12 INITIATIVES

*Nordic co-operation on
combating antimicrobial
resistance*

A white paper outlining
new Nordic initiatives

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12

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antimicrobial resistance*

**A white paper outlining
new Nordic initiatives**

Adopted by Nordic Council 4th of april 2017

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Less than a century ago, pneumonia usually led to death.

INTRODUCTION

The threat of antimicrobial resistance and the need for "One Health"

Less than a century ago, pneumonia usually led to death. However, following the discovery of antibiotics, this bleak outlook improved significantly. Antibiotics have since been used in many different sectors – in everything from human medicine to food production.

Whether it is a doctor treating a patient for pneumonia, or a farmer administering antibiotics to pigs in an attempt to keep various diseases at bay, antibiotics are widely used and taken for granted in many sectors nowadays. This has not always been the case.

However, the escalating and significant increase in the use of antibiotics has led to a global and growing challenge, in the form of antibiotic-resistant bacteria and microbes in many different areas. If the right

policy decisions are not made today, the consequences may be grave in the decades to come.

Antimicrobial resistance (AMR)¹ is already a major threat to public health all over the world, and the problem is growing all the time. According to the *Könberg Report*², compiled in 2014 by former Swedish Minister of Health and Social Affairs Bo Könberg, at least 25,000 people die in Europe each year as a result of antibiotic resistance. In the US, the figure is 23,000.

For some considerable time, very little work has been done on the development of new antibiotics. The latest calculations show that if the current situation is allowed to continue unchecked, it will lead to a humanitarian and economic disaster. Some forecasts predict that by 2050,

¹ Antimicrobial resistance is the ability of microbes such as bacteria, viruses, parasites or fungi to grow despite the presence of a chemical substance, e.g. medication and antibiotics, that would normally kill them or inhibit their growth.

² Bo Könberg, The Future Nordic Co-operation on Health <http://dx.doi.org/10.6027/ANP2014-730>, Nordic Council of Ministers 2014.

multi-resistant bacteria and microbes will kill up to 10 million people world-wide (it should be noted, however, that these figures include deaths from tuberculosis, HIV and malaria). The loss to the world economy is estimated at up to \$100 trillion.³ Exactly how bad the situation would be in the Nordic Region and Europe remains unclear, but we do know that the Region would be unable to ward off the spread of AMR and its deadly consequences.

When discussing the problems associated with AMR, it is important to emphasise that human and animal health, life cycles and fate are all inextricably interwoven. Approx. 60% of all infectious diseases in humans stem from animals (tuberculosis, rabies, avian flu, salmonella, etc.). When referring specifically to new diseases, this figure rises to 75%. Diseases and infections are also transmitted from humans to animals. In this light, it is important that animal welfare, treatment with veterinary medicine and human health are all seen as part of the same context.

In several spheres, it has become clear that there is a need for doctors, veterinarians and other health professionals to work together to improve disease control throughout the cycle, and not just in their own areas. The term "One Health" describes a way of thinking holistically about health-policy strategies in the human, veterinary and environmental fields.

The concept has been on the Nordic Council agenda for some time and has been discussed at meetings of the Nordic Council (NR) and members of the European Parliament. The "One Health" perspective on antibiotic resistance was a central theme in the aforementioned *Könberg Report* on Nordic co-operation on health, and formed part of the programme for the Danish Presidency of the Nordic Council of Ministers (NMR) in 2015.⁴ This led to the Nordic Council of Ministers earmarking funds for follow-up work in its 2016 budget.

One example of a specific initiative to promote a Nordic One Health policy and combat AMR was the *One Health*

³ Jim O'Neil, Antimicrobial Resistance: Tackling a crisis for the health and wealth of nations, https://amr-review.org/sites/default/files/AMR%20Review%20Paper%20-%20Tackling%20a%20crisis%20for%20the%20health%20and%20wealth%20of%20nations_1.pdf

⁴ The declaration was adopted by both the Nordic health ministers and the and food and agriculture ministers, see <http://www.norden.org/da/nordisk-ministerraad/ministerraad/nordisk-ministerraad-for-social-og-helse-politik-mr-s/deklarationer-og-erklæringer/declaration-on-antimicrobial-resistance-through-a-one-health-perspective>

Declaration against antimicrobial resistance, which was adopted by the NMR in 2015. A Nordic expert group was also established in 2013, followed by a strategy group in 2015.

