



Joint Programming Initiative
on Antimicrobial Resistance
JPIAMR Implementation Plan
2014 - 2018

www.jpiamr.eu

CONTENTS

List of acronyms and abbreviations.....	3
1. Background and Introduction.....	4
2. Implementation of the Joint Programming Initiative.....	5
2.1 The Strategic Research Agenda.....	5
2.2 The Implementation Process.....	6
2.3 The Implementation Categories.....	7
2.3.1 SRA delivery.....	7
2.3.1.1 The Prioritisation Process.....	8
2.3.1.2 Funding Activities.....	9
2.3.1.3 Exploring Emerging Topics.....	9
2.3.2 Alignment of Activities.....	9
2.3.3 Evaluation Activities.....	9
2.3.4 Internationalisation and Cooperation.....	9
3. Activities and Instruments.....	9
3.1 Delivery of the Strategic Research Agenda.....	10
3.2 Alignment.....	10
3.3 Evaluation.....	10
3.4 Internationalisation and Cooperation.....	11
4. Implementation Activities 2014-2018.....	11
4.1 Annex 1: Joint Actions Matrix.....	12
4.2 Annex 2: SRA Delivery Matrix.....	16
4.3 Annex 3: JPIAMR alignment plan.....	19

LIST OF ACRONYMS AND ABBREVIATIONS

AMR	Antimicrobial Resistance
DG Santé	Directorate-General for Health and Consumers of the EC
EC	European Commission
EFPIA	European Federation of Pharmaceutical Industries and Associations
EMA	European Medicines Agency
ERA	European Research Area
EU	European Union
G7	Group of Seven
JPI	Joint Programming Initiative
JPIAMR	Joint Programming Initiative on Antimicrobial Resistance
IMI	Innovative Medicines Initiative
MB	Management Board
SAB	Scientific Advisory Board
SHAB	Stakeholder Advisory Board
SRA	Strategic Research Agenda
TATFAR	Transatlantic Taskforce on Antimicrobial Resistance
WG	Working Group
WHO	World Health Organisation

1. BACKGROUND AND INTRODUCTION

Antimicrobial resistance (AMR) is a topic that very well matches the prerequisites for a Joint Programming Initiative (JPI), a new type of country-driven research coordination to tackle common challenges more effectively. Resistance leads to infections that cannot be easily treated with the current antibiotics, especially as discovering new antibiotics has slowed drastically, while antibiotic use is rising. It is a global problem that concerns us all and even though it is often described as an emerging threat (10 million predicted AMR related deaths/year by 2050) it is in fact already upon us hindering modern health systems and treatments.

At the moment, the gap between research funding into chronic diseases and antimicrobial resistance is large but difficult to document. However, national AMR funding does exist but is relatively small and targeted. In addition, countries with low national AMR prevalence allocate more money towards research than countries with greater needs for AMR solutions. This suggests a need for greater coordination across Europe in order to fill knowledge gaps.

JPIAMR coordinates national funding and supports collaborative action to fill existing knowledge gaps. The goal is to shape cohesive and coordinated AMR funding and actions that maximise on resources and reduce duplication of research. Mobilising existing and new resources will create a greater critical mass and attract new researchers into the AMR field. A Strategic Research Agenda (SRA), which outlines key [neglected] areas to tackle, guides JPIAMR and focuses research actions.

MISSION STATEMENT

The Joint Programming Initiative on Antimicrobial Resistance joins forces across nations to fight AMR through effective collaborative actions in areas of unmet needs. A shared common research agenda enhances multi-disciplinary collaboration and ensures that knowledge gaps are quickly identified and filled.



Figure 1. Member states of the JPIAMR initiative (status as of November 2015).

JPIAMR cannot address all aspects of the AMR problem, but can show a way forward by producing new research, engaging new researchers and creating networks that create long-term momentum for other areas in society. There is an urgent need for interdisciplinary and public-private partnerships to support research in the antimicrobial resistance area. Exchanges between industry, public health bodies, and academic bodies will entail not only sharing costs, but also coordination of the respective research activities. This is where JPIAMR will make a difference.

