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As this annual report is being finalized, WHO is ending the 70th World Health Assembly. This meeting was particularly significant; a new Director-General has been elected, and he is the first one from the African region. We are all looking forward to working with Dr Tedros Adhanom Ghebreyesus, who has improved the health of his fellow Ethiopians, and has also made his mark in global health by chairing the Global Fund to Fight AIDS, Tuberculosis and Malaria and dramatically increasing funds to this critical organization.

Dr Tedros has talked about the support he received from early when he was just beginning his scientific career. TDR funded his PhD and then his first research into the impact on malaria transmission related to environmental conditions around dam sites. TDR went on to attract additional funding for his larger studies. It is a perfect example of TDR’s value – building research leadership by identifying young men and women from low- and middle-income countries, getting them started and mentoring them.

TDR has been importantly involved in another WHO initiative – the Global Vector Control Response 2017-2030, which is a new strategic approach to put vector control back on the map. Working with WHO’s Global Malaria Programme and the Department of Control of Neglected Tropical Diseases, a broad consultation resulted in a new report and a resolution adopted at the World Health Assembly that calls for implementing the report recommendations. These include integrating vector control interventions across public health systems, taking into account environmental and social factors, particularly at the community level – something TDR has a lot of experience in.

As you can see, TDR provides an innovating force within WHO and beyond. It is contributing significantly to the implementation of the 2030 Sustainable Development Agenda, which calls for these integrated approaches among the many players. This annual report provides a valuable overview of both their achievements, and just as importantly, shows how they are working on what’s needed next.
This is the last year of my term as TDR’s Joint Coordinating Board (JCB) chair. This has been a journey that has taken me along a path through many of the elements of the TDR programme, starting as a scientist and later as partner with the Swedish International Development Cooperation Agency (SIDA). The opportunity has provided me with an up-close look at how the Special Programme works, and more importantly, what it values and insists upon – year after year after year.

This is why I’d like to call your attention to the three features in this report about long-term impact, because they reflect so well the value of commitment.

Take, for instance, the work to save the lives of African children who get malaria. Once infected, they can deteriorate very quickly and die within 24 hours. Many become too sick to even swallow a pill, and they are too far from a hospital to reach it in time for injectable treatment. Artesunate suppositories that could be given by trained community healthcare workers were developed and tested in several African countries by TDR as a means of buying them time – to stabilize their condition so they could get to the hospital.

In 2016, that long-term TDR commitment paid off. With UNITAID funding, the data went to Medicines for Malaria Venture (MMV) to facilitate further development, and the Indian manufacturer Cipla Limited produced 100 mg artesunate suppositories that met the quality assurance standards that countries need.

This took over a decade, but it could only have happened with persistence and commitment and trusted partnerships. There are two other long-term impact stories in this annual report – one about reducing infant birth defects and death due to congenital syphilis, and another on identifying better outbreak signs and more efficient treatment processes of dengue.

In all cases, the key factor was involvement at all levels – international, national, regional, and communities. TDR has shown over and over that it can bring the right people and organizations to the table. It can drive an initiative that is owned by all, and in the end, make a real difference.
Our contributors

Thank you to the TDR contributors providing overall support*

Thank you to the TDR contributors providing specific project support*

*Listed in order of level of contribution
We are on the final leg of a six-year strategy, begun in 2012 when I first came to TDR. At that time, we committed to a stronger focus on research that increases the numbers of people who have access to the best preventive methods and the treatments. To do this, we have been expanding the involvement of communities and specialists outside the health area, such as in environment.

This strategy is really paying off. There are now new ways of eliminating the scourge of visceral leishmaniasis in the Indian subcontinent, and sustaining that elimination. Tuberculosis control in West Africa is improving due to a regional network that is bringing together multi-disciplinary teams to learn and share from each other. The Caribbean islands are now working together to share data and expertise to stop the spread of diseases like Zika that have such devastating impact on babies. Remote African communities are working with scientists to identify vulnerabilities to the effects of climate change so that they can increase their resilience.

If there is one concept that brings all of our work together, it is community. In 2016, we launched TDR Global, a new online community of more than 2500 current and former TDR grantees, trainees and expert advisers. What a rich source of knowledge and expertise, and they are available for new collaborations and mentorship.

Our work to increase the numbers of women entering and staying in science is also starting to pay dividends. New networks and strong bonds of support have been created. For the first time, the proportion of TDR funds granted to women increased to 40% of the total, the average amount of a grant awarded was equal across genders, and the majority of TDR expert advisers and committee members were women. Within the popular and expanded Structured Operational Research and Training initiative (SORT IT), 45% of the participants are women. Our vision of full equity is looking increasingly within reach.

The strategy that focused us on increased access to health services, and broader, more inclusive approaches, has been very effective. We are now working on the next one that will begin in 2018. We are also looking forward to working with the new WHO Director-General Dr Tedros Adhanom Ghebreyesus, who has used research evidence to achieve some impressive health gains in Ethiopia. These are exciting times, with great potential to reach even higher levels of impact.
Preventing and managing disease outbreaks

Two new networks

Representatives from all Caribbean countries and territories have agreed on a draft framework for a formal network on emerging vector-borne diseases. The goal is to share critical data for emerging infections such as dengue and Zika viruses, develop research plans, and improve surveillance, diagnosis and control. This new network was initiated by TDR to track and respond to epidemics. The consortium has examined how best to map, organize and exchange information on existing diagnostic facilities, surveillance systems and vector control with regard to future epidemics. A preliminary list of research and laboratory facilities in the region has been published, as well as draft recommendations for research and surveillance.

TDR initiated the first-ever international network to track insecticide resistance on vectors of arboviruses like dengue, chikungunya and Zika. The Worldwide Insecticide-resistance Network (WIN) is investigating the landscape of insecticide resistance and looking into alternative control methods. Almost 30 countries are now involved, with more asking to join.

Better preparation for dengue, Zika and chikungunya outbreaks

The process of controlling dengue and other Aedes mosquito-borne arboviruses like Zika and chikungunya is benefiting from the completion of two major 5-year research projects conducted by scientists across Europe, Latin America and South Asia. One was on dengue risk assessment, management and surveillance, and the other produced a dengue framework for resisting epidemics in Europe. The findings have implications for policy and further research. A new handbook was published for dengue outbreak contingency planning: A ‘Model Contingency Plan’. This has helped develop a plan towards a wider approach that encompasses response to Aedes-borne arboviral diseases, including Zika and chikungunya.
Community approaches for vector-borne diseases

Colombia’s work to reduce the numbers of mosquitoes that carry dengue is being seen by national authorities as having benefits for diseases like Zika and chikungunya. A TDR supported research project led to a new community and environmental approach that is now being scaled up. Interventions were deployed in urban and rural settings in several Latin American countries against dengue and Chagas disease. These strategies are now informing and improving vector and disease control strategies in endemic countries, and attracting interest beyond dengue, given that Zika and chikungunya viruses are carried by the same mosquito.