The strategy group has a mandate "to use the Nordic collaboration to support the work being coordinated internationally in e.g. the EU, WHO, FAO and OIE in order to address antimicrobial resistance". The group also "acts as a link between the professional and political level in the Nordic countries to maintain political focus on antibiotic resistance".

The strategy group has not yet had the chance to submit a proper proposal for the shape of Nordic co-operation and the areas on which the Nordic countries should focus their attention in the near future. This white paper, therefore, represents the first attempt to outline political initiatives and specific proposals for Nordic solutions in the fight against AMR.

In 2016, a Nordic hearing was held in Copenhagen, entitled "You don't die of pneumonia, do you...?". This

document presents a handful of the recommendations that emerged from this event, and which could potentially be implemented in a way that generates added value via closer Nordic co-operation. The hope is that this white paper will provide the basis for more active Nordic co-operation, both within the NR and NMR, as well as in other relevant interdisciplinary and international forums.

Last but not least, it is also expected that the white paper's recommendations will inform the ongoing and important work of the NMR strategy group.

The white paper is action-oriented.

BACKGROUND

"You don't die of pneumonia, do you...?"

This document consists of a summary of the hearing "You don't die from pneumonia, do you...?", which took place on 6 December 2016 in the Parliament in Copenhagen, at the request of the Danish Presidency of the Nordic Council Presidium and the President of the Council, Henrik Dam Kristensen. Experts from all five Nordic countries and the appropriate academic environments attended.

The primary purpose of the hearing was to focus attention on the phenomenon of antimicrobial resistance (AMR), which constitutes a growing threat to public health worldwide. However, it also had two other purposes.

Firstly, it was intended as a welcome opportunity to gather experiences and advice from all of the Nordic countries, on how efforts can be made at regional level to manage and combat AMR and its spread, both internally in the Nordic countries and internationally.

Secondly – and more importantly – it was an absolute criterion on the part of the Presidency and the President that the advice collated and experiences presented would subsequently be summarised in a white paper that would form the basis and starting point for either Nordic action or a long-term policy action plan.

In short, the requirement was that the white paper would not only describe the threat posed by AMR, but also identify: 1) potential solutions that utilise existing and new instruments; 2) the stakeholders that would help find the solutions; and 3) the Nordic Region's role in a broad global response to AMR.

In other words, the white paper would be action-oriented.

In order to ensure that these requirements could be met, a range of Nordic professionals, researchers, experts, civil servants and others working in health-care and hospitals,

The health-care and hospitals,
the agriculture and veterinary sector
and the pharmaceutical industry were
invited to participate in the hearing.

the agriculture and veterinary sector and the pharmaceutical industry were invited to participate in the hearing on 6 December in the Danish Parliament. The participants were asked to give their views on how the Region can best tackle the major challenges arising from the proper use of antibiotics, across different sectors and based on the "One Health" principle.

Keynote presenters included: **Dr. Joseph Larsen** (US), deputy director of the Biomedical Advanced Research and Development Authority (BARDA) and member of the board of CARB-X. **Professor Niels Frimodt-Møller** (DK), Head of the Department of Clinical Microbiology at Copenhagen University Hospital, a member of the National Antibiotics Council and head of the Danish Centre for Antibiotic Research and Development (DanCARD). **Professor Dag Berild MD, PhD** (N), Professor of Infectious Diseases, Oslo University Hospital. **Sophie Noya** (B), Director of Public Policy, MSD Europe & Canada. **Johan Struwe**

(S), medical specialist, the Control Unit for Antibiotics and Infection Control at the Public Health Agency of Sweden. **Søren Brostrøm** (DK), Director, the Danish Health Authority. **Frank Aarestrup** (DK), Professor at the Technical University of Denmark (DTU) and one of the people behind the monitoring programme DANMAP. **Jan Dahl** (DK), veterinarian and chief consultant of the Danish Agriculture & Food Council. **Carsten Jensen** (DK), chair of the Danish Veterinary Association. **Solfrid Åmdal** (N), Senior Advisor, Department of Animal Health, the Norwegian Food Safety Authority. **Elisabet Lindal** (S), Senior Veterinary Advisor, Department of Internal Veterinary Issues and Animal Health Staff, Swedish Board of Agriculture.⁵

The proposed solutions and initiatives presented in this white paper are largely based on the points put forward by the keynote speakers at the hearing on 6 December 2016.

