



Government  
of Norway

Strategy

# National One Health Strategy Against Antimicrobial Resistance

2024-2033





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# Foreword

Antimicrobial resistance (AMR) is one of the most pressing health challenges in the world. Without effective measures, this problem will only intensify for future generations. Efforts to combat AMR are more important than ever before, both in Norway and the rest of the world. The consequences of a lack of treatment options for infectious diseases are severe. Therefore, it has been a priority for us to launch a new National Cross-Sectoral One Health Strategy against AMR in 2024. The strategy paves the way for a comprehensive effort to combat AMR in the coming years.

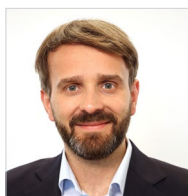
The term *One Health* is now included in the title. This inclusion is meant to reinforce the message that efforts to combat AMR must take place across all sectors of society. The correlation between public health, animal health, plant health and the environment necessitates a One Health perspective on AMR. The strategy is also intended to serve as a link in the cross-sectoral planning and implementation of measures against AMR. Sector-specific action plans will be drawn up, where appropriate.

Compared to other countries, Norway is still in a relatively favourable position in terms of AMR. However, Norway is already experiencing the adverse effects of AMR. Therefore, the goal of the strategy is to harness new knowledge and lessons learned in order to reduce the risk of AMR increasing and developing into an intractable problem. It is crucial to limit disease and mortality caused by, or related to, AMR.

We need to continue our efforts to improve prescribing practices for antimicrobial agents, increase preventive efforts to reduce infections in humans, animals and plants and reduce the occurrence of healthcare associated infections. Knowledge about AMR and the factors that influence its development are crucial to implementing effective measures. Research, innovation and surveillance are therefore essential components of this strategy. The strategy also seeks to improve the Norwegian population's knowledge about AMR, particularly among children and young people.

The efforts to combat AMR in Norway are inextricably linked to the situation in the rest of the world. Norway seeks to contribute to reducing AMR globally through international cooperation and assistance. Such efforts have both direct and indirect effects on AMR in Norway. It is necessary to strengthen international efforts across sectors from a One Health perspective. In addition to governments, multilateral organisations including the UN, WHO, WOAHA, FAO and UNEP, the private sector, civil society, academia and other actors also play an important role.

The strategy establishes a foundation for both domestic and international efforts. These efforts are key to preserving, further developing and ensuring the availability of effective antimicrobial agents for future generations.



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## Abbreviations

**AMR** — Antimicrobial Resistance

**CPO** — Carbapenemase-producing organisms (bacteria)

**DG HERA** — The European Commission’s Health Emergency Preparedness and Response Authority

**ECDC** — European Centre for Disease Prevention and Control

**EMA** — European Medicines Agency

**ESBL** — Extended spectrum beta-lactamase (bacteria)

**EEA** — European Economic Area, i.e., EU Member States, Norway, Iceland and Liechtenstein

**FAO** — Food and Agriculture Organization of the United Nations

**IPC** — Infection Prevention and Control (in the health service)

**MRSA** — Methicillin-resistant *Staphylococcus aureus* (bacteria)

**NORM** — Norwegian Surveillance Programme for Antimicrobial Resistance in Human Pathogens

**NORM-VET** — Norwegian Monitoring Programme for Antimicrobial Resistance in Bacteria from Feed, Food and Animals

**OECD** — Organisation for Economic Co-operation and Development

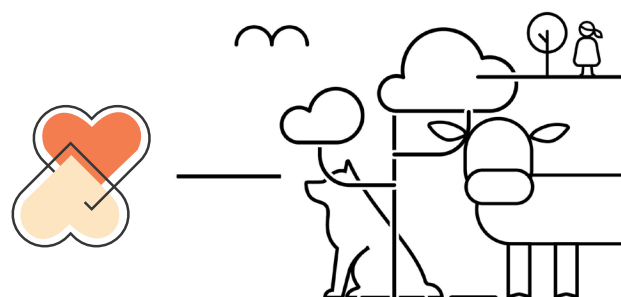
**UNEP** — United Nations Environment Programme

**VRE** — Vancomycin-resistant *Enterococcus* (bacteria)

**WHO** — World Health Organization

**WOAH** — World Organisation for Animal Health





# Introduction


The prevention and treatment of infections in humans, food-producing animals,<sup>1</sup> companion animals and plants is essential to ensure a healthy and functioning society. When necessary, infections caused by bacteria, viruses, fungi and parasites are treated using medications containing antimicrobial active substances. Similarly, plants are treated with pesticides to prevent and treat plant pests. However, as a consequence of this, microbes may develop resistance to the active substances in question. Antimicrobial resistance (AMR) is a term that encompasses resistance to all types of antimicrobial agents, including agents against bacteria (antibiotics)<sup>2</sup>, viruses (antivirals), parasites (antiparasitics) and fungi (antifungal agents). The WHO has declared AMR as one of the top 10 global public health threats. Without effective antimicrobial agents, it will be difficult to prevent and treat infections, offer modern surgical procedures, and perform cancer treatments. According to the OECD, AMR already contributes to longer hospital stays and an increased risk of complications in patients. Unless we take effective action, AMR will be one of the drivers of increased strain and costs on our health care services. Without effective measures against microbes, it is expected that AMR will result in more than 569 million additional days in hospital per year by 2050 and cost 1.1 billion EUR per year, in the EEA for the period 2015-2050.<sup>3</sup> It is therefore important to prevent AMR from developing into an almost intractable problem.

There is a clear correlation between the use of antimicrobial agents and the occurrence of AMR. Nevertheless, the prevention of AMR involves far more than just the prudent use of antimicrobial agents. The strong correlation between public-, animal-, and plant health, and the environment, necessitates a One Health perspective on AMR. A cross-sectoral approach is also key, as efforts against AMR within a single sector, do little to limit the major challenges posed by AMR and the proliferation of resistance genes across sectors. The One Health concept recognises the complex interactions between humans, animals and the environment. It emphasises the importance of an interdisciplinary approach to understanding health challenges, solving problems, and achieving good health and well-being.

<sup>1</sup> Food-producing animals comprises livestock (including horses) and farmed fish.

<sup>2</sup> In the strategy, antimicrobial agents against bacteria are referred to as *antibiotics*.

<sup>3</sup> [AMR-Tackling-the-Burden-in-the-EU-OECD-ECDC-Briefing-Note-2019.pdf](#)



**The World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (WOAH) and the United Nations Environment Programme (UNEP) have agreed on a common definition of One Health:**

*One Health is an integrated, unifying approach that aims to sustainably balance and optimise the health of people, animals and ecosystems. It recognises the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent. The approach mobilises multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development.*

AMR is not a new phenomenon. As early as 1945, Sir Alexander Flemming warned that overuse of penicillin could have disastrous consequences. As a countermeasure to the risk of AMR, Norway has adopted a restrictive approach to the use of antimicrobial agents, implemented a number of control measures, requirements, recommendations, and plans, all aimed at preventing disease in both humans and animals. The first Norwegian cross-sectoral action plan against antibiotic resistance was adopted in 2000. The action plan was regularly updated until the National Strategy against Antibiotic Resistance was launched in 2015. The main goal of this strategy was to reduce the total use of antibiotics, promote more appropriate use thereof, and increase knowledge of what drives the development and spread of antibiotic resistance. Furthermore, the strategy aimed for Norway to be a force in international and normative efforts to improve access, responsible use, and development of new antimicrobial agents, vaccines, and better diagnostic tools.

At the start of the work on revising the 2015 strategy, the Norwegian Institute of Public Health was commissioned to prepare a knowledge gap analysis, in cooperation with the Norwegian Veterinary Institute, the Institute of Marine Research, the Norwegian Environment Agency and the Norwegian Food Safety Authority. The report was presented in December 2020 and was published on the Norwegian Institute of Public Health's website.<sup>4</sup> Due to the COVID-19 pandemic,

<sup>4</sup> [amr-kunnskapshull-rapport.pdf \(fhi.no\)](#)

further work on drafting a new strategy was delayed, but the knowledge gap analysis was nevertheless considered to be an important source document. One of the Expert Group's conclusions was: *"The Norwegian National Strategy against Antibiotic Resistance (2015–2020) primarily focused on reducing the consumption of antibiotics in humans and animals. The goals for the human health service have largely been achieved, both in terms of total human consumption of antibiotics and the use of particularly resistance-driving antibiotics in healthcare institutions. For animals, including farmed fish, all the reduction targets have been reached, and there is no evidentiary basis for recommending new general reduction targets"*.

The Norwegian Directorate of Health has led an evaluation process of the action plans under the strategy, related to human health and in January 2023 published the *Handlingsplan mot antibiotikaresistens i helsetjenesten – evalueringsrapport 2022* [Action Plan against antibiotic resistance in the health service — Evaluation report 2022],<sup>5</sup> followed by the *Evaluering av handlingsplan for et bedre smittevern 2019-2023* [Evaluation of the action plan for improved infection prevention and control 2019-2023] in March 2024.<sup>6</sup> These reports highlight several achievements, as well as areas in need of further work. For example, it was noted that there continues to be a need to reduce the use of certain types of antibiotics in the health service and to continue efforts to reduce healthcare associated infections.

Every year, NORM/NORM-VET publishes a report on the Usage of Antimicrobial Agents and Occurrence of Antimicrobial Resistance in Norway. The key message of NORM/NORM-VET 2022 is as follows: *"Antimicrobial resistance is still a limited problem among humans and food-producing animals in Norway. This reflects the low use of antibacterial agents in human and veterinary medicine, a favourable pattern of use, as well as effective infection prevention and control measures. The data presented in this report indicate that the strategies for containment of antimicrobial resistance have been successful, both in the food-producing animal sector as well as in the healthcare sector. Continuous efforts and awareness raising are needed to preserve the favourable situation and ensure that antibacterials remain effective when needed"*.

Efforts to combat AMR have also been intensified in the EU. In June 2023, the Council of the European Union issued a Council Recommendation on stepping up EU actions to combat AMR in a One Health approach<sup>7</sup>. The Council Recommendation contains a number of specific goals and calls on states to incorporate these goals into their respective national strategies and action plans. Although such a Council Recommendation is not binding upon EU Member

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<sup>5</sup> [Handlingsplan mot antibiotikaresistens i helsetjenesten – evalueringsrapport 2022 — Norwegian Directorate of Health](#) [Action Plan against antibiotic resistance in the health service — Evaluation report 2022 – In Norwegian only]

<sup>6</sup> [Evaluering av handlingsplan for et bedre smittevern 2019-2023 — Norwegian Directorate of Health](#) [Evaluation of the action plan for improved infection prevention and control 2019-2023]

<sup>7</sup> [Council Recommendation on stepping up EU actions to combat antimicrobial resistance in a One Health approach \(europa.eu\)](#)

States or Norway (as an EEA country), it is in Norway's interest to follow up this recommendation as cooperation with the EU is important in the global efforts against AMR.

Even though the 2015 National Strategy against Antibiotic Resistance focused on bacterial resistance, and used the term *antibiotic resistance*, it was explained in a footnote that the strategy covered all forms of antimicrobial resistance. Based on both the development of knowledge and the international use of the term, we have decided to consistently use the term *antimicrobial resistance* in this new strategy. Thus, greater attention is being paid to the development of AMR in microbes other than bacteria, e.g., in fungi. Antimicrobial agents against fungi, known as *antifungal agents*, are widely used in agriculture globally and in other products exposed to fungi, such as paint products. In the field of human medicine, there has been a global rise in the number of recorded outbreaks of *Candida auris* – a microbe that can be resistant to several types of antifungal agents. The European Centre for Disease Control (ECDC) and several health institutions in Europe<sup>8</sup> have issued clear warnings that antifungal resistance is a pressing challenge.


