Implementation research for the appropriate use of, and access to, antimicrobials

Guest speakers: Joy Lawn, Malabika Sarker & Christine Halleux

Moderator: Fernando Pascual Martinez

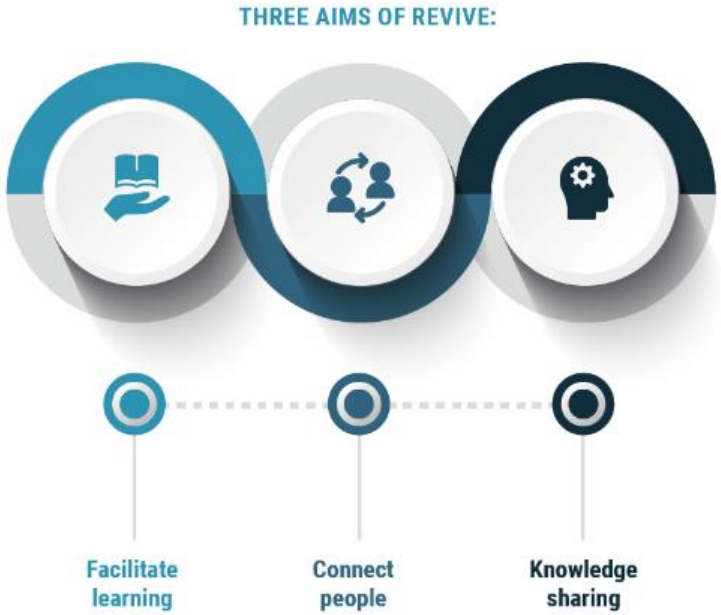
Host: Victor Kouassi

3 December 2024

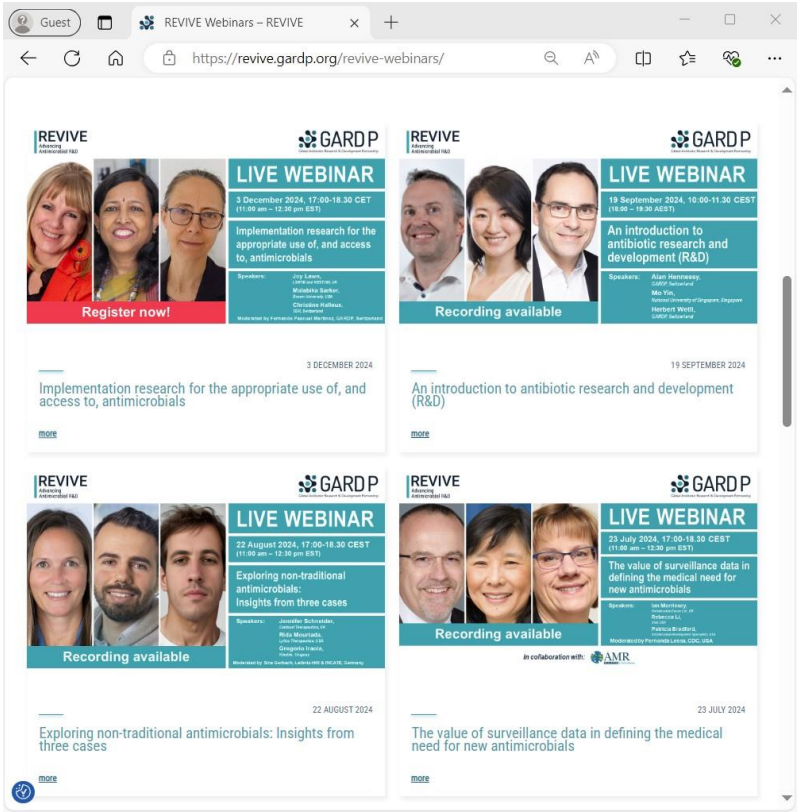
GARDP
Global Antibiotic Research & Development Partnership

REVIVE

Capture essential R&D technical knowledge and share expertise with the global community through the REVIVE website (revive.gardp.org).

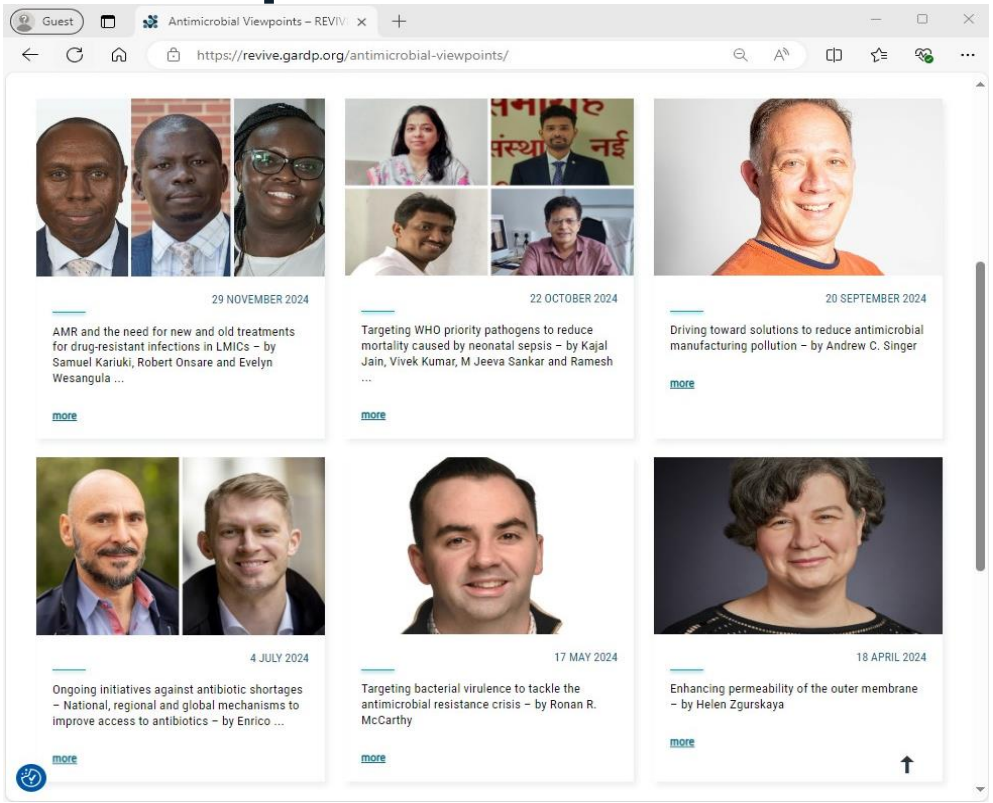


Webinar recordings



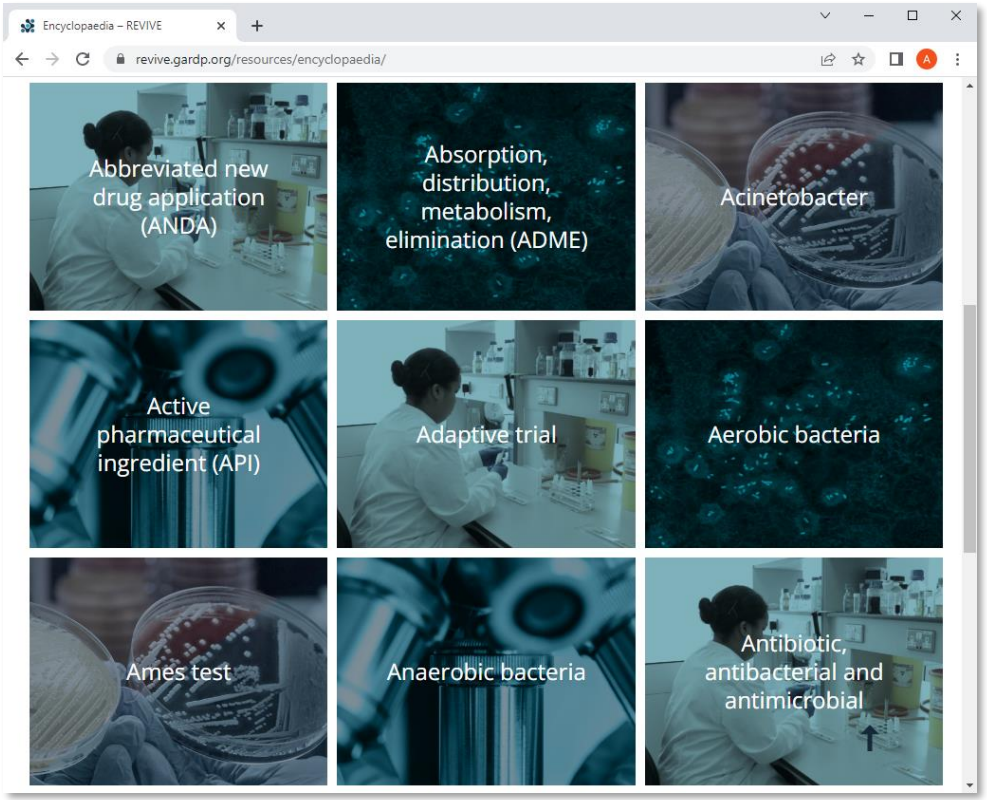
revive.gardp.org/webinars

Antimicrobial Viewpoints



revive.gardp.org/antimicrobial-viewpoints

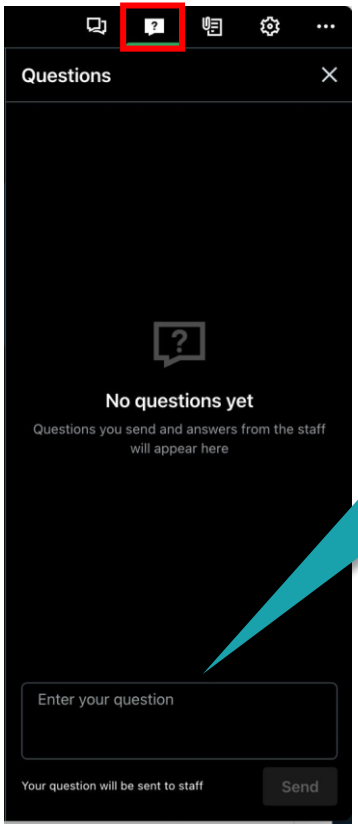
Antimicrobial Encyclopaedia



revive.gardp.org/resources/encyclopaedia

How to submit your questions

If your question is addressed to a specific speaker, please include their name when submitting the question.



The presentation will be followed by an interactive Q&A session.