This document was written by Simon Langkjær of the Nordic Council Secretariat.

⁵ The programme for the hearing: <http://www.norden.org/da/nordisk-raad/sessioner-og-moeder/moeder/alle-moeder-i-nordisk-raad-oprettes-i-denne-mappe/man-doer-da-vel-ikke-af-lungebetaendelse-en-nordisk-hoering/>

OVERALL OBJECTIVES

Seven-point strategy

The goal of the Nordic hearing "You don't die of pneumonia, do you...?" was to address the threat that antibiotic resistance poses to health at local, regional and international level, as well as to identify and formulate a number of Nordic initiatives and priorities for action to address the threat.

In the Nordic Region, the "One Health" Initiative has in recent years led to a closer focus on the problem of resistance. However, bacteria and microbes respect no borders. In order to prevent situations in which simple operations become life-threatening, pneumonia is fatal, and epidemics spread from animals to humans, new and more dynamic initiatives are required to deal with the ever-growing resistance to antibiotics.

This is not a problem that can be solved by silo thinking. Rather, all

relevant sectors – from health, research and industry to veterinary, agriculture and the environment – must participate in a coordinated effort. At the same time, the sheer scale of the problem calls for targeted political action. A situation such as this calls for a long-term strategic plan involving all of the Nordic countries.

A joint Nordic strategy could be based on, e.g. the recently established US-UK CARB-X initiative, which brings together health authorities, governments, academics and industry from both sides of the Atlantic to combat antibiotic resistance.⁶

Irrespective of the exact form the Nordic strategy takes, it is essential that it is based on a set of overall objectives, and that it allows specific, practical, legal and administrative solutions to be constructed and modified at a later date.

⁶ Based on the Obama administration's "National Action Plan for Combating Antibiotic-Resistant Bacteria" and the UK report Tackling Drug-Resistant Infections Globally.

Based on the recommendations presented by the speakers at the hearing, the overall objectives for a Nordic strategy can be summed up as follows:

1. Reduction of the need for antibiotic treatment through vaccination and prevention of infection.
2. Rationalisation of the use of antibiotics for the treatment of humans and animals.
3. Collation of knowledge of distribution patterns and the spread of antimicrobial resistance.
4. Collation of knowledge of the optimal use of existing antibiotics and vaccines.
5. Providing incentives for the development of new health technologies, innovative medicines and vaccines.
6. Improving the dissemination and sharing of best practices.
7. Political pressure and dialogue via international co-operation.

The question then becomes how to implement these objectives and comply with them in practice.

In response, this white paper lists 12 well-founded recommendations that show how the objectives above can be translated into tangible initiatives.

What all of the initiatives have in common is that a united Nordic approach to AMR would not only save resources, but would also promote efficiency and be conducive to providing better protection against the threat of AMR.

The overall objectives for a Nordic strategy can be summed up as follows:

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6. Improving the dissemination and sharing of best practices.
7. Political pressure and dialogue via international co-operation.

IMPLEMENTATION OF THE STRATEGY

12 tangible initiatives

1. Faster and more accurate diagnoses

There is a need to launch and fund Nordic innovation and development programmes aimed at devising new and more effective methods of making faster diagnoses, so that patients can receive the right treatment at the right time.

Facilitating and developing better and faster methods of diagnosis for doctors and vets will be a significant step towards achieving a general reduction in antibiotic use in human and veterinary health care. More rapid diagnoses would, at an earlier stage, provide an informed basis on which to decide on the appropriate treatment. It would also reduce the risk of the wrong treatment being administered, because only individuals with bacterial infections – i.e. not those with viruses – would be treated with antibiotics. Faster and better diagnostic tools would also reduce the need for prophylactic and group medication in agriculture.

The Nordic countries have a long history of successfully pooling resources in various development and innovation programmes, as seen in institutions such as *Nordic Innovation*.

2. The best possible antibiotic treatment

This white paper recommends drawing up Nordic plans for funding and launching clinical studies to determine the best possible treatment with antibiotics.

In both human and veterinary medicine, there is a significant need for a greater and closer focus on clinical research into the best possible use of antibiotics, i.e. administering the right dosage for the right period of time.

In particular, there is a great need for knowledge about how best to use older generations of antibiotics. In recent years, there have been very few studies, in either the human or the veterinary field, of penicillin and older types of antibiotics, and how their effects compare to broad-spectrum and more recent antibiotics. This gap in the research is mainly due to a lack of both support and financial incentives, which have inevitably resulted in declining interest from pharmaceutical companies and poorer treatment guidelines.

