the
HANDB◉◉K
of
COMMUNITY
ENGAGEMENT
for
ANTIMICROBIAL
RESISTANCE

CE4AMR

The handbook of community engagement for antimicrobial resistance.

CE4AMR

This is an output of the Community Engagement for Antimicrobial Resistance (CE4AMR) network and resource hub through the project: Developing Community-Led Solutions to Antimicrobial Resistance: Building a One Health Approach in Low and Middle Income Countries.

With design by Mariana Fonseca Braga and Emmanuel Tsekleves
ImaginationLancaster, Lancaster University

imagination
LANCASTER

UNIVERSITY OF LEEDS

CONTRIBUTORS

COMMUNITY ARTS AGAINST ANTIBIOTIC RESISTANCE

University of Leeds & HERD International

Dr Sushil Baral
Abriti Arjyal
Professor Paul Cooke
Dr Rebecca King
Dr Jessical Mitchell
Nichola Jones

ONE HEALTH POULTRY HUB

Royal Veterinary College (UK)

Professor Fiona Tomley
Professor Rajib Dasgupta

DUST BUNNY

Lancaster University

Dr Emmanuel Tsekleves
Professor Collins Ahorlu
Dr Mariana Fonseca Braga

COMMUNITY DIALOGUES FOR PREVENTING AND CONTROLLING AMR

ARK Foundation & University of Leeds

Professor Rumana Huque
Dr Rebecca King
Fariza Fieroze

GENERATING COLLECTIVE SOLUTIONS TO REDUCE UNNECESSARY ANTIBIOTIC USE IN VIETNAM

Oxford University Clinical Research Unit Vietnam

Dr Sonia Lewycka
Giao Vu Thi Quynh

SUPPORTING EVIDENCE-BASED POLICY: A LONGITUDINAL STUDY OF AMR

London School of Hygiene and Tropical Medicine & Indian Institution of Public Health Gandhinagar

Professor Deepak Saxeena
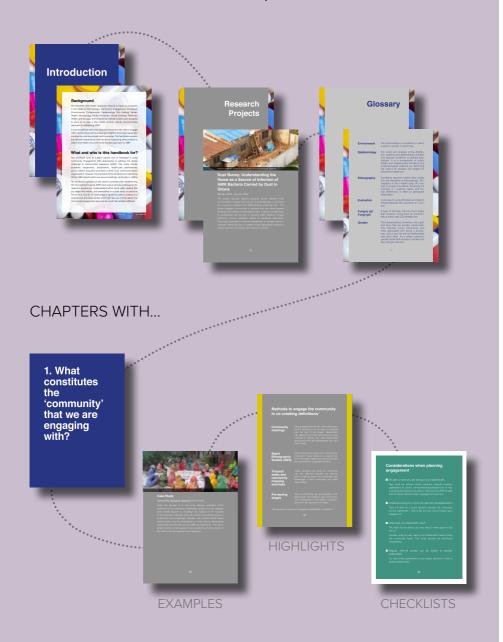Dr Naomi Bull
Kalpana Pachillu
Kavita Yadav

HERD International

UNIVERSITY OF LEEDS

RVC Royal Veterinary College
University of London

JNU

Lancaster University

ark foundation
advancement through research and knowledge

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phfi INDIAN INSTITUTES OF PUBLIC HEALTH

This handbook is made up of...

Introduction

Background

The CE/AMR's One Health Approach network is made up of experts in the fields of Anthropology, Community Engagement, Co-Design, Environmental Contamination, Epidemiology, Film-making, Human Health, Microbiology, Poultry Production, Social Sciences, Veterinary Health, and Zoology. The broad focus of these projects was designed to allow up to take a One Health (human, animal, environmental) approach to addressing AMR.

A common thread within the network is research is the need to engage LMIC communities with the challenge of AMR to the locally meaningful solutions by unlocking locally held knowledge. This handbook unpacks the network's experience, with the aim of supporting other projects to take a One Health and community-focused approach to AMR.

What and who is this handbook for?

The handbook aims to support anyone who is interested in using Community Engagement (CE) approaches to address the global challenge of antimicrobial resistance (AMR). This could include academic researchers, practitioners, health-care professionals, policy-makers, education providers or other local, community-based organisations. However, the emphasis of this handbook is on delivering CE for AMR projects within low-resource settings, particularly in LMICs.

The handbook highlights six key areas to consider when implementing CE. Moreover, how to tackle AMR. Each area is introduced based on the network's experience, contextualised with some wider reading that you might find helpful, and exemplified in a case study or resource. This is not a "how-to" or "best-practice" guide but rather a collection of experiences and case studies which will help you to think about how Community Engagement approaches could help address different

Research Projects

Dust Bunny: Understanding the Home as a Source of Infection of AMR Bacteria Carried by Dust in Ghana

January 2018 - January 2020

This project explores hygiene practices across different home environments in Ghana with and aim of understanding of the home as a source of infection from AMR bacteria carried by dust. The project engages communities to examine their own home-hygiene practice and collects microbiological data. It returns this data back to communities with the aim of reducing AMR infections through improving common practices related to household cleanliness. The project provides an informed assessment of societal norms in domestic cleanliness and co-creates locally-appropriate solutions to reduce infections occurring in the home environment.

Glossary

Environment	The surroundings or conditions in which a person, animal, or plant lives.
Epidemiology	The study and analysis of the distribution, patterns and determinants of health and disease conditions in defined populations. It is a cornerstone of public health, and shapes policy decisions and evidence-based practice by identifying risk factors for disease and targets for preventive healthcare.
Ethnography	Qualitative research method that comes from the discipline of Anthropology. Ethnography is the in-depth study of a culture or a facet of a culture, focusing, for example, on- customs, habits, and mutual differences. It relies on participant observation.
Evaluation	A process of using indicators and data to measure/assess the outcomes of a project.
Fungus (s)/ Fungi (pl)	A type of microbe. Can be much larger than bacteria. Fungi exist as communities of many cells. EG athletes-foot.
Gender	The characteristics of women, men, girls and boys that are socially constructed. This includes norms, behaviours and roles associated with being a woman, man, girl or boy, as well as relationships with each other. As a social construct, gender varies from society to society and can change over time.

CHAPTERS WITH...

1. What constitutes the 'community' that we are engaging with?

Case Study

Community Dialogue Approach (2017-2019)

Within the process of a community dialogue approach (CDA) members of the community, stakeholder groups and the research team worked together to co-design the materials to be included in the final CDA meetings. This can include a household survey to understand local knowledge, attitudes, and practices (KAP) toward antimicrobials, plus the development of visual tools to demonstrate appropriate antimicrobial use and AMR risk behaviours. This was a lengthy process which required many revisions as the full consent of the community was explored and understood.

Methods to engage the community in co-creating definitions*

Community meetings	Early engagement with the community allows the CE process to be as open as possible from the start of the project. Researchers can observe and mark attendance at these meetings to identify any under-represented groups and work with stakeholders to try and reach these.
Rapid Ethnographic Studies (RES)	Where researchers observe the community to understand what's behaviours, experiences, and knowledge. Reflections are shared with the community to understand context.
Transect walks and community mapping exercises	These activities can bring the community into the definition process by allowing them to directly share and contextualise their knowledge of their community and water (stakeholder).
Pre-testing stages	Allow the feasibility and acceptability of CE approaches to be tested in each community. This can feedback in more detail in Chapter 4 and within the examples from Nepal.

*We expand on methods of engaging stakeholders in Chapter 4.

Considerations when planning engagement

☑ Be clear on what you are asking of your stakeholders.
- They could be advisory board members, financial investors, gatekeepers to certain communities/resources/services or they could provide publicity to the project. These are very different roles and will require different levels of engagement and input.

☑ Understand what your community need from the stakeholder?
- There will likely be a power dynamic between the community and the stakeholder - what is this and how could it impact upon engagement?

☑ What does your stakeholder need?
- This might not be obvious: you may need to make space to find this out.
- Consider what you may need to do if stakeholder needs conflict with community needs. This could become an ethical consideration.

☑ Regular, informal contact can be helpful to develop relationships.
- You could invite stakeholders to your project activities in order to develop relationships.

EXAMPLES

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Farmers in Nepal treat chickens with antimicrobials.
Photo courtesy of HERD International.

Introduction

This handbook has been developed through a knowledge exchange network called CE4AMR: The One Health Approach. This work was funded by the Global Challenges Research Fund (GCRF) and took place in 2020-21. The handbook was co-developed by a multidisciplinary team representing the following six research projects, all of which tackle the challenge of antimicrobial resistance through community-based methods in low-middle income countries (LMICs).

- [Community Dialogues](#) in Bangladesh

- [Community Arts Against Antibiotic Resistance](#), Nepal

- [Dust Bunny](#), Ghana

- [The One Health Poultry Hub](#), India

- [Antimicrobial risk behaviours among livestock communities](#) in India and Kenya

- [Community antimicrobial use](#), Vietnam

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A common thread within the network's research is the need to engage LMIC communities with the challenge of AMR to find locally meaningful solutions by unlocking locally held knowledge. This handbook unpacks the network's experience, with the aim of supporting other projects to take a One Health and community-focused approach to AMR.

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The handbook highlights six key areas to consider when implementing CE interventions to tackle AMR. Each area is introduced based on the network's experience, contextualised within some wider reading that you might find helpful, and exemplified in a case study or resource. This is not a "how to" or "best practice" guide but rather a collection of experiences and case studies which will help you to think about how Community Engagement approaches could help address different

aspects of AMR in your particular context.

The language used in this handbook is designed to be accessible and jargon-free but the production team has assumed that readers will have a basic knowledge of AMR. Please refer to our *Glossary* if you are unsure about any of the language used in this handbook. As further background, we also include here a *brief introduction to AMR*.

Brief introduction to AMR

What is AMR: Antimicrobial resistance (AMR) occurs when microbes stop responding to antimicrobial treatments. Some people mistakenly think that people or animals become resistant to antimicrobials, but it is the microbes themselves that become resistant.

How does AMR happen: Microbes are living things that naturally exist in our environment. They even live inside our bodies. Some microbes are just naturally resistant to certain antimicrobials; others can develop resistance by exchanging their DNA with resistant microbes (DNA exchange is how some microbes reproduce). Finally, any microbe can change in response to things that causes them stress. This could be temperature, pollution, or it could be drug treatments.

AMR develops much faster when antimicrobial treatments are used inappropriately; for example, by not finishing a full course of medication. In this situation, the microbes in your body will be stressed by the antimicrobial drug, but not all of them will be killed. This means that some microbes could become resistant to the drug and next time, when these microbes cause you to be unwell, the same drug may be completely ineffective. These resistant microbes may make you feel unwell for longer. This might also mean that you will need alternative treatments or perhaps become more seriously ill, if the microbes spread into other parts of your body.

AMR or ABR: Sometimes people confuse antimicrobial resistance with antibiotic resistance. Antibiotic resistance (ABR) is a specific type of AMR. ABR happens when bacteria become resistant to antibiotic medicines. It is important to remember that not all types of AMR are related to antibiotics and bacteria. For example, malaria is caused by a type of parasite which can become resistant to many types of drugs.

AMR is not just a human problem: Microbes can also cause animals to become unwell, and veterinarians also treat animal with antimicrobial medicines. This means that antimicrobial misuse in agriculture and veterinary care can similarly lead to AMR.

