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Action plan against the rising threats from Antimicrobial Resistance

1. INTRODUCTION

1.1. The rising risk of antimicrobial resistance (AMR)

Since the introduction of penicillin in the 1940s **antimicrobial medicines**, such as antibiotics, have become **essential for the treatment** of many microbial infections in humans and animals. In addition to the treatment of infectious diseases (e.g. pneumonia, tuberculosis, malaria, HIV/AIDS) and hospital-acquired infections (e.g. methicillin resistant *Staphylococcus aureus* (MRSA)), antimicrobials are vital for reducing the risk of complications in relation to complex medical interventions, such as hip replacements, organ transplants, cancer chemotherapy and the care of premature babies. In addition, antimicrobials are used in veterinary medicine and for non-therapeutic purposes (e.g. disinfectants, preservatives, and food and feed additives).

Seventy years later, these applications are **now seriously jeopardized** by the emergence and spread of microbes that are resistant to affordable and effective first-choice, or "first-line" medicines, rendering the drugs concerned ineffective for the treatment of the infection. This resistance is a natural biological phenomenon but is amplified by a variety of factors. The inappropriate use of therapeutic antimicrobials in human and veterinary medicine, the use of antimicrobials for non-therapeutic purposes as well as the pollution of the environment by antimicrobials is accelerating the emergence and spread of resistant microorganisms. The consequences are severe:

- A subset of drug-resistant bacteria is responsible for about 25,000 human deaths annually. In addition to avoidable death, this also translates into extra healthcare costs and productivity losses of at least EUR 1.5 billion¹. In healthcare settings, AMR notably represents a threat of particular concern, i.e. infections acquired from exposure in a hospital or a healthcare service unit. Approximately 4 million patients are estimated to acquire a healthcare-associated infection in the EU every year.
- Common bacteria causing e.g. diarrhoea or respiratory infections in several animal species have become more resistant to commonly used veterinary antimicrobials causing increased suffering and mortality in animals, and consequently, production losses and extra costs as well as occupational hazards to animal keepers.

The development of resistance, the pressure to reduce the use of antimicrobials as well as the weak market incentives and increasing difficulty and cost to develop new effective antibiotics have discouraged investment in this area with the consequence that only a few new antibiotics are currently under development.

Increasing global trade and travel favours the spread of antimicrobial resistance between countries and continents. Therefore, antimicrobial resistance is a **global public health concern**.

¹ ECDC/EMA JOINT TECHNICAL REPORT The bacterial challenge: time to react. Available from: http://www.ema.europa.eu/docs/en_GB/document_library/Report/2009/11/WC500008770.pdf

1.2. Ongoing efforts are not sufficient

The problem of AMR is known since many years now and has been recognized both by the Council and the European Parliament:

- The **Council** adopted on 10th June 2008 **Conclusions** on AMR calling upon the Commission, in accordance with the "health in all policies" approach, to promote cooperation between the Commission, Agencies and the Member States against AMR, and on 1st December 2009 Conclusions on innovative incentives for effective antibiotics calling upon the Commission to develop a comprehensive action plan concerning incentives to develop new effective antibiotics including ways to secure their rational use.
- On 12th May 2011 the **European Parliament** adopted a non-legislative **resolution** on antibiotic resistance in which it stresses that AMR has become a huge issue in recent years. To cope with this growing problem and the consequent treatment failures, the EP calls on the Commission to establish an EU-wide plan to combat AMR.

