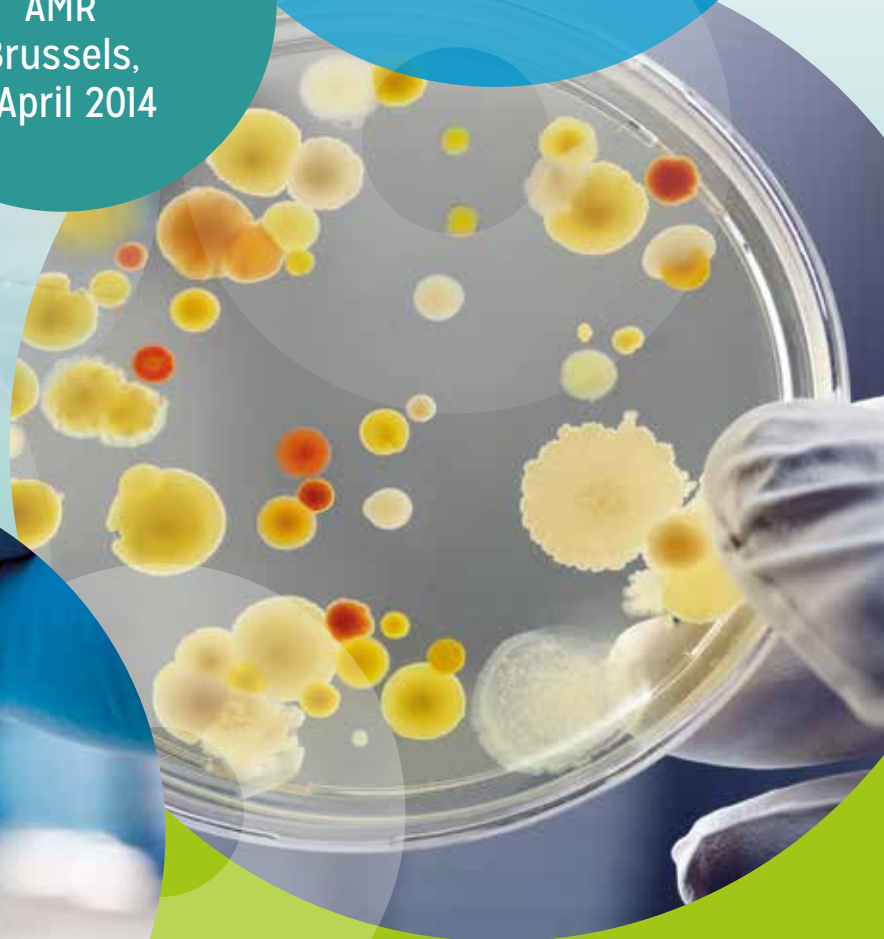# jpiamr

Joint Programming Initiative
on Antimicrobial Resistance

Report
on the official
launch of the JPIAMR
Strategic Research
Agenda

Towards a Global
Research Agenda for
AMR
Brussels,
3 April 2014

THE
MICROBIAL
CHALLENGE
AN EMERGING THREAT
TO HUMAN / ANIMAL
HEALTH

1. INTRODUCTION

Antibiotics have saved millions of lives from once deadly infectious diseases. But, misuse of antibiotics and other antimicrobials in humans and animals has led to bacteria evolving resistance.

Strategic Research Agenda

Joint Programming Initiative on Antimicrobial Resistance

jpiamr

The Strategic Research Agenda

Glossary	
AMR	*Antimicrobial Resistance*
SRA	*Strategic Research Agenda*
JPIAMR	*Joint Programming Initiative on Antimicrobial Resistance*
IMI	*Innovative Medicines Initiative*
WHO	*World Health Organisation*
EFPIA	*European Federation of Pharmaceutical Industries and Associations*
SAB	*Scientific Advisory Board*

On 3 April 2014 in Brussels, the **Joint Programming on Antimicrobial Resistance** (JPIAMR) presented its **Strategic Research Agenda** (SRA) which outlines the steps needing to be taken to minimise antimicrobial resistance, one of today's most serious public health threats.

In addition to the 19 countries (including both Canada and Israel) already signed up to this initiative, JPIAMR received support from countries ranging from Australia to South Africa during this meeting.