Remember that AMR develops in microbes and that microbes are alive! Microbes can move around our environment in the soil, water and on plants, but also within the bodies of humans and other animals. Once AMR has developed it can spread between individuals, species, and geographical areas very quickly. Poor hygiene, animal husbandry, water quality and sanitation can all increase the spread of AMR.

Antimicrobials are not the problem: Antimicrobial treatments and drugs are vital to protect the health of humans, animals, and plants. However, each antimicrobial only works on certain microbes. We need to ensure that the right drug is used to treat the right bug. To treat a given bug, the right drug also needs to be taken in the right dose and for the right amount of time. When subject to an antimicrobial treatment, a plant or animal should not be harvested or used for food. This is because antimicrobials do not fully breakdown. Their residues can pass through the body and enter the food chain or the environment. Antimicrobial residues are often too weak to destroy microbes but may stress them enough to cause resistance to develop, thus leading to AMR.

An introduction to CE

The term "Community Engagement" can mean different things to different people, and this can be confusing. The network used the following definition of Community Engagement:

> *"a participatory process through which equitable partnerships are developed with community stakeholders who are enabled to identify, develop and implement community-led sustainable interventions to issues that are of concern to them. This approach can result in bespoke local solutions to addressing the drivers of AMR which align with the priorities and needs of communities".*

This definition was co-designed by a group of international researchers and practitioners in 2017 and builds upon to the UNICEF standards on Community Engagement Initiatives. We expand upon this in Chapter 1.

How did we co-develop this handbook?

In June-July 2020, the CE4AMR: One Health Approach team reflected on the key questions which underpin their own research using Community Engagement to tackle AMR. This exercise resulted in the development of six research questions.

1   What constitutes the 'community' that we are engaging with?

2   What (CE) strategies have been utilised to understand the context in which AMR develops in LMICs and what are the advantages/disadvantages of these?

3   Which One Health drivers (including behaviours) have we focused on when addressing AMR within specific LMIC communities?

4   What are the best ways to make CE scalable and sustainable when tackling One Health AMR challenges?

5   What are the most effective ways to engage with national and international stakeholders, beyond the community?

6   How do we define success, measure effectiveness, and learn from failures, when applying CE methods to the One Health AMR context?

Photo by Amol Sonar on Unsplash.

In August 2020, each project team answered the research questions separately, giving specific details of their own work, knowledge, and experience. This information was synthesized by the University of Leeds and presented back to all team members plus external advisors from the World Health Organization, The Wellcome Trust, and Universities in Nepal and Bangladesh.

This synthesis highlighted four key areas where the team felt it could make a contribution to this area of global concern:

1. *What are the competing ways in which we can collectively define Community?*
2. *The current scope of CE approaches being utilized in AMR research.*
3. *The barriers and challenges of applying CE to AMR.*
4. *The AMR research gaps which may benefit from CE approaches.*

These areas are further discussed in our 'Community Engagement: The key to tackling Antimicrobial Resistance (AMR) across a One Health context?' publication.

This handbook, on the other hand, consolidates the practical experience of the CE4AMR: One Health Approach team. Here we unpack each of our research questions in detail, share our knowledge, provide case studies and sign-post additional reading.

Research Projects

Members of a community dialogue group in Bangladesh gather to discuss AMR. Photo courtesy of ARK Foundation.

Community Dialogues Approach (CDA) for addressing antibiotic resistance in Bangladesh

January 2017 - December 2018

CDAs are facilitated discussion groups led by trained members of the community to prompt dialogues around critical issues. The CDA assumes that a stimulus is required to trigger a dialogue between community members. This projected worked in Bangladesh to pilot test the ability of the CDA to address AMR. Both external (training, materials etc) and internal (trained volunteers) stimuli were used to address antibiotic misuse at the community level.

55 community volunteers were trained and delivered 400 CDAs (each meeting was attended by an average of 40 community members). Discussions documented by communities included the importance of acquiring a prescription for antibiotics, visiting the community clinic if sick and encouraging handwashing. The project also revealed a need to strengthen communities' capacity to action decisions made and monitor progress. A key achievement for the project was being a winner of a global competition to identify 'pioneering 'approaches to addressing AMR.

Abriti Arjyal prepares film equipment for a participatory video (PV) workshop in Nepal. Photo courtesy of HERD International .

Sourcing Community Solutions to Antibiotic Resistance in Nepal

January 2018 - June 2019

This project developed and pilot-tested a participatory video (PV) approach to explore AMR in two Nepali communities. Participants took part in workshops designed to inform them on the issue of AMR and train them to make and edit videos. The project resulted in the co-production of six short films identifying community-led solutions to local drivers of AMR. Each was based on a topic relating to AMR relevant to the local context. The videos were shown at community events and to policymakers with the aim to both inform local communities and influence policy. The project provided unique insights into common local practices that drive AMR locally and identified several locally appropriate and community-ked solutions to addressing these drivers. The project also produced a manual to guide future research in this area.

Informal-settlement houses in Accra, Ghana. Photo by Emmanuel Tsekleves.

Dust Bunny: Understanding the Home as a Source of Infection of AMR Bacteria Carried by Dust in Ghana

January 2018 - January 2020

This project explores hygiene practices across different home environments in Ghana with and aim of understanding of the home as a source of infection from AMR bacteria carried by dust. The project engages communities to examine their own home-hygiene practices and collects microbiological data. It returns this data back to communities with the aim of reducing AMR infections through improving common practices related to household cleanliness. The project provides an informed assessment of societal norms in domestic cleanliness and co-creates locally appropriate solutions to reduce infections occurring in the home environment.

Community members attending an OUCRU event to discuss AMR in the Red River Delta region of Vietnam. Photo courtesy of OUCRU.

Generating Collective Solutions to Reduce Unnecessary Antibiotic use in Vietnam

April 2019 - March 2021

This project evaluates and contrasts traditional health education and training with a Participatory Action Research (PAR) approach to behaviour change. Based in Vietnam, this project aims to engage community members and farmers in a one health dialogue to encourage community-wide changes in the way people seek and use antibiotics for human and animal health and how health-workers prescribe antibiotics in a hospital setting.

Unfortunately, due to the COVID-19 pandemic, progress on this project has been stalled. Within the handbook we reflect on examples of previous CE work by the co-investigators involved in this project. We refer to Women's Discussion Groups which are similar to the CDA described above, but specifically targeted toward the health needs of women. Additionally, within animal health settings in Vietnam, studies are underway to establish the effectiveness of providing training to farmers on appropriate antibiotics. ViParc, a project that started life in the Mekong Delta of Vietnam in 2016, was a trial aiming to help smallholder farmers reduce the need for antimicrobials in chicken production. The trial's key message to farmers was "Healthy Chickens Need No Antibiotics," i.e. Farmers should prevent disease in chickens by adopting good husbandry practices instead of giving them antibiotics in the absence of disease. Findings suggested that farmers had high levels of access to cheap antimicrobials, and that AM use was common in the early stages of growth. Challenges in addressing the drivers of AMR in the local area were in the landscape of chicken farming locally, high levels of sickness in flocks and easy access to antimicrobials.
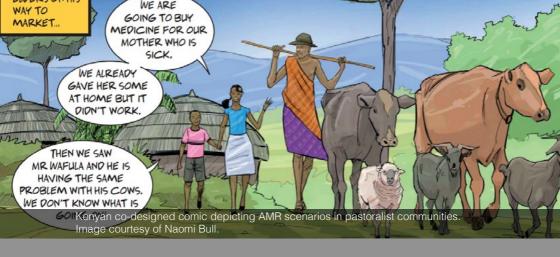
Photo by Egor Myznik on Unsplash.

An example of Semi-intensive poultry production, common in Southeast Asian Countries. Photo by Karine Gatellier.

GCRF One Health Poultry Hub

February 2019 - May 2024

The One Heath Poultry Hus is an interdisciplinary research programme that aims to address the need for minimising risk to animal and public health as demand for poultry and eggs in LMIC's grows. The project works across Bangladesh, India, Sri Lanka and Vietnam and aims to understand how and why intensive farming practices increase AMR. Overall, the project aims to identify high-risk behaviours, processes and environments that drive AMR and evaluate interventions to improve control over infection rates. The Hub adopts a One Health approach to the issue of combatting animal-to-human diseases by bringing together a team of laboratory, clinical, veterinary and social scientists, focussing in particular on the need for safe poultry production in South and South East Asia.

Kenyan co-designed comic depicting AMR scenarios in pastoralist communities. Image courtesy of Naomi Bull.

Supporting Evidence-Based Policy: a longitudinal study of AMR risk behaviours among livestock keeping communities in India and Kenya

January 2017 - September 2017

This interdisciplinary project focused on one health aspects of AMR, looking at three inter-related drivers: social, behavioural, and environmental among two livestock-dependent communities (Maasai pastoralists in Kenya and subsistence dairy producers in India). Comic books were produced, developed by local artists, and disseminated at the community level to schoolchildren. These comic books provided learning materials on AMR and good antimicrobial stewardship. The data generated in this project underpins an online decision-support tool created to assist policy-makers in identifying the most effective interventions to prevent the emergence and spread of AMR.

Glossary

Biological/medical terms related to AMR

Antimicrobial resistance (AMR) — The process by which microbes (bacteria, viruses, fungi) change in order to survive the drugs designed to kill them.

Drug resistant — A microbe which has gone through the process of AMR and is now resistant to antimicrobial treatments.

Drug resistant infection — An infection caused by an antimicrobial-resistant microbe.

Antimicrobial — A substance which either kill or stop the growth of microorganisms. These exist in nature but are also developed into medical and veterinary treatments.

Antibioitc — An specific type of antimicrobial which is used to treat bacterial infections.

Microbe/ Microorganism — A living thing that can only be seen under a microscope. Bacteria, Fungi and Viruses are all different types of microbe.

Germ/Bug — A microbe which causes illness or disease.

Bacterium (s) Bacteria(pl) — A type of microbe. Each bacterium consists of a single cell. EG E.Coli

Fungus (s)/ Fungi (pl) — A type of microbe. Can be much larger than bacteria. Fungi exist as communities of many cells. EG athletes foot.

Virus   A very small type of microbe. Viruses can only survive inside the cells of other living things. EG the common cold.

Microbiology   The branch of science that deals with microorganisms.

Epidemiology   The study and analysis of the distribution, patterns and determinants of health and disease conditions in defined populations. It is a cornerstone of public health, and shapes policy decisions and evidence-based practice by identifying risk factors for disease and targets for preventive healthcare.

Terms related to methodology

Community Engagment (CE)

See Chapter 1.

Participatory Research

Methodological approaches and techniques, all with the objective of handing power from the researcher to research participants, who are often community members or community-based organisations. Participatory research is designed and implemented in collaboration with a target population, rather than by/on said population.

Participatory Video (PV)

A set of techniques to involve a group or community in shaping and creating their own film for a range of purposes, including undertaking participatory research.

Community Dialogue (CDA)

The opportunity for exchanging information and perspectives, clarifying viewpoints, and developing solutions to issues of interest to the community.

Ethnography

Qualitative research method that comes from the discipline of Anthropology . Ethnography is the in-depth study of a culture or a facet of a culture, focussing, for example, on customs, habits, and mutual differences. It relies on participant observation.

Survey

Method of gathering information from a sample of people. Surveys use a collection of questions to gather information on the views or experiences of a group or individual.

Data

Facts and/or statistics collected together for reference or analysis.

Qualitative data

Refers to qualities or characteristics. It is collected using questionnaires, interviews, or observation, and often appears in narrative form. It can also be generated collaboratively during a participatory research project.