The Commission has taken a number of important actions:

- In the field of human medicine, the 2001 Community Strategy against AMR² called for EU actions against AMR in the fields of surveillance, research, prevention and international cooperation. This led to the adoption of EU wide recommendations and guidelines against AMR.
- In animal husbandry, the ban on the use of antimicrobials for growth promotion was introduced in 2006. The Commission has developed legislation on the control of *Salmonella* at all relevant stages of production, processing and distribution in order to reduce the exposure of humans to potentially resistant *Salmonella*.
- In the field of veterinary medicine, the emphasis has been in monitoring zoonotic AMR (i.e. resistance transmissible between animals and humans) and on the use of antimicrobials in animals.
- The authorisation requirements of human and veterinary medicines and other products, such as food enzymes, probiotics and decontamination agents, with possible effects on development of AMR have also been the focus areas.
- AMR is the subject of research funded under the Seventh Framework Programme (FP7) and the Innovative Medicines Initiative (IMI). AMR is also the subject of a proposed Joint Programming Initiative (JPI), which aim to coordinate research activities among EU Member States³.
- Scientific opinions on AMR by EU Risk Assessment bodies i.e. the European Centre for Disease Prevention and Control (ECDC), the European Food Safety

² COM/2001/0333 final Volume I.
³ <http://ec.europa.eu/research>

Authority (EFSA), the European Medicines Agency (EMA), the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) have formed the basis for policy planning, for example, development of new antimicrobials and monitoring AMR and antimicrobial usage.

Similarly, some action has been undertaken at **international level** e.g. by the World Health Organisation (WHO) and the Codex Alimentarius.

1.3. The need for substantially reinforced action and new determined initiatives

Although the actions taken so far go in the right direction, they have not succeeded in containing the rising threat from AMR. A substantial reinforcement of current measures in place together with a new set of rigorous measures are therefore needed in order to reduce the pressure of using antimicrobials and to prevent the further spread of resistance and preserve the ability to combat microbial infections.

In order to succeed, a **holistic approach** is needed. AMR is a major European and global societal problem, involving many different sectors e.g. medicine, veterinary medicine, animal husbandry, agriculture, environment and trade. It cannot be successfully tackled through isolated, sectoral efforts. Food and direct contact with animals may serve as a vehicle for the transmission of AMR from animals to humans emphasizing the link between human and veterinary medicine in line with the "One Health" initiative⁴. The fact that resistance may spread from country to country when people and animals travel or when food, feed and other possible vehicles of AMR are traded, stresses the need for coordinated efforts across borders.

Based on such holistic approach, the new actions put forward in this Action Plan aim at:

1. Mitigating the risk of developing AMR in humans from the **use** of antimicrobials both in humans and animals by effectively ensuring across the EU their **appropriate use**, and promoting **microbiological diagnosis** as the means to determine, to the extent possible, the need for antimicrobials.
2. Putting in place effective ways to **prevent microbial infections** and their spread.
3. **Developing effective antimicrobials** or alternatives for treatment of human and animal infections.
4. Joining forces with **international partners** to contain the risks of spreading AMR from international trade and travel and via the environment.
5. Reinforcing **research** to develop the scientific basis and **innovative means** to combat AMR.

⁴ <http://www.one-health.eu>

2. KEY ACTIONS FOR A SUCCESSFUL FIGHT AGAINST AMR

2.1. Appropriate use of antimicrobials

The appropriate use of antimicrobials is essential for reducing and preventing AMR and is the cornerstone of EU policy against AMR, both in human and veterinary medicines. Antimicrobials should only be used if necessary and in accordance with best practices.

Prudent use of antimicrobials in human medicine

AMR is directly linked to the way in which patients and prescribers use antimicrobial agents. The inappropriate use of these agents (e.g. taking antimicrobials for wrong reasons or incorrectly) is driving the emergence and selection of drug resistant microbes. Promoting the appropriate or prudent use of antimicrobials from the doctor and the pharmacist to the patient is the determinant in reversing the increasing rates of AMR.

The 2002 Council Recommendation on the prudent use of antimicrobial agents in human medicine⁵ lays out specific actions to be implemented by Member States and the Union with a view to containing AMR (e.g. setting up of surveillance systems, implementation of control measures such as access to antibiotic through prescription only, promotion of education and training programmes etc.). Whereas reports published by the Commission in 2005 and 2010 have highlighted important progress in the implementation of this Recommendation, there are still numerous areas where only limited improvement has been attained.