Coming together globally is crucial as the world now seems to be entering a post-antibiotic era where resistance is so widespread that for some groups of bacteria, few antibiotics are effective enough for therapy. This also means that sophisticated clinical interventions such as organ transplants, cancer chemotherapy or care for pre-term infants will become far more difficult due the threats of infections with multi-drug resistant bacteria.

jpiamr

1.1 The Strategic Research Agenda (SRA)

To go some way towards tackling AMR, JPIAMR has identified six priority topics to form a Strategic Research Agenda (SRA). These topics will give the fight against antibiotic resistance a multidimensional approach. These approaches will be translated into new prevention and intervention strategies that improve public health and the wellbeing of populations and deliver economic and societal benefits throughout Europe and beyond.

Operating on all relevant levels, from the scientific community to research funders and from policy makers and societal stakeholders to industry and SMEs, is the only way to reduce the inappropriate use of antibiotic both in humans and animals and to ultimately find a more sustainable way to use antibiotics and treat disease. Therefore, supported by European Commission funding, the Innovative Medicines Initiative (IMI), national funding contributions and public-private partnerships, the next step for JPIAMR is to promote research, which fit within the six priority areas and which will contribute towards solving the AMR problem.

1.2 The SRA launch event

The meeting '**Towards a Global Research Agenda** for AMR' held on 3 April 2014 in Brussels, Belgium hosted approximately 100 participants and speakers.

The meeting was organised by the **Joint Programming Initiative on Antimicrobial Resistance** (JPIAMR) to launch the **Strategic Research Agenda** (SRA) to an audience beyond the initiatives' member states.

The meeting's objectives were to:

● Achieve wide recognition and awareness for the findings and roadmap of the JPIAMR Strategic Research Agenda (SRA)

● Encourage uptake of the recommendations developed in the SRA by a wide range of stakeholders

● Encourage a follow-up future collaboration between research funding agencies in the field of antimicrobial resistance

● Encourage participation of private funders

● Discuss the key priorities of the SRA among international partner funders to develop global funding opportunities for areas of common interest.

● Work towards a global Joint Programming Initiative

This report gives a summary of the presentations and discussions during this workshop.

● jpiamr

2. PRESENTING THE TOPIC:
WHY IS AMR A HUMAN THREAT?

4

The State Secretary at the Swedish Ministry of Health and Social Affairs, **Lena Furmark**, opened the meeting. She identified AMR as one of society's main health threats and urged the audience to act now. AMR has the highest political priority in Sweden and is one of five top priorities of the **World Health Organisation** (WHO). Furmark emphasised the importance of working at all levels of society to achieve a more responsible use of antibiotics. When a new antibiotic is finally developed, we must make sure to promote it cautiously to prevent misuse and rapid resistance development.

The European Commissioner for Research, Innovation and Science, **Maire Geoghegan-Quinn**, also addressed the audience and put focus on how strongly the Commission supports JPIAMR's move towards an international AMR strategy. She pointed out how pleased she was to read that JPIAMR's Strategic Research Agenda includes animals and the environment in its AMR approach. The SRA has truly adopted a 'One Health' approach.

The Commissioner also congratulated the JPIAMR on having already launched its first call as this is a clear sign of the commitment of the member states within the JPI.

The Commission plans to support JPIAMR research in the future, possibly through the ERA-Net scheme.

Carmen Pessoa Silva, Head of the AMR unit at the **World Health Organisation** (WHO) informed the audience that it is not only bacteria that are becoming resistant. The scope is much larger. At the moment, the medical costs of AMR are about a fourth of the combined medical and societal costs; a huge expense!