Support for reaching the end of the visceral leishmaniasis target

TDR-supported research has been instrumental in helping Bangladesh and Nepal reach the visceral leishmaniasis elimination target. A systematic review of current knowledge of transmission dynamics and how they affect disease elimination was published in the past year, which should inform new lines of attack and modelling studies for maintaining the achievements and sustaining elimination. This work is part of an overall package of research supported since 2005 that has contributed to a sharp reduction of cases. All activities have been conducted as a collaboration between country researchers and control programme managers and international collaborators.

Support countries in reducing their disease burden

New regional network for tuberculosis control

TDR initiated the West-African Regional Network for TB control (WARN-TB) comprising 16 countries. The network is designed to support the End TB Strategy and has identified disease control gaps and research priorities at the country and sub-regional level, which are being addressed through implementation research projects.

Improved care options for young children with malaria

A special issue of the Journal of Clinical Infectious Diseases on the improvement of care for children under the age of five demonstrates how TDR-supported projects have significantly reduced the number of severe malaria cases in the participating countries. The supplement of 10 research articles, Malaria in Highly Endemic Areas: Improving Control Through Diagnosis, Artemisinin Combination Therapy, and Rectal Artesunate Treatment, documents the feasibility of managing malaria through timely diagnosis and treatment by community healthcare workers in three very high burden countries. Researchers from African ministries of health and research institutions describe how access was increased to rapid malaria diagnosis, oral artemisinin combination therapy and rectal artesunate treatment for severe malaria in 172 remote, high burden malaria endemic villages.
Approaches that build resilience to climate change

Decision-support processes and tools to build resilience to diseases transmitted by vectors like mosquitoes are now being used for policy and practice changes. The four-year project investigated vulnerable populations in dry land Africa, covering four diseases (African trypanosomiasis, malaria, Rift Valley fever and schistosomiasis) in seven countries (Botswana, Côte d’Ivoire, Kenya, Mauritania, South Africa, Tanzania and Zimbabwe). About 50 scientific articles have been published and 59 young researchers received training and degrees as a result of the project. Stakeholders from the health and environment sectors are now using the results to improve current control strategies for these diseases. A community of practice is actively engaged through the knowledge-sharing platform: VBD-environment.org

Increased evidence base on social innovation for health

Twenty-three case studies on social innovation in health care delivery were completed and made available online, as part of TDR’s Social Innovation in Health Initiative, to provide more evidence on what works and what does not in this area. Four research institutions were selected to receive seed funding to become social innovation hubs. These institutions will promote community-based social innovation in health, convene the various health system actors, lead research to provide evidence on what works and what does not work, and strengthen country capacity.
Expanded data and sharing opportunities

Scientists now have access to tuberculosis clinical trial data from three studies through a multiple partner agreement. This should open up new possibilities for expanded research into this growing disease threat. Two databases of schistosomiasis and soil-transmitted helminths trials were also established and analysed.

Two other initiatives were launched in 2016 – one for countries to share safety data on drug exposures during pregnancy (in collaboration with the WHO HIV/AIDS Department) and another on novel treatments for multidrug resistant tuberculosis (in collaboration with the WHO Global TB Programme). These will generate evidence of drug safety in routine use that is needed to support treatment guidelines.

Implementation research and national capacity expanded

Implementation research to explore system bottlenecks and develop new approaches has been integrated across TDR. Some of the key areas include ensuring elimination of visceral leishmaniasis is sustained in the Indian subcontinent, improving tuberculosis control in West Africa, and addressing national disease and system priorities with 45 small grants in each of the WHO regions.

Capacity to conduct this research has also increased, with integrated training for researchers and disease control programme staff/implementers in Africa and South East Asia. TDR piloted the development of national implementation research strategies and priorities to support prevention and control of TB, malaria and neglected tropical diseases in Ghana, Indonesia and Tanzania.
2016 Key achievements

Research capacity strengthening and knowledge management

Enhanced regional support
The six regional training centres supported by TDR are conducting and disseminating research training courses. A training course on good health research practices involving human subjects is now available in English, French and soon in Spanish. Some of these centres are also involved in the finalization of implementation research training materials.

Fellowships and university training
Under the clinical research and development scheme, twelve fellowships were awarded. By the end of 2016, all seven universities admitted their first cohort of students (a total of 73 Masters and seven PhDs).

Operational research in public health programmes and expanded access for women
The Structured Operational Research and Training Initiative (SORT IT) programmes are for the first time being led and implemented by those in the countries where the research is being conducted. SORT IT has a strong network of trainers in low- and middle-income countries, and the programme has also been included as a component of the new Action Plan to strengthen the use of evidence, information and research for policy-making in the WHO European Region. Women make up 45% of the participants.
New research guidelines and recommendations

TDR published in 2016 several new guidelines and recommendations regarding research practices. These included reporting guidelines for implementation and operational research; two additional reports outlining barriers to, and ways of promoting, the systematic use of implementation/operational research in countries receiving grants from the Global Fund to Fight AIDS, Tuberculosis and Malaria (the Global Fund); and a consultation on the topic that has contributed to the Global Fund making clear its policy in support of implementation/operational research in these countries. The ESSENCE on Health Research initiative of funders published a new good practice document: Six Practices to Strengthen Evaluation of Global Health Research for Development, and a further study analysing consent forms resulted in a proposed new template.

Two countries have developed new prioritized health research agendas as a result of TDR support through the Access and Delivery Partnership. Indonesia published a national strategy for implementation and operational research, and Ghana finalized their national health research agenda and developed a framework for implementation research.

Expanded access to entomology courses

A directory of the courses of medical entomology worldwide has been developed and put into use, and the main findings of the commissioned review were published in Memorias do Instituto Oswaldo Cruz.

Options for a pooled fund for health R&D

The TDR report, Health Product Research & Development Fund: a proposal for financing and operation, was a key resource during global and regional discussions on how a pooled fund for health product research and development (R&D) could be set up under the governance of WHO. Currently, most health products are developed based on their potential future commercial market, and consequently, R&D is still limited for diseases of poverty. Yet every year, over 1.4 billion people, including 500 million children, continue to be affected by diseases such as dengue, malaria and tuberculosis, due to a lack of new drugs, diagnostics and vaccines.

TDR expert network launched

TDR Global, a new platform of more than 2500 current and former TDR grantees, trainees and expert advisers is now online. Members’ bios and publications are in a searchable database so that institutions and researchers can find the needed expertise in their region and thus enhance collaboration. This is also allowing TDR to track the effectiveness of grant and training support on career paths.
New approaches for preventing and controlling dengue

TDR’s long commitment to reducing the toll of dengue is paying off for both that disease as well as two others. Dengue is transmitted by the bite of an *Aedes* mosquito, the same mosquito that also carries the pathogens for Zika and chikungunya.