Most respiratory tract infections are caused by viruses that are self-limiting and often do not require treatment. However, in certain cases, the use of antiviral agents is recommended in the treatment of viral infections. Such treatments can contribute to the development of antiviral resistance. Thus, it is important that this strategy also addresses measures to reduce resistance to antiviral agents. Sometimes patients can be given antibiotics to treat viral infections or for secondary bacterial infections. Prudent use in these settings is also important as unnecessary use of antibiotics to treat viral diseases contributes to an increased occurrence of antibiotic resistance.

Although we have been successful in reducing the use of antimicrobial agents in Norway, measures are still needed to ensure a prudent and responsible use of antimicrobials. These measures should comprise all aspects of a One Health approach and include measures to encourage less use of antimicrobial agents, continued use and access to narrow-spectrum antimicrobials, and strengthened international efforts. Just as important as a prudent and responsible use of antimicrobial agents are the preventive efforts to reduce infections in humans, food-producing animals and companion animals, as well as corresponding preventive efforts to avoid plants becoming infested with plant pests. The pandemic gave rise to new knowledge about infection prevention and control and the integrated use of surveillance data as a basis for advice and measures. It is

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<sup>8</sup> [Eurosurveillance | Increasing number of cases and outbreaks caused by \*Candida auris\* in the EU/EEA, 2020 to 2021](#)

important that new knowledge is used so that implemented prevention measures have a real effect against AMR.



### **Narrow-spectrum and broad-spectrum antibiotics;**

Antibiotics kill bacteria or slow bacterial growth. Narrow-spectrum antibiotics target a limited group of bacteria. They should be the antibiotic of choice whenever possible. Penicillin is the most commonly used type of antibiotic in humans in Norway. Broad-spectrum antibiotics target many types of bacteria and may be required in the case of severe illness or if it is unknown which type of bacteria have caused the illness.

Internationally, a number of processes are underway to strengthen efforts against AMR. Norway seeks to be a force for targeted and effective global and regional initiatives against AMR. Microbes do not respect national borders, necessitating, both national and global efforts against AMR. We must contribute to efforts in other countries that have higher rates of infections, resistance and use of antimicrobial medicines in order to halt the development of resistance globally, and thereby also in Norway. In this context, Norway will contribute to strengthening prevention, continue to promote a prudent and responsible use of antimicrobial agents and contribute to ensuring a One Health approach in AMR efforts. To avoid infections, it is necessary to ensure that preventive measures such as access to clean water and basic health services are available in all countries. Furthermore, it is important to work together in an international context to ensure improved access to narrow-spectrum antibiotics.

Knowledge of the causes and mechanisms (drivers) of the development and spread of AMR, as well as knowledge of prevention and treatment are essential to be able to successfully take action against AMR. At the same time, it is important that new knowledge is applied and is not merely an end in itself. We need to view the whole picture in context, from the generation of new knowledge to the implementation of knowledge, in all aspects of society.

The new national strategy builds upon lessons learned and results achieved through the previous strategy and previous action plans. The recommendations in the knowledge gap analysis, the evaluation work by government agencies and the EU Council Recommendation constitute key documents. Both the COVID-19 pandemic and the situation of war in Europe have shown that all countries can be

vulnerable to health threats and provided us with experiences that are relevant to the efforts against AMR.

It is expected that relevant government ministries draw up separate, sector-specific action plans in which they will develop their own targets. The action plans should be consistent with the principles in the strategy. Through the measures described both in the strategy and subsequent sector-specific action plans, the overall aim is to curb the development of AMR, both at the national and international level. Furthermore, the strategy and sector-specific action plans should ensure that Norway is even better equipped in its efforts against AMR in the sectors of agriculture, aquaculture, health and environment, as well as to actively contribute in the global efforts against AMR.

This strategy is expected to remain in effect for a period of ten years. As such, it will be important to carry out an interim evaluation, based on a situational analysis, an evaluation of the measures and their implementation.



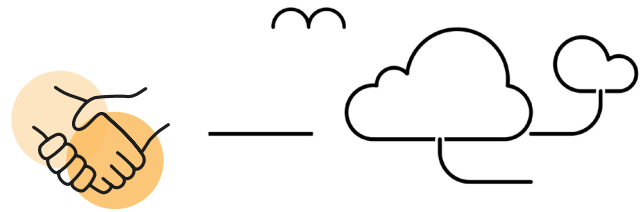
# Goals

In its efforts to reduce the challenges AMR poses to public, animal and plant health, and the environment, both nationally and globally, the Government will build upon the goals of the previous strategy. The Government emphasises that measures in the various sectors are to be viewed in context and that efforts are to be well coordinated in order to achieve our ambitious goals.

The main goals shall provide guidance and reflect a One Health approach. The points in the sections titled 'The Government-will' are worded so that their implementation can be measurable and verifiable. Where appropriate, goals and measures will be further elaborated in action plans.

## Main goals

1. Strengthen cross-sectoral AMR collaboration
2. Strengthen the prevention of AMR
3. Ensure prudent and responsible use of antimicrobial agents
4. Ensure access to necessary antimicrobial agents
5. Increase and make use of new knowledge regarding AMR
6. Be an active force in the global efforts against AMR



## Strengthen cross-sectoral AMR collaboration

In order to work effectively against AMR we are dependent on both a One Health and a cross-sectoral approach. The 2015 World Health Assembly resolution states that [...] *there is a need for a coherent, comprehensive and integrated approach at global, regional and national levels, in a “One Health” approach and beyond [...]*. The new strategy shows how cross-sectoral collaboration is envisaged in a Norwegian context. The preparation and publication of the strategy by five government ministries will ensure that the goals are followed up in each sector and by their underlying government agencies.

Both a One Health approach and cross-sectoral measures across the relevant areas of responsibility require information sharing, a common understanding of the situation, interaction and coordination. To manage this cooperation, an interministerial working group led by the Ministry of Health and Care Services was established in which the Ministry of Agriculture and Food, the Ministry of Trade, Industry and Fisheries and the Ministry of Climate and Environment have participated. We have continued the interministerial working group and expanded the group by including a representative from the Ministry of Foreign Affairs. The Ministry of Health and Care Services has acted as the secretariat for the group and coordinated its work. A clearer mandate for the interministerial working group will be drawn up. The mandate will reflect what is referred to by the WHO as a “multisectoral coordinating group (MCG)”. The working group shall coordinate the follow-up of the measures described in the strategy and the associated action plans. Furthermore, the working group shall ensure that an interim evaluation of the strategy and a final evaluation, including a situational analysis and knowledge gap assessment, are carried out. In order to ensure good cooperation, the working group shall prepare an annual schedule indicating relevant cross-sectoral events regarding AMR. Furthermore, the working group shall contribute to information exchange and be responsible for coordinating the follow-up of events of significance to AMR, where there is a need for an interministerial approach.

Cross-sectoral coordination is important at all levels. Therefore, it is important to facilitate coordination between different government agencies, healthcare



institutions, microbiology laboratories and other actors included in work with animals, humans and the environment. The coordination efforts of existing groups and steering committees should therefore continue.

The One Health approach is important in highlighting the interconnections between public health, animal health, plant health, and the state of the environment. The effects of climate change across the globe have already affected the emergence and spread of several types of diseases, such as malaria and dengue fever. In addition, environmental degradation and pollution affect the occurrence and risk of various types of infections. These three factors jointly contribute to the increased occurrence of established infectious diseases, as well as an increased risk of emergence of new unknown infections. There are ongoing discussions as to whether urbanisation can lead to a heightened risk of zoonotic diseases,<sup>9</sup> thereby increasing the strain on health and care services and contributing to increased AMR. This shows the importance of adopting a cross-sectoral approach.

Norway has had good systems for One Health surveillance of resistance and use of antimicrobial agents among humans and animals (in NORM and NORM-VET) for several years. Moving forward, there is a need to explore ways to further improve these systems. It is particularly important to consider how multisectoral surveillance can be developed to ensure more harmonised and integrated surveillance systems. For instance, it is relevant to assess whether surveillance of resistance markers in Norwegian wastewater should be included in the integrated surveillance. Moreover, it is important to ensure improved data sharing among relevant actors.

Population ageing, social inequalities, chronic diseases and the need for medical treatment increase the risk of longer and more frequent hospital stays, invasive treatments, and a greater need for long-term use of antimicrobial agents. As a result, the risk of healthcare associated infections and the development of resistant infections also increases. An action plan for the prevention of healthcare associated infections and AMR in the human health sector will be important to ensure coordinated action on human health. As the total burden of disease has considerable bearing on the domestic AMR situation, it is necessary that efforts relating to AMR and healthcare associated infections be viewed in the context of the sector's efforts on universal health coverage and health promotion. This work takes place at all levels of health and care services, in local government and in civil society. Good collaboration between all these actors to contribute to good health and a low burden of disease is therefore important from an AMR perspective. This will be followed up by revising the existing human health action plans, assessing existing and new measures, and continuing the well-functioning systems that are already in place.

The favourable situation of low occurrence of AMR in food-producing animals and companion animals in Norway is largely a result of good animal health and

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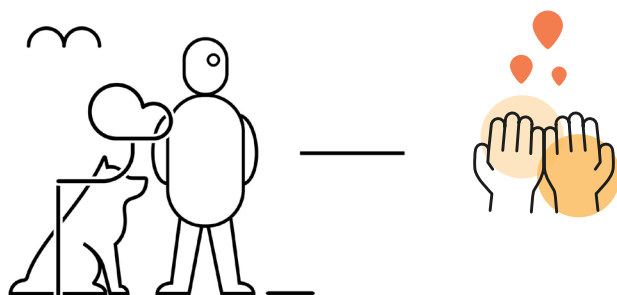
<sup>9</sup> Zoonotic diseases are infectious diseases that can be transmitted between animals and humans.

the fact that animal health personnel have adopted restrictive practices in prescribing and using antimicrobial agents. Furthermore, we have a responsible and competent livestock industry, as well as excellent cooperation between industry, national expert institutions and the authorities. A continuation of this good cooperation is important to ensure good disease prevention and infection control in food-producing animals and companion animals, so that good animal health is preserved and public health is safeguarded. In addition, consideration should be given to how other preventive work on agricultural inputs such as feed and fertilizers, in crop production and the environment can be included to ensure an even better cross-sectoral approach. It is essential to safeguard the goal of a better One Health approach and the importance of good cross-sectoral collaboration in the preparation of a new action plan for food-producing animals, companion animals, plants and intermediate goods in the agricultural sector.

There are different approaches as to how best to safeguard the cross-sectoral aspect of AMR efforts beyond a multisectoral group. For example, Sweden has an AMR Ambassador responsible for coordinating Sweden's cross-sectoral collaboration with other countries. The United Kingdom has a Special Envoy on AMR who is a key coordinator for all AMR efforts, both domestically and internationally. In order to strengthen and highlight efforts against AMR, it may be useful to investigate whether it is appropriate to establish a similar position in Norway.

