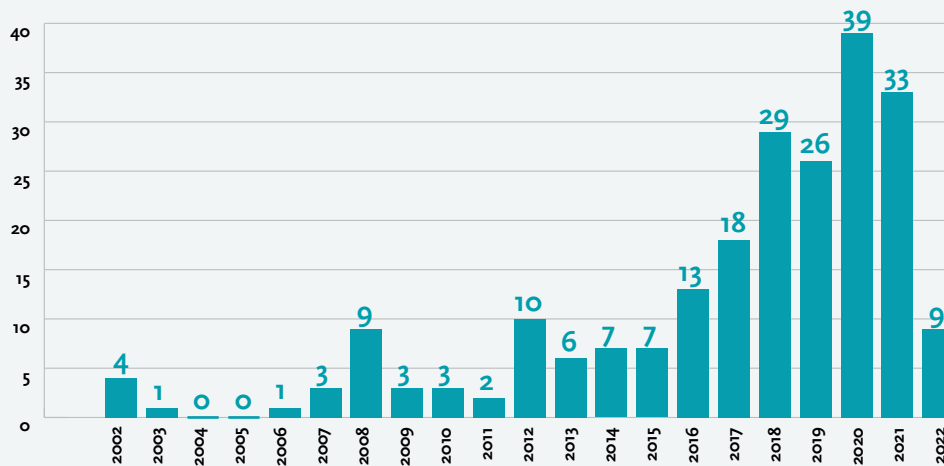
## EDCTP1 and EDCTP2

*One important mark of success is the number of additional grants secured by EDCTP fellows. Over the past decade, the number of grants and the total amount awarded has increased significantly (Figures 12, 33). As the data are self-reported on the EDCTP Alumni web platform, these figures may be an underestimate of the actual new grants secured by current and former fellows.*

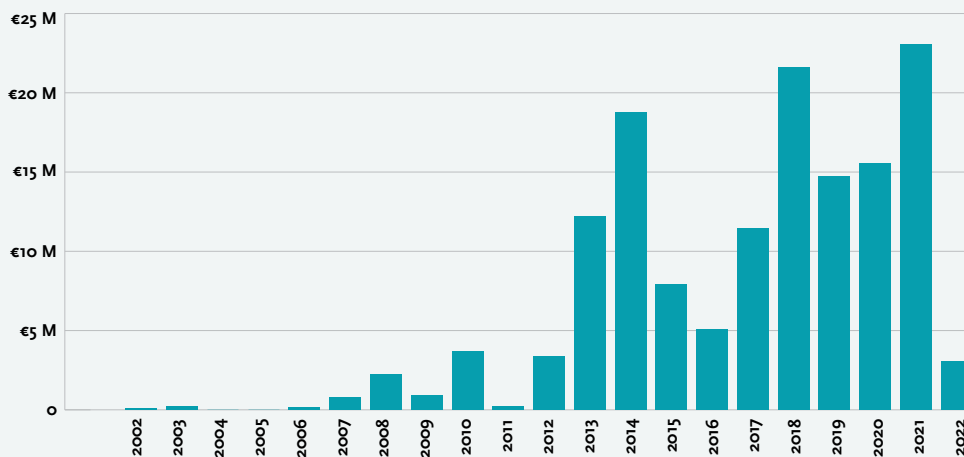
EDCTP2 fellows had published 237 papers as at November 2022. As with EDCTP1 fellows, they have also continued to publish on non-EDCTP-funded projects that they lead or contribute to.

The total amount of published papers for EDCTP1 (163) and EDCTP2 (237) combined amounts to 400 and will increase in the coming years.

**Figure 12:** Number of additional grants awarded to EDCTP1 and EDCTP2 fellows over the years 2002–2022. (Source: Alumni Platform)



**Figure 13:** Value of additional grants awarded to EDCTP1 and EDCTP2 fellows over the years 2002–2022.



## Career progression

*The EDCTP2 programme provides support at multiple stages of a research career, providing opportunities for promising researchers to develop their skills and progress to more senior positions. Although it is not anticipated that EDCTP would necessarily support an individual at all stages of their career, there are examples where an EDCTP fellowship has enabled a researcher to secure a more senior EDCTP fellowship. This suggests that schemes are successful in building the competitiveness of fellows for follow-on fellowship funding.*

Examples include:

- **Dr Adebajo Adegbola** (Nigeria): Preparatory Fellowship → EDCTP/TDR Clinical Research & Development Fellowship
- **Dr Clifford George Banda** (Malawi): EDCTP/TDR Clinical Research & Development Fellowship → Career Development Fellowship (see Box)
- **Dr Solomon Mequanente Abay** (Ethiopia): EDCTP/TDR Clinical Research & Development → Career Development Fellowship
- **Dr Edith Majonga** (Zimbabwe): Preparatory Fellowship → Career Development Fellowship (see Box)
- **Dr Hamtandi Magloire Natama** (Burkina Faso): Preparatory Fellowship → Career Development Fellowship
- **Dr Ilse Marion Sumari-de Boer** (Tanzania): Career Development Fellowship → Senior Fellowship
- **Dr Marieke van der Zalm** (South Africa): Career Development Fellowship → Senior Fellowship (see Box)

There is other evidence at the global level of the scientific impact achieved by EDCTP fellows:

- Since it was introduced by the UK Royal Society (the UK's national academy of science) in 2017, the **Royal Society Africa Prize** has been won twice by EDCTP fellows: by **Professor Deborah Yeboah-Manu** (see Box) in 2018 and by **Professor Novel Chegou** (see Box) in 2022. In addition, its predecessor, the Royal Society Pfizer Prize, was awarded to Senior Fellow **Professor Faith Osier** in 2014.
- Of the 14 individuals awarded Calestous Juma Science Leadership Fellowships in 2021 through the Global Grand Challenges initiatives, funded by the Bill and Melinda Gates Foundation, two are current or former EDCTP Fellows: **Professor Collen Masimirembwa** (Zimbabwe) and **Professor Abdoulaye Djimdé** (Mali).

### Career Development Fellowship:

Dr Clifford George Banda

**Dr Clifford George Banda** is a clinical pharmacologist with interests in dose optimisation and the safety of medications used to treat malaria and HIV in special subpopulations (such as pregnant women, mother–infant pairs and children under five years of age). He is also interested in the optimisation of drug dosing regimens in critically ill patients and when treating co-morbidities.

Dr Banda was initially funded by EDCTP through a TDR/EDCTP Clinical Research Development Fellowship, during which he helped to develop the Worldwide Antimalarial Resistance Network (WWARN) Malaria Clinical Trials Toolkit, a database template and other supporting resources that provide a step-by-step guide for researchers on how to plan, design and carry out trials.

He went on to apply successfully for an EDCTP Career Development Fellowship. Dr Banda's fellowship project, IMPROVE DDI, is part of the EDCTP-funded IMPROVE-1 and -2 studies, which are exploring the use of dihydroartemisinin–piperaquine (DP) to prevent malaria infections in pregnant women with or without HIV infections, respectively. His studies are examining whether co-administration of DP and dolutegravir-based antiretroviral therapy affects bloodstream levels of either drug.



In 2021 he was awarded an NIHR/Wellcome International Training Fellowship, funded by Wellcome and the UK National Institute for Health Research (NIHR). He is now part of the Malawi Liverpool Wellcome Trust Clinical Research Programme, University of Malawi, Blantyre, Malawi and an Honorary Research Fellow at the University of Malawi College of Medicine.

- Banda CG, Nkosi D, Allen E et al. [Effect of dihydroartemisinin/piperaquine for malaria intermittent preventive treatment on dolutegravir exposure in pregnant women living with HIV.](#) *J Antimicrob Chemother.* 2022;77(6):1733-1737.
- Banda CG, Barnes KI, Maartens G. [Interpretation of Drug Interactions between Dolutegravir and Artemether-Lumefantrine or Artesunate-Amodiaquine.](#) *Antimicrob Agents Chemother.* 2019;63(6):e00576-19.
- Banda CG, Chaponda M, Mukaka M et al. [Efficacy and safety of artemether-lumefantrine as treatment for Plasmodium falciparum uncomplicated malaria in adult patients on efavirenz-based antiretroviral therapy in Zambia: an open label non-randomized interventional trial.](#) *Malar J.* 2019;18(1):180.