Quantitative data

Refers to numbers and counts.

Indicator

Pieces of information that measure aspects of a project, these peices of information make up realistic and measurable progress markers for a project.

Evaluation

A process of using indicators and data to measure/assess the outcomes of a project.

Output

The measurable outcomes of a project.

Interdiscipli-nary

The combination of multiple areas of interest or study.

Stakeholder

A person with an interest or concern in your project topic or community.

Community

A group of people who share common elements such as geogroahipc location, characteristics or demographics.

Low-middle-income country (LMIC)

The World Bank classifies countires into four categoris by income group, LMIC's are at 1,036 - 4,045 GDP or below.

Organisations

World Health Organisation (WHO)

The WHO is a consortium formed in 1948 which now works worldwide to promote health, keep the world safe, and serve the vulnerable.

Global Action Plan on AMR

In May 2015, the Sixty-eight World Health Assembly adopted the global action plan on antimicrobial resistance. The goal of the global action plan is to ensure, for as long as possible, continuity of successful treatment and prevention of infectious diseases with effective and safe medicines that are quality-assured, used in a responsible way, and accessible to all who need them.

AMR National Action plan (AMR NAP)

The World Health Assembly also urged all Member States to develop and have in place by 2017, national action plans on antimicrobial resistance that are aligned with the objectives of the global action plan.

ReACT Group

Created in 2005 ReAct is one of the first international independent networks to articulate the complex nature of antibiotic resistance and its drivers. ReAct was initiated with the goal to be a global catalyst, advocating and stimulating for global engagement on antibiotic resistance by collaborating with a broad range of organisations, individuals and stakeholders.

One Health

The collaborative efforts of multiple disciplines working locally, nationally, and globally, to attain optimal health for people, animals and our environment.

Other relevant terms

Sex
Either of the two main categories (male and female) into which humans and most other living things are divided on the basis of their reproductive functions.

Gender
The characteristics of women, men, girls and boys that are socially constructed. This includes norms, behaviours and roles associated with being a woman, man, girl or boy, as well as relationships with each other. As a social construct, gender varies from society to society and can change over time.

Intersectionality
The interconnected nature of social categorizations such as race, class, and gender as they apply to a given individual or group, regarded as creating overlapping and interdependent systems of discrimination or disadvantage.

Power
The capacity of an individual to influence the actions, beliefs, or conduct (behaviour) of others.

Hierarchy
The ranking of group members, with some members being superior or subordinate to others.

1. What constitutes the 'community' that we are engaging with?

What constitutes the 'community' that we are engaging with?

When using community engagement approaches, we first need to understand who we mean by 'The Community'. Research teams will often try to identify and define a specific group of people to work with, usually the people who are intended to benefit the most out of the project. However, defining a community should always be a community-led process , community members should be recognised as experts in their own lives and encouraged to share knowledge on community dynamics and context. Understanding these nuances can support researchers and practitioners to clearly define a community and then better support and understand the problem of AMR from their perspective. When a community is able to create it's own definition, a CE becomes more acceptable and feasible within its given setting.

Certain parameters are often used to define communities, for example where people live, their age, their gender, their income. On the one hand, these factors can help to narrow down a group of people with shared needs, and so make projects specific and meaningful. On the other, they can also be excluding. If used in isolation, such factors do not reflect the reality that people can belong to multiple communities at the same time, they also overlook cultural and social aspects that influence AMR. For this reason, CE research needs to address the context around and within a community, and how different parts of the community relate to each other.

Another challenge in understanding community is to consider who is part of the community and who belongs to a wider stakeholder group? Stakeholder groups around a core community can also influence local AMR practices and circumstances. In this chapter we reflect upon how communities can be defined, understood, and contextualised in

relation to the challenge of AMR. We focus on the need for communities to define themselves in the early phases of the project development. We consider contextual factors which communities may use to define themselves and how these relate to the challenge of AMR. Finally, we discuss ways to engage with, map and understand community needs and manage expectations during project delivery and beyond.

Why define a community?

We understand community engagement (CE) to mean: A participatory process through which equitable partnerships are developed with community stakeholders who are enabled to identify, develop and implement community-led sustainable interventions to issues that are of concern to them. This approach can result in bespoke local solutions to addressing the drivers of AMR which align with the priorities and needs of communities.

To carry out such a process we need to know who we are working with, who needs and will benefit from the process; these individuals are our core community. We also need to think about who will work around this community to support the process, and may also benefit; these individuals are our stakeholders (see Chapter 5 for discussions on stakeholder mapping). To ensure we are co-developing the most effective, meaningful, and contextually appropriate CE process everyone involved needs to understand who falls into the category of community, and who falls into the category of stakeholder. This means we do need to create some parameters which define our core community and wider stakeholders.

How to define a community?

In traditional health interventions a community may be defined by external parameters such as geographic location, demographic factors such as age, gender, or ethnicity, or by socioeconomic factors linked to education, employment, or wealth (Box 1). Although these factors can neatly define a community on paper, they are not mutually exclusive because individuals can belong to multiple different communities at the same time. If used in isolation, these factors can exclude certain individuals from a community and limit the reach and impact of a project.

Box 1: Factors commonly used by researchers and practitioners to define communities.

- *Gender*: This is usually only considered as a binary term.
- *Geographic Location*
- Age
- *Family status*: Parent/child/grandparet/grandchild etc.
- *Professional status/Education*: can often be conflated with wealth and socio-economic status
- *Shared experiences* and *behaviours*
- *Social and cultural norms, beliefs and religious practices*
- *Underrepresented groups* (such as women)
- *Political beliefs*
- *Ethnicity*

CE projects tend to take a more holistic approach to defining a community. For example, UNICEF's definition of community (Box 2) includes contextual factors such as beliefs and practices as well as networks and relationships within communities. This is a complex explanation, but it exemplifies the need to fully understand contextual details around a community. Defining communities based on a combination of parameters and contextual factors can be particularly important with regards to AMR because this complex challenge relates to so many aspects of a community from diet to healthcare to cleaning strategies.

> *The minimum social unit that is locally relevant just above the level of the household (neighbourhood, canton, precinct, parish, town, village). It can also include non-geographically centred social networks of interaction, interchange and interdependency. Such networks may have direct local inputs into the transfer of health, educational, social, informational, economic, cultural and political resources (diaspora networks, rural-urban networks, peer-group or social networks, kinship networks). Communities are not monolithic, and often include unequal distributions of authority, access, and power over decision-making and resources (by gender, sociocultural background, physical and mental ability, ethnicity, language and religion/faith).*

Box 2: UNICEF definition of Community.

Indian Co-designed comic book depicting action on AMR. Image courtesy of Naomi Bull.

Case Study

Meat eating behaviours in India and South East Asia.

Many of the projects involved in this cluster work in Southeast Asia where dietary norms, particularly meat consumption, can be influenced by culture, religion, and societal expectations. In India eating beef is broadly forbidden, whilst in some sectors of society any non-vegetarian diet is frowned upon yet there are still individuals who do consume meat and beef. Thus, any CE for AMR project based in this area must fully understand the needs of all community members rather than attempting to define a community by fixed parameters, for example assuming all members follow a vegetarian or beef-free diet based on their culture.

This is a useful example of understanding the community practices and how these may not always be reflected by societal norms. The behaviours mentioned here are also relevant to AMR as eating the meat (or any animal product including eggs or milk) of an animal undergoing antimicrobial treatment can contribute to the development and spread of AMR because antimicrobials do not fully breakdown in the body. Therefore, antimicrobial residue can be passed along the food chain and reach humans. Here the antimicrobial may stress microbes within the human gut, leading to resistance developing.

AMR can impact upon community-defining factors.

It is important to consider the potential impacts of AMR on the factors we use in our definitions of community. Members of one geographic community, for example, may interact with antimicrobials and antibiotics differently based on their gender, socio-economic status or industry. Women and men tend to take different roles within households, women often care for the young and elderly within their family and this may impact the routes through which women and men in a community seek and use antibiotics. This extends to traditional farm work, where gender and socio-economic status dictate agricultural job roles and may impact on the risks of exposure to infections and AMR. Additionally, given that AMR bacteria do not recognise geographic borders, the inappropriate use of antimicrobials on one farm could impact a farm or community many miles away if the waste antimicrobials are washed and carried away in rainwater or rivers, used as a fertilizer for crops or processed as dung-based fuel for burning.

The community as experts in their own lives

One approach creating a meaningful definition of community, that distinguishes between community and stakeholder, is to engage the community themselves in the definition process. This can occur at project-planning stages or very early on in the project and is a good way to engage community members and stakeholders to raise awareness of the project and build trust between each other.

Methods to engage the community in co-creating definitions.*

Community meetings

Early engagement with the community allows the CE process to be as open as possible from the start of the project. Researchers can observe and track attendance at these meetings to identify any under-represented groups and work with stakeholders to try and reach these.

Rapid Ethnographic Studies (RES)

Where researchers observe the community to understand share behaviours, experiences, and knowledge. Reflections are shared with the community to understand context.

Transect walks and community mapping exercises

These activities can bring the community into the definition process by allowing them to directly share and consolidate their knowledge of their community and wider stakeholders.

Pre-testing stages

Allow the feasibility and acceptability of CE approaches to be tested in each community. This is discussed in more detail in Chapter 4 and within this example from Nepal.

*We expand on methods of engaging stakeholders in Chapter 5.

Co-creation of project materials

Within CE projects, community members are core contributors to the research team. Equitable value should be given to the contributions of community members as to those of 'experts' within the project process. Community members, within CE projects, actively develop outputs such as videos, comics, community groups etc and are likely to sustain the project's impacts long-term.

Conducting awareness drives in collaboration with the community

Involving the head of the community/someone who community members can trust/someone in a position of power, to generate more confidence and involvement of other community members.

Photo by Ave Calvar on Unsplash.

A community dialogue taking place in Bangladesh. Women are gathered to discuss the topic of AMR. Image courtesy of ARK Foundation .

Case Study

Community Dialogues Approach (2017-2018).

Within the process of a community dialogue approach (CDA) members of the community, stakeholder groups and the research team worked together to co-design the materials to be included in the final CDA meetings. This can include a household survey to understand local knowledge, attitudes, and practice (KAP) toward antimicrobials, plus the development of visual tools to demonstrate appropriate antimicrobial use and AMR-risk behaviours. This was a lengthy process which required many iterations as the full context of the community was explored and understood.

THE TALKING CURE
— for anti-microbial resistance (AMR) —

ADDRESSING SUSTAINABLE DEVELOPMENT GOALS (SDG):

3 GOOD HEALTH AND WELL-BEING

MISUSE OF ANTIMICROBIALS IS INCREASING DRUG RESISTANCE IN DISEASES SUCH AS

HIV/AIDS

Malaria

Tuberculosis
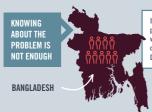
Drug-resistant infections cause 700,000 deaths worldwide each year.

Without action to control resistance, this annual toll will exceed 10 million by 2050.