Zika dominated news headlines in 2016 because of its devastating secondary impact on babies born to women infected during their pregnancy. Yet dengue is one of the fastest spreading diseases in the world. Over 2.5 billion people – over 40% of the world’s population – are at risk from the disease. It is a leading cause of serious illness and sometimes death among children and increasingly adults in many Asian and Latin American countries.

There is no cure or specific treatment, so prevention is critical.

**Reducing mosquito transmission – a community approach**

One of TDR’s first community projects on dengue began in 2006 in urban and semi-urban areas in India, Indonesia, Myanmar, the Philippines, Sri Lanka, and Thailand. Working in partnership with community members, disease control officers and research teams, the search was on to find where the highest rates of mosquito breeding occurred so that new tools could be developed that would block as much of this as possible. The team tried out mechanical lids to cover water storage containers, fish that would eat mosquito larvae, recycling to remove containers that were left outside households and would fill with water, and composting to remove attractions for mosquitoes. Window and door screens were often locally produced and educational materials were designed taking into consideration the cultural and social conditions.

More studies beginning in 2010 were conducted in seven Latin American countries, which resulted in safer environmental approaches led by community members, and significant reductions in mosquito larvae. Several countries are now scaling up these approaches, which may also reduce the risk of Zika and chikungunya.
Better management of dengue cases

While research into prevention methods has been underway, there have also been investigations into how to better manage dengue cases. Even though there is no specific treatment, early detection and access to proper medical care lowers fatality rates below 1%. In close collaboration with the World Health Organization and country and regional disease control programmes, TDR has been guiding research and new training materials in this area.

WHO’s 2009 publication, Dengue: Guidelines for diagnosis, treatment, prevention and control, created a demand for more training. TDR investigated best approaches through research to develop and update materials that would help clinicians recognize the evolution of the course of dengue disease in its various forms of severity, and apply the knowledge and principles of management accordingly. The result was the 2012 Handbook for clinical management of dengue.

Earlier outbreak detection

The following year, work to develop new models and practical guidelines for dengue detection and management began. Dengue affects urban populations, often causing massive hospital overflows during the rainy seasons when the numbers of mosquitoes and virus transmission is high – increasing from 50 cases a week up to 3000 cases on a peak day.

A TDR worldwide panel of experts found that there was no universally accepted or proven set of indicators to detect dengue outbreaks, or proven methods for controlling the Aedes aegypti mosquito that carries the disease, or agreed-upon guidelines for clinical health systems management of outbreaks. There was also scarce information on the costs of outbreaks and understanding of climate factors.

Teams of global and national experts worked together to share and compare data. “It is very rewarding to be working with other countries facing the same challenges, and to learn from them,” said Dr Lokman Hakim Sulaiman, the Deputy Director General of Health for the Ministry of Health in Malaysia during the process. “We know there is no one-size-fits-all, but through this careful analysis of past research and testing new models with our own cases, we should find what works best in each of our countries.”

A pilot of new calculations of dengue alarm indicators that came out of this work increased the ability to predict outbreaks by 80-90% in Brazil, the Dominican Republic, Malaysia, Mexico and Viet Nam. From this, the Operational Guide: Early Warning and Response System (EWARS) for dengue outbreaks was developed. Programme managers now have a user-friendly tool, based on carefully collected and analysed global data, that can help them develop their alarm indicators and plans.
Diagnostic evaluations lead to dramatic reductions in congenital syphilis

In June 2016, Armenia, Belarus, Moldova and Thailand achieved the elimination of mother-to-child transmission of HIV and syphilis – showing that even countries with scarce resources could do it. This success is due to TDR research conducted between 2003 and 2009, and a motivated team committed to ensuring the evidence is used for policy and practice changes.

Syphilis – the silent killer

Syphilis is a sexually transmitted infection caused by a bacterium, Treponema Pallidum. Most infections do not cause any symptoms and yet the effects of a silent infection are devastating: one third of the women infected in pregnancy have a stillborn baby and a third give birth to a baby with congenital syphilis who will have serious complications and may not survive beyond childhood.

Screening in pregnancy is thus vital. Rosanna Peeling, who led diagnostic evaluations at TDR from 2003-2009, could see the critical need for simple but quality-assured diagnostic tools that could identify the infection while the woman was still pregnant. Just one shot of penicillin (costing only a few cents) before the end of her second trimester prevents the infection from being transmitted to the baby.

Documenting quality diagnostics that work in remote field conditions

Dr Peeling came up with criteria for these simple rapid tests – affordable, sensitive, specific, user-friendly, rapid and robust, equipment-free and deliverable to end-users – ASSURED, and initiated an extensive programme of evaluations worldwide that helped to turn the tide of access to diagnostics in detecting infections in the developing world. Her term is now a standard assessment for rapid tests used globally.

The challenge for public health experts was to show these simple rapid tests worked in all representative field settings. The TDR team chose countries with fairly robust health systems such as Brazil and China, but also Haiti, ranked one of the world’s poorest countries, and countries with strong prevention of mother-to-child transmission of HIV programmes such as Peru, Tanzania, Uganda and Zambia, where twinning the screening of HIV and syphilis would increase efficiency and cost-effectiveness.
Policy changes lead to countries adopting rapid syphilis tests

Many countries had limited laboratory infrastructures for the traditional tests that require patients to return for an additional clinic visit to get their test results. In low-income settings, pregnant women often have to travel long distances to reach a health facility that offers laboratory testing. Even when they do manage to get there, they often fail to return for their test results. So these evaluations showing that the rapid tests could work in all these settings helped countries make the shift and implement their screening policy.

In Brazil, public policy changed at the end of 2011 to universally adopt rapid tests into the national public health system. The TDR studies showed the test worked even with populations that were hardest to reach, testing 46,000 indigenous people in the Amazonian region. An astounding 6.5 million rapid tests were done last year nationwide and despite the odds, Brazil is making huge inroads. Between 2010 and 2015, identified cases of congenital syphilis increased more than double.

In China, rapid syphilis tests “fill the coverage gaps in the traditional laboratory-based technologies for detecting the infection,” says Xiang-Sheng Chen, Deputy Director of the National Centre for STD Control in China, who was Principal Investigator for the TDR studies in China.

“They are used to integrating testing into services for high-risk populations in remote and rural areas, as well as for some pregnant women as part of antenatal care, while lab testing continues to be used in large urban areas such as Beijing and Shanghai.” More than 95% of pregnant women are now tested for syphilis in the country.

Signalling its commitment, in 2010 and 2011 the People’s Republic of China launched two national programmes: one for syphilis for all population groups; the other especially for pregnant women to prevent mother-to-child transmission of congenital syphilis. There are still some 3 million syphilis cases in China but indications of a decline.

With early successes from the TDR seven-country study, WHO launched the Global Elimination of Congenital Syphilis Initiative in 2007, later extending it to the dual elimination of mother-to-child transmission of HIV and syphilis. Over the next four years, maternal syphilis infections globally were estimated to have decreased by 38% and adverse pregnancy outcomes such as prematurity, stillbirth and congenital syphilis by 39%.

