

### Antimicrobial Resistance (AMR) Structured Operational Research and Training IniTiative (SORT IT) Annual Review 2022

**NIHR Global Health Research Portfolio** 

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## 1. DSHC summary and overview

#### 1.1 Brief description of the AMR–SORT IT programme

This programme aims to build sustainable operational research capacity to generate and use evidence to tackle the emergence, spread and health impact of antimicrobial resistance (AMR). The programme uses the Structured Operational Research and Training Initiative (SORT IT), which is a global partnership-based initiative coordinated by TDR, the Special Programme for Research and Training in Tropical Diseases. TDR is co-sponsored by the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP), the World Bank and the World Health Organization (WHO). SORT IT supports countries and institutions to conduct operational research around their own priorities, build sustainable operational research capacity and help make evidence-informed decisions to improve programme performance. The focus of SORT IT is on health workers at all levels of the health system and decision-makers.

The AMR–SORT IT programme targets seven low- and middle-income countries (LMICs), namely Colombia, Ecuador, Ghana, Myanmar, Nepal, Sierra Leone and Uganda. These countries (except for Colombia and Ecuador), were selected as they align with those supported by the Fleming Fund, a UK aid programme managed by the Department of Health and Social Care which aims to generate, share and use antimicrobial resistance data. While the Fleming fund focuses on generating and sharing antimicrobial resistance data (pillar 2) of the Global Action Plan on tackling AMR, the AMR-SORT IT programme focuses on the other four pillars namely: preventing infections, antibiotic stewardship, assessing the burden of AMR and improving use of diagnostics and treatments. The roles are thus complimentary in supporting the Global Action Plan to tackle AMR. AMR–SORT IT research priorities are tailored to local needs and are coordinated with national AMR coordinating committees and in-country Fleming Fund activities where these exist. Research priorities are also in line with the Global Action Plan on antimicrobial resistance, published by WHO.

1.2 Summary of AMR–SORT IT programme performance over the last 12 months (general progress on activities, early outputs, outcomes, impacts across all awards)

During 2022, the AMR–SORT IT programme evaluated and confirmed that research conducted in the preceding years has an impact and is also 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 (in 2022), 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% had completed a

new research study. To date, 25% of those trained have become mentors after one training cycle. These figures indicate collateral benefits to the health system and capacity strengthened.

High-quality, policy/practice relevant research continues to be rapidly published. In 2022, 36 studies (that were started in 2021) from Colombia, Ecuador, Ghana and Sierra Leone were completed and submitted for publication in 2022. Twenty-five studies from Ghana and Sierra Leone were published in two special issues of open Access journals on average within 10-12 weeks after submission. By the end of 2022, cumulatively, seventy-four locally relevant research studies from the human, agricultural and environmental sectors (with an integrated 'One Health' approach) were completed and 62 were published in less than 10 weeks of submission. The AMR–SORT IT programme continued to use a new mechanism to speed up the research publication process through expedited reviews and accelerating the journal processes while maintaining rigorous standards of scientific review. For details of published studies, please see sections 2.4 and 2.5.

Such expedited peer-reviewed publications aim to ensure timely evidence for policy and practice based decision-making. All these research studies are policy relevant and endorsed by the AMR Coordinating Committees in target countries. These AMR committees are the highest decision-making bodies in the target countries and are responsible for ensuring the implementation of national AMR action plans, setting research priorities and applying the findings of research. As such, the publications are demonstrative of TDR's aims in producing local research, for local solutions, with local ownership.

In terms of capacity strengthening, 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. In 2022, research capacity was built through training four groups of individuals at the same time, thereby enhancing value for money as the same projects and resources (training material, infrastructure, venue) were used to train an entire team. Trainings involved: 1) frontline workers and programme staff; 2) SORT IT alumni; 3) academia; and 4) WHO country office staff. The average numbers trained per research study is 3.0.

Research communication to decision-makers has also improved with trainees continuing 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 36 evidence briefs were produced in 2022 and a total of 215 individuals from various institutions cumulatively benefited from this module by the end of 2022. In an effort to further enhance visibility of operational research, TDR successfully integrated three-minute lighting videos below the abstracts on the journal websites. This is a pioneering step in further enhancing research dissemination and research uptake through engagement with scientific journals. It also set an example that can be built upon by

others. For examples of three minute lightening presentations that have been integrated within journal websites, please see section 2.4

The AMR–SORT IT programme has also contributed to strengthening health systems against pandemics. In 2022, fifty-six percent (56%) of individuals involved with the AMR–SORT IT project continued to apply their acquired skills in a synergistic manner to the COVID-19 global response, compared to 73% in 2021 when countries were still badly hit by the COVID-19 pandemic. Through training, research and action, SORT IT-AMR activities have specifically contributed to building health system resilience by protecting health workers, keeping health facilities safe, improving laboratory diagnostic capacity and informing communities on preventive measures. This suggests that the investment in research training to date has equipped health workers with the skills and competencies needed for tackling COVID-19 and similar pandemics in various ways. It has also supported the integration of research within health systems.

Finally, global collaborations to tackle AMR have expanded. The AMR–SORT IT network was expanded to include 69 implementing partners in 30 countries from Asia, Africa, The Americas and Europe. The AMR-SORT IT partnership is now the largest partnership of implementing institutions in the world. The list of institutions in the partnership can be found here <u>https://tdr.who.int/activities/sort-it-operational-research-and-training</u>. Close collaboration is maintained with AMR coordinating committees and WHO regional and country offices. TDR has also provided support to WHO country offices and One Health committees, improving strategic planning and implementation of AMR plans.

#### 1.3 Performance of delivery partners

TDR has kept DHSC informed of progress across AMR SORT-IT via regular update meetings, email and sharing communication opportunities. DHSC has observed SORT IT in action virtually, invited to some of the key sessions in Ghana, and Sierra Leone.

COVID-19 related restrictions on travel continued into the first half of 2022 and SORT IT training activities continued to take place in a hybrid manner via an online SORT IT platform developed by TDR. In October 2022, the first face-to-face training module took place in Ghana. Seeking to embed learning from the pandemic whilst maintaining value for money, the future model of training is likely to shift to a hybrid model where earlier training modules will take place in person to support relationship building and later modules run virtually.

The broader support provided by the AMR–SORT IT project to WHO country offices and AMR committees continues to propel activities needed to strengthen the AMR response. These include human resources (e.g. support to SORT IT technical officers and research fellows), financial support to hold meetings of technical working groups and conduct

research dissemination events. These activities continue to support the AMR committees and WHO/TDR capabilities to strengthen health system resilience to tackle not only AMR, but also COVID-19 and other pandemics such as influenza.

Following the coup d' etat in Myanmar on the 1<sup>st</sup> of February 2021 and the United Nations embargo on conducting training activities, TDR gained approval from DHSC and FCDO to replace Myanmar with Ghana where they launched an AMR SORT-IT programme in November 2021. The programme in Ghana was accelerated and by October 2022, a total of 16 research studies were completed in Ghana. The rapidity of this shift reflects the importance of TDRs in-country links and the ability to leverage WHO country offices to mitigate against unforeseen risks during project implementation and maintain diversity in delivery countries of the programme.

The original MoU was due to expire in December 2021, but due to COVID-19 related delays TDR worked with DHSC and an initial no-cost extension (NCE) was agreed to December 2022, which was subsequently extended to June 2023. Without the extension to December 2022, 24(33%) of 72 policy relevant research studies from Colombia and Ghana could not have been completed with loss in 'value for money' of investments already made since 2019. There would also have been reputational risks to both TDR and DHSC as the funder as the target countries expected to use the final results of the research studies. The extension to June 2023, will also allow TDR the time to assess the impact of selected studies from the first cohort completed research in Ghana, Nepal and Sierra Leone. This would showcase how the DHSC funded work has contributed to influencing policy and/or practice and improving health system performance. This amendment includes repurposing the underspend from cost-savings related to reductions in travel and accommodation because of online and hybrid trainings. The proposed activities into June 2023 would make best use of the remaining budget allocation in line with DHSC and TDR strategic priorities.