#### Preparatory Fellowship:

Dr Edith Majonga

**Dr Edith Majonga** (Biomedical Research and Training Institute, Harare, Zimbabwe) was awarded a Preparatory Fellowship in 2020 in order to learn new techniques for analysing cardiac structure and function, as a way to understand how HIV infections and antiretroviral therapy may lead to heart abnormalities in adolescents, thereby increasing the long-term risk of cardiovascular disease.

Dr Majonga has been contributing to the BREATHE trial, which examined the impact of azithromycin on respiratory symptoms in children on antiretroviral therapy, and in 2021 successfully applied for an EDCTP Career Development Fellowship. In her fellowship, she is using echocardiography, cardiac magnetic imaging and biomarker analysis to try to identify the mechanisms underlying heart abnormalities in young people.

- Majonga ED, Yindom LM, Hameiri-Bowen D et al. [Proinflammatory and cardiovascular biomarkers are associated with echocardiographic abnormalities in children with HIV taking antiretroviral therapy.](#) *AIDS.* 2022 Aug 24. doi: 10.1097/QAD.0000000000003368.
- Majonga ED, Mapurisa GN, Rehman AM et al. [The effect of azithromycin for management of HIV-associated chronic lung disease on right heart function: Results from the BREATHE trial.](#) *Int J Cardiol Heart Vasc.* 2021;37:100920.
- Majonga ED, Rehman AM, McHugh G et al. [Incidence and Progression of Echocardiographic Abnormalities in Older Children with Human Immunodeficiency Virus and Adolescents Taking Antiretroviral Therapy: A Prospective Cohort Study.](#) *Clin Infect Dis.* 2020;70(7):1372-1378.



#### Senior Fellowship Plus:

Dr Marieke van der Zalm

**Dr Marieke van der Zalm**, based at Stellenbosch University in South Africa, is a globally recognised scientist on the long-term damage to the lungs caused by TB infections during childhood.

During an EDCTP Career Development Fellowship, she set up a cohort of 300 well-characterised young children with suspected pulmonary TB, in order to discover more about the course of disease in this age group. She also helped to organise the first ever international post-TB lung health symposium.

In her Senior Fellowship, Dr van der Zalm is building on this foundation, tracking the cohort of young children as they recover from TB and pulmonary virus infections, comparing results with those seen in a matched control group. She will assess multiple aspects of lung function and healthcare use, to provide an indication of long-term impacts on lung health.



As holder of a Senior Fellowship Plus, Dr van der Zalm is also overseeing the work of a trainee fellow, **Dr Justina Bramugy**, based in Mozambique. Dr Bramugy is also studying the effects of TB and viral infection in children, taking advantage of a cohort of children recruited by the EDCTP-funded **Stool4TB project** in rural Mozambique.

- van der Zalm MM, Walters E, Claassen M et al. [High burden of viral respiratory co-infections in a cohort of children with suspected pulmonary tuberculosis](#). *BMC Infect Dis*. 2020;20(1):924. doi: 10.1186/s12879-020-05653-9.
- Allwood B, van der Zalm M, Makanda G et al. [The long shadow post-tuberculosis](#). *Lancet Infect Dis*. 2019;19(11):1170-1171. doi: 10.1016/S1473-3099(19)30564-X.
- Migliori GB, Marx FM, Ambrosino N et al. [Clinical standards for the assessment, management and rehabilitation of post-TB lung disease](#). *Int J Tuberc Lung Dis*. 2021;25(10):797-813. doi: 10.5588/ijtld.21.0425.
- Gunasekera KS, Walters E, van der Zalm MM et al. [Development of a Treatment-decision Algorithm for Human Immunodeficiency Virus-uninfected Children Evaluated for Pulmonary Tuberculosis](#). *Clin Infect Dis*. 2021;73(4):e904-e912. doi: 10.1093/cid/ciab018

#### Senior Fellowship:

Professor Dorothy Yeboah-Manu

**Professor Dorothy Yeboah-Manu** is a microbiologist and professor at the [Noguchi Memorial Institute for Medical Research](#) at the [University of Ghana](#). Having studied for her master's and PhD at the London School of Hygiene and Tropical Medicine and the Swiss Tropical Medicine Institute, respectively, she returned to Ghana to work on mycobacterial infections, receiving a five-year Wellcome Trust fellowship in 2012.

In her EDCTP GSK Senior Fellowship, which she started in 2020, Professor Yeboah-Manu is assessing interactions between TB and type 2 diabetes. The prevalence of diabetes is rising at an alarming rate in sub-Saharan Africa. Although the two conditions are thought to influence each other, it is not clear exactly how, particularly in African populations. By recruiting patients at both diabetes and chest clinics, Professor Yeboah-Manu is tracking patients over time to see how diabetes affects the risk of acquiring TB and treatment outcomes. The project is also examining ways to optimise the integrated care of patients with the two conditions.

Professor Yeboah-Manu has developed a wide-ranging portfolio of research on mycobacterial infections, including *M. ulcerans* (Buruli ulcer) as well as TB. In particular, she has done much to high the genetic diversity of the *M. tuberculosis* family of bacteria, including *M. africanum*, which accounts for up to 40% of the cases of pulmonary TB in West Africa.

Professor Yeboah-Manu is a Site Principal Investigator of the EDCTP-funded **PANDORA-ID-NET** pandemic preparedness network. In 2018 she was awarded the Royal Society's Africa Prize in recognition of her work on TB and other bacterial infections and in 2021 was appointed the first female Director of the Noguchi Memorial Institute for Medical Research.

- Asante-Poku A, Asare P, Baddoo NA et al. [TB-diabetes co-morbidity in Ghana: The importance of Mycobacterium africanum infection](#). *PLoS One*. 2019;14(2):e0211822.
- Osei-Wusu S, Morgan P, Asare P et al. [Bacterial Load Comparison of the Three Main Lineages of Mycobacterium tuberculosis Complex in West Africa](#). *Front Microbiol*. 2021;12:719531.
- Osei-Wusu S, Otchere ID, Morgan P et al. [Genotypic and phenotypic diversity of Mycobacterium tuberculosis complex genotypes prevalent in West Africa](#). *PLoS One*. 2021;16(8):e0255433.



### Senior Fellowship:

Professor Novel Chegou

Originally from Cameroon, **Professor Novel Chegou** is currently a professor at Stellenbosch University, South Africa. He has a particular interest in the development of biomarkers for TB for diagnosis and tracking responses to therapy.

Professor Chegou was part of the EDCTP-funded **AE-TBC project**, which identified a set of biomarkers associated with TB meningitis in adults, a potentially fatal mycobacterial infection of brain tissue. The EDCTP-funded **ScreenTB project** is evaluating the potential of a point-of-care diagnostic based on these biosignatures to detect active TB.

In his Senior Fellowship project, Professor Chegou is working with colleagues in the Engineering Department of Stellenbosch University to develop a biomarker-based point-of-care test for TB meningitis in children, the most severe form of the disease. Currently diagnosis relies on imaging or analysis of cerebrospinal fluid, which requires specialist facilities. Many children die or suffer life-saving disabilities because of this delay in diagnosis.

In light of the importance of his work, in 2022 the UK's Royal Society awarded Professor Chegou its Royal Society Africa Prize, which recognises the innovative contribution of an African research scientist.