However, a few studies have been conducted into the treatment of human beings. The findings of these studies indicate that, in several cases, the recommended treatment time for various antibiotics is either too long or far exceeds the point at which optimal efficacy is achieved.

For example, for streptococcal throat infection, the recommended antibiotic treatment time in Norway is 5–10 days, but studies have shown that the optimal time is in fact 3–5 days. Another example is cystitis, for which the treatment time in several countries ranges from 3 to 7 days, but recent studies have shown that it may be possible to supplement the treatment of cystitis with ibuprofen – a pain-relieving and anti-inflammatory medicine that will reduce the antibiotic intake. A third example of optimising antibiotic treatment concerns the case of kidney infection (pyelonephritis) in women, which STRAMA-funded studies in Sweden indicate only needs to be treated for one week rather than two.

3. Rational and appropriate use of antibiotics

There is a need to develop Nordic guidelines and incentives in order to promote a more rational and appropriate use of antibiotics, combined with more up-to-date advice that builds on the most recent Nordic data.

The vast majority of antibiotic prescriptions in the Nordic countries are not written in hospitals or veterinary clinics, but in the primary health system, i.e. by GPs and vets. In Denmark, antibiotics prescribed to humans outside of the secondary health system make up approximately 90% of antibiotics prescriptions. For this reason, GPs and vets in local clinics should also be a priority area with regard to promoting more rational use of antibiotics.

“Rational” use is defined as “motivated”, “useful” and “premeditated”. In general, GPs, dentists and veterinarians need to be better at assessing individual situations and judging whether treatment with antibiotics will achieve the desired outcome agreed upon by the doctor and patient. In other words, the purpose of rationalising treatment with antibiotics is to improve the judgement of GPs and vets, as well as the basis on which they decide whether their prescriptions are necessary, productive, and have sound motivations.

One example of such rationalisation is in Norway. As a result of too great a variation in the antibiotics prescribed for the same infection by different GPs, doctors are now required to write a diagnosis code on their antibiotic prescriptions. This data is stored in a national prescription database, where doctors can compare their prescription practice with the national average. The idea is that the database will promote a more rational use of antibiotics.

Another alternative is the STRAMA programme in Sweden, which has shown that a targeted policy calling for more rational antibiotic treatments can help to significantly reduce the total antibiotic use among humans without increasing the mortality rate. The programme included setting national targets for a rational use of prescription treatments, more restrictive guidelines for prescribing medicine, and improved national and regional advice to GPs about the latest recommendations for antibiotic treatments.

A similar policy could usefully be adopted by veterinarians working in both agriculture and food production.

Compared to Sweden, Denmark issues twice as many antibiotic prescriptions for children under four – a figure that would be considerably lower if guidelines similar to the Swedish ones were adapted at Nordic level. Such guidelines might include so-called “wait-and-see prescriptions”, a ban on issuing prescriptions over the phone, local-authority pharmacists, local “STRAMA groups”, computer programs that evaluate symptoms and recommend treatment, etc.⁷

⁷ The Danish “Guidance on the Prescription of Antibiotics” issued in 2012 states that greater caution should be exercised regarding the use of antibiotics. The objectives are that the guidance on when to use antibiotics should be more strict and rational, and that drugs that are less prone to triggering resistance should be used instead of, e.g. carbapenems, fluoroquinolones and cephalosporins. The guidance is relatively detailed, and involves GPs, hospitals and knowledge of AMR from textbooks, etc. The full guide is available (in Danish) at: <https://www.retsinformation.dk/Forms/R0710.aspx?id=157975>

4. Prevention of infection and spreading of infections that require treatment

This white paper recommends funding and launching Nordic studies, guidelines and initiatives to prevent the development and spread of infections in humans and animals that require treatment. These initiatives should include vaccination programmes, specific programmes to combat infections in livestock, reinforcement of the requirements for hygiene on farms and in treatment clinics, and exchanges of knowledge and information about best practice in health care and veterinary care.

With specific reference to agriculture and livestock, an important step towards minimising the need for antibiotics would be to look at how alternative and different forms of animal husbandry and farm conditions can help to prevent and reduce the use of antibiotics.