Please submit your questions through the box provided after clicking the ‘questions’ button. We will review all questions and respond to as many as possible after the presentation.

Today's speakers

Implementation research for the appropriate use of, and access to, antimicrobials

Joy Lawn
Professor of Maternal, Reproductive & Child Epidemiology
LSHTM and NEST360 *(UK)*

Malabika Sarker
Professor of the Practice of Behavioural and Social Sciences
Brown University (USA)

Christine Halleux
Unit Head – Implementation Research
TDR (Switzerland)

Moderator:
Fernando Pascual Martinez
R&D Access Development Lead
GARDP (Switzerland)

Joy Lawn

Joy Lawn is a Ugandan born neonatal doctor and perinatal epidemiologist, currently Professor of Maternal, Reproductive & Child Epidemiology, at London School of Hygiene & Tropical Medicine (LSHTM), UK. She leads a research team working on multi-country studies covering newborn health, stillbirths and child development, including large scale implementation research with NEST360 Alliance.

She currently co-chairs the Lancet Commission on Evidence-based Implementation and has published over 370 peer-reviewed papers including leading several Lancet series and UN reports. Her master's degree was from Emory, Atlanta, USA and her doctorate degree from the Institute of Child Health, London.

Implementation research: how can we close funding gaps and democratise methods for local use?

REVIVE Advancing Antimicrobial R&D

GARDP Global Antibiotic Research & Development Partnership

3rd December 2024

Professor Joy Lawn

MBBS FRCPCH MPH PhD FMedSci

LSHTM and NEST360 team

Lancet Commission on Evidence based Implementation

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

MARCH MATERNAL ADOLESCENT REPRODUCTIVE & CHILD HEALTH

NEST360

@MARCH_LSHTM | @NEST360

@joylawn

RESEARCH PIPELINE

… A robust research pipeline needed, true interdisciplinary science,
…. Impact on health outcomes HIGHEST for implementation research

Description
Characterize problems

Discovery
Basic science

Development
Create new interventions

Delivery
Implementation research for equity & quality

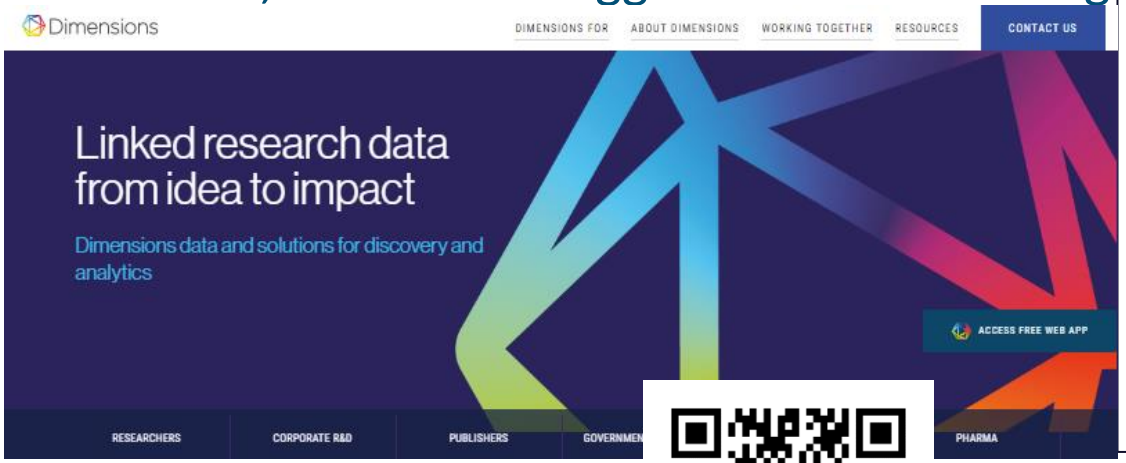
Source: Lawn et al., BMC RH 2014

<10% of funding and often lower

"Unlike minds" get better results = teams beyond our "bubbles"

Who funds what and where? Does research funding match burden?

Dimensions, the world's biggest research funding database https://www.dimensions.ai



7 million grants

- Data on grant size, dates, funders, recipients, geolocation, topics
- All languages (e.g. captures China's funding)
- Searchable using standard terms, tags, Boolean operators

1.7 billion linked citations

TOP FINDING= INEQUALITIES

- US$577 million worldwide / year

Lancet Global Health 2023
Agravat P, Loucaides E, … Fitchett E, Lawn JE

Articles

Research funding for newborn health and stillbirths, 2011–20: a systematic analysis of levels and trends

Priyesh Agravat, Eva M Loucaides*, Meghan Bruce Kumar, Anna Howells, Alexandra Molina García, Ismail Sebina, Núria Balanza, Elizabeth J A Fitchett†, Joy E Lawn†*

Research funding to **LMICs**, newborns 2011-2020

TOP FUNDED TOPICS IN LMIC

1. Neonatal infections (~0.4 million deaths/year)
2. Direct complications of preterm birth (1 million direct deaths/year)

Stillbirth research very little funding in both high and low-income countries (1.9 million/year)

RESEARCH PIPELINE

48.7%
for basic science research

2.9%
for implementation

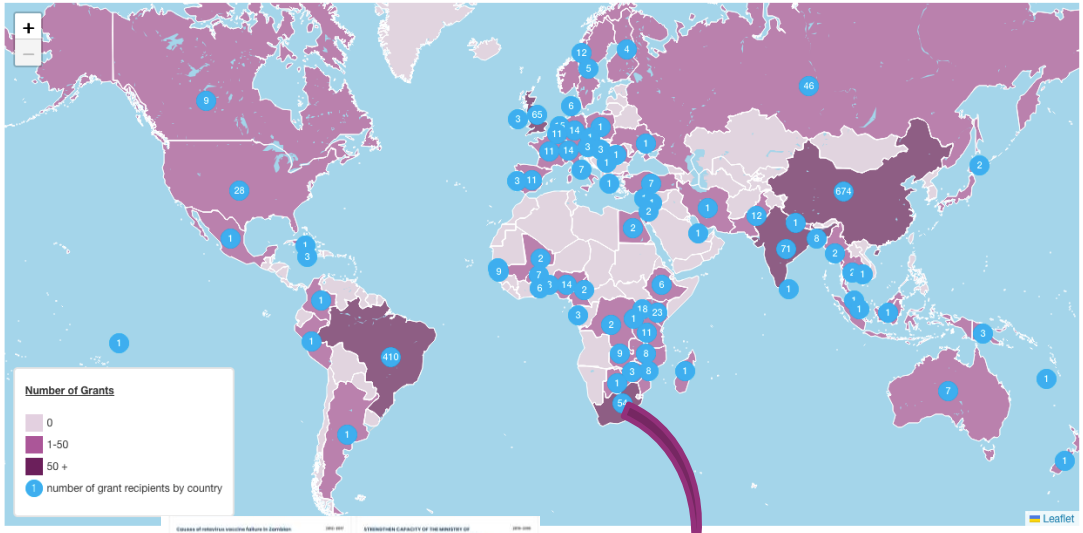
CHANGE NEEDED: Not just more money but better targeted by place, burden, more on implementation research and more LMIC leadership

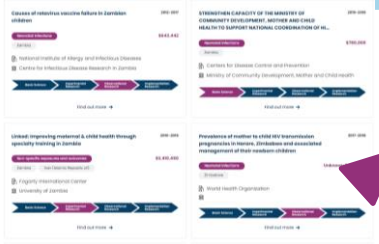
Agravat P, Loucaides E, … Fitchett E, Lawn JE Lancet Global Health 2023

Newborn Toolkit Research Funding Map

More than $577m a year is spent funding research that mentions newborns. But where does it go?

Expand to read more





AIMS

- **Amplify research uptake** from limited current funding in LMIC settings
- **Find local collaborators** for new research ideas;
- **Help reshape global research funding** to better match burden and context, with more implementation research and more LMIC leadership

https://newborntoolkit.org/research-funding-map#learning-hub

South Africa 52 grants,
26 on neonatal infections!
Can you find any on implementation research?

New interactive map based on the data from this Lancet paper aiming to help us all go faster to close those gaps

Democratising Implementation research

Most cited paper for “implementation research definition” 1567 time in 10 years

BMJ

BMJ 2013;347:f6753 doi: 10.1136/bmj.f6753 (Published 20 November 2013)

RESEARCH METHODS & REPORTING

Implementation research: what it is and how to do it

Implementation research is a growing but not well understood field of health research that can contribute to more effective public health and clinical policies and programmes. This article provides a broad definition of implementation research and outlines key principles for how to do it

David H Peters *professor*[1], Taghreed Adam *scientist*[2], Olakunle Alonge *assistant scientist*[1], Irene Akua Agyepong *specialist public health*[3], Nhan Tran *manager*[4]

“THE QUESTION is the king in implementation research ”

Three questions on implementation research:

1. **WHAT is it?**

2. **HOW** to do it? What are some useable tools, frameworks, methods? Where to find out more?

3. **WHY** The Lancet Commission on Evidence based Implementation How can we all help democratize implementation research?

Question 1: WHAT is implementation research?

= 100s of definitions!

Peters BMJ 2013:
"Scientific inquiry into questions concerning implementation — the act of carrying an intention into effect, which in health research can be policies, programmes, or individual practices (collectively called interventions)."

AI
Implementation research (IR) is the scientific study of how to effectively implement programs, policies, and treatments in real-world settings.

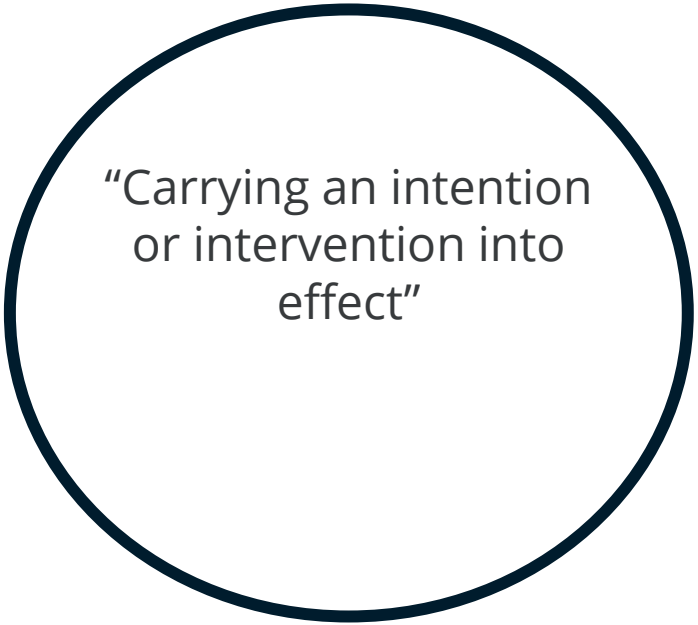
Embedded IR – UNICEF
"The integration of research within existing health programme implementation and policymaking cycles to improve programme outcomes (e.g. coverage, sustainability, efficiency, cost, scale) and overcome implementation bottlenecks."