- Manyelo CM, Solomons RS, Snyders CI et al. [Validation of host cerebrospinal fluid protein biomarkers for early diagnosis of tuberculous meningitis in children: a replication and new biosignature discovery study](#). *Biomarkers*. 2022;27(6):549-561.
- Jacobs R, Awoniyi DO, Baumann R et al. [Concurrent evaluation of cytokines improves the accuracy of antibodies against Mycobacterium tuberculosis antigens in the diagnosis of active tuberculosis](#). *Tuberculosis (Edinb)*. 2022;133:102169.
- Mutavhatsindi H, van der Spuy GD, Malherbe ST et al. [Validation and Optimization of Host Immunological Bio-Signatures for a Point-of-Care Test for TB Disease](#). *Front Immunol*. 2021;12:607827.
- Penn-Nicholson A, Mbandi SK, Thompson E et al. [RISK6, a 6-gene transcriptomic signature of TB disease risk, diagnosis and treatment response](#). *Sci Rep*. 2020;10(1):8629.



## Developing the next generation of African researchers

*Fellows make critical contributions to the knowledge base, but one of their most critical roles – particularly for Senior Fellows – is in the nurturing of new scientific talent, for example through supervision of early-career researchers (at master's, PhD and junior fellowship level).*

By mid-2022, at least 455 early-career researchers had benefited from supervision by EDCTP fellows. As this is self-reported data from the EDCTP Alumni Platform, the true figure may be higher (Figure 14).

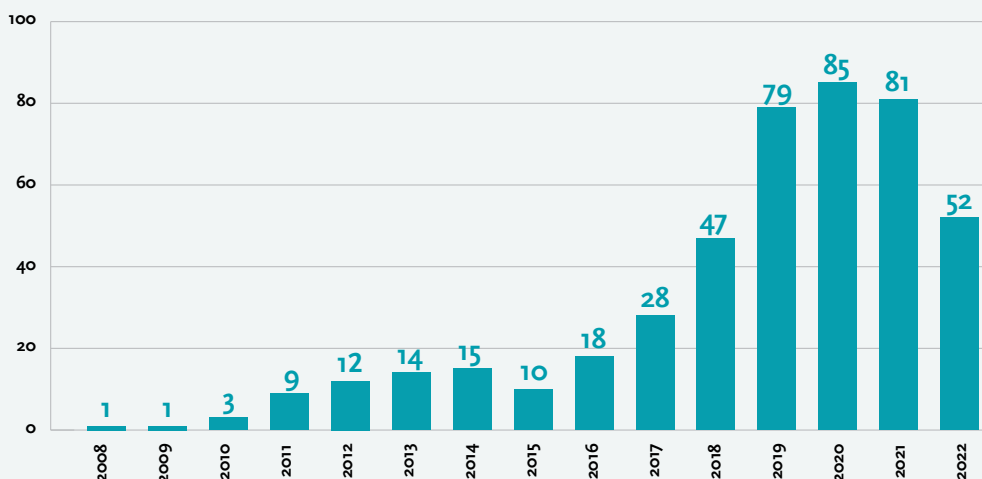
One feature of EDCTP Senior Fellowships is their **flexibility**. As well as directly supporting the research of fellows, they can also be used specifically to build research capacity. During EDCTP2, for example, **Professor Faith Osier** (2015 Senior Fellow) used her fellowship to develop research capacity at the Wellcome Trust/KEMRI Research Programme in Kenya, where her group is making a major contribution to the understanding of host responses to the malaria parasite and identification of potential malaria vaccine antigens.

Similarly, **Professor Khertan Dheda** (2017 Senior Fellow) used his fellowship to support the work of early-career researchers within a clinical

trial he was leading, which is testing a new treatment for multidrug-resistant TB. During his fellowship, **Professor Collen Masimirembwa** (2016 Senior Fellow) established a training programme providing short- and long-term training for clinicians in clinical pharmacology and pharmacogenomics, building capacity in this key emerging area of medicine.

Furthermore, funding of fellowships has an important **multiplier effect**, with each fellow supervising and mentoring master's and PhD students, as well as postdoctoral and other early-career researchers. This increases the size of the research workforce, further strengthening research capacity. Leading researchers build strong research teams, whose members have themselves gone on to secure EDCTP fellowship support. Examples include **Assistant Professor Laurent Dembele** from **Professor Abdoulaye Djimdé's** team, **Professor Grant Theron**, **Dr Ali Esmail** and **Dr Jonathan Peter** from **Professor Khertan Dheda's** group, and **Professor Wendy Burger**, who worked with **Professor Willem Hanekom**, one of the first recipients of an EDCTP Senior Fellowship award.

**Figure 14:** Mentees or students supervised by EDCTP1 and EDCTP2 fellows during EDCTP fellowships. (Source: Alumni Platform)



### Career Development Fellowship:

Dr Tecla Temu

After obtaining MD and PhD degrees from Brown University, USA, Tecla Temu was a Fulbright-Fogarty Postdoctoral Research Fellowship in Public Health, undertaking research in Kenya on the epidemiology of cardiovascular diseases in an African population and their interaction with infectious diseases.

In her EDCTP fellowship, she has been carrying out studies on immune factors that could be contributing to the increased risk of cardiovascular disease in people living with HIV in Kenya, particularly persistent inflammation and immune activation in subclinical atherosclerosis. A better understanding of these risk factors could lead to more targeted and effective interventions to combat cardiovascular disease in sub-Saharan Africa.

Dr Temu has also received funding from the US National Institutes of Health (NIH) for studies on microbial translocation and pre-clinical atherosclerosis in people living with HIV in Kenya. She is also affiliated to the Department of Global Health at the University of Washington, USA.

- Temu TM, Wagoner J, Masyuko S et al. [Central obesity is a contributor to systemic inflammation and monocyte activation in virally suppressed adults with chronic HIV in Kenya.](#) *AIDS.* 2021;35(11):1723-1731.
- Temu TM, Polyak SJ, Zifodya JS et al. [Endothelial Dysfunction Is Related to Monocyte Activation in Antiretroviral-Treated People With HIV and HIV-Negative Adults in Kenya.](#) *Open Forum Infect Dis.* 2020;7(10):ofaa425.
- Temu TM, Zifodya JS, Polyak SJ et al. [Antiretroviral therapy reduces but does not normalize immune and vascular inflammatory markers in adults with chronic HIV infection in Kenya.](#) *AIDS.* 2021;35(1):45-51.



### Preparatory Fellowship:

Dr Gyaviira Nkurunungi

**Dr Gyaviira Nkurunungi** (Medical Research Council/Uganda Virus Research Institute and London School of Hygiene and Tropical Medicine Uganda Research Unit) has a particular interest in immune responses to vaccines, which are often less effective in LMICs than in high-income countries, possibly because of extensive past exposure to pathogens. In his Preparatory Fellowship, Dr Nkurunungi learned new laboratory techniques and data-analysis methodologies in order to investigate how immune responses are affected by past helminth infections. His project also provided an opportunity to obtain pilot data to support a follow-up fellowship application.

Dr Nkurunungi has been part of the team working on the POPVAC programme, a series of linked studies examining vaccine responses in populations. While studying for his PhD at the London School of Hygiene and Tropical Medicine, Dr Nkurunungi was awarded the Garnham Medal, which is awarded by the School annually to a student completing a doctoral thesis in basic or laboratory science.

- Nkurunungi G, van Diepen A, Nassuuna J et al. [Microarray assessment of N-glycan-specific IgE and IgG profiles associated with Schistosoma mansoni infection in rural and urban Uganda.](#) *Sci Rep.* 2019;9(1):3522.
- Nkurunungi G, Zirimenya L, Nassuuna J et al. [Effect of intensive treatment for schistosomiasis on immune responses to vaccines among rural Ugandan island adolescents: randomised controlled trial protocol A for the 'POPulation differences in VACcine responses' \(POPVAC\) programme.](#) *BMJ Open.* 2021;11(2):e040426.
- Nkurunungi G, Zirimenya L, Natukunda A et al. [Population differences in vaccine responses \(POPVAC\): scientific rationale and cross-cutting analyses for three linked, randomised controlled trials assessing the role, reversibility and mediators of immunomodulation by chronic infections in the tropics.](#) *BMJ Open.* 2021;11(2):e040425.