KNOWING ABOUT THE PROBLEM IS NOT ENOUGH

BANGLADESH

In Bangladesh, we pioneered a new way to tackle AMR called the Community Dialogue Approach

AMR

Local volunteers host regular meetings in the community to help people talk about what drives antibiotic misuse and identify solutions

Rather than just raising awareness, this creates a shared responsibility to change behaviour

---

OUR PILOT PROJECT IN COMILLA DISTRICT, BANGLADESH

Our survey of 1,300 people across 26 villages found that 48% had heard of antibiotics. Of these:

78% had taken antibiotics

22% hadn't had a prescription

19% hadn't finished the full course

The drivers of antibiotic misuse included:

- limited clinic opening hours
- partial prescriptions
- sharing antibiotics
- buying antibiotics over the counter

The community dialogues involved:

5 community clinics, serving around 30,000 people

55 volunteer facilitators

400 meetings

FUNDED BY:

GCRF-ESRC/QR/GIAA:

£375K

The pilot showed that the Community Dialogue Approach to AMR is practical, sustainable and could be scaled up to a wider area.

Qualitative feedback so far suggests that behaviour is changing within these groups.

Because of its pioneering approach, the project was chosen to present at the 2nd Global Call to Action on AMR in 2018, co-hosted by the Wellcome Trust, the UN Foundation, and the World Bank.

NEXT STEPS

Our approach has the support of the Bangladesh Ministry of Health and Family Welfare and we aim to evaluate its impact across a wider catchment within the country.

We hope to adapt the approach for the health system in Nepal.

NEPAL

LEAD ACADEMIC:
Dr Rebecca King, Nuffield Centre for International Health and Development, University of Leeds, UK

PARTNERS:
ARK Foundation, Bangladesh; Malaria Consortium, UK; University of Liverpool, UK

GCRF

UNIVERSITY OF LEEDS

Contextualising definitions of community (and stakeholders)

A community is unlikely to remain static during the process of CE, individuals will age, become parents, change professions etc. These contextual factors can change both the dynamics of how members of a community relate to each other and to their views on AMR. This means the needs of the community may change during the project, some contextual factors may be under the research team's control but others may not (see lists below).

The roles of some community members could mean they become stakeholders at certain points within a project, for example if village elders hold positions of influence, they may be able to encourage engagement with certain marginalised groups who have not already been involved in the process. Contextual factors could also impact upon the challenge of AMR in that community, for example if sanitation systems are not maintained during a long-term project the issue of infection and AMR could become more acute within a community.

Researcher directed factors that can contextualise a CE for AMR project

Regular communication with the community and wider stakeholders involved in a project.

- May need to use different methods of communication for different groups.

Engagement of communities and stakeholders at the early stages of project development.

- Allow them space to input on the project and show their inputs are being utilised.

Coordination of activities based on the needs of the community members and wider stakeholders.

- Utilise community suggestions to improve the project.
- Take account of faith days, caring responsibilities and working patterns.

Training of trainers is a good way of ensuring long-term success.

- In some settings the research team may not interact directly with the community and instead train facilitators to take on this role. This can be helpful where there are language barriers or cultural sensitivities to consider.

Maintain compliance/fidelity to intervention.

- It is the research team's job to stay as close to the original research plan as possible, but this should be approached flexibly, as not everyone identified as stakeholders will want to contribute for the full lifespan of the project.

Use appropriate delivery methods.

- Ask the community and stakeholders how they would like to be engaged and incorporate these suggestions into the project.

Research capacity within the entire project team

- May consider factors such as skillset, physical location, and relationship between research team members.

- CE is not a "stay in your lane" approach, team members will likely have to move out of their specialist areas to collaborate and make the project a success.

Factors from outside agencies that can contextualise a CE for AMR project

Infrastructure of the project setting

- Poor travel networks could prevent community members attending events and engaging with the project.

- Poor Water and Sanitation and Hygiene (WaSH) networks could impact on the safety of a project.

Geographic, weather, and climatic events within the project setting

- In mountainous areas it may be difficult to gather the community and stakeholders together.

- Seasonal or extreme weather events may impact upon the ability of a community or wider stakeholders to attend events and fully engage with a project.

Support of the local leaders, community representatives

- These stakeholders may have previous experience of engaging with research, it could be useful to explore these relationships to ensure expectations of this project are not biased by previous experiences.

Support of national and local policy makers

• This will likely to be linked to previous experience/expectations.

• Available finances could also influence the level of support you receive from policy makers.

Support and understanding from media.

• May choose to cultivate a relationship with certain media as part of wider stakeholder networking.

• Media interests may align with those of the national government, or they may not, useful to understand the media's relationship with the government in each setting.

2. What (CE) strategies have been utilised to understand the context in which AMR develops in LMICs (and what are the advantages/ disadvantages of these?

What (CE) strategies have been utilised to understand the context in which AMR develops in LMICs (and what are the advantages/ disadvantages of these?

Although AMR is a global challenge, low-and-middle income countries (LMICs) are likely to feel it's impacts most acutely. This is due to a combination of factors including limited resources, poor hygiene, and weaker health infrastructure and governance. These factors likely impact on AMR development but can also influence the strategies or approaches by which we investigate the burden of AMR in LMICs.

Understanding how AMR develops in LMICs is usually treated as a biological question. Studies tend to focus on quantifying antibiotic use, the burden of drug resistant infections, or by surveying health professionals' knowledge of antibiotic use and AMR. These data help understand the scale of AMR, however, they focus on human health and often represent formal healthcare settings only. Antimicrobial (mis)use needs to be considered across the broader One Health and community dimensions of AMR. For example, in LMICs non-prescription antimicrobials are frequently used without diagnosis in humans, or to increase productivity in food-producing animals. Unfortunately, there is only limited work which has sought to join up the data from human and animal settings or consider how antimicrobials may be reaching the environment and thus allowing AMR to develop and spread. That said, even if this level of One Health surveillance was achieved, the predominant strategies that have been adopted by researchers to understanding AMR remain quantitative, thereby failing to consider the behavioral rationale behind antimicrobial (mis) use.

In recent years participatory action research (PAR), alongside creative methods such as film, drama and theatre, have been utilized to engage LMIC communities with the challenge of AMR. These approaches can provide a rich understanding of people's decision-making processes, knowledge (gaps) and behaviors. They are often evaluated by mixed-method approaches including qualitative analyses and have clearly revealed that it is not simply a lack of knowledge which drives AMR-related behaviors such as inappropriate antibiotic use. Rather, this work has shown that there is a complex interplay at work between knowledge, practice, belief, context, and resources. Understanding better how these areas interact would greatly enhance our understanding of how AMR develops, and spreads in LMICs. PAR is, however, often considered as 'add on' engagement within existing AMR projects. This can be problematic, firstly because it suggests that creative strategies focused on behavior change are worth less than biological approaches to tackling AMR. Secondly, the findings of additional activities are often reported separately to the biological data from the core AMR project and so neither support the surveillance needs described above nor the evaluation of the impact of such initiatives.

Although there is a growing appetite for mixed-methods strategies, to truly understand both the biological, and behavioral challenges of AMR, we require better linkages between interdisciplinary and multi-stakeholder approaches. This chapter considers examples of such strategies, using a range of case studies from across LMIC settings.

Why is AMR a problem in LMICs?

AMR is a global problem but low- and middle-income countries (LMICs) face particular challenges due to their weaker health and sanitation systems, limited access to a full range of antimicrobial medications, poor AMR governance and investment. LMICs also tend to have variable knowledge of AMR and antimicrobials across the public and specialist professions including clinicians and veterinarians. For all these reasons LMICs are often referred to as AMR *reservoirs*, a term which depicts the growing burden of AMR within certain countries.

Understanding AMR in LMICs

Understanding exactly how AMR develops in LMICs is difficult and often calls for a combination of strategies. Table 1 summarizes the details and challenges of these approaches.

Photo by Paul Szewczyk on Unsplash.

Table 1: Approaches to tackle AMR in LMICs

Strategy Area	Examples	What does this strategy do?	Challenges
Biological surveillance	Counting infections in hospitals, farms, communities. Mapping infections across areas. Monitoring antimicrobial use in human and animal health care. Recording antimicrobial waste in the environment.	Measuring infection rates and antibiotic use can help scientists understand how resistance is developing, and which drugs are likely to be most successful at treating infections. This type of information can be collected across human, animal, and environmental settings to give a One Health picture of AMR.	Because non-prescription antimicrobials can be easily purchased in most LMICS it can be difficult to accurately monitor antimicrobial use. LMICs tend to have weaker infrastructure in terms of health and hygiene it is hard to measure and monitor infections. Environmental AMR surveillance is particularly weak in LMICs as the bulk of laboratory capacity is utilized to monitor human health.

Strategy Area	Examples	What does this strategy do?	Challenges
Anthropological methods	Surveys, interviews and focus groups	Asking people about their antimicrobial use and other AMR behaviors (such as hygiene etc.) can help us to understand how and why AMR could be developing and spreading.	People may not feel comfortable speaking their truth to external researchers. There may be external pressures which force people to behave in ways which they know are wrong, surveys may not capture this information.
	Ethnographic methods	Observing antimicrobial use in community, health care or agricultural settings can help us to understand how and why certain decisions are made and how these could impact on AMR.	People may feel uncomfortable being observed by external researchers.

Strategy Area	Examples	What does this strategy do?	Challenges
Creative & Community Engagement approaches	[Participatory Video](#), Community Theatre, [Comic book development](#), Co-design workshops.	In these approaches people are encouraged to explore the problem of AMR and create their own output (film, drama, comic etc.) based on their understanding of the problem. This can provide a contextual explanation of why and how AMR is developing setting.	Very specific to the community involved. Community may need to be corrected if misinformation is discussed, if not done sensitively this can create a power imbalance.
	Community Dialogues, Community Health Clubs, Women's Discussion Groups.	These types of approaches tend to use local volunteers as facilitators. Volunteers can be trained on AMR and pass this knowledge on to the wider community through discussion groups which can help to reveal local AMR issues.	Very specific to the community involved. Facilitators should not monopolize discussions, rather they need to create space to understand what the wider community's AMR knowledge and behaviors entail.

Many studies have used biological strategies which collect quantitative data. There is a global focus on linking up this type of data from human, animal, and environmental sources to create a One Health picture of AMR. However, this is difficult to achieve in LMICs as most laboratories only work on samples from human health-care facilities.

Anthropological methods which generate qualitative data have become a popular way to understand behavioral questions linked to AMR, such as why pharmacists prescribe certain drugs. This type of approach has shown that even when people have good knowledge of AMR and antimicrobial usage, they may not always follow best practice. This is concerning and shows that biological and anthropological strategies can miss the broader context of why people behave in certain ways, and why AMR develops differently in different contexts.

Alternative research approaches, such the use of creative methods and/or community engagement, are now being applied to AMR (and other-health issues) because they help researchers to engage with their communities and develop a two-way dialogue that can lead to genuine knowledge exchange. This process is invaluable to understanding why certain behaviors occur in certain situations and is proving very helpful in attempts to contextualize the development of AMR in LMICs.

All these strategies have an important role in understanding how AMR develops in LMICs. Individually they can tell us about different parts of the AMR problem but using a combination of strategies within a mixed methods study is likely to be the most successful way to fully understand AMR in a given context.

Co-designing cleaning practices workshop. Photo by Andy Darby.

Case Study

Dust Bunny (ongoing).

The Dust Bunny project uses a combination of surveys, microbiological and design-research methods to understanding the home as a source of infection and AMR in Ghana. The interdisciplinary team is currently assessing societal practices in domestic cleanliness to co-create locally-appropriate solutions that reduce infections in the home. In combination these approaches will reveal the extent to which antibiotic resistance is driven by household practices, with the aim of reducing bacterial infection in the home, and thereby reducing AMR. The project has created a range of tools which can be used to support projects using creative methods to investigate AMR, home hygiene or WaSH (water, sanitation, and hygiene) issues. The tools can also be applied to interventions with professionals and communities intended to reduce the spread of infections in the home, workplace, or other built environments.