1.4 What are the key lessons identified over the past year for wider DHSC/NIHR global health research

Research can have impact: During 2022, the AMR–SORT IT programme showed impact at multiple levels: on policy and practice, on capacity strengthening and further researchas catalyst to generate local momentum for innovative solutions. 71% of research studies from Asia and Africa had an influence on policy and/or practice within 12-months after completion. The enabling factors included: early and continued engagement with those expected to use the results of research (AMR committees and national stakeholders); ensuring that research studies were national priorities, policy relevant and of high quality; the research question emerged from within the health system; rapid publication mechanisms were put in place; research findings were communicated in a manner that was simple and understandable to busy decision makers. Training on effective and persuasive research communication is important: The newly developed 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 quick actions to improve public health. A brief video on the research communication module from Ghana is available in section 2.4.

Investment in research training has had a significant collateral impact on strengthening health system resilience to tackle pandemics. The investment in AMR research training to date has equipped health workers with the skills and competencies needed for tackling COVID-19 and similar pandemics. It has also supported the integration of research within health systems and through capacity built, ensured that when the pandemic struck, the health system had the 'right people at the right place, at the right time'

Lessons learned from moving online: The SORT-IT online platform has now enabled a more agile mode of delivery which can be deployed at lower cost and allows for mentors in different countries to be paired with mentees. From experience, the benefits of building relationships in the early modules through face-to-face interactions and then moving online has been shown to be preferable. The first face-to-face module in 2022 was on research communication and was conducted in Ghana. It was much more effective to in terms of allowing interactive discussions at formal and informal settings at the training venue. However, this will continue to be monitored and hybrid modes of training would seem the way forwards.

Benefits of sustained partnership from previous collaborations: Working through partnerships and local stakeholders is key for it is a matter of principle and good ethical practice of fairness and inclusiveness and serves to mitigate risk: Despite COVID-19 disruptions and restrictions on travel, the successful completion of all 74 planned research studies for the AMR SORT IT programme demonstrates the added value of working through pre-existing and new partnerships. The AMR–SORT IT network in countries from Asia, Africa, The Americas and Europe were mobilized to support countries and achieve the expected outputs.

Moreover, the suspension of activities in Myanmar and rapid launch and completion of 12 research studies in Ghana within one year has demonstrated the importance of having strong connections in-country to manage unforeseen risks. The benefit of being part of a wider SORT-IT programme has also been illustrated through the support of the WHO country offices both to manage the suspension in Myanmar and commence activities in Ghana. The WHO regional and country offices offer a very strong network through which other NIHR opportunities could be tested and disseminated.

Finance and MoU amendments: Through the process of developing options for the NCE and securing the MoU amendment DHSC and TDR have improved communication and understanding of organisational priorities. DHSC and TDR will work closely to ensuring

that key lessons are captured both for potential future SORT-IT programmes and the GHR portfolio.

1.5 DHSC to summarise key recommendations/actions for the year ahead, with ownership and timelines for action

Recommendation	Owner	Timeline
Support the translation of research findings into action	TDR	Summer 2023
Support the publication of selected research studies that can demonstrate the added value of research in strengthening health systems and public health.	TDR	Summer 2023
Support the consolidation of results and lessons learned shared across DHSC and UK Government programmes.	DHSC	

### 2. Summary of aims and activities

#### 2.1 Brief outline of AMR–SORT IT programme aims

SORT IT is a global partnership-based initiative coordinated by TDR. SORT IT seeks to make countries "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 implementation with a hands-on (learning by doing) approach that empowers front-line health workers and new trainers.

The <u>aim</u> is to build sustainable operational research capacity to generate and utilize evidence on the emergence, causes, spread and health impact of AMR in low- and middle-income countries. <u>Specific objectives</u> are to:

- 1. Build adequate and sustainable local Operational Research (OR) capacity on AMR.
- 2. Support OR for:
  - Improved surveillance and monitoring of the AMR situation in countries.
  - Identifying drivers of antimicrobial drug resistance in humans and enhancing prevention.
  - Improving antimicrobial stewardship and procedural interventions.
- 3. Build adequate and sustainable structures and processes for evidence-informed decision-making at national level.
- 4. Foster mechanisms for knowledge sharing to maximize the potential for broader research impact.

#### 2.2 Delivery partner's assessment of progress against milestones/deliverables

AMR–SORT IT Programme targets	Current status of progress against milestones/ deliverables	If the award is not on track to contribute to expected outcomes and impacts, why not? What are the potential impacts of this and how have plans been revised to accommodate this?
72 research subjects started	74 (exceeded) COVID delays in 2020 and 2021 were overcome through the development and deployment of an online training platform and accelerated implementation through mobilisation of partnerships in 2021 and 2022.	
46 studies published	62 (exceeded)	
80% of first authors from LMIC	100% (exceeded)	
40% female first authors	47% (exceeded)	
70% government first authors	78% (exceeded)	
80% milestone completion (SORT IT modules)	97% (exceeded)	
80% participant satisfaction score (SORT IT modules)	93% (exceeded)	
60% southern institutions involved	80% (exceeded)	
50% of mentors are alumni	59% (exceeded)	

2.3 Delivery partner's assessment of how individuals/communities (including any relevant sub-groups) have been engaged and their needs reflected in identifying research priorities, design/planning, implementation, analysis, and reporting and dissemination.

a) Details of how individuals/communities have been engaged has been covered in the 2021 report. By the end of 2022, 25% of completed research studies focused on "One Health" such as improving water quality, waste management, and rational use of antibiotics in animal husbandry. This will have a wider benefit on the lives of poor communities.

b) TDR continues to strengthen a "One Health" approach in the implementation of research studies and eventual research uptake through continued engagement with AMR coordinating committees, WHO country/regional offices and implementing partners in the target countries. TDR has also played an active role in WHOs One Health research priority setting exercise and in various forums in Geneva in Africa including at the Global Health Network Conference in South Africa.

c) Those expected to use the results such as the technical leads of the pillars of the AMR action plans and members of the national AMR coordinating committee were engaged early to be at the forefront for identifying relevant research that fits with national AMR priorities. Details of how engagement was galvanized has been covered in the 2021 report. The mechanisms for participant selection and research topics were also endorsed by AMR committees. The findings of research that was completed in 2022 were disseminated to the community members through presentations and one-to-one discussions by the researchers themselves supported by WHO country office colleagues.

## Complimentary links to Fleming Fund activities were also facilitated through the AMR committee.

#### SORT IT and Fleming Fund Projects have had a Synergistic Effect

The SORT-IT- AMR research projects have generated data on the AMR situation in all target countries which has in turn led to informed decision making and designing of appropriate interventions to tackle AMR. Some of these interventions which are focused on surveillance and laboratory strengthening are being funded by Fleming Fund. In addition, the operational research and knowledge management skills acquired from SORT-IT have been used in the improvement of governance, development of guidelines, strategies, and policies that are critical in the implementation of the Fleming Fund project in countries.

## Here are some examples from Ghana, Nepal and Sierra Leone of complementarity between the AMR-SORT IT programme and Fleming Fund Grants:

**Ghana:** Providing technical and human resource support to Fleming fund supported surveillance sites

Fleming fund is supporting Ghana in its efforts to establish a national surveillance system for antibiotic resistance which is part of the Global Antibiotic Surveillance System (GLASS) for reporting to WHO.

SORT IT focal persons working at the WHO country office provided direct support to the focal point of GLASS to collate, clean and analyze AMR data from seven Fleming Fund supported sentinel sites and subsequently loaded the data to the GLASS platform. This is the second submission of surveillance data to GLASS on behalf of Ghana, since registration in 2016. It is a milestone in efforts towards improving quality of surveillance data being reported to GLASS.

Furthermore, nine research studies published through the AMR-SORT IT programme highlighted gaps in various aspects of laboratory services such as surveillance, antibiotic resistance patterns and laboratory performance. https://www.mdpi.com/si/130021

These studies are now providing an important feedback loop between laboratories and clinicians (the end users) on what needs to be improved, thereby contributing to the role of laboratories in improving clinical care and providing evidence to inform the review of treatment guidelines.