Collaboration is at the heart of this JPI, top down through the alignment of national research programmes and joint research calls but also bottom up through incentivizing collaboration among the scientific community itself. Thus, this

JPI aims to coordinate European research on AMR in close collaboration with the funding instruments of the European Union (EU), specifically Horizon 2020, Innovative Medicines Initiative (IMI) and the ERA-NET scheme, meaning also fostering collaboration with the industry. When it comes down to research funding as a joint activity JPIAMR rather focuses on basic and pre-clinical research than on the development of drugs.

However, the collaboration of these 22 countries (see figure 1) within the JPIAMR does not only include joint transnational research funding but, furthermore, the alignment of national strategies, the internationalisation of the consortium participating in this JPI as well as fostering the agreement of common or similar policies on the common problem of AMR. We work closely with a large number of key stakeholders such as the World Health Organisation (WHO), the European Commission (EC), the Group of Seven (G7), the Transatlantic Taskforce on Antimicrobial Resistance (TAFTAR) or the AMR Review.

The proposed activities will mobilize the available national resources of several nations in an optimal way while ensuring minimum duplication of effort. Furthermore, existing expert groups will be utilized, and research activities in many different fields created that are relevant to AMR. This transnational cooperation will enhance the societal impact that is required in this concerning and urgent common challenge we are facing.

2. IMPLEMENTATION OF THE JOINT PROGRAMMING INITIATIVE

This Implementation Plan sets out to deliver the JPIAMR strategy and its SRA during the period 2014-2018. The purpose of the plan is to guide the operations of the JPIAMR. In particular, the Implementation Plan:

- **Presents priority items to be implemented;**
- **Permits to plan ahead for agreed joint activities;**
- **Lists specific goals and;**
- **Outlines the efforts to be deployed.**

The Implementation Plan aims to facilitate deployment of activities and to inform policy makers, research funder's managers, the scientific community, and society at large of how JPIAMR will tackle AMR challenges in the period 2014-2018.

2.1 The Strategic Research Agenda

The JPIAMR joins forces across nations to fight AMR through effective collaborative actions in areas of unmet needs. A shared common SRA enhances multi-disciplinary collaboration and ensures that knowledge gaps are quickly identified and filled.

The first step has been to identify six priority topics to form a common SRA. These topics will give the fight against AMR 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. The SRA has truly adopted a 'One Health' approach including animals and the environment in its AMR approach. Joint programming is the process by which participating countries define, develop and implement a common SRA. This agenda is based on the agreed vision on how to address major societal challenges that no individual country is capable of handling by itself.

The SRA of the JPIAMR was developed by the Scientific Advisory Board (SAB) as well as by experts in broad consultation rounds. It was published January 27th, 2014 and presented April 3rd, 2014 in Brussels in a major launch event with key international research funders focusing the discussions on the steps that need to be taken to minimise antimicrobial resistance.

Six priority topics form the SRA action against AMR that aim to lead to a lower, more rational use of antibiotics in veterinary and clinical settings and to a significant reduction of the risk that antibiotic-resistance poses to public health:

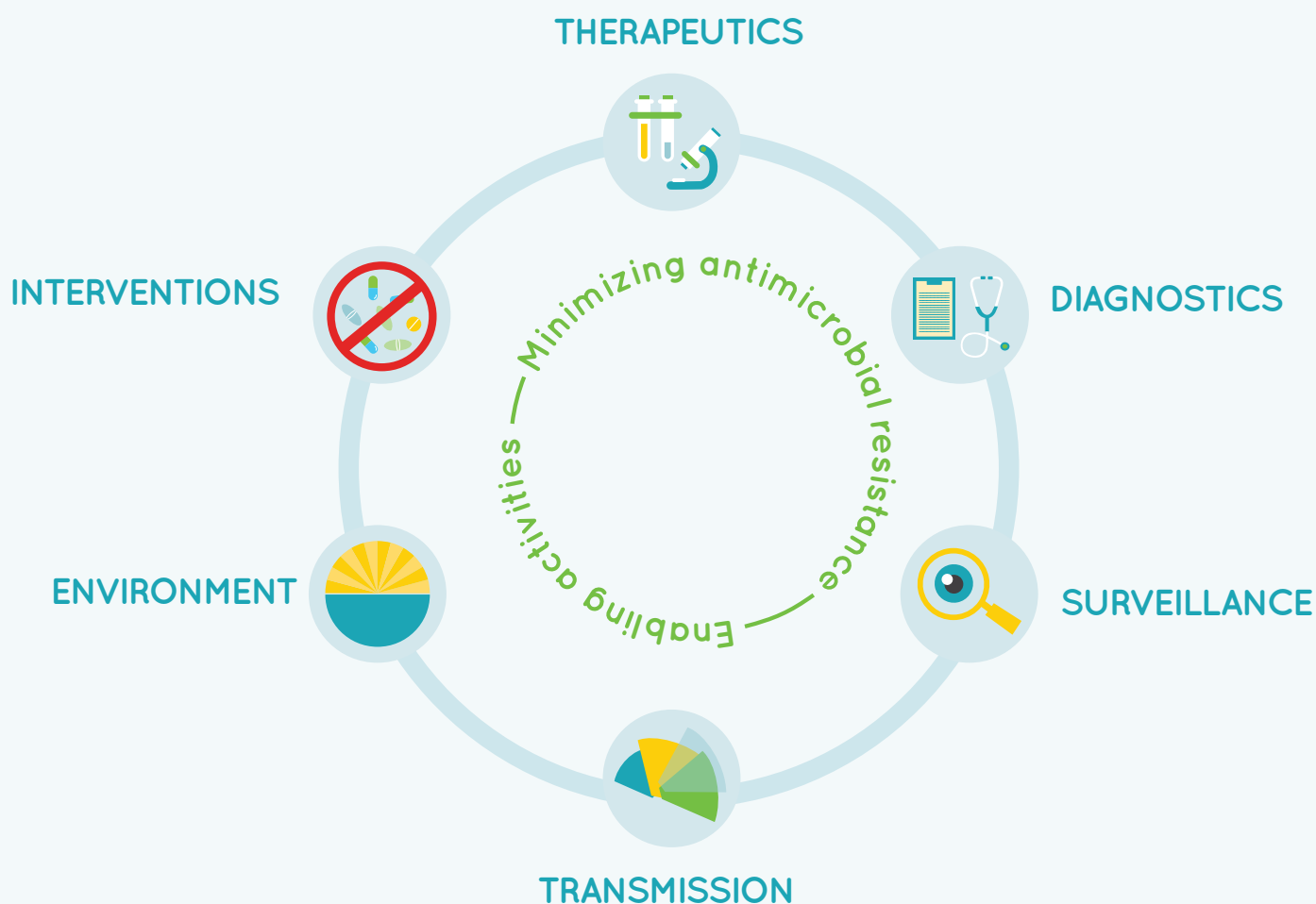


Figure 2. The six priority topics of the Strategic Research Agenda of the JPIAMR
<http://www.jpiaamr.eu/activities/strategicresearchagenda/>

2.2 The Implementation Process

In order to organise the portfolio of joint activities the JPIAMR Management Board (MB) has set four strategic Working Groups (WG) on SRA Implementation (delivery), Alignment, Internationalisation and Evaluation, respectively that deploy the implementation of the initiative.

The implementation then covers two aspects: the SRA priority topics and the supporting strategic actions. Also included in the implementation plan is the daily basis management of the JPIAMR governance structure.

This Implementation Plan is based on the principles of:

- **VARIABLE GEOMETRY:**
JPIAMR members and partners engage variably in the portfolio of activities;
- **FLEXIBILITY:**
This supports the development of activities responding to the members’ needs and opportunities
- **RESPONSIVENESS:**
activities can develop due to the AMR challenges and JPIAMR will tackle the changing environment through specific and tailored activities.