Members of a Nepali community learn about film-making practices whist exploring their relationships with antimicrobials as part of a participatory video project. Photo courtesy of HERD International.

Case study

Community Arts against Antibiotic Resistance across Nepal (CARAN) 2017-19.

This study used Participatory Video (PV) to better understand AMR in the Kathmandu region of Nepal. Over the course of the project, small groups from two separate communities took part in a series of 5 workshops each that introduced key issues around AMR, as set out in the WHO guidelines. This information was delivered via arts-based interactive exercises alongside training in film production, the process of which is detailed in the project manual. This process allowed participants to reflect upon AMR from the perspective of their communities. The workshops subsequently led to the production of six films focused on engaging with the issue of AMR from the perspective of their respective communities. Each film was conceptualized as a stand-alone piece. However, they were also put together into two anthology films in which each group also describes the nature of the overall project, their approach to the production process and how they wished to curate the films both to their local community and to regional and national policy stakeholders.

You can find more examples of CE approaches to AMR on the [CE4AMR projects page](#) and MESH community engagement platform which has a dedicated [AMR section](#).

Photo by Raimond Klavins on Unsplash.

3. Which One Health drivers (including behaviours) have we focused on when addressing AMR within specific LMIC communities?

Which One Health drivers (including behaviours) have we focused on when addressing AMR within specific LMIC communities?

AMR research in LMICs is mostly related to antibiotics misuse, and misinformation, and is focused on the human aspect of One Health. A small but growing number of studies address the misuse of antimicrobials in food-producing animals, while even fewer focus on AMR in the environment. Antimicrobials do not fully breakdown within the body, so waste products from hospital and community sanitation systems, farms and open defecation sites increase the risk of antimicrobial residue spreading into the environment and potentially contaminating food-producing animals and crops.

Most studies are ultimately concerned with the impacts of AMR on human health. There is little consideration of the impacts of AMR on animal and environmental health specifically. Furthermore, other forms of environmental and ecosystem damage, such as pollution and climate change, have not been considered in relation to AMR despite the growing evidence that both these impacts are likely to stress microbes in a similar way to antimicrobial misuse and so can also potentially contribute to the development and spread of AMR.

As discussed in the last chapter, AMR is often approached from a biological perspective. There is a lack of research on the drivers of antimicrobial resistance that encompasses contextual and social challenges. For example, AMR guidance is not always adhered to even when it is in place. Consumers, patients, and professionals are known to act against guidance but there is little research which unpicks the social, economic or contextual reasons behind these decisions. Additionally, there is limited research into the cause of

adopting "bad" practices. Why do people misuse antimicrobials and how can we discourage this?
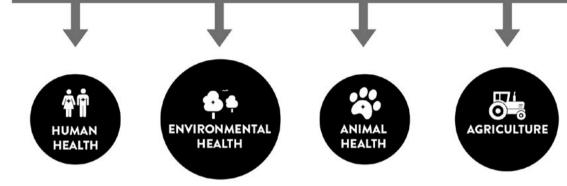
Finally, many approaches to AMR are reactive rather than preventative. There is focus on developing drugs and diagnostics rather than addressing infection prevention behaviours that could stop the need for antimicrobial use in the first instance. This latter point is confounded by what is known as the "excess versus access" debate. Many LMICs still struggle to afford and access a full range of antimicrobial treatments for human and animal treatments. This leads to the overuse and misuse of accessible treatments, an approach which does not treat all infections and is a known driver of AMR.

This chapter focuses on the One Health drivers of AMR across human, animal, and environmental sectors. We consider current knowledge gaps and the scope of Community Engagement approaches to support learning in these areas.

The focus on Human Health drivers of AMR

The World Health Organization (WHO) encourages all countries to think about AMR in terms of One Health and supports countries to produce their own National Action Plan (NAP) on AMR. Existing NAPs and Global AMR Guidance discuss similar themes in terms of how best to tackle AMR. These can be broken down into the following 8 areas.

ONE HEALTH DYNAMICS OF ANTIMICROBIAL RESISTANCE

HUMAN HEALTH

ENVIRONMENTAL HEALTH

ANIMAL HEALTH

AGRICULTURE

AQUACULTURE

SUSTAINABLE DEVELOPMENT GOALS

ZERO HUNGER	GOOD HEALTH & WELLBEING	CLEAN WATER & SANITASATION	INDUSRY, INNOVATION & INFASTRUCTURE	PARTNERSHIPS FOR THE GOALS
QUALITY EDUCATION	REDUCED INEQUALITIES	CLIMATE ACTION	LIFE BELOW WATER	LIFE ON LAND

NO POVERTY

GENDER EQUALITY

AMR impacts on and is impacted by many of the Sustainable Development Goals. Image courtesy of CE4AMR.

However, in practice AMR interventions and research projects often focus on the human drivers of AMR, for example:

• Buying and using antimicrobials without a prescription.

• Taking antibiotics when they are not needed.

• Poor hygiene.

• Poor prescribing practices.

• Poor adherence to Global, National or Local AMR guidance.

The WHO's [list of behavioral objectives to tackle AMR](#) also emphasizes behaviors linked to human antimicrobial use, and how to prevent the human health impacts of AMR.

The need to consider One Health Drivers of AMR

In low resource settings human health is understandably seen as a priority and an immediate concern. However, if AMR develops in the microbes infecting animals and the environment it will eventually impact upon human health, so we need to consider wider drivers of AMR such as:

Misuse of antimicrobials in veterinary health, agriculture and aquaculture.

• Use of antimicrobials as growth promotors or prophylaxis.

• Consuming the meat and biproducts (milk, eggs etc.) of animals on antimicrobial treatment.

• Sharing of antimicrobials between animals.

• Sourcing antimicrobials without a veterinary consultation.

Poor animal husbandry.

- Overcrowding.

- Shared feeding and water stations.

Allowing untreated antimicrobial waste to enter the environment.

- Poor sanitation including open defecation.

- Run-off and waste from pharmaceutical production, agriculture and aquaculture, hospitals, and community settings.

- Disposal of waste* antimicrobials directly into the environment.

- Other forms of pollution (chemicals and heavy metals) can stress microbes and cause AMR.
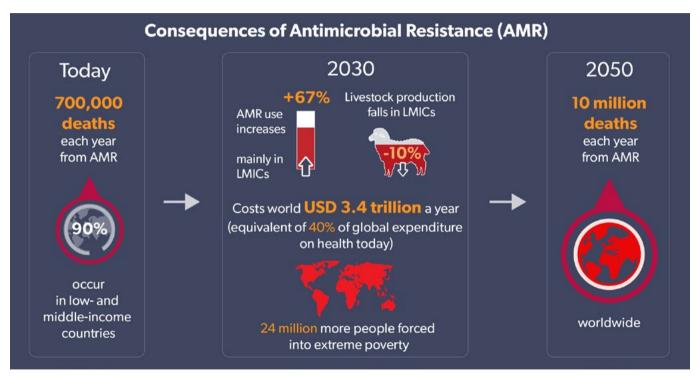
*Waste antimicrobial implies misuse has occurred. An antimicrobial prescribed by a health professional should be used in full and thus no waste should be left over.

Better consideration of animal and environmental AMR drivers

Both the drivers and impacts of animal and environmental AMR need to be communicated more effectively so that communities can ensure they are behaving safely. Currently we need to expand this to animal and environmental health.

Some Global bodies have made progress in widening their One Health focus on AMR. For example, the Institute of Livestock Research (ILR) has produced a helpful graphic to communicate just how big the problem of antimicrobial misuse and AMR is within the agricultural sector.

The Wellcome Trust has also produced a large report regarding the environmental dynamics of AMR and pointers for action.

Consequences of Antimicrobial Resistance (AMR)

Today

700,000 deaths each year from AMR

90%

occur in low- and middle-income countries

2030

+67% AMR use increases mainly in LMICs

Livestock production falls in LMICs

-10%

Costs world **USD 3.4 trillion** a year (equivalent of 40% of global expenditure on health today)

24 million more people forced into extreme poverty

2050

10 million deaths each year from AMR

worldwide

Consequences of AMR linked to agricultural antimicrobial use and misuse. Image courtesy of CGIAR AMR Hub @amrhub.

In Vietnam, antimicrobials are commonly used within farming practices, community members share their experiences at an OUCRU community event. Photo courtesy of OUCRU.

Case Study

Drug stores as the main source of antimicrobials for chicken farmers in Vietnam (2019).

This 2019 study in the Mekong Delta of Vietnam considered the use of antimicrobials by small-scale poultry farmers. The authors engaged the farmers as their core community but also vets and informal drug sellers as wider stakeholders. All groups completed a short questionnaire to better understand the local dynamics of antimicrobial use. Findings show that antimicrobials are used frequently, in large quantities and often without diagnostic testing to identify a disease and appropriate treatment. Antimicrobials in this area are cheap and easily available for farmers, they also constitute around 15% of veterinary drug store incomes meaning drug sellers are highly motivated to provide them. Although 57% of the drug shop owners were affiliated to the local veterinary authority and so could provide diagnostic services the rest could not. Those shops who could not provide diagnostic services saw a higher percentage of their income generated by antimicrobial sales, suggesting these establishments prescribe antimicrobials more readily. The surveys also identified contextual factors which promoted antimicrobial use, for example most farmers visited drug shops within a 4km radius of their farm/home suggesting ease of access contributes to antimicrobial use. These results sug-

gest that interventions targeting veterinary antimicrobial use need to focus on improving the whole community's knowledge base on livestock/poultry diseases and their diagnosis. This could contribute to reducing overall levels of antimicrobial use in the area.

Contextualizing the One Health drivers of AMR

Another way to ensure AMR is approached from a One Health perspective is to contextualize the drivers of AMR more specifically within a given context. Global Guidance documents are worded in generic terms to appeal to a broad audience. To appeal directly to a given community, however, people will often want to understand the specific risk and impacts of AMR on their own lives. This means AMR interventions, research and resources need to understand the specificities of AMR in a given context.

This could be achieved by;

Understanding the language communities use to describe infections, generic drug use, antimicrobials and AMR.

- Words may not always be the best way to communicate. Can you use images in your project in order to communicate more effectively?

Asking if communities have seen, understand and follow Global and National AMR guidance.

- Is the language accessible, is the guidance meaningful?

Exploring why "negative" AMR behaviors occur.

- This is unlikely to simply be because of a lack of knowledge.
- Certain community members may not be able to afford a doctor's prescription, or geographical barriers may prevent farmers accessing veterinary services on a regular basis.

Considering gender and intersectionality factors which may influence human health behaviors, animal husbandry and interactions with the environment.

- Men, women, and children often take different roles within the home, in agriculture and aquaculture. This can influence the drivers of AMR that they are engaged with.
- The main breadwinner in a particular home will likely take responsibility for the type of health and veterinary care which is affordable and accessible to the rest of the family.

Using CE to consider the One Health drivers of AMR

Community engagement offers a way to contextualize the One Health drivers of AMR within a given community. CE approaches can help to address many of the points discussed above and help us understand the One Health dynamics of AMR in different settings.

Photo by Deepak Kumar on Unsplash.

Kenyan co-designed comic depicting AMR scenarios in pastoralist communities. Image courtesy of Naomi Bull.