Such complementarity provides 'real-time' information on gaps in laboratory performance which can benefit from the Fleming Fund to strengthen and improve health systems.

#### Sierra Leone:

#### Technical Support for the establishment of AMR Governance in Sierra Leone

The SORT IT Technical Officer and Fellow have provided technical support to the national AMR unit to establish AMR governance structures in Sierra Leone, which is one of two main objectives of the Fleming Fund in Sierra Leone. The AMR organigram was developed, AMR Technical working groups with clear terms of reference established, and AMR national and sector focal points appointed, through this support. Furthermore, skills acquired from the SORT IT program were applied in the development of strategic documents like the AMR Surveillance and AMU/C strategies that serve as a roadmap for AMR Surveillance in Sierra Leone.

SORT IT Research Identifying gaps in Laboratories, Clinical Practices, and Infection Prevention and Control in Healthcare facilities.

Several Operational research studies have been conducted through the Regional and National SORT IT (AMR) programs that have identified strengths, gaps, and challenges in clinical practices, laboratory capacity, and infection prevention and control in Sierra Leone's health service delivery. Some of the SORT IT studies conducted at the Ola During Children Hospital (Fleming Fund Reference Laboratory), identified challenges and made recommendations for the improvement of microbiology capacities at the laboratory. https://www.mdpi.com/1660-4601/19/8/4865; https://www.mdpi.com/2414-6366/6/2/103. These recommendations were taken into consideration while developing a renovation plan for the laboratory and renovation is currently ongoing.

In addition, Operational Research skills were used by both WHO and MOHS technical staff in the conduct of a point prevalence survey at two Fleming Fund Supported Sites. These findings, which have been widely disseminated, are serving as baseline parameters, and will be used to assess the impact of some of the components of the Fleming Fund project over the implementation period

## **Nepal:** Identifying infrastructure, human and training gaps hampering quality of data at surveillance sites

A study in Nepal showed that only nine of 21 laboratory surveillance sites were reporting data on antimicrobial resistance to the national level and then on to WHO through GLASS. Quality of data was found to be poor and these shortcomings were linked to infrastructural and human resource gaps such as lack of computers and desk space for data entry clerks, shortage of data entry clerks, inadequate training etc. This led the Fleming Fund to come in and provide funding for computers and infrastructural support for all laboratory surveillance sites as well as in improving the governance system through establishment of Standard Operating Procedures. This has dramatically improved surveillance reporting in the country with all 21 surveillance sites now reporting nationally and also to WHO.

## High quality policy/practice relevant research and innovation outputs

2.4 Aggregated number of outputs by output type.

Output type	<b>Total number</b> (cumulative number since funding began)
Publications in scientific journals	<ul> <li>62 published studies are open access and accessible at:</li> <li>International Journal of Environmental Research and Public Health. Operational Research to Tackle Antimicrobial Resistance in Ghana <u>IJERPH  </u> Special Issue: Operational Research to Tackle Antimicrobial Resistance in Ghana (mdpi.com)</li> <li>International Journal of Environmental Research and Public Health. Operational Research and Capacity Building to Tackle Antimicrobial Resistance in Sierra Leone. <u>Operational Research and Capacity Building to Tackle Antimicrobial Resistance in Sierra Leone (mdpi.com)</u></li> <li>Public Health Action, Operational research to tackle AMR in Nepal. <u>Public Health Action: Ingenta Connect Table Of Contents</u></li> <li>Tropical Medicine and Infectious Diseases, "AMR in Low-and-Middle-Income Countries"_ <u>https://www.mdpi.com/journal/tropicalmed/special issues/AMR</u></li> </ul>
Research protocols	72
Evidence summaries in plain language	72 Video: <u>https://youtu.be/y5DQLykpGbg</u> Summaries available at: <u>https://tdr.who.int/activities/sort-it-operational-research-and-training/communicating-research-findings</u> . News Letter: <u>Communicating research findings</u> with a KISS (who.int)
Three minute lightening presentations included under abstracts on the journal websites	https://www.mdpi.com/2414-6366/6/2/89 https://www.mdpi.com/2414-6366/6/2/83
Standard operating procedures for SORT IT	1
SORT IT curriculum packages	
- For protocol development (6 days)	1
- For data capture and analysis (6 days)	1

Output type	<b>Total number</b> (cumulative number since funding began)
- For manuscript writing (7 days)	1
- For knowledge management (7 days)	1
Database on SORT IT facilitators	1
Database of SORT IT participants	1
Database on SORT IT metrics	1
Platform for data-sharing (COVID/AMR)	1
SORT IT online training platform	1 SORT IT operational research and training (who.int)
Newsletters on SORT IT AMR	6 <u>SORT IT operational research and training (who.int)</u>

2.5 List of research and innovation outputs produced that are considered to be most significant in contributing towards high quality applied global health knowledge with strong potential to address the needs of people living in low and middle income countries.

Award	Output title	Authors	Date	Output type (e.g. article, book chapter, policy brief etc.)	DOI (where applicable)
SORT IT- AMR project	1. 62 policy relevant publications on AMR	Authors from Asia and Africa and The Americas	2022	Published articles	<ul> <li>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)</li> <li>International Journal of Environmental Research and Public Health. Operational Research and Capacity Building to Tackle Antimicrobial Resistance in Sierra Leone. Operational Research and Capacity Building to Tackle Antimicrobial Resistance in Sierra Leone (mdpi.com)</li> <li>Public Health Action, Operational research to tackle AMR in Nepal. Public Health Action: Ingenta Connect Table Of Contents</li> <li>Tropical Medicine and Infectious Diseases, "AMR in Low-and-Middle- Income Countries"_ https://www.mdpi.com/journal/tropica Imed/special_issues/AMR</li> </ul>

Award	Output title	Authors	Date	Output type (e.g. article, book chapter, policy brief etc.)	DOI (where applicable)
	2. Evidence briefs	Authors from Asia and Africa and The Americas	Dec 2022	Evidence summaries and lightening presentations	Available at: https://tdr.who.int/activities/sort-it- operational-research-and- training/communicating-research- findings.
	3. Video on research communication	TDR and partners	Nov 2022	Video	Video: https://youtu.be/y5DQLykpGbg
	<ol> <li>Lightening presentations by principal authors on key messages included under the abstract on journal websites</li> </ol>	TDR	Nov 2022	Lightening presentations of research papers in 3 minutes	
	5. Innovative SORT IT online training platform to overcome COVID related restrictions.	TDR/TB-RPC	2022	Online platform that can be used for capacity building even in the event of future outbreaks	https://sortitresearch.com/en
	6. Updated operational research and knowledge management curriculum	TDR and partners	2022	SORT IT curriculum for research protocol, data analysis, manuscript writing and communication that can be used by various implementing partners for capacity building in operational research	

Award	Output title	Authors	Date	Output type (e.g. article, book chapter, policy brief etc.)	DOI (where applicable)
				and evidence-informed decision- making	

#### 2.6 Lead/senior authorship

Twenty-five studies from Ghana and Sierra Leone with LMIC first authors were published in special journal issues in 2022 and are available on the TDR website at:

- International Journal of Environmental Research and Public Health. Operational Research to Tackle Antimicrobial Resistance in Ghana <u>IJERPH | Special Issue: Operational Research to Tackle Antimicrobial Resistance in Ghana (mdpi.com)</u>
- International Journal of Environmental Research and Public Health. Operational Research and Capacity Building to Tackle Antimicrobial Resistance in Sierra Leone. <u>Operational Research and Capacity Building to Tackle Antimicrobial Resistance in Sierra Leone (mdpi.com)</u>

## Informing policy, practice and individual/community behaviour in LMICs

2.7 Delivery partner's summary of the most significant outcomes of any award level engagement and/or influence of policy makers, practitioners and individual/community behaviour

#### 1) Research has an impact and is strengthening health systems

"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 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.

**The enabling factors** for high research impact were: early and continued engagement with those expected to use the results of research (AMR committees and national stakeholders); ensuring that research studies are of priority, policy relevant and of high quality; research questions emerged from within the health system; rapid publication mechanism put in place; research findings were communicated in a manner that was simple and understandable to busy decision makers.

