Our Vision
The health and well-being of people burdened by infectious diseases of poverty is improved through research and innovation.

Our Mission
To support effective and innovative global health research, through strengthening the research capacity of disease-affected countries, and promoting the translation of evidence into interventions that reduce the burden of infectious diseases and build resilience in the most vulnerable populations.

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The highlights on the following page demonstrate the impact of research supported by TDR to improve the health and well-being of people burdened by infectious diseases of poverty. This body of research is leading to new solutions for implementation and improved access to existing health solutions. This is the result of TDR’s strategic priority areas of research for implementation, strengthening research capacity and global engagement acting in an integrated manner.

The TDR Impact Pathway

What is implementation research?

The systematic approach to understanding and addressing barriers to effective implementation of health interventions, strategies and policies.

- Conducted within real-life health systems and community settings, removed from controlled settings associated with other types of scientific research
- Provides evidence to support scale-up of interventions and policy changes
## 2021 Highlights

**Research for implementation**

- A virtual training course has been developed with the WHO Collaborating Centre for Strengthening Pharmacovigilance Practices to develop COVID-19 vaccine safety monitoring systems in African countries.
- 11 studies have been completed on strategies to mitigate the impact of COVID-19 on tuberculosis (TB) care and control in West and Central Africa.
- A research package has been developed to facilitate the implementation of computer-assisted detection (CAD) software for TB screening.
- Operationalizing One Health as a transdisciplinary ecosystem approach for tackling vector-borne diseases is being piloted by research teams in four African countries.
- Four multi-country research consortia have been selected to conduct field trials of the Sterile Insect Technique to control dengue, Zika and chikungunya.
- Four case study projects have been selected to test TDR’s framework on a multisectoral approach (MSA) to vector-borne diseases.
- 35 operational research studies from five countries in Asia and Africa on antimicrobial resistance were completed and published in special issues of two journals.
- A new SORT IT training module has been developed and piloted to strengthen researchers’ communication skills and enhance uptake of their research findings.

**Strengthening research capacity**

- 46 students from French-speaking countries in West Africa have been selected for the Postgraduate Training Scheme programme at Cheikh Anta Diop University in Dakar, Senegal.
- Seven universities in low- and middle-income countries have been selected to participate in the second phase of the Postgraduate Training Scheme (2022–2026).
- Academic institutions in LMICs piloted a new implementation research (IR) core competencies framework to identity and address IR training gaps.
- The Massive Open Online Course (MOOC) on IR is now available in each of the six official languages of the United Nations (Arabic, Chinese, English, French, Russian and Spanish).
- A new module on gender and intersectionality has been developed for the IR toolkit.
- An interactive digital version of the Ethics in IR course has been developed.

**Global engagement**

- As a member of the COVID-19 Clinical Research Coalition, TDR is contributing to the Data Sharing Working Group, which has published a review of COVID-19 data sharing platforms.
- Two new research tools for social innovators have been published: the Social Innovation Monitoring & Evaluation (M&E) Framework and the research checklist for social innovation to guide innovators, researchers and other stakeholders.
- The Small Grants Scheme with WHO regional offices focused on new topics such as health and migration and implementation of the International Health Regulations (2015).
- A “Women in Science” compendium, which profiles 15 inspirational women leaders from the TDR Global community, shares their fascinating journeys and words of wisdom on how to navigate a career in science.
- A practical guide on public engagement and crowdfunding has been published to provide tools, open access resources and advice for researchers, especially those in LMICs.
TDR is able to conduct its work thanks to the commitment and support from a variety of funders. These include our long-term core contributors from national governments and international institutions, as well as designated funding for specific projects within our current priorities.

Core contributors providing overall Programme support in 2021*

*B listed in order of level of contribution.

Contributors who provided support to specific projects in 2021
Introduction

TDR is committed to improving the health and well-being of vulnerable populations disproportionately burdened by infectious diseases, through research and innovation. Our aim is to leave no one behind in benefitting from new medicines, vaccines and diagnostics for improving health.

Over the past few years, the COVID-19 pandemic has of course had a significant impact on our activities. For example, the seven universities in low- and middle-income countries we partner with on the Postgraduate Training Scheme have all shifted to virtual or hybrid learning formats, and many of the implementation research projects we are supporting have faced disruptions.

In spite of such challenges, many research activities have been able to move forward thanks to creative solutions and flexibility to overcome those challenges. Such persistence has helped mitigate the impact of the pandemic on efforts to tackle tuberculosis, malaria and neglected tropical diseases.

Given the inability to organize in-person workshops featuring our flagship implementation research (IR) training tools, online and interactive versions of the IR toolkit, the Good Health Research Practice training course and the Effective Project Planning and Evaluation course have been developed. The Massive Open Online Course on IR is now available in each of the official languages of the United Nations, allowing even more scientists to benefit from this popular course.

We continue to support research for implementation of strategies to reduce the burden of infectious diseases. Notably, in 2021, we supported 11 completed studies in West and Central Africa that evaluated new and adapted strategies to ensure the continuity of TB care amid the COVID-19 pandemic. We are working with scientists who are conducting four case studies in Latin America, Asia and Africa that are testing TDR’s framework on a multisectoral approach to vector-borne diseases. And 35 operational research studies conducted in Asia and Africa on antimicrobial resistance were completed and published.

Perhaps most importantly, we have found that long-term investments in strengthening research capacity in low- and middle-income countries have helped build resilience to respond to crises such as the current pandemic.

We thank all of our donors for their continued confidence and support for research to combat infectious diseases of poverty and to ensure that they are not overlooked during this critical time. We would also like to express our deep appreciation to all of our partners in the field continuing to put their science into action to solve the pressing health problems in their countries.

Our aim is to leave no one behind in benefitting from new medicines, vaccines and diagnostics for improving health.

Dr John Reeder, Director, TDR
The COVID-19 pandemic has shown the critical importance of research to the lives and livelihoods of people across the world. While the pandemic response has undoubtedly demonstrated what many call a miracle of science, it has failed to ensure equitable access to the benefits of that science. The distribution of life-saving products to the world’s highest-risk and most vulnerable populations thus remains a major challenge.

TDR has been placing equitable access at the centre of its approach to implementation research, with a focus on tackling neglected tropical diseases, tuberculosis, malaria and other vector-borne diseases. Given the negative impact of the pandemic on such devastating diseases, TDR’s wide range of research activities has been critical in sustaining these various disease control programmes.

As an example, the pandemic has created many barriers to TB treatment and care, something I have been following closely, given my experience in this area. This prompted TDR and several partners to launch an implementation research initiative to help countries in West and Central Africa evaluate new and adapted strategies to ensure the continuity of TB care. This demonstrates the power of implementation research as an essential tool to mitigate the impact of COVID-19 on other disease-control efforts.

Strengthening capacity to conduct such research remains more important than ever, and TDR’s training programmes have been innovative in their partnerships with institutions in low- and middle-income countries. In particular, the Clinical Research and Development Fellowship programme has built an impressive cadre of scientists who are now making a real difference as research leaders in their countries.

I congratulate TDR on the many achievements highlighted in this report and look forward to seeing continued progress across the Programme.

“While the pandemic response has undoubtedly demonstrated what many call a miracle of science, it has failed to ensure equitable access to the benefits of that science.”

Dr Soumya Swaminathan
Dr Vic Arendt  
TDR Joint Coordinating Board Chair

While 2021 was another challenging year, I have been impressed by the body of work TDR managed to accomplish in spite of the COVID-19 pandemic. TDR has continued to address the global health threats – neglected tropical diseases, tuberculosis, malaria, climate change and antimicrobial resistance – that have risked being overshadowed by the pandemic.

In the Sahel region of Africa, TDR has been supporting efforts to address the very high burden of malaria through proven interventions such as seasonal malaria chemoprevention (SMC). In collaboration with several partners, TDR has led the development and implementation of tools to assess the impact of COVID-19 on SMC delivery and coverage. This has allowed several countries to develop and conduct operational research projects for optimizing their SMC strategies in the context of the pandemic.

As I am often working in West Africa, I have also seen first-hand the need for strengthening research capacity in French-speaking countries in this region, and I have been particularly delighted by the progress TDR has made in this area. The expansion of TDR’s flagship Postgraduate Training Scheme to include Cheikh Anta Diop University in Dakar, Senegal, is a welcome development as the scheme enters an exciting second phase to continue promoting and building implementation research capacity in low- and middle-income countries.

Research initiatives such as these show TDR’s continued commitment to supporting research on infectious diseases that kill millions of people each year, disproportionately affecting vulnerable populations. I am confident of the impact these research activities are having and strongly believe they should continue to be supported and expanded. Now more than ever, we must ensure that no one is left behind.

As Chair of the Joint Coordinating Board, I congratulate TDR on its many achievements in 2021 and thank all Board members and observers for their continued support to TDR and its far-reaching programme of work.

“TDR has continued to address the global health threats – neglected tropical diseases, tuberculosis, malaria, climate change and antimicrobial resistance – that have risked being overshadowed by the pandemic.

Dr Vic Arendt
Research capacity strengthening activities are at the heart of the TDR Strategy 2018–2023, which aims to contribute to the achievement of the Sustainable Development Goals and universal health coverage. Within the context of the TDR vision, the overall goal is to strengthen the capacity of individuals, institutions and societies to produce research evidence useful for reducing the burden of infectious diseases of poverty in low- and middle-income countries. Collaborations with partner universities and training institutions in these countries are critical to jointly achieving this goal.

TDR’s long-term investments in research capacity have contributed to building health system resilience and capacity to respond to the COVID-19 pandemic. A recent survey has shown that substantial numbers of scientists who have been trained through TDR programmes have been able to pivot their skills to respond effectively to COVID-19.

The COVID-19 pandemic has also provided an opportunity for partner training institutions to switch to online or hybrid training methods. For example, all postgraduate training programmes adopted a hybrid format, offering both virtual and in-person courses. And online versions of the TDR Implementation Research toolkit, Good Health Research Practice training course and Effective Project Planning and Evaluation course were developed or piloted in 2021.

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4. Strengthening capacity to conduct clinical trials in low- and middle-income countries

5. The Access and Delivery Partnership
46 students from French-speaking countries in West Africa have been selected for the Postgraduate Training Scheme programme at Cheikh Anta Diop University in Dakar, Senegal.

Seven universities in low- and middle-income countries have been selected to participate in the second phase of the Postgraduate Training Scheme (2022–2026).

Academic institutions in LMICs piloted a new implementation research (IR) core competencies framework to identity and address IR training gaps.

The Massive Open Online Course (MOOC) on IR is now available in each of the six official languages of the United Nations (Arabic, Chinese, English, French, Russian and Spanish).

A new module on gender and intersectionality has been developed for the IR toolkit.

An interactive digital version of the Ethics in IR course has been developed.

2021 Highlights
1. Building the capacity of the next generation of researchers and global health leaders

TDR’s Postgraduate Training Scheme provides a full academic scholarship through eight participating universities located in low- and middle-income countries. Students obtain master’s degrees focused on implementation research on malaria, TB and neglected tropical diseases. Fellows typically go on to establish careers in research or public health in LMICs.

Support for postgraduate research training in low- and middle-income countries has built cadres of skilled professionals in infectious diseases of poverty across Africa, Asia and Latin America, who have become influential in research, public health and policy positions.

International reach of the Postgraduate Training Scheme

NUMBERS OF MASTER’S STUDENTS TRAINED AT PARTNER UNIVERSITIES IN THE POSTGRADUATE TRAINING SCHEME

<table>
<thead>
<tr>
<th>Country</th>
<th>Partner University</th>
<th>Students from Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>The National School of Public Health, University of Antioquia, Medellin</td>
<td>45 students from Latin America</td>
</tr>
<tr>
<td>B</td>
<td>Cheikh Anta Diop University Dakar</td>
<td>46 students from West Africa</td>
</tr>
<tr>
<td>C</td>
<td>School of Public Health, University of Ghana, Accra</td>
<td>49 students from Africa</td>
</tr>
<tr>
<td>D</td>
<td>Department of Public Health, University of Zambia, Lusaka</td>
<td>33 students from Africa</td>
</tr>
<tr>
<td>E</td>
<td>University of the Witwatersrand, Johannesburg</td>
<td>50 students from Africa</td>
</tr>
<tr>
<td>F</td>
<td>Faculty of Health Sciences, American University of Beirut</td>
<td>33 students from Eastern Mediterranean</td>
</tr>
<tr>
<td>G</td>
<td>James P Grant School of Public Health, BRAC University, Dhaka</td>
<td>75 students from Asia-Pacific</td>
</tr>
<tr>
<td>H</td>
<td>Faculty of Medicine, Universitas Gadjah Mada, Yogyakarta</td>
<td>71 students from Asia-Pacific</td>
</tr>
</tbody>
</table>
Since the inception of the scheme in 2015, the universities have awarded a cumulative total of 402 master’s scholarships and eight PhD fellowships. Among the 402 master’s students, 200 are men, 201 are women and 1 is transgender. Of the eight PhD students, one is a woman.