Rosanna Peeling, reflecting on the impact of this research, said, “The widespread adoption of these new technologies, coupled with political will and a strong investment case, should enable countries to achieve the goal of an HIV- and syphilis-free generation.”
Reducing the malaria death rate among children

A long-term TDR commitment to children who are at the greatest risk of dying from malaria paid off in 2016. A 100 mg artesunate suppository originally developed and tested by TDR, now produced as bioequivalent by Cipla, was placed on the list of malaria pharmaceutical products classified as quality assured by the Expert Review Panel of the Global Fund to Fight AIDS, Tuberculosis and Malaria.

This is the first Good Manufacturing Product artesunate suppository authorized for purchase for pre-referral management of severe malaria by the Global Fund, and marks a major milestone in providing quality treatment for children with severe malaria. Although the WHO Guidelines for the treatment of malaria recommend use of rectal artesunate, there has been no product with WHO prequalification or marketing authorisation by a stringent regulatory authority available for procurement or use. This has prevented malaria endemic countries from using this life-saving treatment.

Children with malaria can deteriorate very quickly and die within 24 hours if they cannot be treated orally or reach injectable treatment quickly. This 2009 publication showed that among 17,000 patients in Bangladesh, Ghana and Tanzania, a single inexpensive artesunate suppository substantially reduced the risk of death or permanent disability. These results were the basis for the product’s inclusion in the WHO Guidelines for treatment of malaria.

Since then, a multi-country study in Ghana, Guinea-Bissau, Tanzania and Uganda has evaluated access and compliance with referral advice when rectal artesunate delivery occurs routinely by trained healthcare workers in their community. More recent work in high burden malaria areas evaluated rectal artesunate as part of a package of commodities (rapid diagnostic tests and artemisinin combination treatment for uncomplicated malaria) delivered by trained community health workers in Burkina Faso, Nigeria and Uganda.
Expanded partnerships to achieve results

In 2014, TDR signed an agreement with Medicines for Malaria Venture (MMV) to make its data available to facilitate further development and WHO pre-qualification of rectal artesunate for pre-referral treatment of children with severe malaria. With UNITAID funding, the TDR data enabled MMV to provide support to the Indian manufacturer Cipla Limited to develop a 100 mg artesunate suppository, and test for bioequivalence prior to submission to WHO prequalification.

The rectal artesunate research and development is an excellent example of the partnership approach to global health. It shows how different groups each provide value. Dr David Reddy, CEO of MMV, says, “Administration of rectal artesunate reduces the risk of death and disability from severe malaria by approximately half, and as a result of the Global Fund’s decision, this vital drug can be made available to more vulnerable patients, helping to save more lives.”
Environmental change

Mitigating the impact of climate change

A four-year project across Africa is analysing how to increase resilience to diseases transmitted by vectors like mosquitoes among vulnerable communities in sub-Saharan Africa and the Sahel region. The reach and audience of VBD-environment.org, the knowledge-sharing platform for this project, is expanding, and work is underway to scale up the use of community-based participation tools and to support further research capacity.

Socioecological strategies

This new research initiative based in South East Asia (Cambodia, Indonesia, the Philippines and Thailand) is focused on the prevention and control of vector-borne diseases, such as dengue, chikungunya and Zika, using socioecological strategies. It includes strong elements of transdisciplinarity and systems thinking, adaptive management and community participation.
Emerging challenges

Developing a global response to vector-borne diseases

The explosive spread of Zika has highlighted the dire need for effective global capacity to combat vector-borne diseases, particularly in urban centres. Since 2015 alone, 65 countries have reported cases of this devastating disease that has been linked to severe brain abnormalities in infants. WHO Member States have called on the Director-General to develop a Global Vector Control Response in collaboration with affected countries and other relevant stakeholders. TDR is working with the Global Malaria Programme and the Department of Control of Neglected Tropical Diseases.

Malaria elimination: understanding insecticide resistance and the burden and causes of residual malaria

Studies continue on understanding the impact of insecticide resistance on the current core prevention tools to control malaria, as well as the causes of residual malaria – which occurs despite good treatments and preventive strategies put in place. Six projects in Benin, Brazil, Mali, Nigeria, Papua New Guinea, Peru, Thailand and Viet Nam are examining insecticides used, mosquito net utilization and potential resistance of insecticides, as well as the burden of residual malaria and the potential causes, such as mosquito and human behaviours and environmental changes.

Caribbean regional network on vector-borne emerging diseases

The Caribbean region comprises a great diversity of environmental, social and economic conditions, with weak connections existing between the territories. TDR is helping this new network to better address the exchange of surveillance information on the circulating vector-borne diseases, share facilities and collaborate.

Identifying alternative methods of vector control of emerging arboviruses

The control of diseases transmitted by vectors in poor countries relies mainly on the use of chemical insecticides, which are at risk of parasite resistance. New methodologies developed for agricultural pests may provide options. TDR is supporting a systematic review of the literature in this area, with the goal of developing an international network of scientists from both public health and agriculture to interact and exchange experiences, and identify research and implementation priorities.
Work in 2017 and beyond. Research

Social and community dynamics
This area of focus analyses how all levels of a community can participate in the prevention of disease transmission, and be actively involved in the control of vector-borne diseases.

Increasing capacity for social innovation
The Social Innovation in Health Initiative is supporting the establishment of social innovation research hubs and research in low- and middle-income countries. In collaboration with the Pan American Health Organization/WHO Regional Office for the Americas, innovations are being mapped in Latin America and case studies developed. Guidance for social innovation research is being developed, and the web-based knowledge sharing platform continues for future expansion.

Developing new strategies for urban health
By 2050, around three quarters of the global population will be living in urban conglomerations, mainly in low- and middle-income countries. Mobility, poverty, inequality and climate change are some of the drivers of health risks in urban settings, including infectious diseases such as dengue, influenza (avian, swine flu), urban malaria, leishmaniasis, lymphatic filariasis, rabies and water-borne diseases, tuberculosis and AIDS. Disastrous urban epidemics of dengue and Chikungunya viruses with a breakdown of social services including health care delivery have been reported in recent years. An analysis on research gaps in vector control in urban areas is being conducted.

Innovation facilitation
TDR brings together experts to identify gaps in tools and interventions that control infectious diseases, and help get these interventions in use. Currently, this includes standardising methodologies of clinical trials for cutaneous leishmaniasis, and supporting the registration dossier for moxidectin for onchocerciasis control (passed on to an outside company for final development).
Sustained effectiveness of available interventions

Preventing parasite resistance in prevention programmes

 Helminths are parasitic worms, and they are the most common infectious agents among people in low- and middle-income countries. Prevention is the key strategy. TDR is supporting new models that estimate how fast resistant parasites would spread under current and alternate control strategies for onchocerciasis, lymphatic filariasis, soil-transmitted helminths and schistosomiasis. Genetic markers are being assessed to see whether they can replace current invasive methods used to measure onchocerciasis treatment effects.

