

Community conversations on antimicrobial use and resistance in livestock

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Introduction to antimicrobial use and resistance in livestock

Antimicrobial drugs play a critical role in the treatment of diseases; their use is essential to protect animal health. However, antimicrobials are often misused for prevention and treatment of livestock diseases. This promotes selection and the potential spread of antimicrobial resistant (AMR) microorganisms. Consequently, antibiotics and other microbials stop working when needed to treat a diseased animal. In addition, if these microorganisms infect people, they may be resistant to currently available drugs.

In Ethiopia, the use of veterinary drugs in food-producing animals has increased with improved access. The use of drugs in livestock is not commonly supervised by a trained veterinarian. In addition, knowledge on how these drugs work and how they should be used to achieve the intended impact is often not passed on to livestock keepers. Incorrect use of antimicrobials and other veterinary drugs, access to falsified or counterfeit veterinary drugs and noncompliance to withdrawal periods contribute to AMR and may result in drug residues in animal-food items, of which the real risks for public health are poorly understood.

Similarly, incorrect use or overuse of antibiotics in people also increases risk of development of resistance. First, it results in increased risks for people for infections that cannot be treated, but also possibly drugs for livestock may become ineffective if the resistant pathogen is common in people and animals. Hence, AMR is not only a public health concern but also contributes to treatment failure in livestock, thus threatening livelihoods.

There may be gender differences in the use of antibiotics. It is important to consider gender in interventions that aim to eliminate AMR.

Why should community members care about AMR?

When an infection strikes and medicines like antibiotics (and other antimicrobials) do not work, community members can lose their entire stock of animals to disease. This may also put their and their families' health at risk if the infection spreads between animals and people. The increasing prevalence of AMR could lead to reduced treatment options, forcing veterinarians to use more expensive drugs. In addition, infected animals may shed resistant bacteria, posing a threat to other farm animals, household pets and humans through direct contact or environmental contamination. Infected animals may also act as a reservoir for those bacteria, which then enter the food chain.

The responsible use of antimicrobials to treat sick animals can help community members:

- reduce livestock losses due to diseases;
- increase livestock productivity, thereby improving their income and livelihoods;
- reduce costs of unnecessary veterinary drug consumption;
- meet livestock marketing quality and food safety standards; and
- improve animal and human health.

Why community conversations on antimicrobial use and resistance?

Community conversations are facilitated dialogues which enable community members to identify and explore challenges and collectively or individually take actions to tackle those challenges. It is based on the recognition that community groups have the capability and motivation to prevent AMR and bring about positive animal and possibly public health outcomes, individually as well as collectively, once the community recognizes and perceives ownership of the drug-resistance problem.

Community conversations give a chance for community members to listen to each other attentively and speak out about potential solutions for an issue at hand. It also helps community members feel included in the process of problem analysis and decision-making about the problem at hand, such as the use of antimicrobial drugs.

Antibiotics are tools for reducing animal diseases and suffering from bacterial infections, but decisions about which antibiotics to use corresponding to clinical signs and disease in food animals and how to use them must be made with consideration of the risks of AMR. It is essential that all men and women livestock community members are aware and have knowledge about the impact of antibiotics misuse in livestock and public health.

Antibiotics and other antimicrobials are used to treat sick family members, in addition to livestock. This is additional drug knowledge within a household and community conversations will help leverage these views and knowledge in the discussion on treatment of sick livestock.

Community conversations create space for community members to freely share their views and discuss issues regarding the use of antimicrobials and the potential emergence of AMR microorganisms. They help create awareness and knowledge among community groups and promote attitudinal and behavioural change towards prudent use of antimicrobials, thereby encouraging the community to take actions collectively or individually to reduce the risk of AMR both in animals and humans.

Community conversations engage community members, including animal health workers/veterinarians, community leaders, religious leaders, men and women community members (couples or women in male-headed households), traditional animal healers, local animal drug vendors, health extension agents and livestock development agents. Engaging diverse groups in community dialogues will facilitate interaction, cross-learning and shared understanding among community members and service providers about rational use of antimicrobials and the impact of misuse of these medicines.

Learning goals and objectives

The goal for the community conversations on antimicrobial use and resistance is to create awareness among community members, animal drug vendors, community animal health workers (CAHWs) and public health personnel about the impact of the misuse of antimicrobials on animal treatment failures and public health.

Specifically, the community conversations aim to:

- explore knowledge, attitudes and practices (KAP) of men and women community members, CAHWs and animal drug providers about antimicrobial use and resistance;
- discuss antimicrobial misuse and create awareness among community members, CAHWS and local animal drug providers about the risk of AMR;
- explore gender differences (including intersectionalities) in antimicrobial usage in various livestock species;
- discuss alternative livestock health management measures to reduce the need for antimicrobials;
- develop collective actions towards rational use of antimicrobials and adoption of alternative measures;
- capacitate local animal health service providers to educate and advise community members on responsible use of antimicrobials and alternative livestock health management measures; and
- bring the voices of community members and integrate community concerns and decisions into animal drug dispensation, and use regulatory and herd-health management strategies.

Learning objectives for community members

By the end of the community conversations, community members will be able to:

- identify and explore their knowledge, perceptions and practices about antimicrobial use in animals and humans;
- explore their own behaviour and gender dynamics around acquisition and use of antimicrobials;
- explain how misuse of antimicrobials can lead to potential risk of AMR, which can cause animal treatment failure and loss of animals due to disease, and untreatable diseases in people;
- identify local distribution channels of veterinary drugs and accessibility by men and women;
- explain the impact of AMR on public health;
- act collectively or individually to reduce the risk of AMR by taking alternative measures to reduce the need for drugs and advocating for proper, rational use of drugs if they are needed; and
- share information and knowledge with other community members about responsible use of antimicrobials and alternative measures to prevent infectious diseases.

Learning objectives for animal health service providers

By the end of the community conversations, local animal drug vendors, veterinarians, CAHWs and public health personnel will be able to:

- identify threats posed by AMR and the ways they can help to tackle the problem;
- discuss why there is a global concern about misuse of antibiotics and AMR;
- list key risks of development of AMR in livestock and humans; and
- identify their role in tackling AMR.