In 2011, the WHO held the 'World Health Day' to raise awareness of AMR. Resulting activities and follow up meetings and discussions established that a Global Action Plan must be developed. Steps towards forming this plan are already underway. The first step was to conduct a survey of the current AMR status around the world. Here, the WHO found that only 29 out of 120 countries had a national AMR plan.
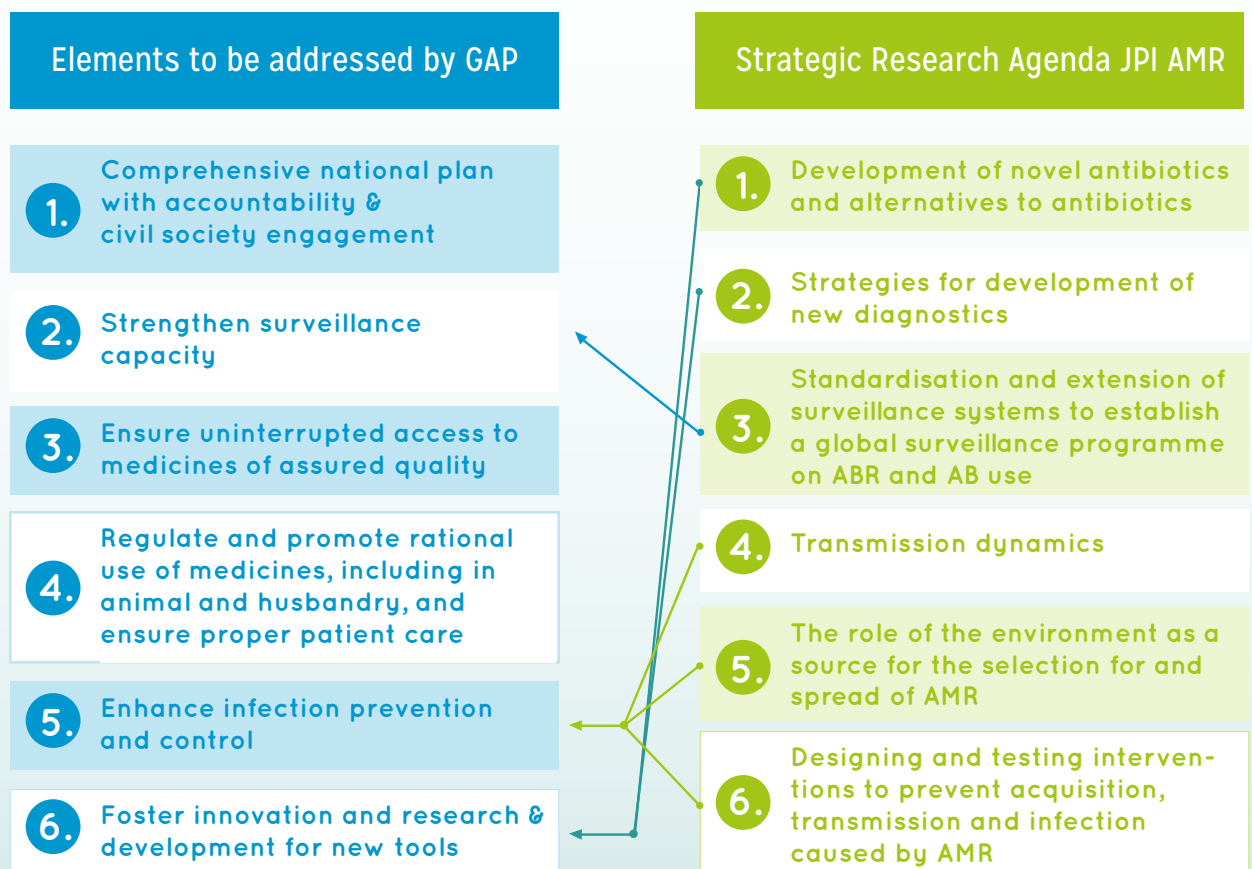
The survey also found:

- Weak/lack of surveillance structure
- Need for cost-effectiveness studies to inform policies
- Lack of links between human and animal health/agriculture
- Weak R&D structure

The next step will be to define the Global Action Plan.

Drawing on the topic of the day, Pessoa Silva made some comparisons between a Global Action Plan and the Strategic Research Agenda. Many synergies can be found. Both put focus on developing better surveillance, enhancing infection and control as well as research into new antibiotics and vaccines for more efficient treatment. Pessoa Silva finished by saying that the SRA is essential to reach global collaboration to combat AMR and that she sees much collaboration between JPIAMR and the WHO in the future.

Opportunities for Collaboration with JPI AMR

Elements to be addressed by GAP

1. Comprehensive national plan with accountability & civil society engagement
2. Strengthen surveillance capacity
3. Ensure uninterrupted access to medicines of assured quality
4. Regulate and promote rational use of medicines, including in animal and husbandry, and ensure proper patient care
5. Enhance infection prevention and control
6. Foster innovation and research & development for new tools

Strategic Research Agenda JPI AMR

1. Development of novel antibiotics and alternatives to antibiotics
2. Strategies for development of new diagnostics
3. Standardisation and extension of surveillance systems to establish a global surveillance programme on ABR and AB use
4. Transmission dynamics
5. The role of the environment as a source for the selection for and spread of AMR
6. Designing and testing interventions to prevent acquisition, transmission and infection caused by AMR

jpiamr

3. WHY A JOINT PROGRAMMING INITIATIVE ON AMR?

Mats Ulfendahl introducing the Joint Programming Initiative on Antimicrobial Resistance.