Developing methods to monitor drug resistance to malaria mass drug administration

Research is helping national malaria control programmes detect the emergence of drug resistance during mass drug administration. In 2016, some 18 million children received preventive treatment for malaria during the rainy season in West and Central Africa. This means there is a vast pool of parasites at risk of drug resistance to amodiaquine and sulphadoxine/pyrimethamine (AQ-SP) now and in the future.

Strengthened evidence bases

Improved and shared data

TDR promotes, supports and contributes to databases that can strengthen the evidence base. This leads to better informed treatment policy decisions, and the identification of research gaps. Two open databases that were launched in 2016 are now being used by researchers across the globe for broader investigations: The TB-Platform for Aggregation of Clinical TB Studies (TB-PACTS) on tuberculosis clinical trials, and the helminths data-sharing platform of 12 000 individual patient records of schistosomiasis and soil-transmitted helminth infections treated with standard medications.

With the WorldWide Antimalarial Resistance Network (WWARN), TDR is recruiting new members for the independent Data Access Committee (DAC). Members of the committee will help WWARN develop and implement an updated technical, governance and ethical data sharing framework, which allows data contributors to delegate decisions about data access and use to this independently appointed committee, thus expanding access.

Increasing drug safety monitoring

A central database was set up in 2016 to collect data on pregnancy exposure registries, and another one on global active drug safety monitoring and management of anti-tuberculosis drugs. These data are now being analysed and will be shared so that countries can use this pooled data to evaluate potential safety issues and improve oversight of trials of new treatments. Additional data are being analysed for treatment trials on Loa loa and cutaneous leishmaniasis, and for safety monitoring at the community level for mass drug administration. In addition, under the scope of the Access and Delivery Partnership, safety monitoring capacity is being strengthened in Ghana, Indonesia and Tanzania.

Improving the use of modeling for research guidelines

TDR is bringing together modelers and technical experts to develop guidelines on when to incorporate modelling into World Health Organization recommendations. These should help guideline developers strengthen their recommendations.
Work in 2017 and beyond. Research

Optimized implementation of public health programmes

Improving dengue epidemic alerts
TDR is working with country control programmes and researchers to identify signals that can alert country control programmes to an impending dengue outbreak so that they can react quickly and efficiently to curb the epidemic. This has led to a model contingency plan that countries are testing and validating, and research is examining how it could be applied to other arboviral diseases such as Zika and chikungunya.

Reaching every last case of visceral leishmaniasis in South-East Asia
The most suitable interventions for the post-elimination phase of visceral leishmaniasis are being tested in Bangladesh and Nepal. This is taking place in areas where the number of diagnoses is low, so that the most efficient ways of following up these cases can be identified. This includes research into diagnostics, and vector control with community managed tools and social mobilization.

Moving toward onchocerciasis elimination
New WHO guidelines provide the methodology and criteria for when it’s safe to stop onchocerciasis control in a transmission zone. However, countries need to know how to determine these zones. TDR is helping to develop tools for this purpose that African countries, faced with vast onchocerciasis endemic areas that cross country borders, can use.

Improving fever management
TDR is leading research on the microbiological causes of severe infection in young infants in rural Africa, to inform guidelines for first line antibiotics treatment. Data on the pathogens causing infection in babies born at home are scarce, particularly for infections in the first weeks and months of life.
Improving tuberculosis control

A collaborative regional model approach is being piloted in West Africa. The project is focused on increasing the use of operational and implementation research to address national and regional research priorities. Sixteen pilot projects on tuberculosis research priorities have already been developed. Another project, RAFAscreen, is defining the most appropriate tuberculosis screening strategies for diabetic and HIV patients (who are at higher risk of this disease) and piloting this in Benin, Guinea and Senegal at all levels of the healthcare system.
Increasing research capacity in national ministries of health

National programme managers need to identify problems which impede optimal implementation, identify potential solutions and motivate decision-makers to invest in these solutions. However, few have research training that could help them conduct this analysis. TDR is helping to increase this capacity. In Ghana, Indonesia and Tanzania, staff in the ministries of health, national research institutions and academia are working together to conduct research that helps meet a variety of health goals, including the elimination of lymphatic filariasis, improved tuberculosis case detection and optimized preventive malaria treatment for pregnant women.

The Structured Operational Research and Training (SORT IT) initiative, after several years of working with countries around the globe to identify system bottlenecks, is now supporting sub-regions and countries to establish their own facilitation for this training and practice. This capacity, which includes producing issue briefs for policy is being embedded in national ministries of health.

Establishing clinical research during outbreaks training

The conduct of clinical research during epidemics poses special challenges and historically has been inadequate. The Clinical Research During Outbreaks (CREDO) training curriculum is supporting researchers in low- and middle-income countries to generate clinical evidence during outbreaks of infectious diseases. The curriculum will encompass the full spectrum of activities, from gathering good quality descriptive clinical data right through to clinical trials of experimental therapeutic interventions.

Expanding implementation research training

The Implementation Research Toolkit is being updated and provided in a more interactive, online form. In addition, a Massive Open Online Course (MOOC) is being developed that will provide an introduction to the topic, with video lectures and case studies. A short training course on basic principles in implementation research has been developed by the regional training centres network supported by TDR. These will be available in English and French.
Regional training centres collaborate
The six regional training centres supported by TDR will continue to institutionalize training courses in good health research practices, and further develop collaborative training courses.

Postgraduate training continues
This scheme that supports Masters degrees and PhDs focused on implementation research is planned through 2019. Coordinators and selected faculty members from the seven universities involved in the postgraduate support scheme continue to meet to share best practices.

Testing new approaches to providing research evidence to control programmes
The COSMIC project has studied scheduled screening and treatment of malaria by community healthcare workers among pregnant women in three African countries. Policy panels have been held to explore methods for transferring these research results to policy and practice improvements. Video interviews of the pregnant women, midwives, community health workers and leaders are one of the innovations being tested.

Further support to the pooled fund for health R&D analysis
Currently, most health products are developed based on their potential future commercial market, and consequently, R&D is still limited for diseases of poverty. Yet every year, over 1.4 billion people, including 500 million children, continue to be affected by diseases such as dengue, malaria and tuberculosis, due to a lack of new drugs, diagnostics and vaccines. Following the 2016 TDR publication, Health Product Research & Development Fund: a proposal for financing and operation, additional supporting materials are being developed – an operational plan with case studies on leishmaniasis and schistosomiasis, and a directory of health product profiles. These are being discussed at the 70th World Health Assembly in 2017 and other venues, as part of the process to create a fairer system of R&D for diseases affecting developing countries.

New resources under development
• A new online course for researchers and disease control practitioners to build capacity for gender-based data analysis. The goal is to increase understanding of gender considerations for health under a changing climate, incorporating gender awareness and sensitivity for intervention and control programmes of diseases transmitted by vectors such as mosquitoes.
• The largest known database on loiasis African eye worm, through strengthened country capacity, to analyse the long-term efficacy and safety of mass preventive treatment.