#### Preparatory Fellowship:

Dr Mary Oboh

**Dr Mary Oboh** (Medical Research Council Unit, The Gambia at the London School of Hygiene and Tropical Medicine, UK) has studied at the University of Lagos and obtained her PhD at Université Cheikh Anta Diop, Dakar, Senegal. She is interested in applying molecular techniques to understand the evolution of drug resistance in falciparum malaria, the spatial dynamics of *Plasmodium ovale*, and interactions between *Plasmodium* and the gut microbiome.

Her fellowship project is focusing on how the gut microbiome affects the severity of malaria in children in the Cross River region of Southern Nigeria. During her fellowship she is spending time at the Liverpool School of Tropical Medicine, UK.

- Oboh MA, Isaac C, Schroeter MN et al. [Population genetic analysis of Plasmodium falciparum cell-traversal protein for ookinetes and sporozoite among malaria patients from southern Nigeria](#). *Infect Genet Evol.* 2022;105:105369.
- Oboh MA, Faal F, Adeniji OE et al. [Multiple Plasmodium falciparum drug resistance polymorphisms identified in a pregnant woman with severe malaria and a concomitant spontaneous abortion in Cross River, Nigeria, West Africa](#). *Malar J.* 2022;21(1):160.
- Oboh MA, Oriero EC, Ndiaye T et al. [Comparative analysis of four malaria diagnostic tools and implications for malaria treatment in southwestern Nigeria](#). *Int J Infect Dis.* 2021;108:377-381.

#### Preparatory Fellowship:

Dr Francis Zeukeng

**Dr Francis Zeukeng** is a research assistant at the University of Yaounde I and a lecturer at the University of Buea, Cameroon. He has a particular interest in using molecular techniques to provide a better understanding of neglected and emerging infections.

In his Preparatory Fellowship, Dr Zeukeng spent time at a regional centre of excellence in Buruli ulcer, the Noguchi Memorial Institute for Medical Research in Ghana, where he gained new skills in genomic analyses and bioinformatics. His main fellowship project focused on using these new technologies to understand routes of transmission of *Mycobacterium ulcerans*, the cause of Buruli ulcer.

- Zeukeng F, Ablordey A, Kakou-Ngazoa SE et al. [Community-based geographical distribution of Mycobacterium ulcerans VNTR-genotypes from the environment and humans in the Nyong valley, Cameroon](#). *Trop Med Health.* 2021;49(1):41.



#### Clinical R&D Fellowship:

Dr Stephen Walimbwa

During his fellowship, Dr Walimbwa (Infectious Diseases Institute, Makerere University, Uganda) spent a year at the Novartis Institutes for Biomedical Research in Basel, Switzerland, gaining new experience of early-phase clinical studies. The fellowship allowed Dr Walimbwa to receive training and acquire skills and expertise in the design, set-up, operationalisation and follow-up of phase I-IIa clinical trials. He was also able to establish a network of contacts within Swiss academia and pharmaceutical industry.

After his return to Uganda, Dr Walimbwa was promoted to Clinical Trial Manager at the Infectious Diseases Institute. In this role, he has contributed to multiple major trials of interventions for HIV, malaria and other locally important diseases, as well as having a critical role to play in ensuring that the Institute is able to host international-standard clinical trials.

- Nakalema S, Chappell CA, Pham M et al. [Pharmacokinetics of levonorgestrel and etonogestrel contraceptive implants over 48 weeks with rilpivirine- or darunavir-based antiretroviral therapy](#). *J Antimicrob Chemother.* 2022;77(11):3144-3152.
- Paton NI, Musaazi J, Kityo C et al. [Efficacy and safety of dolutegravir or darunavir in combination with lamivudine plus either zidovudine or tenofovir for second-line treatment of HIV infection \(NADIA\): week 96 results from a prospective, multicentre, open-label, factorial, randomised, non-inferiority trial](#). *Lancet HIV.* 2022;9(6):e381-e393.

- Walimbwa SI, Kaboggoza JP, Waitt C et al. [An open-label, randomized, single intravenous dosing study to investigate the effect of fixed-dose combinations of tenofovir/lamivudine or atazanavir/ritonavir on the pharmacokinetics of remdesivir in Ugandan healthy volunteers \(RemTLAR\). \*Trials\*. 2021;22\(1\):831.](#)
- Walimbwa SI, Lamorde M, Waitt C et al. [Drug Interactions between Dolutegravir and Artemether-Lumefantrine or Artesunate-Amodiaquine. \*Antimicrob Agents Chemother\*. 2019;63\(2\):e01310-18.](#)

#### Clinical R&D Fellowship:

Dr Ahmed Zeynudin Kasim

**Dr Ahmed Zeynudin Kasim** has been playing a critical role in the development of Jimma University in Ethiopia. During his fellowship (2018–2020), Dr Zeynudin Kasim gained new skills and experience at the Julius Clinical Research BV in The Netherlands, especially in the design, implementation and management of multidisciplinary trials, with a focus on neglected infectious diseases.

After his period at Julius, Dr Zeynudin Kasim was appointed Chief Academic and Research Director at the Institute of Health, Jimma University, where he has overall responsibility for leadership and management of research programmes across the Institute. He is playing a key role in the development of clinical trial capacity at Jimma University and has contributed to a range of important studies.

- Zeynudin A, Degefa T, Tesfaye M et al. [Prevalence and intensity of soil-transmitted helminth infections and associated risk factors among household heads living in the peri-urban areas of Jimma town, Oromia, Ethiopia: A community-based cross-sectional study. \*PLoS One\*. 2022;17\(9\):e0274702.](#)
- Lacerda MVG, Llanos-Cuentas A, Krudsood S et al. [Single-Dose Tafenoquine to Prevent Relapse of Plasmodium vivax Malaria. \*N Engl J Med\*. 2019;380\(3\):215-228.](#)
- Levecke B, Cools P, Albonico M et al. [Identifying thresholds for classifying moderate-to-heavy soil-transmitted helminth intensity infections for FECPAKG2, McMaster, Mini-FLOTAC and qPCR. \*PLoS Negl Trop Dis\*. 2020;14\(7\):e0008296.](#)



#### Clinical R&D Fellowship:

Dr Alphonse Liyoyo

**Dr Alphonse Liyoyo** is Research Manager and Head of the Clinical Trial Unit at Kibong'oto Infectious Disease Hospital, Kilimanjaro, Tanzania, and is affiliated with the Kilimanjaro Clinical Research Institute. His fellowship included a placement at the multinational pharmaceutical company Novartis in Basel, Switzerland.

Through his fellowship (2018–2020), Dr Liyoyo was able to boost his hands-on skills and experience in the pharmacology, pharmacokinetics and pharmacodynamics of old and new antibiotics for TB, TB/HIV and MDR-TB, including those in early clinical phases, and their interaction with other drugs. He also expanded his skills in designing a clinical research protocol. On his return he has attempted to pass on his new learning to colleagues and continues to contribute to multiple clinical studies in Tanzania.

- Said B, Nuwagira E, Liyoyo A et al. [Early empiric anti-Myco\*\*ba\*\*cterium tuberculosis therapy for sepsis in sub-Saharan Africa: a protocol of a randomised clinical trial. \*BMJ Open\*. 2022;12\(6\):e061953.](#)
- Ntinginya NE, Kuchaka D, Orina F et al. [Unlocking the health system barriers to maximise the uptake and utilisation of molecular diagnostics in low-income and middle-income country setting. \*BMJ Glob Health\*. 2021;6\(8\):e005357.](#)
- Msoka EF, Orina F, Sanga ES et al. [Qualitative assessment of the impact of socioeconomic and cultural barriers on uptake and utilisation of tuberculosis diagnostic and treatment tools in East Africa: a cross-sectional study. \*BMJ Open\*. 2021;11\(7\):e050911.](#)



## EDCTP fellows and the EDCTP2 Strategic Research Agenda

---

*EDCTP fellows are making important contributions to the EDCTP2 Strategic Research Agenda, which summarises priority knowledge gaps identified through consultation with the EDCTP Scientific Advisory Committee, as well as sub-Saharan Africa and other international stakeholders.*

For **HIV**, several fellows are studying co-infections or co-morbidities affecting people living with HIV, including Kaposi's sarcoma-associated herpesvirus (**Dr Georgia Schafer**, SF) and cardiometabolic co-morbidities (**Professor Andre Pascal Kengne**, SF).