Case Study

Evidence-based policy (2018).

This study sought to tackle AMR through evidence-based policy and employed local illustrators to create AMR comic books for the children of pastoralist communities in rural Kenya. These comics showed locally appropriate scenes including livestock movement, feeding and vaccination programmes. Because the children were familiar with these scenarios, they could connect to the AMR challenges described in the comics and understand how to adapt their own behaviors to safeguard animal health.

Similar comics were created for children living in dairy farming communities in India. However, the graphics and behaviors depicted within the Indian and Kenyan comics were very different and reflected the cultural specificity of animal health care. Using local illustrators and discussing the comic content with communities allowed this project to clearly communicate the behaviors associated with AMR in each setting, and support children to understand these drivers.

An example of Semi-intensive poultry production, common in Southeast Asian Countries. Photo by Karine Gatellier of the One Health Poultry Hub.

Case study

The GCRF One Health Poultry Hub (ongoing).

This hub is an international consortium of researchers, farmers and practitioners focused on protecting the health and productivity of the poultry sector in South East Asia. This group has a specific commitment to understand the drivers and impacts of AMR within poultry production and takes several approaches to these issues. The Hub's team is mainly composed of veterinary health experts who are interested in monitoring and counting infections, mapping patterns of drug use and using this data to understand how, why, and where AMR develops and spreads. However, to contextualize this information they also need to consider the behavioral dynamics of poultry production such as how antimicrobial medicines are used, particularly non-prescription drugs, and how animal husbandry methods impact on AMR. Understanding these behavioral drivers of AMR requires a community engagement approach and collaboration between veterinarians, epidemiologists and social scientists.

4. What are the best ways to make CE scalable and sustainable when tackling One Health AMR challenges?

What are the best ways to make CE scalable and sustainable when tackling One Health AMR challenges?

As we have discussed throughout this handbook, community engagement approaches offer a way to understand the context of how AMR develops in LMICs, and places value on the knowledge of local communities. However, due to their specificity, CE interventions can be difficult to deliver on a larger scale or apply to new settings. There are also challenges over how to sustain CE for AMR projects in low-resource settings once funded projects have finished and the research team has left. In this chapter we consider what the terms scale and sustain mean to CE for AMR projects.

Because AMR is a relatively new challenge to be addressed through CE, interventions can be viewed as novel and even risky. In these cases, we not only need to think about the potential to scale and sustain the intervention, but firstly to consider if it is feasible and acceptable within the community. Feasibility and acceptability questions favour pilot studies and pre-testing approaches. This means that CE is often used as an exploratory approach without a strategic plan for scale-up. We challenge this notion through examples but also discuss the very clear difficulties in scaling and sustaining the CE approach to tackle AMR.

CE can be resource-heavy in terms of time, money, and personnel. This again means CE interventions are often considered one-off solutions or pilot studies. We clarify that strategic plans for scale-up may not always focus on repeating the entire intervention instead on sharing community co-produced outputs more widely. This presents an accessible and affordable route to scaling and sustaining the reach of the project.

The wider CE literature suggests that a key approach to scaling and sustaining interventions is to embed them within existing systems, such as community clinics. The same may be true for AMR-focussed interventions. However, AMR is a one health challenge and needs to be considered from angles beyond just human health. This presents questions about which systems to embed CE for AMR interventions within, or if embeddedness is the best approach to scalability. In this chapter we consider how to scale and sustain CE interventions which specifically tackle AMR.

Considering the terms scale and sustain from different perspectives.

Scalability and sustainability are closely linked terms which refer to the long-term goals of a project. Scale tends to mean the reach of a project, how many people are engaged with it or impacted by it. Sustainability refers to the longevity of the project, how repeatable is it in the long term and particularly without the support of external funding.
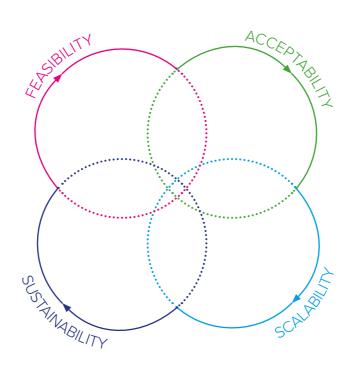
Each stakeholder will have different objectives for the long-term goals of a project, and this will influence their vision of scale-up and sustainability. Some approaches such as the Community Dialogue Approach or Women's Discussion Groups are designed to last indefinitely. Once co-produced resources are developed and facilitators are trained, new attendees may join the meetings and new facilitators can be trained allowing the project to be scaled and sustained. However, approaches such as participatory video which relay on specialist equipment and practitioners may not in themselves be sustainable in low resource settings, yet their outputs (co-produced films) can be shared allowing the messaging around AMR to reach new and larger audiences over time.

Scale and sustain can also hold different definitions in different disciplinary backgrounds. There is no 'one-size-fits-all' approach to CE, therefore there will be different ways to conceptualise different stages of a project. It will be useful to define these terms in the earliest stages of project planning and consider them as dynamic; they may need to be revisited at key stages to ensure that the project is maintaining its original aims (See Chapter 1 for community engagement and Chapter 5 for methods of stakeholder engagement).

Scale and sustain… are these the right words?

Many projects see other stages that pre-date scalability and sustainability, those which aim to test acceptability and feasibility in a specific context before investing resources into a project on a larger scale. This is particularly so in fields where CE is not a recognized approach. For example, animal health aspects of AMR are rarely tackled through CE so veterinarians and zoologists may prefer to pilot test a new approach before relying on it. Pilot phases are effective because they allow a CE approach to be tested within a given context and community. However, when considering the wider literature, CE interventions tackling AMR that do include a pilot phase are often quite short-lived and do not incorporate a scale-up strategy. As such, the project may be highly feasible and accepted but may not have the funding, support or infrastructure to be sustained or scaled in the longer term.

The journey of a project between feasibility, acceptability, scalability, and sustainability is not expected to be linear. It will more likely be a process which loops back and forth as new knowledge and information is shared between partners (see the 'iterative loops' figure on the next page) It's important to make space for this feedback so that scale-up methods do not conflict with the overall aims of the project.

ITERATIVE LOOPS BETWEEN FEASIBILITY, ACCEPTABILITY,
SCALABILITY AND SUSTAINABILITY

Examples of comic images co-designed by the children of Kenyan co-designed comic pastoralist communities to explore AMR . Image courtesy of Naomi Bull.

Case Study

Supporting evidence-based Policy (2018).

In the Supporting Evidence Based Policy study Kenyan children in pastoralist communities helped to co-design comics which explained local AMR challenges linked to the movement of animals and environmental contamination. These comics proved so popular with children that local governments requested copies to share during World Antibiotic Awareness week. This expanded the reach of the project to more than 3000 children which appears a huge success. However, the comics were distributed far beyond their intended audience, to children in formal settlements and urbanised areas. This created a challenge for the research team as they worried the highly specific information in the comics would no longer be relevant to all children. In an ideal setting the team reflected that they would have liked to conduct follow-up research to consider if the comics were acceptable and feasible in their new settings.

Considerations for Scaling and sustaining CE for AMR interventions.

Scale-up strategies are often most successful if they are co-designed around community needs and resource availability, with a view to how these may change over time.

Valuing community knowledge can support scale-up and sustainability.

- Sharing community co-produced outputs means your material is already worded in a locally and cultural appropriate way and so should better engage the wider community.

Consider best and worst cases of scaling.

- For example, if your outputs end up reaching a much wider audience will they still be specific enough to tackle the AMR challenge in that new community?

Inadequate supply chains around resources critical to the project are often cited as barriers to scale-up, particularly in low resource settings and LMICs.

- For example, access to technical support such as electricity, the internet or laboratory capacity can be an issue.

- Travel and infrastructure issues could prevent groups meeting as regularly as would be best for the intervention.

Mapping stakeholders and systems is a key process to ensuring longevity of projects.

- Mapping existing systems including their reach and contextual factors will allow you to see if your intervention is likely to be maintained.

- AMR is a One Health challenge and so scale-up strategies need to incorporate stakeholders from across the One Health sphere.

- Advocacy activities are recognised to positively influence scalability as they can engage wider stakeholders who will support the project through policy changes and financing.

Barriers to the scalability and sustainability of CE for AMR projects.

CE interventions can experience barriers to potential scale-up activities and/or achieving long-term sustainability. The resources required for scale-up may not be feasibly sourced at the local level long-term, for example a project may require printed materials or specialist equipment to continue. PV interventions, for example, rely on specially trained facilitators and costly camera equipment that may need to be returned once a project has finished. Additionally, CE interventions may be viewed as a novelty, meaning that long-term financial support may be difficult to secure. This issue is furthered by a lack of reliable evaluative data available in this area. Reliable data is often needed to put forward a case for long-term funding of a project- the topic of evaluation is covered in more detail in RQ6 of this handbook.

Using co-produced outputs as a route to scale-up.

Community co-produced outputs are recognized to facilitate both scalability and sustainability. This is because outputs can be used as both research evidence and community resources. The community can keep ownership of these and use them in meaningful ways to continue the impact of the original project whilst the research team can use the outputs as evidence of success to secure funding to scale up projects or as data sources to address new linked challenges in new research bids.

Participants begin to create films around their experiences of AMR and antibiotic use as part of a participatory video project in Nepal. Photo courtesy of HERD International.

Case study

CARAN project (2017-19)

Communities engaged in this project co-produced films, which told stories of local antibiotic use and misuse. The film outputs had multiple uses within and beyond the funded lifespan of the project. Firstly, communities retained access to the films, to share with wider stakeholders as they wished. Films also allowed policy makers to understand how antimicrobials are being misused in their communities, allowing policy guidance to be adapted and contextualised. Finally, the films and wider data (transcripts etc.) from this project revealed new and important research questions around the drivers of AMR in this community. These drivers are now being explored in an additional funded study, in the development of which the co-produced films were vital.

Embeddedness as a route to scale-up and sustainability.

Embedding CE interventions within existing systems is often considered to be one of the best ways to ensure a project is both feasible and acceptable within its setting, but also able to be scaled and sustained over time.

Photo by Myriam Zilles on Unsplash.

Women in Bangladesh gain information on AMR from visual resources and discuss these within their community dialogue meeting. Photo courtesy of ARK Foundation.

Case study

Community Dialogues Approach (2017-19).

The CDA involves training volunteers on the topic of AMR and facilitation skills and supporting them to run community dialogues, or informal discussion groups, which address the topic of AMR in that specific community and share key facts on the issue and ends up with a solution by the community itself. To embed this approach, CDA volunteers were selected from within the catchment area of existing community clinics and supervised by existing community support groups. This meant that facilitators were familiar to the community and that materials for the CDA could be co-designed based on the experiences of the health care facilities in that area. Discussions within CDAs thus reflected the needs and experiences of that specific community.

5. What are the most effective ways to engage with national and international stakeholders, beyond the community?

What are the most effective ways to engage with national and international stakeholders, beyond the community?

Stakeholder engagement can facilitate access to diverse communities, support local and cultural understanding of the problem in question, and increase our ability to scale and sustain projects. The question of how best to engage stakeholders with CE interventions is often asked by the researchers and practitioners. We can use stakeholder mapping exercises to find out who we should be engaging with, but if relationships with these stakeholders do not already exist it can be daunting to know how to approach them, or to effectively communicate the needs and impact of our work.