In 2021, Institute of Health and Development at Cheikh Anta Diop University in Dakar, Senegal, joined the programme to serve students from French-speaking countries in West Africa. The university received more than 1500 applications and selected 46 students.

“The call for applications revealed significant demand for research training in French,” said Professor Adama Faye, Director of the Institute of Health and Development. “We are excited to offer this new opportunity to strengthen capacity in the West African region.”

The extension of the scholarship scheme to French-speaking West Africa is supported by Luxembourg’s Ministry of Foreign Affairs and the German Federal Ministry of Education and Research (BMBF).
In a village in eastern Ghana where Comfort Tetteh grew up, many people thought it was normal for a child to urinate blood. But after studying public health, Tetteh recognized this as a sign of schistosomiasis, one of the many neglected tropical diseases that affect her community.

“In the districts that I’ve worked in, everything is about tropical diseases,” said Tetteh, who became a disease control officer after graduating with a Bachelor of Science degree. “I saw Buruli ulcers, I saw leprosy, I saw schistosomiasis, I saw yaws and many other diseases. My job was to implement disease control measures, and my interest grew to go beyond treatment and help people to apply community-level measures to prevent the appearance of these diseases,” Tetteh said.

Tetteh, now a senior public health officer in Greater Accra, recently had the opportunity to learn how to do exactly that through postgraduate training in implementation research at the University of Witwatersrand in South Africa, with a scholarship from TDR. The University of Witwatersrand is one of seven universities in low- and middle-income countries partnering with TDR on the Postgraduate Training Scheme.

Originally, TDR offered individual scholarships for students to study NTDs – usually in wealthy developed countries. This was expensive and time-consuming – and it also had some unintended consequences.

“The one big lesson we learned is that we weren’t strengthening the capacity of the institutions in the South,” said Dr Pascal Launois, head of TDR’s Research Capacity Strengthening unit.

Repositioning to strengthen institutional capacity in the Global South

To correct this, in 2015, TDR issued a call inviting institutions in the Global South to host students for PhD and Masters programmes in implementation research, with TDR providing the course material and full scholarships for the students.

A flood of institutions applied, and after a careful vetting process, including site visits with independent experts, seven universities were selected: BRAC University (Bangladesh), Universidad de Antioquia (Colombia), the University of Ghana, Universitas Gadjah Mada (Indonesia), American University of Beirut (Lebanon), the University of the Witwatersrand (South Africa) and the University of Zambia. In 2020, Cheikh Anta Diop University in Senegal was added to cater to French-speaking students in Africa.

The aim is to ensure that the research is done by the researchers based in the disease-endemic countries.

“The institutions like it a lot because they get visibility, they are able to host international students and it provides the opportunity for South-South networking, which means we are strengthening the capacity of institutions in the South,” said Dr Mahnaz Vahedi, who has been managing TDR’s flagship postgraduate training programme since 2017.
Professor Tobias Chirwa, Dean of the School of Public Health at the University of Witwatersrand, South Africa

"The Wits School of Public Health has benefited from the long-term investments from TDR in building implementation research capacity to support sub-Saharan African postgraduate students."

Close-up on Wits School of Public Health

Professor Tobias Chirwa, Dean of the School of Public Health at the University of Witwatersrand (Wits) in South Africa, said that hosting the postgraduate training programme has been a boost for both his institution and sub-Saharan Africa.

"Through its extensive network and rich postgraduate programmes, the School will continue to provide regional training on implementation research and collaborate with research and academic institutions in Africa and beyond to develop and implement interventions that are relevant and contextual," Chirwa said.

Professor Latifat Ibisomi, the academic coordinator of the training programme at Wits University, said that TDR has enabled the school to "host outstanding students from multi-disciplinary backgrounds across 12 sub-Saharan Africa countries. These students have conducted country-specific implementation research and transferred their skills to several countries across the continent."


"We are contributing to the building of a critical mass of implementation researchers who are working to unblock implementation barriers that abound in the region."

Professor Latifat Ibisomi, academic coordinator of the postgraduate training programme at the University of Witwatersrand
Selection of universities for the second phase of the Postgraduate Training Scheme

As the first phase (2015-2021) of the scheme comes to an end, the process of selecting universities to participate in the second phase (2022-2026) started with a call for applications in March 2021. A total of 20 applications were submitted, among which 19 were eligible. Each application was reviewed by one member of the Scientific Working Group (SWG) and one external reviewer. Each application was evaluated according to the following criteria: university’s profile; implementation research expertise; staff experience in teaching IR; sustainability and proposal relevance and feasibility.

Based on this evaluation, the following universities have been selected for the second phase of the scheme:

• Universidad de Antioquia, Colombia
• University of Ghana, Ghana
• Indian Institute of Health Management Research, India
• Cheikh Anta Diop University, Senegal
• University of the Witwatersrand, South Africa
• BRAC University, Bangladesh
• University of Gadjah Mada, Indonesia

Additionally, University of Sciences, Techniques and Technologies of Bamako in Mali has been recommended by the reviewers for consideration as an additional French-language university if further funding becomes available.

Implementation research themes for students’ projects at the universities participating in the Postgraduate Training Scheme (as of September 2020).
A framework of core competencies in implementation research has been developed to address the lack of a standardized curriculum for IR training programmes globally, especially one that is responsive to IR training needs in low- and middle-income countries. The framework was developed as a collaboration between Johns Hopkins University, the UNDP/UNFPA/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP) and the seven universities participating in TDR’s Postgraduate Training Scheme.

The framework identified 59 competencies and 52 sub-competencies relevant for teams addressing implementation challenges surrounding effective delivery of life-saving programmes and health services in real time and under real-life conditions, through research embedded in their local contexts. More details were published in BMJ Global Health.

Academic institutions in LMICs involved in TDR’s Postgraduate Training Scheme were recruited to participate in a pilot assessment to further establish the validity and utility of the framework for guiding IR training programmes in LMICs and examining the performance of students. These institutions and training programmes include: Universidad de Antioquia in Colombia; University of Ghana; University of Witwatersrand in South Africa; University of Zambia; and Universitas Gadjah Mada in Indonesia.

A preliminary assessment of IR training programmes using the core competency framework and assessment tools revealed that the different programmes are in various stages of development. The framework will be used to address the IR training gaps at these universities.

**Circles of knowledge and skills relevant for implementation research education and training programmes**

**Development of the IR core competencies framework**

![Spotlight]

- **Ethical Engagement**
  - Beneficiaries
  - Barriers
  - Facilitators
  - Integrated Solutions

- **Scientific Enquiry**
  - Question Development
  - Design
  - Methods
  - Rigorous Conduct

- **Communication and Advocacy**
  - Framing
  - Channels
  - Dahlia
  - Prioritization

- **Systems**
  - Working with Stakeholders
  - Identification
  - Engagement
  - Collaboration
  - Implementation

- **Resources**
  - Finances
  - Proposal Development
  - Human Resources

- **Context (Internal and External)**

- **Strategies**
  - Integrated Solutions
  - Barriers
  - Resources

- **Barriers**

- **Human Resources**

- **Finances**

- **Proposal Development**

- **Ethical Engagement**
2. Implementation Research Training Tools

Over the years, TDR, in collaboration with partners, has developed a suite of flagship training courses relevant to implementation research, aimed at improving access to, and delivery of, public health strategies and interventions. The main purpose and the target audience for each course are detailed below in the typical order they are taken by participants:

Highlights of progress on the tools are outlined opposite.

<table>
<thead>
<tr>
<th>IMPLEMENTATION RESEARCH (IR) TRAINING TOOLS</th>
</tr>
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<tbody>
<tr>
<td>TOOL</td>
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<tr>
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</tr>
<tr>
<td>MAIN PURPOSE</td>
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<tr>
<td>TARGET AUDIENCE</td>
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</table>
Massive Open Online Courses (MOOC) on Implementation Research

This course is a step-by-step online training for public health researchers and decision-makers, disease control programme managers, academics and others that focuses on how to design and demonstrate robust IR projects to improve control of infectious diseases of poverty and generate better health outcomes.

2021 updates:

- 14 sessions of the MOOC were organized: seven sessions in English, three in French, two in Spanish and two in Russian. A Chinese translation of the MOOC has been established on a platform developed by the National Institute for Parasitic Diseases in Shanghai, and the first session in Chinese took place on 22 November 2021.
- Three additional modules are currently being developed on: 1) the use of qualitative, quantitative and mixed methods in IR; 2) community engagement; and 3) illustrative examples of successful IR projects for the control of neglected tropical diseases in Ecuador, Ethiopia, Indonesia and Nepal.

Evaluation of the MOOC

The IR MOOC was evaluated using the Kirkpatrick Model, a model which has been widely used to evaluate courses for learners in high-income countries. The Kirkpatrick Model includes four levels of evaluation: reaction, learning, behaviour and results. Below are key findings of the evaluation, which have been published in several scientific journals.

REACTION: How favourably do the learners react to the training?
MOOC meets the expectations of 72.3% of participants. (Launois P et al., 2019)

LEARNING: How do the learners acquire knowledge, skills and attitudes as a result of training?
80.9% of participants indicated significant improvement in knowledge. (Nwameme A et al., 2021, EURODL, in press)

BEHAVIOUR: To what degree do the learners apply what they have learned?
30% modified or implemented changes in professional practice, particularly on how they approach stakeholders and community. (Launois P, 2021)

RESULTS: What are the benefits of the training?
25% initiate and develop research collaborations. (Allotey P et al., Open Praxis, 2021)
### 2021 Participation in Massive Open Online Course (MOOC) on IR by country

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Countries/Areas</th>
<th>Number of participants</th>
<th>Countries/Areas</th>
<th>Number of participants</th>
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*oPt refers to occupied Palestinian territory, including east Jerusalem*
Impact of the MOOC on Gambia Ministry of Health’s efforts to control schistosomiasis

As TDR prepares its next generation of IR training programmes and curricula, it is important to understand the range of IR courses that have been developed and implemented by others. A mapping has been conducted of recent and ongoing IR training efforts globally, as presented in grey and peer-reviewed literature, followed by interviews with key stakeholders engaged in the development and conduct of IR training programmes, particularly in LMICs.

The results obtained from the literature search and interviews with key stakeholders indicate that future programmes should focus more on strengthening institutional rather than individual capacity, place greater emphasis on team building and management, provide additional information on community engagement and outline training trajectories for prospective IR practitioners. Additional content needs were also identified, particularly on gender in IR, how to address health inequities and the application of IR findings. The stakeholders also identified that IR training courses were typically designed with researchers rather than implementers in mind.

The following recommendations have been proposed for developing future IR training programmes:

• Prioritize team-based approaches to training and increase the focus on conducting collaborative research.
• Revise trainings to enable programme implementors to become informed IR consumers and active collaborators, instead of teaching them how to conduct research themselves.
• Combine ‘training by doing’ programmes and twinning experiences with established online IR trainings.
• Build institutional capacity and demand through integrating IR with established monitoring, evaluation and learning systems.
• Create specialized training modules to fill gaps in content and supplement ongoing trainings.

Based on this result, a framework for future IR trainings has been developed.

We thank TDR for offering the free implementation research training, which has been instrumental in guiding our research.

Bakary Sanneh, Principal Laboratory Scientist, Ministry of Health, the Gambia
Implementation Research Toolkit

This toolkit provides deeper learning on implementation research. It is designed to help researchers identify system bottlenecks and the stakeholders to be involved in the process, formulate appropriate research questions, conduct the research and develop a plan for implementing the study results.

2021 updates:
- A Chinese version of the facilitator guide and workbook have been published.
- A new module on gender and intersectionality is currently under external review and is being edited.
- New features and functionalities are being developed, including: individual user registration, support for establishing research teams among individual users, comprehensive self-assessment and module tracking tools.

Ethics in Implementation Research

TDR and WHO’s Global Health Ethics team have jointly developed a training course for researchers and research ethics committees on the important ethical consideration in implementation research. The course comprises six interactive modules interspersed with activities including case studies, role-playing and quizzes.