Expected outcomes of community conversations

- act as a baseline to measure change in KAP of community members over time
- inform monitoring and evaluation programs in antimicrobial use and resistance
- improved understanding of veterinary drug use in livestock production
- increased awareness of men and women community members about antimicrobial treatment of sick animals and implications for public health
- increased understanding of gender differences in antibiotic use in various livestock species
- responsible and effective use of veterinary drugs
- reduced veterinary drug residues in animal-food items

Learning content

- causes of animal diseases (viruses, bacteria, fungi and parasites)
- how antimicrobials work
- gender differences in antimicrobial use
- causes and impact of AMR
- withdrawal periods of antimicrobial use in food animals
- alternatives to antibiotic use to prevent infectious diseases
- community actions to reduce risk of AMR

Learning materials and methods

Community conversations can be facilitated using participatory and collaborative learning methods such as small group discussions, panel discussions, role plays, storytelling, posters and provocative questioning. These interactive methods stimulate discussion and reflections around antimicrobial use and resistance.

Panel discussions

A panel of community members, veterinarians and animal drug vendors can discuss issues regarding antimicrobial use and resistance. Community facilitators must identify discussion points to engage panellists in discussions and reflections followed by questions and feedback from participants.

Role plays

Role playing takes place between two or more people who act out roles to explore a scenario or problem situation. It helps get a sense of what other people are likely to think and feel about a situation, and engages them in reflective discussions exploring their views, attitudes and perceptions about an issue at hand.

Storytelling

Stories are about people and what they do. They are ways of understanding social life—its dynamics, influences and impacts on individuals. Asking people to share a story allows them to express their experiences in their own words and in spaces where the stories are listened to and respected.

Personal stories can be gathered or created around antimicrobial use and resistance. Community members' KAP about antimicrobial use can be presented as a story used to prompt conversations and explore emerging issues and views. Community members feel comfortable telling stories of their experiences, perceptions and challenges, and they become open to others' views, values, experiences and perspectives. This can help them engage in meaningful discussions to identify concerns and find solutions together.

Provocative questioning

Provocative questioning is a way of soliciting information and perspectives that invites several options for answers. It can help community members and local partners reflect on issues that affect them and deepen their understanding of concerns and options for transformation.

Process documentation

Documentation is an ongoing and integral process of community conversations. It must be conducted in a rigorous way capturing information on activities, outcomes (including decisions and changes) and outputs. Community conversations require rich documentation. In a rich description of the community conversation process, sentiments, tone, actions and the significance of interactions among community members are captured and reflected upon.

Community entry and mobilization

Community entry is an important task that community facilitators undertake to understand the community and mobilize community members.

Process of organizing and facilitation of community conversations:

- identify local partners
- introduce yourself to local partners and community leaders
- explain the purpose of the community conversations to local partners and community leaders
- clarify expectations and roles of local partners and build relationships
- obtain the support of community leaders in community mobilization
- request the presence of community leaders in the opening and closing sessions.
- facilitate community conversations
- document the process and outcomes
- make follow-up visits to community members to document knowledge application and changes due to community conversations

Local partners:

- district livestock development offices (animal health team leaders and veterinarians)
- CAHWs
- health extension agents
- district government communications affairs offices
- district women, children and youth affairs offices
- livestock development agents

Community groups:

- community leaders
- kebele women's affairs representatives
- community-based sheep breeding/fattening group leaders
- men and women community members (couples or individual women)

Gender integration and community sharing approach

Women in male-headed households may have limited access to information about the use of antibiotics and AMR risks. There may be gender differences in the use of antibiotics in animals.

To increase women's access to information and facilitate shared understanding and decision-making within the household, couples' participation is encouraged in community conversations.

Community conversations also adopt a mixed-group approach where community members and local service providers participate in conversations to allow cross-learning and joint action. This mixed group approach allows better interaction and shared understanding between community groups and service providers and also creates commitment for joint actions. The approach also helps reduce social distance among community members and service providers, thus promoting free interaction between women community members and male service providers. It encourages follow up and better communication, and advisory support of men and women community members by local service providers in an equitable manner.

Community groups are expected to share information from community conversations with their household members, neighbours and other community members using various formal and informal social spaces. It is also expected that animal health workers and health extension agents will continue to support learning and awareness creation through their formal interventions and informal interactions with community members.

Community conversations facilitation process

The facilitation process involves four learning stages: exploration of existing knowledge, supplementation/filling gaps of existing knowledge with new knowledge, learning integration and action, and review and reflection (Table 1). Facilitators use different methods to facilitate learning during these stages.

Identification of men and women community members' perceptions, attitudes and practices about antimicrobial use and resistance promotes community members' awareness of the problem and provokes their critical thinking about it. The expected learning outcome of this stage is awareness/concern of community members about the issue in question and willingness to learn and engage in discussions about antimicrobial use and AMR risks.

Once community members explore their existing knowledge and practice gaps and are willing to learn more, new knowledge is introduced. This learning stage is key to increase awareness/knowledge of community members about antimicrobial use and AMR. It helps community members gain knowledge about what antimicrobials are, how they work, how AMR is caused and its impacts on animals and humans. The outcome of this learning stage is that community members are motivated and show interest/intention for change to reduce AMR risks.

The third stage is learning integration and action planning. In this stage, facilitators review key learning points/messages and encourage community members to identify actions that reduce AMR risks. The learning outcome is action planning and motivation to apply the knowledge.

The final learning stage is review and reflection on experiences and lessons learned. In this stage, facilitators engage in reflections and lessons learned activities with community members and service providers regarding implementation of their learning transfer actions and early signs of change. Facilitators also identify new gender-disaggregated learning needs of community members and provide customized problem-solving and coaching support to community members and service providers.