#### **THE GOVERNMENT WILL:**

- strengthen cross-sectoral AMR collaboration
- ensure that the strategy is followed up in the form of sector-specific action plans with specific targets, where appropriate
- evaluate the status of the strategy work midway and towards the end of the strategy period
- investigate how we can further improve the integrated surveillance of AMR and use of antimicrobial agents from a One Health perspective
- assess how work against AMR can be included in health promotion and how civil society can best be involved
- investigate the need for a cross-sectoral AMR coordinator for the Government's AMR efforts



## Strengthen the prevention of AMR

Strengthening prevention against all infections will reduce the likelihood of the development and spread of AMR and the genes that cause resistance. Infection prevention is based on a whole of society and whole of government approach. From a One Health perspective, it is important to ensure good health, as well as reduce the number of infections in humans, food-producing animals, companion animals and plants. Good procedures for infection prevention and control in the health sector have been fundamental in Norway to these ends. Infections can lead to the spread of microbes and, in turn, an increased use of antimicrobial agents. Strengthened prevention will contribute to limiting the spread of infection and thereby maintain a low use of antimicrobial agents. Good preventive efforts must be viewed as a shared task, in which all sectors responsible for human, animal and plant health and the environment contribute. This is in line with the strategic priorities of the WHO, WOA, FAO and UNEP for the coming years.

Poor living conditions and chronic diseases can result in higher rates of infections. The risk of AMR increases with the number of infections that require repeated and prolonged treatment. Therefore, preventing chronic diseases and countering social inequalities will also contribute to preventing AMR.

Knowledge-based infection prevention and control is essential in order to reduce the risk and extent of infections, as well as infestations by plant pests. Furthermore, surveillance and data on microbes, outbreaks, resistance patterns and use of antimicrobial agents are key. It is necessary to strengthen our national surveillance capacity in order to be able to track changes and trends in a better and timely manner. This includes acquiring more knowledge about the burden of infections, including all healthcare associated infections,<sup>10</sup> prevalence of resistant microbes and use of antimicrobial agents. This is important to be able to take appropriate measures that limit infections, reduce unnecessary use of antimicrobial agents and limit the development of AMR.

<sup>10</sup> Infections that occur in connection with contact with the health service, especially hospital or nursing home stays.

In the healthcare sector, there is a need to investigate how all infections and outbreaks associated with the health and care services, including bloodstream infections,<sup>11</sup> postoperative wound infections and infections involving resistant microbes, can best be monitored. It is also necessary to investigate how such information can be used optimally by both national and local authorities, how information can be shared between reference laboratories and the national government agencies, and how new technology can be incorporated into the systems.

In recent years, we have gained further knowledge about how the environment can affect AMR, both directly and indirectly. Climate change can affect the development of resistance, both domestically and globally. Rising temperatures can lead to increased growth and survival of microorganisms such as bacteria and fungi. This, in turn, will increase the risk of infection and lead to greater usage of antimicrobial agents. With more extreme weather comes frequent flooding and an increased risk of unwanted and uncontrolled contaminations with sewage and wastewater. At the other end of the scale, droughts can contribute to poor harvests and a need for increased feed imports. This means that measures in the AMR strategy must also be viewed in the context of our stewardship of the environment, whether at the overarching societal level or at the level of individual societal contributions. There is a need for better knowledge of how resistant microbes and resistance genes can be transmitted from water and other reservoirs to other microbes, animals and humans. Wastewater monitoring has already been used in several countries to monitor COVID-19 and Norway should further investigate whether wastewater monitoring can contribute to improved prevention of AMR. It is necessary to investigate how we can ensure good infection prevention and control for humans, animals and plants, and at the same time reduce adverse impacts on the environment in Norway and in countries where medicines and infection prevention and control equipment are manufactured. For example, the contribution of single use IPC equipment to waste and environmental pollution should be minimized where possible.

Sustainable food systems based on good agricultural and animal husbandry practices, hygiene measures and biosecurity are fundamental to ensuring good animal and plant health, resulting in the reduced need for antimicrobial agents. In Norway, for decades, we have had a management model based on extensive cooperation and interaction between the government authorities, national expert institutions, animal health personnel, and the livestock and aquaculture industries to prevent disease and the development of AMR in humans and animals. The continuation and strengthening of this good cooperation is important to ensure good infection prevention and control and disease prevention among food-producing and companion animals. The knowledge-gap analysis revealed that

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<sup>11</sup> Severe and often life-threatening intravascular infections

human infections associated with MRSA and ESBL carry twice the risk of mortality compared to infections with susceptible bacteria in comparable patients. In the previous strategy, the aim was that livestock-associated MRSA (LA-MRSA) should not be established in Norwegian pig farms. LA-MRSA in pigs is notifiable to the national authorities and the purpose of the surveillance programme is to keep the Norwegian pig population free of LA-MRSA by identifying positive herds for further infection tracking and eradication. LA-MRSA has not been detected in pigs between 2019 and 2024. The goal that LA-MRSA should not be established in Norwegian pig farms remains, in order to maintain the good status and prevent Norwegian pig herds developing into a reservoir for transmission of LA-MRSA to humans.

The knowledge gap analysis revealed that some forms of resistance and resistant bacteria are considered particularly significant from a One Health perspective. From a precautionary perspective, it is necessary to minimise such occurrences to the greatest extent possible in food-producing and companion animals to prevent them from becoming a significant source of transmission to humans. At the same time, it will be important to ensure good practices to prevent humans contributing to the spread of AMR to animals. LA-MRSA has been introduced to Norwegian pig farms via persons who have been to countries where the incidence of LA-MRSA is higher than in Norway.<sup>12</sup> The *Regulations of 6 April 2022 relating to animal health* contain a requirement that laboratories and animal health personnel to notify the Norwegian Food Safety Authority immediately if they suspect or detect LA-MRSA in cattle, small ruminants, and pigs. In addition, there is a requirement that certain other resistant bacteria, regardless of animal species, be reported to the Norwegian Food Safety Authority within seven days. In the long term, this reporting obligation will contribute to providing a better overview and increased knowledge of particular forms of resistant bacteria in diseased animals. In addition, it will contribute to the detection of changes or outbreaks of resistant bacteria. It is necessary to establish procedures for regularly revising the list of which resistant bacteria and genes for resistance, are notifiable when detected in animals. It will be relevant to consider what types of resistance are notifiable for humans when revising the list for animals. In order to further reduce the risk of spread of AMR from animals, the knowledge gap analysis recommends introducing restrictions on animal husbandry in situations where resistance forms or resistant bacteria have been detected in animals that are significant from a One Health perspective be given consideration. Under the current legislation, restrictions on animal husbandry are required upon detection of LA-MRSA. No restrictions will be imposed on animal husbandry when other listed resistant bacteria are detected, unless the animal shows signs of clinical disease. The introduction of restrictions or other measures beyond the requirements currently stipulated in the legislation, and the possible consequences thereof, will have to

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<sup>12</sup> [Spread model and socio-economic analysis of measures against LA-MRSA](#)

be considered in greater detail. In the forthcoming period, it will be necessary to maintain a good emergency response to diseases caused by resistant bacteria within Norway, as well as ensure sound control on the import of animals, animal products, plants, food and feed in order to prevent the introduction of such diseases to the country.

For several years, various preventive methods have been used in crop production in order to reduce the need for direct control of plant diseases and other pests. Integrated crop protection, such as crop rotation, breeding of new species, measures in sowing, planting and harvesting, have contributed to combating plant pests, and thereby reducing the need for antifungal agents. The choice of appropriate preventive measures in the field of integrated crop protection will depend on the crop and the pest. Against the backdrop of increasing resistance to azoles, which are important antifungal agents from a One Health perspective, there is a need to raise awareness on the use of other preventive measures than the use of such agents. It is also necessary to gain an overview of the extent to which agricultural and other actors are using antifungal agents rather than alternative preventive measures.

Immunisation reduces the occurrence and limits the spread of infection by protecting people and animals from infections and the development of disease. It is important to develop new vaccines, and ensure access to both new and existing vaccines. In addition, better use of vaccines will reduce the burden of disease and the need for antimicrobial agents as fewer people will become ill. Well-supported immunisation programmes can provide significant societal benefits and help limit the development of AMR. In addition, targeted immunisation can be used to reduce the use of antimicrobial agents.

High vaccination coverage for the vaccines that are part of the Childhood Immunisation Programme contribute significantly to limiting the need for antimicrobial agents. The Government is working on establishing an adult immunisation programme, which will also contribute to reducing the occurrence of AMR. Vaccination of health and care services personnel against seasonal influenza is an example of how vaccines can reduce transmission from health personnel to especially vulnerable patients, which is important for infection prevention and control in relation to AMR. There is still room for improvement in terms of achieving higher vaccination rates in the healthcare sector.

Vaccination of food-producing animals and companion animals promotes good animal health and animal welfare. The successful phasing out of Narasin in poultry production (which was a goal of the previous strategy) has largely been due to the use of effective vaccines and improved routines. In the 1980s, vaccination was adopted as a targeted policy instrument to reduce the use of antimicrobial agents in aquaculture. Since the previous strategy, the aquaculture

industry has been working on vaccines for cleaner fish and new vaccines for salmon have been granted market authorisation.

Infection prevention and control in the health and care services, internationally referred to as *Infection Prevention and Control* (IPC), is particularly important to avoid the spread of resistant infectious agents and the potential consequences for affected persons and healthcare institutions. The ECDC has estimated that there are more than 3.5 million cases of healthcare associated infections each year in the EEA countries. Such infections are the cause of more than 90,000 deaths. As a follow-up to the 2015 National Strategy, the Ministry of Health and Care Services launched the *Handlingsplan for et bedre smittevern* [Action plan for better Infection Prevention and Control] in 2019.<sup>13</sup> In the knowledge gap analysis, the Expert Group noted that it is important to follow up and further develop the National Action Plan. In 2018, the Norwegian Institute of Public Health published a situational analysis of infection prevention and control in Norway and the Norwegian Directorate of Health has evaluated the Action Plan. Both highlighted the need for clear infection prevention and control goals in the strategy and that these goals be followed up in the form of measures in the subsequent action plan. In Norway, we are privileged to have good infection prevention and control in our healthcare institutions. Nevertheless, reports from the Norwegian Institute of Public Health show that every 20th hospitalised patient contracts a hospital infection. Data from the OECD show that about 70 per cent of all human infections caused by resistant bacteria are healthcare associated infections.

The COVID-19 pandemic showed how important it is to avoid the spread of infections in institutions, both to avoid serious infections, but also to be able to maintain a normal level of service. The Norwegian Institute of Public Health has published an after-action review on infection prevention and control in the health and care services during and after the pandemic which highlighted several areas of improvement. This will be viewed in the context of other action plans belonging to the sector which are planned to be revised in the forthcoming strategy period. The European Centre for Disease Prevention and Control (ECDC) has estimated that approximately 50 per cent of all healthcare associated infections are preventable. The proportion of preventable infections varies depending on the type of infection, institution, resources, etc. Although there has been a long-standing focus on this topic in Norway, there is room for improvement of infection prevention and control, as well as their surveillance. National experts in this field have expressed the need for measures with clear goals.

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<sup>13</sup> [Handlingsplan for et bedre smittevern – med det mål å redusere helsetjenesteassosierte infeksjoner 2019–2023 \[Action plan for better Infection Prevention and Control – with the aim of reducing healthcare associated infections 2019—2023 – in Norwegian only\] \(regjeringen.no\)](https://www.regjeringen.no)

Healthcare associated infections have adverse consequences for individual patients, and also result in high costs and reduced capacity in the health and care services. In addition to the fact that over 70 per cent of resistant bacterial infections are healthcare associated, some studies have shown that healthcare associated infections result in longer hospital stays. For example, a study from Scotland found that median hospital stays were 7.8 days longer for patients with healthcare associated infections, and concluded that, in Scotland, a 10 per cent reduction in such infections annually would reduce patient-days in healthcare institutions by 5,800.<sup>14</sup> Therefore, it is desirable to reduce the proportion of healthcare associated infections as the costs involved are considered to greatly exceed the costs associated with improved infection prevention and control. A vision zero approach is not considered realistic. However, a realistic goal is to reduce the occurrence of healthcare associated infections by at least 10 per cent during the strategy period.

