2022 Annual Report

The Structured Operational Research and Training Initiative on tackling antimicrobial resistance in Africa, Asia and Latin America

Progress, Achievements, Challenges
Background

The Structured Operational Research and Training Initiative (SORT IT) is a global partnership-based initiative coordinated by TDR, the UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases. SORT IT seeks to make countries and institutions “data rich, information rich and action rich”, thereby building health system resilience, enhancing programme performance and improving public health. The SORT IT model combines research training and research implementation with a hands-on (learning by doing) approach that empowers front-line health workers and new trainers.

Key success indicators: research implementation, capacity building and health systems strengthening.

- 74 research studies completed in seven countries
- 64 studies published (by Dec 2022)
- 71% of research had an impact on policy and/or practice
- 69 implementing institutions became part of the AMR-SORT IT partnership
- 25% of trainees became mentors after one training cycle
- 86% of trainees are applying SORT IT acquired skills to tackle AMR
- 56% of trainees are applying SORT IT acquired skills to the COVID-19 response
- 64% of trainees completed a new research study

For more on AMR-SORT IT, go to https://tdr.who.int/activities/tackling-antimicrobial-resistance
SORT IT for tackling antimicrobial resistance

In January 2019, the Government of the United Kingdom of Great Britain and Northern Ireland, represented by its Department of Health and Social Care, through the National Institute of Health Research (NIHR), committed designated funding for tackling antimicrobial resistance (AMR). This is now referred to as the AMR–SORT IT.

Aim

Build sustainable operational research capacity to generate and utilize evidence to tackle the emergence, spread and health impact of AMR in low- and middle-income countries (LMICs).

How?

Strong engagement with World Health Organization (WHO) country offices, AMR committees and SORT IT partners in addressing country priorities and catalysing the evidence to action cycle. There are integrated performance targets and metrics for accountability.

Where?

Seven-countries (Figure. 1)

Who?

Health workers from all levels of the health system and decision-makers

Scientific scope

Research priorities are tailored to national AMR action plans and local needs. Reinforced by country ownership, the SORT IT project aims to make each of the five pillars of AMR action plans “data rich, information rich and action rich.”

Desired impact

Strengthened health systems, better programme performance and improved public health.

Figure 1. Target countries for the AMR–SORT IT project
The five pillars of the AMR action plan

1. Improve awareness and understanding
   - Risk communication
   - Education

2. Strengthen surveillance and research
   - National AMR surveillance
   - Laboratory capacities
   - Research and development

3. Reduce incidence of infection
   - IPC health care
   - Community level prevention
   - Agriculture and Animals

4. Optimize use of antimicrobials
   - Access to qualified antimicrobial medicines regulations
   - Use in veterinary and agriculture

5. Sustainable investment in countering AMR
   - Measuring the burden of AMR
   - Assessing investment needs
   - Establishing procedures for participation

*Figure 2.* Strategic pillars of the AMR action plan
The AMR–SORT IT cycle

The AMR–SORT IT is geared to catalyse the evidence-to-action cycle from defining relevant research to ensuring uptake of research findings. We train those embedded within health systems and try to enable the structures and processes needed for evidence-informed decision-making. SORT IT thus embraces the ‘Train, Embed, Retain and Enable’ strategy for individuals working within health systems. This approach is in line with WHO’s Thirteenth General Programme of Work, 2019–2023. The AMR–SORT IT research cycle is shown in Figure 3.

More details on the AMR-SORT IT are available at: https://tdr.who.int/docs/librariesprovider10/flyers/amr_sort_itflyer.pdf?sfvrsn=373811e7_1

Figure 3. The AMR–SORT IT research cycle
2. How are value for money and the outputs of AMR-SORT IT achieved?

Good value for money of SORT IT continues due to TDR’s established convening power, global networking capacity, use of SORT IT technical know-how and the trained human resource pool that has been built over the past decade. The deployment of an online training platform has increased efficiencies, by allowing projects to continue and at lower costs, despite being significantly delayed due to COVID-19. To promote effectiveness and impact, we have continued to engage with those expected to use the research results, such as members of the AMR committees, WHO country offices and disease control programmes. To maximize the opportunities for research uptake, we have improved ‘effective communication of research evidence’. Participant selections promote gender and geographic equity and first authorship from low- and middle-income countries (LMICs). These achievements have reinforced TDR’s coordination role, improved TDR partnerships and elevated TDR’s position to new levels of strength and international recognition.
3. Overall summary of progress (2019–2022)

Main highlights of the fourth year (2022):

**Research has impact and is strengthening health systems against AMR and COVID-19.**

Of the first 36 SORT IT studies from Asia and Africa that were assessed 12 months after completion, 71% influenced policy and/or practice. In terms of applying acquired skills from SORT IT, 86% of trainees are applying their skills to AMR practice, 56% to the COVID-19 response and 64% completed a new research study. To date, 25% of those trained became mentors after one training cycle. These figures indicate collateral benefits to the health system and capacity built.