One solution is to link the project with the needs of stakeholders from the outset. However, AMR can be complex to engage with because it is often considered a biological problem and is often tackled by human health stakeholders only. As we have discussed throughout this handbook, AMR is a One Health problem impacting upon human, animals, and the environment. Stakeholder engagement needs to represent this One Health reach. Using CE approaches to tackle AMR adds another layer of complexity to our engagement process. Stakeholders across the One Health sphere, but particularly those in animal and environment health, may be unfamiliar with CE if it is not commonly used in their field of work.

Across the CE literature, sharing community-produced outputs is considered a good way to engage stakeholders. It encourages them to consider the views of the community about the problem at hand. However, sharing of outputs obviously occurs toward the end of a project. Although this can be helpful in developing the relationships needed to scale and sustain an intervention (see chapter 4), we are
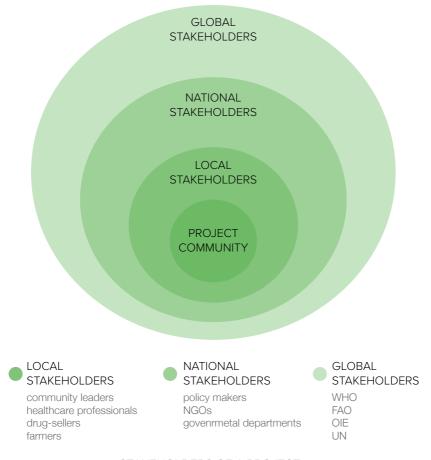
interested here, specifically, in how best to engage stakeholders at the planning, developmental and implementation stages.

In this chapter we share knowledge and experience of stakeholder engagement specific to AMR and CE. We also discuss some stakeholder mapping resources which may support projects to identify who they could be engaging with across the One Health sphere.

What are the most effective ways to engage with national and international stakeholders, beyond the community?

What do we mean by Stakeholder? We use the term stakeholder to mean anyone with an interest in, or associated with, the project.

Stakeholders differ to the community in that they may not always be the focus of a CE for AMR project. The community refers to the intended core beneficiaries of a CE project, which we define as per Chapter One. Stakeholder is a looser term to refer to those associated with the project, they may benefit from it, they may support it or influence it (see the 'stakeholders of a project' figure on the next page).

GLOBAL
STAKEHOLDERS

NATIONAL
STAKEHOLDERS

LOCAL
STAKEHOLDERS

PROJECT
COMMUNITY

LOCAL
STAKEHOLDERS

community leaders
healthcare professionals
drug-sellers
farmers

NATIONAL
STAKEHOLDERS

policy makers
NGOs
govenrmetal departments

GLOBAL
STAKEHOLDERS

WHO
FAO
OIE
UN

STAKEHOLDERS OF A PROJECT

As discussed in Chapter 1, at certain points in a projects, stakeholders and the community can overlap. For example, village elders may be part of the project's core community, but they may also act as gatekeepers to other parts of the community by encouraging these individuals to take part in the project. In this case the village elders are both community members and stakeholders at certain points in the project.

Why engage with stakeholders?

Stakeholders can support projects in different ways. For example, through encouraging participation by community members, by providing financial support or other resources, by acting as gatekeepers to certain parts of a community, or by raising the profile of a project. You may choose to engage with different stakeholders for different reasons.

Different stakeholders will themselves have needs and reasons for engaging with a project. It is important to think about why a stakeholder would want to be involved with your project, and if their needs align with your project's aims, objectives, morals and ethics. For example, a pharmaceutical company may wish to support an AMR project financially in order to fulfil their corporate social responsibility obligations. However, they may not have any intention of changing practices, such as irresponsible disposal of pharmaceutical waste, which could be harming the community.

Stakeholders, Community Engagement and Antimicrobial Resistance

CE projects relay heavily on stakeholder engagement because wider stakeholders can help contextualise the needs of the community and support projects to achieve their desired impact. It is important to include stakeholders with different views of the problem and project. For AMR this means engaging stakeholders across One Health (human, animal, and environmental) settings. For example, the Community Dialogues project aimed to develop community conversations on AMR based around human health. However, many of the communities the project worked with also kept food-producing animals and it became clear that conversations around AMR needed to consider factors relating to infection prevention through good animal

husbandry. As such, this project engaged stakeholders with veterinary and agricultural backgrounds to co-develop their community dialogue resources and ensure content was fit for purpose.

Engaging with Stakeholders

Here we discuss the different types of stakeholders you might want to engage with during a CE for AMR project. We signpost key resources to help you find stakeholders, understand their needs and suggest tips for successful engagement.

Local and Regional Stakeholders

Because community engagement interventions need to be locally meaningful and specific it is important to engage with stakeholders who really know and understand a particular community. This could include, for example, local community groups, schools, health centres, faith organisations or businesses. These stakeholders can advise on appropriate language and methods of communication as well as the timing and location of events. Some of these stakeholders may act as gate keepers giving you access to other parts of the community. Others may help you to secure space to deliver your project or generate buy-in from policy makers. The framework contained in this publication offers a creative approach to engaging stakeholders based on a review of the literature in Design Thinking.

National and International Stakeholders

Stakeholders could include International organisations such as non-government organisations (NGOs) who are interested in AMR at the global level. Many of these groups also have national sub-groups

which operate at country level. ReACT Group have produced this stakeholder [mapping resources](#) which introduces key Global AMR stakeholders. This document is very helpful in highlighting each organisations' area of interest within AMR and could help projects identify how the needs of these stakeholders interlink with projects aims.

Policy Makers

One of the most common groups of national or regional stakeholders that CE and AMR projects engage with are policy makers. These tend to be individuals or organisations operating at National level and likely include the governmental ministries linked to health, agriculture, environment, education and perhaps research and development. In some settings there may be regional branches of these ministries, or local government officials who may be more appropriate to engage with. The CE4AMR network has collated a list of top tips for policy stakeholder engagement, check it out in the checklist for Stakeholder Engagement section in the end of this chapter.

Female community members discuss antimicrobial usage and potential for AMR at workshops in the Red River Delta region of Vietnam as part of the OUCRU project. Photo courtesy of OUCRU.

Case Study

Women's discussion groups evaluation (2006).

Women's discussion groups (WDGs) involve training facilitators to deliver health messaging to groups of women and mothers, embedding into an already established network of volunteers. This evaluation project aimed to understand the role of women as stakeholders in policy development, based on their experiences of WGDs. Authors gathered data from WDGs in rural Malawi including qualitative feedback from facilitators plus quantitative data based on the outcomes of the WDGs. The evaluation found that WDGs helped to develop awareness of maternal health issues and motivation to address them. In this format, rural women were able to clearly identify and prioritise health issues that affected them. Women in the groups carefully considered and ranked the importance of action on various health issues according to prevalence and severity. The evaluation argues that considering local women as key stakeholders should be an essential part of policy development to shape locally acceptable and appropriate interventions to tackle maternal health issues. The authors of this study are now interested in expanding the women's discussion group model to address AMR risks in maternal and child health.

A checklist for Stakeholder Engagement

Considerations when planning engagement

☐ *Be clear on what you are asking of your stakeholders.*

They could be advisory board members, financial investors, gatekeepers to certain communities/industries/services or they could provide publicity to the project. These are very different roles and will require different levels of engagement and input.

☐ *Understand what your community need from this stakeholder?*

There will likely be a power dynamic between the community and the stakeholder – what is this and how could it impact upon engagement?

☐ *What does your stakeholder need?*

This might not be obvious; you may need to make space to find this out.

Consider what you may need to do if stakeholder needs conflict with community needs. This could become an ethic/moral consideration.

☐ *Regular, informal contact can be helpful to develop relationships.*

You could invite stakeholders to your project activities in order to develop relationships.

Understand key planning processes and events of your policy makers

☐ *What are the key cyclical processes which lead to changes in policy?*

Timing of Policy cycles? Often 5 years with updates being made in the final year.

What is the Annual budget cycle? When will new money be available?

When will there be annual sector reviews or other events that you can get invited to?

☐ *When are the election cycles and who is running for what role?*

Understanding this could help you decide who to engage with and when.

☐ *Be aware of International agendas such as the Sustainable Development Goals (SDGs) etc.*

Consider what is important in your setting but also neighbouring countries which will likely have influence.

Find a "hook" within these agendas upon which to engage your stakeholder.

AMR is not in original SDGs although there are now some convoluted indicators. This could be a problem because there is

not an AMR-specific "hook" within the SDGs.

The WHO's emphasis on producing country specific AMR National Action Plans (NAPs) is a very clear hook.

Most AMR National Action Plans cover a 5-year period and are reviewed in the year before the current plan ends, this is a good

Initial engagement
with a focus on Ministry/ Government officials

☐ *Get to know people rather than departments, people will move around.*

Junior ministers can be a long-term investment for policy engagement.

Civil servants (or equivalent) can be stable contacts.

☐ *Do not wait! Engage with policy makers at project planning phases as they can support and shape the project going forward and develop a sense of ownership.*

Ministry officials can produce letters of support for funding proposals which has the benefit of creating early, meaningful engagement on the part of the stakeholder and can also support the grant application on the side of the researcher.

Policy makers may actually prefer to engage with new, rather than established, ideas as they can take some ownership of them.

☐ *Don't forget to engage with the Finance Ministry/department - you will need money at some point!*

Key information to prepare and share

☐ *Clearly communicate the facts around AMR.*

Numbers have impact but they must be backed up by simple/ unambiguous evidence.

Nuance the meaning of AMR to different One Health Sectors

☐ *Use existing policy to contextualise your information.*

National AMR Action Plans

Infection prevention strategies

Agricultural bills around antimicrobial use.

☐ *Share direct examples of CE in action on AMR.*

☐ *Share community produced outputs.*

☐ *Invite stakeholders to your project activities.*

☐ *Clearly communicate the stage of the research to the stakeholders.*

☐ What is the problem for your stakeholders – demonstrate that your work is relevant to this area?

☐ As results appear – use evidence (carefully!) not as academic papers – User friendly outputs – policy briefs, presentations, events, social media, speeches.

6. How do we define success, measure effectiveness, and learn from failures, when applying CE methods to the One Health AMR context?

How do we define success, measure effectiveness, and learn from failures, when applying CE methods to the One Health AMR context?

This handbook has guided you through the process of using CE approaches to tackle AMR in LMICs and low resource settings. This final chapter considers how we measure and share the success of these approaches.

The process of measuring success is often referred to as an evaluation. Evaluations provide an assessment of a project's success, impact, and failings. They can tell us if a project is working well and, if not, how it can be improved. This is important because failure is essential to future development. When we chose to focus only on the successful elements of a project, we lose the opportunity to improve. Evaluations do this by bringing together evidence about the change a project has created. This evidence can take many forms, for example, quantitative data on numbers of participants involved, or antibiotics used, qualitative data on how participants feel, or what they have learned about a topic or biological data regarding types of infections etc. All these different measures (or indicators) tell us different things about a project but bringing them together in an evaluation allows us to understand how and why a change has occurred.

We need to think about who the evaluation is for and what information will be meaningful to this audience. Researchers, community members and wider stakeholders are likely to consider success or failure in different ways. For example, one researcher may determine the success or failure of a project based on a specific indicator, such as infection rate, whilst other stakeholders may base their evaluation of success or failure on a completely different range of indicators

such as local knowledge or participant engagement. These different indicators will lead to different types of data being collected within the project and this could influence how the findings of the project and evaluation are shared.