Infection prevention and control against resistant microbes is part of overall infection prevention and control in the health service. This means that measures targeting multiple microbes are required, including hand hygiene, infection surveillance and the use of antimicrobial agents. In addition, measures targeting specific microbes or resistance are also needed, such as screening and isolation during stays in the health service. For several years, MRSA garnered the most attention. However, in recent years we have also seen major outbreaks of VRE and an increase in cases of CPOs that are highly resistant to several different medications. In other countries, we have also seen outbreaks of resistant fungal infections and an increase in multidrug-resistant tuberculosis. The continual emergence of new disease suggests a need to revise existing policies and guidance, including routines for isolation and infection prevention and control. Guidelines, manuals and advice must be based on up-to-date knowledge, surveillance data and knowledge of the effectiveness of measures.

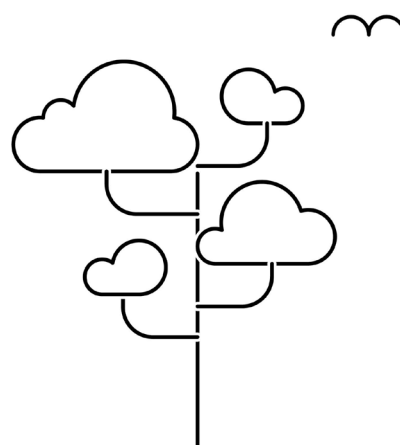
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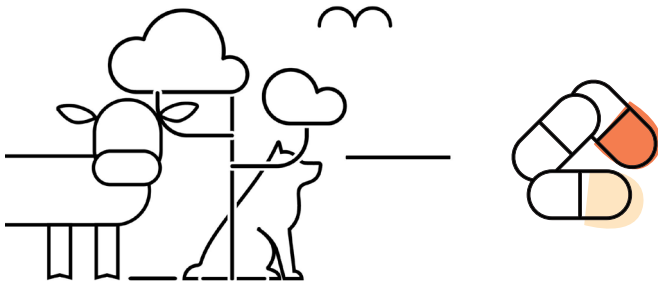
<sup>14</sup> Stewart S, Robertson C, Pan J, Kennedy S, Haahr L, Manoukian S, Mason H, Kavanagh K, Graves N, Dancer SJ, Cook B, Reilly J. Impact of healthcare-associated infection on length of stay. *J Hosp Infect.* 2021 Aug; 114:23-31. doi: 10.1016/j.jhin.2021.02.026. PMID: 34301393.



## THE GOVERNMENT WILL:

- strengthen the prevention of AMR
- ensure good infection prevention and control for humans, animals and plants, and determine how this can be implemented while reducing adverse impacts on the environment
- consider strengthening national surveillance capacities in relation to humans, food-producing animals, companion animals, crop production and the environment to better monitor changes and trends
- improve the quality and availability of surveillance and analysis of the occurrence of resistant bacteria in clinical isolates (from infections), among healthy people and the occurrence of healthcare associated infections
- reduce the proportion of patients who contract a healthcare associated infection by at least 10 per cent compared to 2019 levels, based on timely, quality-assured data from nursing homes and hospitals
- work to ensure that new and emerging microbes with serious disease potential do not establish themselves in Norwegian hospitals, nursing homes or the animal population
- work to ensure access to better and new vaccines





## Ensure prudent and responsible use of antimicrobial agents

Prudent and responsible use of antimicrobial agents for humans, animals and in agriculture is one of the most important measures to combat AMR. One of the main goals of the previous strategy was to reduce the total use of antibiotics. In the new strategy period, the Government will, in accordance with the recommendations of the 2020 knowledge gap analysis, continue its efforts for more appropriate use of antimicrobial agents while avoiding an increase in their use.

Unlike many other countries, the use of antibiotics in humans in Norway was lower during the COVID-19 pandemic than in the past. However, by 2023, the level of use had returned to near pre-pandemic levels. The use of antibiotics for food-producing animals and companion animals is already very low.

It is important that relevant actors in Norway have access to good information, appropriate tools and guidelines necessary to continue contributing to the prudent and responsible use of antimicrobial agents. Legislation, treatment recommendations, etc. must be regularly updated to reflect new knowledge. Lessons learned in the field of antibiotics must also be applied in conjunction with the regulation and use of other antimicrobial agents.

There is a need to raise awareness among the population about the challenges related to AMR and to increase knowledge and awareness about infections in general, when it is necessary to use antimicrobial agents and how they are to be used. Campaigns can be used to disseminate knowledge about the appropriate use of antimicrobial agents and raise awareness of the importance of avoiding the development of AMR. Furthermore, such campaigns can be used to explain that not all diseases and infections should be treated with antimicrobial agents. Educational programs such as e-BUG<sup>15</sup> are useful tools to educate children and adolescents about microbes, infection prevention and control and infections.

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<sup>15</sup> [Website \(e-bug.eu\)](http://e-bug.eu)

Increasing knowledge and raising public awareness, not least among children and young people, will reduce the pressure on physicians, dentists, animal health personnel and other prescribers of antimicrobial agents.

Prescribers need to know about the proper use of antimicrobial agents and when specific treatments are necessary and effective, so that any medication is appropriately prescribed. The basis for good prescribing practice are laid down during professional education, as well as in the workplace in both the specialist and primary care services and corresponding services in the animal health sector. Courses and other training measures contribute to good prescribing that is in accordance with legislation, up-to-date guides and current knowledge. For health personnel and animal health personnel educated in countries with different prescribing practices, it is important to have measures in place to ensure that they adhere to Norwegian medicines legislation and prescribing practices when practicing in Norway. It is necessary to establish structures and procedures at all levels to ensure that treatment guidelines and treatment recommendations are known and adhered to. When updating treatment recommendations, it is important to ensure that the selection of antimicrobial agents is evidence-based and in line with the national strategy and action plans. Treatment recommendations should be regularly reviewed and updated if new and relevant knowledge emerges.

In the health sector, it is important that management ensure that infection prevention and control programmes in healthcare institutions form an integral part of the institutions' internal control systems. Quality assured and up-to-date guidelines for the use of antibiotics are a prerequisite for good antibiotic stewardship. Programmes for antibiotic stewardship aim to ensure that guidelines and best practices are known and adhered to. The antibiotic stewardship programmes for primary and specialist health services established under the previous strategy were considered effective and have contributed to reaching relevant targets. The Government intends to continue this work ensuring that antibiotic stewardship programmes that contribute to better prescribing practices form an integral part of local infection prevention and control plans.

In NORM/NORM-VET 2022, a decrease in total antibiotic use in humans was reported compared to 2012. However, the decrease in sales of systemic antibiotics observed during the pandemic had returned to pre-pandemic (i.e. 2019) levels by 2022. Accordingly, the goal of the 2015 strategy of a 30 per cent reduction was only briefly reached, during the pandemic. In the field of human health, it is therefore crucial to continue efforts to reduce the total use of antibiotics.<sup>16</sup> A reduction of 10 per cent compared to 2019 levels is in practice a continuation of the 2015 goal. At the same time, it is important to focus on specific issues, such as the choice of

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<sup>16</sup> This means antibiotics of ATC code J01, except for methenamine. [ATC Registry – The Norwegian Pharmaceutical Product Compendium](#)

antimicrobial agents for respiratory and urinary tract infections and the duration of preoperative antimicrobial prophylaxis. It may be beneficial to explore possible tools to provide direct feedback to prescribers and improve the surveillance of the use of antimicrobial agents.

The use of broad-spectrum antibiotics is an important driver for the development of AMR. Therefore, it is important to limit such use. This can be achieved by implementing continuous evaluation and improvement of practice, e.g., by using antibiotic teams and reassessment of choice of antibiotic after 72 hours, in hospitals and in nursing homes.

In the future, new diagnostic technologies and the use of artificial intelligence can contribute to better decisions on the choice of medicines. This will require increased integration of electronic systems when prescribing antimicrobial agents.

In the EU, a target has been set to reduce the use of antimicrobial agents for farmed animals and aquaculture by 50 per cent by 2030 based on 2018 levels. The knowledge gap analysis shows that the use of antimicrobial agents for food-producing animals and companion animals in Norway is low, and that no published data has been found to substantiate whether there is a potential for a further general reduction target for usage. However, it is necessary to consider whether it will be possible to reduce the use or change the types of antimicrobial agents used for certain microorganisms and animal species. In this regard, and in order to contribute to a continued low use of antimicrobial agents in food-producing animals and companion animals, it is necessary to continue monitoring the prescribing and treatment practices of animal health personnel using the Norwegian Veterinary Prescription Register (VetReg).<sup>17</sup> Whether there is a need to update the lists of antimicrobial agents that are reserved for humans or for other reasons are not recommended for use in animals should also be considered.

*Regulation (EU) 2019/6,<sup>18</sup> which is implemented in Section 2 of the Act of 4 December 1992 no. 132 relating to medicines etc. (The Medicines Act), stipulates that Norway is obliged to report data on the use of antimicrobial agents in cattle, pigs, chickens and turkey. There is a requirement to report data on the use of antimicrobial agents. There is also a requirement to report data on the use of antimicrobial agents in horses as of 1 January 2026 and in dogs and cats as of 1 January 2029. In order to ensure complete data when reporting to the European Medicines Agency (EMA), the Norwegian Food Safety Authority must prepare for this in VetReg within the specified time limits. In addition, the Norwegian Food Safety Authority must take appropriate steps to ensure that veterinarians report such data.*

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<sup>17</sup> [Reporting to VetReg and codes for prescriptions | Norwegian Food Safety Authority](#)

<sup>18</sup> [Legemidler til dyr | Norwegian Food Safety Authority \[Medicines for animals – in Norwegian only\]](#)

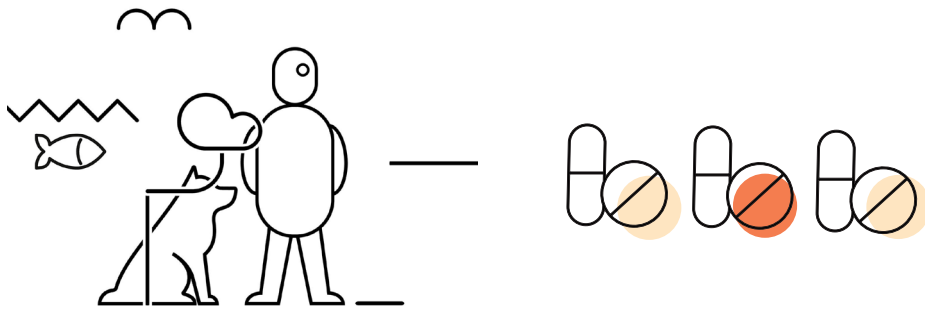


**Regulation (EU) 2019/6 on veterinary medicinal products has a clearer focus on the use of antimicrobial agents. The most important changes are listed below.**

- Prescriptions for antimicrobial medicines shall only be valid for five days from the date of issue.
- The requirements are largely aimed at limiting the use of antimicrobial medicines, thereby reducing the development of resistance.
- Animal health personnel are required to provide justifications for their prescribing of antimicrobial agents.
- The quantity of the medicines prescribed shall be limited to the amount required for the treatment.
- Requirements for the information in prescriptions have been expanded.
- Rules for the use of medicines according to the cascade principle have been clarified.