**High-quality, policy/practice relevant research was rapidly published and capacity built.**

The SORT IT online training platform, which was developed to overcome COVID-19 restrictions on travel and gatherings, continues to be used in a hybrid manner. Seventy-four locally relevant research studies from the human, agricultural and environmental sectors ('One Health') were completed and 65 were published in a record time of less than 10 weeks after submission without compromising rigorous peer review. These are local research, for local solutions, with local ownership. In 2022 alone, 36 studies from Colombia, Ecuador, Ghana and Sierra Leone were completed. Such expedited peer-reviewed publications aim to ensure timely evidence for decision-making.

Research capacity was built through training four groups at the same time on each project: 1) front-line workers and programme staff; 2) SORT IT alumni; 3) academia; and 4) WHO country office staff. The average number of individuals trained per research study is 3.0.

**Improved research communication.**

Trainees continue to benefit from the newly developed training module (SORT IT module 4) on 'effective communication of research findings', maximizing the opportunities for research uptake. A total of 215 individuals from various institutions benefited from this module. We also successfully integrated three-minute lighting videos below the scientific abstracts on journal websites. This is a pioneering and unprecedented step in further enhancing research dissemination and research uptake through engagement with scientific journals.

**Expanded global collaborations.**

The AMR–SORT IT network was expanded to include 69 implementing partners in 30 countries in Asia, Africa, the Americas and Europe, including 80% mentors from the south and 40% SORT IT alumni. Close collaboration is maintained with AMR coordinating committees and WHO regional and country offices.
4. Details of outputs in 2022

1. Research impact

1.1. Research is having an impact and strengthening health systems to tackle AMR and COVID-19

Of the first 36 SORT IT studies from Asia and Africa that were assessed through a survey 12 months after completion, 71% have influenced policy and/or practice.

If research is to have impact and change health outcomes for the better, the research findings should be translated into recommendations that can shape policy and/or practice and SORT IT is invaluable for this purpose.

Dr Thomas Samba,
Chief Medical Officer, Ministry of Health and Sanitation, Sierra Leone
Of the first 36 research studies assessed for impact, 71% influenced policy and/or practice change.

Table 1: Brief stories of research impact from Ghana, Nepal and Sierra Leone
Please see annexes 2–4 for the full stories

<table>
<thead>
<tr>
<th>Study question</th>
<th>Research impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>**Use of wastewater for agriculture. How safe is it in Accra, Ghana?**¹</td>
<td>The wastewater from a major sewage treatment plant was found to be rendered safe enough after treatment for being re-utilized for fish farming.</td>
</tr>
<tr>
<td><strong>Improving antimicrobial resistance surveillance in Nepal using operational research</strong>²</td>
<td>The study led to Standard Operating Procedures being established and major infrastructure improvements to improve reporting. AMR surveillance was scaled up from 14 to 21 sites nationally and data quality improved.</td>
</tr>
<tr>
<td><strong>Reporting on antimicrobial use in livestock in Sierra Leone: challenges, actions and impact</strong>³</td>
<td>The study led to the introduction of mandatory country-wide reporting on antibiotic use in livestock, training and the mobilization of significant resources (32 computer tablets and 30 motorbikes). All 15 districts in the country now report on livestock data (compared to three in the previous years) and 88% of weekly reports are received (compared to 1% previously).</td>
</tr>
</tbody>
</table>

1.2 Applying SORT IT skills to tackle COVID-19 and strengthen health systems

The survey conducted 12 months after completion of a SORT IT cycle also showed that 86% of trainees were applying their acquired SORT IT skills to tackle AMR and 56% to the ongoing COVID-19 response. The SORT IT skills used for tackling COVID-19 included: situation analysis; surveillance; improving infection, prevention and control; data analysis; reporting and decision-making; mitigating the effect of COVID-19 on other diseases, etc. Furthermore, 64% of those trained completed a new research study after completing the SORT IT course and 25% became mentors through a train-the-trainer programme. These are indicators of capacity built.