UNICEF
Implementation research (IR) is an approach to health systems strengthening in which (a) generation and use of research is led by decision-makers and implementers; (b) local context, priorities, and system complexity are taken into account; and (c) research is an integrated and systematic part of decision-making and implementation.

Allottey et al 2008
Implementation science is 'applied research that aims to develop the critical evidence base that informs the effective, sustained and embedded adoption of interventions by health systems and communities.'

$$\text{Implementation success} = f \text{ of treatment effectiveness (moderate)} + \text{acceptability (high)} + \text{potential to improve care (high)} + \text{penetration (high)}.$$

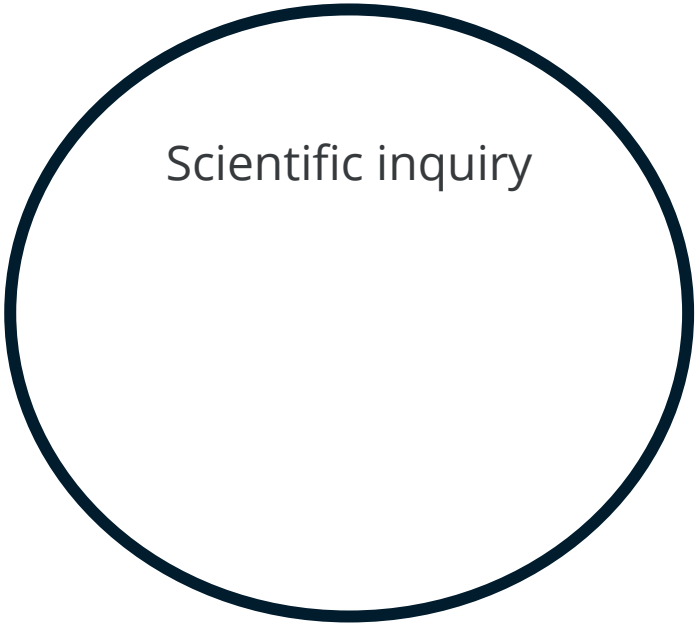
Implementation



“Real word contexts”
“User focused”

“Doer”

Research

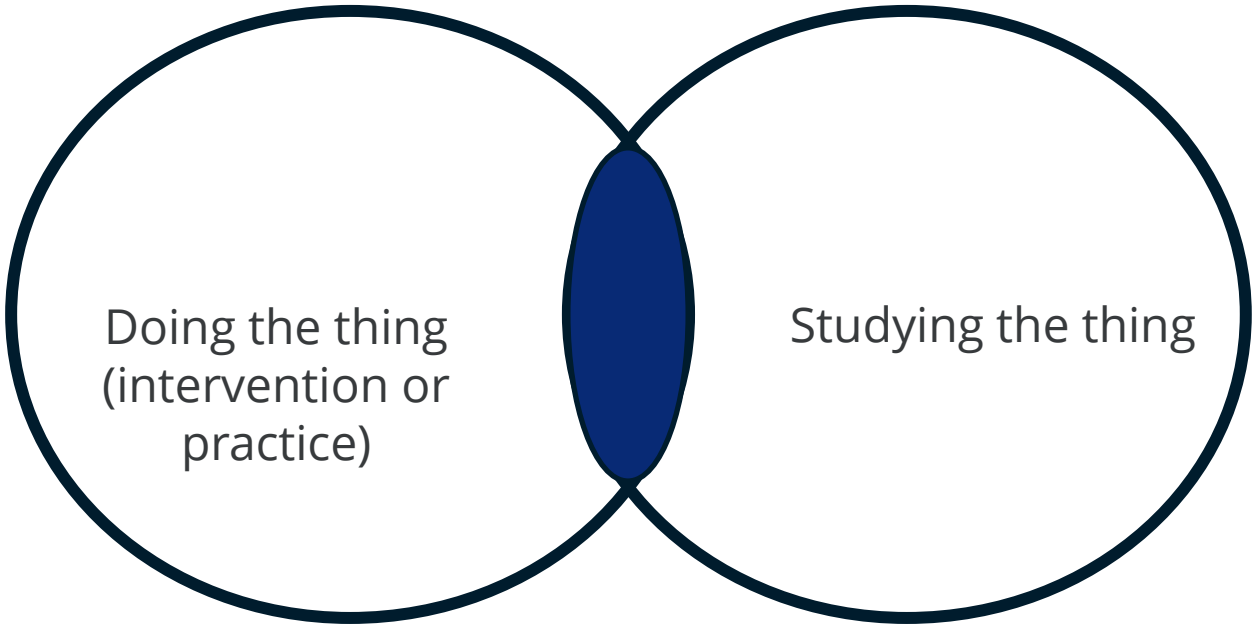


“Efficacy” “Controlled”

“Thinker”

Implementation

Research

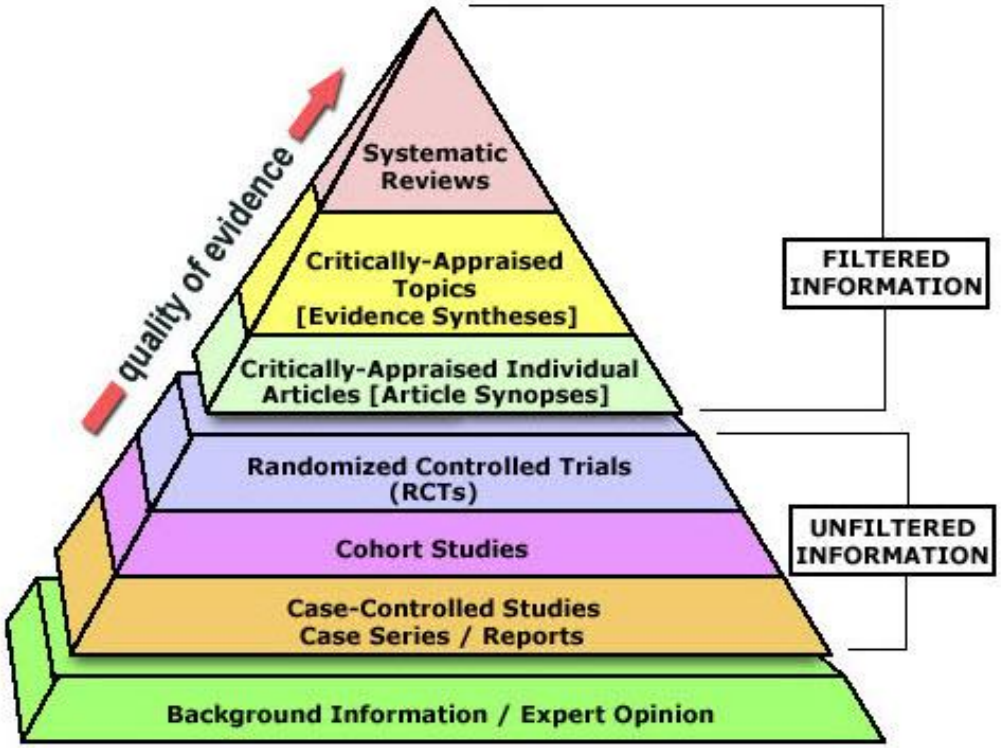


Implementation research
"Study of **how best** to help people or places **do the thing"**

Question 2:
HOW to do implementation research?

Adapted terms from Geoff Curran 2020, BMC ISC Implementation science made too simple

"Studying the thing"
Eg "What intervention is best?"
Evidence based medicine hierarchy of quality of evidence



Evidence-Based Medicine by Jan Glover, David Izzo, Karen Odato and Lei Wang.

"Study of **how best** to help people or places **do the thing"**
Implementation research

>61 theories/ frameworks/ models

>73 implementation strategies

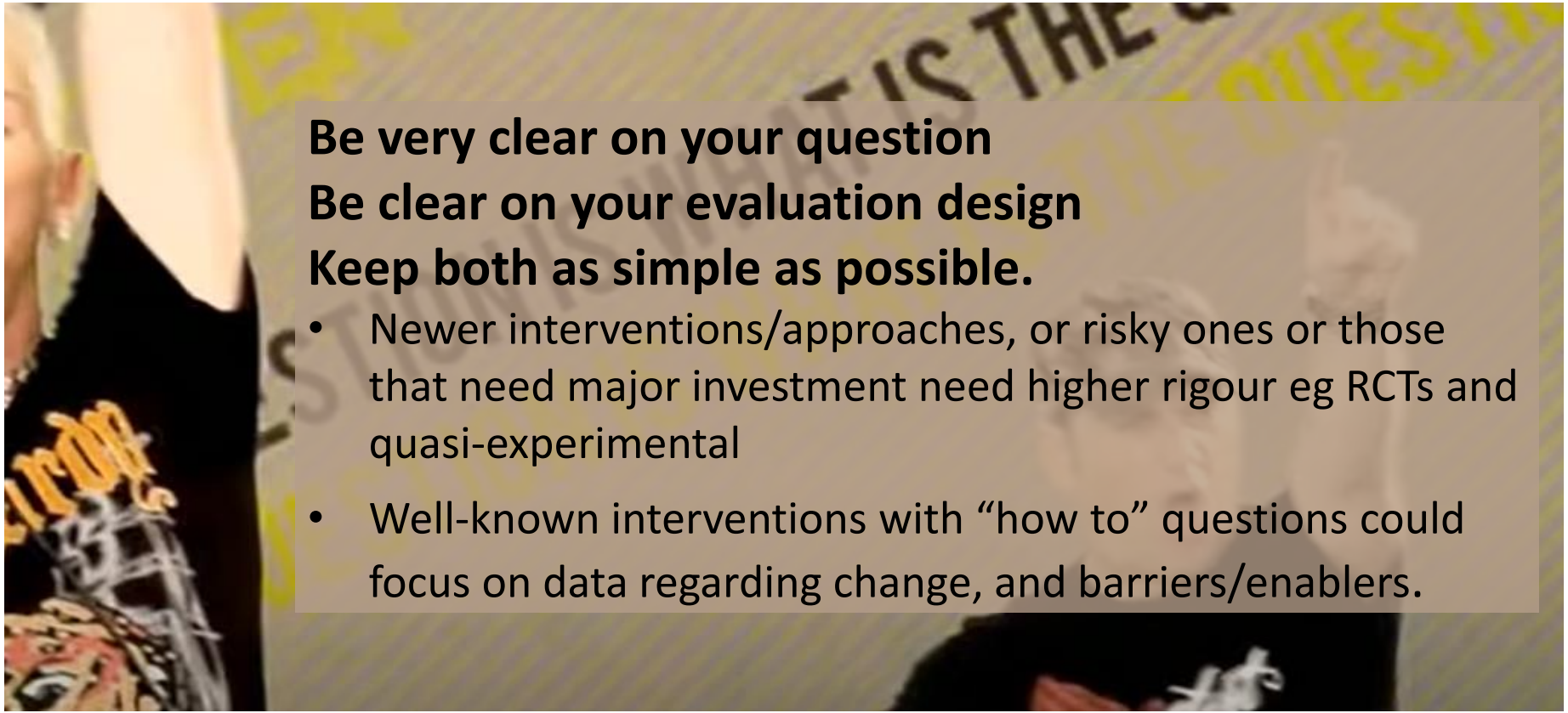
>400 implementation-related measures listed by Society for Implementation Research Collaboration