**THE GOVERNMENT WILL:**

- ensure a prudent and responsible use of antimicrobial agents
- contribute to raising awareness among the population about the challenges of AMR through increased dissemination of general knowledge about infections, the appropriate use of antimicrobial agents and the consequences of AMR
- facilitate good prescribing practices based on legislation, guidelines and recommendations for the use of antimicrobial agents
- work to reduce the total use of antibiotics among humans by 10 per cent compared to 2019 levels
- stimulate the use of new diagnostic aids and artificial intelligence to contribute to the prudent and responsible use of antimicrobial agents



## Ensure access to antimicrobial agents

Due to our prescribing practices and use of antibiotics, Norway is one of the few countries that can still use narrow-spectrum antibiotics. This is why we can still use narrow-spectrum antibiotics as the first line of treatment for many bacterial infections. This is an important contribution to limit the development of resistance. As the market for such medicines is small the supply is vulnerable. As with many other medicines, we often experience shortages. In recent years, we have seen a shortage of some types of penicillin. Because the potential market for such medicines is very limited and the use is restricted, the industry has limited incentives to manufacture and market such medicines.

Pharmaceutical manufacturing is a global industry with a complex supply chain. The failure of one link in the chain can cause delays in deliveries and shortages. Medicine shortages are an international problem, often caused by various problems in manufacturing, raw material shortages or larger-than-expected sales. International conditions, such as war and conflict, energy crises and high inflation can also affect the supply of medicines.

For older medicines such as antibiotics, small countries with low sales volumes are particularly at risk, as they are of limited appeal to the pharmaceutical companies. In addition, there are few manufacturers of narrow-spectrum antibiotics, which also renders supply vulnerable. Many other European countries are experiencing antibiotics shortages. At the European level, we experienced a significant amoxicillin shortage in the autumn of 2022 and winter of 2023. During the autumn of 2023, there were supply problems for apocillin tablets, as well as oral solution and tablets of erythromycin.

Medicine shortages, including shortages of various types of antimicrobial agents and vaccines, can have major consequences for both human and veterinary medicine. The Government published its report to the Norwegian Parliament, The Storting (white paper) No. 5 (2023–2024) Health Emergency Preparedness in 2023. Security of supply is one of six key risk and vulnerability areas discussed in the report. This also includes access to antibiotics. The white paper states that, as

with other medicines, access to antibiotics must be based on a balance between national and international measures. The use of legal and economic policy instruments such as flexibilities in the regulation of price, and strengthening the potential of negotiations and procurement are tools the Government seeks to develop further. The Norwegian Medical Products Agency was established on 1 January 2024, tasked with ensuring security of supply and access to medicines. Consideration of the use of legal and economic policy instruments to ensure access to antibiotics is now clearly defined as one of the Agency's responsibilities in the area of security of supply.

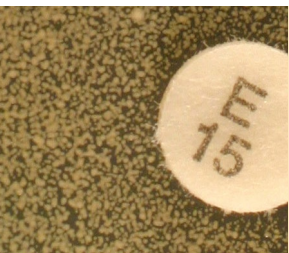
Through cooperation with other countries, Norway's negotiating position for the procurement of medicines has been strengthened. Letters of intent have been signed between Norway, Denmark and Iceland on strengthening Nordic medicines cooperation to secure the supply of established critical medicines and rapid introduction of new effective medicines at an appropriate price. As part of this cooperation, several joint Nordic tenders for antimicrobial medicines have been completed. It is important that this work, which is rooted in the Nordic Pharmaceutical Forum, is strengthened and developed further to ensure access to narrow-spectrum antimicrobial agents.

Access to medicines is a crucial part of health emergency preparedness cooperation in the EU, which has developed at a record pace since the onset of the global COVID-19 pandemic. The European Medicines Agency (EMA) has been given an expanded mandate to monitor Europe's security of supply of medicines. Legislation governing medicines is essentially fully harmonised within the EEA, and Norway is therefore an integral part of the work of the EMA and the European cooperation.

The European Commission's Health Emergency Preparedness and Response Authority (DG HERA) has been established to safeguard Europe's access to medicines and medical equipment in a crisis. DG HERA will ensure the monitoring of the supply and access to crisis-relevant medicines and medical equipment, research and development, tenders, procurement and manufacturing of medicines and medical equipment in crises. DG HERA has been given a major role in joint negotiations and procurement to secure access to medicines and medical equipment in crises. In DG HERA's risk analysis of health threats, antimicrobial resistance is listed as one of the three greatest threats to Europe. Given that DG HERA's mandate is to ensure access to medical countermeasures to manage health threats, policy instruments to safeguard access to antibiotics are also included in their portfolio. Furthermore, the Commission is working on targeted measures at the European and regional level to ensure access to medicines outside of crises, during shortages or in situations involving particularly challenging market dynamics, as is the case for antibiotics. Norway must be an integral part of European cooperation to ensure access to antibiotics.

Through the EU's health programme, EU4Health, and projects under the auspices of DG HERA, Europe is exploring policy instruments to safeguard access to both new and older antibiotics. In order to ensure a robust national follow-up of European efforts, it is crucial that Norwegian government agencies coordinate their participation well. The use of financial instruments to safeguard access to antibiotics must include comprehensive assessments of how measures can affect drug policy in the light of the drug policy goals and principles for prioritisation.

The development of resistance worldwide has created a need for new antimicrobial agents. Over the past decade, only two new classes of antimicrobial agents have emerged that are considered innovative by the WHO, and few are under development. The WHO reports that over 80 per cent of new antibiotics derive from existing classes (types) and contribute little in the efforts against resistant bacteria. Furthermore, the efforts regarding antibiotic resistance have led to a policy of encouraging restrictive prescribing practices and limiting the use of antimicrobial agents as much as possible. As large earnings cannot necessarily be expected in relation to the development and marketing of antimicrobial agents, it is not sufficiently appealing to commercial actors.

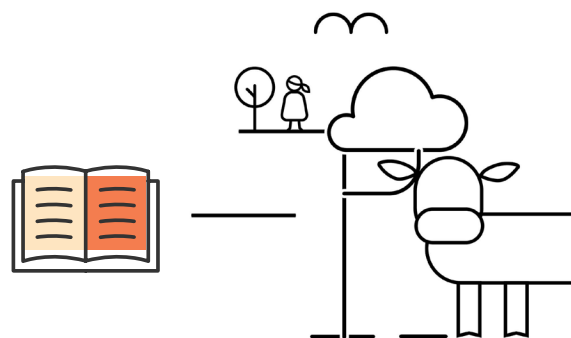


Since 2022, Norway has been one of the chairs of the Global AMR R&D Hub, a G20 initiative that brings together experts to coordinate global efforts and incentives for research and development of antibiotics.

## THE GOVERNMENT WILL:

- continue to ensure access to necessary antimicrobial agents
- investigate the need for financial and regulatory policy instruments that contribute to the development of and access to, new antimicrobial agents, as well as ensuring access to older narrow-spectrum antimicrobial agents
- further develop and strengthen cooperation with Nordic and European countries to better harness the potential of joint negotiations and procurement of antimicrobial agents
- contribute to further developing and strengthening global initiatives in research and development; and access to antibiotics





## Increase and implement new knowledge on AMR

Improved knowledge on AMR and the factors that influence its development are crucial if the measures described in this strategy will be successful. The 2020 knowledge gap analysis notes that although our basic understanding of AMR has remained unchanged for the past decade, we have gained more detailed insight into how resistance arises, is selected and can spread within and between humans, animals, the environment and across national borders. It also notes the need for increased knowledge on how we can best reduce the demand for antimicrobial agents, improve accuracy when prescribing antimicrobials and prevent the spread of resistant microorganisms. We have acquired considerable knowledge and experience since the previous strategy was published in 2015. In the new strategy, it has been important to include lessons learned and at the same time indicate areas where there is a need to increase and harness new knowledge in order to take effective action against AMR.

Limiting of the occurrence of infections in general is one of the most important measures to avoid the development of AMR and is one of three priority measures in the WHO's work going forward.<sup>19</sup> During the COVID-19 pandemic, a number of population-based infection prevention and control measures were implemented to limit spread, known as *non-pharmaceutical measures*. The measures ranged from information campaigns on cough etiquette and the importance of hand washing, to intrusive measures such as selective lockdowns. We need to gain better knowledge of whether such measures can be useful in the efforts against infectious diseases and AMR without the measures excessively restricting individual freedom. Furthermore, it is necessary to explore how to better prevent viral infections to reduce the danger of bacterial secondary infections.

There is a need for better knowledge on the surveillance that is needed in Norway. This involves developing suitable technological solutions to be able to improve,

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<sup>19</sup> [Antimicrobial resistance: accelerating national and global responses \(who.int\)](https://www.who.int)

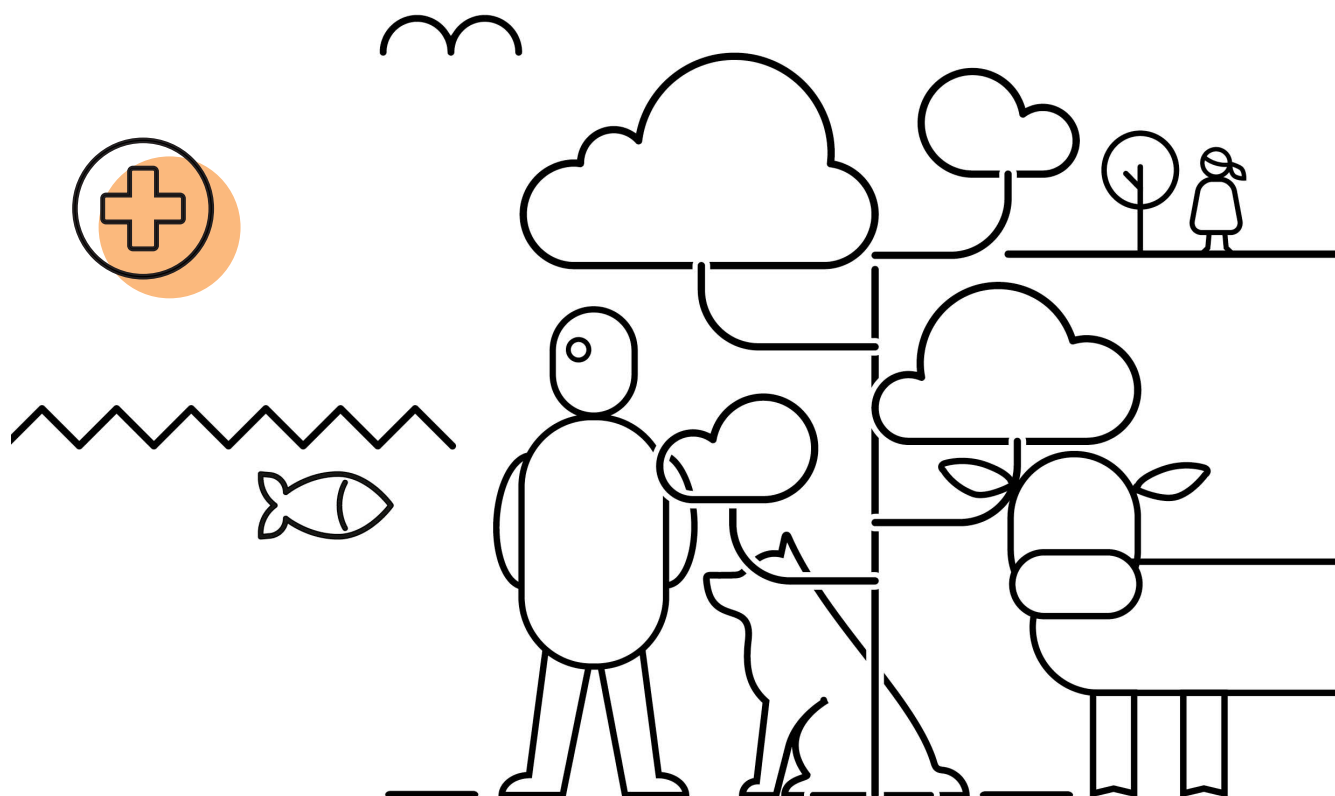
automate and integrate the surveillance of infections, the use of antimicrobial agents and AMR. Furthermore, it will be useful to investigate how artificial intelligence and modelling can help us to better understand the occurrence and risk factors of resistance in the Norwegian population. There is also a need for more knowledge about AMR and resistance genes in humans, food-producing animals, companion animals and plants. Among other things, it will be necessary to gain more knowledge about the extent to which AMR in companion animals and horses can spread to humans via direct contact and its significance for human health. Increased surveillance of microorganisms and resistance genes from the environment, including from wastewater is also needed. Moreover, greater knowledge and more data are needed about AMR and resistance genes in imported animals, animal products, agricultural inputs, such as feed, and plants, as well as the significance of this for humans, food-producing animals, companion animals and plants in Norway.