2021 updates:
- An interactive digital version of this course has been developed and will be translated into French.
Designing the next generation of IR training programmes

As TDR prepares its next generation of IR training programmes and curricula, it is important to understand the range of IR courses that have been developed and implemented by others. A mapping has been conducted of recent and ongoing IR training efforts globally, as presented in grey and peer-reviewed literature, followed by interviews with key stakeholders engaged in the development and conduct of IR training programmes, particularly in LMICs.

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3. Fostering learning and collaboration through Regional Training Centres

TDR supports a network of Regional Training Centres located in each WHO region, which have been selected on a competitive basis to conduct, disseminate and manage the portfolio of training courses on IR. Regionalization of these courses using train-the-trainer methodology and training workshops enables TDR to work more closely with the end users and become more relevant to regional needs, empower centres based in the regions to serve as training hubs and utilize existing expertise in disease-endemic countries.

The Regional Training Centres have played a critical role in the dissemination and management of several research training courses.

Regional Training Centres (RTCs) directly supported by TDR

- **EUROPE**
  - Astana Medical University, Astana, Kazakhstan (training expertise in bioethics)

- **EASTERN MEDITERRANEAN**
  - Institut Pasteur de Tunis, Tunisia (training expertise in implementation research and Good Clinical Practice)

- **AFRICA**
  - Université Cheikh Anta Diop de Dakar, Senegal* (training expertise in public health)
  - School of Public Health, University of Ghana, Accra, Ghana (training expertise in social science and implementation research)
  - Université Cheikh Anta Diop de Dakar, Senegal* (sub-regional RTC)

- **SOUTH-EAST ASIA**
  - Gadjah Mada University, Yogyakarta, Indonesia (training expertise in social science and implementation research)

- **NEW**
  - Malaysian Global Health Consortium, Kuala Lumpur, Malaysia (training expertise in implementation science)

*sub-regional RTC

> Watch the video on Building a community of practice in implementation research in the Latin American region at https://www.youtube.com/watch?v=TAubt4ijwrM
4. Strengthening capacity to conduct clinical trials in low- and middle-income countries

Complementing our training programmes on research for implementation, TDR also supports the Clinical Research and Development Fellowship (CRDF) scheme, which enables early- to mid-career researchers in low- and middle-income countries to learn how to conduct clinical trials. Selected fellows are placed for 12 months in training partner organizations (pharmaceutical companies, product development partnerships, or research organizations) and then receive a reintegration grant for 12 months at their home institution. The fellowship is supported through funding from the Bill & Melinda Gates Foundation.

Since 1999, a cumulative total of 129 fellows (39 women, 90 men) from 39 low- and middle-income countries have been selected to be placed with 34 partner organizations. All fellows have returned to work in their home institutions. Following efforts in 2019 to encourage applications from women, the percentage of women selected increased from 23% in the previous calls (2007 to 2019) to 50% in the latest call (2020–2021).

In 2021, 18 fellows, of whom half are women, were selected to be placed at nine training partner organizations.

Training partner organizations hosting CRDF fellows in 2021

- **INFECTIOUS DISEASES DATA OBSERVATORY, UK**
  - Hosting CRDF fellow from Sierra Leone.
- **EUROPEAN VACCINE INITIATIVE, GERMANY**
  - Hosting CRDF fellow from Cameroon.
- **GLAXOSMITHKLINE VACCINES, BELGIUM**
  - Hosting CRDF fellows from Kenya, Rwanda, Uganda and United Republic of Tanzania.
- **FOUNDATION FOR INNOVATIVE NEW DIAGNOSTICS, SWITZERLAND**
  - Hosting CRDF fellows from Colombia, Ethiopia and Nepal.
- **Takeda, Switzerland**
  - Hosting CRDF fellow from Colombia.
- **Swiss Tropical and Public Health Institute, Switzerland**
  - Hosting CRDF fellow from Democratic Republic of Congo.
- **Novartis Institutes for Biomedical Research, Switzerland**
  - Hosting CRDF fellow from Colombia.
- **INSTITUT PASTEUR DE MADAGASCAR, MADAGASCAR**
  - Hosting CRDF fellow from Mali.
"My career took a big jump following my Clinical Research and Development Fellowship," says Mohammad Sharif Hossain, currently a co-investigator on three ongoing COVID-19 studies at icddr,b in Dhaka, Bangladesh.

He has also recently published a paper as a co-author on research he conducted on the use of ivermectin as a treatment for COVID-19. The study results, published in the International Journal of Infectious Diseases, have been disseminated to policy-makers at the Bangladesh Ministry of Health and Family Welfare, and are currently being assessed for inclusion in national guidelines on treatment of COVID-19 patients.

But until taking up TDR’s fellowship, Sharif’s career progression had been steady but fairly unremarkable. He’d completed a masters in applied statistics from the University of Dhaka – a field, he says, that chose him rather than being chosen by him.

Having enjoyed practical work during his studies, Sharif decided on a research career path, joining icddr,b as a statistical officer. It was in 2018, after his promotion to Senior Statistical Officer, that he recalls an internal email about the Clinical Research and Development Fellowship (CRDF). His application was successful, and he joined WWARN, where he learned how to standardize and analyse data from different clinical trials and settings.

In fact, Sharif worked in three different locations during his fellowship: Oxford in the United Kingdom, and Melbourne and Darwin in Australia. His work there focused on updating the WWARN clinical trials database and identifying relevant trials already in the WWARN repository. His work also included developing a Statistical Analysis Plan (SAP), analysing data according to the SAP and, finally, preparing a manuscript using the data generated.

Returning to icddr,b on completion of his fellowship, Sharif was now skilled and confident in handling and analysing large volumes of data emerging from clinical trials. This expertise is demonstrated by his work on malaria published in PLOS Medicine (involving a meta-analysis of 42 studies covering 15,341 patients) and his most recent research work on COVID-19.

This includes a multi-centre phase II/III trial of the BDB-001 injection (a monoclonal antibody – C5a blocking agent) in the treatment of progressive severe COVID-19; a baseline survey for malaria and COVID-19 infection in the Chittagong Hill Tracts in southeastern Bangladesh; and a study of rapid antigen tests to diagnose COVID-19 in an urban community in Dhaka.
5. The Access and Delivery Partnership

The Access and Delivery Partnership (ADP) helps countries strengthen policies, human capacities, systems and regulations to ensure that effective medicines, vaccines and diagnostics reach the people who need them.

ADP is a collaboration between UNDP, the WHO Department of Regulatory Systems Strengthening, TDR and PATH, and is funded by the Government of Japan. (From TDR, ADP activities are jointly managed by the Research Capacity Strengthening Unit and the Research For Implementation Unit.) Within the partnership, TDR is working with ADP focus countries to strengthen institutional capacity in the areas of priority setting, implementation research and drug safety monitoring. The ADP focus countries are Bhutan, Burkina Faso, Ghana, India, Indonesia, Malawi, Senegal, Thailand and the United Republic of Tanzania.

TDR activities led by the Research Capacity Strengthening Unit undertaken as part of ADP include the following:

• Support for the launch of a virtual community platform, which aims to facilitate regular stakeholder engagement, South-South knowledge exchange, sharing of best practices, insights into emerging challenges and feedback on ADP interventions and strategic approach. The digitally enhanced TDR IR toolkit will be hosted on this platform and may later address non-communicable diseases in addition to infectious diseases.
• Development of a new module on gender and intersectionality
• to be added to the TDR online IR toolkit.

TDR has also provided technical support for various research projects in ADP focus countries, which are detailed in the Research for implementation section of this report.
Research for implementation

Strategies to reduce the burden of infectious diseases of poverty and accelerate progress towards universal health coverage

Building on more than 40 years of experience, TDR works with a vast network of researchers and public health practitioners in low- and middle-income countries (LMICs) to ensure that more scientific evidence is generated and translated into safe, effective, equitable and accessible health solutions for populations suffering from infectious diseases of poverty. This often means studying how interventions that work in clinical trials and pilot settings can be transferred to “real life” settings and scaled up at the national level.

We fund research that national and international programmes have identified as priorities for overcoming obstacles and bridging gaps on the path from innovation to implementation, access and health impact.

Contents

1. Research for implementation of strategies to tackle:
   1.1 Research for implementation of strategies to tackle COVID-19
   1.2 Research for implementation of strategies to tackle tuberculosis
   1.3 Research for implementation of strategies to tackle malaria and other vector-borne diseases
   1.4 Research for implementation of strategies to tackle neglected tropical diseases

2. Supporting researchers to incorporate intersectional gender analysis into infectious disease research

3. Maximizing data use for public health decision-making

4. Facilitating the access and delivery of new health technologies
2021 Highlights

A virtual training course has been developed with the WHO Collaborating Centre for Strengthening Pharmacovigilance Practices to develop COVID-19 vaccine safety monitoring systems in African countries.

11 studies have been completed on strategies to mitigate the impact of COVID-19 on tuberculosis (TB) care and control in West and Central Africa.

A research package has been developed to facilitate the implementation of computer-assisted detection (CAD) software for TB screening.

Operationalizing One Health as a transdisciplinary ecosystem approach for tackling vector-borne diseases is being piloted by research teams in four African countries.

Four multi-country research consortia have been selected to conduct field trials of the Sterile Insect Technique to control dengue, Zika and chikungunya.

Four case study projects have been selected to test TDR’s framework on a multisectoral approach (MSA) to vector-borne diseases.

35 operational research studies from five countries in Asia and Africa on antimicrobial resistance were completed and published in special issues of two journals.

A new SORT IT training module has been developed and piloted to strengthen researchers’ communication skills and enhance uptake of their research findings.
1.1. Research for implementation of strategies to tackle COVID-19

Strengthening COVID-19 vaccine safety monitoring in African countries

As part of the Access and Delivery Partnership (ADP), TDR and the WHO Collaborating Centre for Strengthening Pharmacovigilance Practices in Morocco have developed an e-learning initiative to strengthen COVID-19 vaccine safety monitoring systems in African countries.

Countries need to ensure that unexpected or severe reactions after COVID-19 vaccination are reported and investigated so that the vaccines continue to meet high safety standards. A training project based on South-South collaboration was developed to address this issue in order to contribute to strengthening COVID-19 vaccine safety monitoring systems in low- and middle-income countries. This will ultimately be beneficial for the delivery of all vaccines.

The project kicked off with the development of a train-the-trainer programme targeting national health staff with minimal knowledge and experience with pharmacovigilance practices, who are expected to be delivering in-country trainings. The WHO Collaborating Centre in Morocco led the development of the training module based on WHO recommendations, building on its extensive experience with COVID-19 vaccinations from earlier this year.

As travel and meeting restrictions continue to impact many countries, it was necessary to rely on an online format for the trainings. French-language training was held in May with registered participants from six African countries: Benin, Burkina Faso, Djibouti, Niger, Senegal and Togo. A total of 36 participants successfully passed the course and were certified.

Twelve participants from Senegal and 10 from Burkina Faso (70% were pharmacists and 30% medical doctors) participated in the second phase of the training programme, which resulted in country-specific training plans on COVID-19 vaccine safety monitoring and a training kit with ready-to-use tools adapted to the local context.

Senegal’s Directorate of Pharmacy and Medicine has started immediate implementation of the training kit for its national training programme. Two training sessions for 60 pharmacovigilance focal points at district and regional level from 14 regions took place from 21–26 June 2021.

English-language virtual training took place from 12–16 July 2021 with 22 participants, all national pharmacists or medical officers, from three countries: Malawi, Pakistan and Syria.

“The training materials were invaluable for strengthening our vaccine safety monitoring efforts during our preparations to roll out COVID-19 vaccines nationally.”

Dr Aminata Diarra Lô, Head of the Pharmacovigilance Division of Senegal’s Directorate of Pharmacy and Medicine
1.2. Research for implementation of strategies to tackle tuberculosis

Ensuring continuity of TB care amid COVID-19

The COVID-19 pandemic has created many barriers to tuberculosis (TB) treatment and care. In Burkina Faso, a study supported by TDR and partners found that the average length of time between the onset of TB symptoms and the first consultation with a health service had increased by 73%, compared with data from 2017/2018.

These findings highlight just one of the ways in which the COVID-19 pandemic is threatening progress on reducing the global burden of TB. Ensuring continuity of TB services, as well as developing or adapting existing strategies, is critical to protect the lives of people with TB during this pandemic.