" ... "

ULFENDAHL CONCLUDED BY URGING THE AUDIENCE

WE ARE ALL RESPONSIBLE. WE ALL HAVE TO LOOK AT WHAT WE CAN DO TO TAKE THIS INITIATIVE FURTHER. WHY WORK HARD FOR JPIAMR? WE JUST HAVE TO! THE GLOBAL HEALTH IS AT STAKE.

The JPIAMR Management Board Chair, **Mats Ulfendahl** explained that JPIAMR has been active for four years already from the first formal proposal being submitted in April 2010. Officially, the initiative started in 2011 with the Coordination and Support Action (CSA) becoming active in September 2012.

JPIAMR wants to reach beyond Europe and create a truly global initiative by welcoming other countries to join. The activities within the JPI should address the GLOBAL research area.

jpiamr

4. WHAT IS THE JPIAMR STRATEGIC RESEARCH AGENDA?

Herman Goossens, Scientific Advisory Board (SAB) Chair, University of Antwerp outlined the Strategic Research Agenda for the audience.

He described that the first thing the SAB did to define the Strategic Research Agenda (SRA) was to agree on a mission statement:

" ••• "

"THE SRA OF THE JPI ON AMR WILL DEVELOP INTEGRATED APPROACHES TO PURSUE UNIQUE WORLD-CLASS RESEARCH ON AMR THAT WILL BE TRANSLATED INTO NEW PREVENTION AND INTERVENTION STRATEGIES THAT IMPROVE THE PUBLIC HEALTH AND WELLBEING OF POPULATIONS, AND DELIVERS ECONOMIC AND SOCIETAL BENEFIT THROUGHOUT EUROPE AND BEYOND."

Herman Goossens describing the SRA mission statement

Goossens explained that the ultimate goal of the SRA is to reduce the burden of AMR by:

- Identifying gaps, obstacles and opportunities for understanding and controlling AMR.

- Stimulating research into the causes, prevention, diagnosis and treatment of infections caused by resistant organisms.

- Generating novel approaches for improved healthcare.

- Translating this knowledge into step changes in policy and practice to safeguard future generations.

The Strategic Research Agenda was developed through a series of meetings with the SAB in addition to a consultation process with stakeholders, a series of expert workshops, national consultations and an online public consultation process. The end result was a document which identifies six priority topics which have been assigned letters rather than numbers to indicate that there is no priority order.

jpiamr

Topic A:
Therapeutics

The first priority is to improve the antibiotics that already exist. It is important to get the big pharmaceutical companies involved again in order to develop new antibiotics and other alternatives, such as vaccines that can continue to treat disease in decades to come.

Topic B:
Diagnostics

At the moment, up to 70% of antibiotics are prescribed incorrectly simply because physicians cannot make a precise patient diagnosis. Better use of diagnostics could decrease this percentage and thus limit the misuse of antibiotics. A road map for the development of rapid diagnostics is needed in addition to sustainable business models. Looking at clinical validity, clinical utility and cost-effectiveness is also a must.

Topic C:
Surveillance

Increased human travel and migration and the transport of food and animals have led to greater spread of the genetic elements responsible for AMR. So far, crucial surveillance data is lacking. Countries have different levels of surveillance. Europe has done more surveillance than the rest of the world but many countries simply lack a national reporting system altogether. We need standardisation and extension of surveillance systems in order to be able to establish a global surveillance system.

Topic D:
Transmission

Another area where understanding is currently lacking is the transmission of AMR. "MRSA is a piece of cake compared to gram negative bacteria," said Goossens in this talk. He continued to say that the gram negative resistance in Asia might already be too wide-spread to be stopped and other pandemics of clones, plasmids and genes are to be expected. We need to do research to find out why these are so successful in spreading. Through research we could develop a comprehensive, multi-disciplinary understanding of the transmission mechanisms by which antibiotic resistance can spread between bacterial populations and between different (animal and human) reservoirs. The next step will be to translate this knowledge into the development of evidence-based strategies to minimise the spread of resistance.

Topic E:
Environment

So far, most efforts to tackle AMR have primarily looked at the medical and human angle. Environmental risk factors for the spread of resistant bacteria have not been significantly assessed. The SRA will promote research efforts to assess the contribution of pollution of the environment with antibiotics, antibiotic residues and resistant bacteria, on the spread of AMR. This will lead to the development of strategies to minimize environmental contamination by antibiotics and resistant bacteria. These strategies will have to take into account cultural differences.

jpiamr

Topic F:
Designing and testing interventions

When designing interventions to control AMR, it's important that the outcomes of funded projects are taken care of and used. Most interventions to control AMR to date have been based on experience, empiricism and common sense; rather than strong evidence. The SRA recommends studying preventative and control interventions that focus on improved antibiotic stewardship, compliance and prevention of transmission of AMR in order to determine and improve their efficacy. This means that there needs to be an understanding of health care systems in various countries to be able to develop a 'One Health' approach linking all different ecosystems and health care systems, in the fight against AMR.

