Designing AMR Governance

Senegal

Systems workshop summary report, October 2023

Executive summary

What was the purpose of the systems workshop?
In October 2023, Senegalese stakeholders participated in a systems analysis workshop focused on the emergence and spread of antibiotic resistance (ABR) in Senegal. This workshop was undertaken as part of Designing AMR Solutions, a six-country project funded by the Joint Programming Initiative on AMR, focused on improving policy and governance for antibiotic stewardship at national and global levels. The workshop objectives were to:

- Understand the factors influencing the emergence and spread of ABR in Senegal;
- Share perspectives across sectors; and
- Identify priority actions to combat antibiotic resistance in Senegal.

Who contributed?
30 contributors working in different sectors and disciplines attended a three day in-person workshop to participate in structured discussions and exercises to articulate the problem; map the system of relevant factors and relationships; and identify priority actions over different time scales. The workshop took a One Health approach, bringing together actors with expertise in human, animal and environmental health and reflecting on interconnections between sectors.

What were the key systems insights and priority actions?
Contributors agreed that the problem of ABR was likely to continue to increase in the future if current conditions remained in place. Contributors identified a range of factors and relationships across the human, animal and environmental sectors that contributed to this problem. The discussion of ongoing spread of resistant pathogens within and between different environments and populations, as well as similar issues in policy and practice across sectors, highlighted the importance of cross-sectoral collaboration. The importance of policy and governance considerations was also highlighted, with a need to invest in training, infrastructure and policy enforcement.

To conclude the workshop, contributors identified a number of priority actions and discussed challenges to implementation including resource constraints, the lack of trained veterinary professionals, and the geographic context with sometimes unregulated movement of people and goods across national borders.

What are the next steps?
In Senegal, a follow-up workshop is planned with contributors working at the local level to enable comparison and communication of perspectives across governance levels. The national-level workshop described in this report is one of five happening globally in different countries. Once we have completed these workshops and received feedback from contributors, we will bring together insights from the workshop to support our project goals of strengthening context-appropriate policy and governance for antibiotic stewardship. We will share cross-country insights with all contributors once the workshops are complete.

Acknowledgements

We would like to take this opportunity to thank the workshop contributors for generously giving their time to this project and sharing their essential expertise and insights.

We would like to thank Mamadou Ciss and Mouhamadou Moustapha Sow from the Institut Sénégalais de Recherches Agricoles (ISRA) and their collaborators including Ahmad Iyane Sow, Amadou Guèye, Rosalie Seck and Kadiatou Barry for organizing and facilitating the workshop. We also thank our colleagues in the Global Food System & Policy research group for their input in piloting workshop materials and activities.

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If you have any responses, thoughts or additional insights, please get in touch.

Goals, format and contributors

This report summarises the systems workshop undertaken in Senegal as part of the Designing AMR Solutions project. This is a six-country project aiming to strengthen national and global governance for improved antimicrobial stewardship.

The workshop was focused on the role of the Senegalese system in driving the emergence and spread of ABR. The workshop objectives were:

- Understand the factors influencing the emergence and spread of ABR in Senegal;
- Share perspectives across sectors; and
- Identify priority actions to combat antibiotic resistance in Senegal.

The workshop was informed by a One Health perspective, which "recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) as closely linked and interdependent".

The workshop took place in Dakar, Senegal in October 2023 over two days. Attendees participated in structured discussions and exercises to develop a systems map of the problem and identify and discuss priority actions.

30 stakeholders participated in the workshop, including representatives from professional bodies, research institutions and government. Contributors were recruited based on their professional roles and expertise and work on topics related to ABR and its drivers in the human health, animal health, environment and food and agriculture sectors.

Workshop discussion and outputs

Articulating the problem

Given the number of participants, contributors worked in small groups throughout the workshop, sharing their insights in plenary at various points. The beginning of the workshop focused on exploring and describing the emergence and spread of ABR in Senegal. The exercise entailed asking the contributors to think about how they perceived the trends in ABR in Senegal from past to present. Contributors also subsequently provided insight into how they believed the trends in ABR would change in the future if no change was imposed (status quo), the best-case scenario with substantial positive change, and then worst-case scenario with negative change, based on their expertise and knowledge. Each contributor was asked to share their perspective with their colleagues and reach a consensus to visually represent how the problem was behaving over time.