TDR, in partnership with the Access and Delivery Partnership Project (ADP), Damien Foundation and The Union, is leading an initiative to help countries in West and Central Africa evaluate new and adapted strategies to mitigate the impact of COVID-19 on TB care and control through implementation research. Leveraging the research expertise in the West and Central African Research Networks for TB control (WARN/CARN-TB), 11 projects were competitively selected and the studies implemented.

Publications of the results are currently being prepared, including the following:

<table>
<thead>
<tr>
<th>Country</th>
<th>Publication title</th>
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<tr>
<td>Benin and Niger (joint publication)</td>
<td>Feasibility, acceptability and effectiveness of e-supervision and e-formation during the COVID-19 pandemic in Benin and Niger</td>
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<tr>
<td>Burkina Faso</td>
<td>Delays in tuberculosis diagnosis and treatment initiation in Burkina Faso during the COVID-19 pandemic (a second, qualitative paper on quality of life and perceptions of COVID-19 among TB patients is currently in preparation)</td>
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<tr>
<td>Guinea and Niger (joint publication)</td>
<td>Systematic screening for tuberculosis in suspected COVID-19 or recovered patients with persistent respiratory signs: Experiences from Niger and Guinea</td>
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<td>Guinea</td>
<td>Quality of life of TB patients in the context of the COVID-19 pandemic in Guinea</td>
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<td>Impact of COVID-19 on TB notification and treatment outcomes in Guinea</td>
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<tr>
<td>Senegal</td>
<td>Feasibility, acceptability and effectiveness of a virtual TB DOTS strategy to overcome COVID-19 barriers in Senegal</td>
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</table>
These studies demonstrate the variety of new strategies being tested to overcome challenges to TB control during the COVID-19 pandemic. The challenges are creating opportunities for innovation to ensure the continuity of TB services.

TDR and partners have also launched a new project to help mitigate the impact of COVID-19 and future public health emergencies on TB service provision in West and Central Africa. This project is a partnership between the Robert Koch Institute (RKI), WARN/CARN-TB, the Health Information Systems Programme (HISP) at the University of Oslo (UiO) and the WHO Global Tuberculosis Programme (WHO/GTB). Financial support for the project is provided by the German Federal Ministry of Health (BMG).

Evaluating digital technologies for TB care

TDR, in partnership with WHO/GTB, has developed an interactive web-based toolkit that supports national TB programmes (NTPs) and other partners to conduct implementation research designed to evaluate digital technologies for TB care. The Implementation Research for Digital Technologies and TB (IR4DTB) online toolkit was developed as an adaptation of the original IR toolkit, with support from the Access and Delivery Partnership.

The toolkit was launched during a five-day ‘hybrid’ workshop in November 2020. The workshop was organized in collaboration with the Chinese Centers for Disease Control and Prevention (China CDC) and the Chinese Anti-TB Association and brought together participants from China, Malaysia, Pakistan and Uzbekistan. More than 25 colleagues from China CDC and the Chinese Anti-TB Association joined in person from Beijing, while other colleagues joined remotely.

Throughout 2021, ongoing support has been provided to three research teams to support their ongoing work on the following research studies developed during the workshop:

• Using digital health tools to support TB medication adherence under programmatic conditions in China: current situation investigation and availability technology evaluation
• Exploring the acceptability of CAD software for tuberculosis detection by primary care providers in JiangXi Province
• Scaling up different types of electronic medication monitors to assist TB medication management in China

IR4DTB is currently being translated into French- and Russian-language versions to support its rollout into other regions in 2022.

Facilitating the implementation of a shorter all-oral treatment for drug-resistant TB

TDR, in collaboration with WHO/GTB and partners, has developed an operational research package (dubbed ShORRT for Short, all-Oral Regimens for Rifampicin-resistant Tuberculosis) to support the implementation of such drug regimens. Launched in November 2019, the ShORRT initiative currently involves 26 countries and about 1200 patients are already benefiting from the shorter all-oral treatment regimens through this initiative.
ShORRT: Generic operational research tool developed

Master Protocol (English, Spanish, Portuguese, French)

Electronic data capture (REDCap)

Generic paper-based data collection forms (English, Spanish, Portuguese, French)

Study procedures (English, Spanish, Portuguese, French)

Regional workshop

Protocol development

First in-country mission Cambodia

Launch of the CAM-ShORRT study

Workshop with LAC

Creation of the ShORRT initiative

First meeting of the protocol writing committee

Launch at the Union conference in Hyderabad

Mission to work with Benin, Democratic Republic of Congo & Nigeria Cotonou, Benin

Launch of the study in Nigeria & Vietnam

26 countries
Supporting the effective use of computer-assisted detection of TB

A toolkit to facilitate the implementation and use of computer-assisted detection (CAD) software for TB screening has been developed by TDR in collaboration with WHO/GTB and partners.

This toolkit was developed following the release of updated WHO guidelines for TB screening in 2021 which, for the first time, recommended the use of CAD for the interpretation of chest x-rays among individuals over the age of 15 in both TB screening and triage settings. This new recommendation is expected to increase both the interest and implementation of CAD by NTPs to improve TB detection.

The toolkit is a practical guide intended for use by national TB programmes and other implementers who have decided to use CAD and aims to:

- support new CAD users to understand threshold scores and their programmatic implications within the context of a TB screening or triage programme;
- describe a simplified operational research protocol that can be used to conduct CAD calibration studies by estimating the diagnostic accuracy of CAD against a bacteriological reference standard; and
- support users to analyse, interpret and apply the results of the CAD calibration study based on local context and use case.

The ShORRT operational research package ensures that research projects are quickly established and that data are collected in a standardized way from a variety of settings, thus facilitating cross-country analysis and results. Countries that started their research projects in Q1 2020, such as Cambodia, are already planning to share their data to inform upcoming reviews of drug-resistant TB treatment guidelines.
Mitigating the impact of COVID-19 on malaria control efforts

Because of slowing global progress against malaria, WHO has highlighted the urgency of strengthening the delivery of proven interventions such as seasonal malaria chemoprevention (SMC). This intervention targets the Sahel and sub-Sahel regions of Africa, and the very high burden of malaria in these regions of Africa means that optimizing the delivery of SMC could make a substantial contribution to reducing the global burden of malaria mortality.

In 2019, SMC programmes reached 22 million children. However, many of these children did not receive the full number of monthly treatments that are needed to protect them throughout the high-risk period, and there remain an estimated 13 million children who are eligible for SMC and could benefit but live in areas which do not have SMC programmes. The urgent need to close this gap and to optimize SMC delivery to protect all eligible children was stressed in a technical consultation organized by WHO’s Global Malaria Programme (WHO/GMP) and TDR.

With funding from the European and Developing Countries Clinical Trials Partnership (EDCTP), the OPT-SMC project is supporting 13 countries in West and Central Africa to conduct implementation research on SMC. This project is a partnership between the Université de Thiès in Senegal, TDR, Medicines for Malaria Venture, the London School of Hygiene & Tropical Medicine (LSHTM) and 13 countries implementing SMC.

As part of the project, TDR led the development of a tool to assess the impact of COVID-19 on SMC delivery and coverage. This was done in collaboration with OPT-SMC partners and WHO/GMP.

All partner countries were supported for using this assessment tool. In April 2021, the survey report was circulated and discussed with the national malaria programmes in a virtual OPT-SMC meeting in preparation for SMC campaigns beginning in August 2021.

Based on the suggestions of SMC countries and partners, and on the results of the evaluation, the following considerations have been identified as essential to mitigate the impact of health emergencies, such as the COVID-19 pandemic, on SMC delivery:

- good preparation/planning of SMC campaigns with enough anticipation between national malaria control programmes and partners, supported by the mobilization of funds
- prioritization of door-to-door-delivery
- increased sensitization before, during and after the campaign
- stronger implication of administrative authorities, leaders and influential groups
- improved access to and use of digital technologies for facilitating various SMC activities
- development of an emergency preparedness and contingency plan.

FOR MORE ON IR FOR MALARIA CONTROL. See episode 8 of the Global Health Matters podcast on “Discoveries from vaccine implementation” at https://tdr.who.int/global-health-matters-podcast/discoveries-from-vaccine-implementation
TDR is also leading the development of a package of research protocols for the conduct of SMC coverage surveys, impact assessments, safety monitoring and drug resistance surveys.

In 2021, four countries developed and conducted operational research projects for optimizing their SMC strategies in the context of the COVID-19 pandemic. Publications from this research are forthcoming.

Supporting countries to test the Sterile Insect Technique to control dengue, Zika and chikungunya

Four multi-country research consortiums have been selected to conduct field trials of the Sterile Insect Technique to target Aedes mosquitoes that transmit diseases such as dengue, Zika and chikungunya.

The Sterile Insect Technique (SIT) is a form of insect birth control by mass rearing in dedicated facilities of male mosquitoes, which are then sterilized and released to mate with females in the wild. As these do not produce any offspring, the insect population declines over time.

TDR, the International Atomic Energy Agency (IAEA) in partnership with the Food and Agriculture Organization of the United Nations (FAO), and WHO’s Department of Control of Neglected Tropical Diseases (WHO/NTD), developed and published a guidance document for countries interested in testing SIT for Aedes mosquitoes.

This was followed by an open call to select consortiums of institutions, vector control agencies and public health systems working on innovative vector control approaches, for proposals on testing SIT. Four multi-country proposals were selected, and discussions are ongoing with potential funders. A calibration study based on local context and use case.

### Research consortiums selected following the IAEA/TDR call for field testing of SIT

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<thead>
<tr>
<th>WHO Region(s)</th>
<th>Countries Included</th>
<th>Research Institutions</th>
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<tbody>
<tr>
<td>Europe, the Americas</td>
<td>Italy, Mexico, Switzerland</td>
<td>Centro Agricultura Ambiente, Centro Regional de Investigación en Salud Pública / Instituto Nacional de Salud Pública, University of Applied Sciences and Arts of Southern Switzerland</td>
</tr>
<tr>
<td>Western Pacific</td>
<td>French Polynesia, Cook Islands, Chile (Easter Island)</td>
<td>Institut Louis Malardé, Te Marae Ora – Cook Islands Ministry of Health, Secretariat of Public Health at Chile Ministry of Health</td>
</tr>
<tr>
<td>South-East Asia, Western Pacific</td>
<td>Thailand, Philippines, Indonesia</td>
<td>Centre of Excellence for Vectors and Vector-Borne Diseases at Mahidol University, Research Institute for Tropical Medicine, Centre for Isotopes and Radiation Application at National Nuclear Energy Agency</td>
</tr>
<tr>
<td>The Americas</td>
<td>Brazil, Cuba, Guadeloupe</td>
<td>Biofabrica Moscamed Brasil, Institute of Tropical Medicine Pedro Kourí, Institut Pasteur de Guadeloupe</td>
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A Special Project Team (SPT) will be established to manage the research proposals and organize independent and external follow-up. The SPT includes up to six external experts on epidemiology, entomology, social sciences, cost effectiveness and the SIT technology and four focal persons from the partnership (IAEA, CDC, WHO/NTD and TDR).

The first field trial is expected to start in the first half of 2022.

**Improving the impact of an innovative malaria control tool for remote Amazon populations**

In collaboration with TDR, the Global Fund to Fight AIDS, Tuberculosis and Malaria, and the Pan American Health Organization (PAHO), scientists are conducting research to support implementation of a promising malaria self-diagnosis and self-treatment kit for hard-to-reach populations in Suriname, Brazil and French Guiana.

While Suriname is now very close to achieving elimination of malaria, foci of transmission of the disease persist among illegal migrant workers crossing the borders with Brazil and French Guiana. These populations are often traveling to and from gold mines in the Amazon rainforest and have very little or no access to health services.

To address this challenge, an innovative self-diagnosis and self-treatment kit called Malakit was developed through a collaboration between three scientific centres: the Centre d’Investigation Clinique Antilles-Guyane (Cayenne Hospital in French Guiana), the Oswaldo Cruz Foundation in Brazil and the Foundation for the Advancement of Scientific Research in Suriname.

Published results of a tri-national pilot trial show that Malakit was used correctly by 72% of the 223 persons who reported using it. The intervention appears to have accelerated the decline in malaria incidence in the study sites by 43%.

This encouraging result has prompted the research team and Suriname’s Ministry of Health to include the kit in their routine tools against malaria and to evaluate the potential for further deployment. Following discussions between the Global Fund, TDR and the respective ministries of health and research teams, a research project has been developed to improve the impact of this Malakit intervention.
Piloting the multisectoral approach to prevent and control malaria and emerging arboviral diseases

Four case study projects have been selected to test TDR’s framework on a multisectoral approach (MSA) to vector-borne diseases, and a new collaboration on MSA has been established with WHO/GMP, with funding from the United Nations Peace and Development Trust Fund (UNPDTF).