Goossens finished by presenting the 'enabling activities' identified to create impact. JPIAMR proposes to develop a publicly accessible database of research activities in the EU as a start. This will avoid duplications of efforts and enable sustainability of results. In addition, the JPI will also develop a bio bank of clinical specimens and strains, linked to a database.

jpiamr

Brendan Barnes giving the audience the industry perspective.

???

WHY WAS THERE A DECLINE IN DEVELOPMENT OF NEW ANTIBIOTICS?

During the Swedish EU Presidency in 2009, the question was raised;

"Why was there a decline in development of new antibiotics?"

Why indeed?

Brendan Barnes from the **European Federation of Pharmaceutical Industries and Associations** (EFPIA) assigned this to the barriers in R&D.

For the industry, there is no reward. The industry wants to make a profit from selling their drugs. Antibiotics become resistant quickly and thus are poor long term investments. To create a push for industry research into new antibiotics, there needs to be new business models put in place.

Barnes identified the **Innovative Medicines Initiative** (IMI) as one of the drivers of progress in the field of AMR. The new IMI2 initiative is aligned with Horizon 2020 objectives of the Health Challenge and addresses healthcare priorities identified by the 2013 report on priority medicines for Europe and the world. Collaboration needs to be across sectors to harness all knowledge and technologies which can contribute to the IMI2 vision - diagnostics, imaging, IT, medical devices.

Barnes went on to identify JPIAMR as one of the other major world drivers in the AMR field. The SRA has a comprehensive scope, ambitious targets and openness to engage with stakeholders. There are some questions though such as where is the focus? How does it progress to concrete objectives? And where is the real integration of activities?

Barnes concluded by saying that EFPIA looks forward to working with the JPI and believes that it has an important role to play but the SRA needs to be followed by a detailed implementation plan.

jpiamr

John Watson, Deputy Chief Medical Officer at the Department of Health UK

It aims to determine what action needs to be taken and how to persuade all involved players to adapt to this knowledge.

Watson told the audience that the UK welcomes the JPIAMR initiative and is keen to discuss the SRA.

6.1 Funding AMR research: the British approach

John Watson, Deputy Chief Medical Officer at the Department of Health in the UK reported that the UK has a 'Five year AMR Strategy 2013-2018' written by the Department of Health together with the Department of Agriculture in order to cover all areas of the AMR problem.

The UK strategy is based on the concept of the three P's:

- Prevent (people from being infected)
- Preserve (the antibiotics we have)
- Promote (development of new antimicrobials, new approaches, better diagnostics)

Global mobilisation and co-operation at the international level is a must to:

- Raise awareness
- Prevent the spread of AMR
- Understand transmission
- Create a 'One Health' approach
- Promote alignment and coordinated actions

To have a logical response to AMR research, all seven UK research councils as well as governmental bodies and charities work together in the 'AMR Funders Forum' reported **Sir John Savill**, Chief Executive of the Medical Research Council, UK.

The growing concern of AMR makes it a political and societal priority and the UK funding agencies have broad remits to support AMR research across the whole of the research spectrum. Collaborative working,

jpiamr

coordination of key disciplines, coordinating research funding (government and other research funders including industry) and the integration with human/animal healthcare are a must to tackle AMR.

Since 2007, the UK has spent €337on AMR. Savill supports Ulfendahl's view that global collaboration is a more efficient use of the research funding and in particular big data are very important to facilitate the use of patient data.

6.2 NIH's antibacterial resistance program in the United States

Dennis Dixon, Chief of the Bacteriology and Mycology Branch, National Institute of Allergy and Infectious Diseases, NIH, reported that they spend $800M per year on AMR basic, translational and clinical research. This research forms the basis of the 'NIAD antibacterial resistance Programming', which will ultimately lead to better diagnostics, prevention and treatment.

The US strategies to address antibacterial resistances include the promotion of rational use of antibiotics, infection control, surveillance and biomedical research.