86% of trainees applied their acquired SORT IT skills to tackle AMR, 56% to the COVID 19 response and 64% had completed a new research study a year after completing SORT IT training.

Figure 4. SORT IT skills used to tackle AMR and COVID-19 and research capacity built

1.3. Impact grants provide solutions to the complexities behind antimicrobial resistance

In collaboration with the six WHO regional offices, TDR’s Impact Grants for Regional Priorities supported several research studies conducted by medical teams and public health institutions in 20 countries. Partly funded by the AMR–SORT IT project, the research topics investigated included: Identifying risk factors linked with drug resistance; links with migration-related issues; approaches to develop evidence-based antibiotics protocols/policies; social inequalities in antimicrobial resistance; education and public awareness needs. More information available at: [https://tdr.who.int/newsroom/news/item/26-06-2022-understanding-the-complexities-behind-antimicrobial-drug-resistance](https://tdr.who.int/newsroom/news/item/26-06-2022-understanding-the-complexities-behind-antimicrobial-drug-resistance)
**Research facets**

**Identifying risk factors linked with drug resistance**
- Tuberculosis Research and Prevention Centre / Ministry of Health, ARMENIA
- National Public Health Laboratory, Federal Ministry of Health, SUDAN

**Migration-related issues**
- Laboratoire Microbiologie Santé et Environnement Lebanese University, LEBANON

**Approaches to develop evidence-based antibiotics protocols/policies**
- Cape Coast Teaching Hospital, GHANA
- Department of Medical Research, Ministry of Health and Sports, MYANMAR

**Social inequalities in antimicrobial resistance**
- Profamilia, COLOMBIA

**Education and public awareness needs**
- Karaganda State Medical University, KAZAKHSTAN
- Research team, UZBEKISTAN

**Human-livestock interface for treatment**
- Joint Clinical Research Centre, UGANDA
- Center for Health and Disease Studies, NEPAL

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**Examples of key research findings**

**Armenia:** Very low rate of access to drug resistance testing and high rate of resistance found among people with access to testing - these problems are linked to poor implementation of guidelines.

**Sudan:** Multi drug-resistant TB is linked to risk factors such as previous TB treatment, HIV infection, type 2 diabetes; identifying such high-risk factors is key to improving TB management.

**Lebanon:** Patients leaving the country before completing TB treatment encourages the emergence of drug resistance.
2. High-quality policy relevant research that is rapidly published

2.1 SORT IT research studies supporting the AMR strategic pillars

Figure 4, below shows the categorization of 74 research subjects (from Africa, Asia and the Americas) by AMR pillars and the proportion of all studies (n=74) that were One Health (in green). Refer to Annex 1 for details of research themes.

SORT IT is contributing to the national AMR effort by developing operational research capacity that helps understand in real-time, the situation on the ground. It is about “feeling the pulse” of the situation.

Dr Francis Kasolo,
WHO Representative, Ghana

Figure 4. 74 research studies informing the pillars of the AMR action plan
2.2 Research implementation and timely publications for decision-making

Using the SORT IT online training platform developed to overcome COVID-19 restrictions, 74 research studies were cumulatively completed by 2022 and 65 were published in a record time of less than 10 weeks from submission. This was achieved by pro-actively accelerating the journal processes and providing structured support to the researchers, especially to promptly respond to editorial requirements and peer review. Such expedited peer-reviewed publications aim to ensure timely evidence for decision-making.

All published studies are open access and available through the following links:

- International Journal of Environmental Research and Public Health. Operational Research to Tackle Antimicrobial Resistance in Ghana. [IJERPH | Special Issue: Operational Research to Tackle Antimicrobial Resistance in Ghana (mdpi.com)]
- Public Health Action, Operational research to tackle AMR in Nepal. [Public Health Action: Ingenta Connect Table Of Contents]
- Tropical Medicine and Infectious Diseases, "AMR in Low-and-Middle-Income Countries" [https://www.mdpi.com/journal/tropicalmed/special_issues/AMR]
3. Research communication through a KISS – Keep It Short and Simple

Trainees benefited from a newly developed training module (SORT IT module 4) on ‘effective communication of research findings’ to enhance research uptake. A total of 215 individuals from various institutions benefited from this module. A four-minute video on the research communication module from Ghana is available at: https://youtu.be/ySDOlykpGbg

In an effort to further enhance visibility of operational research, we successfully integrated three-minute lightning videos below the abstracts on the journal websites. This is a pioneering and unprecedented step in further enhancing research dissemination and research uptake through engagement with scientific journals. It also sets an example that can be built upon by others. Example: https://www.mdpi.com/2414-6366/6/2/89

Additional outputs can be accessed at: https://tdr.who.int/activities/sort-it-operational-research-and-training/communicating-research-findings

The SORT IT training on research communication is vital to present research findings in a simple manner. It allows decision-makers to easily grasp the key messages and take action to improve public health.