17 outcome domains for implementation research Proctor et al.

- Acceptability
- Adoption
- Appropriateness
- Cost
- Feasibility
- Fidelity etc..

Dr. Geoff Curran's Implementation science made too simple

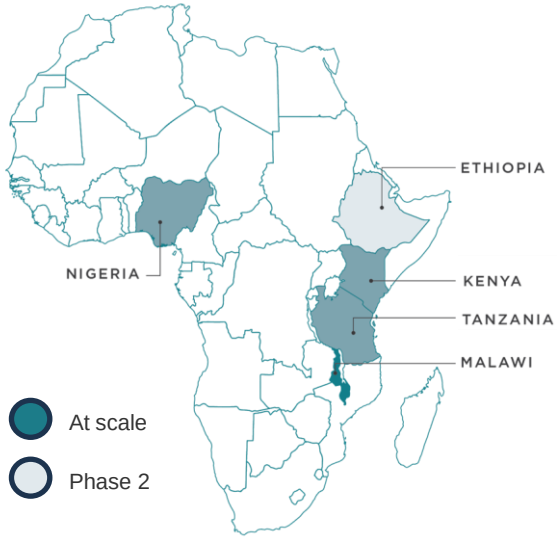
“The question is WHAT IS THE QUESTION?”



Be very clear on your question
Be clear on your evaluation design
Keep both as simple as possible.

- Newer interventions/approaches, or risky ones or those that need major investment need higher rigour eg RCTs and quasi-experimental
- Well-known interventions with “how to” questions could focus on data regarding change, and barriers/enablers.

NEST360 Alliance Across Africa = Multi-country systems change for faster impact, with embedded implementation research



Alliance of 22 organizations (17 in Africa) **working with five African country governments** to accelerate newborn survival towards SDG 3.2. funded by BMGF, ELMA, CIFF.

38
Malawi

13 +14
Kenya

7+21
Tanzania

7+14
Nigeria

16
Ethiopia

Data = foundational

- Comparable individual level dataset
- Health systems data eg HFA
- Data use on ward, hospital and Government level wards for rapid change

Embedded "how to" questions

- Eg how to increase KMC or CPAP coverage/quality?
- Eg nurses and device ratios needed?
- Eg how to close blood culture use gap?

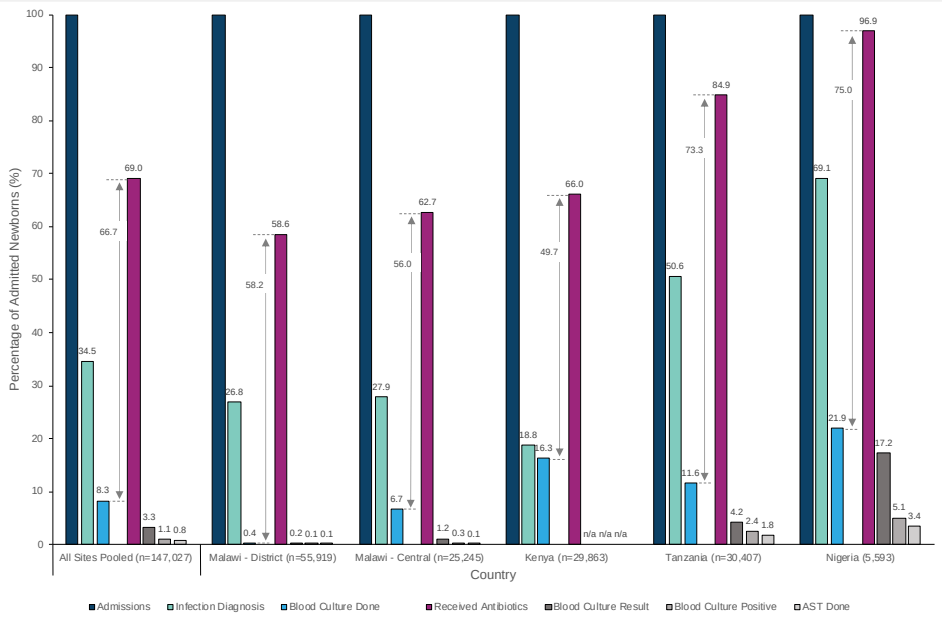
Overall evaluation for impact and cost effectiveness using rigorous quasi-experimental design

NEST360 **5** Countries **130** Hospitals **1M+** Deliveries per year **200k+** Admissions per year

Eg: Detection Gap: **QUANTITATIVE** Findings for blood culture use

Country Level Detection Gap

Fig 1 shows **the major gap between antibiotic and blood culture** use for inpatient newborn care at the country level (July 2019-September 2022).

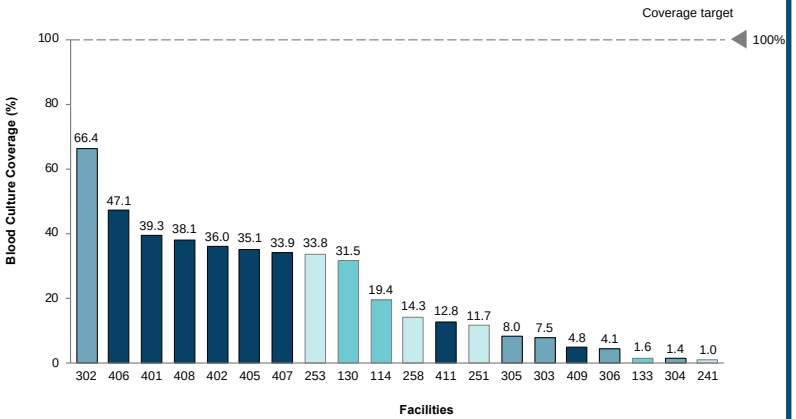


Note: All 68 neonatal units implementing with NEST360 have laboratory access (HFA)

Facility Level Assessment of Detection

Despite the major detection gaps noted at the country level, there was **significant variation in blood culture use at the facility level**, with some facilities outperforming.

Fig 2 depicts the facility-level blood culture coverage for 20 NEST360-implementing facilities.



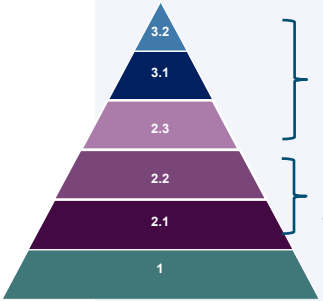
Note: For brevity, the 48 facilities with <1% blood culture coverage were excluded from figure.

BMC Peds 2023, Sarah Collins, James Cross.. ...Joy Lawn

NEST360

Detection Gap: **QUALITATIVE** barriers enablers for blood culture use

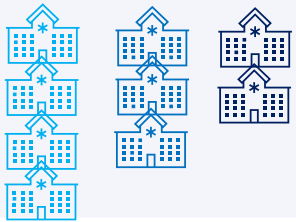
Facility Selection



Step 1: Highest performing facility in each country selected

Step 2: Facility from each of the lower tiers with the highest number of recorded admissions selected

10 facilities selected as sites for qualitative research visits across Nigeria, Kenya, & Tanzania



Tool Development

WHO HSBBs as a **framework:**

- Semi-structured interviews
- Questionnaires

Ward doctors, nurses

Laboratory technicians, managers

Pilot Study

Tanzania 2022

Ward

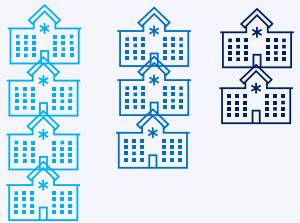
Barriers
-Financial
-Target Population
Enablers
-Research Activity
-Prioritisation at Management Level
Health Worker Knowledge

Laboratory

Barriers
-Procurement of Blood Culture Bottles
-Human Resources
Enablers
-Ward-Laboratory Relationship
-Availability/Collection of Local Data
-External Research Activity

Work in progress 3 countries

Data collection at remaining facilities, analysis, writing, and **communicating findings back!**