Table 1. Experiential learning stages and methods

Learning stage	Objective	Methods/tools
Exploration and identification of existing knowledge	Identify knowledge gaps Stimulate community members' thinking and motivation for learning	Brainstorming, role playing, storytelling
Introducing/imparting new knowledge	Filling knowledge gaps Increasing knowledge and awareness	Pictorial presentation, interactive discussion, storytelling
Knowledge integration and application	Learning internalization Communication of key messages Action planning	Recap, summary presentation, personal reflections
Review, reflection and re-planning	Review and reflection on experiences and lessons learned Identify new learning needs Re-planning/improvising	Reflection questions, problem-solving training and mentoring

Topic I. Exploring KAP of community members about antimicrobial use and resistance

The topic aims to encourage discussion among community members and animal health service providers about antimicrobial use practices and patterns, and how misuse of antimicrobials can lead to AMR. It explores KAP of community members and animal health workers about antimicrobial use and AMR risks. It also explores the local distribution networks of veterinary drugs, and how behaviour around distribution and use of antimicrobials can contribute to emergence of AMR. Community members will explore their antimicrobial use practices and gain new understanding and insight into the impact of misuse of antimicrobials.

Learning objectives

The topic explores how community members think and behave towards antimicrobial use and resistance, and how this can affect animals' health and productivity. It aims to make community members and animal health service providers feel the need for collective action to responsibly use antimicrobials and reduce drug resistance in livestock.

By the end of the discussion topic, community members and animal health service providers will be able to:

- explore their own KAP around antimicrobial usage;
- discuss situations that lead to use of antimicrobials;
- identify gender differences in antimicrobial use;
- explain the impact of antimicrobial misuse; and
- identify local distribution networks of antimicrobials, and accessibility by men and women.

Learning content

- reasons for use of antimicrobials
- gender differences in antimicrobial use
- types of antimicrobials (purpose, administration route, dosage and storage)
- sources and quality of veterinary drugs
- diagnosis and dispensing of veterinary drugs
- gender-disaggregated sources of advice/information regarding use of antimicrobials
- withdrawal periods of antimicrobials in food animals
- community members perceptions on AMR causes
- consequences/impacts of AMR

Duration: two hours

Materials and methods

- posters
- extension leaflets

- interactive discussions
- storytelling and experience sharing
- feedback and reflections

Learning activities

Welcome and introductions

Warmly welcome participants and invite community leaders or elders to open the community conversations with prayers. Observe local traditions and customs.

Introduce the facilitation team.

Explain the purpose of the community conversations, the discussion topics that will be covered and what is expected of community members and local partners by the end of the community conversations.

Ask community groups if they have questions before you proceed.

Establish some conversation ground rules (e.g. respect each and everyone's ideas, keep mobile phones on silent mode, active participation, open and frank discussion).

Introduce the discussion topic

Tell participants that you want to encourage a discussion to learn about the knowledge that already exists in the community regarding antimicrobial use and AMR.

Explain that at this exploratory stage you are not introducing community members to any new knowledge, rather first, you want to facilitate a conversation/discussion to find out about existing KAP of community groups regarding antimicrobial use and resistance.

Community members' knowledge about causes of animal diseases

Ask men and women community members to name animal diseases and what causes these diseases (causative agents) such as virus, bacteria, parasite or fungus.

This is a warm-up discussion to give community members awareness about the causes of animal diseases and to introduce the discussion about AMR.

Expand the discussion by giving examples of diseases caused by different agents, for example, sheep pox caused by pox virus, mastitis caused by different kinds of bacteria and fasciolosis caused by the liver fluke parasite.

Find out the local terms for antimicrobials, antibiotics and AMR and use these consistently throughout the community conversations.

Then find out what community members know about antimicrobials and their uses.

Ask community members:

- What are antimicrobials?
- For what cases/animal diseases do you use them?

- Are your animals diagnosed by a trained veterinarian before you buy and use antibiotics?
- Can you mention medicines that you commonly use to treat sick animals and for what diseases/clinical signs?

Facilitate a discussion among men and women participants and note down their responses.

Gender differences in the use of antimicrobials

Find out if there is a gender difference in the acquisition and use of antibiotics. If there is a difference in how men and women use antibiotics, find out why.

Ask participants:

- How do men and women use antibiotics and for which livestock?
- At what time of the year do men and women mostly use antibiotics? Explore any combination of modern and traditional medicines to cure animal diseases.
- How are antimicrobial-use decisions made in the household?

Community members' sources of information and advice on antimicrobial use and AMR

Community members may have different sources of information about antimicrobial use. Facilitate a discussion to learn about information sources available to community members regarding antimicrobials and their uses.

Find out if there are differences among men and women regarding information sources on antimicrobial use. Encourage a discussion among men and women participants.

Summarize the discussion and note down main points.

Use the following questions to facilitate the discussion:

- What are your sources of information/knowledge about the use of antibiotics?
- What specific information do you get from these sources about antibiotics? Probe: drug dosage and regimen.
- How useful is the information from these sources? What additional information do you want about antibiotics?

Community members' knowledge and attitude on sources and quality of antibiotics

Community members may have access to several veterinary drug sources, and they may have limited knowledge about the quality and efficacy of drugs from these sources.

Community members may also intentionally or unintentionally practise unnecessary and excessive use of antimicrobials. Facilitate a discussion to learn about abuse and misuse of antimicrobials.

Explore community members' antimicrobial use practices and find out the reasons for such practices.

Use the following questions to facilitate the discussion and probe as necessary:

- Do community members comply with prescriptions or the advice of veterinarians when using antimicrobials? If not, why?
- Where do you get veterinary drugs? For each source, find out who has access to that source. After listing the sources and distance to source, prioritize the three most important sources. Note down reasons for the prioritization.

- Do community members make direct contact with veterinary drug sources to deliver their own treatment to sick animals? If yes, why? Find out what they think about this practice.
- Do community members identify sources of falsified or poor-quality medicines? Find out how they discern the quality of veterinary drugs from various sources.
- What is the view of community members about falsified veterinary drugs?
- Who regulates the supply chain and use of antimicrobials for livestock?
- What do community members do with leftover veterinary drugs?

Community members' knowledge on type and purpose of antimicrobials

There are different types of antimicrobials, and the purpose, administration route and dosage differ based on the disease.