## 2. Impact grants provide solutions to the complexities behind antimicrobial resistance

In collaboration with 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-complexitiesbehind-antimicrobial-drug-resistance

**Lesson learnt:** The complimentary funds widened the spectrum of the research portfolio allowing inclusion of qualitative research studies which explore, the root causes of problems/constraints facing the health system.

#### 2) Rapid publication to ensure timely evidence is available for decision-making

During 2022, twenty-five research projects from Ghana and Sierra Leone were propelled through a novel publication mechanism for rapid evidence generation for decision-making. These studies were published in a record time of 10–12 weeks by: a) proactively accelerating the journal processes; and b) providing structured support to the researchers. These are available at <u>IJERPH | Special Issue: Operational Research to Tackle Antimicrobial Resistance in Ghana</u> (mdpi.com) and <u>Operational Research and Capacity Building to Tackle Antimicrobial Resistance in Sierra Leone (mdpi.com)</u>

#### How SORT IT accelerated the publication process:

Various interventions were put in place by TDR to accelerate the publication process such as proposing reviewers, setting time limits for peer review and rapid processing by journals. More specific details are available in the 2021 report.

#### 3) Strengthening research capacity and training-of-trainers

"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

The AMR–SORT IT training model combines research training and research implementation through hands-on work on a research project. The work done with collaborating partners builds communities of practice which are maintained through creating a roster pool at TDR and an alumni network which is a web based network that links up all those who were trained through SORT IT. Individuals who are trained in one region, are brought on board in another region as trainers and vice-versa. There are thus national, regional and global pools of trained mentors and alumni. To increase value for money, a 'Training-Of-Trainers' programme is integrated. Each research project includes four layers of training that includes a) frontline health workers/programme staff b) SORT IT alumni; c) academia and d) WHO country office staff.

*Value for money was enhanced* by introducing four layers of training at the same time. An average of 3 persons are trained per research project

## 4) Research communication has improved through a KISS - Keep It Short and Simple.

"The SORT IT training on research communication is vital to present research findings in a simple manner and avoid jargon. 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

Trainees continue to benefit from the newly developed training module (SORT IT module 4) on 'effective communication of research findings' for research uptake. A total of 215 individuals from various institutions benefited from this module. Outputs can be accessed at: <u>https://tdr.who.int/activities/sort-it-operational-research-and-training/communicating-research-findings</u> Researchers in Colombia, Ecuador, Ghana and Sierra Leone produced four outputs which have been detailed in the 2021 report.

## 5) Digital technology through a SORT IT online platform continued to be used for implementing research trainings in a hybrid manner

In 2022, we continued to use and adapt the SORT IT online training platform, to propel SORT IT research activities and trainings. Developed with a SORT IT partner in Armenia (TB-RPC), this platform has also allowed us to network with 30 countries and bring subject matter experts to link in for one- or two-hour sessions that in the past would have resulted in travel to countries. It has thus reduced costs and improved efficiencies. Detail on the offer of the online platform and the tendering and procurement process are included in the 2021 annual report.

Using the online platform, we conducted virtual and "hybrid" trainings which resulted in 36 policy relevant studies from Colombia Ecuador, Sierra Leone and Ghana being completed and 25 published in 2022. The SORT IT platform was vital for bringing together individuals from six WHO country offices and 69 partner institutions in Asia, Africa, Europe and Latin America.

**Lessons learnt:** The SORT IT virtual platform proved to be an asset at a time of COVID-19 but can be used in future situations where travel is restricted. Used in a hybrid manner, it can reduce costs of international travel and accommodation and bring cost savings. It can also improve efficiencies and reduce the carbon footprint.

There are also some downsides: For example, upstream engagement and one-to-one interactions (a vital aspect of networking and building relationships which is a cross-

cultural feature of face-to-face interactions) with those expected to use the results of research is weaker. Time differences continued to be a challenge for mentors from different parts of the world to engage fully in sessions. For example, for a training in Ghana, mentors from India were 4 hours ahead and those in Vancouver were seven hours behind. Practically, when a training module started at 9 am Ghana time, it was already lunch hour in India and about midnight in Vancouver. This posed logistic challenges by reducing efficiencies in managing meetings, providing feedback to researchers and ensuring outputs. Importantly it increased online fatigue.

The way forward is to implement hybrid training models while trying to also source mentors from countries where there is less of a time difference.

#### 6) Broader support to countries for building health systems resilience

The AMR–SORT IT programme 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 supported AMR committees and WHO/TDR capabilities to strengthen health system resilience to tackle not only AMR, but also COVID-19 and other pandemics such as influenza. Some examples of areas where health systems have been strengthened include: a) integrated surveillance for outbreaks of COVID-19 and pandemic Influenza in Nepal ; b) improved quality of laboratory testing in Nepal, Myanmar and Sierra Leone ; c) hand hygiene improvements in health facilities in Sierra Leone; d) ensuring safety of health workers and communities in all target countries.

"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

#### 7) Building LMIC equitable research through partnerships to tackle AMR.

The AMR collaborative network was expanded to include 69 implementing partners in 30 countries from Asia, Africa, 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 through inclusion of new institutions and bringing on board those trained to become mentors in a different country. This allows to tackle AMR by opening perspectives and exchanging experiences "thinking global, and regional while acting local"). More on partner institutions at: <u>SORT IT operational research and training (who.int)</u>

**Lessons learnt:** These partners were mobilised by SORT IT to support countries and achieve the expected outputs. Such solidarity and partnerships are key at a time of global pandemics.

## LMIC and UK researchers trained and increased support staff capacity

2.8 Aggregate level summary across awards of individual capacity strengthening supported by at least 25% NIHR award funding

Training level	Total number who are currently undertaking or have completed during the award period	% LMIC nationality	% female
2019 - operational research	Each research project simultaneously implements four layers of training, namely: 1) training of front-line workers and programme staff; 2) training of SORT IT alumni as trainers; 3) training of academia as trainers; and 3) training of WHO country office staff. In 2019, we enrolled 36 front-line health workers with research projects. Thirty-one (31) SORT IT alumni, 12 academic staff and 16 WHO staff were also part of the team as part of a training-of-trainers approach. An average of three people per project were trained.	100%	47%
2020 – operational research	In 2020, there were no trainings due to COVID-19. Activities were restarted in early 2021.	N/A	N/A
2021 – operational research	In 2021, we enrolled 36 more front-line health workers with research projects in Colombia, Ecuador, Ghana and Sierra Leone and completed 36 studies from regional trainings in Asia and Africa	100%	47%
2022- operational research	In 2022, a total of 36 research studies were completed from Colombia, Ecuador, Ghana and Sierra Leone. Cumulatively, from 2019 to December 2022 a total of 72 front-line health workers were enrolled and completed their research training and 251 benefited from training-of-trainers. An average of three people were trained per research project. All principal investigators were from LMICs and 47% were female.	100%	47%

#### LMIC institutional capacity strengthened

2.9 Delivery partner's summary of evidence of activities and outcomes from across awards demonstrating how NIHR funding has helped to strengthen LMIC institutional capacity to contribute to and lead high quality research and training within a national research ecosystem. 1. Independent capacity to conduct research: Of the first 36 SORT IT trainees from Asia and Africa who participated in a survey 12-months after study completion, 64% completed a new research study and 25% became mentors after one training cycle.

**Lesson learnt**: Both percentages are indicators of independent research capacity built among trainees to implement research and mentor others.