Dixon highlighted some innovative US approaches to the antibiotic resistance challenge:

- Systems Biology and Antibacterial Resistance: New Directions for Drug Discovery

- Harnessing the Immune System to Combat Bacterial Infection

- Disarm, But Leave Unharmed: Exploring Anti-Virulence Strategies

- Synthetic Microbiome: An Ecobiological Approach

- Less is Better: Diagnostics to Guide Use of Narrow-Spectrum Therapeutics

- Exploring Natural Predators: The Specificity of Phage Therapy

- Teaching Old Drugs New Tricks: Extending the Clinical Utility of Antibacterial Drugs

In addition, more drugs should make it to clinical trials. Therefore, the US has 'The Antibacterial Resistance Leadership Group' which has a mission to prioritize, design, and execute clinical studies that will reduce the public health threat of antibacterial resistance.

6.3 The South African perspective on the antimicrobial resistance challenge

South Africa is classified as a middle income country, but the country has huge problems with health issues said **Niresh Bhagwandin,** Executive Manager: Strategic Research Initiatives, South African Medical Research Council.

The biggest health problem in South Africa is HIV. In 2012, 12.2% (6.4 million) of the population were HIV positive and the major part of infected individuals are females. Focus on the prevention of mother to child transmission has decreased infected new-borns from 25% 2004 to 2% in 2012. Bhagwandin also reported an increase in transmitted resistance from 0% in 2010 to 8% in 2012.

jpiamr

Another big problem for the country is the increase of drug-resistance of tuberculosis as this disease is also highly prevalent within South Africa.

For AMR, the specific challenge for South Africa is the economic impact of AMR and antibiotics overuse. There is a need to pay greater attention to hospital-acquired infections. The country has several active research groups, many in international collaborations (e.g. with India, Kenya and Vietnam) and an estimated €7-14 M is spent annually on AMR research. With the currently favourable South African currency exchange rate this research funding gives high research productivity per €.

The main factors that drive antibiotic resistance in South Africa:

Inappropriate use (clinical indication, choice, administration and dosing)

- The regulatory environment

- Knowledge of health care workers (lack of continuous education)

- Impoverished living conditions of patients – malnutrition, limited access to clean water and sanitation, HIV/TB epidemic

- Insufficient supply of antibiotics to the public sector

- Poor quality antimicrobials and use of degraded and expired medicines

- Unreliable access to diagnostic facilities and clinicians

6.4 Antimicrobial resistance: the Canadian perspective

AMR is less prevalent in Canada than in the US but it is increasing, reported **Alain Beaudet**, President of the Canadian Institutes of Health Research. Therefore, increased political awareness is necessary as AMR could potentially have a huge impact of the Canadian healthcare system. Canada is currently dealing with the AMR issue largely through its health portfolio through four health agencies. Last year (2013), Canada invested $15.3 M in AMR research and the country also participate in a Canada-UK joint healthcare program as well as in JPIAMR.

Canada's integrated approach towards AMR:

- The country maintains two national surveillance systems: (1) the Canadian Integrated Program for Antimicrobial Resistance Surveillance (2) the Canadian Nosocomial Infection Surveillance Program (CNISP).

- It regulates the sale of antimicrobial drugs for use in humans.

- It establishes policies and standards related to the safety and nutritional quality of the food supply.

- CIHR's Institute of Infection and Immunity has supported numerous research initiatives that seek to better understand the origin, spread, evolution and development of resistance in microorganisms.

jpiamr

Beaudet stated that a multicultural approach to any challenge stimulates innovation. We must make sure to monitor what comes out and make use of the products. Canada needs to increase awareness and more closely monitor the impact of AMR at various levels of its health systems in particular to the Ministry of Agriculture as 75% of antibiotics use in Canada is in agriculture.

6.5 Australia's response to the threat of antimicrobial resistance

The Australian health care system is a mixed system of public-private access. This means access for all, with subsidies when needed, and the necessary infrastructure, reported **Warwick Anderson**, Chief Executive Officer of the National Health and Medical Research Council, Australia.

In Australia, antibiotic usage remains high while the level of resistance is still low. However, resistant bacteria that were once primarily the concern of hospitals are now frequently seen in the community. It is not uncommon for patients to arrive at hospitals carrying resistant bacteria acquired in the community setting. The levels of community-acquired resistance are very high in some disadvantaged communities, especially Aboriginal and Torres Strait Islander communities.

Emergence and epidemiology of AMR is determined by complex interaction of environmental, epidemiological, clinical and behavioural factors in humans, animals and agriculture.

Therefore, there is a clear need for surveillance data from animals (including companion animals) and agriculture. Information on bacterial isolates and their antibiotic resistance patterns is collected in most large teaching hospitals but currently there is little national coordination of data. There is also little collection of data for community-acquired resistance or in agriculture or food production. Such national data are critical to coordinated AMR surveillance systems.