Find out what knowledge exists among men and women about types of antibiotics, route of administration and dosage. Facilitate the discussion based on identified animal diseases.

Use the following questions to facilitate the discussion:

- What type of antibiotics do you use to treat animal diseases? Facilitate the discussion and note down responses based on disease types, for example, respiratory, digestive/enteritis and mastitis for different species of livestock.
- How do you use/administer them? List the drugs they mention and ask who uses them.
- How do you determine dosage? Probe: Do they consider age, body condition of animals, follow instructions etc.?
- How long do you use antibiotics (duration of treatment) to treat sick animals? Facilitate the discussion depending on the type of drugs they mention.
- For which animal diseases do you frequently use antimicrobials? If not mentioned by community members, probe: respiratory problems and digestive/internal parasite infections.
- How often do you use antimicrobials to treat sick animals? Estimation per year based on type of diseases and livestock species. Probe into seasonal variations.
- Do you use human drugs for veterinary purposes? If yes, why? Which drug, for what disease and in which livestock species? How do you use these drugs?
- Do you allow animals on treatment to immediately freely graze with other animals without quarantine for a few days?

The discussion at this stage aims to explore community members' existing KAP about antimicrobial uses. Identify the gaps in KAP of community members about antimicrobial use and resistance. You will address these gaps in the next discussion topic.

Withdrawal periods of antimicrobial use in food animals

Community members may sell or consume animal products immediately after treatment, and they may not recognize the impacts on public health.

Facilitate a discussion to learn about community members' awareness and attitudes about antimicrobial residues in animal-food items (meat, milk and eggs) and how this can affect human health.

Ask community members the following questions:

- If you fatten animals for sale, how long is the withdrawal period following antimicrobial use before you take animals to markets?
- What about selling or consuming meat, milk and eggs?
- What do you think are the consequences of consuming animal-source foods immediately after treatment of animals with antibiotics?

Community members' knowledge and attitudes about AMR risks

Intentionally or unintentionally, community members may abuse and overuse antibiotics, and they may not recognize the risks of such use of these drugs. Encourage a discussion among community members to find out their knowledge and attitudes about AMR risks including animal treatment failures and public health.

Use the following questions to facilitate the discussion:

- How do community members perceive AMR? Do they know how it develops and why it is a problem? Find out if there are community members who have animals that no longer respond to drugs that were previously effective. If yes, what have they done about it?
- Do community members think they can do something to reduce the spread of AMR? If yes, how and why?

Summary and highlight of key points from the exploratory discussion

Conclude the discussion topic by summarizing key KAP gaps of community members in antimicrobial use and resistance.

Facilitators' resources

In Ethiopia, a lack of capacity among animal health service providers contributes to bad practices regarding antibiotic use. Community members only see service providers deliver drugs, so they go straight to the source (local drug suppliers). Community members also see service providers performing procedures with no anesthetic/pain relief which may lead to a belief that animals do not experience pain or that pain is unimportant.

Community members have a stepwise approach to treating sick livestock: 1) traditional medicines, 2) buy medicines and treat themselves and 3) call service providers who treat without asking about history or diagnosing. If/when this doesn't have an immediate effect, community members will call multiple service providers, potentially seeing three vets in a day. When it comes to self-directed treatment, men do the injecting, usually for cattle. Women give tablets, usually for small ruminants and poultry.

The causes of AMR may be due to practices of animal health workers, community members' behaviour towards the use of antimicrobials and supply chains of antimicrobials. Some of these causes may include inappropriate prescription practices, inadequate community members' awareness and knowledge regarding the use of antimicrobials, limited diagnostic facilities, unauthorized sale of antimicrobials and lack of appropriate functioning drug regulatory mechanisms.

Antibiotic resistance is one of the most urgent threats to public health. Antibiotic-resistant bacteria can cause illnesses that were once easily treatable with antibiotics to become untreatable. Antibiotic-resistant bacteria are often more expensive to treat.

Misuse of antibiotics causes the development and spread of antibiotic resistant bacteria. Every time an animal is treated with antibiotics, sensitive bacteria (bacteria that antibiotics can still attack) are killed, but resistant bacteria are left to grow and multiply without competition. This is how repeated use of antibiotics can increase the number of drug-resistant bacteria. If poorly managed, this effect is passed on to humans.

Topic 2. Learning about antimicrobials, how they work in animals and how resistance develops

In this session, resource persons introduce new knowledge to supplement and address knowledge gaps of community members identified in the previous session. The topic aims to give community members basic knowledge about antimicrobials, how they work, and the effects of misuse of antimicrobials. It also facilitates discussion about alternative measures to reduce the spread of AMR.

Learning objectives

By the end of the discussion topic, community members will be able to:

- identify the various causes of animal diseases with the aim to differentiate between bacterial, viral and parasitic diseases;
- explain how antimicrobials (antibiotics and antiparasitic drugs) work and their side effects;
- list proper animal husbandry practices that can prevent the spread of infectious diseases;
- seek appropriate advice and information from animal health workers on antimicrobial use and their side effects;
- properly follow advice and prescriptions of veterinarians; and
- use the correct dosage, duration of treatment and withdrawal period for antimicrobials used in food-animals.

Learning content

- causes of animal diseases (viruses, bacteria, fungi and parasites)
- purpose of antimicrobials and how they work
- sources and quality of veterinary drugs
- drug residues in animal-source foods
- causes and impacts of AMR
- responsible practices in antimicrobial use
- use of alternative measures to reduce the development of AMR

Duration: one hour

Materials and methods

- posters
- extension leaflets
- interactive discussion
- storytelling and experience sharing
- feedback and reflections

Learning activities

Introduce the discussion topic

In the previous discussion topic, we explored the KAP of community members about antimicrobial use and AMR.

In this discussion, we will address the KAP gaps of community members by introducing new knowledge.

Causes of animal diseases

Using poster or pictorial presentation, explain disease-causing agents making distinctions among viruses, bacteria, fungi and parasites.