Capacity for modelling expanded
Modelling is becoming more important for areas such as economic/cost-effectiveness analysis of interventions, assessment of the potential effect of interventions on transmission, morbidity or mortality and for aiding decisions on interventions required to achieve specific objectives. Modelling fellowships have been piloted and will be expanded.

TDR global expands networking options
TDR Global, a new platform of more than 2500 current and former TDR grantees, trainees and expert advisers is growing. Members’ bios and publications are in a searchable database so that institutions and researchers can find needed expertise. Other opportunities for visibility and networking are being developed, such as online talks and regional meetings.
Key publications and resources

TDR has a goal of supporting researchers in disease endemic countries to conduct research and lead the writing and publication of the research findings. The percentage of peer-reviewed publications coming from these countries was 80% in 2016, up from 75% the previous year. The proportion of first authors was also high – 73%, compared to 62% the previous year. This is a good indicator of the quality and experience of investigators, since first authors are usually the lead investigators of the research project. All TDR publications are freely available to anyone.

Research and capacity strengthening publications

**Operational Guide: Early Warning and Response System (EWARS) for dengue outbreaks**

This publication is designed to provide programme managers with a user-friendly tool that can: (i) analyse and draw conclusions from historic dengue datasets; (ii) identify appropriate alarm indicators that can sensitively and specifically predict forthcoming outbreaks at smaller spatial scales; and (iii) use these results and analyses to predict and build an early warning system to detect dengue outbreaks in real-time.

**Technical handbook for dengue surveillance, dengue outbreak prediction/detection and outbreak response**

This model contingency plan assists programme managers and planners in developing a national, context-specific, dengue outbreak response plan. It helps: (a) detect a dengue outbreak at an early stage through clearly defined and validated alarm signals; (b) precisely define when a dengue outbreak has started; and (c) organize an early response to the alarm signals or an "emergency response" once an outbreak has started.

**Report on the WHO/TDR consultation on promoting implementation/operational research in countries receiving grants from the Global Fund to Fight AIDS, Tuberculosis and Malaria**

This report covers the TDR consultation on 9-10 December 2015 in Geneva to promote implementation and operational research in countries receiving grants from the Global Fund. The focus was on malaria, tuberculosis and TB/HIV, identifying barriers to the systematic use by programmes of implementation/operational research, and ways of overcoming those barriers. It also addressed the key factors in planning how to undertake this type of research, the capacity to conduct it, coordination among partners and knowledge management.

**Key enabling factors in effective and sustainable research networks**

This report outlines findings from a qualitative research study on health research networks. It identified several advantages in setting up or sustaining networks.
Using the TDR global competency framework for clinical research
Development of the TDR global competency framework for clinical research

These two publications provide a flexible framework and set of tools to help develop clinical research. They include a competency wheel of 50 competencies required for a research team, a competency dictionary, grading system, and role-specific frameworks.

Health product research & development fund: a Proposal for financing and operation
The WHO Director-General requested TDR to explore the possibility of using TDR’s existing governance mechanism to host a pooled fund raised by WHO. This report was the first attempt to provide an analysis of the current R&D landscape for diseases of poverty, and to propose how to de-link the cost of these products from their research and development.

From the ESSENCE on health research group
Planning, monitoring and evaluation framework for research capacity strengthening

This document is the 2016 revision of the 2011 edition and incorporates an up-to-date literature review and feedback from the users of the original version. ESSENCE funders jointly contributed their experiences of evaluation of research capacity strengthening in the process of development and revision of the document.

Six practices to strengthen evaluation of research for development
This good practice document is designed for organizations that fund and support research for development and have a stake in the effective evaluation of these projects. It was produced by ESSENCE on Health Research, an initiative of funding agencies to improve the coordination and harmonization of research capacity investments.

Reports about TDR

TDR: Health research that makes an impact
This brochure provides an overview of TDR. It outlines the vision, mission, values and achievements. It provides examples of key current work areas and approach, and the governance model.

TDR – Sixth External Review
This mandated review conducted in 2015 investigated and analysed the strategic direction of TDR and its specific niche, in order to contribute to the strategy for the period 2018 onwards.

TDR 2015 annual report
This report provides an overview of the 2015 key research achievements and ongoing progress: research capacity building and research priority setting activities; publications and resources; governance and management; performance overview, financial summary and contributor list.

TDR 2015 Results Report
The TDR Results Report illustrates progress made against the 23 key performance indicators that are part of the monitoring and evaluation matrix, in line with the current Performance Assessment Framework.
Governance and management

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 Ren Minghui, who heads the HIV/AIDS, Tuberculosis, Malaria and Neglected Tropical Diseases Cluster, and is an Assistant Director-General of WHO. Day-to-day management is provided by the TDR Director. Thirty full-time staff come from all regions of the world.

TDR’s top governing body is its Joint Coordinating Board (JCB), which includes a mix of representatives from developed and developing countries (see figure 1). A Standing Committee composed of representatives from the four co-sponsoring agencies, the Chair and the Vice-Chair of the JCB, the Chair of 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 paragraph 2.2.2 or paragraph 2.2.3 of the TDR MOU), provides guidance and oversight on an ongoing basis. Programmatic and technical review comes from the Scientific and Technical Advisory Committee (STAC), which includes 15 internationally recognized scientists. Members serve in their personal capacities to represent the range of research disciplines.
Joint Coordinating Board (JCB)
The Board comprises 28 members: 12 members selected by the resource contributors to the Programme (including six constituencies of two 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.

Membership of the Scientific and Technical Advisory Committee (STAC)