- 2. Research training and training-of-trainers: The AMR–SORT IT model uniquely combines research training and implementation and enhances global engagement by building communities of practice. Through an apprenticeship approach, both participants and new trainers have been empowered. Each research project was used to simultaneously implement four layers of training with the following numbers enrolled for training:
  - *Level 1:* 72 research participants with priority research subjects on AMR included in the SORT IT training programme.
  - Level 2: Training of SORT IT alumni and new trainers (training-of-trainers) 59 former SORT IT graduates were paired with senior mentors and trained on teaching OR through the training-of-trainers approach.
  - *Level 3:* Training of academia: 54 individuals from various academic institutions were trained to become trainers on all SORT IT modules.
  - Level 4: 30 lead AMR staff from seven WHO country offices were trained on OR.
- **Lesson learnt:** With each research project being used to train approximately three individuals, the gains in capacity building are multiplied and so too the value for money. A total of 215 individuals benefited from capacity building
- "Through SORT IT, Sierra Leone has rapidly acquired a trained pool of operational research mentors 'a critical mass' who can now go and train others in the health system. This is a big leap towards sustainability" Dr Joseph Kanu, National AMR focal person, AMR country coordinating platform, Sierra Leone.
- 3. SORT IT research studies supporting the AMR strategic pillars and facilitating research integration: All SORT IT activities and research studies were aligned with the pillars (awareness, surveillance, prevention, stewardship and improve diagnostics) of the strategic AMR plans of target countries. As such, AMR–SORT IT has contributed to informing the pillars of the AMR plans at national and global levels. 47% of the studies are on strengthening surveillance and monitoring within the health system. This is vital to "feel the pulse" of the AMR situation in countries. Without good surveillance, we would be thinking and acting blindly.
- 4. AMR SORT IT enhanced the response to COVID 19 pandemic and strengthened health systems

The AMR–SORT IT programme has also contributed to strengthening health systems against pandemics. Fifty-six percent (56%) of individuals involved with the AMR–SORT IT project continue to apply their acquired skills in a synergistic manner to the COVID-19 global response in 2022. AMR activities have specifically contributed to building health system resilience by protecting health workers, keeping health facilities safe, improving laboratory diagnostic capacity and informing communities on preventive measures. This suggests that the investment in research training to date has equipped health workers with the skills and competencies needed for tackling COVID 19 and similar pandemics in the future. The SORT IT programme has also supported the integration of research within health systems and improved surveillance. Furthermore, the AMR-SORT IT focal points who are embedded within the WHO country office teams and supported by DHSC have played a key role in moving the AMR agenda while acting synergistically in the COVID-19 response

- "The AMR–SORT IT program has been beneficial in highlighting shortcomings in AMR data reporting from National AMR surveillance sites in Nepal. This led to infrastructural improvements, trainings, and additional support from the Fleming Fund Country Grant. These interventions have improved overall AMR surveillance in Nepal"
- Ms. Jyoti Acharya, Member-secretary, Human Health AMR Technical Working Group, National Public Health Laboratory, Government of Nepal
- 5. Enhancing global engagement and building networks on AMR: The AMR–SORT IT project brought together a network of 69 partner institutions from 30 countries, thereby creating LMIC to LMIC and high-income country (HIC) to LMIC networks and partnerships (communities of practice on AMR). 80% of these institutions are from the South and this enhances the opportunities for collaboration.

5. Creating digital solutions: An innovative online SORT IT training platform was developed in 2020 and fully deployed thereafter in 2021 to conduct online trainings and subsequently in 2022 for use in a hybrid mode. This platform now serves to store all information such as curricula for trainings, sharing information and also provides conferencing facilities

The platform can be used in circumstances where the standard face-to-face approach is not permissible (e.g. during future outbreaks) and is now accessible to LMIC partner institutions through TDR

- 6. Capacity in research communication: 215 individuals benefited from a newly developed SORT IT training module on 'effective communication of research findings', maximizing their capacity to communicate research in a simple and understandable manner thereby improving opportunities for research uptake.
- 2.10 Aggregated distribution of support staff (collected for the purposes of understanding how wider research support responsibilities are divided between LMIC and HIC institutions)

	Total number of FTE support staff (research managers, finance, admin, community engagement practitioners, other) in post during the last 12 months
Employed in LMICs	12 FTE (6 SORT IT technical officers and 6 SORT IT fellows)
Employed in HICs	3.1 FTE (1 SORT IT coordinator, 1 SORT IT technical officer, 0.2 field implementation support, 0.5 finance controller, 0.2 knowledge management, 0.2 administrative support)

## Equitable research partnerships and thematic networks established/strengthened

2.11 Delivery partner's assessment of the extent to which this NIHR funding has contributed towards building or strengthening equitable research partnerships/collaborations and thematic networks (where applicable, including engagement with communities).

Through TDR's convening power, global engagement on AMR was enhanced by bringing on board 69 SORT IT partners from 30 countries, including 59% SORT IT alumni who are engaged with AMR–SORT IT trainings, thereby boosting HIC–LMIC and LMIC–LMIC partnerships. 80% of these partner institutions are from LMICs. This demonstrates TDR's capacity to effectively mobilise institutions, expertise and build communities of practice on AMR at a global level ("think global, act local"). The AMR-SORT IT partnership is now the largest partnership of implementing institutions involved with operational research in the world. The list of institutions can be accessed at: <a href="https://tdr.who.int/activities/sort-it-operational-research-and-training">https://tdr.who.int/activities/sort-it-operational-research-and-training</a>

Close collaboration was also established with WHO country offices in Colombia, Ecuador, Ghana, Myanmar, Nepal, Sierra Leone and Uganda. The institutions involved with collaborations are listed below.

#### LMIC–LMIC collaboration in AMR (55 institutions):

Armenia: Tuberculosis Research and Prevention Center NGO

**Brazi**l: The Universidade Federal de Ciencias de Saude de Porto Alegre; Universidade de Brasilia **Chile**: Universidad de Concepcion

**Colombia**: Universidad de los Andes; Universidad Pontificia Bolivariana; Universidad Pedagógica y Tecnológica; Ministry of Health

Ecuador: The Central University

Ethiopia: Bahir Dar University

**Ghana**: CSIR–Water research institute; Kintampo Health Research Center; Environmental Protection Agency; Institute of Statistical, Social and Economics Research (ISSER)

**Guinea**: University National Centre for Training and Research in Rural Health; Africa Centre of Excellence for Prevention and Control of Transmissible Diseases, University Gamal Abdel Nasser of Conakry

- India: ICMR–National Institute of Epidemiology, Chennai; Bangalore Medical College and Research Institute; All India Institute of Medical Sciences; International Union Against Tuberculosis and Lung Disease (The Union), South East Asia office; Indian Council of Medical Research- National Institute of Epidemiology; Jawaharlal Institute of Postgraduate Medical Education & Research; GMERS Medical College Gotri Vadodara Gujarat; Medical College Baroda, Gujarat; Sri Manakula Vinayagar Medical college; Narotam Sekhsaria Foundation, Mumbai.
- Kenya: University of Nairobi; Madhira Institute; AMPATH; The Kenya Snakebite Research and Intervention Centre; College; Academy for Public Health, Kozhikode, Kerala.

Malawi: Lighthouse Trust

Mexico: The Autonomous University of Yucatán

Myanmar: Department of Medical Research

**Nepal**: Damien Foundation; School of Public Health; B.P. Koirala Institute of Health Sciences; Patan Academy of Health Sciences; National Public Health Laboratory; KIST Medical College and Teaching Hospital; Ministry of Agriculture and Livestock

Nigeria: Ministry of Health

Pakistan: Ministry of Health; Common Management Unit for AIDS, TB & Malaria
Sierra Leone: Food and Agriculture Organization; Sustainable Health Systems; Ministry of Health; Ministry of Agriculture and Livestock
South Africa: Stellenbosch University
Uganda: Makerere University; Lire University; Ministry of Health
Zambia: Zambart
Zimbabwe: Ministry of Health

#### HIC-LMIC collaboration in AMR: (14 institutions):

Belgium: Institute of Tropical Medicine
Canada: University of Toronto; Public Health, Ontario
France: International Union Against Tuberculosis and Lung Disease
Hungary: National Public Health Center
Luxembourg: Médecins Sans Frontières
Sweden: Public Health Agency
Scotland: University of Saint Andrews
United Kingdom: Public Health England; University of Liverpool; The Quadram Institute Bioscience, Norwich
USA: University of Washington; California State University of Fullerton

Details of a "domino effect" in institutions taking up AMR as a priority has been included in the 2021 report, In 2022, The Damien Foundation in Belgium integrated an operational research unit in Brussels to support research including on AMR in LMICs. The

Similarly, the Division of Health System Research of ICMR - National Institute of Epidemiology, Chennai (Dept of Health Research, Ministry of Health and Family Welfare, Govt of India) has a SORT IT alumni who is now the scientist for health systems research including AMR and supports operational research in India and various other countries.