>>DATA FOR ACTION<<

Work in progress, Hannah Mwaniki , Sarh Collins etc al

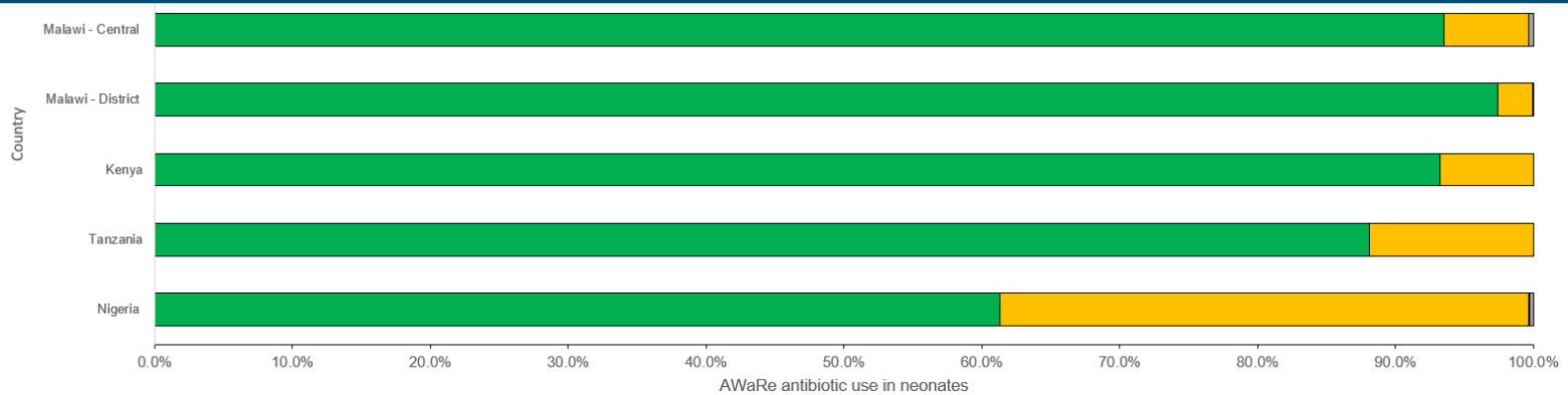
NEST360

Antibiotics Patterns & Stewardship Review

- Using AWaRe classification, will describe antibiotic use at country and facility level
- Novel idea for us also to estimate potential **cost saved** on antibiotics if stewardship is improved

For more information on AWaRe visit **adoptaware.org**

Country Level Antibiotic Use



Work in progress, Dr Sarah Collins and others

Abbreviations: WHO; World Health Organisation, HCAI; healthcare-associated infections, LMICs; low- and middle-income countries

NEST360

HOW to access useful material on implementation research?

Helpful review articles

- Geoff Curran BMC- IS, 2020, ”Implementation science made too simple”
- Peters BMJ 2013, ”Implementation research: what is and how to do it”

Websites with useful collections

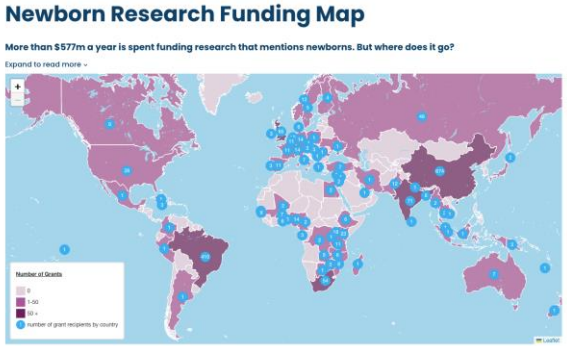
- Eg WHO TDR toolkit https://adphealth.org/irtoolkit/
- Eg RE AIM https://re-aim.org/

Online training

- WHO TDR MOOC
- UNICEF coming soon!

How to get going?

1. Pick an actionable question
2. Look for relevant papers on that question eg on the Newborn Research map
3. Ask others!
4. Design a doable approach if possible using existing data systems and/ or limited targeted qualitative data
5. Use an organising framework – ideally without inventing a new one!



HOW TO IMPLEMENT HIGH QUALITY SMALL & SICK NEWBORN CARE?

WHO + UNICEF 10 core components for Small and Sick Newborn Care
Leadership & Governance
Financing
Infrastructure
Medical supplies and devices
Human resources
Information systems
Family centred care with KMC
Developmental follow-up
Integration with maternal care
Referral systems

Health systems building blocks adapted from WHO

IMPLEMENTATION GAP

Implementation Toolkit
NEST360, UNICEF & many others
Implementers from 170 countries
www.newborntoolkit.org

Join us and share implemenation learning together
En francais – bien venue!

unicef
NEST360

FASTER TOGETHER!
Multi-country, multi-lingual learning for Small + Sick Newborn Care

National Targets

SDG 3.2 for Newborn Survival cannot be met without SSNC

Sub-Saharan Africa South Asia
~80% of neonatal deaths globally

Lower coverage for SSNC yet opportunity for high impact

Over 55,000 unique users in last 12 months from 170 countries

Newborn Toolkit Users by Country,

Newborn Toolkit

- Tools >1000 in 15 languages,
- Technical content in French
- Linked communities of practice in English and French with regular webinars

Please sign up to the Toolkit

Question 3: WHY The Lancet Commission on Evidence based Implementation?

Comment

Achieving justice in implementation: the *Lancet* Commission on Evidence-Based Implementation in Global Health

With the launch of the Sustainable Development Goals *Implementation Science*, in 2006 with a health focus.[5] Published Online June 21, 2023

30 commissioners, all world regions, multiple disciplines
Co-chairs, Bert Peterson, Joy Lawn, Queen Dube

Launched 2023, due publication in 2025/2026

Aim to shift the use of evidence in implementation, democratising local implementation research

Aiming to follow in the path of the Lancet GH Commission on High Quality Health Systems

HAVE YOUR SAY !
What evidence do you use? Why?
What would enable you to generate and use evidence in the real world?

Please do this short survey and share widely!

Thank you and questions welcome!

Malabika Sarker

Malabika Sarker is an implementation researcher and a mixed-method expert in the School of Public Health at Brown University (USA). She has taught across four continents and has extensive research experience in Sub-Saharan Africa and Bangladesh. Before joining Brown University, Malabika was the Associate Dean & Professor of the James P Grant School of Public Health at BRAC University, Bangladesh. There she founded the Center of Excellence of Science of Implementation & Scale-Up (SISU). She has been awarded over US$ 10 million in research and capacity-building grants and has published 146 peer-reviewed articles and five book chapters. In 2018, Malabika was awarded the Heroines of Health global award.

She is a physician with a Master's in Public Health (MPH) from Harvard University, USA, and a doctorate degree in Public Health from the University of Heidelberg, Germany.

Antibiotic Dispensing and Usage Practices in Resource-Constrained Settings: A Potential Driver of Emerging Antimicrobial Resistance in Bangladeshi Communities

Malabika Sarker
Professor of Practice Behavioral and Social Science Department,
School of Public Health,
Brown University, USA
malabika_sarker@brown.edu

Abdullah Al Masud
Ph.D. Student | Research Officer
School of Population Health | Faculty of Medicine
University of New South Wales, Sydney, Australia
abdullah.masud@unsw.edu.au

“The Jack of all trades”

“A patient receiving Ceftriaxone via intramuscular injection from a community pharmacy drug-seller, patient felt shy about having the injection in the hip or thigh due to the open, busy street location.”

12/4/2024

Photo-credit: Sushanta Kumar Paul

Global Scenario

10 million annual deaths by 2050 in LMICs with a high Infectious Disease Burden

65% ↑ in antibiotic consumption (2000 to 2015)
Global survey: 76 countries

Nearly 80% of antibiotics are consumed in the community, with 20-50% used inappropriately

In some SEA two-thirds of antibiotics are consumed without prescriptions (widespread OTC availability)

Bangladesh

Unqualified providers prescribe 63% of antibiotics, and retail pharmacies dispense them without prescriptions

Aggressive marketing encourages unqualified drug sellers to overprescribe and dispense medications without prescriptions

Socio-Political

- Limited knowledge of antibiotic use
- Resistance among customers and sellers
- Weak policy enforcement

Health System

- Poor focus on Community-based antibiotic dispensing and consumption

Research

- Focus on hospital settings,
- Lack of root cause analysis

Standard Treatment Guidelines (STG) on Antibiotic Use in Common Infectious Diseases of Bangladesh

Version: 1.0
Date: 1 December, 2021

Communicable Disease Control
Directorate General of Health Services
Ministry of Health and Family Welfare

Review

Antibiotic resistance in Bangladesh: A systematic review

Iftekhar Ahmed, Md. Bodiuzzaman Rabbi, Sakina Sultana

Show more

+ Add to Mendeley Share Cite

https://doi.org/10.1016/j.ijid.2018.12.017

Get rights and

Highlights

- Forty-six articles on antibiotic resistance in Bangladesh were reviewed to analyze the trend of resistance and to identify gaps in surveillance.
- There is a high prevalence of antibiotic resistance, rendering many

The portrayal of antimicrobial resistance in Bangladeshi newspapers during 2010–2021: Toward understanding the narrative

Tahmidul Haque, Syed Hassan Imtiaz, Md. Imran Hossain, Sazzad Hossain Khan, Md. Mahfuj Alam, Zahidul Alam, S. M. Rokonuzzaman, Orindom Shing Pulock, Susmita Dey Pinky, Ataul Karim Arbi, Haroon Bin Murshid, Nusrat Homaira, Md. Zakiul Hassan

Published: May 31, 2024 • https://doi.org/10.1371/journal.pone.0304582

Article | Authors | Metrics | Comments | Media Coverage | Peer Review

Reader Co

Abstract

Background

Antimicrobial resistance (AMR) is a major global public health crisis and around the last decade, newspapers were one of the main sources of public dissemination of information for so. This study highlights how Bangladeshi mainstream newspapers represented AMR-related news and how they created the narrative of AMR in Bangladesh.

Methods

We conducted both quantitative and qualitative content analysis on 275 AMR-related news articles published in the twelve highest circulated dailies (January 2010 to September 2021).

www.nature.com/scientificreports

scientific reports

Check for updates

OPEN

Factors contributing to antibiotic misuse among parents of school-going children in Dhaka City, Bangladesh

Md Wahidul Islam[1], Muhibullah Shahjahan[1], Abul Kalam Azad[2] & Md Jubayer Hossain[1]✉

Antimicrobial resistance (AMR) is a pressing global health concern, especially in resource-constrained countries, such as Bangladesh. This study aimed to identify the factors contributing to antibiotic misuse by assessing knowledge, attitude, and practice (KAP). A cross-sectional study was conducted from August 20 to August 30, 2022, among 704 parents of school-going children in Dhaka South City. Descriptive statistics were used to analyze the KAP, and multivariate models, including linear and ordinal logistic regression, were used to explore the associations between these factors. The findings revealed that approximately 22% of the participants were male and 78% were female. Most parents (58%) had completed higher secondary education. Approximately 45% of the respondents demonstrated moderate knowledge, 53% had uncertain attitudes, and 64% exhibited antibiotic misuse. Factors such as parental age, education level, employment status, income, child's age, and family type significantly influenced KAP. These findings emphasize the importance of targeted education and awareness initiatives to enhance knowledge and responsible antibiotic use among parents, contributing to global efforts against antibiotic resistance. The government should enforce laws and regulations regarding the misuse of antibiotics.