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Affiliation</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Chair) Charles MGONE</td>
<td></td>
<td>Dar es Salaam, Tanzania</td>
<td>2014-2017</td>
</tr>
<tr>
<td>Maria Teresa BEJARANO</td>
<td>Senior Research Advisor</td>
<td>Unit for Research Cooperation</td>
<td>Deptartment for Partnerships and Innovations, Sida, Stocksund, Sweden</td>
</tr>
<tr>
<td>Graeme BILBE</td>
<td>Research and Development Director</td>
<td>Drugs for Neglected Diseases initiative (DNDi), Geneva, Switzerland</td>
<td>2014-2017</td>
</tr>
<tr>
<td>Moses BOCKARIE</td>
<td>Director for Neglected Tropical Diseases, Liverpool School of Tropical Medicine, Liverpool, United Kingdom</td>
<td>2014-2017</td>
<td></td>
</tr>
<tr>
<td>Claudia CHAMAS</td>
<td>Researcher</td>
<td>Centre for Technological Development in Health</td>
<td>Oswaldo Cruz Foundation (Fiocruz), Rio de Janeiro, Brazil</td>
</tr>
<tr>
<td>Sónia DIAS</td>
<td>Associate Professor, Departament of Public Health</td>
<td>Faculty of Medical Sciences, Instituto de Higiene e Medicina Tropical, Lisbon, Portugal</td>
<td>2016-2017</td>
</tr>
<tr>
<td>Sara Irène EYANGOH</td>
<td>Scientific Director, Centre Pasteur of Cameroon (CPC), Yaoundé, Cameroon</td>
<td>2016-2017</td>
<td></td>
</tr>
<tr>
<td>John GYAPONG</td>
<td>Pro-Vice Chancellor for Research Innovation and Development, University of Ghana, Accra, Ghana</td>
<td>2014-2017</td>
<td></td>
</tr>
<tr>
<td>Poloko KEBAABETSWE</td>
<td>Director Health Systems Research Unit, BoMEPI - Botswana Medical Education Partnership Initiative</td>
<td>University of Botswana School of Medicine, Gaborone, Botswana</td>
<td>2012-2016</td>
</tr>
<tr>
<td>Florencia LUNA</td>
<td>Director, Bioethics Program of FLACSO, Latin American University of Social Sciences, Ciudad de Buenos Aires, Argentina</td>
<td>2012-2016</td>
<td></td>
</tr>
<tr>
<td>Lenore MANDERSON</td>
<td>Professor, School of Public Health, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa</td>
<td>2012-2016</td>
<td></td>
</tr>
<tr>
<td>Frank NYONATOR</td>
<td>Gro Harlem Brundtland Senior Leadership Fellow, Harvard School of Public Health, Boston MA, USA</td>
<td>2014-2017</td>
<td></td>
</tr>
<tr>
<td>Rosanna PEELING</td>
<td>Chair of Diagnostics Research, Department of Clinical Research, ITD, London School of Hygiene &amp; Tropical Medicine, London, United Kingdom</td>
<td>2014-2017</td>
<td></td>
</tr>
<tr>
<td>Xiao-Nong ZHOU</td>
<td>Director, National Institute of Parasitic Diseases; Chinese Center for Disease Control and Prevention, Shanghai, China</td>
<td>2014-2017</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Membership of the TDR Joint Coordinating Board (1 January 2015 to 31 December 2016)
TDR strategy 2012-2017: strong and effective implementation

The five-year strategy covering 2012-2017 is on track to meet strategic goals. Financial planning has ensured strong implementation, with 55% of biennial planned costs at the end of 2016. In February 2017, planned costs were revised to meet expected funding. All major projects within this strategy are expected to be completed on time and within budget by the end of 2017.

In June 2016, the TDR Joint Coordinating Board (JCB) approved two budget scenarios for the biennium 2018 - 2019, one at US$ 40 million and the other at US$ 50 million. These will be implemented in a stepped approach as funds become available. The two scenario model was developed to help manage the uncertainty of income and allow a confident start to implementation. A number of donors had to reduce their contribution to TDR in 2016 due to the global economic situation. This has led to a more conservative forecast for 2018-19. TDR has increased fundraising efforts among both new and existing donors, focusing on the priorities of the 2018-23 strategy.
Figure 2: Financial situation at end 2016 (US$ million)

Figure 3: Financial outlook 2018-19 (US$ million)
TDR uses its Performance Assessment Framework to measure progress in the implementation of its vision and strategic plan. Key performance indicators (see following table) have been developed in consultation with TDR stakeholders. These help assess not only what TDR does (TDR achievements and its contribution to changes in countries) but also how it does it (application of core values and management performance). Measurements are compiled in the annual TDR Results Reports: www.who.int/tdr/publications/about-tdr

In 2016, measurements showed progress was made not only on what we deliver, but also how we work. The key performance indicators that measure equity, for example, showed significant advances. For the first time, the proportion of TDR funds granted to women increased to 40% of the total, and the average amount of a grant awarded was equal across genders. A majority of TDR expert advisers and committee members in 2016 were women.

### Performance overview

TDR uses its Performance Assessment Framework to measure progress in the implementation of its vision and strategic plan. Key performance indicators (see following table) have been developed in consultation with TDR stakeholders. These help assess not only what TDR does (TDR achievements and its contribution to changes in countries) but also how it does it (application of core values and management performance). Measurements are compiled in the annual TDR Results Reports: www.who.int/tdr/publications/about-tdr

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### Performance overview

#### Technical expected results

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Outcome:</strong> Infections disease knowledge, solutions and implementation strategies translated into policy and practice in disease endemic countries (DECs)</td>
<td>1. Number and proportion of innovative knowledge, new/improved solutions or implementation strategies successfully applied in developing countries</td>
<td>0</td>
<td>30 ±75%</td>
<td>24 (+4)</td>
<td>Measured annually, cumulative over 6 years</td>
</tr>
<tr>
<td></td>
<td>2. Number of tools and reports that have been used to inform policy and/or practice of global/regional stakeholders or major funding agencies</td>
<td>0</td>
<td>7</td>
<td>8 (+4)</td>
<td>Measured annually, cumulative over 6 years</td>
</tr>
<tr>
<td><strong>Main output:</strong> New and improved solutions and implementation strategies that respond to health needs of disease endemic countries developed</td>
<td>3. Number and proportion of innovative knowledge, new/improved solutions or implementation strategies developed in response to requests from WHO control programmes and/or diseases endemic countries</td>
<td>0</td>
<td>35 ±87%</td>
<td>36 (+15)</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>4. Number of peer-reviewed publications supported by TDR and percentage published in open access journals</td>
<td>233 Not measured</td>
<td>≥150/ year 100%</td>
<td>901 (2012-2016) (+161 in 2016) 80% open access (2016)</td>
<td>Measured annually</td>
</tr>
<tr>
<td><strong>Feeder outputs:</strong> High quality intervention and implementation research evidence produced</td>
<td>5. Number and evidence of new/improved tools, case-management, control or implementation strategies generated through TDR facilitation with systematic quality review by external committees</td>
<td>0</td>
<td>40</td>
<td>36 (+15)</td>
<td>Measured annually, cumulative over 6 years</td>
</tr>
<tr>
<td></td>
<td>6. Proportion of peer-reviewed publications supported by TDR with first author from DEC institutions</td>
<td>61%</td>
<td>≥70%</td>
<td>73%</td>
<td>Measured annually</td>
</tr>
<tr>
<td><strong>Enhanced research and knowledge transfer capacity within disease endemic countries</strong></td>
<td>7. Number of DEC institutions and/or networks demonstrating expanded scope of activities and/or increased funding from alternative sources thanks to TDR support</td>
<td>0</td>
<td>5</td>
<td>5 (+2)</td>
<td>Measured annually, cumulative over 6 years</td>
</tr>
<tr>
<td></td>
<td>8. Number of TDR grantees/trainees and proportion demonstrating career progression and/or increased scientific productivity</td>
<td>0</td>
<td>150 ±80%</td>
<td>58/68 (2014) 85% (2014) 410 new trainees (+92 in 2016)</td>
<td>Measured on cohorts 3-5 years after training ended</td>
</tr>
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</table>
## Application of core values