Discuss that improper livestock husbandry (poor hygiene, poor infection prevention, poor feeding and poor housing) and introduction of new animals into a herd are common causes of animal diseases. Ask participants to give examples and share their experiences.

Make sure that community members know that there are various disease-causing agents and that animal diseases and their treatment actions differ by the type of causative agents. Note also that community members must not self-treat animals without proper diagnosis and advice by a trained veterinarian for the appropriate choice of treatment including dosages.

Purpose of antimicrobials and how they work

Mention that there are different types of antibiotics.

Discuss why it is possible to treat some diseases but not all with antibiotics. Reinforce that antibiotics do not cure every disease.

Communicate that self-treatment of sick animals without proper diagnosis and advice of animal health workers can have negative impacts on animal and public health.

Emphasize that community members must consult a trained veterinarian and properly follow prescriptions and advice.

Sources and quality of veterinary drugs

Mention that there are different sources of antibiotics, and the quality of drugs can vary depending on many factors.

Then, discuss factors that can affect the quality and efficacy of veterinary drugs. Ask community members to give examples and share their experiences.

Communicate that veterinary drugs must be stored properly. Drugs from informal/illegal sources may not be stored properly, and temperature and humidity can reduce active ingredients which can affect the efficacy of the drugs.

Discuss that when community members use drugs from informal sources (falsified or poor-quality drugs), it is not only that the drugs may not work but also disease-causing agents can adapt to the drugs and develop resistance, which can have negative consequences on animal and public health.

Causes for development of resistance

Emphasize that antibiotics must be used properly to reduce side effects.

Discuss AMR and its causes. Reinforce that misuse of antimicrobials such as inappropriate dosage, incorrect duration of treatment, inappropriate drug use, incorrect selection and poor quality of drugs are major causes of resistance.

Communicate that community members must follow prescriptions and advice of veterinarians and only use veterinary drugs from approved drug providers.

Drug residues in animal-source foods

Emphasize that antimicrobial use can leave drug residues in animal-source foods which can affect human health.

Discuss why community members must not consume animal products (meat, milk and eggs) or sell animals or animal products immediately after treatment with antibiotics. Reinforce that such habits may increase their risk of acquiring new strains of bacteria and antibiotic resistant food-borne infections.

Communicate that community members must observe waiting/withdrawal periods as advised by health practitioners or indicated on labels.

Impact of AMR

Emphasize that AMR can have negative impacts on animal and public health.

Discuss AMR consequences. Reinforce that spread of AMR can cause treatment failure (drugs do not work) in animals and humans. Animal treatment failure causes loss of animals due to diseases and this affects their livelihoods.

Communicate that community members must comply with drug withdrawal periods, use drugs only from approved providers (veterinary pharmacies) if necessary and use drugs properly based on diagnosis, prescription and advice of a trained veterinarian. Community members must not self-treat sick animals using drugs from informal/illegal sources.

Alternative actions to reduce the development of AMR

Stress that prevention of infections is better than cure. Ask community members to share proverbs that signify the value of prevention.

Discuss different alternative infection prevention measures, such as improving biosecurity, good housing and ventilation, good hygiene, appropriate nutrition, regular veterinary visits and developing herd-health plans.

Ask community members to give examples and share experiences of good livestock husbandry practices.

Discuss the benefits of alternative preventive measures. Emphasize that sanitation, vaccination and nutrition are primary alternative measures to reduce the use of antimicrobials and spread of AMR.

Recap and summarize key learning points and messages.

Facilitators' resources

Causes of animal diseases

Disease can be defined as any deviation from health. Healthy animals are alert, active and show interest in their environment. Disease can also be defined as a change in the normal condition of the animal caused by any invading living organism including parasites, bacteria, viruses, protozoa and fungi.

Viruses, parasites and bacteria are the most common disease-causing pathogens. Viruses and bacteria are microscopic in size (too small to be seen with the naked eye) and capable of multiplying rapidly under ideal environmental conditions.

These organisms have coexisted with humans, animals and plants for millennia, and many are essential to life, while others coexist without causing harm. Some may exist as part of the 'normal flora' of a human or animal in good health but can cause disease when introduced to normally sterile parts of the body, such as during surgery or penetrating injury, or when the host's immune system is compromised. In other cases, microorganisms may exist as 'normal microbiota' or cause mild disease in one species, but be life-threatening to another.

Broadly based on causes, diseases can be of two types:

Infectious diseases

- spread from one animal to another directly or indirectly
- produced by microorganisms that enter the body and cause changes in body fluids and cells
- examples are brucellosis, Rift Valley Fever

Noninfectious diseases

- result from injury, improper nutrition, genetic abnormality and exposure to toxic substances
- examples are mineral toxicity or deficiency, poisonous plants, bovine ketosis etc.

Based on mode of transmission infectious diseases could be:

Contagious diseases

- infectious disease transmitted by passage of infectious agent from animal to animal

Noncontagious diseases

- The agent cannot be transmitted from animal to animal. For example, tetanus is an infectious disease but is not contagious because it is not spread from animal to animal.

Vector-borne diseases

- spread by a vector
- Examples: trypanosomosis transmitted by the vector tsetse fly and tick-borne diseases

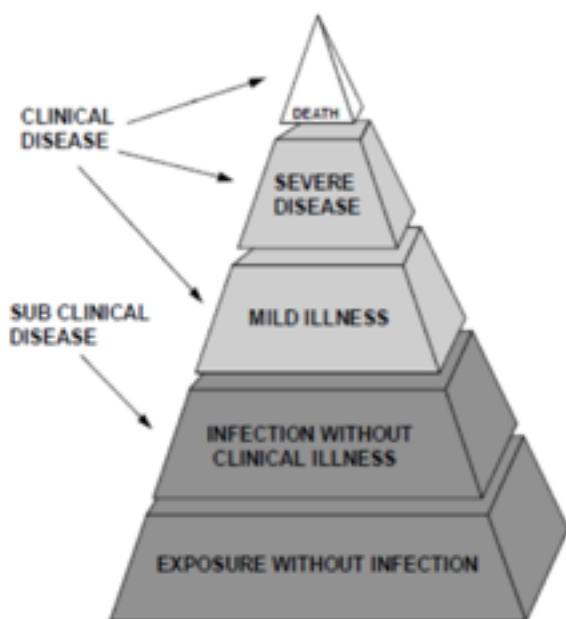
Subclinical diseases

- Some diseases do not produce overt clinical signs although they often affect production. These are called subclinical diseases.
- Helminthiasis and marginal mineral deficiencies, for example, decrease rates of live weight gain. These diseases are major causes of production loss; their identification often requires laboratory investigations.