The International Union Against Tuberculosis and Lung Disease has become a lead contractual partner for setting up data systems for operational research in various countries and with various institutions around the world. They offer consultants and expertise and have a major hub based in India.

**Lessons learnt:** The mobilisation of 69 institutions in 30 countries proved vital during COVID-19 as it helped leverage the human resources and expertise needed to generate high-quality evidence for decision making. Such global solidarity is an asset for ongoing and future work in strengthening health systems at a time of global pandemics. The AMR-SORT IT partnership is now the largest partnership of implementing institutions working on operational research in the world.

#### 2.12 Aggregated HIC/LMIC spend across all awards

	Total committed amount (GBP) allocated to:	% of total committed amount to all institutions:
UK/HIC institutions	£ 714 392	23%
LMIC institutions	£ 2 410 739	77%
All institutions	£ 3 125 131	

2.13 Delivery partner's summary of any other noteworthy outcomes beyond those captured above (note that these may include unanticipated outcomes (both positive/negative), outcomes outside health, and any other secondary benefits to the UK or any other countries)

The fact that AMR–SORT IT supported staff working in WHO country offices in the seven target countries, and that over 50% of all those involved with the AMR–SORT IT project still continue to be on the front-lines of the COVID-19 response in 2022 as countries return to normalcy. This shows that the AMR project has had wider benefits in terms of controlling the spread of new infections on a global basis, including in the United Kingdom. AMR activities continue to contribute to building health system resilience by protecting health workers, keeping health facilities safe, improving laboratory diagnostic capacity and informing communities on preventive measures. Control of AMR, which also has pandemic potential, is of indirect benefit to all countries, including the United Kingdom ("AMR there, is AMR here, is AMR everywhere").

In addition to the 72 front line workers trained, through a training of trainers approach, we also trained 59 SORT IT alumni, 54 individuals from academic institutions and 30 staff from WHO country offices on various aspects of research. This has enhanced the pool of mentors for SORT IT and will help to further scale up efforts to tackle AMR.

Details on how the AMR–SORT IT programme has galvanised the AMR committees in the target countries is covered in the 2021 report. In 2022 SORT IT officers working on temporary contracts in Nepal, Colombia, Ghana and Sierra Leone became integrated as fully time staff within the WHO offices. This is a reflection of their perceived value and contributions made in previous years to the AMR response and health systems strengthening. It also implies sustainability of their positions and work in AMR and COVID-19. This is likely to have spin-offs ant national level and beyond.

### 3. Value for money

- Delivery partner to summarise their approach towards ensuring value for money in how the research is being undertaken. For example:
- 3.1 Economy how are you (the delivery partner) ensuring that funding is being spent on the best value inputs?

**Innovation to tackle COVID-19 restrictions while reducing costs:** In 2021, we championed the development of a SORT IT online platform to catch up on COVID-19 delays in implementation in 2021 and 2022. Developed with a SORT IT partner in Armenia (TB-RPC), this platform allowed us to move to full implementation while avoiding the need for travel and accommodation, resulting in cost savings. It also allowed us to bring subject matter experts from various countries to link in for one- or two-hour sessions, which in the past would have required travel to countries. Details of the cost of development and cost savings were covered in the 2021 report. The platform is now used for storing and sharing training material, conferencing and online learning. This innovation shows leverage, an innovative manner of reducing costs, improved efficiencies and reduced our carbon footprint. Going forwards, we will continue to use this platform in a hybrid manner and monitor its effectiveness and value for money while using it as a complimentary tool to face-to-face modules, hybrid and fully online modes. We will also assess costs savings.

For more information, please see link: https://drive.google.com/file/d/1lpDfzF8\_DFHvKP0AFMWxxwv8rUO5lgKG/view?usp=sharing

**The AMR–SORT IT programme strengthened health systems:** The programme has embedded staff in WHO country offices and in the emergency response units in countries. Over 50% of these individuals still continued work on the front-lines of the COVID-19 and other outbreak responses such as Influenza virus. Their activities continued to contribute to health system resilience by protecting health workers, keeping health facilities safe, improving laboratory diagnostic capacity and informing communities on preventive measures. The strong synergy built between AMR work and the COVID-19 response has been a win–win for health systems strengthening and will serve to strengthen future country responses to pandemics. This shows that individuals working in the health system have acquired skills and competences which are needed both now and in the future. Many of the research studies that were completed in 2022 are related to assessing how health systems are functioning and the identified constraints. As the proposed solutions to address these constraints are being addressed through research uptake, it will contribute further to health systems strengthening and specifically in the five pillars of the AMR action plan "Several completed operational research studies on Infection, Prevention, and Control conducted through AMR-SORT IT have led to recommendations and actions that should help make health facilities safer for health workers, patients, and, the community".

#### Madam Christiana Kallon, National IPC Coordinator, Ministry of Health of Sierra Leone

**Rapidly moving research in Ghana and completing 12 research studies in one year.** The United Nations guidelines for Myanmar stipulate avoidance of meetings and capacity building activities with the de facto authorities. It was thus not feasible to embark on the SORT IT cycle in Myanmar in 2021.

To maximize the overall value for money of the AMR–SORT IT project, we brought forward and launched an AMR–SORT IT programme in Ghana in November 2021 and completed a SORT IT cycle in about 15 months. Research dissemination happened in November 2022 and the research findings are now being moved to actions. Due to strong existing working and personal relationships, The WHO country office team in Ghana, the National AMR coordinating committee and the SORT IT partnership were fully engaged right from the start

Lessons learnt: The ability to rapidly shift from Myanmar to Ghana and to harness the required engagement was possible thanks to close collaboration and early buy-in that TDR achieved with the AMR country coordinating committees and WHO country office in Ghana. The presence of a SORT IT fellow and a technical officer who were both embedded within the WHO country office in Ghana were of advantage in facilitating discussions with country counter-parts and moving activities into rapid implementation. This has demonstrated the importance of in-country links and leveraging WHO country offices to mitigate against unforeseen risks and maintaining diversity in delivery countries of the programme.

**Use of WHO procurement measures** include tenders for hotels and procurement of supplies, with strict internal procedures that ensure competitive bidding.

Use of WHO country office staff for the organization of SORT IT training courses cuts down administration and other costs. These measures have continued in 2022 and improved efficient delivery of outputs and services from suppliers.

Enhanced efficiency - how are you (the delivery partner) maximising the outputs (research and innovation outputs, knowledge exchange, strengthened researcher and support staff capacity, strengthened partnerships/networks) for a given level of inputs? Due to TDR and SORT ITs established convening power, global engagement capacity and the SORT IT know-how that has been built over the past 12 years continued to be mobilized.

The use of those trained in previous cycles of SORT IT to train others as mentors brings efficiency through a Train-The-Trainers programme. The involvement of academic institutions also adds to the pool of future mentors, and brings complimentary resources on board to scale-up of efforts to tackle AMR.

We further continue to enhance efficiencies by training a team of 4 groups using each research project (health workers, SORT IT alumni, academia and WHO staff). Through this approach, with each research project there are three-to-four people trained as a team. This implies a total of 48 people trained through 12 research projects This adds value for money of the capacity building aspect of SORT IT. The percentage of those who continued research independently after completing one SORT IT cycle in 2022 was 64% (indicating independent capacity built) and 25% became mentors. We also continued to leverage 69 partners to share the work and enrichen the outputs.

Effectiveness – how are you (the delivery partner) assessing that the outputs deliver the intended outcomes?

To promote effectiveness and impact, we continued to engage early with those who are expected to use the results of the research. All SORT IT training modules and research activities have time-bound milestones and performance targets against which achieved outcomes are assessed. We also have a post project survey that assesses the impact of research on policy and/or practice on the ground.