Action n° 1: Strengthen the promotion of the appropriate use of antimicrobials in all Member States.

- *In cooperation with ECDC, the Commission will aim at ensuring that all the 2002 Council Recommendation on the prudent use of antimicrobial agents in human medicines are effectively implemented by the Member States with a particular emphasis on:*
 - *Improving the sustainability of national surveillance systems on AMR and access to surveillance data at local and regional levels.*
 - *Improving the implementation by all Member States of the prescription only requirements for antimicrobial agents.*
 - *Improving the implementation of control measures against AMR in nursing homes and long-term care facilities.*
 - *Development of education and training for healthcare workers on all aspects of AMR.*
 - *Better assessment and monitoring at national level of the*

⁵ Council Recommendation (2002/77/EC) of 15 November 2001 on the prudent use of antimicrobial agents in human medicine, OJ L 34, 5.2.2002, p. 13-16.

implementation and efficiency of the national strategies and control measures.

- *The Commission will publish by 2015 at the latest a new report identifying progress made and shortfalls in promoting prudent use of antimicrobials at national and EU level and assess whether the existing EU framework for the promotion of prudent use of antimicrobials should be revised.*

Prudent use of antimicrobials in veterinary medicine

The sub-optimal use of therapeutic antimicrobials for animals, in particular under-dosage, can enhance the development of AMR. Efforts to ensure that the medicines are administered to the animals only at the correct therapeutic level are undertaken in the enforcement of the current rules on veterinary medicines and medicated feed but also in the margins of the ongoing revision of these legal acts.

In the veterinary sector cooperation has been established between the stakeholders (animal health industry, veterinarians and farmers) to promote prudent use. In addition guidelines from international organisations, veterinary associations as well as by Member States on the use of antimicrobials have been developed. Some Member States have also put in place various measures, legislative and others, to promote appropriate use. However, between Member States significant differences exist in the sales of antimicrobials that cannot be explained by the animal husbandry practices. Moreover, there is an increasing concern on the use of antimicrobials in the veterinary sector that are critical for humans.

Examples:

- 3rd and 4th generation cephalosporins are antibiotics that have been classified by the WHO as critically important antibiotics for humans. EMA indicated in a reflection paper in 2008⁶ that for almost all of the indications for the systemic use of these medicines in the treatment of food producing animals, equal or better alternatives are available. In a 2011 opinion, EFSA⁷ "*considered that a highly effective control option for certain types of AMR would be to stop all uses of cephalosporins/systemically active 3rd/4th generation cephalosporins, or to restrict their use (use only allowed under specific circumstances).*"
- MRSA is a major cause of resistant hospital infections. In a 2008 baseline survey coordinated by EFSA, it has been demonstrated that pigs are a major reservoir of a new emerging type of MRSA. A joint ECDC/EFSA/EMA scientific report published in 2009⁸ concludes that "*the extensive use of*

⁶ http://www.ema.europa.eu/docs/en_GB/document_library/Scientific_guideline/2009/10/WC500004307.pdf

⁷ Scientific Opinion on the public health risks of bacterial strains producing extended-spectrum β -lactamases and/or AmpC β -lactamases in food and food-producing animals. EFSA Journal 2011;9(8):2322. [95 pp.]. Available online: www.efsa.europa.eu/efsajournal

⁸ Joint scientific report of ECDC, EFSA and EMEA on meticillin resistant *Staphylococcus aureus* (MRSA) in livestock, companion animals and foods. EFSA-Q-2009-00612 (EFSA Scientific Report (2009) 301, 1-10) and EMEA/CVMP/SAGAM/62464/2009. Available from: http://www.ema.europa.eu/docs/en_GB/document_library/Report/2009/10/WC500004306.pdf

antimicrobials for prevention of disease appears to be an important risk factor for the spread of MRSA".