By carefully watching the animals and learning how they behave, it is possible to observe deviations which may be caused by diseases.

The iceberg phenomenon describes a situation in which a large percentage of a problem is subclinical, unreported or otherwise hidden from view. Thus, only the 'tip of the iceberg' includes animals with different manifestations of clinical disease.

Figure 1. The iceberg concept of disease (Pfeiffer 2002).



Route of disease transmission

Indirect and direct transmission include:

- direct spread of diseases between animals;
- indirect spread of diseases through humans;
- indirect spread of diseases through equipment and vehicles;
- increased livestock density also leads to increased infection pressure;
- indirect spread of diseases through air; and
- indirect spread of diseases through feed.

Purpose of antimicrobials and how antimicrobials work

Knowledge and awareness about the purpose of antimicrobials and proper usage are essential. Antimicrobial is a general term for any compound with a direct action on microorganisms used for the treatment of infections. Antimicrobials are inclusive of antibacterial, antiviral, antifungals and antiprotozoal.

Antibiotics, one type of antimicrobial drug, fight infections caused by bacteria by killing the bacteria or making it difficult for the bacteria to grow and multiply. There are different types of antibiotics that treat specific bacterial infections.

An adequate diagnosis possibly including etiology, although not always easy to determine, is of paramount importance. Antimicrobial drugs are crucial to the health and management of livestock. However, in many cases, the use of antimicrobials might be useless because the causative agent is not sensitive to antimicrobials. For example, antibiotics are not effective against viral or parasitic infections.

Causes for development of resistance

Antibiotic resistance occurs when bacteria develop the ability to defeat the drugs designed to kill them. When bacteria become resistant, antibiotics cannot fight them, and the bacteria multiply without an 'enemy' or competition.

Resistance can be intrinsic or acquired. Some bacteria have never been susceptible to some antimicrobials; they lack the target for the antimicrobial molecule—this is called intrinsic resistance. We cannot use antimicrobials for bacteria that are intrinsically resistant.

The problem is acquired resistance whereby naturally susceptible bacteria become resistant through a mutation in the genome of the bacteria or acquisition of genes from other bacteria. It is driven by selective pressure from exposure to antibiotics, for example, when bacteria strains grow at higher concentrations of an antimicrobial than other strains of the same species. If widespread in a normally susceptible bacterial population, acquired resistance makes an antimicrobial useless for therapy.

The efficient use of antibiotics is key to controlling the development of resistance. Any time antibiotics are used, they can cause side effects and lead to antibiotic resistance.

The emergence of AMR strains is dependent on several factors relating to the antimicrobial (e.g. amount, dosage, frequency and duration of selection pressure) and the organism (e.g. presence of genes conferring resistance to that particular substance, and advantage provided by the expression of these to the survival of the bacteria).

- Inappropriate drug use: prescribing drugs when none are clinically needed
- Omission: when required drugs for certain conditions are not prescribed
- Incorrect selection: mismatch between organisms and drugs; use of human drugs for veterinary use
- Poor quality of available antibiotics
- The use of inappropriate dosages (too high or too low); incorrect duration (too short or too long)

Excessive use and misuse of antimicrobials are widely recognized as two of the major drivers for the emergence of AMR, both directly and indirectly, due to the selection pressure imposed on human and animal microbiota.

Antimicrobials at low dosages (i.e. residual levels, sublethal or subtherapeutic dosages) are also factors contributing to resistance as they promote genetic and phenotypic variability in exposed bacteria, even though they are less likely to kill susceptible bacteria—leading to selection bias—than antimicrobials administered at higher dosages.

Prudent use of antimicrobial drugs has been suggested as a means to reduce use and thereby resistance in both human and veterinary medicine. Antimicrobial agents should not be used in livestock in the absence of disease. Antimicrobials should be administered to animals only when prescribed by a veterinarian. In addition to prudent use, improved infection control and hygiene have been suggested to further reduce the need for antimicrobial drugs.

The use of oral-systemic antimicrobials in groups of animals is common practice in conventional farms, particularly in poultry and pigs. This places selection pressure on both commensal and pathogenic bacteria in the gut flora, which promotes the exchange of genetic material.

The emergence of antibiotic resistance

How does resistance develop and spread?

Two scenarios:

- I. Selection from use of antimicrobials (selection of fittest)

When a human or animal receives antibiotic treatment, in addition to the organism that is the target of the therapy, commensal bacteria in the animal/human gut and on the skin are exposed to the antimicrobial, with susceptible organisms often being replaced by resistant ones.

Co-selection may occur if a bacteria becomes resistant to more than one antimicrobial (for example, to two drugs). In this case, use of one of the drugs will also select for resistance to the other. Spread by various routes

Bacteria carrying the resistance genes disseminate to inanimate objects and other living beings and may have the capacity to transfer resistant genes to pathogenic and nonpathogenic bacteria.

Resistant bacteria may also appear in manure, which is disseminated in the environment and sometimes used as fertilizer on food crops.

Disposal of animal waste also serves as a route of environmental contamination by antimicrobials and resistant bacteria.

Source and quality of veterinary drugs

The source of veterinary drugs for livestock owners could be the government or official veterinarians, drug stores and private suppliers. Community members most commonly access drugs from private suppliers who are not supervised by the government. Active ingredients in some of these medicines may be degraded by the high ambient temperature and humidity. Community members may also access falsified drugs from private suppliers.