International Journal of Surgery Open 49 (2022) 100581

Contents lists available at ScienceDirect

International Journal of Surgery Open

journal homepage: www.elsevier.com/locate/ijso

Correspondence

Antibiotic resistance: An increasingly threatening but neglected public health challenge in Bangladesh

ARTICLE INFO

Keywords
Antibiotic resistance
Bangladesh
Economic burden
Low and middle-income settings

ABSTRACT

Antibiotic resistance is a global problem, and Bangladesh is a significant contributor to this owing to its poor healthcare standards and the misuse and overuse of antibiotics. The available studies suggest that antibiotic self-medication is highly prevalent in developing countries due to easy availability and poor regulatory controls for selling these drugs. Over-prescribing and inappropriate use of antibiotics contribute to the emergence of antimicrobial resistance (AMR) in Bangladesh. Few studies in low and middle-income settings have employed qualitative approaches to examine the constituents of antibiotic sale and dispensing across the full range of healthcare providers. Misconceptions and misinformation led to a wide range of inappropriate uses of antibiotics across the different categories of human and animal healthcare providers. Low awareness of antibiotic action and antibiotic resistance was apparent among healthcare providers, particularly those with little or no training and those in rural areas. Specific and targeted interventions to address AMR in Bangladesh should include educational messages on the rational use of antibiotics and how they work, targeting all types of healthcare providers.

1. Introduction

Antibiotics have been the foremost weapon wielded by humankind in our war against pathogenic microorganisms. Still, the world is on the verge of sliding back to the 'pre-antibiotic era' due to evolving resistance against life-saving antimicrobial drugs, with fundamental effects on individual and public health. Global resistance to antibiotics among clinically important and commensal bacteria is increasing at an alarming rate, thereby threatening the effective treatment of infectious diseases. Antimicrobial resistance (AMR) has both health and economic implications, with increased costs of healthcare for humans and animals associated with resistant infections due to longer duration of illness, additional tests and the use of more expensive drugs. The availability of over-the-counter antibiotics for humans and animals and a lack of training and compliance with standards among healthcare providers (HCPs) are important contributors to the emergence of antibiotic resis-

annually [3]. Currently, 7 million people die each year due to drug resistance. According to WHO, drug resistance could cause 10 million deaths each year by 2050 and by 2030, antibiotic resistance could force up to 24 million people into extreme poverty [4]. Data from LMICS indicate that, because of the development of resistance to first-line antibiotics, 70% of hospital-acquired infections could not be successfully treated by using WHO's recommended regimen [3]. Southeast Asia is at the highest risk of AMR, but there is a lack of implementation of policies due to the weak regulatory regime. Among developing countries of Southeast Asia, Bangladesh was found to be a high degree of ABR, posing a regional and global threat. In 2003 typhoid patients were found to be unresponsive to second-line therapy in Chittagong because first-line treatment was not even attempted because of existing resistance. Management failure with drugs is not rare at all here [5].

3. Misuse of antibiotics in Bangladesh

- What types of antibiotics are procured from community pharmacies, assess their subsequent use, and determine the extent of misuse?

- What social factors exacerbate this misuse and identify potential barriers to antimicrobial stewardship?

Methodology

Cross-sectional Multi-Method Study

Antibiotic Purchasing Survey: **385 customers** from community pharmacies

Antibiotic Usage Survey: Follow up with the **same customers via phone 14 days later**

Four urban and rural areas in Bangladesh

Drug-seller survey: **120 pharmacies on antibiotic** dispensing knowledge

Structured observation: **1,000 individual pharmacy** dispensing practices

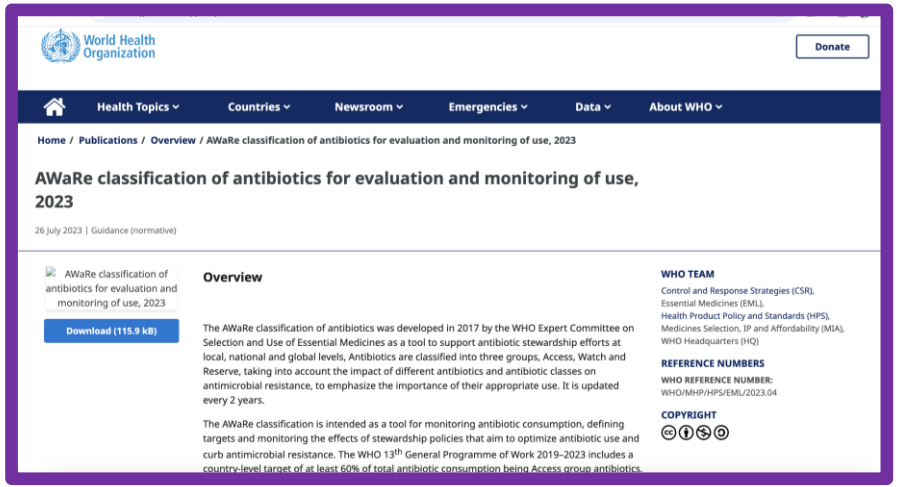
Data collection Sept 2022 – Feb 2023

Simulated patient methods: **60 pharmacies, 20 unqualified providers**

IDI/KII: **16 antibiotic users, 16 drug-sellers, 16 pharmaceutical reps, 16 physicians, 8 unqualified providers**

AWaRe (Access, Watch, and Reserve)

- In 2017, the World Health Organization (WHO) developed the (AWaRe)
  - The Access group contains antibiotics used in the first- and second-line treatment of infections.
  - The Watch group contains broad-spectrum antibiotics with a higher potential of developing resistance.
  - The Reserve group contains last-resort antibiotics used for multidrug-resistant infections.



Antibiotic Purchasing Practices

25.9% : **Antibiotics** (Structured observation)

56.6%: Purchased **without a prescription**, primarily for treating symptoms (Survey)

Macrolides: 23%, 3rd gen cephalosporins:21%, 2nd gen cephalosporins:16.7% (Survey)

WHO-AWaRe classifications: 23.1% as Access 73.5% categorized as Watch (Survey)

Patient(6-59yrs) 27% less likely to present a prescription than those ≤5/≥60 (Survey)

Higher prescription rates: **lower RTI** and enteric fever (Survey)

Gender, location, income, education, and #of health symptoms: no influence (Survey)

Al Masud, A., et al., *Understanding antibiotic purchasing practices in community pharmacies: A potential driver of emerging antimicrobial resistance.* Exploratory Research in Clinical and Social Pharmacy, 2024: p. 100485.

Antibiotic Usage Practices
(Survey with Consumers)

Adherence to minimum antibiotic dosage per STGs was 40.5%

Patients consulting a registered physician significantly 3.8 times more likely to adhere

Males were 32% less likely to adhere compared to females

Rural residents demonstrated 37.0% lower adherence than urban residents

Respondents who recalled the antibiotic dosage had twice likelihood of adherence

Patients on 12-hourly regimens had higher adherence than those on 6-hourly regimens

Patients with uncomplicated skin infections exhibited higher adherence

Drug-sellers' knowledge and practices

- Pharmacy training: 65.8% of 120
- Knowledge on antibiotic use & AMR: Overall score: 60.2% (moderate), 32.5% scored ≤ 4, Those with pharmacy-training scored higher
- Policy awareness: 57.5% were unaware of antibiotic dispensing policies
- AMR awareness: 75.8% recognized the link between antibiotic dispensing and AMR

Simulated Exercise (Symptomatic Treatment Scenario) Drug Seller Survey

Upper Respiratory-Tract Infections

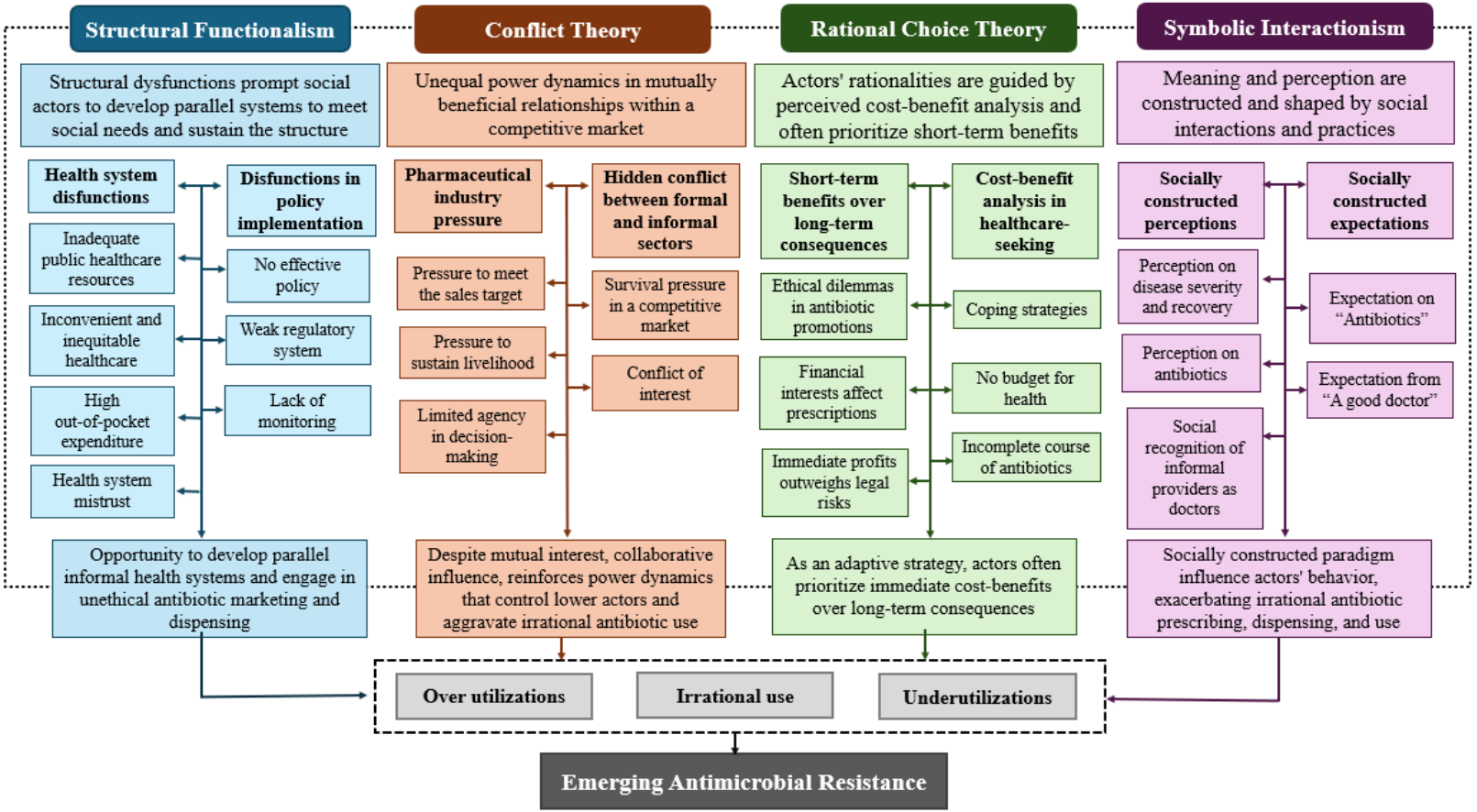
- 54.2% recommended one antibiotic, comprising 90.8% Watch and 9.2% Access categories, with 66.2% improper selection or dosage.