Action n° 2: Strengthen the regulatory framework on veterinary medicines and on medicated feed via the review package foreseen for 2013, in particular:

- *To ensure appropriate warnings and guidance on the labels of veterinary antimicrobials.*
- *To consider restrictions on the regular or the off-label use of certain new or critically important antimicrobials for humans in the veterinary sector.*
- *To consider amending the rules for the advertisement of veterinary antimicrobials.*
- *To revisit the authorisation requirements in order to sufficiently address the risks and benefits of antimicrobial medicines.*

Action n° 3: Introduce recommendations for prudent use in veterinary medicine, including follow-up reports, using the same approach as 2002 Council Recommendation on prudent use of antimicrobial agents in human medicine.

2.2. Prevent microbial infections and their spread

Infection prevention and control in healthcare settings

The burden caused by infections occurring in healthcare settings – so called 'healthcare associated infections' – is high within the EU and is closely related to the issue of AMR. The latter has emerged in virtually all healthcare-associated pathogens, and the majority of novel resistance factors first surface in healthcare facilities. Considering the scientific evidence indicating that approximately 20-30% of all healthcare associated infections can be prevented by intensive prevention and control programmes, the 2009 Council Recommendation on patient safety, including the prevention and control of health care associated infections⁹ includes recommendations to step up the prevention and control of infections in healthcare settings.

⁹ Council Recommendation (2009/C 151/01) of 9 June 2009 on patient safety, including the prevention and control of healthcare associated infections, OJ C 151, 3.7.2009, p. 1–6.

Action n° 4: Strengthen infection prevention and control in healthcare settings

- *Conduct and publish by 2012 a report identifying the progress made by the Member States and gaps in implementing the 2009 Council Recommendations on patient safety, including prevention and control of health care associated infections, with a special emphasis on verifying whether:*
 - *guidance on infection prevention and control is developed,*
 - *surveillance of healthcare associated infections is strengthened and*
 - *proper education and training of healthcare workers is organised.*

Infection prevention and control in farm animals

Improved animal health and biosecurity measures as well as promotion of Good Farming Practices avoid infections and therefore contribute to the reduction of the use antimicrobials in animals including aquaculture ("prevention is better than cure") and consequently of the development of AMR in animal pathogens and zoonotic agents.

In addition to the ongoing Salmonella control programs in poultry, cost/benefit analyses are currently carried out on the control of *Salmonella* in pigs, the second source of human salmonellosis, in view of setting a target for (potentially resistant) infections.

Action n° 5: Introduction of the new Animal Health Law, which will focus on prevention of diseases, reducing the use of antibiotics and replacing current Animal Health provisions based on disease control.

2.3. Develop new effective antimicrobials or alternatives for treatment

Development of new human antimicrobials

A report published in 2009, "The bacterial challenge: time to react"¹⁰, highlights the gap between the increasing problems related to multi-resistant bacteria in the EU and the pressing need for developing new antimicrobials to meet medical needs. This study calls for a European strategy to address this gap. This call was further strengthened by the 1st of December 2009 Council Conclusions on incentives for effective antibiotics mentioned in paragraph 1.2 above.

Numerous research projects that aim to support antimicrobial development are funded within FP7¹¹, including support to clinical trials on off-patent antibiotics. Nevertheless, there is currently and since many years a lack of industrial investment in the development of new antibiotics and only a few products that could combat

¹⁰ ECDC/EMA JOINT TECHNICAL REPORT The bacterial challenge: time to react. Available from: http://www.ema.europa.eu/docs/en_GB/document_library/Report/2009/11/WC500008770.pdf

¹¹ http://ec.europa.eu/research/health/infectious-diseases/antimicrobial-drug-resistance/index_en.html

resistant strains are in the late-stage of development. In the absence of new effective antimicrobials there is a risk that resistance will further develop and certain infections will no longer be able to be treated effectively.