The concentration of food production in recent decades entails new risks of infectious diseases spreading to very large numbers of animals. On the other hand, modern industrialised production processes also provide completely different opportunities for managing health via various strategies for hygiene, management and prevention. Prevention plans at local, national and Nordic level, as well as general programmes in health and hygiene, can significantly reduce the risk of infections, and should be supported and further developed.

In this context, Norway and Sweden can serve as sources of inspiration. In recent years, both the government and the industry in these two countries have increasingly focused on initiatives to prevent infection and improve hygiene conditions and checks on farms, under the heading "Healthy animals don't need medicine".

Sweden has also introduced legislation to tighten up on the general requirements for animal owners' and farms' hygiene measures. In addition, stricter requirements for hygiene and infection control have been introduced in veterinary health and health care.⁸ Sweden also has a national programme for the prevention of infection and promotion of hygiene. In Denmark, plans for protection against infection are an integral part of veterinary advice.

⁸ Sweden has a national programme for the prevention of infection and promotion of hygiene, see www.smittsäkra.se.

5. The use of vaccines in agriculture, livestock and aquaculture

This white paper recommends funding and launching Nordic research programmes aimed at studying and documenting the preventive effect of both existing and potential new vaccines and vaccination programmes on health in agriculture, animal production and aquaculture, as well as the use of antibiotics against infections.

It is widely recognised that the development and use of vaccines to fight specific pathogens and infectious diseases could potentially have a preventive effect on the use of antibiotics in both agriculture and aquaculture. The vaccine triggers the development of specific antibodies that deactivate or limit bacteria and viruses and their harmful and pathogenic effect. This increases the overall resilience of livestock and aquacultures, which reduces the need for antibiotics.

Norway is the world leader in this field. In Norwegian aquaculture, a major national effort has been made to significantly reduce the consumption and use of antibiotics. However, even though much serious research has been conducted in Norway, in the Nordic Region in general, there has not been enough support, public interest or funding for the development of vaccines for use in agriculture and aquaculture. Greater efforts in this area should, therefore, be prioritised at Nordic level.

Developing more and better vaccines means that, in future, the use of antibiotics to treat widespread bacteria and common infections could become a fall-back position rather than the first port of call. In cases where developing and deploying vaccines is not possible, the white paper recommends setting up control programmes in order to contain the spread of these diseases and thereby minimise the need for antibiotic treatment.

PHOTO: NORDEN.ORG / MAGNUS FRÖDERBERG

PHOTO: NORDEN.ORG / KARIN BEATE NØSTERUD

6. Incentives for the development of new antibiotics and vaccines

The white paper recommends that the Nordic countries work together to introduce a range of financial incentives and better framework conditions for the development of new antibiotics and vaccines. To ensure sufficient long-term investment in this area, the white paper recommends that efforts include working together both at Nordic level and via international partnerships.

In the last few decades, the development and production of new antibiotics have slowed significantly – almost grinding to a halt. There are now far fewer pharmaceutical companies actively developing new antibiotics. This is largely due to economic factors and regulatory challenges.

Firstly, it appears as if private pharmaceutical companies think that market conditions make research into new antibiotics prohibitively expensive. In general, funding bodies have taken the view that new antibiotics are not valued sufficiently highly in relation to their contribution to society. In other words, antibiotics generate smaller profits for the pharmaceutical companies than other forms of treatment, and therefore the level of investment in research and development is lower. In other words, developing new antibiotics has quite simply not been considered profitable.

Secondly, there has not been enough pressure or support from politicians and the public sector. The pharmaceutical industry has long complained that it is too difficult to develop new antibiotics due to the complexity of the regulatory framework and the lack of financial incentives. Official bodies and political decision-makers need to ensure a better framework for encouraging investment in new antibiotics and ensuring that patients have access to them.

If the Nordic countries are to ensure the future development of new generations of antibiotics and vaccines, it is absolutely crucial that they begin to focus on the two issues mentioned above and seek to remove obstacles and mechanisms that hold back the development of new products. The following are among the ways in which this can be achieved:

- Mutual commitment by the public sector and private pharmaceutical companies to focus on developing programmes and research.
- Greater focus on support for public-private partnerships.
- More funding for public and private research, which promotes the emergence of new microbiological basic knowledge, new antibiotics and new vaccines.
- Improved structural incentives and framework conditions for pharmaceutical companies and researchers to develop new medicines, e.g. in the form of tax breaks, subsidies and measures such as market-entry rewards.
- Focus on developing vaccines and preventive treatment drugs that resist known bacterial and virus-induced infectious diseases, in order to avoid the use of antibiotics.
- Ensure the continued production and availability of older antibiotics that are no longer produced by the original pharmaceutical companies, but have been outsourced to smaller companies.
- Address the lack of subsidies that impedes investment in antibiotic research and development.
- Focus on innovative incentives to accelerate the development of new antibiotics.