Gastrointestinal infections

- 55.8% recommended one antibiotic 40.3% Watch and 59.7% Access, with 82.1% incorrectly prescribed

- 26.7% recommended Two antibiotics (51.6% Watch, 48.4% Access), with all improper selection or dosage.

Interviews with Multiple Stakeholders



Way Forward

- Targeted interventions in both formal and informal healthcare settings are essential, especially in LMICs, where irrational antibiotic practices are more prevalent in informal settings
- Strengthening patient-physician relationships and emphasizing patient-centered care, including preferences, needs, values, and counseling time, is essential
- Understanding social determinants of health is key to designing effective interventions
- Community pharmacies and informal providers must engage in AMS programs and receive proper training. Interventions must balance public health goals with the economic realities faced by pharmacy drug sellers.
- Comprehensive interventions targeting regulatory enforcement and market dynamics are essential to curb unauthorized antibiotic dispensing
- Effective antibiotic stewardship in LMICs requires contextually relevant regulations, robust monitoring, and targeted awareness campaigns for drug sellers and consumers

Study team

Holly Seale[1], Malabika Sarker[3,4], Ramesh Lahiru Walpola[2], Abdullah Al Masud[1], Alamgir Kabir[1,5], Muhammad Asaduzzaman[6], Md Saiful Islam[1]

Affiliation:

[1] School of Population Health, Faculty of Medicine and Health, University of New South Wales, Sydney, Australia

[2] School of Health Sciences, Faculty of Medicine and Health, University of New South Wales, Sydney, Australia

[3] Brown School of Public Health, Brown University, USA

[4] Heidelberg Institute of Global Health, Heidelberg University, Germany

[5] The George Institute for Global Health, University of New South Wales, Sydney, Australia

[6] Department of Community Medicine and Global Health, Faculty of Medicine, University of Oslo, Norway

References

- Islam, M.W., Shahjahan, M., Azad, A.K. *et al.* Factors contributing to antibiotic misuse among parents of school-going children in Dhaka City, Bangladesh. *Sci Rep* **14**, 2318 (2024). https://doi.org/10.1038/s41598-024-52313-y
- Haque T, Imtiaz SH, Hossain MI, Khan SH, Alam MM, Alam Z, Rokonuzzaman SM, Pulock OS, Pinky SD, Arbi AK, Murshid HB, Homaira N, Hassan MZ. The portrayal of antimicrobial resistance in Bangladeshi newspapers during 2010-2021: Toward understanding the narrative. PLoS One. 2024 May 31;19(5)
- Atia Sharmin Bonna, Shahed Rafi Pavel, Jannatul Ferdous, Sabbir Ahmed Khan, Mohammad Ali. Antibiotic resistance: An increasingly threatening but neglected public health challenge in Bangladesh, International Journal of Surgery Open, Volume 49, 2022
- Iftekhar Ahmed, Md. Bodiuzzaman Rabbi, Sakina Sultana. Antibiotic resistance in Bangladesh: A systematic review, International Journal of Infectious Diseases, Volume 80, 2019, Pages 54-61

Thanks

Data collection team in Bangladesh

We extend our heartfelt gratitude to the study participants and local health authorities for their support. We also acknowledge the dedicated efforts of our team members for their contributions

Christine Halleux

Christine Halleux is Unit Head for Research for Implementation at the Special Programme for Training and Research in Tropical diseases (TDR) where she coordinates a large portfolio of projects in implementation research, including projects focusing on antimicrobial resistance.

Prior to TDR, Christine worked for several years within a medical humanitarian organization where she led medical programmes and implementation research in several African and Latin American countries. She also worked in the pharmaceutical industry focusing on knowledge management and research quality.

Christine holds a medical degree as well as a doctorate degree in biomedical sciences from the Catholic University of Louvain, Belgium. She has also received a post graduate diploma in tropical medicine from the Institute of Tropical Medicine, Antwerp, Belgium.

Challenges and opportunities in the conduct of implementation research for the use of antibiotics

Christine Halleux

UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases

GARDP Revive webinar - 03 December 2024

The implementation gap – a global issue

Most of the 374 Mo people who acquire sexually transmitted infections each year lack access to screening, diagnosis and treatment*

?

?

Only about 2 in 5 people with drug resistant TB accessed treatment in 2022*

© WHO

* Source: WHO data

Implementation research (IR)

Bridging the implementation gap in LMICs

The systematic approach to **understanding** the relevant **context** and **addressing barriers** to **effective implementation** of health interventions

Provides evidence to support scale-up of interventions, driving policy change

© WHO / Billy Miaron

Challenges and opportunities of IR (1/2)

Contextual evidence needed to drive national or local policy change and practice → **Local research, answering local priorities in real-life settings**

CHALLENGES

- Limited research experience on the field
- Limited ressources
- Competing priorities
- Complexity of stakeholders involvement

Mitundu Community Hospital – 2019
© WHO / Monta Reinfelde

Challenges and opportunities of IR (2/2)

Embedding research into practice

OPPORTUNITIES

- Improved efficiency in health systems
- Long term capacity and resilience within health systems

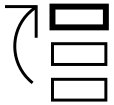
© WHO / Etinosa Yvonne

Research focus and approach

Programme evaluation

Implementation strategies

Engagement local partners



Prioritization of research question

Implementation research as a tool to optimize use of and access to antibiotics

Strategic objective 2:

Strengthen the knowledge and evidence base through surveillance and research

© WHO / Neil Nuia

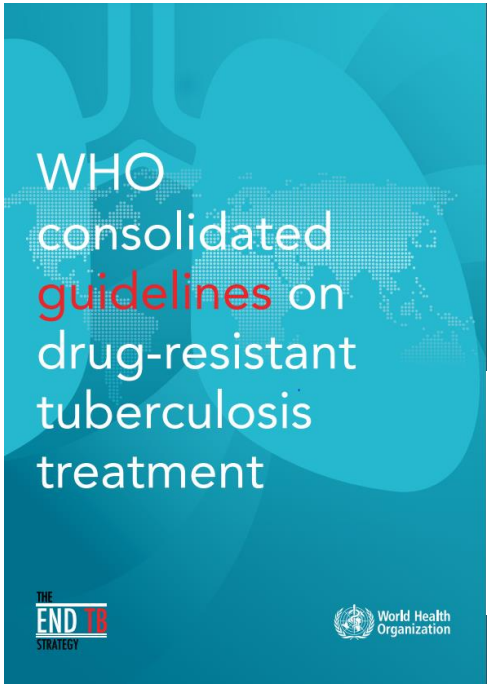
Example:

A research package for introducing all oral shorter regimen for Drug Resistant TB

TDR For research on diseases of poverty
UNICEF • UNDP • World Bank • WHO
LOCAL SOLUTIONS FOR GLOBAL IMPACT

https://tdr.who.int/activities/shorrt-research-package

Context - need for implementation research



(2019 WHO TB guidelines)

…shorter all-oral MDR-TB regimen can be explored under operational research conditions…

Section 4. Use of the standardized shorter MDR-TB regimen

Recommendation

4.1. In MDR/RR-TB patients who have not been previously treated for more than 1 month with second-line medicines used in the shorter MDR-TB regimen or in whom resistance to fluoroquinolones and second-line injectable agents has been excluded, a shorter MDR-TB regimen of 9–12 months may be used instead of the longer regimens (conditional recommendation, low certainty in the estimates of effect).

Research package in support to IR in countries

World Health Organization

TDR For research on diseases of poverty
UNICEF · UNDP · World Bank · WHO

Short, all-Oral Regimens For Rifampicin-resistant Tuberculosis: The ShORRT Research Package

Background

Tuberculosis (TB) is the leading cause of death from a single infectious agent, ranking above HIV/AIDS and malaria. Annually, an estimated 10 million people develop TB disease.

Resistance to anti-TB drugs is a major obstacle to effective TB care and prevention globally. Drug-resistant TB (DR-TB) is multi-factorial and is fuelled by sub-optimal treatment of patients, airborne transmission of the TB bacilli. Nearly half a million people were estimated to have developed multidrug-resistant or rifampicin-resistant TB (MDR/RR-TB) in 2018.

MDR/RR-TB cannot be treated with the standard 6-month course of first-line medication which is effective in most TB patients, and it requires longer and less tolerable treatment with generally poor outcomes.

Attempts to reduce the length of conventional MDR/RR-TB regimens and to use a combination of drugs which is tolerable have been ongoing for several years through various studies. Based on recent evidence, in 2019 the World Health Organization (WHO) released updated guidelines that are expected to lead to major improvements in treatment outcomes and quality of life of MDR/RR-TB patients, including reduced socioeconomic impact. In these guidelines, the adoption of modified all-oral shorter regimens is recommended under operational research conditions.

In order to facilitate the conduct of operational research by countries, and to generate data that are harmonised across different implementation settings, a standardised methodology is required at least for two of the key elements under investigation, namely the effectiveness and safety of the all-oral shorter treatment regimens.

Evidence from this research can inform programmatic implementation at the country level, and also provide important data to the global TB community to strengthen the evidence base and inform treatment guidance.

Integral components related to the implementation and uptake of the new treatment regimens should be considered by National Tuberculosis Programmes as they bear programmatic implications. These include the feasibility and acceptability of the new regimens, and their impact on quality of life of patients, and associated costs to the patients and the health system.