Fellows are also investigating immune responses to HIV, including innate immunity and its contribution to inflammation (**Dr Christina Thobakgale**, SF). Projects are examining key issues such as the impact of pharmacogenomics on response to HIV drugs (**Professor Collen Masimirembwa**, SF; **Professor Yaya Kassogue**, CDF), and adverse drug reactions in HIV–TB co-endemic areas (**Professor Jonathan Peter**, SF).

**Special populations** are an important aspect of many fellowship projects. These include identifying drug resistance mutations in infants with HIV infections (**Dr Immaculate Nankya**, SF). Adolescents are a focus of several projects, with fellows enrolling adolescents at risk of infection in HIV hotspots (**Dr Yunia Mayanja**, CDF), assessing the potential for HIV self-testing in adolescents and young people (**Dr Grace McHugh**, CDF), and tracking resistance mutations in adolescents (**Dr Joseph Fokam**, CDF; see Box)

Fellows are also working to trace pregnant women with HIV who have been lost to care (**Dr Agnes Kiragga**, CDF) and to understand the factors affecting the success of HIV control measures that target HIV-infected pregnant women (**Dr Tacilta Nhampossa**, CDF).

For **TB**, several fellows are studying tailored treatment regimens for drug-resistant TB based on genomic analyses (**Dr Nesri Padayatchi**, SF; **Dr Bugwesa Zablun Katala**, CDF), optimising linezolid use in drug-resistant TB (**Dr Sean Wasserman**, CDF), control of multidrug-resistant TB (**Dr Stella George Mpagama**, SF; see Box) and assessing use of high-dose rifampicin to improve or shorten treatment

in people living with HIV (**Dr Christine Sekaggya-Wiltshire**, CDF; see Box) and children (**Dr Hadija Hamisi Semvua**, CDF).

Other projects are examining biomarkers of risk, stage of infection and response to therapy (**Professor Keertan Dheda**, SF; **Dr Catherine Riou**, SF; **Dr Ali Esmail**, CDF), including novel microbiological assays (**Dr Willy Ssengooba**, CDF) and use of imaging techniques (**Dr Stephanus Malherbe**, CDF; see Box), and their application to diagnosis of tuberculous meningitis (**Professor Novel Chegou**, SF). Assessments are also being made of novel diagnostic products in high-burden settings (**Professor Grant Theron**, SF).

With many cases of TB still being missed, EDCTP fellows are studying approaches for targeted drug-resistant TB case finding in 'hotspots' (**Dr Mareli Claassens**, SF), using information on drug-resistant cases to inform policy (**Dr Elizabeth Streicher**, SF), and partnering with informal healthcare providers to identify TB cases (**Dr Sylvie Kwedi**, CDF).

For **malaria**, several EDCTP fellows are carrying out vaccine-related studies, by examining parasite diversity and naturally acquired immunity (**Professor Faith Osier**, SF) and through use of human challenge models (**Dr Francis Ndungu**, SF). A blood-stage human challenge is also being introduced into Africa for the first time to facilitate studies of transmission-blocking vaccines (**Dr Ally Olotu**, SF).

Seasonal malaria chemoprevention is a focus of several fellows. Projects are examining its use in older, school-age children in Mali (**Dr Karim Traore**, CDF), integration with nutritional supplementation in Burkina Faso (**Dr Paul Sondo**, CDF), and its impact on the development of immunity to malaria (**Dr Mariama Combassere/Cherif**, CDF). Other studies are assessing the safety of primaquine use (**Dr Richard Mwaiswelo**, CDF; **Dr Dominic Mosha**, CDF) and potential interactions between antimalarial drugs and antiretrovirals (**Dr Pauline Byakika-Kibwika**, SF; **Dr Clifford George Banda**, CDF).

Other projects are focusing on parasite drug resistance, as it affects preventive treatment of malaria in pregnant women (**Dr Atinuke Olaeye**,



CDF) and using high-throughput genomic sequencing (**Dr Vito Baraka**, CDF).

Several projects are focused on detection of malaria infections, including use of highly sensitive rapid diagnostics as part of 'test-and-treat' prevention strategies for pregnant women (**Dr Marc Christian Tahita**, CDF) and mobile nucleic acid testing to detect asymptomatic infections to support elimination programmes (**Dr Makhtar Niang**, SF).

Some EDCTP Senior Fellows are using their fellowships to develop research capacity in malaria in Uganda (**Professor Peter Olupot-Olupot**, SF), incorporating training into epidemiological studies, studies of acute kidney injury in severe malaria and a trial of paracetamol use for acute kidney injury, as well as for malaria field trials in Tanzania (**Professor John Lusingu**, SF).

For **respiratory tract infections**, a key focus is the use of tools to better detect and characterise infections and guide treatment in hospitals in low-resource settings (**Dr William Ofuti Worodria**, SF). Other projects are assessing microbiome changes in the upper respiratory tract of children with HIV infections and their association with respiratory symptoms (**Dr Michael Owusu**, CDF) and evaluating a microarray chip to help distinguish bacterial and viral infections in children (**Dr Charles Sande**, CDF; see Box).

For **diarrhoeal diseases**, fellows' projects include a trial of an additional dose of rotavirus vaccine to make up for relatively poor responses to the standard two-dose schedule seen in resource-poor settings (**Professor Roma Chilengi**, SF; see Box), as well as studies to track immune responses in Zambian populations after vaccination with an oral cholera vaccine (**Dr Caroline Cleopatra Chisenga**, CDF).

For **neglected infectious diseases**, several fellows' projects focus on mechanisms of disease. These include studies to understand the potential contributions of intestinal parasite infections to cardiometabolic disease (**Professor Marielle Bouyou-Akotet**, SF), the impact of secondary bacterial infections on lymphatic filariasis (**Dr Alexander Kwarteng**, CDF) and how host factors drive the development of organ-damaging fibrosis in schistosomiasis (**Dr Justin Komguep Nono**, CDF). Novel therapies being evaluated include an innovative

wound dressing that releases nitric oxide as well as antibiotics for treatment of Buruli ulcer (**Professor Richard Phillips**, SF).

Several other fellows have been working on diagnostics tools for neglected infectious diseases. These include development of molecular diagnostics for visceral leishmaniasis (**Dr Dawit Wolday**, SF) and for the cause of Buruli ulcer, *Mycobacterium ulcerans* (**Dr Michael Frimpong**, CDF). New tools are also being assessed for detection of urinary tract damage during *Schistosoma* infections (**Dr Humphrey Kariuki Njaanake**, CDF).

Control of neglected infectious diseases often depends on mass drug administration campaigns, and several EDCTP fellows are working on possible new drugs for such campaigns or refinements to how they are used. Studies are examining targeting of essential *Wolbachia* symbionts to provide new treatment options for onchocerciasis and lymphatic filariasis (**Professor Alexander Yaw Debrah**, SF), optimisation of praziquantel treatment for pre-school-aged children to prevent *Schistosoma mansoni* infections (**Dr Solomon Mequanente Abay**, CDF), and evaluation of annual versus biannual use of ivermectin plus albendazole for control of lymphatic filariasis.

For **emerging and re-emerging infections**, fellows are conducting studies including screening for known and novel arboviral infections in patients with fever in Nairobi, Kenya (**Dr Moses Masika**, CDF) and characterisation of novel epitopes on Ebola virus and Marburg virus that could form the bases of improved rapid diagnostic tests (**Dr Misaki Wayengera**, CDF).