"..."

"WE ARE LOOKING TO DO SOME ACTIVITIES IN THIS AREA [AMR] AND IF THERE ARE INTERNATIONAL INITIATIVES TO JOIN THAT'S VERY INTERESTING",

"RESEARCH TRANSLATION IS SOMETHING WHICH IS ALSO VERY IMPORTANT, HERE WE SHOULD PROMOTE MESSAGE OF APPROPRIATE USE OF ANTIBIOTICS"

The Australian Government recognises that responding effectively to AMR involves a combination of "regulation, monitoring and surveillance, targeted activity on specific organisms, research and education" which has led to the Australian National AMR Prevention and Containment Strategy. This strategy on AMR is an important step in Australia's response. It includes an integrated national surveillance system for antibiotic resistance and antibiotic usage across the human health and agriculture ('One Health' approach). In the 2013/14 budget the Australian Government allocated A$11.9m (€8m) over three years to implement the strategy.

"We are looking to do some activities in this area [AMR] and if there are international initiatives to join that's very interesting", said Anderson. "Research translation is something which is also very important, here we should promote message of appropriate use of antibiotics", he concluded.

jpiamr

Jayaraman Gowrishankar sharing his experiences of tackling AMR in India.

6.6 Policies and challenges for control of AMR in India

Jayaraman Gowrishankar, Centre for DNA Fingerprinting and Diagnostics Department of Biotechnology, Ministry of Science, Government of India told the audience about the realities and practices in India. Healthcare is not covered by the government or health insurance but by direct payment by the patient/s. Diagnostic tests are often as expensive as the treatment, giving incentive to directly treat disease with over the counter antibiotics. Genetic manufacturing of antibiotics in India has kept the cost low. In addition, a big part of the population are living in areas with less than one physician per 10,000 inhabitants. Thereforepatients often go to a pharmacy instead of a physician and ask "what can I take?" The answer is often "antibiotics". Antibiotics are sold without prescription by pharmacists, who therefore also act as primary health care providers. This usage leads to incomplete treatment courses due to ignorance and economic considerations.

In addition, misuse of antibiotics both in veterinary practice, and as growth promoting agents (GPAs) in poultry, livestock and marine products industries lead to antibiotic residues in the environment.

In this context, India has started some new research initiatives and put in place policies for antibiotic use. For example, the Chennai declaration which is a roadmap by and for stakeholders to tackle the AMR challenge which recognizes that although a ban on sale of over the counter antibiotics without prescription will be the ideal step, it is not practical to implement at present. Instead it recommends step-by-step regulation, beginning immediately with controls on sales of 3rd and 4th generation antibiotics and anti-TB agents and then gradually expanding the list. It also gives additional recommendations encompassing accreditation, hospital antibiotic usage policies, veterinary practices, strengthening diagnostic laboratories, education, training, and research. What India needs is an "An implementable antibiotic policy" and NOT "A perfect policy".

jpiamr

6.7 Building a public national system for antimicrobial resistance surveillance in Argentina

Marcelo Galas, Director, National Institute for Infectious Diseases, Argentina reported that antibiotic resistance has increased from 0 to 60% since 2000 with many antibiotics having 70-90% resistance. Galas went on to say that Argentina needs a surveillance system in each hospital and they all have very different AMR profiles.

Argentina has a national surveillance network called WHONET (Surveillance of Antimicrobial Resistance). When it started in 1996 it only included four laboratories. Today, 96 laboratories participate. The network work towards an agreed common protocol with internal quality control each two weeks.

The goals of the network are:

- Orientation of empirical therapy

- Collaboration in prevention, detection and control of Health care associated infections

- Local, Regional and National strategies for antimicrobial agents use

- Early detection of new resistance mechanisms and dissemination control

- Design and evaluation of strategies for the antimicrobial resistance control

- Strengthening of Provincial and Regional Reference Centers for AR surveillance and QC for peripherals Hospitals6.8 Research going global – the EC's readiness to lead the fight against AMR

The eye opener for the threat of AMR was the Microbial Threat conference in Copenhagen in 2009 said Line **Matthiessen**, Head of Unit, Infectious Diseases and Public Health Unit, DG Research and Innovation, European Commission.

So far, under FP7, the European Commission has supported initiatives such as JPIAMR, IMI, European and developing countries clinical trial partnership. The priority is to develop a 'One Health' approach.