It is increasingly recognized that the prevention and control of many diseases, including vector-borne diseases (VBDs), must be driven by more than just the health sector alone, and that a multisectoral approach is required. In the context of the inter-related Sustainable Development Goals, efforts to tackle vector-borne diseases require input from sectors such as water and sanitation, agriculture, housing and education.

Last year, TDR published a theoretical framework on multisectoral approaches to the prevention and control of VBDs. To test the framework, a collaboration has been established between TDR and WHO’s Water, Sanitation, Hygiene and Health team (WHO/WSH) to conduct case studies in disease-affected countries.

“We do feel that the multisectoral approach is how we should be conducting more of our work,” said Bruce Gordon, head of WHO’s WSH unit. “Given the health-related SDGs cut across several sectors, we’re increasingly finding the need to reach out to colleagues in agriculture, tourism and other relevant areas.”

Four case study projects have been selected to test the framework, two on malaria in West Africa and in the Greater Mekong Subregion and two on arboviral diseases in the Americas and Africa. A workshop in June 2021 convened experts and research teams to discuss the projects’ implementation progress, challenges and the way forward. Participants were also trained on implementing multisectoral approaches and effective engagement with the water, sanitation and hygiene (WASH) sector. The workshop was supported by the National Institute of Parasitic Diseases (NIPD) of China CDC, TDR and WHO/WSH.

The four case study projects are as follows:

**INFOGRAPHIC: Case Studies for MSA and Malaria**

**CASE STUDY 1:** Zika, Dengue and Chikungunya: Multisectoral approach for developing solutions applicable to public health for very poor people living in and around the biggest open dump in Latin America in Bruslavia, Brazil

**CASE STUDY 2:** Establishment of a multisectoral strategy in order to prevent transmission of Aedes-borne diseases in the city of Manta, a coastal region of Ecuador

**CASE STUDY 3:** Assessing public-private partnership opportunities to improve access to vector control products among communities at risk of malaria in Cambodia and Vietnam

**CASE STUDY 4:** A pilot multisectoral intervention for controlling malaria vectors and mitigating insecticide resistance in selected coastal and Sahelian west African countries
An additional research proposal is currently under development with Burkina Faso to better understand how the National Malaria Control Programme is working with other sectors and how this could be improved for a stronger involvement of relevant sectors in malaria control.

This project is supported by designated funding from Sida, the Swedish International Development Cooperation Agency.

A new collaboration has also been established with WHO/GMP to test the multisectoral approach for tackling malaria with funding from the UNPDTF. This activity will be conducted in four countries in Africa: Burkina Faso, Senegal, the United Republic of Tanzania and Zambia.

TDR has also launched a new research project that aims to tackle vector-borne diseases in the poorest populations of the world by exploring the complex interconnections between various social determinants of health.

**Operationalizing a One Health approach to vector-borne diseases in the context of climate change**

One Health is a multisectoral, transdisciplinary approach that recognizes the interconnection between the health of people, animals and plants and their shared environment. The approach ensures collaboration and coordination among all relevant sectors and stakeholders to achieve better health outcomes.

The implementation of this approach has become even more urgent and critical with the emergence of COVID-19 and the re-emergence of Ebola and other zoonotic and vector-borne disease threats. With this project, TDR is building on the outputs of an earlier research initiative (started in 2013) on vector-borne diseases and climate change as the basis for operationalizing One Health.

A framework for operationalizing One Health is currently being piloted by research teams in Côte d’Ivoire, Kenya, South Africa, the United Republic of Tanzania and Zimbabwe. Please visit the TDR website for details on each of the research projects below:

**Project 1.** From an Ecohealth research project to operationalizing the One Health approach in West Africa (Côte d’Ivoire and Mauritania)

**Principal Investigator:** Dr Brama Koné, Centre Suisse de Recherches Scientifiques en Côte d’Ivoire (CSRS)

**Project 2.** Operationalizing One Health Initiative for Malaria and Rift Valley Fever Project in Kenya

**Principal Investigator:** Professor Benson B.A. Estambale, Jaramogi Oginga Odinga University of Science and Technology

**Project 3.** One Health Operationalization in the United Republic of Tanzania

**Principal Investigator:** Professor Paul S. Gwakisa, Sokoine University of Agriculture

**Project 4.** Operationalizing One Health in Ingwavuma Community: Developing Transdisciplinary Methodology (South Africa)

**Principal Investigator:** Professor Moses J. Chimbari, University of Kwazulu-Natal

In 2021, a One Health Handbook was published and made available on a web-based platform, along with key supporting materials, providing the scholarly and evidence-based background on One Health. This document was subsequently published as a chapter in the Springer/WHO Handbook of Global Health, making it widely available
within WHO and other collaborating agencies and organizations (FAO, the World Organization for Animal Health, and the United Nations Environment Programme, among others) for their One Health programmes.

An interactive virtual curriculum on One Health is also being developed to build on and extend the fundamentals section of the web-based platform. Each of the country research teams is participating in the pilot course development. ‘Operationalizing One Health as a transdisciplinary ecosystem approach: Linking health, environment and communities’ is a coordinated effort by TDR in collaboration with the Global Health International Group (GHGI) and researchers from Côte d’Ivoire, Kenya, South Africa and the United Republic of Tanzania. This training course is also one of the proposed WHO technical products on norms and standards on data and research for 2022–2023 and is a collaboration between TDR and WHO/NTD.

1.4. Research for implementation of strategies to tackle neglected tropical diseases

WHO has launched a new road map for neglected tropical diseases 2021–2030, which sets out global targets for 2030 and milestones to prevent, control, eliminate and eradicate a diverse set of 20 diseases and disease groups. TDR is committed to supporting the implementation of this road map. Below we highlight research for strategies to achieve and sustain elimination of two neglected tropical diseases (NTDs): visceral leishmaniasis and onchocerciasis.

Ensuring sustained elimination of visceral leishmaniasis as a public health threat

Visceral leishmaniasis (VL), also known as kala-azar – Hindi for ‘black fever’ – is a tropical, parasitic disease transmitted through bites from certain types of sandfly. Kala-azar is characterized by fever, weight loss, swelling of the liver and spleen, anaemia and immune-system deficiencies. Left untreated, the fatality rate can be as high as 100% within two years.

Since 2005, TDR has been working with research institutions and control programmes on the Indian subcontinent to conduct research that informs policy and practice for the elimination target of less than one case of kala-azar per 10 000 inhabitants at district level in Nepal and at sub-district level in Bangladesh and India. TDR has supported research on improving disease surveillance through active case detection, new diagnostic tools, single-dose treatment and vector control tools such as indoor residual spraying. One of the longest and most successful implementation research programmes at TDR, these efforts have contributed to the success of the VL elimination work in the Indian subcontinent. However, further investment is required and new approaches need to be designed and tested to ensure elimination is sustained.
Trend in reported cases of VL in Bangladesh 1994–2020 (Source: Ministry of Health and Family Welfare, Bangladesh)

![Graph showing the trend in reported cases of VL in Bangladesh from 1994 to 2020]

- **2007**: Improved diagnosis and treatment at Upazila health complexes; Active Case Detection (Camp Incentive, Index Case)
- **2011**: IRS started
- **2014**: Single dose AmBisome introduced

> Watch the video on the VL research by Dr Dinesh Mondal, senior scientist at icddr,b in Bangladesh at [https://youtu.be/bBijrW6CIEK](https://youtu.be/bBijrW6CIEK).
Three new studies have been initiated in 2021. These are being conducted in both Bangladesh and Nepal:

1) **Determination of prevalence of post-kala-azar dermal leishmaniasis (PKDL) and assessment of treatment-seeking behaviour of PKDL patients in Bangladesh and Nepal**

   The true burden of PKDL in Bangladesh and Nepal is not known. There is no routine active case detection of post kala-azar dermal leishmaniasis by the national programmes. Since both nodular and macular PKDL patients are infectious to sandflies, PKDL could be a challenge for sustaining VL elimination on the Indian subcontinent. The study will determine the prevalence of PKDL and identify risk factors and the health care seeking behaviour of PKDL patients in these countries. The study findings will inform measures to reduce risk from PKDL as a potential source of infection. Strengthening the programme in PKDL case detection and management will contribute to validation and sustainability of VL elimination in both countries.

2) **Follow-up assessment of visceral leishmaniasis treated patients and assessment of the impact of COVID-19 on VL control services in Bangladesh and Nepal**

   The follow-up assessment of treated VL cases is important to monitor the effectiveness of treatment regimens. Although follow-up is integrated into the national strategy of VL elimination, compliance appears to be limited. In addition, the ongoing COVID-19 pandemic has negatively impacted provision of and access to health care services. This could have long-term effects on the VL elimination programmes in countries. TDR-supported studies are currently investigating the barriers to effective follow-up of treated VL cases. The studies will monitor treatment outcomes and assess the impact of COVID-19 on VL control services and activities. They will generate evidence relevant to certification of the elimination of VL in both countries and contribute to strategies for better management of VL in emergency situations so that the progress in VL elimination is sustained.

3) **Epidemiological, serological and entomological investigation of new visceral leishmaniasis foci in Bangladesh and Nepal**

   Emergence of new foci of transmission in previously non-endemic sites is a threat to the VL elimination effort. It is critical to verify cases, determine the magnitude, identify the main driving forces and suppress transmission as early as possible. Studies are under way to explore epidemiological, serological and entomological aspects of visceral leishmaniasis in suspected new VL foci. Community awareness of VL will be raised through training sessions and effects will be measured through knowledge, attitude and practice (KAP) surveys. The results will ascertain endemcity levels and provide important insights for targeted interventions against emergence of new foci. The findings will contribute to the evidence base to inform an integrated package of strategic interventions which are critical for a post-elimination phase in both Bangladesh and Nepal.
Health worker collecting blood for rK39 serological test in Milche village of Khanikhola rural municipality, Kavre District.

Credit: Megha Raj Banjara
Distilling lessons from the VL elimination effort in the Indian subcontinent to inform strategies in Eastern Africa

TDR has been working with the WHO/NTD VL team to derive lessons from the VL elimination efforts in Bangladesh, India and Nepal that could be applicable to inform strategies in other regional foci. Currently, the largest regional focus of VL in the world is in Eastern Africa, involving Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda.

The new WHO/NTD road map offers opportunities to accelerate VL control in the Eastern African setting, where VL epidemiology is more complex than in its Asian counterparts. In this regard, the success stories and lessons learned from the WHO South-East Asia Region are being documented, and key implementation research areas identified to create a platform for research that would support VL elimination efforts in Eastern Africa. Interviews have been conducted with WHO regional and country offices, NTD departments of ministries of health and with the main partners involved in national VL elimination programmes in both regions. The findings will be presented to a consultative forum for further input to be held in early 2022.

Generating data to support evaluation of moxidectin for inclusion in WHO onchocerciasis elimination guidelines and country policies

Onchocerciasis (also known as river blindness) is caused by the parasitic worm Onchocerca volvulus, transmitted between humans by blackflies. Infection can lead to severe itching, disfiguring skin conditions and visual impairment, including blindness. WHO estimated that in 2020, globally 225 million people lived in areas that require preventive chemotherapy with ivermectin, including 224 million in 26 countries in the WHO African Region, 0.79 million in two countries in the WHO Eastern Mediterranean Region and 35 000 in two countries in the WHO Region of the Americas.

In 2018, the United States Food and Drug Administration (FDA) approved moxidectin for the treatment of river blindness of individuals aged 12 years and older, the result of around two decades of research and collaboration between TDR, researchers in onchocerciasis endemic and other countries, WHO country offices and, since 2014, the not-for-profit biopharmaceutical company Medicines Development for Global Health (MDGH).

While regulatory approval of moxidectin was a major milestone, for the drug to be included in WHO’s onchocerciasis elimination guidelines and national policies, additional data are needed. TDR is providing technical and scientific advice to MDGH and endemic country investigators to acquire the necessary data under a donor agreement between WHO and MDGH. The following three studies were initiated in 2021

1) a pharmacokinetic and safety study to identify a moxidectin dose for 4- to 11-year-old children in Ghana
2) a 12 500-participant double-blind study on the safety of moxidectin compared with ivermectin in individuals with any level of infection (including undetectable levels) in the Democratic Republic of the Congo and other sites under selection
3) a 1000-participant double-blind study evaluating the parasitological efficacy and safety of annual or biannual treatment for two years with moxidectin compared with ivermectin in the Democratic Republic of the Congo.