### Career Development Fellowship:

Dr Joseph Fokam

**Dr Joseph Fokam** is a virologist, senior health scientist and Chief of Service at the Virology Laboratory at CIRCB (Chantal BIYA International Reference Centre for Research on HIV/AIDS Prevention and Management) in Yaoundé, Cameroon.

During his EDCTP fellowship (2017–2019), Dr Fokam focused on treatment failure and drug resistance mutations in adolescents living with HIV. Thanks to wider accessibility to antiretroviral drugs, more children with HIV infections are surviving to adolescence and beyond. However, death rates among adolescents are relatively high and there is growing concern about rising levels of drug resistance and treatment failure.

For his EDCTP Fellowship project, Dr Fokam recruited cohorts of adolescents living with HIV from urban and rural areas of Cameroon and followed them for a year. He identified worryingly high levels of HIV drug resistance, exceeding 90% in both settings. High viral loads, indicative of failure to control HIV replication, were seen in more than a third of adolescents in the urban setting and more than half of those at rural sites. Poor adherence was seen in about a third of participants.

In addition, adolescents failing treatment were found to be harbouring high levels of hidden or 'archived' drug-resistance genes, suggesting that additional tools might need to be used to profile HIV infections and provide early warning of emerging drug resistance and impending treatment failure.

Other analyses have shown that a switch to second-line treatment in children is delayed on average by nearly a year. Switching is driven almost entirely in response to virological failure (high viral load), emphasising the importance of monitoring of viral load in this group. Dr Fokam continues to generate evidence on HIV mutations, with important implications on policymaking on choice of treatment.

Dr Fokam also coordinates VIROFORUM, a platform dedicated to interpreting HIV drug resistance for the clinical management of patients. He acts as Scientific Secretary of the National HIV Drug Resistance Working Group at the Ministry of Public Health in Cameroon and is a Focal Person at the Technical Group for COVID-19 response at institutional level. In this role, he is responsible for daily molecular detection of SARS-CoV-2 in Cameroon. He is also leading the EDCTP-funded PERFECT study, which is evaluating a range of SARS-CoV-2 assays and building local capacity in diagnostics assessment.

- Fokam J, Takou D, Njume D et al. [Alarming rates of virological failure and HIV-1 drug resistance amongst adolescents living with perinatal HIV in both urban and rural settings: evidence from the EDCTP READY-study in Cameroon.](#) *HIV Med.* 2021;22(7):567-580. doi: 10.1111/hiv.13095.
- Fokam J, Mpouel Bala ML, Santoro MM et al. [Archiving of mutations in HIV-1 cellular reservoirs among vertically infected adolescents is contingent with clinical stages and plasma viral load: Evidence from the EDCTP-READY study.](#) *HIV Med.* 2022 Jul;23(6):629-638.
- Njom-Nlend AE, Efouba N, Brunelle Sandie A, Fokam J. [Determinants of switch to paediatric second-line antiretroviral therapy after first-line failure in Cameroon.](#) *Trop Med Int Health.* 2021;26(8):927-935. doi: 10.1111/tmi.13595.
- Fokam J, Alteri C, Colagrossi L et al. [Diagnostic performance of molecular and serological tests of SARS-CoV-2 on well-characterised specimens from COVID-19 individuals: The EDCTP "PERFECT-study" protocol \(RIA2020EF-3000\).](#) *PLoS One.* 2022;17(9):e0273818.

### Senior Fellowship:

Dr Stellah George Mpagama

**Dr Stellah George Mpagama** is one of sub-Saharan Africa's leading experts on the interplay between TB and non-communicable diseases (NCDs) such as type 2 diabetes. She has particular interests in the organisation of efficient and patient-centred services for TB and the integration of TB and NCD care.

Dr Mpagama is part of the EDCTP-funded **PanACEA consortium**, an international partnership set up to accelerate the development of shortened treatment regimens for TB and to build capacity in Africa for TB drug trials. Dr Mpagama also carried out research on the first cohort of multidrug-resistant TB patients treated in Tanzania.

In her EDCTP Senior Fellowship project, she is investigating whether N-acetylcysteine (NAC) can protect against some of the side effects seen during treatment of multidrug-resistant TB with kanamycin, such as hearing loss, which can lead patients to discontinue treatment. Embedded in this project are a range of studies that will support the development of PhD and master's students, making an important contribution to the development of research capacity and use of new technologies in TB research in Tanzania. This will help to establish a local clinical trial unit.

Since 2013, Dr Mpagama has supervised seven master's students, seven PhD students and three fellows. This includes a fellow supported through the EDCTP/TDR Clinical Research Development scheme.

- Chamba NG, Byashalira KC, Shayo PJ et al. [Where can Tanzania health system integrate clinical management of patients with dual tuberculosis and diabetes mellitus? A cross-sectional survey at varying levels of health facilities.](#) *Public Health Pract (Oxf)*. 2022;3:100242.
- Said B, Nuwagira E, Liyoyo A et al. [Early empiric anti-Mycobacterium tuberculosis therapy for sepsis in sub-Saharan Africa: a protocol of a randomised clinical trial.](#) *BMJ Open*. 2022;12(6):e061953.
- Mbelele PM, Sabiiti W, Heysell SK et al. [Use of a molecular bacterial load assay to distinguish between active TB and post-TB lung disease.](#) *Int J Tuberc Lung Dis*. 2022;26(3):276-278.



### Career Development Fellowship:

Dr Stephanus Malherbe

**Dr Stephanus Malherbe**, head of the Molecular Biology Clinical Research Unit at Stellenbosch University, South Africa, has a particular interest in the use of positron emission tomography/computed tomography (PET/CT) imaging to monitor TB disease progression and response to therapy. Such imaging could provide a way to determine which patients are responding to therapy so that individualised and shorter TB treatment regimens could be used on a subset of patients.

His EDCTP fellowship project (2018–2022) is taking advantage of the EDCTP-funded PredictTB trial, which is assessing whether PET/CT imaging can be used to stratify patients and permit shortening of treatment. In his fellowship project, he is analysing scans in more depth to explore interactions between TB-causing bacteria and the host, to identify prognostic biomarkers and biomarkers for assessing response to therapy at key timepoints.

In 2019, Dr Malherbe was awarded the Young Investigator Prize by the International Union Against TB and Lung Disease in recognition of his work on imaging biomarkers.

- Chen RY, Yu X, Smith B et al. [Radiological and functional evidence of the bronchial spread of tuberculosis: an observational analysis.](#) *Lancet Microbe*. 2021;2(10):e518-e526.
- Xie YL, de Jager VR, Chen RY et al. [Fourteen-day PET/CT imaging to monitor drug combination activity in treated individuals with tuberculosis.](#) *Sci Transl Med*. 2021;13(579):eabd7618.
- Scriba TJ, Fiore-Gartland A, Penn-Nicholson A et al. [Biomarker-guided tuberculosis preventive therapy \(CORTIS\): a randomised controlled trial.](#) *Lancet Infect Dis*. 2021;21(3):354-365.
- Malherbe ST, Chen RY, Dupont P et al. [Quantitative 18F-FDG PET-CT scan characteristics correlate with tuberculosis treatment response.](#) *EJNMMI Res*. 2020;10(1):8.





#### Career Development Fellowship:

Dr Christine Sekaggya-Wiltshire

**Dr Christine Sekaggya-Wiltshire** (Makerere University, Uganda) has a particular interest in drug pharmacokinetics, in particular interactions between antiretrovirals and anti-TB drugs – a critical issue for sub-Saharan Africa, where HIV–TB co-infections are common.

In her Career Development Fellowship, Dr Sekaggya-Wiltshire focused on high-dose rifampicin, which has been proposed as an option for shortening the duration of TB treatment but could affect the metabolic processing of antiretrovirals such as efavirenz and therefore may not be suitable for people living with HIV. Dr Sekaggya-Wiltshire has been carrying out a clinical trial to examine efavirenz levels in people with HIV and TB infections given different doses of rifampicin as part of their TB treatment regimen.