Dr Mohammed Vandi,
Director of AMR and health emergences, Sierra Leone

Table 2: Tools developed for effective communication of research findings

<table>
<thead>
<tr>
<th>Tools</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A communication plan</td>
<td>To target decision-makers and stakeholders</td>
</tr>
<tr>
<td>2. One-page plain language summary</td>
<td>Key messages are short and simple</td>
</tr>
<tr>
<td>3. A PowerPoint presentation (10 minutes) and a lightening presentation (3 minutes)</td>
<td>For conferences and national decision-makers</td>
</tr>
<tr>
<td>4. An elevator pitch – one-minute oral presentation</td>
<td>For opportunistic one-to-one conversations</td>
</tr>
</tbody>
</table>
Top: Peer reviewing at a workshop on effective communication of research findings to combat AMR
Bottom: dissemination meeting with stakeholders and decision-makers (Sierra Leone)
4. Building research capacity and training of trainers

The AMR–SORT IT training model combines research training and research implementation through hands-on work on a research project with various partners. This process builds communities of practice. To increase value for money, ‘training-of-trainers’ is integrated. Each research project includes four groups for training. Table 3 shows the groups of individuals being trained and the numbers trained up to December 2022.

Table 3: Groups of individuals trained through AMR–SORT IT (January 2019 to December 2022) in Africa, Asia and Latin America.

<table>
<thead>
<tr>
<th>Layers of training</th>
<th>Number</th>
<th>Training ratio per research study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total research studies started</strong></td>
<td>74</td>
<td>~3 persons trained per study</td>
</tr>
<tr>
<td>Total individuals involved in SORT IT training</td>
<td>215</td>
<td></td>
</tr>
<tr>
<td><strong>Group 1: Front-line health workers / programme staff</strong></td>
<td>72</td>
<td></td>
</tr>
<tr>
<td><strong>Group 2: SORT IT alumni</strong></td>
<td>59</td>
<td></td>
</tr>
<tr>
<td><strong>Group 3: Academia/others</strong></td>
<td>54</td>
<td></td>
</tr>
<tr>
<td><strong>Group 4: WHO country staff</strong></td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

I am certain that participants will benefit from the SORT IT programme which is vital for early-career researchers. This training improves the knowledge, skills and competencies to conduct operational research and generates evidence for reducing the AMR burden.

Dr Joseph Kanu,  
National AMR focal person, AMR country coordinating platform,  
Sierra Leone
5. Broader support to countries for building health systems resilience

The AMR–SORT IT project continues to provide support to WHO country offices and AMR committees to propel activities needed to strengthen the AMR response. These include human resources (e.g., appointment of SORT IT technical officers and research fellows), financial support to hold meetings of technical working groups and conduct research dissemination events. This has galvanized the AMR committees and boosted TDR’s capabilities to strengthen health system resilience to tackle not only AMR, but also COVID-19 and other pandemics such as influenza.

Table 4: Examples of building health systems resilience in countries

<table>
<thead>
<tr>
<th>Health system area</th>
<th>Type of health system resilience built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated AMR surveillance</td>
<td>Good surveillance data is essential to feeling the pulse of AMR in countries. Data of the Global AMR Surveillance System (GLASS) was improved. Integrated monitoring of antibiotic resistance in humans, animals and the environment was developed through the Tricycle Escherichia coli project.</td>
</tr>
<tr>
<td>Quality of laboratory testing</td>
<td>Training and supply of essential laboratory reagents needed for AMR, COVID-19 and pandemic influenza was ensured in Ghana, Myanmar, Nepal and Sierra Leone. National quality assurance programmes were established, preparing countries for future pandemics.</td>
</tr>
<tr>
<td>Hand hygiene</td>
<td>World Hand Hygiene Day keeps patients, families and health workers safe and contributes to the quality of health care delivery.</td>
</tr>
<tr>
<td>Protection of health workers and communities</td>
<td>Sierra Leone continued the local production of an alcohol-based hand rub solution which is seven times cheaper than in the local market – US$ 3 compared to US$ 10. Forty-five thousand (45,000) litres are produced annually for use in health facilities.</td>
</tr>
</tbody>
</table>