In the years to come, we will need, faster and improved diagnostic methods that contribute to better targeted treatment. Research and development of new treatment methods that contribute to reducing the risk of developing resistance, and better ways of treating resistant infections, are also needed. Therefore, it is important to support research on the entire treatment course for humans and animals.

During this strategy period, it will be important to explore how all types of health personnel can contribute to the prevention of infections and AMR. For example, we need to increase knowledge about the role of dental health in preventing resistance and how this area can contribute to efforts to combat AMR, as the sector is responsible for a proportion of antibiotic in human health. Moreover, dental practitioners play a role in the early detection of infections and contribute to promoting oral hygiene to prevent infections.

More research is needed on why and how preventive efforts and good animal- and plant health contribute to maintaining a low use of antimicrobial agents in animals and crop production. As part of this research, it will be important to examine how to avoid bacterial infections such as neonatal infections, arthritis, skin and respiratory infections. Furthermore, in relation to animals and plants, it is relevant to consider whether breeding can be used in preventive efforts to reduce the need for antimicrobial agents. In addition, we need to obtain more knowledge about the causes and treatment of allergies. In crop production, we need more knowledge about how different cultivation systems and breeding can be used in preventive efforts to reduce the need for antimicrobial agents, especially azoles, against fungi.

The knowledge gap analysis also concludes that we lack knowledge about the role of the environment in the development and spread of AMR to humans and



animals. We require more knowledge about how climate change affects the AMR situation internationally and in Norway. Extreme weather events such as floods and droughts, and a warmer climate are believed to influence the survival and spread of disease-causing microbes which can also contribute to the spread of AMR. To gain a better understanding of this, standardised methods for the mapping of AMR need to be designed, supplemented by a system for monitoring the occurrence of antimicrobial agents, resistant microorganisms, resistance genes, and drivers of resistance in the environment. More information is needed on how resistant microbes and resistance genes spread, establish themselves and reinfect humans, in order to avoid environmental reservoirs becoming a source of infections. Climate change, involving extreme weather in several parts of the world could create more favourable conditions for fungi and in turn lead

to an increase in fungal infections in plants, animals and humans. It is uncertain whether more climate-adapted microorganisms cause an increased occurrence of AMR. Therefore, it is important to gain more knowledge about the possible consequences of a changing climate for AMR and infections and, in turn, how this impacts food production.

More knowledge is needed on the occurrence of AMR and resistance genes in fertilisers such as manure and sludge. Fertilisers can be a source of spread of AMR. It is assumed that resistance genes are of greatest significance after ploughing, as bacteria become nonviable within a short period. We need more knowledge about the significance of fertilisers as a source of spread of AMR to the environment. This includes knowledge of how the copper and zinc content of fertiliser products can affect the spread of AMR.

There is a need for increased knowledge about the use of antifungal agents in society since such agents, in addition to being used in crop production, are also used, for example, in paints and on golf courses. Furthermore, there is a need for more knowledge on the prevention and occurrence of fungal infections in humans, food-producing animals and companion animals. This includes knowledge of resistance patterns and any correlations between use and resistance to antifungal agents in agriculture, as well as the occurrence of resistance in clinical isolates in humans.

AMR and infection prevention is a rapidly evolving field both due to changes in occurrence and knowledge. We need to ensure that healthcare personnel, animal health personnel, owners of companion animals, other relevant actors in agriculture and aquaculture, kindergartens and schools have the necessary knowledge to contribute to limiting infections and AMR. We must work to ensure that this is taught in a sound and consistent manner in both schools and continuing education, to ensure that everyone is aware of how they can contribute to better infection prevention and control. This applies to new students, staff members and experienced personnel in these areas.

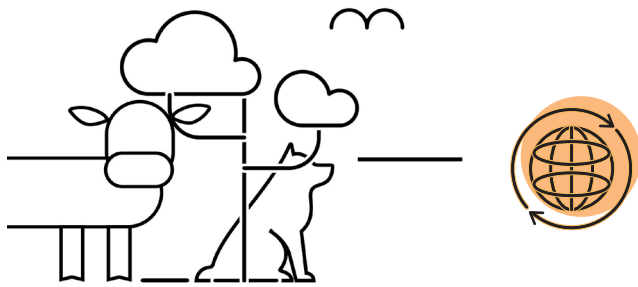
The European Centre for Disease Prevention and Control (ECDC) reports that over 70 per cent of AMR infections are healthcare associated highlighting the need for more research aimed at improving infection prevention and control in the health service and how lessons learned from the pandemic can help us moving forward. Implementation of new knowledge is necessary, and we need to understand what is needed to achieve behavioural changes, both among healthcare personnel and in the population at large. The strategy should contribute to the improvement of knowledge on how to increase support for the instructions given in advice regarding biosecurity measures, as well as vaccine and treatment recommendations for humans, animals and in crop production.

Research can rarely be successfully undertaken by one country alone. In recent years, we have experienced the considerable benefits of international cooperation and projects on research and innovation relating to AMR. The knowledge gap analysis states that, in cooperation with other countries in a similar situation, especially the Nordic countries, we should promote research and innovation in areas that are relevant to us and that we should also support international initiatives and countries that have fallen short in their efforts against AMR. Norway has contributed approximately NOK 6 million annually to the Swedish-led Joint Programming Initiative on Antimicrobial Resistance (JPI-AMR) research programme, of which 29 countries are members. This is now being further developed into a One Health AMR partnership under Horizon Europe. The objective is to increase, harmonise and specialise research on AMR. The initial focus on human health has gradually expanded to a broader One Health perspective. In the coming years, Norway will contribute to international research cooperation, such as the One Health Antimicrobial Resistance (OH AMR) partnership under Horizon Europe. The work of this programme is key to development, evaluation and action in the field of AMR.

It is also important to view AMR in the context of other major health challenges. We have insufficient knowledge about the interplay between non-communicable diseases and occurrence of AMR. A key question is how the increased occurrence of chronic diseases can affect the development of infections and resistance and how increased resistance can affect the treatment options for diseases such as cancer in the Norwegian health service.

#### **THE GOVERNMENT WILL:**

- increase and make use of new knowledge about AMR
- work to strengthen knowledge about AMR and infection prevention and control in relevant graduate and post-graduate education
- increase knowledge on the surveillance of the occurrence of infections, AMR and use of antimicrobial agents, as well as any links between the use of antimicrobial agents and resistance development
- strengthen knowledge about the extent, risk factors and spread of healthcare associated infections
- increase knowledge about use of antifungal agents in society, the occurrence of resistant fungal infections in humans, food-producing animals and companion animals, as well as any links between use of antifungal agents and resistance development
- promote participation in research cooperation initiatives on AMR in Norway, the Nordic countries and Europe



## Be an active force in the global efforts against AMR

It is important that Norway contributes to reducing AMR challenges globally, so that antimicrobial agents can be preserved and developed for the future. Such an international contribution is of considerable significance for the right to health, both in Norway and other countries. Human travel activity and cross-border trade in animals and foodstuffs contribute to the spread of AMR, which means that Norwegian AMR efforts must extend beyond national boundaries. In addition to international efforts relating to humans, it is important to ensure that efforts are strengthened to promote animal and plant health, good environmental health, and safe food. Furthermore, there is a need to strengthen international cooperation across sectors so that as many countries as possible pursue policies that reduce the risks associated with AMR. To these ends, broad partnerships must also be in place involving active contributions from government, the private sector, academia and civil society in order to succeed in the global efforts to combat AMR.

According to the UN, the consequences of AMR will impact a number of sustainable development goals, with significant adverse consequences for health and society in general unless efforts are stepped up. Low and middle-income countries and poor and at-risk groups are hardest hit, accounting for the highest AMR-related burden of disease. Since the UN High-Level Meeting on Antimicrobial Resistance at the United Nations General Assembly in 2016 resulting in the recognition of the Global Action Plan on Antimicrobial Resistance, nearly 180 countries have prepared national strategies and action plans against AMR. Practical implementation challenges remain, particularly in many low and middle-income countries. This is due to a number of factors, including limited monitoring and diagnostic capabilities, funding, access to medicines and challenges in coordinating measures and policy instruments across disciplines and sectors of society. The WHO, FAO, WOAHA and UNEP set standards for efforts to combat AMR and contribute to cross-sectoral cooperation. Norway should therefore continue to support the Quadripartite Collaboration between WHO, FAO, WOAHA and UNEP, which jointly and individually advocate in favour of more countries preparing, updating and implementing their national action plans against AMR. There will

be a need to assess and consider what other coalitions, processes and initiatives Norway should support in the coming years.

Norway should consider how we can optimise our efforts in order to contribute to ensuring that the Quadripartite Cooperation works effectively to strengthen infection prevention and control, improve access to health services and medicines and reduce the use of antimicrobial agents by applying specific, global reduction targets and a One Health approach in AMR efforts, including pandemic emergency preparedness and response.

Norway will consider supporting sector-specific multilateral efforts, such as measures to promote universal health coverage, improve agricultural practices and prevent the leaching of antimicrobial agents and resistance genes from production facilities. This also includes efforts to prevent pollution from untreated wastewater from private households and hospitals.

The Nordic countries' interests are largely aligned as their situations are relatively similar and they experience the same challenges relating to AMR. Through the Nordic Council of Ministers, Norway participates in a cooperative initiative on One Health and AMR. This aim is to ensure access to new antimicrobial agents, as well as older narrow-spectrum antimicrobials. Nordic cooperation has also been established to develop common advice on the management of patients with resistant bacteria in healthcare institutions. Norway should continue its cooperation with the Nordic countries in order to strengthen a common Nordic position on the topic.

The EU is an important partner for Norway on AMR, both internationally and domestically. Norway participates in several European initiatives, including the Joint Action on Antimicrobial Resistance and Healthcare-Associated Infections (2024–2028) together with 30 other countries. These efforts will lead to a strengthening of existing initiatives and contribute to the development of sector-specific action plans and methods to ensure necessary access to antimicrobial agents in European countries. Furthermore, it will ensure improved antibiotic stewardship and infection prevention and control in the health service. Norway has observer status with the right to speak in the Health Security Committee, on the Board of the European Centre for Disease Prevention and Control (ECDC) and in the EU's AMR One Health network. Through participation in the European Sales and Use of Antimicrobials for Veterinary Medicine Working Group (ESUAvet WG),<sup>20</sup> Norway contributes input on data regarding sales volumes of veterinary antimicrobial agents and their use in animals. Norway should, through processes in the EU, actively support regulations that can contribute to reducing antimicrobial resistance.