Dr Sekaggya-Wiltshire has also contributed to multiple other TB studies, and in 2018 was awarded the Stephen Lawn TB-HIV Research Leadership Prize by the International Union Against TB and Lung Disease. The Prize recognises upcoming researchers helping to reduce the burden of HIV- and TB-related disease in Africa.

- Sekaggya-Wiltshire C, Nabisere R, Musaazi J et al. [Decreased dolutegravir and efavirenz concentrations with preserved virological suppression in patients with TB and HIV receiving high-dose rifampicin](#). *Clin Infect Dis*. 2022;ciac585.
- Namugenyi J, Musaazi J, Katamba A et al. [Baseline Xpert MTB/RIF ct values predict sputum conversion during the intensive phase of anti-TB treatment in HIV infected patients in Kampala, Uganda: a retrospective study](#). *BMC Infect Dis*. 2021;21(1):513.
- Nabisere R, Musaazi J, Denti P et al. [Pharmacokinetics, Safety/tolerability, and Efficacy of high-dose Rifampicin in tuberculosis-HIV co-infected patients on efavirenz- or dolutegravir-based antiretroviral therapy: study protocol for an open-label, phase II clinical trial \(SAEFRIF\)](#). *Trials*. 2020;21(1):181.
- Sekaggya-Wiltshire C, von Braun A, Lamorde M et al. [Delayed Sputum Culture Conversion in Tuberculosis-Human Immunodeficiency Virus-Coinfected Patients With Low Isoniazid and Rifampicin Concentrations](#). *Clin Infect Dis*. 2018;67(5):708-716.



#### Career Development Fellowship:

Dr Charles Sande

**Dr Charles Sande's** research at the KEMRI-Wellcome Trust Research Programme in Kilifi, Kenya, focuses on the diagnosis, treatment and prevention of pneumonia, one of the biggest killers of young children in sub-Saharan Africa. His research interests span the use of a wide range of immunological and other methods to understand mechanisms of disease, tools to aid clinical diagnosis, and the development of vaccines for important pathogens such as respiratory syncytial virus (RSV).

In his EDCTP fellowship, Dr Sande has been attempting to identify markers that could be used in clinical settings to spot bacterial causes of pneumonia in young children. Multiple viral and bacterial pathogens can cause pneumonia and tools are rarely available in low-resource settings to distinguish possible causes of disease. This can lead to indiscriminate use of antibiotics, which could have harmful effects on infants and also contributes to the development of antibiotic resistance.

In prior work, Dr Sande and his colleagues identified a set of host proteins that were present at different levels in viral and bacterial infections. His team has developed a microarray chip capable of characterising expression of these proteins and, by using this chip on samples from patients with confirmed viral and bacterial infections, Dr Sande was able to identify three biomarker proteins best able to differentiate the two types of infection. This biomarker signature is being assessed in patients with pneumonia of unknown cause to determine if it sufficiently reliable to inform clinical decision-making.

- Sande CJ, Njunge JM, Mwongeli Ngoi J et al. [Airway response to respiratory syncytial virus has incidental antibacterial effects](#). *Nat Commun*. 2019;10(1):2218.
- Sande CJ, Mutunga M, Muteti J et al. [Untargeted analysis of the airway proteomes of children with respiratory infections using mass spectrometry based proteomics](#). *Sci Rep*. 2018;8(1):13814.
- Drysdale SB, Barr RS, Rollier CS et al. [Priorities for developing respiratory syncytial virus vaccines in different target populations](#). *Sci Transl Med*. 2020;12(535):eaax2466.

**Senior Fellowship:**  
Professor Roma Chilengi



**Professor Roma Chilengi** is a clinical trials specialist with extensive experience of trials of vaccines and other interventions, as well as a growing interest in controlled human infection studies. His past work with the Ministry of Health in Zambia and local NGOs, including rollout of rotavirus vaccination, has had a significant impact on child mortality locally.

In his Senior Fellowship project, Professor Chilengi is assessing whether adding a third dose of rotavirus vaccine at nine months boosts rotavirus-specific immune responses at 1 year, providing longer-lasting protection. Although currently licensed rotavirus vaccines have shown high efficacy in trials, in sub-Saharan Africa, they are typically less effective, and effectiveness might be enhanced by addition of a third dose of vaccine.

Professor Chilengi has made a major contribution to the response to COVID-19 in Zambia. He sat on the Zambian Ministry of Health Emergency Preparedness Technical Working Group, which guided the Ministry of Health on policy and prevention measures related to COVID-19 in Zambia. In September 2021, he was appointed as Special Advisor for COVID-19 to President Hakainde Hichilema of Zambia. In this role, he has had a high public profile within Zambia, appearing on television, radio and the press to promote vaccination and other ways to control COVID-19. In addition, in March 2022, Professor Chilengi was appointed Acting Director General of the Zambia National Public Health Institute.

In addition, Professor Chilengi is a member of the Steering Committee for an EDCTP-funded project evaluating a new *Shigella* vaccine. He is also a member of the [Lancet Commission on Water, Sanitation and Hygiene, and Health](#).

He was previously head of clinical trials facility at the University of Oxford/KEMRI-Wellcome Trust Programme in Kenya and has an adjunct faculty position as Assistant Professor, University of North Carolina, USA.

- Simwanza J, Hines JZ, Sinyange D et al. [COVID-19 Vaccine Effectiveness during a Prison Outbreak when Omicron was the Dominant Circulating Variant-Zambia, December 2021](#). *Am J Trop Med Hyg*. 2022;tpmd220368.
- Chilengi R, Mwila-Kazimbaya K, Chirwa M et al. [Immunogenicity and safety of two monovalent rotavirus vaccines, ROTAVAC® and ROTAVAC 5D® in Zambian infants](#). *Vaccine*. 2021;39(27):3633-3640.
- Chilengi R, Simuyandi M, Chibuye M et al. [A pilot study on use of live attenuated rotavirus vaccine \(Rotarix™\) as an infection challenge model](#). *Vaccine*. 2020 Oct 27;38(46):7357-7362.
- Kazimbaya KM, Chisenga CC, Simuyandi M et al. [In-vitro inhibitory effect of maternal breastmilk components on rotavirus vaccine replication and association with infant seroconversion to live oral rotavirus vaccine](#). *PLoS One*. 2020;15(11):e0240714.

## EDCTP fellows and COVID-19

---

*In response to the COVID-19 pandemic, in 2020 EDCTP activated its emergency funding mechanisms, ultimately supporting 27 projects focused on this new threat to health. However, EDCTP's contribution to the COVID-19 response was much wider than this, with several existing projects being able to pivot to focus on COVID-19, while current and past EDCTP fellows made many important contributions to the COVID-19 response in their respective countries and across the region as a whole.*

Some of the EDCTP COVID-19 projects were led by EDCTP fellows. **Professor Francis Ndungu** (2019 Senior Fellow) is leading the **ImmunoCov** study, which is validating antibody-based tests for COVID-19 and exploring the evolution of immune responses to SARS-CoV-2, while **Professor Dawit Wolday** (2018 Senior Fellow) is coordinating the **Profile-Cov** project, which is investigating immune responses to SARS-CoV-2 in people from Ethiopia.

One important role has been to provide **scientific advice** to national decision-makers. **Professor Roma Chilengi** (2018 Senior Fellow), for example, was appointed as Special Advisor for COVID-19 to President Hakainde Hichilema of Zambia. In addition, **Dr Misaki Wayengera** (2018 Career Development Fellow) was appointed chair of the Ugandan Ministry of Health and the national task force's scientific advisory committee on COVID-19. **Professor Pauline Byakika-Kibwika** (2019 Senior Fellow) is also a member of the Scientific Advisory Committee to the Ministry of Health in Uganda, advising on multiple aspects of the national COVID-19 response. **Dr Christine Sekaggya** (2018 Career Development Fellow) is a member of Uganda's Scientific Committee for case management, which provides advice to the Ministry of Health on treatment guidelines and occupational health guidance for health workers.