We developed and implemented a new training module on 'how to effectively communicate research findings to decision-makers'. This has helped to engage policyand decision-makers to easily understand the key messages of research and use the results. For example a study from Sierra Leone showed that of 14 districts that should have been reporting on antibiotic use in livestock, only three were reporting and of those reporting data was complete in only one percent of reports. The challenges to reporting were lack of computers, internet connectivity and motorbikes for field supervision. This led the director general of livestock in collaboration with the Food and Agriculture Organisation to mobilize resources and provide 32 computer tablets, 30 motorbikes for field supervision set up regional data hubs and conduct nation-wide trainings. The impact assessed one year later showed that all 14 districts were now reporting and 88% of data were complete. A significant improvement in the status prior to the baseline research study. Decision makers include members of AMR committees, managers of disease control programmes.

#### 3.2 Equity

• Please summarise any activities that have taken place to ensure everyone is treated fairly as part of the application process and within funded research teams, regardless of gender, gender identity, disability, ethnic origin, religion or belief, sexual orientation, marital status, transgender status, age and nationality.

We continue to include (and collect) data on gender, age, geographic equity and nationality in the participant selection process. We specifically target problems of vulnerable groups as a priority for research wherever possible, for example studies on neonates, children, and women. In 2022, 47% of selected front-line workers in the SORT IT training programme were women.

In terms of targeting problems of vulnerable populations, the AMR–SORT IT programme focused on seven LMIC countries, some of which have weaker health systems and populations that are generally vulnerable to AMR. This is due to limited (or lack) of access to health care facilities, inadequate laboratory diagnostic facilities and effective antibiotics due to poor availability or high costs. In many LMICs, the use of sub-optimum doses of antimicrobials, or using antimicrobials to which resistance has already developed, fosters drug resistance. Paying attention to these geographic and socio-economic perspectives contributes to an equitable approach to programming. In terms of geographic equity and involvement of One Health subjects, we have endeavoured to bring in new mentors and peers from agriculture and animal health into training modules in 2022.

• How are you (the delivery partner) ensuring that the funded research benefits vulnerable groups to improve health outcomes of those left behind?

Details of how the funded research benefits vulnerable groups were covered in the 2021 report. There are several examples. For example a study done on neonates with sepsis in Nepal showed that the time it took for laboratory results to return was as long as nine days and many neonates died before the results became available. The findings of this study resulted in improvements being made to improvements in laboratory procedures and the commissioning of automated laboratory equipment.

Similarly another study from a tertiary hospital in Nepal showed that pregnant women who underwent caesarean sections were unnecessarily receiving antibiotics and this led to new guidelines being developed on how to use antibiotics after surgery and trainings. The impact of these interventions will be assessed in 2023.

3.3 List of any additional research and infrastructure grants secured **by LMIC partners** during the course of this NIHR funding – including value, funding source, lead institution and country, what % of additional funding allocated to LMIC partners, HRCS code.

Not applicable

## 4. Risk

4.1 Delivery partner to summarise the five most significant risks (both in terms of potential impact and likelihood) across awards within the last year.

Risk	How is the risk being managed/mitigated?	Current status
COVID-19 pandemic and continued embargos on travel and gatherings in early 2022	We developed and deployed a virtual SORT IT platform which was used in a hybrid manner, allowing training activities to continue at full speed in 2022. To catch up with the project deliverables, we rescheduled SORT IT modules through 2022 and 2023 and a project extension was accepted by DHSC until June 2023. Face-to- face training restarted in October 2022. This should ensure that we meet all the required deliverables	Likelihood: Medium <u>Impact</u> : Low, due to availability of an online training platform and the lifting of travel bans. A no-cost extension from DHSC to June 2023 has also been most helpful in ensuring that research findings are taken up and implemented The extension also allows TDR to assess the influence on policy and practice of previous round of research in improving programme performance and strengthening health systems.
Due to COVID-19 delays 37 research studies from Colombia, Ecuador, Ghana, and Sierra Leone will only be completed in the last six months of 2022. Most studies identified problems in the health system and technical support for implementing solutions will be needed which takes about 12–15 months following study completion (thus into 2023).	A No Cost Extension (NCE) of the project to June 2023 will help maximize opportunities to support the translation of research findings into actions	<u>Likelihood</u> : Medium <u>Impact</u> : Low, as the work will be supported through the NCE and continued support by WHO country offices.
Impact assessments of research studies are an	We will conduct these assessments during the course of 2023 with support from WHO	<u>Likelihood</u> : Medium <u>Impact</u> : Low as the

Risk	How is the risk being managed/mitigated?	Current status
integral requirement of 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.	country offices	NCE to June 2023 will help propel these activities
Lack of time to collect data to demonstrate the impact of completed research studies	Through the NCE accorded by DHSC, we will conduct a dedicated SORT IT cycle between January and May 2023 that will collect, analyse and publish selected studies from Ghana, Nepal and Sierra Leone through an adapted SORT IT cycle. Funding has also been allocated for this activity.	Likelihood: Low Impact: Low as all arrangements to run this SORT IT have been concluded and it is slated to start in January 2023.
Currency fluctuation risk between the pound sterling and US dollar	Contingency was included in budget lines. Final instalment was received in January 2022 hence the depreciation of the British pound during 2022 did not pose a risk.	<u>Likelihood</u> : Low <u>Impact</u> : Low

- 4.2 Fraud, corruption and bribery. Delivery partner to summarise:
  - their approach to handling accusations of fraud, corruption and bribery (if not covered in previous reports)
  - any changes in the last year to the anti-corruption strategy applied to managing NIHR funded awards

As stated in the 2021 annual report, the WHO has a written policy on combatting fraud and corruption and TDR confirms that this policy is being fully implemented to prevent such events and address them when they arise. TDR will take timely and appropriate action to investigate any allegations of fraud and corruption in accordance with its accountability and oversight framework. If an allegation is found to be substantiated through investigation, WHO will give due consideration to timely and appropriate sanctions in accordance with regulations, rules and procedures, and full recovery is sought from the recipient entity. TDR will keep DHSC informed through mechanisms outlined in WHO's policy (reporting to governing bodies and to donors).

4.3 Safeguarding

• Please detail and highlight any changes or improvements you (the delivery partner) have made in the past year to ensure safeguarding policies and processes are in place in your project and your downstream partners.

As illustrated in the 2018 External Audit of TDR and in the annual reviews of the Internal Control Framework, TDR follows WHO's policy on internal controls, and we comply with WHO mechanisms for safeguarding assets, including preventing and detecting errors, theft and fraud. In addition, to enhance safeguarding of policies and processes for this project, TDR has introduced:

A. Safeguarding of SORT IT trainees, partners and beneficiaries detailed in the 2021 report.

- B. Safeguarding assets from theft, fraud, etc:
- 4.4 Please see details in the 2021 report. Please summarise any activities that have taken place to minimise carbon emissions and impact on the environment across this funding call.

We have developed a virtual training platform which provides an alternative 'online' means of training during the COVID-19 pandemic. This has been of wider benefit in reducing airline flight related carbon emissions from 2021, into 2022 and beyond. Going forward, we will use the experience to introduce a hybrid approach of face-to-face and online sessions for training and other meetings and workshops. This would help to considerably reduce carbon emissions across TDR programmes in the future.

# 5. Delivery, commercial and financial performance

#### 5.1 Performance of awards on delivery, commercial and financial issues

Expenditure in the year 2022 was £1.71million (with an additional £0.259 million committed costs). A total of £ 6,278 m has been spent of the full amount of £ 7,329 m. After taking into consideration the committed costs as mentioned, the balance that is left is £0.792m. This amount was forecasted to be the balance that will be used for the final six months of the project ending June 2023.Salaries of WHO country office staff in three countries, Ghana, Nepal and Sierra Leone, will be continued in 2023. A SORT IT course that will assess impact of previous cycles of research. This cycle will include modules 1,2 and 3 will be held in 2023 bringing countries together as well as those who were trained to assess the impact of solutions that were implemented and lessons learned from previously completed SORT IT cycles.

- 5.2 Transparency this question applies to funding schemes which include transparency obligations within their contracts.
  - Delivery partner to confirm whether or not International Aid Transparency Initiative (IATI) obligations have been met (please refer to\_ <u>https://iatistandard.org/en/iati-standard/</u>). Yes
  - If these are not yet met, please outline the reasons why.