Contributors suggested that over time, ABR had increased steadily due to factors like injudicious use of antibiotics in human and animal healthcare. Contributors anticipated that under the status quo ABR would continue increasing, as these driving factors were still in place. In a worst-case scenario, contributors expected exponential increase in ABR, potentially driven by further outbreaks of disease, conflict, or other calamities. The best-case scenario for contributors involved strengthened policies; implementation of best practices in areas such as infection prevention and control and antibiotic prescribing; and increased awareness of ABR among various professions as well as the general public. Contributors thought that this could lead to a plateau in ABR emergence and spread, with moderate decline thereafter.

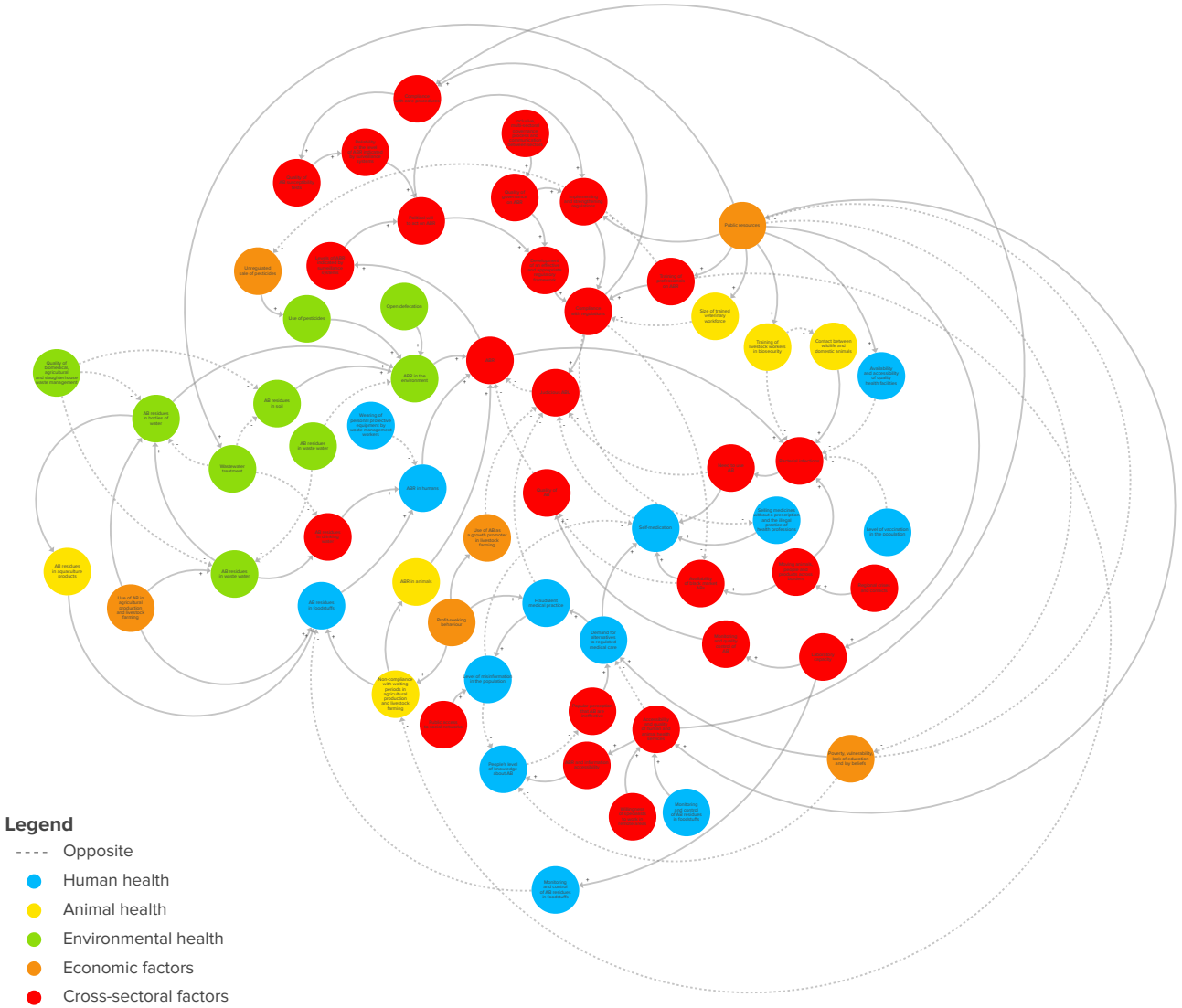
Contributors were engaged with the process and took time to discuss their own backgrounds and perspectives as well as various contextual factors when conceptualizing their timeline. There was strong agreement on the overall progression of ABR emergence. Variation arose when considering the feasibility of reducing levels of ABR in Senegal, with some groups believing that action on ABR could drive improvements in the next 10 years, while others thought improvements would take longer.

Mapping the system

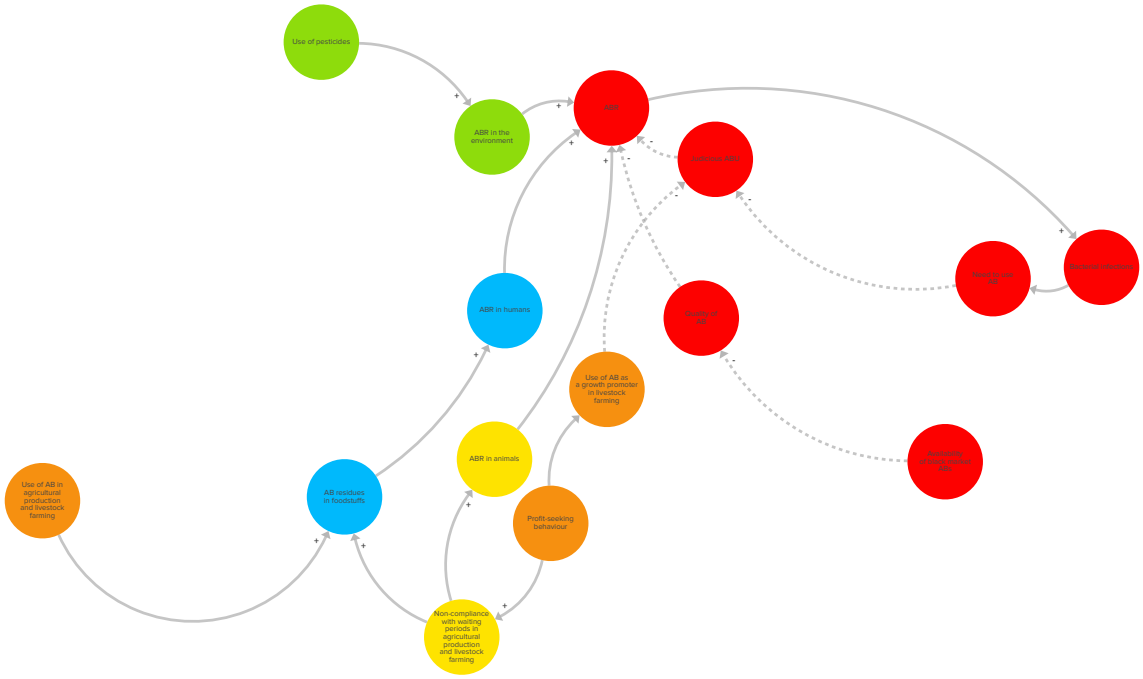
After articulating the problem by describing how and why ABR in Senegal varies over time, contributors worked on the development of a systems map to represent the factors and causal connections driving this issue. Contributors did this in three phases. First, contributors identified key factors that they thought impacted this issue through individual reflection, and shared them with their small group. Second, contributors developed a 'connection circle', mapping causal connections between the factors that they had identified. Finally, contributors developed a systems map, integrating the factors and connections they have identified.

Using workshop outputs, including pen and paper visuals produced by contributors and notes taken by the facilitation team on the discussion, an integrated systems map was developed to summarise the perspectives of the group. This map contained several key sections, which are summarised below.

Visuals included below can be viewed in more detail on the online mapping platform Kumu: https://kumu.io/GFSPR/design-amr-senegal-comparative.

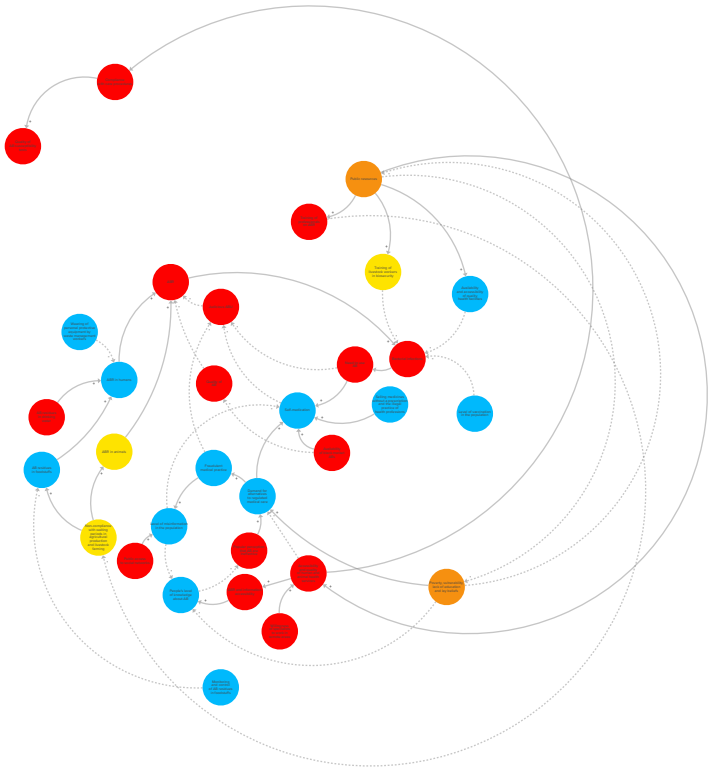

Legend
Opposite
Human health
Animal health
Environmental health
Economic factors
Cross-sectoral factors

ANTIBIOTIC USE IN FOOD-PRODUCING ANIMALS



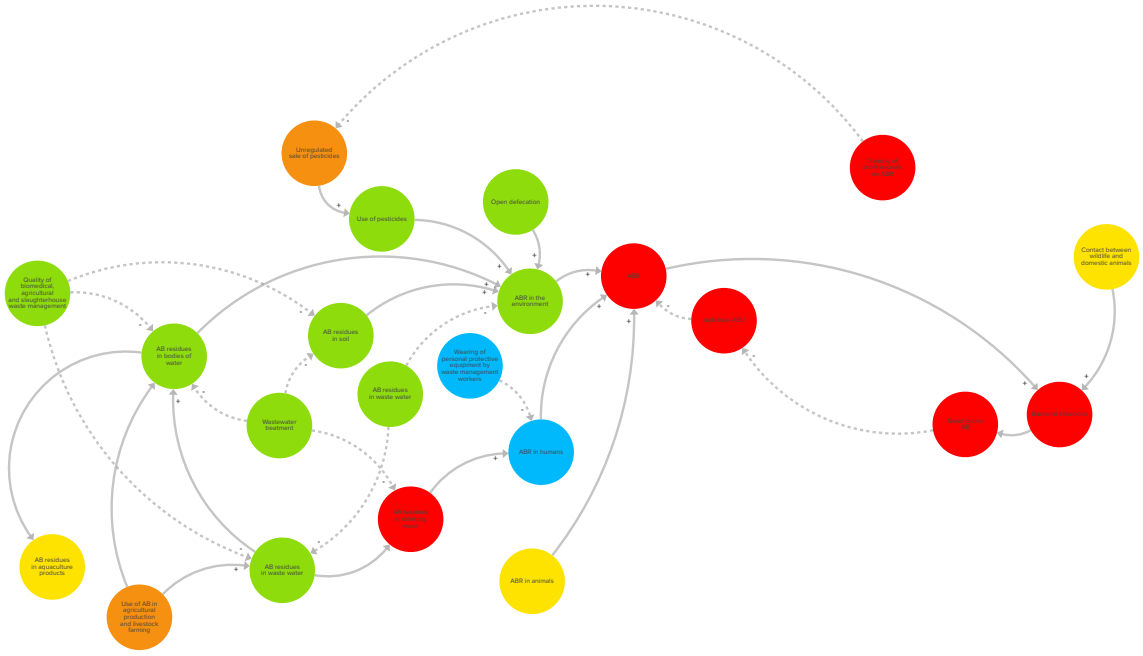
- When rearing livestock (including in aquaculture contexts), antibiotics are frequently used to reduce disease burden from infections
- More use and improper use run the risk of bacteria becoming resistant to them.
- Resistant bacteria can spread to foodstuffs, the environment, and humans
- The need for profits drives the use of antibiotics for growth promotion and reduces judicious use
- The availability of antibiotics on the black market reduces the quality of antibiotics available, which in turn drives improper prescribing and ABR

TRANSMISSION TO HUMANS AND INCREASED DISEASE BURDEN



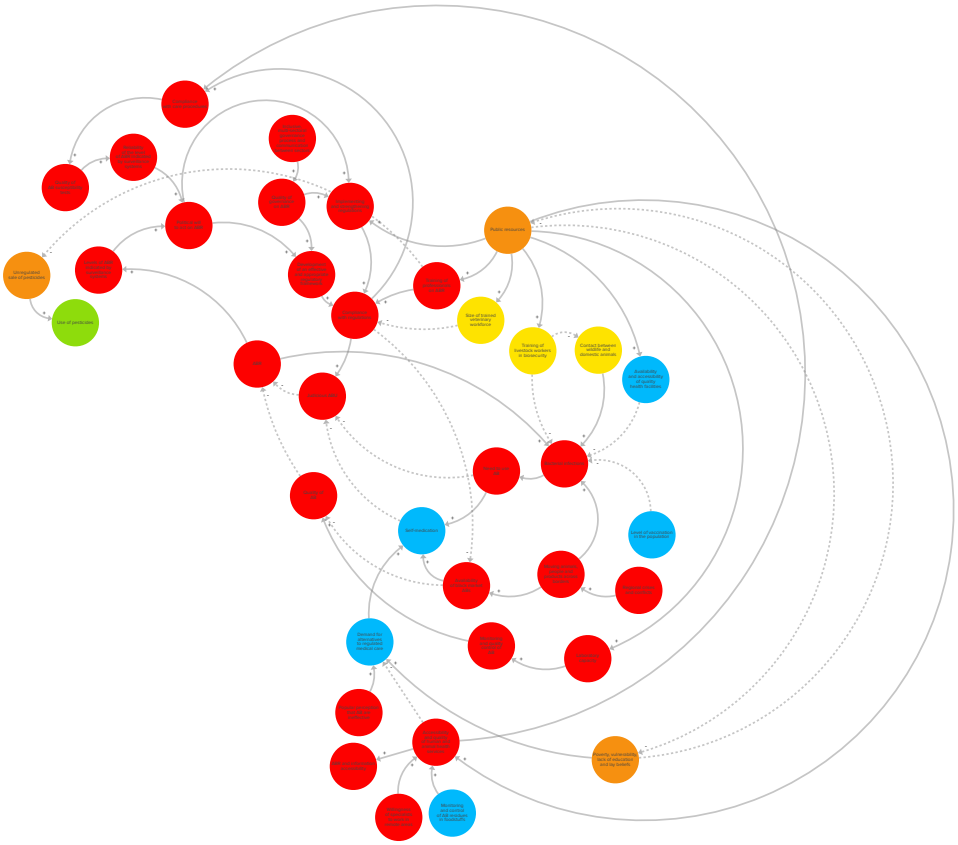
- Antibiotics reduce the disease burden in humans by reducing illness due to bacteria
- Lack of access to healthcare, which is inequitable across the population given specialists' reluctance to work in remote areas, creates barriers to appropriate ABU and exacerbates ABR burden
- Education levels around antibiotics can shape the popular perception of AB effectiveness, which drives the market for alternative treatments and fraudulent medical practices. This can in turn lead to increased misinformation
- Misinformation, the increased use of social media, and structural determinants resulting in limited education also weaken trust in scientific evidence and increase self-medication
- Finally, ABU in other sectors can also impact human health when AB residues are present in foodstuffs, which can be caused by non-compliance with waiting periods following ABU in animals, or in drinking water
- Public resources funnelled into training professionals on ABR, training livestock workers on biosecurity, and increasing access to health facilities can reduce the occurrence of infection and strengthen judicious ABU.

ACCELERATED EMERGENCE AND SPREAD IN THE ENVIRONMENT



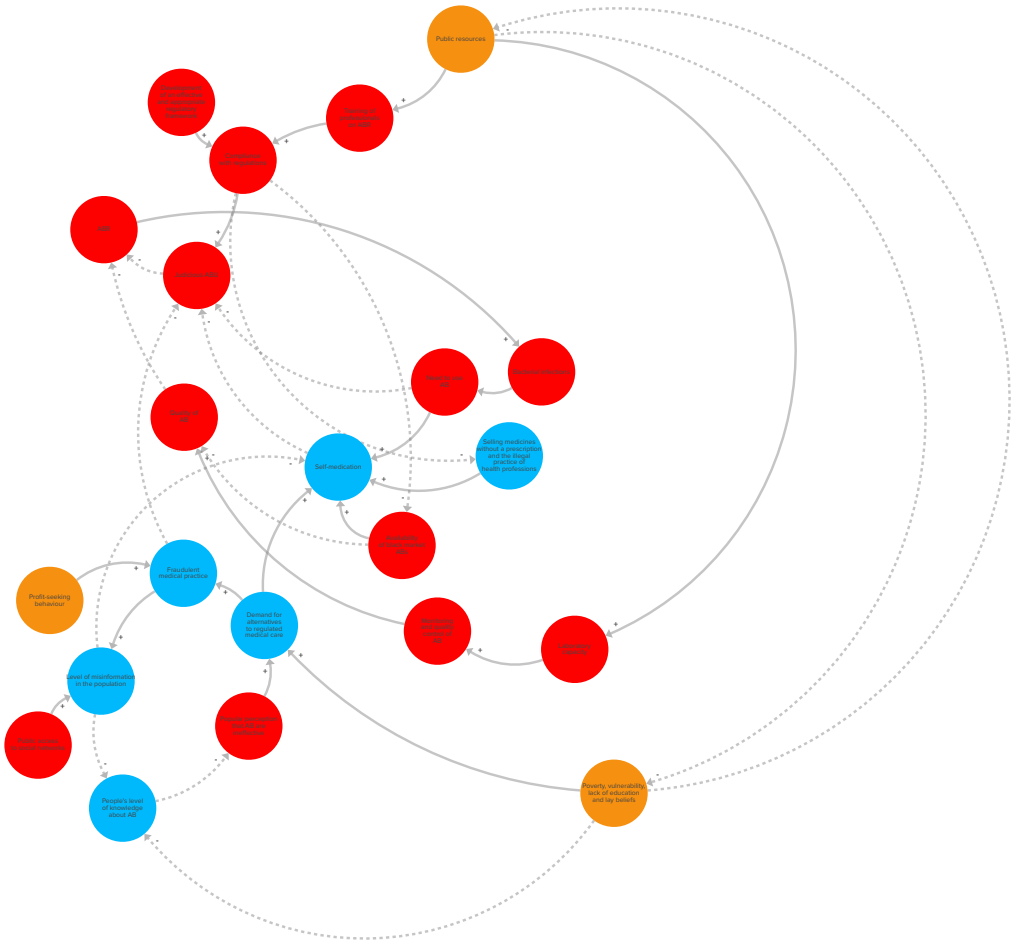
- ABR in agriculture can spread into the environment through contact with wildlife or spread into water and soil
- The use of pesticides and practices such as open defecation can also result in ABR in the environment
- ABR in the environment can impact agricultural settings, for example spreading through water used for irrigation or increasing the risk of bacterial infection and ABU
- Training professionals can reduce ABR in the environment by reducing the unregulated sale of pesticides, as can improving standards in waste management. Encouraging waste management workers to wear personal protective equipment can reduce the spread of ABR from the environment into human populations.

REGULATION, SURVEILLANCE AND PUBLIC AND POLITICAL WILL



- Controlling the increase in ABU depends on adequate and well-enforced regulation around ABU and disease prevention
- Public and political will directly impacts the financial resources allocated towards actions on ABR
- Education and awareness-raising across different sectors can also support ABR mitigation
- These factors, combined with appropriate training across sectors, will improve the judiciousness of ABU among prescribers and producers
- ABR in Senegal is also driven by factors outside its national borders, including importing of food products, livestock, and illicit ABs from other jurisdictions; cross-border migration resulting from regional crises; and spread of disease outbreaks
- The ability to monitor, survey, and test ABR within the system can contribute to improving political will to act on ABR and strengthen regulations/regulatory frameworks as well as compliance

UNREGULATED PHARMACEUTICALS AND MEDICAL PRACTICES



- Poverty, vulnerability, education levels and lay beliefs around health drive demand for alternatives to regulated medical care
- This, combined with profit-seeking behaviour on the part of practitioners, leads to fraudulent medical practices
- Non-compliance with regulations drives the availability of black-market AB, the sale of AB without prescriptions, and the illegal practice of medical professions
- The development of an effective and appropriate regulatory framework, the training of professionals, population-level education and the strengthening of laboratory capacity to measure AB quality could reduce the prevalence unregulated pharmaceuticals and medical practices. All of these initiatives would require public investment.

Priority actions to control the emergence and spread of ABR

Contributors identified priority actions to control the emergence and spread of ABR in Senegal (Table 1). Contributors individually reflected to identify priority actions over the low-impact & easy to achieve, low-impact & difficult to achieve, high-impact & easy to achieve, and high-impact & difficult to achieve.

Contributors then shared their priority actions with the group, discussing the ways in which this action had the potential to transform the system.

In Senegal, key challenges for combatting ABR included:

- Resource availability, with many areas of capacity-building and infrastructure requiring investment;
- Lack of trained workforce, particularly for veterinarians, where supply falls far short of demand, leading to widespread prescription and administration by para-veterinarians and auxiliary staff; and
- Regional context, in which goods and people move across several land borders, driving the spread of infectious agents and unregulated AB.

Table 1 Priority actions to control the emergence and spread of ABR in Senegal

Low Impact / Easy to Achieve	Low Impact / Difficult to Achieve	High Impact / Easy to Achieve	High Impact / Difficult to Achieve
• Promoting sanitation in local areas • Raising awareness among stakeholders • Monitoring and quality control of medicines • Communicating the risk of ABR to the population*	• Improving waste management* • Developing programmes to reduce poverty • Conducting vaccination campaigns	• Outreach on ABR and One Health for professionals across sectors* • Promoting the training of grassroots actors • Establishing a national network of professionals focused on ABR • Raising awareness on existing laws and regulations • Establishing a system to monitor the presence of antibiotic residues in food* • Mobilizing producer organisations in the fight against ABR • Strengthening health services with equipment and materials, including in laboratories* • Providing the population with quality health facilities • Providing farmers with quality veterinary services • Strengthening working groups on hospital-based infections (CLINs)	• Making access to care equitable for both humans and animals • Strengthening data infrastructure • Implementing an integrated waste management system (biomedical, animal, environmental, etc.) • Mapping, harmonizing and revitalizing ABR regulations** • Strengthening drug sales control strategies including enforcing sanctions against the illicit sale of medicines* • Strengthening the capacities of stakeholders around ABR and the One Health approach • Enforcing wait time regulations* • Strengthening human resources in remote areas • Improving water quality

*Action was proposed as both low- and high-impact solution **Action was proposed as both easy and challenging to achieve

Conclusions and next steps

Contributors identified a range of factors and relationships across the human, animal and environmental sectors that impacted the emergence and spread of ABR in Senegal and were likely to contribute to the predicted continued growth of ABR. The discussion of ongoing spread of resistant bacteria within and between different environments and populations highlighted the importance of cross-sectoral collaboration and a One Health approach.

The role of ABU in human and animal populations was broadly discussed as a driver of ABR, with a need for enhanced training, infrastructure and enforcement of regulations across sectors to promote judicious ABU. Lack of access to care also creates barriers to judicious ABU and treatment, potentially driving a need for additional antibiotics. The existence of the black market and the use of fraudulent antibiotics in Senegal contribute to the misuse, non-compliance, and misinformation around antibiotics in the population.

Contributors identified a number of priority actions to control ABR in Senegal, discussing actions with either high or low impact, and which were seen as either more or less challenging to implement. Challenges to implementation included resource constraints; lack of a trained workforce, particularly in terms of veterinarians; and the regional context, given sometimes unregulated movement of people and goods across land borders with neighbouring countries.

Within Senegal, a follow-up systems workshop is planned involving stakeholders working at the local level. These perspectives will complement those of actors from national and inter-governmental agencies collected during the workshop described in this report. A comparison of workshop results will facilitate shared understand across different governance levels.

Designing AMR Solutions features five case study countries, including Senegal. Parallel systems workshops are ongoing across the other country contexts in order to understand context-specific drivers and dynamics. Project outputs and activities will continue to be shared on our website:

https://design.dighr.org/