There are several reasons for the lack of industrial investment in new antibiotics. Developing new, effective and safe antibiotics is more and more scientifically difficult and costly. Restrictions on the use of antibiotics deter investment. Pricing structure does not reward utility. The majority of antibiotics are administered for short periods. Generics take an increasing share of the antibiotic market. There is an urgent need for increased research and development and a new business model for antibiotics.

Action n° 6: To promote, in a staged approach, unprecedented collaborative research and development efforts to bring new antibiotics to patients by:

- *Launching rapidly with EFPIA¹², within the IMI-Joint Undertaking, a programme for research on new antibiotics aimed at improving the efficiency of research and development of new antibiotics through unprecedented open sharing of knowledge.*
- *Establishing an overarching framework agreement with the industry, defining objectives, commitments, priorities, principles and modes of action for public-private collaboration in a longer term perspective. Mobilising adequate resources, within IMI in particular (and its possible successor), FP7 and in the longer term the forthcoming research and innovation programme 2014-2020 (Horizon 2020), in order to support research and development work, based on criteria and modalities adapted to the specific needs and challenges of antibiotic development. Use the flexibility in the current pharmaceutical legislation to give rapid authorisation to new antibiotics and work with stakeholders and the Member States' authorities towards the establishment of adequate market and pricing conditions for new antibiotics.*
- *Ensure conditions for and implement fast track procedures for the marketing authorisation of new antimicrobials.*

This action will be complemented by the reinforced action to ensure prudent use as well as international collaboration aimed at combating transfer of resistance.

Development of veterinary antimicrobials

The development of antimicrobials for potential use in animals has been hampered, particularly in view of the uncertainty as to whether new antimicrobials or even new indications for such active substances would be given a marketing authorisation for the veterinary sector.

¹²

European Federation of Pharmaceutical Industries and Associations.

Development of diagnostic tools in human and veterinary medicine

Diagnostic tools that include tests for quick and accurate identification of pathogenic micro-organisms and/or for determining their sensitivity to antimicrobials play a key role in the fight against microbial infections. Research on the development of such tools as well as their implementation in health care is funded under FP7 and additional efforts are expected to be funded under the forthcoming research and innovation programme 2014-2020 (Horizon 2020).

Development of vaccines and other preventive measures

Vaccines and other preventive measures could have an important impact on reducing the spread of infections and, thus, the need for treatment. Therefore, research and innovation in this field should be supported.

Action n° 7: Promote efforts to analyse the need for new antibiotics into veterinary medicine

- *Establishing request for scientific advice to clarify in particular whether the development of new veterinary antimicrobials would reduce AMR.*
- *Evaluation of the need and possible introduction of incentives that trigger development in veterinary medicines to increase the likelihood that innovations reach the market within the review of the rules on veterinary medicines foreseen in 2013.*

2.4. Joining forces with international partners to contain the risks of spreading AMR from international trade and travel and via the environment

In view of the global nature of AMR, the EU has already worked actively in several international fora, which aim to expand global awareness and joint measures. The Commission will continue to support this work, e.g. to encourage other WHO regions to take into account the approach of the WHO's European region, to ensure continuous consistency with work of the WHO Advisory Group on Integrated Surveillance of Antimicrobial Resistance, to further contribute to the development of Health Codes by the World Organisation for Animal Health (OIE), to play an active role in the Codex Alimentarius, and to continue to encourage trading partners to consider their own measures against AMR.

In addition, the EU aims at developing bilateral cooperation against AMR. The EU started a bilateral cooperation with the USA on AMR as a request of the EU-US summit 2009. In 2011 the EU-US Transatlantic taskforce (TATFAR) has identified 17 key recommendations for strengthened cooperation in 3 key areas: 1) Appropriate therapeutic use of antimicrobials in human and veterinary medicines, 2) Prevention of drug-resistant infections and 3) Strategies for improving the pipeline of new antibiotics. The TATFAR recommendations for concrete future collaboration on these key areas are consistent with the priorities in this action plan.

Action n° 8: Develop and/or strengthen multilateral and bilateral commitments for the prevention and control of AMR in all sectors.