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<sup>20</sup> [European Sales and Use of Antimicrobials for Veterinary Medicine Working Group | European Medicines Agency \(europa.eu\)](https://www.euro.who.int/en/about-us/partners/european-sales-and-use-of-antimicrobials-for-veterinary-medicine-working-group)

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Norway also participates in the Transatlantic Taskforce on Antimicrobial Resistance (TATFAR) with the EU, the United States, Canada, the United Kingdom. This is a forum for collaboration in which experts from relevant government agencies including the Norwegian Institute of Public Health, the Norwegian Veterinary Institute and the Norwegian Medical Products Agency participate to safeguard Norwegian interests.

Norway provides financial support to multilateral organisations working on global health which contributes to capacity building for the prevention, early detection and rapid response to emerging or persistent infection threats and resistance development in low and middle-income countries. Norway's international efforts for universal health coverage, access to vaccines, prevention of infections and infectious diseases, global emergency preparedness from a One Health perspective, pandemic emergency preparedness and response, and the development of new knowledge and technology contribute to the efforts to combat AMR. Among other efforts, Norway contributes significant funds to vaccine development through the global Coalition for Epidemic Preparedness Innovations (CEPI). Through the WHO, the global vaccine alliance Gavi, the Global Fund to Fight AIDS, Tuberculosis and Malaria, the Global Financing Facility (GFF), the Pandemic Fund and other global health initiatives, Norway is contributing to strengthening health systems in low and middle-income countries. In cooperation with actors including Africa Centres for Disease Control and Prevention (Africa CDC), the Norwegian Institute of Public Health is also working to strengthen national public health institutes, which are particularly relevant to the efforts against AMR. Furthermore, the Norwegian Institute of Public Health's Building Stronger Public Health Institutions and Systems (BIS) programme contributes to strengthening global efforts on health safety and health emergency preparedness with special attention to low and middle-income countries. This work is essential to combat challenges such as AMR by developing robust public health infrastructure and systems that are capable of effectively managing and preventing infectious disease.

As part of the efforts to achieve the Sustainable Development Goals in the health sector, a cross-sectoral health system approach that encompasses efforts to achieve universal health coverage and effective measures against AMR in humans, animals and the environment is necessary. Ensuring access to basic needs, such as clean water, good sanitation and basic health services, is crucial in order to maintain good health and avoid infections. Equitable access to basic health services and good quality medicines, including effective antimicrobial agents, creates better conditions for early detection and treatment of infections. In countries with high rates of antimicrobial resistance, there is often a lack of diagnostic tools and good quality data and knowledge on the extent and access to effective measures that are adapted to their setting. More accurate treatment and use of medicines can both prevent infections and contribute to reduced rates of antimicrobial resistance and enhanced pandemic emergency preparedness.

Norway's experiences with the use of vaccines to avoid the use of antimicrobial agents should be disseminated to other countries through participation in international forums. Relevant examples of lessons learned include the development and use of targeted vaccination to reduce the use of antimicrobial agents in aquaculture and the effective use of vaccination to phase out the use of Narasin as a feed additive in poultry production.

Norway should continue to support the WHO, WOA, FAO and other international actors in their efforts to develop infection prevention and control in the health service, prevent diseases in animals and ensure good practices in agriculture in all countries and regions. Likewise, Norway should support UNEP and others' efforts to prevent the spread to the environment of antimicrobial agents and resistance genes from production facilities and wastewater from private households and hospitals, as such pollution can itself act as a driver of resistance.

We must reduce the use of antimicrobial agents globally. Therefore, Norway must continue to work internationally to prevent infections in humans and animals, as well as promote the prudent and responsible use of antimicrobial agents against bacteria and fungi. In order to prevent overuse or misuse of antimicrobial agents, Norway should, in the coming period, work to ensure that all prescribers of antimicrobial agents are professionally independent and not influenced by economic incentives. There is also a need to contribute internationally to ensure that some antimicrobial agents are reserved for human use. Norway has contributed to Codex Alimentarius'<sup>21</sup> efforts to achieve harmonised, integrated monitoring and surveillance at the global level and in revising the Code of Practice to Minimize and Contain Foodborne Antimicrobial Resistance. During the upcoming period, it will be important to support the efforts of the Quadripartite Cooperation in encouraging countries to follow through on these efforts.

Norway will continue to contribute to the FAO's and WOA's continued efforts to introduce an international ban on the use of antimicrobial growth promoters in food production. In addition, Norway should work to ensure that antimicrobial agents are not used for herd prophylaxis or preventive purposes in plants.

By supporting low and middle-income countries' access to existing vaccines, antimicrobial agents and diagnostic tools for more accurate treatment, we can reduce the number of infections and the need for antimicrobial agents. These efforts involve preventive measures, such as hand washing and improved sanitation. At the global level, it is necessary to continue efforts to reduce the spread and impact of diseases such as HIV and AIDS, tuberculosis and malaria, which, according to the Global Fund to Fight AIDS, Tuberculosis and Malaria, are the cause of more than 2.5 million deaths, annually. Furthermore, drug-resistant tuberculosis is on the rise in several parts of the world. Norway should

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<sup>21</sup> Antimicrobial Resistance | CODEXALIMENTARIUS FAO-WHO

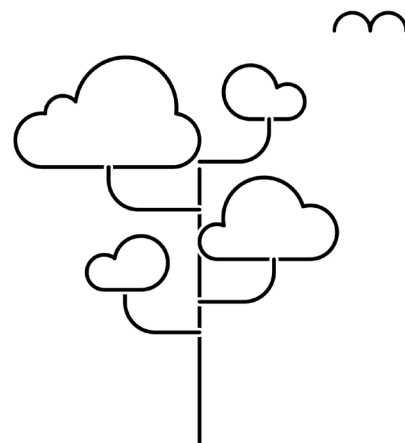
also support improved antibiotic stewardship and specific reduction targets in international agreements.

In countries with high rates of AMR, there is often a lack of good data and knowledge on the extent of the challenge and access to effective and appropriately adapted measures is limited. Norway is working to strengthen disease surveillance in low and middle-income countries, including through contributions to policy design in the Pandemic Fund, the Global Fund to Fight AIDS, Tuberculosis and Malaria and the WHO.

A number of new initiatives have contributed to further increasing access to research and innovation funds related to AMR. The G20 has established a research and development hub for AMR where Norway participates on the board of directors. The WHO, along with Drugs for Neglected Diseases (DNDi), has established a global partnership for research and development on antimicrobial agents known as the *Global Antibiotic Research and Development Partnership* (GARDP). This partnership contributes to developing promising medications with the aim of making them available to all countries and markets, including low and middle-income countries.

#### **THE GOVERNMENT WILL:**

- be an active force in global efforts against AMR and support initiatives to strengthen international cooperation and joint commitments
- work to ensure that the WHO, FAO, WOA and UNEP continue using a One Health approach in AMR efforts and strengthen their standard-setting role in relation to AMR
- consider which international coalitions, processes and initiatives best support global AMR efforts and may be relevant for Norwegian support
- contribute to universal health coverage, preventive measures, increased access to essential medicines and implementation of national action plans against AMR in low and middle income countries through multilateral cooperation and broad partnerships
- actively work to promote a prudent and responsible use of antimicrobial agents globally
- work to ensure that all prescribers of antimicrobial agents are professionally independent and not influenced by economic incentives
- participate in and promote international cooperation to increase research and innovation on new antimicrobial agents



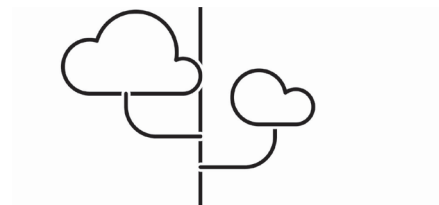
## Economic and administrative consequences

AMR already exists globally and nationally, causing health challenges and mortality among humans and animals, worldwide. The aim of the new national strategy is to reduce the risk of AMR increasing and, in a worst-case scenario, developing into an intractable problem. The goal is to limit disease and mortality caused by or related to AMR and avoid increases in AMR, as we have seen occur in some other countries, with the consequences this has for health, costs and productivity.

The prevalence of AMR is still relatively low in Norway but is increasing. We are connected to the rest of the world through travel, migration and the importation of animals and food. The arrival of patients from areas affected by war and conflict is an example of a challenging situation for the Norwegian health service. Moreover, there has recently been a significant increase in AMR in several countries that previously experienced AMR at a similar level to Norway.

A cost-benefit assessment is difficult to conduct as the costs related to uncontained AMR are potentially immeasurably large. Although the costs associated with AMR are difficult to quantify, the OECD has conducted several models relevant to Norwegian conditions. The OECD's 2023 report, *Fighting Antimicrobial resistance in the EU and EEA countries – Embracing a One Health approach*<sup>22</sup> states that AMR costs the EEA countries approximately EUR 11.7 billion (with around 50 per cent attributed to expenses in the health sector and the remaining 50 per cent to lost productivity across other sectors). Furthermore, the OECD has estimated how much each OECD country could save by funding and implementing a One Health package of measures. This is based on modelling two scenarios where these measures have either a good or limited effect. Both internal and external evaluations of the model have been carried out. The results

<sup>22</sup> *Fighting Antimicrobial Resistance in EU and EEA countries* (oecd.org)



can be used as an indication of how these measures could affect the health and economies of each country. A full description of the model can be found on the website of the OECD's SPHeP-AMR documentation.<sup>23</sup> The OECD<sup>24</sup> has estimated that an investment of NOK 57 per Norwegian residents per year in five related One Health measures could prevent more than 4,000 infections, save 47 lives, save NOK 256 million in costs to the health service and increase productivity by NOK 224 million. According to the OECD, every NOK invested in the five measures will yield a return of NOK 1.39.

We have few studies on the direct costs of AMR in the Norwegian health service. Andreassen et al.<sup>25</sup> found that patients with MRSA experienced hospital stays that were, 8 days longer on average compared to similar patients without MRSA. This entailed an increased cost from EUR 7,198 to EUR 13,233 per patient. In 2020, Haugnes et al.<sup>26</sup> estimated that there was an additional cost of between EUR 56 and 87 per day per patient for persons requiring isolation in hospital in accordance with the recommendations on the management of patients with resistant bacteria.

It is important to estimate the possible impact and costs related to AMR if the world fails to limit the increase we are currently seeing. In O'Neill's *Final Report and Recommendations on Tackling Drug-Resistant Infections Globally* from 2016,<sup>27</sup> it is estimated that by 2050, increases in AMR could result in the loss of 10 million lives annually and economic losses of up to USD 100 trillion unless proactive solutions are identified to slow the development of resistance. However, this is not just a direct problem for human health. The World Bank also estimates a 7.5 per cent reduction in livestock by the year 2050 due to AMR.

All measures taken to follow up the strategy and sector-specific action plans will be implemented within the current budgetary frameworks.