TDR acknowledges and supports the requirements of the International Aid Transparency Initiative Standard (IATI Standard). WHO, as a signatory to IATI, shall publish information and data in accordance with the IATI Standards. In accordance with this commitment, WHO publishes information on its website (<u>https://extranet.who.int/programmebudget/</u>) which facilitates the traceability of contributions from the Government of the United Kingdom of Great Britain and Northern Ireland to WHO and down to its major offices. TDR also publishes information on grants and contracts awarded as an annex to the annual reports of each Strategic Priority Area (research for implementation, research capacity strengthening and global engagement), upon approval from the TDR governing bodies. These reports are published on TDR's website.

### 6. Monitoring, evaluation and learning

#### 6.1 Monitoring

• Monitoring activities throughout the review period and how these have informed programming decisions.

**Robust inbuilt metrics.** All SORT IT trainings are routinely assessed through an in-built monitoring system which includes: achievement of the 80-80-80-80 performance targets - 80% participant satisfaction score; 80% successful completion of all milestones; 80% publication record within a maximum of 18 months of manuscript submission; and 80% of research assessed for impact on policy and practice through surveys. We also assess the number of institutions from HICs and LMICs involved in collaborative partnerships and the capacity of alumni to continue undertaking and publishing operational research beyond the life of the programme.

**Equity.** Gender equity, age, nationality, LMIC leadership and north-south, south-south collaborations are reported each quarter on a global level. Mapping of geographic coverage is also included.

**Quality of generated evidence.** To ensure quality control of generated evidence, TDR routinely assesses the quality of reporting of SORT IT publications according to international standards. The last independently commissioned assessment of SORT IT in 2021 showed that 90% of publications (n-392) involving 72 countries and 24 thematic areas showed excellent reporting quality. A further similar assessment in 2022 of 67 mixed-methods and qualitative research during seven years of implementing SORT IT in 18 countries, 32 journals and 13 public health themes showed that reporting quality was 'good' to 'excellent' in 89% of publications.

Further information on these assessments is available here:

- Quality, Equity and Partnerships in Mixed Methods and Qualitative Research during Seven Years of Implementing the Structured Operational Research and Training Initiative in 18 Countries <u>https://www.mdpi.com/2414-6366/7/10/305</u>
- Quality, Equity and Utility of Observational Studies during 10 Years of Implementing the Structured Operational Research and Training Initiative in 72 Countries\_ <u>https://www.mdpi.com/2414-6366/5/4/167</u>

**Availability of SORT IT resources on the TDR website.** All publications and policy briefs generated through SORT IT are available in an open access format on the TDR website.

#### https://tdr.who.int/activities/sort-it-operational-research-and-training

**Financial reports.** Quarterly financial and activity updates with WHO country offices and partners through written reports and virtual means.

**Performance-based contracts.** All delivery partners have performance-based contracts which are paid on achievement of deliverables. Due to COVID-19 delays, all contracts with implementing partners will be extended into 2023, with payments being deferred as relevant.

6.2 Evaluation plans and activities that have taken place across awards throughout the review period.

All SORT IT training modules are routinely evaluated for quality and improvement through participant surveys by those trained. We also receive feedback from mentors, WHO country offices and others who participate in the SORT IT activities and suggestions are critically reviewed by the SORT IT technical and organizational committees and taken forward as appropriate. Within 12-15 months of study completion, we systematically evaluate completed research studies for impact on policy and/or practice. This involves a survey questionnaire with the principal investigator which is complimented with qualitative interviews including with stake holders and decision makers. Reports of decisions taken, actions implemented are cross-verified through available proofs. In 2023, we will adapt a SORT IT programme to build capacity to assess and demonstrate research impact using selected studies from Ghana, Nepal and Sierra Leone. This will allow us to fine-tune the tools for assessing changes in policy and practice. These tools and the approach can be scaled up to other projects.

Some examples of individual reflections by trainees on various training modules are given below:

"I was not confident about data but through SORT IT, I have understood a lot about data. I liked the approach of theory followed by practice. Now I feel confident enough to analyze my data - A trainee from Nepal"

*"I liked the way we went from zero to almost complete manuscript in less than a week - A trainee from Ghana"* 

*"Information on how to disseminate research findings and ensure impact is rare. I really liked this module as it focuses on just that - A trainee from Columbia"* 

"Skills that I acquired through SORT IT are helping me to contribute in addressing AMR at our work place. For example, in the formulation of hospital guidelines and rational use of antibiotics - A trainee from Nepal"

"At the district level, SORT IT skills helped me to respond adequately to the COVID 19 pandemic with little resources. Acquired data analysis, reporting and decision making skills have been very useful. I am applying these to mitigate the effect of COVID-19 on malaria and other diseases- A trainee from Sierra Leone"

#### 6.3 Learning

#### Key lessons

The key lessons learnt are: 1) the research conducted through the AMR-SORT IT programme is having impact; 2) the new module developed on improving research communication is applauded and appreciated to enhance research uptake; 3) using online tools can allow alternative modes of delivering trainings and can results in cost savings and also contribute to reducing the carbon footprint and; 4) working through expended partnerships brings on added resources for implementation at times of pandemics and also LMIC-LIMIC and LMIC-HIC collaborations which are of value.

Research can have impact: During 2022, the AMR–SORT IT programme showed that 71% of research studies from Asia and Africa had an impact within 12-months after completion. The enabling factors included: early and continued engagement with those expected to use the results of research (AMR committees and national stakeholders); ensuring that research studies were national priorities, policy relevant and of high quality; the research question emerged from within the health system; rapid publication mechanisms were put in place; research findings were communicated in a manner that was simple and understandable to busy decision makers.

Effective and persuasive research communication training is important: The newly developed 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 quick actions to improve public health. A brief video on the research communication module from Ghana is available here https://youtu.be/y5DQLykpGbg

Investments in research training has had a significant collateral impact on strengthening health system resilience to tackle pandemics. Fifty-six percent (56%) of individuals involved with the AMR–SORT IT project continued to apply their acquired skills in a synergistic manner to the COVID-19 global response. This suggests that the investment in AMR research training to date has equipped health workers with the skills and competencies needed for tackling COVID 19 and similar pandemics. It has also supported the integration of research within health systems.

Lessons learned from moving online: The SORT-IT online platform has now enabled a much more agile mode of delivery which can be deployed at lower cost and allows for mentors in different countries to interact with mentees. Where possible the benefits of building relationships in the early modules through face-to-face interactions and then moving online has been shown to be preferable. The first face-to-face module in 2022 was on research communication and was conducted in Ghana. It was much more effective to in terms of allowing interactive discussions at formal and informal settings at the training venue. However, this should continue to be monitored and hybrid modes of training would seem the way forwards.

Working through partnerships and local contacts is key for risk mitigation: Despite COVID-19 disruptions and restrictions on travel, the successful completion of all 74 planned research studies for the AMR SORT IT programme demonstrates the added value of working through partnerships. The AMR–SORT IT network was expanded to include 69 implementing partners in 30 countries from Asia, Africa, The Americas and Europe. These partners were mobilized and were key for supporting countries and achieving the expected outputs.

Moreover, the suspension of activities in Myanmar and rapid launch and completion of activities in Ghana (including 12 research studies) within one year has demonstrated the importance of having strong connections in-country to manage unforeseen risks. The benefit of being part of a wider SORT-IT programme has also been illustrated through the support of the WHO country offices both to manage the suspension in Myanmar and commence activities in Ghana. The WHO regional and country offices offer a very strong network through which other NIHR opportunities could be tested and disseminated.

#### 6.4 Key milestones/deliverables for the coming year

Award	Key milestones/deliverables for coming year	
AMR–SORT IT programme	Support for publication of the remaining 10 pending studies that were completed.	
	Conduct a six month adapted SORT IT cycle to assess and document impact of 12 selected studies from Ghana, Nepal and Sierra Leone	
	Impact assessment of 36 studies completed in Colombia, Ecuador, Ghana and Sierra Leone	
	Support WHO country offices in target countries in Asia and Africa and the Americas to implement recommendations of completed research and assess its impact on policy and/or practice.	