### Equity

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<tr>
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<tbody>
<tr>
<td>Key stakeholders in disease endemic countries engaged in setting the research agenda and ensuring research reflects their needs</td>
<td>9</td>
<td>9</td>
<td>0 (0)</td>
<td>Measured annually, cumulative over 6 years</td>
</tr>
<tr>
<td>9. Number and evidence of research-related agendas, recommendations and practices agreed by stakeholders at global, regional or country level</td>
<td>0</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Proportion of TDR outputs produced with key DEC stakeholder active involvement</td>
<td>Not measured</td>
<td>100%</td>
<td>100%</td>
<td>Measured annually</td>
</tr>
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</table>

### Social and economic

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<tr>
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</thead>
<tbody>
<tr>
<td>11. Proportion of TDR grants/contracts awarded to institutions or individuals in DECs (total count and total dollar amount)</td>
<td>59% DEC</td>
<td>75% DEC</td>
<td>82% DEC (amount) 75% DEC (count)</td>
<td>Measured annually</td>
</tr>
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</table>

### Gender

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</thead>
<tbody>
<tr>
<td>12. Proportion of experts from DECs on TDR advisory committees</td>
<td>58%</td>
<td>60%</td>
<td>72%</td>
<td>Measured annually</td>
</tr>
<tr>
<td>13. Proportion of women among grantees/contract recipients (total count and total amount)</td>
<td>35% (n) 17% ($)</td>
<td>50%</td>
<td>41% (% count) 40% (% amount)</td>
<td>Measured annually</td>
</tr>
<tr>
<td>14. Proportion of women on TDR advisory committees</td>
<td>32%</td>
<td>50%</td>
<td>54%</td>
<td>Measured annually</td>
</tr>
<tr>
<td>15. Proportion of women as first author of peer-reviewed publications supported by TDR (within a calendar year)</td>
<td>Not measured</td>
<td>50%</td>
<td>39%</td>
<td>Measured annually</td>
</tr>
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</table>

### Effective partnerships

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</thead>
<tbody>
<tr>
<td>16. Resources leveraged as direct contributions (co-funding, services or in-kind) to TDR projects (examples)</td>
<td>Not measured</td>
<td>tbd</td>
<td>$ 1:1 (2015) ($ TDR : $ partners) People 1:17 (2015) (TDR : in the field) To be measured end of 2017</td>
<td>Measured in the second year of each biennium</td>
</tr>
</tbody>
</table>

### Sustainability of outcomes

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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>17. Number of effective public health tools and strategies developed which have been in use for at least two years</td>
<td>51</td>
<td>67</td>
<td>75 (2015) To be measured end of 2017</td>
<td>Measured in the second year of each biennium</td>
</tr>
</tbody>
</table>

### Quality of work

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<tr>
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</thead>
<tbody>
<tr>
<td>18. Proportion of project final reports found satisfactory by peer-review committees</td>
<td>Not measured</td>
<td>&gt;80%</td>
<td>To be measured end of 2017</td>
<td>Measured in the second year of each biennium</td>
</tr>
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</table>

### Management performance

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<tr>
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</thead>
<tbody>
<tr>
<td>Effective resource mobilization</td>
<td>78%</td>
<td>≥100%</td>
<td>To be measured end of 2017</td>
<td>Measured in the second year of each biennium</td>
</tr>
<tr>
<td>19. Percentage of approved biennial budget successfully funded</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Percentage of income received from multi-year agreements</td>
<td>Not measured</td>
<td>tbd</td>
<td>To be measured end of 2017</td>
<td>Measured in the second year of each biennium</td>
</tr>
<tr>
<td>Effective management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Percentage of staff workplans and performance reviews (including personal development plan) completed on time</td>
<td>Not measured</td>
<td>≥90%</td>
<td>100%</td>
<td>Measured annually</td>
</tr>
<tr>
<td>22. Proportion of expected results on track</td>
<td>60%</td>
<td>≥80%</td>
<td>89%</td>
<td>Measured annually</td>
</tr>
<tr>
<td>23. Proportion of significant risk management action plans that are on track</td>
<td>Not measured</td>
<td>≥80%</td>
<td>100%</td>
<td>Measured annually</td>
</tr>
</tbody>
</table>
## Contributions table

### TDR 2016 revenue

<table>
<thead>
<tr>
<th>Contributor</th>
<th>Amount (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core contributors</strong></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>1,114,827</td>
</tr>
<tr>
<td>China</td>
<td>55,000</td>
</tr>
<tr>
<td>Cuba</td>
<td>5,000</td>
</tr>
<tr>
<td>Germany</td>
<td>665,927</td>
</tr>
<tr>
<td>India</td>
<td>110,000</td>
</tr>
<tr>
<td>Japan</td>
<td>280,000</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>1,133,787</td>
</tr>
<tr>
<td>Malaysia</td>
<td>25,000</td>
</tr>
<tr>
<td>Mexico</td>
<td>30,000</td>
</tr>
<tr>
<td>Nigeria</td>
<td>302,602</td>
</tr>
<tr>
<td>Norway</td>
<td>952,268</td>
</tr>
<tr>
<td>Spain</td>
<td>42,463</td>
</tr>
<tr>
<td>Sweden</td>
<td>4,031,277</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1,685,393</td>
</tr>
<tr>
<td>Thailand</td>
<td>41,911</td>
</tr>
<tr>
<td>Turkey</td>
<td>5,000</td>
</tr>
<tr>
<td>United Kingdom of Great Britain and Northern Ireland</td>
<td>3,053,435</td>
</tr>
<tr>
<td>World Health Organization</td>
<td>801,560</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>1,719</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>14,337,170</strong></td>
</tr>
<tr>
<td><strong>Contributors providing specific project funding</strong></td>
<td></td>
</tr>
<tr>
<td>Bill &amp; Melinda Gates Foundation</td>
<td>2,080,582</td>
</tr>
<tr>
<td>International Union Against Tuberculosis and Lung Disease (IUATLD)</td>
<td>340,000</td>
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<tr>
<td>Switzerland</td>
<td>128,205</td>
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<tr>
<td>United Nations Development Programme (UNDP)</td>
<td>1,194,604</td>
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<tr>
<td>U.S. Agency for International Development (USAID)</td>
<td>628,103</td>
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<td><strong>Subtotal</strong></td>
<td><strong>4,371,494</strong></td>
</tr>
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<td><strong>TOTAL CONTRIBUTIONS</strong></td>
<td><strong>18,708,664</strong></td>
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</table>
The Special Programme for Research and Training in Tropical Diseases (TDR) is an independent global programme of scientific collaboration established in 1975. It has a twin mission to improve existing and develop new approaches for preventing, diagnosing, treating, and controlling neglected infectious diseases, and to strengthen the capacity of developing endemic countries to undertake this research and implement the new and improved approaches. TDR is sponsored by the following organizations: