National Action Plan (NAP) **on Antimicrobial Resistance**

2025–2029

Government of Iceland
Ministry of Health

National Action Plan (NAP)
on Antimicrobial Resistance

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Foreword

One of the most important tasks of our time is to preserve the effectiveness of antibiotics for future generations. To achieve this, extensive measures must be taken, and ambitious goals set in the fight against the spread of antibiotic resistance.

Antibiotic resistance is a growing global problem and one of the greatest health threats the world faces today. There is a real danger that in the near future, simple and serious infections may not be treatable with antibiotics. Such a situation would have extremely serious health and economic consequences for us here in Iceland, as well as for the entire world.

While it is not possible to eradicate antibiotic resistant bacteria, it is possible to keep their spread in check through extensive measures. These measures, which affect humans, animals, food, and the environment, are referred to as the "One Health" approach. Antibiotic resistant bacteria do not respect country borders and therefore the fight against antibiotic resistance requires international cooperation.

In January 2024, the working group of the Minister of Health presented recommendations for actions against antibiotic resistance in Iceland for the period 2025-2029. These recommendations were approved by the government as the official actions against antibiotic resistance. The actions involve numerous activities that need to be undertaken in the coming years and fall under the responsibilities of the Ministry of Health, the Ministry of Food, Fisheries and Agriculture, and the Ministry of the Environment, Energy, and Climate.

Only through extensive and coordinated actions can we limit the spread of antibiotic resistant bacteria and thus maintain the effectiveness of antibiotics for future generations.

Willum Þór Þórsson
Minister of Health

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Minister of Food, Fisheries and Agriculture

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Minister of Environment, Energy and Climate

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Antibiotic resistance is one of the greatest health threats facing the world today, and the threat is increasing each year. Although antibiotic resistance is not as significant a problem in Iceland as it is in many other countries, antibiotic-resistant bacteria respect no borders, and the problem has increased here as elsewhere in recent years. It is foreseeable that increased antibiotic resistance will cause difficulties in treating various diseases and infections, increase mortality rates, and raise healthcare costs.

International organizations have recently highlighted this danger and urged nations worldwide to join forces to prevent the spread of antibiotic-resistant bacteria before it is too late. Each nation is encouraged to develop action plans and set goals and benchmarks. Since the causes of antibiotic resistance are diverse and interconnected, a One Health approach is encouraged, meaning that actions need to target humans, animals, food, and the environment.

The Icelandic government's action plan against antibiotic resistance spans a five-year period, from 2025 to 2029. It includes six actions encompassing 24 goals and 75 activities that need to be implemented. The activities are prioritised, and the cost of their implementation is assessed.

The six actions upon which the action plan is based are:

1. **Promote targeted and prudent use of antibiotics in humans and animals.**
2. **Limit the spread of antibiotic resistance through information dissemination, education, and prevention.**
3. **Improve knowledge of antibiotic resistance through surveillance and scientific research.**
4. **Limit the spread of antibiotic resistance through interventions.**
5. **Increase participation in international cooperation on actions against antibiotic resistance.**
6. **Ensure coordination and management of actions against antibiotic resistance in the future to come.**

Work is already ongoing in various activities specified in the plan. The total basic cost of all activities over the five-year period of the plan is estimated to be about 500 million ISK at current prices. To implement all activities within the plan's period, an additional estimated 1.2 billion ISK will be needed.

The aim is to implement as many of the plan's activities as possible within the specified time frame and to ensure funding. Additionally, their costs will be reassessed at least annually during the plan's period by a special working group appointed by the Minister of Health.

Only through targeted and extensive actions, along with follow-up, will it be possible to limit the spread of antibiotic resistant bacteria.

Abbreviations and Definitions

AMEG Classification	Antimicrobial advise ad hoc Expert Group. Classification by the European Medicines Agency of antibiotics based on potential public health consequences of increased resistance when these drugs are used in animals and the need for these drugs in veterinary medicine.
AMR	Antimicrobial resistance.
ATC	Anatomical Therapeutic Chemical. Classification of drugs by organ systems.
AWaRe Classification WHO	WHO classification according to the prioritisation of antibiotics ("Access, Watch, Reserve").
BÍ	The Farmers' Association of Iceland.
COVID-19	Coronavirus disease 2019.
DID	Defined daily dosage/1000/day. Standardised daily doses per 1,000 inhabitants per day.
DÍ	The Icelandic Veterinary Association.
E. coli	*Escherichia coli.*
EC	European Commission.
ECDC	European Centre for Disease Prevention and Control.
EFSA	European Food Safety Authority.
EMA	European Medicines Agency.
EL	The Directorate of Health in Iceland.
ESBL	Extended-spectrum beta-lactamases.
EU	European Union.
FRN	Ministry of Social Affairs and Labour.
FAO	Food and Agriculture Organization of the United Nations.
GDP	Gross Domestic Product.
H. influenzae	Haemophilus influenzae.
HA	University of Akureyri.

Heilsuvera	An official website on various common and individual health information.
HH	Primary Health Care of the Capital Area.
HRN	Ministry of Health.
HVIN	Ministry of Higher Education, Science and Innovation.
ISK	Icelandic krona.
Keldur	Institute for Experimental Pathology, University of Iceland.
LSH	Landspítali, the National University Hospital of Iceland.
MAR	Ministry of Food, Agriculture and Fisheries.
MAST	Icelandic Food and Veterinary Authority.
MATÍS	Company specialising in food research and biotechnology.
MRN	Ministry of Education and Children.
OECD	Organisation for Economic Cooperation and Development.
One Health	Approach integrating human, animal, food and environmental health.
PCU	Population Correction Unit. Estimated weight of livestock in the country each year.
SAF	Association of Travel Service.
SAk	Akureyri Hospital.
SFV	Association of Welfare Service Companies.
SVEID	Department of Bacteriology and Virology at Landspítali.
SVL	Chief Epidemiologist.
Sýklalyfjaávísun	Prescription of antibiotics and medical orders for outpatients and inpatients at hospitals or nursing homes.
UN	United Nations.
URN	Ministry of the Environment, Energy and Climate.
UST	Environment Agency of Iceland.
WGS	Whole genome sequencing.
WHO	World Health Organization.
WOAH	World Organisation for Animal Health (former OIE).
ÞÍH	Development Centre of the Icelandic Primary Health Care.

Introduction

The discovery of antibiotics almost a century ago proved to be one of the most remarkable discoveries in the history of medicine. The advent of antibiotics brought about radical changes in the treatment of severe bacterial infections in both humans and animals, and it is safe to say that they have prevented millions of deaths and severe consequences of infections. Additionally, antibiotics enable patients with serious diseases, such as cancer and various autoimmune diseases, to receive immunosuppressive treatment, which increases the likelihood of infections.

Antibiotic resistance refers to the ability of pathogens to thrive and multiply in the presence of antibiotics that would typically kill or inhibit their growth. In recent years, bacterial resistance to antibiotics has been increasing globally, threatening the health security of both humans and animals. In 2019, the World Health Organization (WHO) declared that **antibiotic resistance was one of the top ten health threats facing the world**[1] and in July 2022, the European Commission (EC) similarly declared that antibiotic resistance was one of the top three health threats to European Union (EU) member states[2].

With the increasing resistance to antibiotics, the treatment of patients with the aforementioned diseases will be significantly limited, and the cost of their treatment will rise due to the increased number of hospitalisations required and longer hospital stays. Food security will also decrease as antibiotic resistance affects animal health and consequently food production[3].

The growing spread of antibiotic resistance thus not only causes increasing difficulties in treating infected individuals but also poses a serious threat to humans and animals and will result in significant financial expenditures[4]. A recent article in *The Lancet*[5] estimated that nearly 5 million people died due to infections caused by antibiotic resistant bacteria in 2019, most in sub-Saharan Africa. Of these, about 1.3 million died due to the direct effects of resistant bacteria. It has been predicted that **if the current trend of antibiotic resistance continues, at least ten million people will die globally in 2050 due to antibiotic resistant bacteria, and global gross domestic product (GDP) will decrease by 2-3.5%**[6]. The COVID-19 pandemic and conflicts between countries are likely to accelerate this trend. The reduction in Gross

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[1] WHO. Ten threats to global health in 2019. https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019.

[2] European Commission. HERA factsheet-HEALTH UNION: Identifying top 3 priority health threats. https://health.ec.europa.eu/publications/hera-factsheet-health-union-identifying-top-3-priority-health-threats_en.

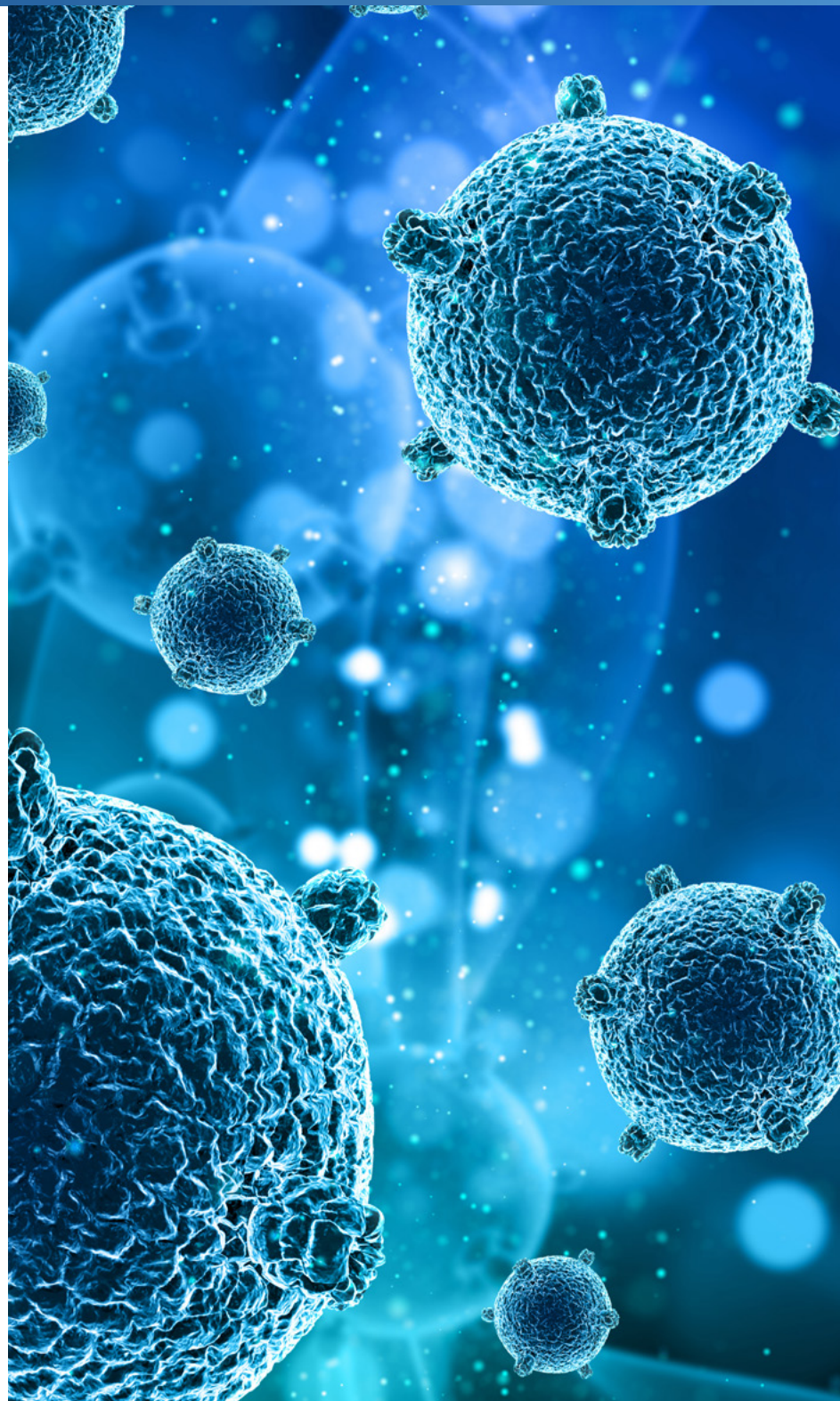
[3] https://www.fao.org/antimicrobial-resistance/background/what-is-it/en/

[4] The Lancet, nóvember 2022. Global mortality associated with 33 bacterial pathogens in 2019: a systematic analysis for the Global Burden of Disease Study 2019. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(22)02185-7/fulltext.

[5] The Lancet, janúar 2022. https://www.thelancet.com/action/showPdf?pii=S0140-6736%2821%2902724-0.

[6] Review on Antimicrobial Resistance, *Tackling drug-resistant infections globally*. https://amr-review.org/sites/default/files/AMR%20Review%20Paper%20-%20Tackling%20a%20crisis%20for%20the%20health%20and%20wealth%20of%20nations_1.pdf.

Domestic Product (GDP) will primarily result from increased healthcare costs due to limited treatment options for patients with infections caused by antibiotic-resistant bacteria[7, 8]. Many international organisations, such as the United Nations (UN)[9], WHO[10], the World Organisation for Animal Health (WOAH)[11], the European Centre for Disease Prevention and Control (ECDC)[12], the Organisation for Economic Co-operation and Development (OECD)[13] and the European Food Safety Authority (EFSA)[14] have also expressed great concern about the increasing spread of antibiotic resistance and urged action.



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[7] ECDC. *The bacterial challenge: time to react.* https://www.ecdc.europa.eu/sites/default/files/media/en/publications/Publications/0909_TER_The_Bacterial_Challenge_Time_to_React.pdf.

[8] OECD. Stemming the Superbug Tide. https://www.oecd.org/health/stemming-the-superbug-tide-9789264307599-en.htm.

[9] The United Nations General Assembly, 71st session. http://www.un.org/pga/71/event-latest/high-level-meeting-on-antimicrobial-resistance/.

[10] WHO. Sixty-eighth World Health Assembly 2015.

[11] World Organization for Animal Health 2023. https://doc.woah.org/dyn/portal/digidoc.xhtml?statelessToken=mASJwRxf8hf20kfBAKEZpedOWnC5F0qhnrW9d1VgCpo=&actionMethod=dyn%2Fportal%2Fdigidoc.xhtml%3AdownloadAttachment.openStateless.

[12] ECDC. Antimicrobial resistance. https://www.ecdc.europa.eu/en/antimicrobial-resistance.

[13] OECD. Antimicrobial Resistance. https://www.oecd.org/health/antimicrobial-resistance.htm?utm_campaign=ELS%20Newsletter%20November%202023&utm_content=AMR-project-page&utm_term=els&utm_medium=email&utm_source=Adestra.

[14] EFSA. Antimicrobial resistance. https://www.efsa.europa.eu/en/topics/topic/antimicrobial-resistance.

In June 2023, the EC published a detailed report containing recommendations for actions against antibiotic resistance in the spirit of "One Health," which refers to actions concerning humans, animals, food, and the environment[15]. The report stated that all countries should aim to **reduce the total use of antibiotics in humans by at least 20% by 2030 and by 50% in animals. These recommendations emphasise the need for member states to take action before the problem becomes insurmountable**.

It is crucial to preserve the effectiveness of the antibiotics currently on the market because, at this time, few new antibiotics are in the research and/or approval process. WHO has concluded that since new antibiotics are not on the horizon, comprehensive measures must be taken to address the increase in antibiotic resistance[16].

To achieve success in the global fight against antibiotic resistance, it is essential that all nations cooperate because the spread does not respect borders. Antibiotic resistance spreads between countries with humans, animals, feed, and food, and therefore all nations must contribute with coordinated actions.

An interdisciplinary working group of the Ministry of Health (HRN), the Ministry of Food, Agriculture and Fisheries (MAR), and the Ministry of the Environment, Energy, and Climate (URN) was appointed in December 2022. The group presented proposals for a five-year action plan (2025-2029) on the spread of antibiotic resistance in Iceland in January 2024. The proposals were subsequently approved by the government in February of the same year as the government's action plan on the matter[17].

The action plan is based on numerous activities that need to be undertaken, as detailed later in this document. They are prioritised, costs estimated, responsible stakeholders specified, and their timeframes set.

The working group is also responsible for monitoring the implementation and progress of the action plan and will publish a report at least annually (monitoring and evaluation).

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[15] European Commission. Council Recommendation on stepping up EU actions to combat antimicrobial resistance in a One Health approach. https://health.ec.europa.eu/publications/council-recommendation-stepping-eu-actions-combat-antimicrobial-resistance-one-health-approach_en.

[16] WHO. Global shortage of innovative antibiotics fuels emergence and spread of drug-resistance. https://www.who.int/news/item/15-04-2021-global-shortage-of-innovative-antibiotics-fuels-emergence-and-spread-of-drug-resistance.

[17] https://www.stjornarradid.is/efst-a-baugi/frettir/stok-frett/2024/02/22/Ny-adgerdaaaetlun-heilbrigdisradherra-til-ad-sporna-vid-utbreidslu-syklalyfjaonaemis/

The six actions of the Action Plan

The duration of the action plan is five years (2025–2029) and it consists of the following six actions (see appendix 1, p.31):

1. **Promote targeted and prudent use of antibiotics in humans and animals (see p.15).**
2. **Limit the spread of antibiotic resistance through information dissemination, education, and prevention (see p.17).**
3. **Improve knowledge of antibiotic resistance through monitoring and scientific research (see p.19).**
4. **Contain the spread of antibiotic resistance through intervention measures (see p.21).**
5. **Increase participation in international cooperation on actions against antibiotic resistance (see p.22).**
6. **Ensure coordination and management of actions against antibiotic resistance for the future (see p.21).**

For each action, objectives are set to be achieved, and for each objective, specific activities are identified that need to be undertaken (see p.26). For each objective, output indicators and benchmarks are also specified. Responsible stakeholders are identified for each activity and their timeframes and priority set. Most of the activities are long-term projects that need to be reviewed regularly, or at least every five years. It should be noted that work on some of the activities is already partially or fully underway. The work currently in progress is specified in the appendix 1. In a special section later in this document the cost estimates for individual activities during the period 2025 to 2029 is discussed (p.24) as well as in appendix 1.

1. Promote targeted and prudent use of antibiotics in humans and animals

Excessive and/or imprudent use of antibiotics in humans and animals is considered one of the main risk factors for the emergence and spread of antibiotic resistant bacteria. Antibiotic resistance arises due to genetic changes in the bacteria and can, in many cases, spread from one bacterium to another.

Activities that promote the targeted and prudent use of antibiotics in humans and animals are therefore an important part of the action plan (see appendix 1, p.31). Registration of antibiotic use and easy access to the data is essential for undertaking activities that promote improved usage. Therefore, activities related to the registration of antibiotic use, creation of databases, and data monitoring are significantly prominent in this action. Activities related to the development of guidelines and quality improvement are also key elements to achieving success, both in primary care, nursing homes, and hospitals, as well as among physicians and veterinarians in independent practicies. Education for the public and professionals about the use of antibiotics also plays an important role in reducing and improving usage. The educational aspect of the action plan is specifically discussed on p.19.

In the first action, the following four objectives are set to reduce and improve antibiotic use in both humans and animals:

1.1. Enhance and develop electronic records and monitoring of antibiotic prescriptions in humans.

1.2. Promote reduced and prudent use of antibiotics in humans through quality development and creation of guidelines.

1.3. 1.3.Enhance and develop electronic records and monitoring of antibiotic prescriptions in animals.

1.4. Promote prudent use of antibiotics in animals through quality development and creation of guidelines.

A total of 22 activities are specified to achieve the above mentioned objectives. Out of these, 16 activities are in priority group one and six in priority group two, with none in priority group three. The total cost of all activities in action one for the period 2025-2029 is estimated at around 606 million ISK, although it varies somewhat between years.

The responsible stakeholders for the 13 activities under objectives 1.1 and 1.2 (antibiotic use in humans) are the Directorate of Health (EL) (seven), the Development Centre of the Icelandic Primary Health Care (ÞÍH) (three), the Chief Epidemiologist (SVL) (two), and Landspítali, the National University Hospital of Iceland (LSH) (one activity). Additionally, numerous other stakeholders are involved, including hospitals, other healthcare institutions, HRN, and the Association of Welfare Service Companies (SVF).

The responsible stakeholders for the nine activities under objectives 1.3 and 1.4 (antimicrobial use in animals) are Icelandic Food and Veterinary Authority (MAST) (seven), MAR (one), and HRN (one activity). Other stakeholders are also involved in the implementation of several of the activities in action one.

2. Limit the spread of antibiotic resistance through information dissemination, education, and prevention

The core of the action plan involves initiatives aimed at reducing and improving the use of antibiotics, enhancing hygiene practices (infection prevention and control), and preventing infections through other means such as vaccinations. To achieve this, it is essential to educate and inform the general public, healthcare professionals, welfare service staff, veterinarians, and food producers about the importance of prudent antibiotic use and the significance of infection control measures.

Public health measures among the general population and various vaccinations reduce the incidence of common respiratory and gastrointestinal infections, thereby reducing the use of antibiotics and consequently the spread of antibiotic-resistant bacteria. Education of the public about preventive measures and participation in vaccinations against pathogens such as pneumococci, H. influenzae type b, influenza (common causes of respiratory infections), and rotavirus (common cause of acute gastrointestinal infections in children) plays a crucial role in reducing disease burden in society and spread of antibiotic resistant bacteria.

Additionally, hygiene measures are crucial in preventing the spread of antibiotic resistant bacteria among animals, reducing the likelihood of transmission between humans and animals, and minimising the risk of food contamination.

Under action two, which includes activities involving information dissemination, education, and prevention, the following five objectives are set to limit the spread of antibiotic resistant bacteria (see appendix 1, p.31):

2.1. Increase public knowledge about antibiotic resistance, the use of antibiotics, and infection prevention.

2.2. Increase the knowledge of healthcare workers and welfare service staff about antibiotic resistance, the use of antibiotics, and infection prevention.

2.3. Increase the knowledge of veterinarians about antibiotic resistance, the use of antibiotics, and infection prevention.

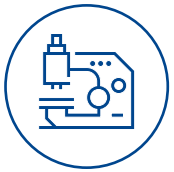
2.4. Increase the knowledge of food producers and other food companies about antibiotic resistance, the use of antibiotics, and infection prevention.

2.5. Reduce the likelihood of infections among the public in the community.

A total of 18 tasks are specified in action two in order to achieve the above mentioned objectives. Of these, five are in priority group one, eleven in priority group two, and two in priority group three. The total cost of the activities for the period 2025–2029 is estimated to be around 196 million ISK, although it varies somewhat between years.

The responsible stakeholders for the 18 activities under action two are SVL (seven), MAST (six), HRN (three), ÞÍH (one), and the Primary Health Care of the Capital Area (HH) (one activity). Numerous other stakeholders are also involved in action two.

3. Improve knowledge of antibiotic resistance through monitoring and scientific research



In order to implement the most effective and efficient measures against antibiotic resistance at any given time, it is necessary to obtain scientific knowledge about the emergence and spread of resistant bacteria and to gain the best understanding of their distribution through monitoring in humans, animals, food, and the environment.

The results of monitoring and scientific research provide a necessary basis for assessment and comparison and are also important for evaluating the need for and the success of intervention measures.

Regulation No. 221/2012, on reporting for infection control, specifies mandatory notifications for certain resistant bacteria detected in humans. A similar notification obligation applies to food and feed, referencing the aforementioned regulation, but it is not in place for antibiotic resistant bacteria detected in animals and the environment. It is important that comparable regulations apply to these as well.

Whole genome sequencing (WGS) of bacteria is currently considered the best method for studying the origin and spread of antibiotic resistant bacteria but has not been systematically used for investigating antimicrobial resistance (AMR) in Iceland. It is anticipated that in the coming years, the use of WGS for investigating particular AMR will be partially mandated within the EU. Therefore, WGS needs to be officially implemented for laboratory investigations of antibiotic resistant bacteria in Iceland.

In order to improve knowledge of antibiotic resistance through monitoring and scientific research, six objectives are set (see appendix 1, p.31):

3.1. Harmonise the notification and registration requirements for all antibiotic resistant bacteria according to One Health approach.

3.2. Improve knowledge of the spread of antibiotic resistant bacteria in humans.

3.3. Improve knowledge of the spread of antibiotic resistant bacteria in animals and food.

3.4. Improve knowledge of the spread of antibiotic resistant bacteria and antibiotic residues in the environment.

3.5. Strengthen basic research on antibiotic resistance according to One Health approach.

3.6. Enhance and coordinate whole genome sequencing of antibiotic resistant bacteria.

A total of 17 activities are specified to achieve the above mentioned objectives. Of these, ten are in priority group one, six in priority group two, and one in priority group three. The total cost of all activities in this action for the years 2025–2029 is estimated to be around 768 million ISK, although it varies somewhat between years.

The main responsible stakeholders for the activities are MAR (six), SVL (three), UST (three), HRN (two), MAST (two), and LSH (one activity). Numerous other stakeholders are also involved in action three.

4. Contain the spread of antibiotic resistance through intervention measures

Antibiotic resistant bacteria can be found in samples obtained from humans, animals, food, or the environment. It is important that in such cases, guidelines are available to determine whether specific treatments and/or measures are needed to eradicate these resistant bacteria and/or prevent their spread.

In order to contain the spread of antibiotic resistance through intervention measures, five objectives are set in action four (see appendix 1, p.31):

4.1. Ensure appropriate responses when certain resistant bacteria in humans are detected.

4.2. Ensure appropriate responses when certain resistant bacteria in animals are detected.

4.3. Ensure appropriate responses when certain resistant bacteria in food are detected.

4.4. Treat wastewater appropriately in order to minimise the spread of certain antibiotic resistant bacteria.

4.5. Ensure appropriate responses when certain resistant bacteria or antibiotic residues are detected in the environment.

A total of seven activities are specified to achieve the above mentioned objectives. Of these, three are in priority group one and four in priority group two. The total cost of the activities for the period 2025–2029 is estimated to be around 50 million ISK.

The responsible stakeholders for the seven activities under action four are MAST (three), UST (two), SVL (one), and URN (one activity). Additionally, various other stakeholders are involved in action four.

5. Increase participation in international cooperation on actions against antibiotic resistance

Since the spread of both antibiotic susceptible and antibiotic resistant bacteria does not respect borders, international cooperation is of utmost importance in the battle against AMR. Most nations have published or are working on creating National Action Plans against antibiotic resistance following the guidelines of WHO. Additionally, international cooperation provides access to research collaborations and funding for research domestically, which facilitates the implementation of various tasks in this action plan.

In order to increase participation in international cooperation, three objectives are set in action five (see appendix 1, p. 31):

5.1. Strengthen cooperation with institutions of the European Union.

5.2. Strengthen cooperation with international organisations.

5.3. Strengthen Nordic cooperation.

A total of ten activities are specified to achieve the above mentioned objectives. Of these, nine are in priority group one and one in priority group three. The total cost of the activities for the period 2025–2029 is estimated to be around 145 million ISK.

The responsible stakeholders for the ten activities under action five are HRN (four), SVL (three), MAST (two), and MAR on behalf of the Institute for Experimental Pathology at Keldur, University of Iceland (Keldur), for activity 5.1.5 (one activity). Additionally, several other stakeholders are involved in the activities in action five.

6. Ensure coordination and management of actions against antibiotic resistance in Iceland for the future

To ensure good coordination and implementation of the activities specified in the plan, it is important that an interdisciplinary group of experts will be active at all times. This group will have the role of monitoring the implementation and progress of the action plan and making recommendations for changes if necessary. Additionally, the group needs to monitor cost estimates and progress in cooperation with the responsible stakeholders (see the section on indicators on. P.30).

The interdisciplinary working group that proposed the action plan against antibiotic resistance to the government of Iceland has been provided the task of implementing the plan and monitoring its progress ("monitoring and evaluation plan").

In this action, there is one objective (see appendix 1, p.31):

6.1. Ensure the implementation and execution of activities against antibiotic resistance in the near future.

The responsible stakeholder for this objective is HRN, but MAR, and URN also participate in the coordination and management.

The cost of action six is estimated to be around 27 million ISK for the period 2025-2029. Most of the cost will be borne by HRN, but certain expenses will also be covered by the MAR, and URN (see appendices 2.2 and 2.3, p.52).

Cost Estimates of Activities

Responsible stakeholders for individual activities estimated the total costs of their activities assigned to them within each action rather than the cost of each activity. Results of the cost estimates can be seen in appendix 2 on p.52.

Costs are divided into basic and additional costs. Basic costs refer to the funding that responsible stakeholders are already allocating to specific activities, while additional costs are the extra funding needed to carry out or complete specific activities over the five-year period of the plan. The cost estimates do not account for changes in price levels between years. Given the considerable uncertainty about the cost of individual activities in the coming years, it will be necessary to review the cost estimates at least annually. This review will be the responsibility of the working group discussed in action six on p.23.

As stated in appendix 2 on p.51, the total cost of all actions against antibiotic resistance over a five year period is expected to be around 1.8 billion ISK. Of this amount, additional cost is estimated to be around 1.2 billion ISK.

The largest cost items in the plan are associated with activities focusing on promoting more targeted and prudent use of antibiotics and activities aiming at various types of monitoring and scientific research.

Although the cost of implementing the action plan is substantial, it can be asserted that keeping the spread of antibiotic-resistant bacteria under control will be significantly cost-effective, as stated in chapter on introduction.

Responsible Stakeholders for Activities

The responsible stakeholders for each activity are specified in the action plan (see appendix 1, p.31.). They are responsible for implementing the activities within the specified time frame and for assessing the costs, both basic and additional costs. In many cases, the responsible stakeholders will not carry out the implementation of the projects themselves but will ensure that they are carried out by other stakeholders.

Other stakeholders in collaboration with the responsible stakeholders are also involved in most of the activities and are specified in the plan. This does not exclude the involvement of others if deemed necessary.

Of the 75 tasks specified in the action plan, 41 is the responsibility of HRN and its institutions, 28 are the responsibility of MAR and its institutions, and six are the responsibility of URN.

Prioritisation of Activities

The activities in the action plan are prioritised into three categories, with category one encompassing the most urgent one to be implemented.

The prioritisation considers the following factors:

- **Is the activity likely to be effective in preventing the spread of antibiotic resistant bacteria?**
- **Is it likely that the activity will be implemented within the next two years, five years, or later?**
- **Has the project already started but not yet been completed?**
- **Is the project defined in a regulation but has not yet been implemented?**

It is most important to promptly undertake the activities with the highest priority, but the aim is to carry out all activities according to the action plan. Only through extensive One Health approach can satisfactory results be obtained.

Of the 75 activities specified in the action plan, 44 are in priority group one, 27 in group two, and four in group three.

Of the 44 activities in priority group one, 25 are the responsibility of HRN and its institutions, 16 are the responsibility of MAR and its institutions, and three are the responsibility of the URN.

Of the 27 activities in priority group two, 14 are the responsibility of HRN and its institutions, ten are the responsibility of MAR and its institutions, and three are the responsibility of the URN.

Of the four activities in priority group three, two are the responsibility of HRN and two are the responsibility of MAST.

Time frame of Activities

The government action plan is a five year plan covering the years 2025–2029. In appendix 1 the status of the activities that are already partially or fully underway can be seen.

The action plan and individual activities will be regularly reassessed, or at least every five years. It is clear that some of the activities are short term projects that hopefully can be completed in a few years, but most of the activities are long term initiatives that involve changing work practices for the future. The time frames for individual activities can be seen in appendix 1.

Indicators of the Action Plan

Two types of indicators are set to measure the success of the action plan: **output indicators** and **outcome indicators**. The guidelines from WHO[18] on monitoring and evaluating action plans against antibiotic resistance are used as a reference and adapted to Icelandic conditions. The One Health policy of EU is also considered, which encourages member countries to reduce antibiotic use in humans by at least 20% by 2030 and by 50% in animals[19].

Output Indicators

Output indicators are indicators for each objective which assess whether the objectives of the action plan have been achieved (see appendix 1). In addition to output indicators, progress benchmarks are set for each objective, which should be reached by 2030.

For some objectives, particularly those related to the environment, it is not possible to set indicators and benchmarks due to a lack of baseline information. In such cases, emphasis will be placed on gathering data and subsequently developing guidelines. Output indicators can be added later to the action plan in these instances.

[18] WHO. Monitoring and evaluation of the global action plan on antimicrobial resistance. https://iris.who.int/bitstream/handle/10665/325006/9789241515665-eng.pdf?ua=1.

[19] ESB. Council recommendation on stepping up EU acitons to combat antimicrobial restistance in a One Health approach.

Outcome indicators

Outcome indicators measure the overall success of the action plan. Outcome indicators are divided into indicators for humans, animals, and food, but at this time, it is difficult to establish outcome indicators for the environment due to limited information on the spread of antibiotic resistant bacteria in the environment in Iceland.

The outcome indicators set in this action plan are based on those published in the EU's One Health policy17 but have been adapted to Icelandic conditions. The action plan aims for a 20% reduction in antibiotic use in humans by 2029 compared to 2022. However, it is challenging to aim for a 50% reduction in animal use since usage in Iceland is already low and lower than in almost all European countries.

Outcome indicators for humans

Outcome indicators for humans address changes in the resistance rates of certain bacteria identified in humans, changes in the use of specific antibiotic classes, and changes in participation in certain vaccinations that prevent various respiratory infections, thereby reducing the use of antibiotics.

Table 1. Proportion of selected antibiotic resistant bacteria (%) in humans in 2022 and goals for 2029.

Bacteria	Resistance	Samples	2022	2029
Staphylococcus aureus	Methicillin (MRSA)	Invasive	1,1%	<2%
E. coli	ESBL	Invasive	9,8%	<15%*
	Carbapenemase producing	All samples	0,0%	0%
Klebsiella pneumoniae	Carbapenemase producing	All samples	0,0%	0%
Streptococcus pneumoniae	Penicillin resistance (R**)	Invasive	28,6%	<20%
	Penicillin and erythromycin resistance	Invasive	28,6%	<20%
	Reduced penicillin resistance (I***+R)	All samples	41,0%	<25%
H. influenzae	Resistance for amoxicillin+ clavulanic	All samples	23,0%	<20%

* ESBL resistance has been increasing in recent years. Therefore, 20% reduction is unlikely as proposed by the EU[17].
**Resistant
***Intermediate resistance

Table 2. Antibiotic use in humans (DID) in 2022 and goals for 2029.

Antibiotic use in humans	2022	2029
Total ATC J01 (sales)	19,5	15
Total ATC J01 community (prescriptions)	17,55	14
Total ATC J01 hospitals/ institutions (sales)	1,1	1
Proportion of antibiotics in „Access“ group WHO („AWaRe“)	>80%	>80%
Tetracyclines community (ATC J01A) (prescriptions)	4,5	2,5
Third generation cephalosporins hospitals/institutions (ATC J01DD) (sales)	0,18	0,15

Table 3. Proportion of humans fully vaccinated (%) in 2022 and goals for 2029.

Vaccinations	2022	2029
Pneumococci - children	92%	92%
Pneumococci - 60+ years	35%	70%
Influenza - 60+ years	55%	70%
COVID-19 - 60+ years	73%	70%
Influenza - children	30%	70%

Outcome indicators for animals and food

Outcome indicators for animals and food address changes in the resistance rates of certain bacteria identified in and on animals and food, along with changes in the use of specific antibiotics in animals.

Table 4. Proportion of selected antibiotic resistant bacteria (%) in animals and food in 2022 and goals for 2029.

Bacteria	Resistance	Samples	2022	2029
Staphylococcus aureus	Methicillin (MRSA)	Pigs, swab samples at slaughtering	0%	0%
E. coli	ESBL/AmpC producing (except up-regulated chromosomal AmpC)	All samples	<1%	<1%
	Carbapenemase producing	All samples	0%	0%

Table 5. Antibiotic use in animals (mg/PCU*) in 2022 and goals for 2029.

Antibiotic use in animals	2022	2029
Total (tablets) (sales)	5,3**	<4
Group B (AMEG group)	0,1%	<0,5%
Group D (AMEG group)	>82%	>90%

* PCU: Estimated weight of lifvestock each year

** According to the EMA report on the sale of antibiotics for animals in 2022, the recorded sale was about 0.6 tons of active substances (including tablets), and the PCU was 140.2. This gives about 4.8 mg/PCU. However, it has been found that the actual sale was closer to 0.75 tons of active substances, making the real figure 5.3 mg/PCU

Appendices

1. Action and Implementation Plan

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
1. Promote targeted and prudent use of antibiotics in humans and animals	**1.1 Enhance and develop electronic records and monitoring of antibiotic prescriptions in humans.** **Output indicator:** The proportion of antibiotic prescriptions in humans recorded in central databases. Information accessible and published in monitoring reports. **Benchmark:** >90% of all antibiotic prescriptions in humans are recorded in the central database, and data accessible in 2029.	1.1.1 The proportion of antibiotic prescriptions in humans recorded in central databases. Information is accessible and published in monitoring reports.	Standardised recording of antibiotic prescriptions for inpatients in hospitals not in place.	Electronic recording of antibiotic prescriptions in all hospitals established, and data is transferred electronically to central databases at EL.	EL	SVL, health institutions, hospitals	1	2025	2029
		1.1.2 Improve the recording of indications for antibiotic prescriptions in the electronic databases of hospitals, and transfer the information to central databases at EL.	Indications are not directly recorded in the electronic medication administration systems of hospitals/institutions. Indications (diagnoses) are recorded in the electronic health record, which is not directly connected to the medication administration systems.	Indications for antibiotic prescriptions accessible in the electronic systems of hospitals/institutions and in the central database at EL.	EL	SVL, health institutions	2	2025	2026
		1.1.3 Set up a dashboard/data visualisation for antibiotic prescriptions for doctors in the electronic systems of hospitals.	Dashboard/data visualisation not available in the electronic systems of hospitals.	Dashboard/data visualisation for antibiotic prescriptions available in hospital electronic systems.	EL	SVL	2	2025	2029

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
1. Promote targeted and prudent use of antibiotics in humans and animals		1.1.4 Implement and introduce electronic recording of antibiotic prescriptions in all nursing homes. Data on prescriptions transferred to the central databases at EL.	Electronic recording and transfer of information on antibiotic prescriptions in nursing homes to the central databases at EL not in place except where the prescription portal is used. Many nursing homes have adopted the eMed system, but data not transferred to EL.	Electronic recording of antibiotic prescriptions in all nursing homes implemented, and prescription information transferred to the medication database at the EL.	EL	ÞÍH, SVL, SFV, health institutions.	1	2027	2028
		1.1.5 Start recording indications for antibiotic prescriptions in the electronic systems of nursing homes, and transfer the information to the central databases at the EL.	Indications not recorded in the electronic medication administration systems of nursing homes.	Recording of indications implemented in the electronic systems of nursing homes, and the information accessible centrally at the EL.	EL	ÞÍH, SVL, SFV, health institutions.	2	2027	2028
		1.1.6 Set up a dashboard/ data visualisation for antibiotic prescriptions for doctors in nursing homes.	Dashboard/data visualisation not available in nursing homes.	Dashboard/data visualisation for antibiotic prescriptions available in all nursing homes.	EL	SFV, SVL.	2	2027	2028
		1.1.7 Improve the recording of indications for antibiotic prescriptions in the prescription database of primary healthcare with detailed classification. Information transferred to the central databases at the EL.	Recording of indications is partially in place at all primary healthcare centers but is used to varying extents. Information is not transferred centrally to the EL.	Improved recording of antibiotic prescriptions in primary healthcare.	ÞÍH		2	2025	2026

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
1. Promote targeted and prudent use of antibiotics in humans and animals		1.1.8 Develop further interactive presentation of statistics on antibiotic prescriptions.	Interactive presentation of drug statistics is partially available at the EL for medications dispensed through the Prescription Portal.	Interactive presentation of drug statistics established for all antibiotic prescriptions.	EL	SVL, health institutions, hospitals.	1	2026	2029
		1.1.9 Develop further the annual report by the SVL and other stakeholders on antibiotic use.	The annual report by the SVL and stakeholders published annually.	Establish the annual publication and institutional collaboration.	SVL	MAST, UST, Medicine Agency, SVEID.	1	2025	2029
	1.2 Promote reduced and prudent use of antibiotics in humans through enhanced quality development and creation of guidelines. **Output indicator:** The proportion of defined target groups with specified guidelines.The proportion of health institutions with active antibiotic stewardship programs. **Benchmark:** >95% of defined target groups with guidelines by the year 2029. >95% of health institutions with active antibiotic stewardship programs.	1.2.1 Enhance the development and promotion of guidelines on antimicrobial use and stewardship at larger hospitals.	Antibiotic stewardship implemented only at LSH (active only at the Children's Hospital).	Antibiotic stewardship implemented at all major hospitals.	LSH	Hospitals, SVL.	1	2025	2029
		1.2.2 Enhance the development and dissemination of guidelines on nursing homes on antibiotic use and stewardship.	The development of guidelines on antibiotic use in nursing homes has started.	Guidelines on antibiotic use in all nursing homes in place.	ÞÍH	Öldrunarlæknar, SVL.	1	2025	2027
		1.2.3 Firmly establish the Strama project within the primary care and continue its development.	The Strama project has been implemented in all primary care centers except at the „Læknavakt“.	ÞÍH will be entrusted the responsibility for the activity to the future.	ÞÍH	HRN, HH.	1	2024	2029
		1.2.4 Encourage the development of guidelines for antibiotic use among the groups of specialists outside hospitals who prescribe antibiotics the most.	Guidelines only in place for primary healthcare (Strama) and to some extent for pediatricians.	Guidelines in place for defined groups of specialists outside hospitals who prescribe antibiotics the most.	SVL	LSH, medical associations.	1	2025	2028

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
1. Promote targeted and prudent use of antibiotics in humans and animals	**1.3 Enhance and develop electronic recording and monitoring of antibiotic prescriptions in animals.** **Output indicator:** The proportion of antibiotic prescriptions in animals recorded in central databases. Information accessible and published in monitoring reports. **Benchmark:** >90% of antibiotic prescriptions recorded in the central database, and data accessible by the year 2029.	1.3.1 Implement and introduce electronic recording of antibiotic prescriptions in animals, and transfer prescription information to central databases.	A central database has been established but is not yet fully operational. Introduction has begun. Implementation completed in the coming weeks/months.	Central database implemented and usage introduced.	MAST		1	2025	2026
		1.3.2 Amend the regulation to mandate all records of antibiotic prescriptions to be logged into the database in the future.	Regulation regarding the obligation of recording has come into effect, but further details are needed on how the recording should be implemented.	The regulation on the obligation of recording and implementation has taken effect.	MAR	MAST	1	2025	2026
		1.3.3 Enhance monitoring by recording antibiotic prescriptions for animals in a central database.	Monitoring not sufficient at present.	Information on antibiotic prescriptions for animals available.	MAST		1	2025	2029
		1.3.4 Set up a dashboard/data visualisation for regulatory authorities (MAST).	Dashboard/data visualisation not available in the central database.	Dashboard/data visualisation functional.	MAST		1	2025	2026
	1.4 Promote prudent use of antibiotics in animals through enhanced quality development and guidelines. **Output indicator:** Percentage of defined target groups with specified guidelines. **Benchmark:** >95% of defined target groups with guidelines by the year 2029.	1.4.1 Prepare guidelines on antibiotic use in animals.	Guidelines not available.	Guidelines available.	MAST	DÍ	1	2025	2027
		1.4.2 Implement regulations on restrictions regarding veterinarians' authority to prescribe antibiotics.	No regulation is currently in place. Draft regulation was submitted to the MAR by the end of 2020.	A new regulation has come into effect.	HRN	MAST, MAR.	1	2025	2025
		1.4.3 Set up a dashboard/data visualisation in databases for veterinarians.	Dashboard/data visualisation is not available.	The dashboard/data visualisation has been implemented.	MAST		2	2026	2027

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
1. Promote targeted and prudent use of antibiotics in humans and animals		1.4.4 Increase monitoring of prescriptions and use of certain antibiotics (Category B in the AMEG classification) and clarify veterinarians' exemptions to dispense antibiotics.	Monitoring of prescriptions of specific drugs has not been conducted.	Monitoring firmly established.	MAST		1	2025	2029
		1.4.5 Increase dialogue between regulatory authorities (MAST) and veterinarians through regular formal and informational meetings.	Dialogue has begun, needs to be firmly established.	Regular informational meetings, at least annually.	MAST	DÍ	1	2025	2029

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
2. Limit the spread of antibiotic resistance through information dissemination, education, and prevention	**2.1 Increase public knowledge about antibiotic resistance, the use of antibiotics, and infection prevention.** **Output indicator:** The current level of public knowledge on antibiotic resistance, the use of antibiotics, and infection prevention. **Benchmark:** Significant increase in knowledge by the year 2029.	2.1.1 Conduct regular surveys on public knowledge of antibiotic resistance, antibiotic use, and infection prevention, and assess the need for increased education.	A Nordic survey was conducted in 2018.	Regular surveys conducted.	SVL	ÞÍH, LSH.	1	2025	2029
		2.1.2 Increase education and information dissemination in the media and on social media, based on survey results (see 2.1.1). Share information with other institutions such as the EL, MAST, UST, and Heilsuvera.	Limited content on websites and social media of primary healthcare (Heilsuvera), the EL, island.is, MAST and UST. This information is not coordinated.	Widespread, coordinated, and accessible information available.	SVL	ÞÍH, HH, MAST, UST, Medicines Agency.	1	2025	2029
		2.1.3 Enhance education in connection with the annual awareness campaign of WHO, FAO, WOAH, and ECDC during the week of November 18-24.	SVL publishes information annually on the EL website.	Information in Iceland coordinated with information from WHO, FAO, WOAH, and ECDC. Annual media and social media campaign (television, online media).	SVL	MAST, UST, ÞÍH, LSH.	2	2025	2029
		2.1.4 Increase education for parents in infant health care and enhance access to educational materials for daycare and parents.	No formal education in place.	Standardised education available and actively disseminated.	ÞÍH	Icelandic Association of Local Authorities.	2	2025	2026
		2.1.5 Develop educational materials for tourists about the uniqueness of Iceland regarding antibiotic resistance and animal diseases.	No formal education in place	Proposals for an educational project for foreign tourists available.	MAST	SAF, The Icelandic custom.	3	2027	2028

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
2. Limit the spread of antibiotic resistance through information dissemination, education, and prevention		2.1.6 Increase public education on the importance of origin of food, proper food preparation and handling.	Information and education available from the MAST.	Increased availability of educational materials, inc luding social media.	MAST	SVL	2	2025	2029
		2.1.7 Education for the public on antibiotic use, infection prevention, antibiotic resistance, and the risk of infection during international travel.	Some educational materials available on the websites of the SVL and Heilsuvera, but do not cover antibiotic resistance in relation to travel.	Education for those traveling abroad, e.g., on Heilsuvera (in connection with travel vaccinations), is available.	HH	ÞÍH, SVL, LSH.	1	2025	2029
		2.1.8 Introduce education on infection prevention and antibiotic resistance in primary and secondary schools.	No formal education on infection prevention and antibiotic resistance in primary and secondary schools.	Formal education in place in primary and secondry schools.	HRN	MRN, Icelandic Association of Local Authorities.	3	2025	2029
	2.2 Increase the knowledge of healthcare workers and welfare service staff about antibiotic resistance, the use of antibiotics, and infection prevention. **Output indicator:** Level of knowledge among healthcare professionals and welfare service staff on antibiotic resistance, antibiotic use, and infection prevention. **Benchmark:** Significant increase in knowledge by the year 2029.	2.2.1 Conduct a survey to assess the knowledge of healthcare professionals and welfare service staff on antibiotic resistance, antibiotic use, and infection prevention, and map out the need for increased education.	No survey has been conducted.	A survey conducted.	SVL	ÞÍH, LSH, EL.	1	2025	2026
		2.2.2 Encourage increased education and formal training, for healthcare professionals and welfare service staff according to the results of the survey (see 2.2.1).	Quality documents and informal education available. This varies among groups of healthcare professionals and staff in nursing homes.	Quality documents and guidelines for healthcare professionals and nursing home staff updated and/or developed by the relevant institutions.	SVL	ÞÍH, LSH, healthcare institutions, SFV, HÍ.	2	2026	2027

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
2. Limit the spread of antibiotic resistance through information dissemination, education, and prevention		2.2.3 Annual awareness campaign in connection with the annual awareness campaigns of WHO and ECDC during the week of November 18–24.	SVL annually publishes information on the EL website.	Information coordinated information from WHO and ECDC. Annual symposium by the SVL on antibiotic resistance. Healthcare institutions publish news and content on their own platforms.	SVL	MAST, UST, ÞÍH, LSH.	2	2025	2029
		2.2.4 Analyse the curriculum for healthcare professional's education on antibiotic resistance, antibiotic use, and infection prevention, and provide recommendations for improvements.	Current status unknown.	Analysis, implementation, and recommendations for improved education in place.	HRN	University of Iceland, HA, HVIN.	1	2025	2026
	2.3 Increase the knowledge of veterinarians about antibiotic resistance, the use of antibiotics, and infection prevention. **Output indicator:** The level of knowledge among veterinarians on antibiotic resistance, antibiotic use, and infection prevention. **Benchmark:** Significant increase in knowledge by the year 2029.	2.3.1 Conduct a survey to assess the knowledge of veterinarians on antibiotic resistance, antibiotic use, and infection prevention, and map out the need for increased education.	No survey has been conducted.	Survey been conducted.	MAST	DÍ	2	2025	2025
		2.3.2 Increase education for veterinarians based on the survey results (see 2.3.1).	No formal education in place.	Educational materials, guidelines, and quality documents for veterinarians available.	MAST	DÍ	2	2026	2029

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
2. Limit the spread of antibiotic resistance through information dissemination, education, and prevention	**2.4 Increase the knowledge of food producers and other food companies on antibiotic resistance, the use of antibiotics, and infection prevention.** **Output indicator:** The level of knowledge among food producers and food companies on antibiotic resistance, antibiotic use, and infection prevention. **Benchmark:** Significant increase in knowledge by the year 2029.	2.4.1 Conduct a survey to assess the knowledge of food producers and companies on antibiotic resistance, antibiotic use, and infection prevention, and map out the need for increased education.	No survey been conducted.	Survey been conducted.	MAST	Public Health Committees.	2	2026	2026
		2.4.2 Increase education for food producers and companies based on the survey results (see 2.4.1).	No formal education in place.	Educational materials available and targeted education provided.	MAST	Public Health Committees.	2	2027	2029
	2.5 Reduce the likelihood of infections among the public in the community. **Output indicator:** Epidemiology of specified infections known at all times. **Benchmark:** Significant reduction in specified infections by the year 2029.	2.5.1 Improve/maintain participation of children and adults in vaccinations against pneumococci, H. influenzae b, and influenza, as well as vaccinations against other respiratory infections. Ensure access to the best vaccines available at any given time.	Participation in pneumococcal vaccination among children is good but lower in influenza vaccination. Participation in influenza among 60 years+ is 40 to 50%.	Improved participation in vaccinations and ensured access to the best vaccines.	SVL	Primary Health care, ÞÍH.	2	2025	2029
		2.5.2 Explore the possibility of increasing sick leave rights for parents/guardians due to children's illnesses.	Parents are entitled to at least 12 sick days per year due to children's illnesses, regardless of the number of children. Rights vary according to collective agreements.	Increased sick leave rights for parents/guardians due to children's illnesses.	HRN	FRN	2	2025	2026

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
3. Improve knowledge of antibiotic resistance through monitoring and scientific research	**3.1 Harmonise the notification and registration requirements for all antibiotic resistant bacteria according to One Health approach.** **Output indicator:** The status of recordings on specified antibiotic resistant bacteria. **Benchmark:** Recordings of specified bacteria fully harmonised in 2025.	3.1.1 Examine whether Regulation No. 221/2012 needs to be revised regarding which antibiotic resistant bacteria in humans should be subject to mandatory reporting and which bacteria should be subject to mandatory recording.	Regulation on recording and reporting of bacteria last revised in 2023.	A new and updated regulation comes into effect.	HRN	SVL	1	2025	2025
		3.1.2 Harmonise the notification and recording requirements for resistant bacteria identified in humans, animals, food, feed, and the environment.	Harmonised regulations are not in place.	Harmonised notification and recording requirements.	MAR	URN, MAST, UST.	1	2025	2025
	3.2 Improve knowledge of the spread of antibiotic resistant bacteria in humans. **Output indicator:** The spread of antibiotic-resistant bacteria among specified groups of humans. **Benchmark:** The spread of antibiotic resistant bacteria known among all specified groups by the year 2029.	3.2.1 Ensure standardised procedures/guidelines for the detection of antibiotic resistant bacteria in laboratories. Summary reports should be sent at least annually to the SVL.	Guidelines are available, but the status of implementation in laboratories is unknown. Reports on resistance rates are only sent from the SVEID.	Laboratories performing susceptibility testing use the same procedures (EUCAST) and send results on resistance rates to SVL.	LSH	EL, SVEID.	1	2025	2026
		3.2.2 Update and harmonise guidelines on screening for resistant bacteria in healthcare institutions, hospitals, nursing homes, and private clinics. Results of susceptibility tests for specified bacteria are recorded electronically and information sent electronically to the SVL.	Guidelines on screening for resistant bacteria in healthcare services were published by the SVL in 2019. Laboratory analyses of resistant bacteria at LSH and SAk are already recorded electronically and sent to SVL.	Updated and harmonised guidelines on screenings are available. Analyses of resistant bacteria from all laboratories recorded electronically and sent to SVL. The spread of resistant bacteria in healthcare institutions, hospitals, and nursing homes known.	SVL	LSH, SAk, healthcare instiuturions, nursing homes.	2	2025	2029

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
3. Improve knowledge of antibiotic resistance through monitoring and scientific research		3.2.3 Update harmonised guidelines on screening resistant bacteria in employees of production facilities.	Guidelines for employees of pig farms regarding MRSA in place.	New and updated guidelines for employees in primary production.	MAST	SVL, LSH, ÞÍH, primary health care.	1	2024	2025
		3.2.4 Develop a plan for sentinel screening for antibiotic resistant bacteria in the community.	Sentinel screening not conducted.	Plan on sentinel screening in place and implemented.	SVL	ÞÍH, LSH, HRN.	2	2025	2029
		3.2.5 Update guidelines on screenings of immigrants and asylum seekers.	Guidelines in place.	Guidelines updated.	SVL	LSH, HH.	2	2025	2029
	3.3 Improve knowledge of the spread of antibiotic resistant bacteria in animals and food. **Output indicator:** The spread of antibiotic resistant bacteria among specified groups of animals and in food in summary reports. **Benchmark:** The spread of antibiotic resistant bacteria among all specified groups of animals and in food known by the year 2029.	3.3.1 Ensure the enforcement of current Regulation No. 1000/2018 on monitoring of antibiotic resistance in food and animals.	The regulation has not been fully enforced due to a lack of funding.	Regulations enforced.	MAR	MAST, Public Health Committees.	1	2025	2025
		3.3.2 Introduce MRSA monitoring in pigs in regulations.	"MRSA monitoring has been funded by grants from the Antimicrobial Resistance and Zoonosis Fund of MAR.	Implemented into regulation.	MAR	MAST	2	2025	2025
		3.3.3 Publish regulations on monitoring of ESBL/AmpC and indicator bacteria in lambs.	Monitoring in lambs has been funded by grants from the Antimicrobial Resistance and Zoonosis Fund by MAR.	Regulation implemented.	MAR	MAST	2	2025	2025
		3.3.4 Publish guidelines on screening for antibiotic resistant bacteria in other foods, such as vegetables and seafood.	Guidelines on screening in foods other than meat products are not in place.	Guidelines in place.	MAST	MAR	3	2027	2029

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
3. Improve knowledge of antibiotic resistance through monitoring and scientific research	**3.4 Improve knowledge on the spread of antibiotic resistant bacteria and antibiotic residues in the environment.** **Output indicator:** Information on the spread of specific antibiotic-resistant bacteria and antibiotic residues in the environment. **Benchmark:** Not relevant.	3.4.1 Publish guidelines on screening and monitoring of antibiotic resistant bacteria in the environment and at certain hot spots.	No guidelines or regular monitoring for surveillance in place.	Guidelines in place.	UST	Public Health Committees, HRN, URN, MAST.	1	2025	2029
		3.4.2 Monitoring of antibiotic resistant bacteria in the environment.	Only one screening has been conducted by MAST in 2019.	Regular screenings on the spread of resistance in the environment have begun, both related to company operating licenses and official monitoring.	UST	Public Health Committees, HRN, URN, MAST.	1	2026	2029
		3.4.3 Monitoring of antibiotic residues in the environment (watchlist monitoring).	Annual screening in 3 to 5 sessions in accordance with the European Union watchlist.	Monitoring plan published and increased screening initiated.	UST	Public Health Committees, HRN, URN.	2	2025	2029
	3.5 Strengthen basic research on antibiotic resistance according to One Health approach. **Output indicator:** The number of published peer-reviewed articles from Iceland on antibiotic resistance. **Benchmark:** Not relevant.	3.5.1 Establish the antibiotic resistance fund with secure financing, and encourage scientists to conduct research on antibiotic resistance.	The antibiotic resistance fund has secured financing only for several years at a time.	The antibiotic resistance fund has secured financing for the future.	MAR	HRN, URN.	1	2025	2026

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
3. Improve knowledge of antibiotic resistance through monitoring and scientific research	**3.6 Enhance and coordinate whole genome sequencing of antibiotic resistant bacteria.** **Output indicator:** The proportion of WGS on selected antibiotic-resistant bacteria carried out in Iceland in Iceland. **Benchmark:** All WGS of antibiotic resistant bacteria performed in Iceland by the year 2029.	3.6.1 Establish an official and harmonised policy for WGS of antibiotic resistant bacteria in humans, animals, food and the environment, and secure funding.	No official policy exists and funding is not secured. WGS is performed at LSH/SVEID, MATÍS, and abroad. Costs are covered by various companies and partly from the Zoonosis Fund.	Strategic guidelines and prioritisation in place. Costs for sequencing secured.	HRN	LSH, MAR, URN, SVL, MAST, UST, MATÍS.	1	2025	2026
		3.6.2 Implement WGS in monitoring, according to EU Regulations 1000/2018.	The EU has published that starting from 2028, monitoring of antibiotic resistance in food and animals should be conducted using WGS. Iceland has not yet developed a strategy on how to comply with this.	Procedures for WGS on antibiotic resistant bacteria implemented.	MAR	MAST, Keldur, LSH.	1	2026	2027

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
4. Contain the spread of antibiotic resistance through intervention measures	**4.1 Ensure appropriate responses when certain resistant bacteria in humans are detected.** **Output indicator:** The proportion of defined target groups with specified guidelines. **Benchmark:** >95% of defined target groups with guidelines by the year 2029.	4.1.1 Update and expand guidelines on eradication treatment, disinfection, and contact tracing both within and outside healthcare institutions, hospitals, and nursing homes for specific resistant bacteria.	Guidelines from the SVL from 2019 on screening and actions in healthcare institutions are available (https://island.is/sykingavarnir-heilbrigdisthjonusta/leidbeiningar). They are also included in the LSH quality manual (SVEID-LSH).	Harmonised guidelines on intervention measures both within and outside healthcare institutions, hospitals, and nursing homes.	SVL	LSH, SAk, ÞÍH.	1	2025	2029
	4.2 Ensure appropriate responses when certain resistant bacteria in animals are detected. **Output indicator:** The proportion of defined target groups with specified guidelines. **Benchmark:** >95% of defined target groups with guidelines by the year 2029.	4.2.1 Develop guidelines on the treatment of pets identified with specific resistant bacteria. This includes disinfection and contact tracing.	Guidelines not in place.	Guidelines puiblished.	MAST	DÍ,	2	2027	2027
		4.2.2 Develop guidelines on the treatm ent of food producing animals identified with specific resistant bacteria. This includes disinfection and contact tracing.	Guidelines not in place.	Guidelines published for defined animal species.	MAST	DÍ, BÍ, MAR.	2	2025	2027

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
4. Contain the spread of antibiotic resistance through intervention measures	**4.3 Ensure appropriate responses when certain resistant bacteria in food are detected.** **Output indicator:** The proportion of defined target groups with specified guidelines. **Benchmark:** >95% of defined target groups with guidelines by the year 2029.	4.3.1 Develop guidelines on the handling of food and other consumer goods when certain resistant bacteria are detected, including disinfection and contact tracing.	Guidelines not in place.	Guidelines published.	MAST	MAR, SVL.	1	2025	2028
	4.4 Treat wastewater appropriately in order to minimise the spread of certain antibiotic resistant bacteria. **Output indicator:** The proportion of defined urban areas that have initiated measures to improve wastewater treatment. **Benchmark:** >95% of defined urban areas have initiated measures by the year 2029.	4.4.1 Wastewater treatment in Iceland complies with the provisions of laws and regulations.	Many wastewater treatment facilities across the country do not comply with the provisions of laws and regulations.	The 30 largest urban areas in the country have initiated measures to improve wastewater treatment.	URN	Local communities, Public Health Committees, HRN, MAST, UST.	1	2025	2029

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
4. Contain the spread of antibiotic resistance through intervention measures	**4.5 Ensure appropriate responses when certain resistant bacteria or antibiotic residues are detected in the environment.** **Output indicator:** The proportion of defined target groups with specified guidelines. **Benchmark:** >95% of defined target groups with guidelines by the year 2029.	4.5.1 Develop guidelines on actions when resistant bacteria are detected in wastewater/environment.	Guidelines not in place.	Guidelines published.	UST	Public Health Committees, HRN, URN, MAST.	2	2025	2028
		4.5.2 Develop guidelines on actions when antibiotic residues are detected in the environment.	Guidelines not in place.	Guidelines published.	UST	Public Health Committees, HRN, URN, MAST, Medicines Agency.	2	2025	2028

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
5. Increase participation in international cooperation on actions against antibiotic resistance	**5.1 Strengthen cooperation with institutions of the European Union.** **Output indicator:** Measurement and assessment of Iceland's participation in international cooperation. The proportion of projects and groups related to antibiotic resistance in which Iceland participates. **Benchmark:** Full participation in projects and groups related to antibiotic resistance by the year 2029.	5.1.1 Maintain and strengthen cooperation with ECDC on antibiotic use and resistance.	Cooperation and participation are in place. SVL is the national contact point with ECDC, and the SVEID is the reference laboratory.	Cooperation and participation satisfactory. Information distributed to relevant domestic stakeholders.	SVL	SVEID, Infection control Department of LSH, HRN.	1	2025	2029
		5.1.2 Increase Iceland's participation in various collabor ative projects, such as Joint Action projects on antibiotic resistance and use.	Iceland is a participant in the EU project on actions against antibiotic resistance and infections in the healthcare system (JAMRAI-2).	Additional funding obtained for actions related to antibiotic resistance. Increased knowledge and more effective monitoring and measures against antibiotic resistance.	HRN	SVL, MAST, UST, LSH, ÞÍH, Keldur.	1	2025	2029
		5.1.3 Strengthen cooperation with EMA, especially regarding the ensured supply of antibiotics and access to new antibiotics.	Cooperation and participation are in place (Medicines Agency and MAST).	Cooperation and participation satisfactory. Ensured supply of common antibiotics in Iceland and good access to new antibiotics.	HRN	Medicines Agency, hospitals, health institutions, SVL, MAR, MAST.	1	2025	2029
		5.1.4 Maintain and strengthen cooperation with EFSA.	Cooperation and participation are in place. MAST is the national contact point with EFSA.	Cooperation and participation satisfactory. Information distributed to relevant domestic stakeholders.	MAST	MAR	1	2025	2029
		5.1.5 Maintain the competence of National Reference Laboratory for Antimicrobial Resistance (NRL-AR) and cooperation with the EU Reference Laboratory for Antimicrobial Resistance (EURL-AR).	Cooperation and participation are in place. Keldur is designated by MAR as the National Reference Laboratory for antimicrobial resistance in animals in Iceland.	Cooperation and participation satisfactory. Information distributed to relevant domestic stakeholders.	MAR	Keldur	1	2025	2029

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
5. Increase participation in international cooperation on actions against antibiotic resistance		5.1.6 Strengthen cooperation with EU DG-SANTE (Health and Food Safety) - AMR One Health Networkand.	Inactive participation in online meetings and events. Contact points UST, MAST, and SVL.	More active participation in this forum.	HRN	MAR, URN, SVL, MAST, UST.	3	2025	2029
	5.2 Strengthen cooperation with international organisations. **Output indicator:** Measurement and assessment of Iceland's participation in international cooperation / The proportion of projects and groups related to antibiotic resistance in which Iceland participates. **Benchmark:** Full participation in projects and groups related to antibiotic resistance by the year 2029.	5.2.1 Maintain and strengthen cooperation with WHO on antibiotic resistance and antibiotic use.	SVL participates in WHO-GLASS cooperation on the use of antibiotics and AMR.	Cooperation and participation increased. Information distributed to relevant stakeholders.	SVL	LSH, HRN.	1	2025	2029
		5.2.2 Maintain and strengthen cooperation with WOAH.	Cooperation is ongoing. A representative from MAST participates in WOAH committees on antibiotic use and resistance.	Cooperation and participation satisfactory. Information distributed to relevant domestic stakeholders.	MAST	Engir aðrir.	1	2025	2029

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
5. Increase participation in international cooperation on actions against antibiotic resistance	**5.3 Strengthen Nordic cooperation.** **Output indicator:** Measurement and assessment of Iceland's participation in international cooperation/ The proportion of projects and groups related to antibiotic resistance in which Iceland participates. **Benchmark:** Full participation in projects and groups related to antibiotic resistance by the year 2029.	5.3.1 Ensure participation in expert and strategy groups of the Nordic Council of Ministers on actions against antibiotic resistance in the spirit of One Health.	Participation in place by SVL, MAST, UST, SVEID-LSH, and Keldur.	Increased knowledge about antibiotic resistance and joint research projects in place.	SVL	MAST, UST, SVEID-LSH og Keldur, HRN.	1	2025	2029
		5.3.2 Strengthen joint procurement of antibiotics in the Nordic countries.	Work has begun, see: https://www.lyfjastofnun.is/frettir/norraenn-samvinna-um-lyfjamal-styrkt-med-nyrri-stefnu/.	Joint procurement increased.	HRN	LSH	1	2025	2029

Actions	Objectives	Activities	Current status of activities	Deliverables of activities	Responsible stakeholders of activities	Other stakeholders	Priority of activities (1-3)	Start of activities (year)	End of activities (year)
6. Ensure coordination and management of actions against antibiotic resistance in Iceland for the future	**6.1 Ensure the implementation and execution of activities against antibiotic resistance in the near future.** **Output indicator:** Multidisciplinary group established. **Benchmark:** Multidisciplinary group established for the future.	6.1.1 A multidisciplinary group of experts should be appointed to oversee the implementation of the activities against antibiotic resistance and to reassess individual projects in the future.	A multidisciplinary group of experts is in place, appointed for two years. The group is currently tasked with proposing actions and individual projects.	Active policy making interdisciplinary group in place which reviews the government actions against antibiotic resistance.	HRN	MAR, URN.	1	2025	2029

2. Cost estimate of the action plan

2.1 Summary (ISK)

	2025	2026	2027	2028	2029	Alls
Basic cost	109.481.938	106.481.938	103.681.938	103.381.938	119.781.938	542.809.690
Additional cost	292.855.562	276.855.562	224.855.562	233.355.562	214.980.562	1.242.902.810
Total cost	402.337.500	383.337.500	328.537.500	336.737.500	334.762.500	1.785.712.500

Based on price level 2025
Basic cost: Funding already being allocated
Additional cost: extra funding needed

2.2 Cost estimates of individual actions (ISK)

Actions	Responsible stakeholders	Cost	2025	2026	2027	2028	2029	Total 2025-2029
1. Promote targeted and prudent use of antibiotics in humans and animals	HRN	Basic cost	3.000.000	0	0	0	0	3.000.000
		Additional cost	0	0	0	0	0	0
	EL	Basic cost	0	0	0	0	0	0
		Additional cost	80.000.000	80.000.000	32.000.000	29.000.000	17.000.000	238.000.000
	SVL	Basic cost	6.250.000	6.250.000	6.250.000	6.250.000	6.250.000	31.250.000
		Additional cost	3.593.750	3.593.750	3.593.750	3.593.750	3.593.750	17.968.750
	LSH	Basic cost	11.000.000	11.000.000	11.000.000	11.000.000	11.000.000	55.000.000
		Additional cost	23.000.000	23.000.000	23.000.000	23.000.000	23.000.000	115.000.000
	ÞÍH	Basic cost	3.644.438	3.644.438	3.644.438	3.644.438	3.644.438	18.222.190
		Additional cost	11.355.562	11.355.562	11.355.562	11.355.562	11.355.562	56.777.810
	MAR	Basic cost	0	0	0	0	0	0
		Additional cost	0	0	0	0	0	0
	MAST	Basic cost	6.700.000	6.700.000	6.700.000	6.700.000	6.700.000	33.500.000
		Additional cost	7.600.000	7.600.000	7.600.000	7.600.000	7.600.000	38.000.000
	TOTAL	Basic cost	30.594.438	27.594.438	27.594.438	27.594.438	27.594.438	140.972.190
		Additional cost	125.549.312	125.549.312	77.549.312	74.549.312	62.549.312	465.746.560
		Total	**156.143.750**	**153.143.750**	**105.143.750**	**102.143.750**	**90.143.750**	**606.718.750**