Work led by **Professor Wendy Burgers** (2018 Senior Fellow) provided important information on the impact of past infection on vaccine-induced immunity and on the preservation of T-cell immunity to SARS-CoV-2 variants.

In addition, **Dr Stephanus Malherbe** (2018 Career Development Fellow) is contributing to the TOGETHER 3 trial, funded by the Bill and Melinda Gates Foundation, which investigated

use of lopinavir/ritonavir (LPV/r) antivirals for treatment of SARS-CoV-2 infection among high-risk outpatient adults early in disease. **Dr Jonny Peter** (2019 Senior Fellow) has studied genetic predispositions to COVID-19. **Dr Moses Masika** (2019 Career Development Fellow) contributed to research characterising COVID-19 infections in Kenya, while **Dr Marisa Klopper** (2018 Career Development Fellow) is helping to develop an app to characterise coughs as part of symptom screening. **Dr Stella Mpagama** (2018 Senior Fellow) has been characterising COVID-19 cases and using data collected to develop algorithms to guide clinical management.

**Dr Aida Sivro** (2018 Career Development Fellow) led work evaluating rapid antigen tests for SARS-CoV-2 infection and contributed to key studies on antibody responses to delta and omicron variants. **Dr Georgia Schafer** (2019 Senior Fellow) has examined the interplay between SARS-CoV-2 and other viral infections, including HIV and herpesviruses. **Dr Moustapha Mbow** (2018 Career Development Fellow) contributed to a range of papers assessing the spread of SARS-CoV-2 variants in Senegal and antibody responses to the virus, while **Dr Oghenebrume Wariri** (2020 Career Development Fellow) was involved in studies tracking SARS-CoV-2 in The Gambia, optimising care for COVID-19 patients and COVID-19 vaccine hesitancy.

Many EDCTP-funded researchers have been involved in efforts to communicate with the general public about COVID-19 and to tackle myths and misconceptions. **Dr Barbara Castelnuovo** (2019 Senior Fellow), for example, led a study exploring perceptions of COVID-19 among people living with HIV in Uganda. Dr Sekaggya participated in radio and TV talk shows on COVID-19-related issues, including a COVID-19 'myth-buster' TV show, Dr Masika has also appeared on national and international TV, radio and social media, and **Dr Michael Owusu** (2017 Career Development Fellow) contributed to public education in Ghana.



## Conclusions

*Since its launch in 2003, the EDCTP programme has funded 418 fellows and long-term training to over 1000 additional African researchers working on poverty-related infectious diseases in sub-Saharan Africa. Several fellows have in turn supervised and mentored hundreds more – creating a multiplier effect that has provided a significant boost to health research capacity in the region.*

Initially focusing on support for established researchers through a Senior Fellowship scheme, it has expanded to cover other critical stages of the research career, including the transition to scientific independence (Career Development Fellowships) and preparation for a career in research (Preparatory Fellowships and Clinical Research & Development Fellowships). These new awards are helping to ensure that a ‘pipeline’ exists to strengthen the regional science base and scientific leadership in sub-Saharan Africa.

EDCTP fellowship schemes provide a source of funding for African-based researchers, meaning that they do not have to leave the region to advance their careers (although many choose to spend some time outside Africa to develop new skills and enhance their international networks, just as researchers in high-income countries undertake periods of research outside their native countries). For EDCTP1, encouraging researchers to return to Africa was an important goal, with around 10% of fellowships being used to reintegrate researchers who had been working abroad.

EDCTP fellows have made many important contributions to EDCTP’s scientific research agenda. Their projects map to critical priority areas identified through consultation with stakeholders in sub-Saharan Africa and their findings are filling important gaps in knowledge.

These contributions are reflected in the extensive **scientific outputs** being generated by current and former EDCTP fellows. Although the contribution of Africa to global scientific publications remains low, it is rising. During 2003–2012, sub-Saharan Africa doubled its contribution to world scientific research, from 0.44% to 0.72%. In some fields, such as tropical medicine, Africa performs relatively strongly, accounting for one-third of all international publications. However, performance still varies markedly across the continent, with countries such as South Africa accounting for a significant proportion of outputs.

Strengthening of human capacity in science is essential for the future of sub-Saharan Africa. It will provide the **leadership** that enables African countries to define their own local research agendas and identify priority research questions that reflect their own needs. **Senior researchers** have a critical role to play in attracting funding, establishing international collaborations to access new knowledge and emerging technologies, and nurturing future generations of researchers.

It takes time for leadership potential to be realised. However, several Senior Fellows from EDCTP1 now hold senior academic positions – including Abdoulaye Djimdé in Mali, Pauline Mwinzi (Chief Research Officer at the Kenya Medical Research Institute (KEMRI) Center for Global Health Research), Christian Happi (Director of the Africa Centre of Excellence for Genomics of Infectious Disease in Nigeria), Professor Cissy Kityo Mutuluza (Executive Director of the Joint Clinical Research Centre in Uganda), Adetifa Ifedayo (appointed Director-General of the Nigerian CDC in 2021) and Willem Hanekom (Executive Director of the Africa Health Research Institute in South Africa). Over time, the researchers supervised and mentored by these leaders are themselves overseeing ‘third-generation’ master’s and PhD students and early-career fellows, catalysing further development of research capacity.

Across sub-Saharan Africa, EDCTP researchers are already playing critical roles advising disease control programmes, helping to address key gaps in knowledge, and evaluating interventions that have the potential to enhance the care provided by national health systems. As illustrated by COVID-19, they provide a national resource that can be an invaluable source of expertise during health emergencies.

Fellowship schemes are likely to remain core to the third EDCTP programme, **Global Health EDCTP3, launched in 2022**. The Global Health EDCTP3 programme budget will include up to €800 million from the EU, conditional on



contributions of at least €439 million from the EDCTP Association and €400 million from contributing partners, such as philanthropic organisations and industry.

Conceptually, the EDCTP3 programme aims for continuity with past EDCTP programmes, for example by maintaining its focus on poverty-related diseases affecting sub-Saharan Africa, advancing medical interventions through high-quality clinical research carried out by international consortia, and capacity building for clinical research in sub-Saharan Africa. As well as increased funding compared to EDCTP2,

the scope of the EDCTP3 programme has been widened to include antimicrobial resistance and the impact of the climate crisis on infectious disease.

Discussions are underway with other organisations that support fellowships in sub-Saharan Africa to identify how fellowship support can best be delivered through EDCTP3. In the meantime, current and former EDCTP fellows are conducting the research that will make a real difference to the populations in sub-Saharan Africa most affected by poverty-related infectious diseases.





# Colophon

---

## European & Developing Countries Clinical Trials Partnership

The Hague, the Netherlands, December 2022

The EDCTP2 programme is supported under Horizon 2020, the European Union's Framework Programme for Research and Innovation

---

### Europe Office

Anna van Saksenlaan 51  
2593 HW The Hague  
The Netherlands

**Phone:** +31 70 344 0880/0897

### Africa Office

Postal address  
P.O. Box 19070  
Tygerberg 7505, Cape Town  
South Africa

### Visiting address

Francie van Zijl Drive,  
Parowvallei 7505, Cape Town  
South Africa

**Phone:** +27 21 938 0690

**Fax:** +27 21 938 0569

---

**Email:** [info@edctp.org](mailto:info@edctp.org)

**Web:** [www.edctp.org](http://www.edctp.org)

**Twitter:** @EDCTP

**YouTube:** edctpmedia

### Writer:

Ian Jones

### Review and editing:

EDCTP Secretariat

### Concept and design:

Pitch Black Graphic Design, The Hague / Berlin

### Photography:

Makhulu Media, Panos Pictures

### Cover picture:

Panos Pictures (priMe project)

*The power of sharing science*