The protocols for these studies are available at https://mox4oncho-multimox.net/resources.

Funding is provided by the European and Developing Countries Clinical Trials Partnership, MDGH and the Luxembourg National Research Fund.
2. Supporting researchers to incorporate intersectional gender analysis into infectious disease research

TDR is encouraging scientists to consider in their research the intersections of gender with other social inequalities that have an impact on health conditions associated with infectious diseases of poverty. Such an intersectional gender lens enables us to better understand how to develop effective gender-responsive strategies to prevent and control infectious diseases and improve health outcomes.

These gender and infectious disease research efforts are being guided by TDR’s strategy on intersectional gender research. This has included the development of an interactive web-based toolkit.

TDR is incorporating an intersectional gender lens across different streams of work, including social innovations for health and implementation research. Five hubs across different geographical regions will be selected to identify and analyse how gender intersects with other social variables and influences social innovations. This new activity is being supported by designated funding from Sida.

In addition, new research teams from Bhutan, Kenya, Malawi and South Africa have been selected to conduct intersectional gender research studies to:

- explore how gender dimensions and other intersecting inequities shape access to TB and dengue services for transgender men, transgender women, men who have sex with men and women who have sex with women in Bhutan;
- assess gender and other intersecting dimensions in disease exposure, care-seeking behaviour and treatment pathways in malaria prevention and control in Kenya and Malawi, focusing on the case of Migori County and Chikwawa District; and
- generate context-specific evidence to understand pre-treatment loss to follow-up (PTLFU) in Eastern Cape Province, South Africa, with an intersectional gender lens.

Researchers in Nepal and Uganda have also been piloting the intersectional gender research toolkit, in collaboration with Makerere University School of Women and Gender Studies and HERD International. Despite disruptions from the COVID-19 pandemic, the case studies focusing on schistosomiasis and tuberculosis in Uganda and lymphatic filariasis and tuberculosis in Nepal were completed in 2021 and will be published in 2022.
Scientist Profile: Dr Chandani Kharel

Bringing an intersectional gender lens to infectious disease research in Nepal

When Dr Chandani Kharel was working as a clinician in Nepal, she witnessed many patients dying from infectious diseases such as tuberculosis and diarrhoea, as well as from malnutrition. This was often because they couldn’t afford health care and only sought help when it was too late.

“For me, that was a very striking thing. Why is health care not accessible for everyone? Why does it have to be that you die because you’re poor? We are always talking about universal health coverage, but in reality, that’s not happening on the ground,” Dr Kharel said.

That prompted her to pivot into a career in public health to influence health policy. She obtained a Master of Science degree in Public Health with a focus on health systems management and policy from the Institute of Tropical Medicine in Belgium in 2016.

“As a clinician, I was helping only a limited number of people who came to seek health care. I saw public health as an opportunity to reach out to a wider population, including policy-makers,” she said.

Within public health, Dr Kharel has been focusing on gender-related aspects of health issues. This partly stems from her experience as an expert in sexually transmitted infections. There, she saw that many young women lacked access to health information in a largely patriarchal society. Seeing this first-hand has led her to advocate for gender equity and equality in health.

Piloting TDR’s intersectional gender research toolkit

Over the past two years, Dr Kharel has been part of a research team at HERD International in Nepal that has been collaborating with TDR on bringing an intersectional gender lens to infectious disease research.

This research team has been piloting the toolkit and generating evidence on how gender intersects with age and ethnicity in the treatment of TB patients in Kathmandu enrolled in the National TB Control Programme. One of the key research findings was males, predominantly from disadvantaged castes, have poorer treatment outcomes.

They are also studying how gender intersects with other social stratifiers to influence perception, understanding and awareness of lymphatic filariasis (LF) among people in Bardiya District. Here they have found that the majority of study participants perceived that the ethnicity of an individual influences his or her access to health information, which also shapes their vulnerability to LF.

Policy-makers at federal, provincial and municipal levels have been engaged since the development of the project proposals. Further dissemination efforts involve the engagement of female community health volunteers and community members broadly.
The challenge of mainstreaming intersectional approaches to health in Nepal

Mainstreaming the inclusion of gender and intersectionality across health programmes is an ongoing effort, Dr Kharel says. Nepal has already formed a Gender Equality and Social Inclusion (GESI) strategy which has been included in health programmes since 2009. The initial focus on gender and caste has been expanded to address people with disabilities, the elderly and the poor.

However, the concept of intersectionality is still novel in Nepal, Dr Kharel said.

“It’s an iterative process. We would obviously like to see intersectionality integrated across all health programmes.”

It’s an iterative process. We would obviously like to see intersectionality integrated across all health programmes.

Dr Chandani Kharel
3. Maximizing data use for public health decision-making

The Structured Operational Research and Training Initiative (SORT IT) is a global partnership-based initiative that is coordinated by TDR and has over 50 implementing partners, including disease control programmes, nongovernmental organizations (NGOs) and academia. SORT IT builds sustainable capacity to conduct operational research according to country priorities and encourages the use of the generated evidence for decision-making to improve public health.

**Tackling public health emergencies with real-time operational research**

The COVID-19 pandemic has caused enormous disruptions to essential health services. A WHO ‘pulse’ survey revealed that 90% of countries faced continued disruptions to essential services and 42 percent of households missed health services, highlighting the need to quickly adapt health services to ensure continued care during such a public health crisis.

TDR and SORT IT partners monitored monthly changes in tuberculosis and HIV services in Kenya, Malawi and Zimbabwe. This real-time data gave decision-makers valuable information on how to adapt services to the COVID-19 era. This resulted in real-time programme improvements. For example in Kenya, following a slump, the number of people with presumptive TB symptoms increased by 58% and HIV testing increased by 23%.


In September 2021, in collaboration with the Global Outbreak and Response Network, and the WHO Regional Office for South-East Asia, TDR also launched a SORT IT programme to assess the impact of COVID-19 on different aspects of health service delivery and build health system resilience to respond to emergencies in Bhutan, East Timor, India and Nepal.

**Strengthening communication of research findings for uptake**

Together with SORT IT partners, TDR led the development of a new training module that aims to provide researchers with the tools and skills to effectively communicate their research findings with a KISS – ‘keep the information short and simple.’

Due to the COVID-19 pandemic, this module was developed and piloted online. In Ghana, Nepal, Sierra Leone and Uganda, it was successfully piloted to produce four outputs:

1. a communication plan targeting decision-makers and stakeholders;
2. a one-page plain language evidence summary with key messages, the implications and recommendations;
3. a PowerPoint presentation of 10 minutes for use at conferences and a lightening presentation of three minutes for use with national decision-makers; and
4. an elevator pitch (30 to 60 seconds) oral presentation for use in opportunistic one-to-one conversations with stakeholders.
Tackling antimicrobial resistance through operational research

In 2019, TDR, with the support of the Government of the United Kingdom of Great Britain and Northern Ireland’s Department of Health and Social Care, launched a SORT IT programme focused on tackling antimicrobial resistance (AMR). To date, the AMR-SORT IT network has been scaled up to include 60 institutions in 26 countries.

During the first two years of the programme, a ‘One Heath’ approach was embraced and comprehensive engagement was established with AMR coordinating committees, WHO country and regional offices and SORT IT partners in Asia, Africa, Europe and the Americas. Thirty-seven research studies aligned with national and global AMR action plans were launched.

In 2021, a SORT IT online training platform was deployed to overcome COVID-19 travel restrictions. Using this innovative tool, 35 research studies from five countries in Asia and Africa were completed, all of which were published in special issues of two journals. Twenty-five new projects were started in Colombia, Ecuador and Sierra Leone, and high-level endorsement was established for 12 more studies in Ghana.

A new publishing mechanism was also pioneered for timely dissemination of research evidence in a record time of 10–12 weeks following study completion. The 35 completed studies from Ghana, Myanmar, Nepal, Sierra Leone and Uganda were published in the open access journals Tropical Medicine and Infectious Disease and Public Health Action. Evidence summaries from this research have also been published on the TDR website.
Scientist Profile: Dr Rose Kosgei

Using operational research to improve women’s health

Dr Rose Kosgei has been a specialist obstetrician and gynaecologist at the University of Nairobi, Kenya, since 2013. Her mentor, Professor Jane Carter, former president of the International Union Against TB and Lung Disease (The Union) was based at Brown University, USA, where Dr Kosgei won a fellowship in 2009. Professor Carter suggested she apply to the SORT IT programme that builds operational research capacity, and Dr Kosgei became part of it to work on TB in pregnancy.

This was an important issue because Kenya had a high maternal mortality ratio of 488 deaths per 100,000 live births. A quarter of these deaths were attributable to diseases such as TB, HIV or malaria. Thus, screening pregnant women for TB would be useful, but Dr Kosgei and her team were not convinced this was being done accurately. They realized that they needed to find a better way in collaboration with the National TB Programme.

“SORT IT helped me to structure the research logically, in a way that was relevant to this particular setting.”

After her training in Paris, which she finished in 2011, she was able to help run trainings in Ethiopia, Kenya and Zimbabwe. By 2018, Dr Kosgei says “we were able to incorporate the SORT IT model into the curriculum of the Master in Medicine degree in obstetrics and gynaecology at the University of Nairobi. The advantage of the model is that it teaches the practical skills to conduct and publish operational research.”

Leadership buy-in to ensure the sustainability of operational research

The end game of SORT IT training, however, is not just that individuals are trained, but that the knowledge and understanding are institutionalized to ensure sustainability.

“It’s all about getting people engaged. In programmes within ministries of health, you need to bring the head of the programme on board,” she says. “They are often too busy to fully participate in the training, but if they take part as observers, and contribute to the manuscripts as authors to guide data collection and analysis, then you have their buy-in. This is critical because we need to work on the national or local research priorities that they define.”

Dr Kosgei describes SORT IT as having a transformative effect on her career development. Just before starting the programme in 2011, she had only four publications. A decade later, she has more than 80 publications, including from mentoring people on SORT IT trainings.

“I’m awaiting promotion to associate professor once I graduate from my PhD work that focuses on tuberculosis and gender. SORT IT has been motivating me the whole way.”
4. Facilitating the access and delivery of new health technologies

The Access and Delivery Partnership (ADP) helps countries strengthen policies, human capacities, systems and regulations to facilitate the access and delivery of new health technologies and ensures that effective medicines, vaccines and diagnostics reach the people who need them.

ADP is a collaboration between UNDP, the WHO Department of Regulatory Systems Strengthening, TDR and PATH, and is funded by the Government of Japan. (From TDR, ADP activities are jointly managed by the Research Capacity Strengthening Unit and the Research for Implementation Unit.) Within the partnership, TDR is working with ADP focus countries to strengthen institutional capacity in the areas of priority setting, implementation research and drug safety monitoring. The ADP focus countries are Bhutan, Burkina Faso, Ghana, India, Indonesia, Malawi, Senegal, Thailand and the United Republic of Tanzania.

TDR activities led by the Research for implementation unit undertaken as part of ADP include the following:

- development of an e-learning initiative to strengthen COVID-19 vaccine safety monitoring systems in African countries;
- a situation analysis of the active TB drug safety management and monitoring (aDSM) implemented by the 27 countries participating in the West and Central African Networks for TB control (WARN-TB and CARN-TB); and

TDR has also provided technical support for various research projects in ADP focus countries, including the following:

**Ghana**

In 2021, TDR worked with Ghana’s Neglected Tropical Disease Programme by training programme staff and health workers at national and regional levels on key aspects of implementation research to look at gender influences on access to health services and the perception and experience of stigma in women suffering from skin-related NTDs. The programme has finalized the research protocol on this topic. TDR also initiated work with the National Medicines Programme and provided support for the development of a protocol to assess compliance to national treatment guidelines and conduct of the research.

**Burkina Faso**

TDR is currently providing support to the Agence Nationale de Regulation Pharmaceutique (ANRP) for the development of a research protocol to assess the use of the MedSafety app used to report adverse drug reactions.

**Malawi**

TDR supported the Department of Pharmacy of the College of Medicine of Malawi to develop a protocol and conduct a Knowledge Attitude and Practices survey that will provide useful information on the remaining training gaps and on the impact of past capacity building activities on reporting adverse drug reactions.