Using CE approaches to tackle AMR is an interdisciplinary process which inevitably brings challenges. This is especially visible when attempting to evaluate an AMR intervention. When researchers combine fields to address a One Health topic like AMR, traditional means of measuring success or failure may not be appropriate because they do not capture the complexity of a One Health problem. For example, after a month of engaging in 'community dialogues' a community may not see a decrease in incidences of a particular infection, but community members may report changes in their home animal husbandry behaviours which could prevent infections spreading in the future. Thus, the indicators we use to measure success should be carefully considered, we need to think about what we are measuring and how we measure it. A key benefit to CE approaches is that they can be evaluated through mixed method approaches utilising multiple indicators.

This chapter considers how to evaluate CE for AMR projects in a contextual and meaningful way. We discuss which indicators could be used to quantify and track the success or failure of an intervention. We consider the benefits of combining evaluative methods to best understand the context in which success or failure occurs, and finally we discuss the inevitability of failure and the benefits to learning when things go wrong.

Who is the evaluation for?

As discussed in earlier sections of this handbook, community members and other stakeholders should be involved in all parts of the CE process. Establishing meaningful goals from the beginning can ensure community and stakeholder engagement within the project, and help in planning effective evaluations. It is likely that different stakeholders will have varying priorities and hopes for the project. These should be openly discussed during planning stages. Understanding who an evaluation is for can help define what success and failure could look like. This discussion will also support the project team to decide which indicators to measure during the evaluation process.

Key actors to engage with during evaluations include:

Box 3:
Key actors to engage with during evaluations.

- *Core Community*
- *Stakeholders*
- *Wider and interlinked communities*
- *Funder*
- *Host organisation or Research institution*
- *Experts within the field*

What is success and failure?

Across CE for AMR projects neither success nor failure will not always look the same. Projects will have different aims and their evaluations will measure different indicators to see if these aims have been met. In broad terms, successes can be defined as expected outcomes of a project. Failure is not always the opposite of success but tends to reflect situations where project aims have not been met.
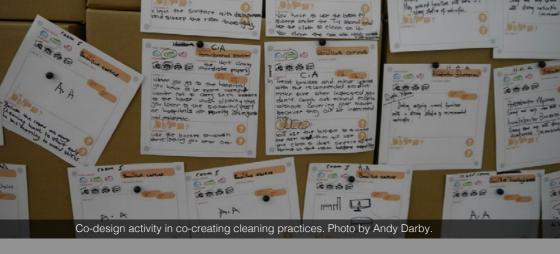
CE for AMR projects require careful evaluation processes because of the contextual focus of CE which is generally based around the needs of a defined community and their wider stakeholders (see chapters 1&5). For example, in a project aiming to engage communities with appropriate medical antimicrobial use, survey data may suggest that community knowledge around AMR has increased (success), but observational data may suggest behaviours and practices have not changed (failure). In this situation, the indicators chosen to reflect on successes and failures are key to understanding not if the project was successful, but rather which elements within the project were successful or not, and why. The specificity of CE as a strategy, and of AMR as a One Health challenge, mean that CE for AMR evaluations need to consider a range of indicators to understand why a certain intervention led to success or why a failure occurred. When effectively planned and communicated, this type of evaluation can help everyone understand why some parts of the project worked, why others did not, and how it could be improved in the future. For a useful example see 'The Consequences of AMR Education and Awareness Raising'.

Indicators, data and outputs

To effectively measure successes and failures, projects need to measure or track certain indicators. Indicators can be numerical data from surveys or counts, biological data from taking samples of blood, water, soil etc. or qualitative data from focus groups and interviews. Projects need to consider which indicators should be used to measure success and failure, and what type of output should be created to share this information at the end of the project (see the Checklist for Impact on page 111). Designing a suitable evaluation which measures appropriate indicators is important as it ensures the impact of individual projects are captured and communicated but it also strengthens the wider opinion of CE as a tool to tackle major challenges. CE interventions are iterative, meaning that they repeat steps according to the learning of a project in order to optimise results, and because of this any evaluation framework will require some flexibility. This is expanded upon later in this section.

The use of mixed method approaches to CE for AMR evaluations

Mixed-methods evaluations use a combination of different indicators, measures, and outputs to evaluate and share the findings of a project. They are popular within CE because they allow failure and success stories to be contextualised. Evaluations that use only one indicator for success are at risk of missing contextual insights on local AMR challenges. In contrast, mixed-method evaluations allow the consideration of multiple indicators and are flexible. Flexibility is crucial within CE as there is rarely a 'one-size-fits-all' approach to either the intervention or evaluation of a CE for AMR project. Rather, the needs of the community, will influence the shape of an intervention and these could change over time meaning that evaluations that capture multiple indicators are best placed to understand the impact of a project.

Co-design activity in co-creating cleaning practices. Photo by Andy Darby.

Case Study

The Dust Bunny project aims to understand how home hygiene practices can impact upon AMR in Ghana.
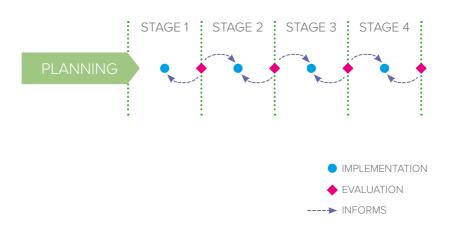
The multidisciplinary team use a mixed methods approach to their intervention by delivering training workshops and sharing cleaning products. The evaluation also takes a mixed-method approach by collecting biological data on the types of infections present in households and if any are drug resistant. This is useful on its own because it can allow the project team to understand the risk of AMR within different home environments. However, it is much more meaningful when combined with qualitative data from interviewing homeowners. Here the team can understand more about the home hygiene behaviours in each household and how these relate to infections. Combining these types of data together allows the Dust Bunny project to understand which home hygiene practices are more effective at minimising infection in general, and with regard to AMR specifically. The community can then share this best practice to protect other homes.

Evaluation should not be a linear process.

Linear approaches to evaluation are not always appropriate in evaluating CE for AMR projects. This is because they do not reflect the cyclical, or iterative nature of CE methods; where we learn from each stage and feedback to generate more effective methods as the intervention continues (see the diagrams below).

PLANNING > IMPLEMENTATION > EVALUATION

LINEAR APPROACHES TO EVALUATION

STAGE 1 | STAGE 2 | STAGE 3 | STAGE 4

PLANNING

● IMPLEMENTATION
◆ EVALUATION
----> INFORMS

CYCLICAL AND ITERATIVE APPROACHES TO EVALUATION

The second diagram breaks a project into stages and shows points for evaluation which inform both the previous and future stages of research. Because CE is a process, different stages of the project can uncover new knowledge. When this occurs, it may be necessary to revisit a previous stage to contextualise the intervention and ensure it is fit for purpose in the community.

Iterative evaluation is also appropriate to the challenge of AMR which is a dynamic problem and could change during the lifespan of a project. As new information on AMR comes to light in a particular context, a project may need to be adapted. Iterative evaluations allow adaptations to be made in real time rather than waiting until the end point. Finally, this approach to evaluation allows failure to be identified during the delivery of a CE for AMR project, which in turn can allow the project team to contextualise and understand the reason for this failure.

Learning from Failure

Failure is often considered a negative term, yet in this handbook we aim to position failure as an opportunity for learning and [contextualisation](#). This cluster suggest that some degree of failure within CE for AMR interventions is almost inevitable because AMR itself is such a complex problem. CE approaches by their nature are flexible and are shaped by the local community during the project, this means evaluative indicators decided during project planning stages may not actually evidence success by the end of the project. However, even if the outcome of a study is not achieved, well-planned evaluations and the use of multiple indicators can support the team to understand what contributed to failures and highlight where success were achieved. Reflections on failure can be used to inform better implementation methods in future projects or scale-up activities. These lessons can also be shared externally, through publications, training workshops and other appropriate avenues, so that other teams can benefit from lessons learned in different projects.

Photo by Mrjn Photography on Unsplash.

Case Study

Examples of failure in research are very difficult to find because usually it is only successful studies that are published and shared. However, a collection of studies aiming to understand infection risks, antibiotic use, and AMR in maternity units in India, do discuss their failings. This research team planned to train cleaners on AMR and its prevention strategies. The theory was that, as cleaners are directly responsible for cleanliness in these maternity units, their actions directly impact upon maintaining Water, Sanitation and Hygiene (WaSH) standards many infection risks. A specific training programme was designed to be embedded within their workdays and linked to daily cleaning duties. However, the intervention was not successful because there was a strong and negative impact of hierarchical structures in the workplace. At a mid-term evaluative point, the team realised that cleaners are often the most disadvantaged and least recognized members of the workforce. The power dynamics and hierarchy of many health care facilities was so strong that cleaners were not allowed to partake in the programme, and not recognized as change agents who can be vital in maintaining optimal WASH status in healthcare facilities and preventing antibiotic use. This represents a valuable example of failure upon which the research team have published. In this case evaluation points allowed researchers to realise that they had not

fully understood the context and power dynamics within the hospital setting. The interventions were therefore unable to fully engage with cleaning staff as agents of change and the projects failed to meet their original aims. Instead, these studies uncovered a key barrier, the workplace hierarchy, which could be explored through future CE interventions and eventually allow cleaning staff to participate in AMR related training.

A Checklist for Impact

What indicators could be used to evidence impact?

Knowledge

☐ What have people learned?

☐ Has knowledge of AMR changed?

☐ Has the research teams' knowledge of AMR changed?

Attitude or behaviour change

☐ Have people's aspirations changed?

☐ Do people want to change their behaviour?

☐ Has the research teams' behaviour changed?

Practice

☐ Are people doing different things?

Infection or illness

☐ Have incidences of illness changed as a result of the intervention?

Antimicrobial use

☐ Has this changed following the intervention?

Engagement

☐ Did people enjoy the intervention?

☐ Did people find the intervention useful?

☐ Did people return to multiple phases of the intervention (if applicable)

Diversity

☐ How wide is the geographic distribution of participants?

How do we measure these indicators?

Quantitative Data

Biological indicators

☐ Infections and illness

☐ Antimicrobial use

Counts

☐ How many people have engaged with a project?

☐ How many people have returned to the second phase of a project?

☐ Can also use counts to gather demographic and engagement indicators.

Statistical analyses

☐ Are there relationships between the different types of quantitative data collected?

Qualitative data

☐ *Interviews and focus group discussions.*

Allow people to share their knowledge, attitudes, and practice (KAP).

☐ *Ethnogrpahic and observational data*

Allow attitudes, practice, and behaviours to be observed.

☐ Survey data

Very flexible, may be qualitative or quantitative or a combination of both.

Can allow counts of engagement, assessment of enjoyment, information on knowledge, attitudes and practice (KAP).

When looking at knowledge, attitudes, and practices (KAP) we will often be interested in the direction of change. For example, has people's knowledge increased? Are people now behaving in ways which protect them from infection and AMR.

How might we share this information?

☐ *Academic publications*

☐ *Accessible publications such as short policy briefs and reports*

☐ *Alternative communications such as films, posters and animations*

☐ *Best practice workshops with other researchers*

Focus on reflections and lessons learnt.

☐ *Dissemination events*

☐ For community members and key stakeholders (national and local levels).

☐ With facilitators and supervisors.

☐ Small group meetings with expert panels

☐ Media and press activity

☐ Newspaper articles

☐ Press release

☐ Invite journalists to dissemination events.

☐ Social media

☐ Press can allow real-time sharing of learnings/challenges/ failures/success etc.

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