However, as mentioned previously, if there is to be any hope of making noticeable and significant progress in the development of new antibiotics, it is not sufficient to restrict these efforts to a purely Nordic framework. For financial and scientific reasons, the Nordic Region cannot do it on its own. AMR is a global challenge and should be approached from a global perspective.

In addition to the work done at Nordic level, the Nordic countries should aim to establish and participate in international public-private partnerships. For example, in the US, UK and EU, partnerships exist in which public funds are used to support experimental research and development programmes for the development of new health technologies until it becomes financially viable for companies to invest in the further development and the production of medicines and antibiotics. The EU's *New Drugs for Bad Bugs – The Innovative Medicines Initiative (ND4BB)* and CARB-X in the United States are examples of these types of partnerships.⁹

This white paper considers partnership arrangements between the private and public sectors advantageous because they involve sharing both work and resources, and combining the best of both worlds. The scheme also opens up better opportunities for the parties to reach a joint understanding, and gives the public sector a greater say on which areas and technologies to focus on in the future.

⁹ Other examples worth mentioning include *Transatlantic Taskforce on Antimicrobial Resistance (TATFAR)* and *Joint Programming Initiative on Antimicrobial Resistance (JPIAMR)*, which consist of a collaboration between the US and EU, and an internal EU programme, respectively. Further information is available at <https://www.cdc.gov/drugresistance/tatfar/about.html> and <http://www.jpiamr.eu/>.

7. Public information campaigns in the Nordic Region

Public information campaigns aimed at spreading knowledge of the challenges posed by antibiotic resistance, the sensible use of antibiotics and the importance of good hygiene (in relation to animals, humans and the environment) are an essential part of a successful strategy for fighting AMR.

The majority of human antibiotic intake does not take place in hospitals or treatment clinics in the health system, but in primary health systems and out in the population. As such, this is where extraordinary efforts need to be made to reduce the use of antibiotics.

In relation to this issue, the Nordic countries have learned many useful and important lessons over the years, and they can build on and strengthen this knowledge and experience by working together.

In addition to public education campaigns, this white paper also suggests that basic data and information on AMR and how to combat it is incorporated into the teaching material in primary and secondary schools in the Nordic countries, and that teaching about AMR is made a special priority on agricultural study programmes and when training doctors, dentists and veterinarians.

8. Nordic institutions and online database

The white paper recommends that measures be taken to develop and set up a Nordic institution and online database in the area of microbiology.

In order to strengthen the research and knowledge base, which forms the framework for national precautionary measures and guidelines regarding antibiotic treatment, it is recommended that a joint online database is established in the field of microbiology, and that a Nordic institution or organisation is set up to work together on human and veterinary medicine in the Region.¹⁰

A database and institution of this type would have the capacity to co-ordinate and support differentiated efforts, both within a series of prioritised microbiological areas where this is not currently possible, and in areas that are not covered by existing institutions, such as the European Food Safety Authority (EFSA). Duplication should, of course, be avoided.

The objectives and advantages of setting up the database and institution include:

- real-time sharing of knowledge, data and information between the Nordic countries.
- greater focus on specialised data acquisition in terms of geography, types of treatment, patient groups, and animal species and breeds.
- closer focus on collating data about hot spots.
- a range of professional groups being obliged to report special risks of infection and resistant bacteria.
- closer collaboration and knowledge-sharing, including with the Baltic states.

¹⁰ The Nordic Region has a long history of organisations working together in this way. One such example in the health area would be the Nordic Institute of Dental Materials in Oslo.

9. Priority list of dangerous pathogens and joint procurement of particularly important antibiotics

The white paper recommends drawing up a Nordic priority list of dangerous pathogens that are difficult to treat, as well as particularly important antibiotics that need to be procured to treat infections that are resistant to antibiotics.

Bacteria and diseases do not stop at national borders, but spread rapidly across whole regions. This makes it necessary to coordinate the fight against AMR and to draw up a Nordic list of particularly dangerous pathogens that are resistant to most antibiotics.¹¹ The WHO and FAO already publish lists of dangerous pathogens.¹² While they are definitely useful and can form the basis for a Nordic list, they also need to be adapted to the Nordic context and its specific needs.