**Senegal**

TDR supported the Direction de la Planification, de la Recherche et des Statistiques of Senegal in the design and development of a study on the effects of the COVID-19 pandemic on the delivery of national disease control programmes for malaria, TB and NTDs. The aim is to quantify the impact on human resources, management, the availability of medicines and diagnostics, and patient care.
Global engagement

Promoting innovative and inclusive approaches to research

An essential part of TDR’s work is to engage with the global health community to promote and facilitate the role of research for development and to advocate for the use of high-quality evidence to inform policy. TDR is at the interface between research and health care delivery. Embedded within the United Nations family through its co-sponsors (UNICEF, UNDP, the World Bank and WHO), this unique position allows TDR to create a bridge from local communities to the World Health Assembly to enable the broadest possible scope of dialogue and debate across the spectrum of health research – from priority setting to evidence-based policy-making at local, national, regional and global levels.

This global engagement includes collaboration with WHO regional offices, shaping the global health research agenda, leading a collaborative network on research funding, creating an enabling environment and providing evidence for community-based social innovations to transform health care delivery, and leverage a global network of 7500 scientists and experts who have been associated with TDR.

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5. Harmonizing investments in research capacity
6. Leveraging the TDR Global network for collaboration, mentoring and capacity building
7. Effective engagement in gender and equity
2021 Highlights

As a member of the COVID-19 Clinical Research Coalition, TDR is contributing to the Data Sharing Working Group, which has published a review of COVID-19 data sharing platforms.

Two new research tools for social innovators have been published: the Social Innovation Monitoring & Evaluation (M&E) Framework and the research checklist for social innovation to guide innovators, researchers and other stakeholders.

The Small Grants Scheme with WHO regional offices focused on new topics such as health and migration and implementation of the International Health Regulations (2015).

A "Women in Science" compendium, which profiles 15 inspirational women leaders from the TDR Global community, shares their fascinating journeys and words of wisdom on how to navigate a career in science.

A practical guide on public engagement and crowdfunding has been published to provide tools, open access resources and advice for researchers, especially those in LMICs.
1. Facilitating data sharing for COVID-19 response

TDR is a champion of open science as a critical aspect of maximizing the impact of research on infectious diseases of poverty. In 2020, TDR joined the COVID-19 Clinical Research Coalition, which was formed to accelerate COVID-19 clinical research in resource-limited settings. TDR contributes to the Data Sharing Working Group of the coalition and supported six research projects in 2021 that included:

- a survey of literature and collation of the current practices on clinical data sharing through a rapid evidence synthesis;
- a mapping of compliance to data sharing policies in the context of COVID-19 clinical research;
- a scoping review of COVID-19 published research papers focused on drug treatments and/or vaccines against SARS COV2 virus and mapping of the compliance / adherence to stated data sharing policies;
- a training needs assessment conducted through a virtual workshop to determine existing gaps in knowledge and skills among researchers in LMICs to effectively share and use COVID-19 research data;
- an analysis of data sharing in clinical trials using the International Clinical Trials Registry Platform; and
- a review of COVID-19 data sharing platforms and alignment to FAIR principles to and judge how they rate for ethics, equity and efficacy and willingness to support capacity building for researchers in LMICs.

TDR has used this experience in data sharing to work with a WHO-led working group developing a WHO position statement on the sharing and reuse of health data for research. TDR led the development of guidance documents for WHO staff and researchers on good practices in sharing health data in ways that are effective, ethical and equitable. TDR has also contributed to the steering group for the first ever WHO Health Data Summit.
Towards an Open Science

- **Open Access**: online, free of cost access to peer-reviewed scientific content, with limited copyright and licensing restrictions.

- **Inclusive Education**: access to high-quality knowledge for all.

- **Accountable Science**: practice guided by common principles & core values.

- **Efficient Research**: acceleration of scientific discoveries to tackle social challenges.

- **Open Data**: online, free of cost access to data, with attributed source & terms that allow their reuse & redistribution.

- **Open Reproducible Research**: free access to experimental elements for research reproduction.

- **Open Science Evaluation**: evaluation of research results requiring the community's contribution, not limited to peer reviewers.

- **Open Educational Resources**: open licence & free of cost access to materials for teaching & learning.

- **Available Knowledge**: science, technology & innovation as a common good.
2. Strengthening communication of research findings for uptake

Together with partners of the Structured Operational Research and Training Initiative (SORT IT), TDR led the development of a new training module that aims to provide researchers with the tools and skills to effectively communicate their research findings for uptake.

Due to the COVID-19 pandemic, this module was developed and piloted online.

In Ghana, Nepal, Sierra Leone and Uganda, the module was successfully piloted to produce four outputs:

1. A communication plan targeting decision-makers and stakeholders.
2. A one-page plain language evidence summary with key messages, the implications and recommendations.
3. A PowerPoint presentation of 10 minutes for use at conferences and a lightning presentation of three minutes for use with national decision-makers.
4. An elevator pitch (30 to 60 seconds) oral presentation for use in opportunistic one-to-one conversations with stakeholders.

“

This SORT IT module serves a great need to present research findings in a simple manner, so that we decision-makers can quickly and easily grasp the key messages and take action to address urgent health issues.

Dr Madan Kumar Updhaya, Chief, Quality Standards and Regulation Division, Ministry of Health and Population, Nepal

Please refer to the Research for implementation section of this report for more on SORT IT.
3. Promoting and researching social innovations to improve health care delivery

The Social Innovation in Health Initiative (SIHI) is a network of partner institutions and a community of stakeholders established in 2014 through TDR's leadership. The initiative aims to unlock the capacity of all health system actors and stakeholders, including communities, frontline health workers, innovators, policy-makers, the private sector and academics, to work in collaboration and advance community-engaged social innovation in health care delivery in the Global South. This is pursued through:

(i) research to understand what works, what doesn’t, and how to sustain, replicate or scale up social innovations;
(ii) capacity strengthening to ensure that countries in the Global South take the lead in promoting and researching social innovation; and
(iii) advocacy to catalyse a global culture change and influence the health agenda at the local, national, regional and global levels.

SIHI network to advance social innovation in health through research, capacity strengthening and advocacy (2021)
The network has expanded to engage low- and middle-income countries where SIHI country hubs have been established: at the University of Malawi, Makerere University in Uganda, University of the Philippines, Manila, the Centro Internacional de Entrenamiento e Investigaciones Médicas (CIDEIM) in Colombia and the Social Entrepreneurship to Spur Health (SESH) in China. Since 2020 these hubs are partnering with research institutions to establish additional social innovation hubs in six new countries: Ghana, Honduras, India, Indonesia Nigeria and Rwanda.

The first SIHI hub in a high-income country was established in Sweden by Uppsala University, Karolinska Institute and MAD Foundation.

SIHI also collaborates with various contributing partners at the global level, such as Fondation Mérieux, Ahimsa Fund, Make-A-Difference (MAD), the WHO Innovation hub, the Pan American Health Organization (PAHO), UNAIDS, the United Nations University, the WARN-TB Secretariat in Benin, UNDP and UNICEF to advance and promote social innovation activities in the Global South.

SIHI is supported by TDR, with additional funding provided by the Swedish International Development Cooperation Agency (Sida).

Below are highlights of progress in 2021, demonstrating LMIC leadership in SIHI:

- The SIHI Secretariat played a leadership role in embedding social innovation in key institutions such as WHO (WHO Innovation hub); University of the Philippines, Manila (Social innovation centre); and The Network: Towards Unity for Health (TUFH).
- Two new self-financed hubs were launched in India (July 2021) and in Sweden (December 2021).
- Six new calls for social innovations were launched by the SIHI hubs in China, India, Indonesia, Nigeria, the Philippines, Uganda, and Latin and Central America / PAHO (bringing the cumulative total to 22) and eight new case studies were completed (making the cumulative total 52).
- A journal supplement on social innovation has been published in the Journal of Infectious Diseases of Poverty.
- Ten proposals have been selected to improve engagement of communities in research and in social innovations.
- Two new research tools have been published: the Social Innovation Monitoring & Evaluation (M&E) Framework and the research checklist for social innovation to guide innovators, researchers and other stakeholders.

Mamás del Río, a social innovation in health in Colombia and Peru was featured in an episode of TDR’s Global Health Matters podcast.
4. Collaborating with WHO and other partners on research grants

TDR’s Small Grants Scheme supports researchers and public health practitioners, in collaboration with WHO regional offices, through small grants (ranging from US$ 10 000 to $20 000).

Since 2014 the focus of the scheme has been on implementation research, and each region has taken more responsibility for jointly identifying with TDR the research priorities to be funded. The scheme has included all WHO regions since 2016.

In 2021, several new calls for proposals were issued jointly with regional offices, despite the challenges due to the COVID-19 pandemic. In the WHO Eastern Mediterranean Region, two calls specifically focused on health and migration as well as implementation of the International Health Regulations (2015).

This was an opportunity to engage with WHO initiatives focused on health and migration and health emergencies.
5. Harmonizing investments in research capacity

ESSENCE on Health Research is an initiative to improve the coordination and harmonization of investments in research capacity. ESSENCE members embrace the principles of donor harmonization and country alignment, and according to these principles, they align their activities and procedures with the priorities of the countries they are supporting.

ESSENCE members include some of the top funders of health research around the world. These include health research funding agencies, international health institutions, government research agencies, development agencies, philanthropists and multilateral initiatives. Below are some highlights of progress in 2021:

- ESSENCE has engaged several new member agencies, including the Tanzania Commission for Science and Technology (COSTECH) and the India Alliance on Research.

A policy dialogue at the annual Southern African Research and Innovation Management Association (SARIMA) conference engaged African health research funding agencies and identified strategic directions for potential collaboration.

The new good practice documents on research costing and investing in implementation research were widely disseminated via various networks, conferences and webinars.
6. Leveraging the TDR Global network for collaboration, mentoring and capacity building

Over the years, TDR has contributed to the development of a global community of leaders and agents of change who are showing how research can improve the health and well-being of vulnerable populations. This community, TDR Global, aims to catalyse research collaborations and foster mentorship of young scientists.

Key objectives of TDR Global:
- Foster mentorship to help members increase their capacity and profile.
- Catalyse collaborations by showcasing TDR Global members’ profiles.
- Build as a resource for identifying experts to be considered for review of grants or expert committees for TDR and its partners.
- Encourage networking and connections between people.

Some highlights from 2021 are detailed below.

Celebrating TDR Global’s Women in Science

On International Women’s Day (8 March), we celebrated the women of TDR Global, especially those who have been championing TDR’s mission over many years. A “Women in Science” compendium, which profiles 15 of these inspirational women leaders in global health, shares their fascinating journeys and words of wisdom on how to navigate a career in science. French and Spanish translations will soon be published.

Supporting public engagement and crowdfunding in health research

TDR Global, in partnership with SESH and SIHI, developed a practical guide that provides tools, open access resources and advice on public engagement and crowdfunding for researchers, especially those in LMICs.

As part of this initiative, TDR Global and SESH conducted a crowdfunding challenge and provided training and mentorship for selected finalists. As a result, three of the five finalists have successfully launched crowdfunding campaigns and have already met their financial targets.
Strengthening mentorship programmes and strategies for researchers in LMICs

Sharing institutional mentorship experiences: TDR Global nodes for the Latin American and Asian regions organized a webinar on institutional mentorship.

Research mentorship contest:
TDR Global nodes in Africa, Latin America and Asia launched open calls to identify actionable tools, innovative resources and support related to research mentorship during and after COVID-19.

Showcasing the impact of TDR on scientists’ careers

TDR Global’s first Career Impact Contest aimed to gather stories of how support from TDR has made an impact on the careers of scientists addressing infectious diseases of poverty. Six judges from the TDR Global community evaluated the submissions, which ranged from text-based narratives and photo essays to flyers and videos, based on four criteria: relevance, content, narrative and inclusiveness. Visit the TDR website for more on their inspirational success stories.

I was very happy to see that TDR’s support for these scientists is making a big impact on equity and inclusiveness in global health research in low- and middle-income countries.

Dr Lyda Osorio, Chair of the TDR Global working group and one of the judges for the Career Impact Contest
7. Effective engagement in gender and equity

In 2020, TDR launched a new strategy on intersectional gender research as a pathway to a more inclusive, effective response to infectious diseases. TDR recognizes the need to base gender equality and health equity efforts on solid evidence and in strengthened research capacities, drawing on materials that emphasize the need for a comprehensive approach to effectively address gender and equality dimensions in research on infectious diseases of poverty.