Actions	Responsible stakeholders	Cost	2025	2026	2027	2028	2029	Total 2025-2029
2. Limit the spread of antibiotic resistance through information dissemination, education, and prevention	HRN	Basic cost	0	0	0	0	0	0
		Additional cost	4.500.000	4.500.000	3.000.000	3.000.000	3.000.000	18.000.000
	SVL	Basic cost	8.593.750	8.593.750	8.593.750	8.593.750	8.593.750	42.968.750
		Additional cost	14.093.750	14.093.750	14.093.750	14.093.750	14.093.750	70.468.750
	ÞÍH	Basic cost	0	0	0	0	0	0
		Additional cost	1.000.000	1.000.000	1.000.000	1.000.000	1.000.000	5.000.000
	HH	Basic cost	0	0	0	0	0	0
		Additional cost	600.000	0	0	0	0	600.000
	MAST	Basic cost	2.500.000	2.500.000	2.500.000	2.500.000	2.500.000	12.500.000
		Additional cost	6.400.000	4.900.000	14.400.000	13.400.000	7.900.000	47.000.000
	TOTAL	Basic cost	11.093.750	11.093.750	11.093.750	11.093.750	11.093.750	55.468.750
		Additional cost	26.593.750	24.493.750	32.493.750	31.493.750	25.993.750	141.068.750
		Total	**37.687.500**	**35.587.500**	**43.587.500**	**42.587.500**	**37.087.500**	**196.537.500**

Actions	Responsible stakeholders	Cost	2025	2026	2027	2028	2029	Total 2025-2029
3. Improve knowledge of antibiotic resistance through monitoring and scientific research	HRN	Basic cost	3.000.000	0	0	0	0	3.000.000
		Additional cost	27.000.000	27.000.000	27.000.000	34.000.000	41.000.000	156.000.000
	SVL	Basic cost	781.250	781.250	781.250	781.250	781.250	3.906.250
		Additional cost	7.500.000	7.500.000	7.500.000	7.500.000	7.500.000	37.500.000
	LSH	Basic cost	0	0	0	0	0	0
		Additional cost	33.000.000	33.000.000	33.000.000	33.000.000	33.000.000	165.000.000
	MAR	Basic cost	47.500.000	50.500.000	47.700.000	47.400.000	63.800.000	256.900.000
		Additional cost	16.000.000	21.000.000	16.000.000	21.500.000	16.000.000	90.500.000
	MAST	Basic cost	6.700.000	6.700.000	6.700.000	6.700.000	6.700.000	33.500.000
		Additional cost	1.700.000	1.700.000	1.700.000	1.700.000	1.700.000	8.500.000
	UST	Basic cost	1.100.000	1.100.000	1.100.000	1.100.000	1.100.000	5.500.000
		Additional cost	8.300.000	0	0	0	0	8.300.000
	TOTAL	Basic cost	59.081.250	59.081.250	56.281.250	55.981.250	72.381.250	302.806.250
		Additional cost	93.500.000	90.200.000	85.200.000	97.700.000	99.200.000	465.800.000
		Total	**152.581.250**	**149.281.250**	**141.481.250**	**153.681.250**	**171.581.250**	**768.606.250**

Actions	Responsible stakeholders	Cost	2025	2026	2027	2028	2029	Total 2025-2029
4. Contain the spread of antibiotic resistance through intervention measures	SVL	Basic cost	1.562.500	1.562.500	1.562.500	1.562.500	1.562.500	7.812.500
		Additional cost	2.375.000	2.375.000	2.375.000	2.375.000	0	9.500.000
	MAST	Basic cost	0	0	0	0	0	0
		Additional cost	1.700.000	1.700.000	1.700.000	1.700.000	1.700.000	8.500.000
	URN	Basic cost	0	0	0	0	0	0
		Additional cost	7.000.000	7.000.000	0	0	0	14.000.000
	UST	Basic cost	0	0	0	0	0	0
		Additional cost	10.600.000	0	0	0	0	10.600.000
	TOTAL	Basic cost	1.562.500	1.562.500	1.562.500	1.562.500	1.562.500	7.812.500
		Additional cost	21.675.000	11.075.000	4.075.000	4.075.000	1.700.000	42.600.000
		Total	**23.237.500**	**12.637.500**	**5.637.500**	**5.637.500**	**3.262.500**	**50.412.500**

Actions	Responsible stakeholders	Cost	2025	2026	2027	2028	2029	Total 2025-2029
5. Increase participation in international cooperation on actions against antibiotic resistance	HRN	Basic cost	0	0	0	0	0	0
		Additional cost	2.000.000	2.000.000	2.000.000	2.000.000	2.000.000	10.000.000
	SVL	Basic cost	6.250.000	6.250.000	6.250.000	6.250.000	6.250.000	31.250.000
		Additional cost	15.437.500	15.437.500	15.437.500	15.437.500	15.437.500	77.187.500
	MAST	Basic cost	900.000	900.000	900.000	900.000	900.000	4.500.000
		Additional cost	1.700.000	1.700.000	1.700.000	1.700.000	1.700.000	8.500.000
	MAR (Keldur)	Basic cost	0	0	0	0	0	0
		Additional cost	500.000	500.000	500.000	500.000	500.000	2.500.000
	UST	Basic cost	0	0	0	0	0	0
		Additional cost	500.000	500.000	500.000	500.000	500.000	2.500.000
	TOTAL	Basic cost	7.150.000	7.150.000	7.150.000	7.150.000	7.150.000	35.750.000
		Additional cost	20.137.000	20.137.000	20.137.000	20.137.000	20.137.000	100.687.500
		Total	**27.287.500**	**27.287.500**	**27.287.500**	**27.287.500**	**27.287.500**	**136.437.500**

Actions	Responsible stakeholders	Cost	2025	2026	2027	2028	2029	Total 2025-2029
6. Ensure coordination and management of actions against antibiotic resistance in Iceland for the future	HRN	Basic cost	0	0	0	0	0	0
		Additional cost	3.000.000	3.000.000	3.000.000	3.000.000	3.000.000	15.000.000
	MAR/MAST	Basic cost	0	0	0	0	0	0
		Additional cost	1.800.000	1.800.000	1.800.000	1.800.000	1.800.000	9.000.000
	URN	Basic cost	0	0	0	0	0	0
		Additional cost	600.000	600.000	600.000	600.000	600.000	3.000.000
	TOTAL	Basic cost	0	0	0	0	0	0
		Additional cost	5.400.000	5.400.000	5.400.000	5.400.000	5.400.000	27.000.000
		Total	**5.400.000**	**5.400.000**	**5.400.000**	**5.400.000**	**5.400.000**	**7.812.500**
		Total	**402.337.500**	**383.337.500**	**328.537.500**	**336.737.500**	**334.762.500**	**1.785.712.500**

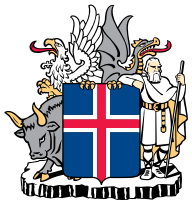
Based on price level 2025
Basic cost: Funding already being allocated
Additional cost: extra funding needed

2.3 Cost estimates of stakeholders (ISK)

Responsible stakeholders	Cost	2025	2026	2027	2028	2029	Total 2025-2029
HRN	Basic cost	6.000.000	0	0	0	0	6.000.000
	Additional cost	36.500.000	36.500.000	35.000.000	42.000.000	49.000.000	199.000.000
EL	Basic cost	0	0	0	0	0	0
	Additional cost	80.000.000	80.000.000	32.000.000	29.000.000	17.000.000	238.000.000
SVL	Basic cost	23.437.500	23.437.500	23.437.500	23.437.500	23.437.500	117.187.500
	Additional cost	43.000.000	43.000.000	43.000.000	43.000.000	40.625.000	212.625.000
LSH	Basic cost	11.000.000	11.000.000	11.000.000	11.000.000	11.000.000	55.000.000
	Additional cost	56.000.000	56.000.000	56.000.000	56.000.000	56.000.000	280.000.000
HH	Basic cost	0	0	0	0	0	0
	Additional cost	600.000	0	0	0	0	600.000
ÞÍH	Basic cost	3.644.438	3.644.438	3.644.438	3.644.438	3.644.438	18.222.190
	Additional cost	12.355.562	12.355.562	12.355.562	12.355.562	12.355.562	61.777.810
MAR	Basic cost	47.500.000	50.500.000	47.700.000	47.400.000	63.800.000	256.900.000
	Additional cost	17.500.000	22.500.000	17.500.000	23.000.000	17.500.000	98.000.000
MAST	Basic cost	16.800.000	16.800.000	16.800.000	16.800.000	16.800.000	**84.000.000**
	Additional cost	19.900.000	18.400.000	27.900.000	26.900.000	21.400.000	**114.500.000**

Responsible stakeholders	Cost	2025	2026	2027	2028	2029	Total 2025-2029
URN	Basic cost	0	0	0	0	0	**0**
	Additional cost	7.600.000	7.600.000	600.000	600.000	600.000	**17.000.000**
UST	Basic cost	1.100.000	1.100.000	1.100.000	1.100.000	1.100.000	**5.500.000**
	Additional cost	19.400.000	500.000	500.000	500.000	500.000	**21.400.000**
	Total	**402.337.500**	**383.337.500**	**328.537.500**	**336.737.500**	**334.762.500**	**1.785.712.500**

Based on price level 2025
Basic cost: Funding already being allocated
Additional cost: extra funding needed



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