Multilateral cooperation

- *Cooperate with **WHO EURO** in implementing the new Regional Strategies against AMR and Multi Drug Resistant tuberculosis across the WHO EURO Region.*
- *Contribute to further development of the Health Codes of the **OIE** and promote the implementation of **Codex Alimentarius** international standards on AMR.*
- *Initiate cooperation on reduction of the environmental pollution by antimicrobial medicines particularly from production facilities.*

Bilateral cooperation

- *Strive to maintain and deepen transatlantic cooperation against AMR through active participation in the **TATFAR** and the implementation of its recommendations. Set out and apply in a staged approach a plan to implement the 17 recommendations of TATFAR.*

3. OTHER HORIZONTAL ACTIONS

In addition to above key actions, some other measures should be taken, including monitoring, research, communication and education/training.

3.1. Monitoring and surveillance

3.1.1. Surveillance of AMR and antimicrobial consumption in human medicine

EU surveillance systems have been developed to monitor AMR (European Antimicrobial Resistance Surveillance Network) and the consumption of antimicrobials (European Surveillance of Antimicrobial Consumption, ESAC). These systems provide key information and data supporting the prevention and control of AMR. In addition, while young children are the main recipients of antibiotics in the EU, there is currently only very limited surveillance data on antimicrobial consumption and antibiotic resistance for children in Europe.

Action n° 9: Strengthen surveillance systems on AMR and antimicrobial consumption in human medicine

- *With the support of the ECDC, assess ways to improve access to data on AMR at all levels (regional, local and hospitals).*
- *Ensure the efficient transfer of the ESAC project to ECDC to secure the sustainability of the project.*
- *With the support of the ECDC, support and monitor the successful*

development of the new EU funded surveillance project ARPEC – Antibiotic Resistance and Prescribing in European Children.

3.1.2. *Surveillance of AMR and antimicrobial consumption in animals*

AMR monitoring is mandatory for most important **zoonotic bacteria** in food producing animals. These bacteria (e.g. *Salmonella*, *E. coli*) may infect humans directly or through the consumption of food and jeopardize antimicrobial treatment in humans. Based on recent EFSA recommendations, the Commission will propose updating of the monitoring requirements. Data on usage of antimicrobials both in humans and in animals is needed for risk profiling, risk assessment and research purposes as well as for setting risk management goals and evaluating their effectiveness.

Harmonisation of resistance monitoring for human, animal, environment and food bacteria favours the comparability of the monitoring results and consequently provides better input for the risk assessment and risk management activities. In addition, the access to data and information on AMR and use of antimicrobials must be enabled and improved for decision makers, professionals and the public.

Action n° 10: Strengthen surveillance systems on AMR and antimicrobial consumption in animal medicine

- *Inclusion of a legal basis for the monitoring of AMR in animal pathogens in its forthcoming proposal for a new Animal Health Law.*
- *Promotion and extension of the European Surveillance of Veterinary Antimicrobial Consumption (ESVAC) with the collaboration of EMA to obtain harmonised data on the usage per animal species and production categories as well as for different indications from all Member States.*
- *Review of the monitoring of AMR in zoonotic bacteria and/or indicators.*
- *With the support of the relevant EU agencies, establish harmonisation between human and veterinary surveillance to allow comparison of data.*

3.2. **Additional Research and Innovation**

Scientific research and innovation serves as a basis for science-based policy and legal measures to combat AMR and can provide new tools for diagnosis and treatment. Diagnostic tools that include tests for quick and accurate identification of pathogenic micro-organisms and/or for determining their sensitivity to antimicrobials play a key role in the fight against microbial infections. Vaccines and other preventive measures could have an important impact on reducing the spread of infections and, thus, the need for treatment. Therefore, research and innovation in these fields should be supported.

The FP7 funds a multitude of collaborative research projects aimed at improving the understanding of resistance mechanisms, as well as projects that stimulate academia

and small and medium sized enterprises to work together towards novel innovative solutions for diagnostic tests and to combat the spread of AMR.