Through several operational research, the AMR–SORT IT programme has played a vital role in demonstrating gaps in Infection, Prevention and Control in health facilities and providing solutions

Mrs Christiana Kallon,
National IPC Coordinator, Ministry of Health of Sierra Leone
Above: 1. Technical AMR working group meeting (Sierra Leone); 2. Meeting to establish integrated surveillance systems for outbreaks (Nepal); 3. Assessment of a bacteriology laboratory (Ghana); 4. Meeting to improve AMR data collection in animal health (Ghana); 5. Team meeting to discuss data on infection, prevention and control in a hospital; 6. Production of local alcohol-based rub for hand hygiene (Sierra Leone).

Support to WHO country offices and “One Health” committees builds health system capacity and resilience. The AMR–SORT IT project has had a synergistic effect on tackling COVID-19 and other pandemics.
6. Informing individual and community behaviour to tackle AMR – the World Antimicrobial Awareness Week

The 2022 theme for the World Antimicrobial Awareness Week (WAAW, 18–24 November) was “Preventing antimicrobial resistance together”. Awareness raising activities to avoid the further emergence and spread of drug-resistant infections were conducted in all target countries through effective communication, education and training.
7. Building LMIC equitable research through partnerships to tackle AMR

The AMR collaborative network was expanded to include 69 implementing partners in 30 countries, including 80% of mentors from the south and 40% SORT IT alumni. This has boosted HIC–LMIC and LMIC–LMIC partnerships, promoted equitable research and built new communities of practice to tackle AMR ("thinking global, acting local"). Details of partner institutions are available at: SORT IT operational research and training (who.int)
Sixty-nine institutions in 30 countries became part of the AMR–SORT IT programme, highlighting TDR’s global engagement in tackling AMR.
Fig. 7. Partner institutions of the AMR–SORT IT project from 30 countries

South-South collaborations (55 institutions)

WHO country offices: Colombia, Ecuador, Ghana, Nepal, Myanmar, Sierra Leone, Uganda
North-South Collaborations
(14 institutions)
5. Tracking progress in relation to performance (log frame) targets

<table>
<thead>
<tr>
<th></th>
<th>Target</th>
<th>Progress (Dec 2022)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Research projects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projects started</td>
<td>72</td>
<td>74</td>
<td>Achieved</td>
</tr>
<tr>
<td>Manuscripts</td>
<td>58</td>
<td>74</td>
<td>Exceeded</td>
</tr>
<tr>
<td>Published</td>
<td>46</td>
<td>62</td>
<td>Exceeded (Completion in 2023)</td>
</tr>
<tr>
<td><strong>Research uptake (ongoing into 2023)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact assessment</td>
<td>36 of 74 studies were assessed by Dec 2022</td>
<td>43%</td>
<td>38 studies to be assessed in 2023</td>
</tr>
<tr>
<td><strong>LMIC leadership and equity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First author from LMIC</td>
<td>80%</td>
<td>100%</td>
<td>Exceeded</td>
</tr>
<tr>
<td>Female first author</td>
<td>40%</td>
<td>47%</td>
<td>Exceeded</td>
</tr>
<tr>
<td>Government co-authors included</td>
<td>70%</td>
<td>78%</td>
<td>Exceeded</td>
</tr>
<tr>
<td><strong>Training performance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milestones achieved (for completed SORT IT cycles)</td>
<td>80%</td>
<td>97%</td>
<td>Exceeded</td>
</tr>
<tr>
<td>Trainee satisfaction Ω</td>
<td>80%</td>
<td>93%</td>
<td>Exceeded</td>
</tr>
<tr>
<td><strong>Collaborative partnerships</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southern institutions involved</td>
<td>80%</td>
<td>80%</td>
<td>Achieved</td>
</tr>
<tr>
<td>SORT IT alumni as mentors</td>
<td>50%</td>
<td>59%</td>
<td>Exceeded</td>
</tr>
<tr>
<td>Trainees joined SORT IT network</td>
<td>80%</td>
<td>100%</td>
<td>Exceeded</td>
</tr>
</tbody>
</table>

*The target numbers are cumulative and based on log frame targets.
Challenges and solutions

1. COVID-19 pandemic related delays until early 2022

Multiple waves of COVID-19 resulted in changes in programme delivery and delayed implementation, particularly with research uptake. In 2021 and 2022, close to 70% of the 132 individuals who were involved with the project were on the front lines of the COVID-19 response and had to share their time with their AMR-SORT IT work. This resulted in unavoidable delays which required a catch-up phase into 2023.