It is also crucial to classify what constitutes particularly important antibiotics within the Nordic health services. In addition to measures that ensure the proper use of them, it is just as essential that antibiotics are always available that can be used to treat infections prone to antibiotic resistance.

In this context, ensuring safe and constant supplies to small pharmaceutical markets, like the Nordic countries, will be a priority. This would require new models for the procurement, funding and distribution of these particularly important antibiotics.

It would also require the Nordic countries to set up a joint organisation, as explained under point 8.

¹¹ In some Nordic countries, including Sweden, it is mandatory to draw up a priority list of dangerous pathogens.

¹² The WHO list "Critically important antimicrobials for human medicine", <http://www.who.int/foodsafety/publications/antimicrobials-third/en/>.

10. Co-ordination of food control and allocating responsibilities between national bodies in the Nordic Region

It is a fact that the regulation and enforcement of food controls varies greatly between the Nordic countries. For example, Denmark has a far more restrictive and extensive system than Finland and Iceland with regard to the antibiotic content of meat and other food products.

If the Nordic countries are to work together and in the same way on combating AMR, then it will be essential to coordinate agreements on food control between them. This would open up opportunities for better and more rational use of each country's resources and expertise.

Instead of national agencies and regulatory bodies in the Nordic countries all doing the same work, this white paper proposes that they share the work between them. This would spread the workload and enable various types of monitoring by the national institutions.

The idea is that the work and the responsibilities would be shared according to the principle of "experience and expertise". In other words, the body responsible for conducting the inspection would be the one with the most experience and the most specialised expertise in the area concerned. The institution responsible would, of course, also be required to inform its counterparts in the other Nordic countries.

It is important to take into account any EU legislation covering this area, to ensure that it does not clash with any co-ordinated Nordic food controls.

11. The Nordic Region in Europe and the rest of the world

This white paper recommends that the Nordic countries reach agreement on a coordinated approach to the impact of relevant EU regulation and legislation, and to the international dissemination of Nordic experiences in combating AMR.

Given that AMR is not just a regional danger, but an international public health threat, it goes without saying that the Nordic countries will need to be part of a broad political collaboration with other countries, and share the work in international health organisations and political forums such as the EU.¹³

The purpose of this cross-border co-operation must be both to influence international legislation and regulation in the area, and to convey information about positive Nordic experiences of combating AMR.

This white paper suggests, therefore, that the Nordic countries, as a minimum, focus on the following points:

- Identifying best practices in Nordic regulatory and investment policies, and the benefits thereof, as part of a strategy proposal to be presented to the EU, WHO, FAO, OIE, etc.
- Ensuring ethical rules for the production of antibiotics and pharmaceutical products.
- Active involvement of the EU and WHO and other relevant international fora in regional initiatives and vice versa.
- Adoption and coordination of joint Nordic political pressure on the EU, given that the standard regulations regarding the use of antibiotics and the EU rules on veterinary medicine and animal welfare, etc., also apply to the Nordic countries.

¹³ The WHO and EU both have action plans to combat AMR. See <http://www.who.int/antimicrobial-resistance/global-action-plan/en/> and http://www.euro.who.int/__data/assets/pdf_file/0008/147734/wd14E_AntibioticResistance_111380.pdf and http://ec.europa.eu/dgs/health_food-safety/docs/communication_amr_2011_748_en.pdf.

12. Nordic Plan

Finally, the white paper recommends that the 11 previous points form the basis of a joint Nordic action plan, complete with details of funding, reporting and political control.

While it may prove impossible to cover all of the points raised, it is crucial to draw up a Nordic action plan for dealing with any epidemic or similar immediate health disaster as this would undoubtedly strengthen the over-all level of contingency planning.

In relation to drawing up such contingency plans, it would be advantageous to use and activate pre-existing national programmes or institutions, e.g. the Nordic Society of Clinical Microbiology and Infectious Diseases.

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ABBREVIATIONS

AMR: Antimicrobial resistance

EU: The European Union

FAO: UN body – The Food and Agriculture Organization

NMR: The Nordic Council of Ministers

NR: The Nordic Council

OIE: World Organisation for Animal Health

STRAMA: The Swedish Strategic Programme Against Antibiotic Resistance

WHO: The World Health Organization

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