Drug residues in animal-source foods

Withdrawal times for antimicrobials are intended to prevent harmful drug residues in meat, milk and eggs. These waiting periods, which are indicated on labels, must be observed between treatment and consumption of animal products. Failure to adhere to withdrawal times may lead to the appearance of drug-resistant bacteria, direct toxicological effects or allergic reactions due to drug residues.

Prudent and efficient antimicrobial use

Drug use by health professionals can be improved through educational interventions and drug use guides such as essential drug lists and standard treatment guidelines.

A proper diagnosis is needed to be able to select appropriate drugs.

Use of alternative approaches to reduce the spread of AMR

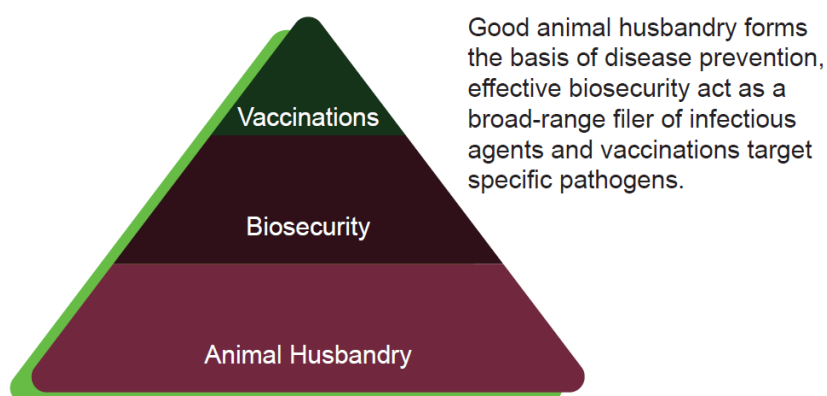
'Prevention is better than cure' and this is the best way to reduce the use of antimicrobials. While antimicrobials are used for the treatment of sick animals, regular disease preventative measures improve the welfare and production of animals, and increase food safety.

Prevention of infectious diseases can be achieved through a wide choice of tools such as improving biosecurity, good animal husbandry (good housing and ventilation, good hygiene and appropriate nutrition), and regular veterinary visits to monitor animal health and welfare and to develop herd-health plans.

The use of biosecurity practices can help greatly in boosting productivity and reducing the use of therapeutics with positive impacts on farm economy and food safety. It is without doubt that vaccination strategies against bacterial as well as viral infections tend to reduce antimicrobial use.

Animals receiving inadequate amounts of nutrients cannot produce efficiently. In addition, their resistance to diseases is lowered. Good animal husbandry helps eliminate physical defects and improves animal welfare, thereby preventing the spread of animal diseases and reducing the need for antimicrobials.

Figure 2. Effective disease prevention methods in livestock.



Impact of AMR

AMR may result in treatment failure in animals and humans and therefore loss of animals due to diseases, poor animal welfare, diminished livelihoods and public health risks (acquiring new strains of bacteria and antibiotic resistant food-borne infections).

Topic 3. Learning integration and action planning

In this discussion topic, encourage a conversation among community members and service providers to summarize key learning points, key messages and action points to reduce the emergence of AMR.

Learning objectives

By the end of the discussion topic, community members and animal health service providers will be able to:

- summarize key learning points and messages;
- identify actions to reduce emergence of AMR; and
- share knowledge and information with their household members and other community members about responsible use of antimicrobials.

Learning content

- summarizing key learning points and messages
- community action to reduce spread of AMR
- community influence through information sharing and adoption of good livestock husbandry practices

Duration: 40 minutes

Materials and methods

- reflection
- summary
- community action

Learning activities

Summary of key learning points/messages

Using a poster presentation, summarize key learning points and messages.

Highlight the following key messages:

- Prevention is better than treatment.
- Improve management and welfare of your animals.
- Nutrition, sanitation, biosecurity and vaccination are primary modes of prevention of infectious diseases.
- Use antimicrobials responsibly.

Distribute extension leaflets on antimicrobial use and AMR to communicate key messages and action points.

Action plans

Encourage a discussion among community groups and animal health service providers to identify actions that they will commit to in order to reduce antimicrobial use and resistance.

Document action points of community groups and service providers.

Ask community members to form action and learning groups to follow up on the community action points and establish linkages with animal health service providers.

Qualitative indicators of change

Facilitate a discussion on expected changes due to community conversations and identify indicators for these changes.

Invite community leaders and local partners to make closing reflections and commitments to follow up on the community conversations. Engaging community leaders and service providers to open and close community conversations can help ensure institutional ownership and commitment to support scaling of community conversations.

Facilitators' resources

Key messages

1. AMR threatens the efficiency of antimicrobials in the public health as well as the animal health sector, and thereby also jeopardizes the welfare of livestock, profitability of livestock production and safety of animal products.
2. The misuse of antibiotics in the livestock sector contributes to the overall emergence of AMR; there is scientific evidence to support the interweaving of resistant bacterial populations in animals and humans.
3. A critical component in mitigating the emergence of AMR in the livestock sector is to reduce the use of antibiotics by applying prudent and medically rational use.
4. It is possible to have healthy and productive livestock by combining prudent and medically rational use of antibiotics with disease preventive measures other than the use of antibiotics.
5. Disease preventive measures include:
 - a. good animal husbandry and welfare such as appropriate management, housing, feeding, and water supply;

- b. effective external as well as internal biosecurity at the farm; and
 - c. efficient and relevant vaccinations.
6. The prudent and medically effective use of antibiotics consists of several elements:
- a. avoid regular preventive use of antibiotics;
 - b. avoid using 'Highest Priority Critically Important Antimicrobials' for human use in animals and adhere to the World Organisation for Animal Health (OIE) list of 'Antimicrobials of Veterinary Importance';
 - c. only use antibiotics based on a diagnosis of the disease by a veterinarian or other animal health professionals and only for authorized indications;
 - d. strive for individual treatment of animals with the correct dose and duration and avoid using antibiotics for group treatments—except for poultry flocks— especially via feed. Use only quality-assured pharmaceuticals and do always consult an animal health professional before use; and
 - e. Properly dispose of unused and expired antibiotics.