**ACTIONS TAKEN** DHSC agreed to a No-Cost Extension (NCE) of the project until June 2023 to complete outstanding activities. The NCE will increase the ‘value for money’ of the project, while offsetting the negative effects of delayed implementation caused by the pandemic.

2. Assessment of research impact

Due to COVID-19 delays, 37 research studies from Colombia, Ecuador, Ghana and Sierra Leone were only completed during the second half of 2022. Most studies identified problems in the health system and technical support for implementing solutions will be needed, which takes around 12–15 months following study completion (thus into 2023).

**ACTIONS TAKEN** A SORT IT programme on assessing impact will be conducted in 2023 to assess the impact of studies from Ghana, Sierra Leone and Nepal.

3. The political situation in Myanmar remains unchanged

United Nations organizations and agencies suggest that meetings and capacity building activities with the de facto authorities in Myanmar should be avoided. It was thus not feasible to consider a national SORT IT cycle in Myanmar in 2022.

**ACTIONS TAKEN** To maximize the overall value for money of the AMR-SORT IT project, instead we successfully launched a programme in Ghana, resulting in 12 research studies being completed by October 2022.
7. Plans for 2023

Our focus in 2023 will be to ensure that all deliverables on the NCE are achieved in. We will also continue to demonstrate the impact of completed studies and use this for advocacy, fundraising and enhancing visibility of the AMR-SORT IT project.

- Impact assessments of research studies are an integral requirement of SORT IT monitoring and the project log frame as agreed upon with DHSC/NIHR. The 37 studies that were completed in 2022 will be assessed for impact in 2023 and early 2024.

- The second batch of researchers from Colombia, Ghana and Sierra Leone completed their training cycle during 2022 and will be ‘hands-on’ with a train-the-trainers programme in 2023 and 2024. Seizing this opportunity is important to build a critical mass of teams that can integrate research into the health system and become leaders of research.

Contact for further information
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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. A full list of TDR donors is available on our website at: https://tdr.who.int/about-us/our-donors

The United Kingdom Department of Health & Social Care has contributed designated funding for this AMR-SORT IT initiative which is branded as the NIHR–TDR partnership.
Annex 1.
Some examples of research topics by strategic AMR pillars

<table>
<thead>
<tr>
<th>Strategic AMR pillars</th>
<th>Research topics</th>
</tr>
</thead>
</table>
| Strengthening surveillance and monitoring | • Data quality from AMR surveillance sites (*Nepal*)  
• Antibiotic resistance patterns and outcomes in adults and children (*Colombia, Myanmar, Nepal*)  
• Impact of COVID-19 on antibiotic resistance (*Colombia*)  
• Surgical site infections after caesarean section (*Sierra Leone*) |
| Reducing incidence of infection | • Infection prevention and control in health facilities (*Colombia, Myanmar, Sierra Leone, Uganda*) and border posts (*Sierra Leone*)  
• Compliance with recommended hand hygiene practices in hospitals (*Sierra Leone*)  
• Antibiotic resistance in ventilator associated pneumonias (*Ecuador*)  
• Health care-associated infections with invasive devices and surgery (*Nepal*) |
| Optimizing antimicrobial use | • Country-wide antibiotic consumption (*Colombia, Myanmar, Nepal, Sierra Leone, Uganda*)  
• Surgical antibiotic prophylaxis (*Nepal*) |
| Sustaining investments (AMR burden, diagnostics) | • Burden of methicillin resistant *Staphylococcus aureus* in health facilities (*Myanmar, Nepal*)  
• Blood cultures for febrile illnesses at AMR surveillance sites (*Colombia, Uganda*)  
• Utilization of culture and sensitivity for meningitis and genital tract infections (*Sierra Leone*) |
| One Health | • What’s in the salad? Bacterial pathogens and antibiotic resistance in lettuce irrigated with wastewater (*Ghana*)  
• Data quality for antibiotic use in animal husbandry and livestock (*Ghana, Sierra Leone*)  
• Antibiotics in poultry production (*Ecuador, Nepal, Sierra Leone*)  
• Antimicrobial pesticide imports (*Sierra Leone*)  
• Antibiotic susceptibility in hospital, sewage and seafood processing effluents (*Colombia, Ghana, Sierra Leone*) |
The Structured Operational Research and Training Initiative on tackling antimicrobial resistance in Africa, Asia and Latin America