To address this need, TDR is focusing on the following approaches:

- disseminating, promoting and implementing TDR's intersectional gender research strategy;
- supporting an intersectional gender approach across research and training-related activities and programmes;
- facilitating gender and intersectionality analyses in research for implementation training; and
- advocating for a research agenda guided by the principles of diversity, inclusivity and equality.

For example, TDR and the UNDP/UNFPA/UNICEF/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP) are working together to understand how partners integrate sex and gender into health research conducted at HRP Alliance hubs, TDR Regional Training Centres and the TDR Postgraduate Training Scheme. The joint initiative, which includes a broad partner consultation, includes exploring information about:

1. current understanding of the value of including sex and gender as variables in health research;
2. the extent to which institutions include sex and gender within health research previously conducted; and
3. training needs of institutions related to the inclusion of sex and gender in their own workplans.

The findings from the consultation will be used to inform the development of programmes to strengthen the integration of sex and gender in health research.
Other examples of the application of the intersectional gender research strategy on TDR’s work have been included in other sections of this report, including:

**Implementation Research MOOC:** In collaboration with the United Nations University International Institute for Global Health (UNU-IIGH), an Implementation Research MOOC module on gender and intersectionality has been developed and will be launched in mid-2022.

**TDR Implementation Research Toolkit:** TDR is currently updating the existing online version of the IR toolkit with a module on gender considerations in IR. This module is being designed to guide researchers and health practitioners to develop an implementation research proposal incorporating an intersectional gender lens.

**Gender and social innovation in health:** This new project, with support from Sida, will explore how gender intersects with other social variables and how they influence social innovation processes and strategies at country level. The project will include social innovations that address infectious diseases in LMICs from five different geographical regions.

TDR contributed to the global initiative led by the Gender and Health hub at UNU-IIGH and the School of Public Health at the University of the Western Cape, which co-convened a collaborative gender and COVID-19 research agenda-setting exercise that was completed in December 2021.

TDR has also formalized its commitment to principles of Equality, Diversity and Inclusivity in science and explicitly encourages researchers to apply irrespective of their gender identity, sexual orientation, social background or (dis)ability status, among others. To continue TDR’s implementation of its Intersectional Gender Research Strategy and systematically mainstream gender and equity dimensions, TDR calls for proposals also formalize requirements to ensure disaggregated data at least by sex and age (and other social stratifiers wherever possible as appropriate) in upcoming calls for proposals.
Global Health Matters podcast

tdr.who.int/global-health-matters-podcast
Produced by TDR and hosted by Dr Garry Aslanyan, the Global Health Matters podcast aims to discuss and share experiences and views on different aspects of global health research, with a focus on low- and middle-income country perspectives. Additional objectives of the podcast are as follows:

- Communicate inspiring stories on research and research careers
- Engage TDR’s partners and stakeholders
- Engage the global health community not yet aware of TDR’s work
- Share practical lessons learned to promote South-South learning on issues related to global health and research.

Episodes produced for Season 1

**Episode 01**
Research in the time of COVID-19

**Episode 02**
Women in science

**Episode 03**
COVID-19 in Africa: the role of research

**Episode 04**
Mothers of the Amazon River: a social innovation for health

**Episode 05**
Climate change’s impact on health

**Episode 06**
Reimagining research leadership

**Episode 07**
Communicating science, not fiction

**Episode 08**
Discoveries from vaccine implementation

**Episode 09**
Navigating digital health waves

**Episode 10**
Actions for decolonizing global health

The podcast is available on Apple Podcasts, Spotify, Google Podcasts or wherever people may listen to podcasts. Podcast website [https://tdr.who.int/global-health-matters-podcast](https://tdr.who.int/global-health-matters-podcast)
Governance and financial performance

TDR is co–sponsored by UNICEF, UNDP, the World Bank and WHO, and it is through these international, multilateral organizations that TDR has such an extensive reach and support. WHO acts as the executing agency of the Programme and provides close ties with its departments for a continuous loop of research informing policy and policy informing research, which in turn supports planning and priority setting at international, regional and national levels.

TDR’s overall management responsibility is ensured by the TDR Special Programme Coordinator, Dr Soumya Swaminathan, who heads WHO’s Science Division as Chief Scientist. Day–to–day management is provided by the TDR Director. Thirty full–time staff and additional project–specific short–term staff come from all regions of the world.

Contents

1. Governance and management
2. Financial Performance Summary
3. Contributions Table
1. Governance and management

Joint Coordinating Board

TDR’s top governing body is its Joint Coordinating Board (JCB), which includes a mix of representatives from developed and developing countries (see figure below).

The Board comprises 28 members: 12 members selected by the resource contributors to the Programme (including five constituencies of two or more governments sharing one seat); six government representatives chosen by the six regional committees of WHO; six members representing other cooperating parties selected by the JCB itself; and the four co sponsoring agencies.

Figure: JCB membership
(as of 1 January 2021)

WHO regions (Regional Offices)
AFR: Africa
AMR: Americas
EMR: Eastern Mediterranean
EUR: Europe
SEAR: South–East Asia
WPR: Western Pacific

Constituencies

Permanent Members

FINANCIAL CONTRIBUTORS
(2.2.1)

CO–SPONSORS
(2.2.4)

OTHER COOPERATING PARTIES (2.2.3)

REPRESENTATIVES OF WHO REGIONS
(2.2.2)
Standing Committee

A Standing Committee composed of representatives from the four co-sponsoring agencies, the Chair and the Vice-Chair of the JCB, the Chair of the Scientific and Technical Advisory Committee (STAC), one representative from the JCB resource contributors group (a JCB member under paragraph 2.2.1 of the TDR Memorandum of Understanding—MOU), and one representative from a disease endemic country (which may be a JCB member under any paragraph of the TDR MOU), provides guidance and oversight on an ongoing basis.

Scientific and Technical Advisory Committee

The Scientific and Technical Advisory Committee (STAC) is TDR’s overarching advisory body, as foreseen in the Memorandum of Understanding, which oversees the scientific and technical strategies, directions and priorities of TDR. STAC provides its recommendations to the JCB and the TDR Secretariat. The Committee includes up to 15 internationally recognized scientists, with members serving in their personal capacities to represent a range of research disciplines.

Scientific Working Groups

In addition, the TDR Secretariat convenes scientific working groups to review and provide advice on the prioritization of proposed activities and the selection of projects for funding, to review and evaluate progress in that regard and make recommendations to the TDR Secretariat. Reviews cover the three core areas of TDR: Research for implementation, strengthening research capacity and global engagement.

2021 STAC membership

(Chair) Professor Charles MGONE, Vice-Chancellor, Hubert Kairuki Memorial University, Dar es Salaam, United Republic of Tanzania

Professor Afif BEN SALAH, Full Professor of Community Medicine, College of Medicine and Medical Sciences, Department of Community and Family Medicine, Arabian Gulf University, Manama, Kingdom of Bahrain

Professor Claudia CHAMAS, Researcher, Centre for Technological Development in Health, Oswaldo Cruz Foundation (Fiocruz), Rio de Janeiro, Brazil

Professor Sónia DIAS, Associate Professor, National School of Public Health, Universidade Nova de Lisboa, Lisbon, Portugal

Dr Sara Irène EYANGOH, Directeur Scientifique, Centre Pasteur du Cameroun, Laboratoire National de Référence et de Santé Publique, Ministère de la Santé Publique, Yaoundé, Cameroon

Dr Subhash HIRA, Professor of Public Health and Senior Advisor, Public Health Foundation of India, New Delhi, India

Professor Mirkuzie Woldie KERIE, Senior Research Adviser, MCH Directorate, Federal Ministry of Health, Jimma, Ethiopia

Dr Caroline LYNCH, Regional Adviser, Medicines for Malaria Venture, Chiang Mai, Thailand

Professor Catherine (Sassy) MOLYNEUX, Professor in Global Health, Health Systems Research Ethics Department, KEMRI-Wellcome Trust Research Programme, Kilifi, Kenya

Dr Alwyn MWINGA, Executive Director, Zambart, Lusaka, Zambia

Dr Emelda Aluoch OKIRO, Head, Population Health Unit, KEMRI/Wellcome Trust Collaborative Programme, Nairobi, Kenya

Dr Shagufta PERVEEN, Senior Instructor, Health System and Policy Research Group, Department of Community Health Sciences, The Aga Khan University, Karachi, Pakistan

Professor Bertie SQUIRE, Professor of Clinical Tropical Medicine; Dean of Clinical Sciences and International Public Health, Liverpool School of Tropical Medicine, Liverpool, United Kingdom
2. Financial Performance Summary

Implementation of the TDR Strategy 2018–2023 began in January 2018 and achievements have been reported on in our annual financial and results reports.

Two programme budget and workplan scenarios were approved by the Joint Coordinating Board for the biennium 2020–2021: a lower scenario at US$ 40 million and a higher scenario at US$ 50 million. The two-scenario model was developed to help manage the uncertainty of funding and allow a confident start to implementation. Implementation of the lower (US$ 40 million) budget scenario began in January 2021. The two-scenario model has proven useful, allowing a higher level of implementation of core operations as funds became available.

Implementation of US$ 37.7 million reflects substantial savings in staff and administration costs. Savings were partially offset by strong implementation in core activities, despite delays in the field resulting from the COVID-19 pandemic.

In June 2021, the Joint Coordinating Board approved two budget and workplan scenarios for the biennium 2022–2023, one at US$ 40 million and the other at US$ 50 million. TDR continues to strengthen its fundraising efforts among both new and existing donors, focusing on the priorities of the current Strategy and aligning with the Sustainable Development Goals.
# 3. Contributions Table

## TDR 2021 revenue

<table>
<thead>
<tr>
<th>Contributor</th>
<th>Amount (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core contributions</strong></td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
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<tr>
<td>Switzerland</td>
<td>1 925 255</td>
</tr>
<tr>
<td>United Kingdom of Great Britain and Northern Ireland</td>
<td>1 662 159</td>
</tr>
<tr>
<td>Germany</td>
<td>1 659 850</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>1 331 719</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1 097 398</td>
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<tr>
<td>Belgium</td>
<td>675 676</td>
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<tr>
<td>Norway</td>
<td>349 365</td>
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<tr>
<td>China</td>
<td>165 000</td>
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<tr>
<td>Spain</td>
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<tr>
<td>India</td>
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<tr>
<td>Japan</td>
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<td>Malaysia</td>
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<tr>
<td>Panama</td>
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<tr>
<td>Mexico</td>
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<td>Miscellaneous</td>
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<tr>
<td>World Health Organization</td>
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<tr>
<td><strong>Subtotal</strong></td>
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</tr>
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</table>

<table>
<thead>
<tr>
<th>Contributors providing project-specific funding</th>
<th>Amount (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Institute of Health Research (NIHR), United Kingdom</td>
<td>2 546 199</td>
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<tr>
<td>United Nations Development Programme (UNDP)</td>
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<tr>
<td>Sweden</td>
<td>1 190 970</td>
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<tr>
<td>Bill &amp; Melinda Gates Foundation</td>
<td>1 133 360</td>
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<td>United States Agency for International Development (USAID)</td>
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<tr>
<td>Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)</td>
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<tr>
<td>World Health Organization</td>
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<tr>
<td>Luxembourg</td>
<td>404 030</td>
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<tr>
<td>Medicines Development for Global Health Limited (MDGH)</td>
<td>93 041</td>
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<tr>
<td>Robert Koch Institute (RKI)</td>
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</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>9 286 203</td>
</tr>
<tr>
<td><strong>Total contributions</strong></td>
<td>23 273 508</td>
</tr>
</tbody>
</table>

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1. The contribution from the Government of Nigeria for the period 2015 to 2020 will be reported in the certified financial statement in 2022 due to the timing of its receipt in TDR.
2. The 2020 contribution from the Government of the People’s Republic of China will be reported in the certified financial statement in 2021 due to the timing of its receipt in TDR.
3. The 2020-2021 core contribution from WHO was received in full in 2020.
4. The 2021 designated contribution from GIZ includes funding from BMBF.
5. The 2021 designated contribution from WHO includes funding from UNPDF (the United Nations Peace and Development Trust Fund) for joint TDR/Global Malaria Programme activities.
TDR, the Special Programme for Research and Training in Tropical Diseases, is a global programme of scientific collaboration that helps facilitate, support and influence efforts to combat diseases of poverty. It is co-sponsored by the United Nations Children’s Fund (UNICEF), the United Nations Development Programme (UNDP), the World Bank and World Health Organization (WHO).