In H2020, international cooperation is a priority and the calls are open for participation from all over the world. Within H2020 there will be support of early and global detection of infectious diseases.

Matthiessen finished with a quote from Nelson Mandela: "If you want to go fast go alone – If you want to go far go together".

jpiamr

7. DISCUSSION

7.1 The Strategic Research Agenda

It was highlighted that all six SRA topics cannot be addressed at the same time in each country. However, there is a need for the global community to address all topics soon. Therefore, JPIAMR's member countries need to shape their funding to be able to address more than one topic. But, joint programming is not only about new funding. Existing mapping show that a substantial sum of money has already been spent on AMR research, especially in the UK, but the AMR problem still remains. It was suggested that perhaps more funds is not the main issue but instead focus should be on coordination. In fact, it was emphasised that in many of the countries which fund AMR research, the funded groups have not been encouraged to collaborate with higher level international partners,

hence the research stays national. The conclusion was that single countries cannot push all priority topics but all topics can be addressed simultaneously by countries and communities focusing on what they do best. JPIAMR now needs to break the SRA down to topics that can and need to be addressed.

Another aspect that was discussed was that the alarm-raising side of the AMR problem and the solution side should go hand-in-hand and should be a priority in the fight against AMR. This raised the issue that some countries, for example the Netherlands, have no immediate threat from AMR at this moment. Raising the alarm when there is no threat present (yet) could have a counterproductive effect on the public opinion. As a follow up on this discussion, the importance of being holistic was highlighted. These countries still use antibiotics in agriculture, so this is where awareness raising is needed. However, the main message is that there needs to be a different solution for each country.

The need for harmonisation of terminology was also discussed. The European Medicines Agency (EMA) and the US Food and Drug Administration (FDA) have different

definitions of disease endpoints. Harmonisation of terminology will improve collaboration and communication.

Another suggestion was for JPIAMR to provide a best-practice document for use of existing antibiotics which would be highly valuable for countries in parts of the world like South America and Africa.

7.2 New antibiotics

The recent trend for a couple of decades has been one of decreasing involvement of pharmaceutical companies in the development of new antibiotics. However, the latest EFPIA organised, topic specific AMR pharmaceutical meeting had around 20 interested companies, compared to eight a couple of years ago, showing a potential positive upturn. Line Matthiesen from the European Commission, pointed out that last year saw a specific call for SMEs for new drugs for infectious diseases. The call has so far had positive results with many promising SMEs participating. The EC is looking for ways to stimulate SMEs other than with grants. Herman Goossens pointed out that it would be important to do a mapping exercise to see what is already funded (eg by IMI) and where the gaps are.

In WHO's assessment of 120 countries it was obvious that there is no link between new research results and development of products and application of this new knowledge and products in society. In the long term, it is necessary to have policy makers and regulators on board so that new products are made use of.

The discussion highlighted that

main focus should be on working to slow down the pace of resistance developing to avoid needing a new molecule every five weeks. This may not be in the interest of the pharmaceutical industry but it must be a key priority.

7.3 Diagnostics

India urged for developing cheap diagnostics. It was commented that it's possible to do a lot of surveillance and diagnostics without it getting expensive. In addition, to be clinically useful, a diagnostic tool cannot take more than one hour. It's also important to agree once and for all what variables for diagnostics are needed which is crucial for funders and companies. To agree on this, the grass roots of the field needs to let funders know what they need.

If diagnostics become cost effective, then it will become a rational alternative leading to less misuse of antibiotics.

7.4 Surveillance

The number of deaths from AMR in Europe comes to 25,000 annually. Is this a true number? There just aren't much data so it seems impossible to know. There is a real need to develop digital tools for gathering research funding data. The UK Gateway to research goes someway to map who is doing that.

If data could be presented showing an increased risk of catching a serious resistant infection at some point in life as a result of consuming lots of antibiotics, that would provide a very direct and effective argument to reduce antibiotic usage.

18

jpiamr

19

In conclusion, antimicrobial resistance is a very serious threat to health that can only be tackled by international coordination of efforts. There is a need for a 'One Health' approach which also takes into account environmental factors. Although not all priority topics can be tackled at once by one country, international collaboration will allow the different topics to be tackled simultaneously in different countries. The next step now is to turn theory into concrete action.

The
Strategic Research Agenda
can be downloaded from the JPIAMR website **www.jpiamr.eu.** For further information on the Joint Programming Initiative on Antimicrobial Resistance please contact the JPIAMR secretariat at
secretariat@jpiamr.eu.

jpiamr