Action n° 11: Reinforce and co-ordinate research efforts, in particular

- *Promote further research aiming at better understanding of antimicrobial resistance and pathogenic-host interactions.*
- *Promote further research on the development of diagnostic tools, vaccines and other preventive measures.*
- *Support the launch of a Joint Programming Initiative¹³ aimed at coordinating national research activities related to AMR.*
- *Support an analysis of the reasons for high usage of antimicrobials in countries with the highest occurrence of AMR in the human sector.*
- *Contribute to a global mapping of drug resistance.*

3.3. Communication, education and training

With more than 50% of EU citizens still believing that antibiotics are effective against viruses, awareness and understanding of the public in general and healthcare, veterinary and other professionals on AMR and the importance of appropriate use need to be enhanced through **education campaigns** throughout the EU and by making AMR a more integral part of education programs for health and veterinary professional groups. The "European Antibiotics Awareness Day" (EAAD) – an annual European public health initiative taking place on 18 November to raise awareness about the threat to public health of antibiotic resistance and about prudent antibiotic use – provides a unique platform to support the dissemination of information and key messages on this issue. With more than 35 Member States and international partners having developed campaigns and events in 2011 as part of the EAAD, this initiative should be maintained and strengthened.

This communication effort should be supported by effectiveness research to improve and maximise the impact of these campaigns on practitioners and the general public.

¹³

http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/intm/118029.pdf

Action n° 12: Survey and comparative effectiveness research

Building up on the findings of the 2010 AMR Eurobarometer survey, the Commission will by no later than 2015 conduct a new EU wide survey:

- *Assessing the impact of the national and EU awareness campaigns on AMR including the development of indicators.*
- *Monitoring the evolution of the behaviour of the general public with regard to AMR and the appropriate use of antimicrobials.*
- *support improving the effectiveness and the impact of these campaigns among others through the identification of target groups and most efficient communication practices and the exchange of best practices.*

4. EX-POST EVALUATION

In order to evaluate and assess the trends, the impact and effectiveness of the measures taken and the goals achieved by the implementation of the 5-year action plan to fight against AMR, the Commission shall monitor the use of antibiotics and antimicrobial resistance, and, where appropriate, shall ask follow up reports on the implementation and actions taken at national level.

5. CONCLUSIONS

The increasing resistance to antimicrobial drugs represents one of the major emerging threats to human health. To address this, a holistic approach is stressed in line with the "One Health" initiative.

The Commission proposes to put in place a 5-year Action Plan to fight against AMR based on 12 key actions:

- Action n° 1: Strengthen the promotion of the appropriate use of antimicrobials in all Member States.
- Action n° 2: Strengthen the regulatory framework on veterinary medicines and on medicated feed.
- Action n° 3: Introduce recommendations for prudent use in veterinary medicine, including follow-up reports.
- Action n° 4: Strengthen infection prevention and control in healthcare settings.
- Action n° 5: Introduce of a legal tool to enhance prevention and control of infections in animals in the new Animal Health Law.
- Action n° 6: Promote, in a staged approach, unprecedented collaborative research and development efforts to bring new antimicrobials to patients.

- Action n° 7: Promote efforts to analyse the need for new antibiotics into veterinary medicine.
- Action n° 8: Develop and/or strengthen multilateral and bilateral commitments for the prevention and control of AMR in all sectors.
- Action n° 9: Strengthen surveillance systems on AMR and antimicrobial consumption in human medicine.
- Action n° 10: Strengthen surveillance systems on AMR and antimicrobial consumption in animal medicine.
- Action n° 11: Reinforce and co-ordinate research efforts.
- Action n° 12: Survey and comparative effectiveness research.

Several Member States have been pro-active in carrying out actions related to those considered at EU level. These actions at national level and the experience gained from it should be the basis of the practical development and implementation of this Action Plan.