Actions for community members to keep their animals healthy and antimicrobials working (FAO 2018):

- Keep animal housing and outside areas that animals use clean by clearing away manure and litter often. Waste from animals given antimicrobials needs to be handled more carefully.
- When an animal gets sick, separate it from the rest of your animals to help prevent the infection from spreading.
- Where possible, practice 'all-in and all-out' on your farm to reduce the risk of new animals infecting the animals you already have. Breed animals at the same time, wean animals at the same time and keep these groups of animals together at all stages of production.
- Keep animal feed dry and stored safely away from potential sources of germs such as rodents, birds, insects and other animals.
- Avoid stress for your animals. Keep them comfortable and dry and make sure they have enough space. Let young animals feed from their mothers if possible before weaning because this helps to prevent infections.
- Help your animals stay healthy and avoid getting sick by ensuring they have good nutrition. Keep animals healthy by making sure their water is clean.
- Vaccinate! Ask your veterinary expert to help you administer relevant vaccines at the right times because prevention is better than cure, and cheaper.
- Seek veterinary expert advice to get the correct diagnosis and treatment because buying and using the wrong drug puts the health of you, your animals and your family at risk. Using the wrong drugs is a waste of your time and money.
- Spread the word, not the germs! Tell other community members what you have learned because everyone needs to work together for cleaner farming to protect animal health, livelihoods and the health of all people who depend on antimicrobials to work when needed most.

Further reading

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Annexes

Annexe I. Facilitation techniques

- Build relationships of trust and respect, and understand community values
- Identify and explore community concerns through provocative questioning
- Encourage people to consider different perspectives
- Outline a story which community members can relate to
- Help community members make their own decisions and plans
- Help community members reflect on and review their agreements and action points
- Summarize key issues identified and agreements reached

Facilitation and group management tips:

- Conversations can take place in outside or in a room with enough air
- Avoid sitting on a chair or raised place if participants are sitting on the ground
- Utilize active methods and activities to engage illiterate participants
- Contextualize learning activities to make sense to participants—use local examples, cases and contexts when you present new information/knowledge
- Summarize discussion to feedback participants and note takers
- Keep conversations on track and manage time

In your facilitation, use:

- Open-ended questions to stimulate diverse responses
- Give participants time to think of and provide responses
- Eye contact and names to encourage people to contribute
- Listen carefully to understand, rephrase and lead a discussion
- Encouragement to promote more responses
- Rephrasing to clarify understanding and show appreciation
- Redirecting to get others involved
- Probing to obtain more information and views
- Observing to check on who is not participating
- Active listening to ‘hear’ with the eyes as well as the ears and check out body language cues
- Summarizing to help participants understand and reach an agreement

Annexe 2. Process documentation checklist

Community conversations require rich documentation. Document the whole process from planning to facilitation and closing of the event.

Use the following checklist to aid your process documentation. It is only a checklist; adapt it as necessary.

- Group dynamics (representation and presence of participants)
- Team meeting/reflection notes
- Meeting notes with partners
- Any observations of participants reactions/body language
- Observations/comments on methods used
- Observations on place, time and logistics
- Feedback from participants and local partners
- Participants' reactions to an issue (divergence, convergence, turning points)
- What participants and partners say and how they say it
- Areas of tensions and strong emotions
- Emerging themes (main ideas, agreements and key learning/messages)
- Key discussion issues, insights, agreements, action points and quotes
- Community agreements and action points
- Perceived benefits of participation and participants' intention for change

Annexe 3. Case documentation template

Use the following template to document changes due to community conversations. It is only a checklist; adapt it as necessary.

Domain	Topics and probes
Background information	<p>Name, age, gender, education level, family size, location</p> <p>Agro-ecology: altitude, climate, soil, rainfall, vegetation ...</p> <p>Land size, major crops and livestock types</p> <p>Organizational membership: cooperative, community breeding group, marketing group ...</p> <p>Leadership in the community</p> <p>Distance from district town</p> <p>Access to infrastructure and services</p>
Problem situation	<p>What was the situation before community conversations regarding use of antimicrobials?</p> <p>Probes:</p> <ul style="list-style-type: none"> • KAP gaps in the use of antimicrobials • acquisition and administration of antimicrobials • withdrawal periods
Response/learning recall	<p>What was discussed in the community conversations?</p> <p>What have you learned from the community conversations?</p>
Community influence through knowledge sharing	<p>Participant:</p> <p>Tell us about your information sharing experience.</p> <ul style="list-style-type: none"> • household members • neighbors • friends • any other person <p>Where and how did the knowledge sharing happen? How did people react to the information shared?</p> <p>Probes:</p> <ul style="list-style-type: none"> • If you have not shared information with any person, what was the problem? • What will you do next? • What support do you need? From whom? • Household members: <ul style="list-style-type: none"> • Tell me what was shared and discussed in your household. • What has your partner, father or mother shared with you and discussed in the household? • How did you find the information? • Did you agree with what was shared/discussed? • Who else shared information from community conversations with you? • How did that happen? What do you think about household information sharing? • Did you feel empowered? Was it useful? How is it useful?

Domain	Topics and probes
Knowledge application	<p>In your household, what has changed due to community conversations regarding antimicrobial use and alternative measures to reduce antimicrobial use and AMR?</p> <p>If no knowledge application, find out why. Identify constraints to knowledge application/behaviour change.</p> <p>What benefits do you receive from your participation in community conversations?</p> <p>Enabling and/or constraining factors for knowledge application</p> <p>Probe for stories/examples/lessons learned</p>
Evidence	<p>Prescriptions</p> <p>Records/history of treated animals</p> <p>Consultations with animal health practitioners</p> <p>Adoption of improved livestock husbandry practices and infection control measures</p> <p>Opinions/views of households and local partners/health practitioners</p> <p>Use of community conversations module and extension leaflet by local partners/service providers</p>
Sustainability	<p>Access to advisory and coaching support from animal health practitioners</p> <p>Demonstration effects on other community members</p> <p>Learning/educational opportunities facilitated by service providers</p>