The ShORRT research package

TDR, in close collaboration with the Global TB Programme at WHO, and technical partners, is leading the development of ShORRT, an implementation/operational research (IR/OR) package, including data collection tools and key procedures, to assess the effectiveness, safety, feasibility, acceptability, cost and impact (including on the Quality of Life) of the use of all-oral shorter drug regimens for MDR/RR-TB patients.

The ShORRT research package is aligned with the 2019 WHO *Consolidated guidelines on drug-resistant tuberculosis treatment*, and the *Companion Handbook to the WHO guidelines for the programmatic management of drug-resistant tuberculosis*.

Objective of the study

To determine the effectiveness, safety, feasibility, cost and impact on the quality of life of all-oral shorter MDR/RR-TB treatment regimens under programmatic conditions.

TDR For research on diseases of poverty

World Health Organization

1. To facilitate the conduct of OR studies for the use of all-oral shorter MDR/RR-TB regimens

2. To harmonize data collection in order to better inform MDR/DR-TB guidelines

ShORRT research package

Master protocol
(in English, French, Spanish and Portuguese)

Generic **paper-based** data collection forms

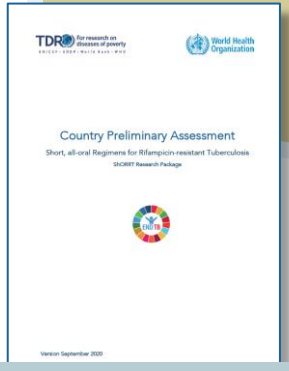
Electronic data capture using the REDCap platform hosted on **WHO's web server**

Study standard operating procedures and QC tools

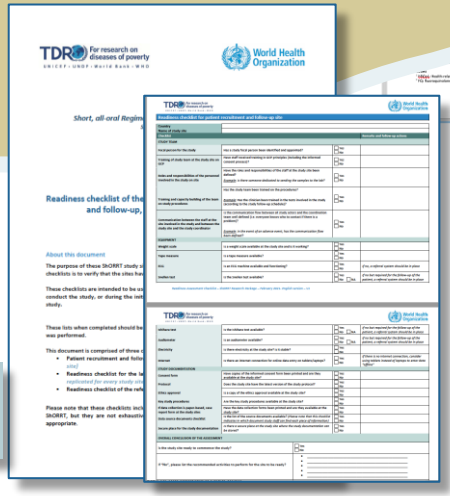
Study quality control tools

Planning phase
- Pre-study visits -

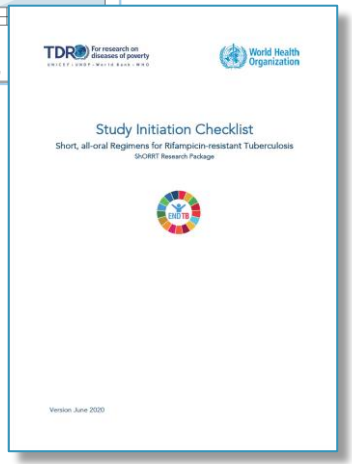
Implementation phase
- Initiation and monitoring visits -



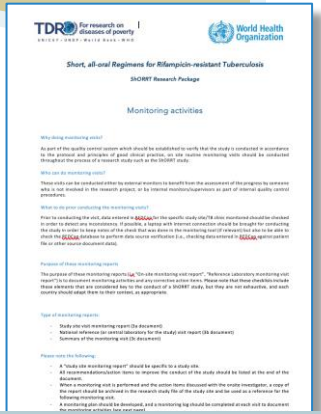
Country Preliminary Assessment Checklist



Readiness Assessment Checklist



Study Initiation Checklist



Monitoring pack

English, French, Spanish, Portuguese

Shorter timelines for the development of research project

Planning phase

Q3/Q4 2019

Country engagement, initial discussions

November 2019
In-country **visit 1**:

- Protocol adaptation
- Visit study sites (patient & data flow) and laboratory
- Stakeholders engagement
- Data collection tools adaptation

Dec 2019

Submission to ethics review

Nov-Dec 2019

Adaptation of protocol, data collection tools and study procedures

Jan 2020

Ethics approval
&
Transfer of funding

3-5 months (COVID-19)

Implementation phase

March/April 2020

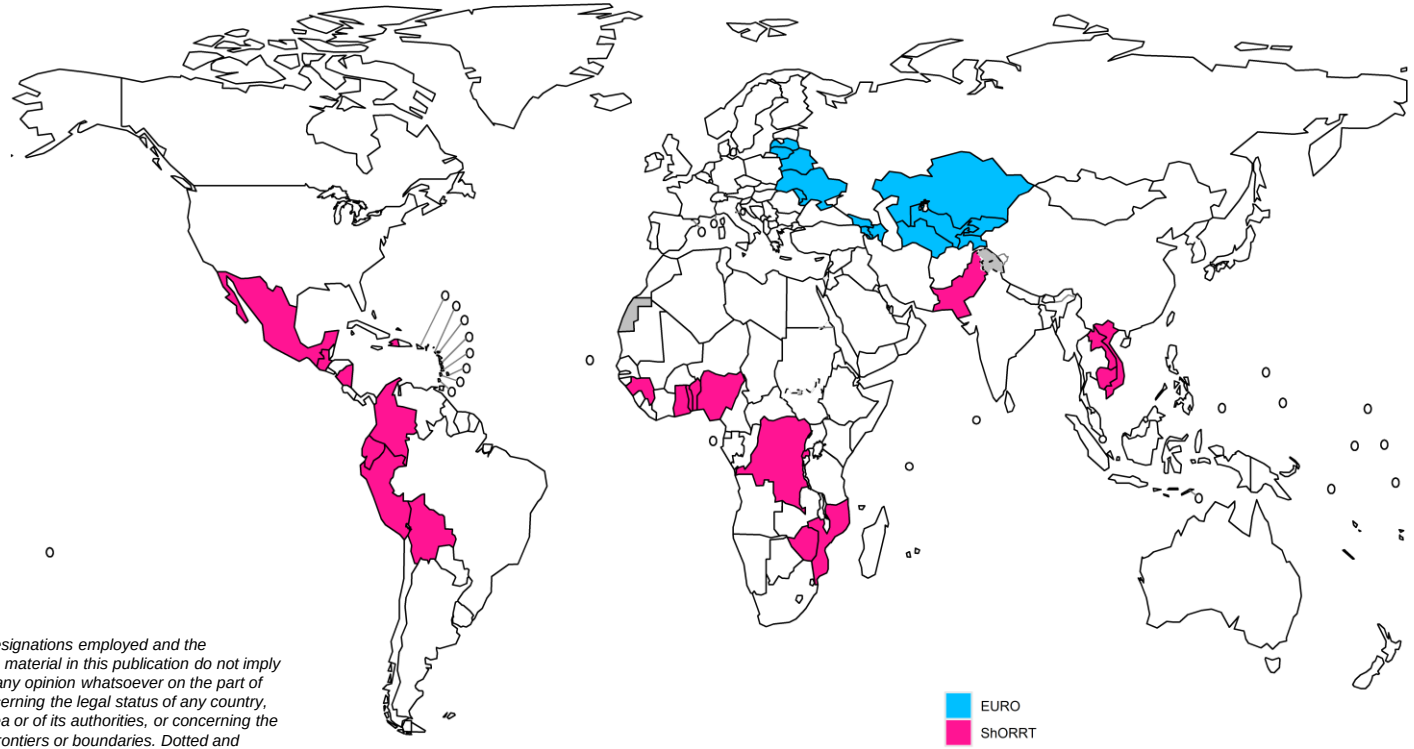
- Launch of the study
- Patient enrolment
- Training on data collection tools

Oct 2020

- 117 patients enrolled *(above target sample size)*

Example of Cambodia

Global uptake – ShORRT implementation as of 2024



Disclaimer: The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of TDR or WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

27 countries using the ShORRT research package / 13 countries in the WHO EURO region

@ WHO / TDR – TDR Strategy 2019.

ShoRRT research package:

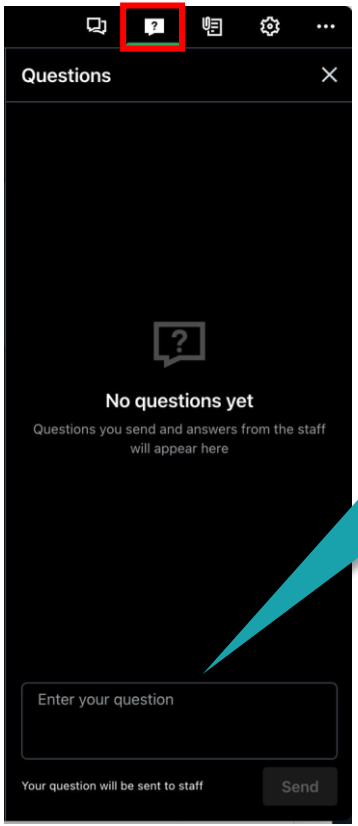
https://tdr.who.int/activities/shorrt-research-package

Contact:

TDR@who.int

How to submit your questions

If your question is addressed to a specific speaker, please include their name when submitting the question.



The presentation will be followed by an interactive Q&A session.

Please submit your questions through the box provided after clicking the ‘questions’ button. We will review all questions and respond to as many as possible after the presentation.

Today's speakers

Implementation research for the appropriate use of, and access to, antimicrobials

Joy Lawn
Professor of Maternal, Reproductive & Child Epidemiology
LSHTM and NEST360 *(UK)*

Malabika Sarker
Professor of the Practice of Behavioural and Social Sciences
Brown University (USA)

Christine Halleux
Unit Head – Implementation Research
TDR (Switzerland)

Moderator:
Fernando Pascual Martinez
R&D Access Development Lead
GARDP (Switzerland)

Upcoming webinars

The importance of chemical synthesis for antimicrobial R&D

With Anna Hirsch & Patrizio Mattei

Moderator: Ravindra Jumde

23 January 2025

17:00-18:30 CET

***In vitro* and *in vivo* correlations for prediction of human pharmacokinetics and dose of antimicrobials**

With Mathew Njoroge & Nina Lawrence

Moderator: Greg Basarab

27 February 2025

17:00-18:30 CET

revive.gardp.org/webinars

Be the first to hear the latest REVIVE updates

- On the REVIVE website (revive.gardp.org/webinars)
- Subscribe to our newsletter
- On X (@gardp_amr) and LinkedIn

Thank you for joining us