<sup>23</sup> [Welcome to SPHeP-AMR's documentation! — SPHeP-AMR documentation \(oecdpublichealthexplorer.org\)](#)

<sup>24</sup> [One-Health-Framework-to-Fight-AMR-in-NOR.pdf](#)

<sup>25</sup> [The impact of methicillin-resistant \*S. aureus\* on length of stay, readmissions and costs: a register based case-control study of patients hospitalized in Norway | Antimicrobial Resistance & Infection Control | Full Text \(biomedcentral.com\)](#)

<sup>26</sup> [Financial and temporal costs of patient isolation in Norwegian hospitals - ScienceDirect](#)

<sup>27</sup> [160518\\_Final\\_paper\\_with\\_cover.pdf \(amr-review.org\)](#)

## Useful links about the AMR situation in Norway

AMR and infection prevention and control are areas undergoing rapid change, both in terms of the occurrence of resistant microbes and measures and initiatives. Since a situational analysis can quickly become outdated, we have chosen to include links to a selection of relevant websites where up-to-date information is available.

### **Helsenorge.no**

<https://www.helsenorge.no/medisiner/antibiotika-og-resistens/om-antibiotikaresistens/>

### **Ministry of Agriculture and Food**

Antibiotic resistance: [Antibiotikaresistens – regjeringen.no](#) [Antibiotic resistance – in Norwegian only]

### **The Norwegian Institute of Public Health**

Kunnskapshull rapport status 2020: [amr-kunnskapshull-rapport.pdf](#) (fhi.no) [Antimicrobial resistance – knowledge gaps, challenges and relevant measures. Status 2020]

Infection prevention and control: [Infection prevention and control – Norwegian Institute of Public Health](#)

Infection prevention and control in the health service: [Smittevern i helsetjenesten – Norwegian Institute of Public Health](#) [Infection prevention and control in the health service – in Norwegian only]

AMR: [Antimicrobial resistance – Norwegian Institute of Public Health](#)

<https://www.fhi.no/sm/smittevern-i-helsetjenesten/mikrospesifikke-tiltak/>



### **The Norwegian Directorate of Health**

[Antibiotika i primærhelsetjenesten – Norwegian Directorate of Health](#)  
[Antibiotics in the primary health service – in Norwegian only]

[Antibiotika i sykehus – Norwegian Directorate of Health](#) [Antibiotics in hospitals – in Norwegian only]

### **National Competence Service for Antibiotic Use in the Specialist Health Service**

Nasjonal kompetansetjeneste for antibiotikabruk i spesialisthelsetjenesten – [Antibiotika.no](#) [National Competence Service for Antibiotic Use in the Specialist Health Service – in Norwegian only]

### **The Antibiotics Centre for Primary Medicine**

[The Antibiotics Centre for Primary Medicine \(ASP\) – Antibiotika.no](#)

### **NORM (including NORM/NORMVET report) – multiple places**

[NORM – Norsk overvåkingssystem for antibiotikaresistens hos mikrober – University Hospital of North-Norway \(unn.no\)](#) [Norwegian Surveillance System for Antimicrobial Drug Resistance (NORM) – in Norwegian only]

### **Norwegian Food Safety Authority**

[Resistens hos bakterier dyr, fôr og mat | Norwegian Food Safety Authority](#)  
[Resistance of bacteria in animals, feed and food – in Norwegian only]

[Når og hvordan skal du melde om resistente bakterier? | Norwegian Food Safety Authority](#) [When and how should you report resistant bacteria? – in Norwegian only]

[MRSA | Norwegian Food Safety Authority](#) [in Norwegian only]

### **Norwegian Veterinary Institute**

[Antibiotikaforbruk og antibiotikaresistens \(vetinst.no\)](#) [Antibiotic use and antibiotic resistance – in Norwegian only]

### **VKM**

[Antibiotikaresistens – Norwegian Scientific Committee for Food and Environment \(VKM\) \(vkm.no\)](#) [Antibiotic resistance – in Norwegian only]

# Appendices

Summary of the sections titled ‘The Government will’ with descriptions of areas of responsibility

## Main goal 1:

### *Strengthen cross-sectoral AMR collaboration*

<b>‘The Government will’ section</b>	<b>Responsible government ministries</b>
<ul style="list-style-type: none"> <li>strengthen cross-sectoral AMR cooperation</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries, Ministry of Foreign Affairs
<ul style="list-style-type: none"> <li>ensure that the strategy is followed up in the form of sector-specific action plans with specific targets, where appropriate</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food
<ul style="list-style-type: none"> <li>evaluate the status of the strategy work midway and towards the end of the strategy period</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries, Ministry of Foreign Affairs
<ul style="list-style-type: none"> <li>investigate how we can further improve the integrated surveillance of AMR and use of antimicrobial agents from a One Health perspective</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries
<ul style="list-style-type: none"> <li>assess how work against AMR can be included in health promotion and how civil society can best be involved</li> </ul>	Ministry of Health and Care Services, Ministry of Agriculture and Food, Ministry of Foreign Affairs
<ul style="list-style-type: none"> <li>investigate the need for a cross-sectoral AMR coordinator for the Government’s AMR efforts</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries, Ministry of Foreign Affairs



**Main goal 2:*****Strengthen the prevention of AMR***

<b>'The Government will' section</b>	<b>Responsible government ministries</b>
<ul style="list-style-type: none"> <li>strengthen the prevention of AMR</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries, Ministry of Foreign Affairs
<ul style="list-style-type: none"> <li>ensure good infection prevention and control for humans, animals and plants, and determine how this can be implemented while reducing adverse impacts on the environment</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries
<ul style="list-style-type: none"> <li>consider strengthening national surveillance capacities in relation to humans, food-producing animals, companion animals, crop production and the environment to better monitor changes and trends</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries
<ul style="list-style-type: none"> <li>improve the quality and availability of surveillance and analysis of the occurrence of resistant bacteria, in clinical isolates (from infections), among healthy people and the occurrence of healthcare associated infections</li> </ul>	Ministry of Health and Care Services
<ul style="list-style-type: none"> <li>reduce the proportion of patients who contract a healthcare associated infection by 10 per cent compared to 2019 levels, based on timely, quality-assured data from nursing homes and hospitals</li> </ul>	Ministry of Health and Care Services
<ul style="list-style-type: none"> <li>work to ensure that new and emerging microbes with serious disease potential do not establish themselves in Norwegian hospitals, nursing homes or the animal population</li> </ul>	Ministry of Health and Care Services, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries
<ul style="list-style-type: none"> <li>work to ensure access to better and new vaccines</li> </ul>	Ministry of Health and Care Services, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries, Ministry of Foreign Affairs

### **Main goal 3:**

#### ***Ensure prudent and responsible use of antimicrobial agents***

<b>'The Government will' section</b>	<b>Responsible government ministries</b>
<ul style="list-style-type: none"> <li>• ensure prudent and responsible use of antimicrobial agents</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries, Ministry of Foreign Affairs
<ul style="list-style-type: none"> <li>• contribute to raising awareness among the population about the challenges of AMR through increased dissemination of general knowledge about infections, the appropriate use of antimicrobial agents and the consequences of AMR</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food
<ul style="list-style-type: none"> <li>• facilitate good prescribing practices based on legislation, guidelines and recommendations for the use of antimicrobial agents</li> </ul>	Ministry of Health and Care Services, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries
<ul style="list-style-type: none"> <li>• work to reduce the total use of antibiotics among humans by 10 per cent compared to 2019 levels</li> </ul>	Ministry of Health and Care Services
<ul style="list-style-type: none"> <li>• stimulate the use of new diagnostic aids and artificial intelligence to contribute to the prudent and responsible use of antimicrobial agents</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food

**Main goal 4:**

***Ensure access to necessary antimicrobial agents***

<b>'The Government will' section</b>	<b>Responsible government ministries</b>
<ul style="list-style-type: none"> <li>• Ensure access to necessary anti-microbial agents</li> </ul>	Ministry of Health and Care Services, Ministry of Agriculture and Food, Ministry of Foreign Affairs, Ministry of Trade, Industry and Fisheries
<ul style="list-style-type: none"> <li>• investigate the need for financial and regulatory policy instruments that contribute to the development of and access to new antimicrobial agents, as well as ensuring access to older narrow-spectrum antimicrobial agents</li> </ul>	Ministry of Health and Care Services, Ministry of Foreign Affairs
<ul style="list-style-type: none"> <li>• further develop and strengthen cooperation with Nordic and European countries to better harness the potential of joint negotiations and procurement of antimicrobial agents</li> </ul>	Ministry of Health and Care Services, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries
<ul style="list-style-type: none"> <li>• contribute to further developing and strengthening global initiatives in research and development and access to antibiotics</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries, Ministry of Foreign Affairs

## Main goal 5:

### *Increase and make use of new knowledge regarding AMR*

<b>'The Government will' section</b>	<b>Responsible government ministries</b>
<ul style="list-style-type: none"> <li>increase and make use of new knowledge about AMR</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries, Ministry of Foreign Affairs
<ul style="list-style-type: none"> <li>work to strengthen knowledge about AMR and infection prevention and control in relevant graduate and post-graduate education</li> </ul>	Ministry of Health and Care Services, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries
<ul style="list-style-type: none"> <li>increase knowledge on the appropriate surveillance of the occurrence of infections, AMR and use of antimicrobial agents, as well as any links between the use of antimicrobial agents and resistance development</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food
<ul style="list-style-type: none"> <li>strengthen knowledge about the extent, risk factors and spread of healthcare associated infections</li> </ul>	Ministry of Health and Care Services
<ul style="list-style-type: none"> <li>increase knowledge about use of antifungal agents in society, the occurrence of resistant fungal infections in humans, food-producing animals and companion animals, as well as any links between use of antifungal agents and resistance development</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries
<ul style="list-style-type: none"> <li>promote participation in research cooperation on AMR in Norway, the Nordic countries and Europe</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food

**Main goal 6:*****Be an active driver in the global efforts against AMR***

<b>'The Government will' section</b>	<b>Responsible government ministries</b>
<ul style="list-style-type: none"> <li>• be an active force in global efforts against AMR and support initiatives to strengthen international cooperation and joint commitments</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries, Ministry of Foreign Affairs
<ul style="list-style-type: none"> <li>• work to ensure that the WHO, FAO, WOH and UNEP continue using a One Health approach in AMR efforts and strengthen their standard-setting role in relation to AMR</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries, Ministry of Foreign Affairs
<ul style="list-style-type: none"> <li>• consider which international coalitions, processes and initiatives best support global AMR efforts and may be relevant for Norwegian support</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries, Ministry of Foreign Affairs
<ul style="list-style-type: none"> <li>• contribute to universal health coverage, preventive measures, increased access to essential medicines and implementation of national action plans against AMR in low and middle income countries through multilateral cooperation and broad partnerships</li> </ul>	Ministry of Health and Care Services, Ministry of Foreign Affairs
<ul style="list-style-type: none"> <li>• actively work to promote a prudent and responsible use of antimicrobial agents, globally</li> </ul>	Ministry of Health and Care Services, Ministry of Climate and Environment, Ministry of Agriculture and Food, Ministry of Trade, Industry and Fisheries, Ministry of Foreign Affairs
<ul style="list-style-type: none"> <li>• work to ensure that all prescribers of antimicrobial agents are professionally independent and not influenced by economic incentives</li> </ul>	Ministry of Health and Care Services, Ministry of Agriculture and Food, Ministry of Foreign Affairs, Ministry of Trade, Industry and Fisheries
<ul style="list-style-type: none"> <li>• participate in and promote international cooperation to increase research and innovation on new antimicrobial agents</li> </ul>	Ministry of Health and Care Services, Ministry of Agriculture and Food, Ministry of Foreign Affairs, Ministry of Trade, Industry and Fisheries

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**Photo credits page 5:**

Minister of Health and Care Services: Ministry of Health and Care | Minister of Agriculture and Food: Torbjørn Tandberg |  
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