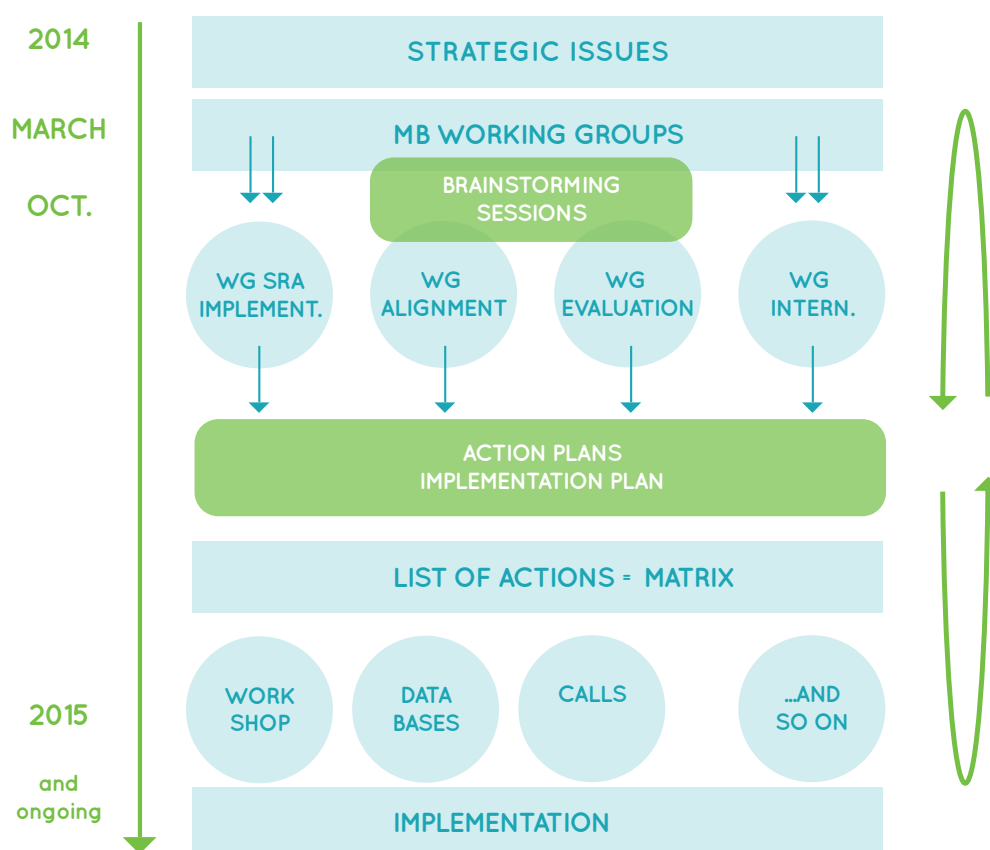


Figure 3. The process of the implementation of the JPIAMR.

2.3 The Implementation Categories

The implementation plan of the JPIAMR is structured in four categories reflecting the WGs formed previously to enable the work of the JPIAMR. These categories are described in the following chapters.

The implementation activities are described in detail within the “Annex 1: Joint Actions Matrix”.

2.3.1 SRA delivery

The SRA provides a framework of opportunities for countries involved in the JPIAMR and those, who are willing to participate in joint actions planned. Following, the process of prioritisation is described and joint actions are characterised by funding activities as well as the exploration of emerging topics of the field of AMR.

2.3.1.1 The Prioritisation Process

The SRA provides a framework of opportunities for countries involved in the JPIAMR and those, who are willing to participate in joint actions. Joint actions will be implemented through co-operative activities that re-align or link national investments in order to achieve increased impact and the provision of new funding.

An initial prioritisation of the SRA proposals for collaborative transnational initiatives has been started by the members: they will identify the key joint actions and relevant instruments. This is due to the limited amount of funding and resources that triggers the necessity to balance the timeline and level of implementation.

The SAB was asked to develop a preliminary prioritisation of the SRA in July 2013. On this basis the MB has decided their preliminary actions towards the development of an implementation plan. Discussions in 2013 at the MB started the implementation work development. A research funding mapping exercise and a gap analysis as well as a prioritisation survey were issued beginning 2014 among the MB (“Working Groups Action Plan”). Further prioritisation was achieved through a survey amongst the member states as well as a brainstorming workshop with experts of the six topics and the related fields of research identified in the SRA.

The particular focus is on:

- **Scientific priorities: from the funder perspective and attempted to establish areas within the SRA, which would be a priority for member states and the relevant funding organisations within each member state.**
- **Classify policy priorities based on: strategic relevance.**
- **Prioritisation has been started by the members: they will identify the key joint actions and relevant instruments. This is due to the limited amount of funding and resources that triggers the necessity to balance the timeline and level of implementation.**

A next step is to prioritise, which strategic issue out of the SRA will be implemented first, and which steps will be realized for each of the six SRA priority topics. This includes the following procedure:

- **To analyse scientific priorities from the funder perspective based on the SRA**
- **To define areas within the SRA, which would be a priority for member states and the relevant national funding organisations**
- **To define instruments**
- **To implement the SRA with a societal impact**

In the future the instrument of a brainstorming meeting and a stocktaking exercise will be used on a regular basis to verify and develop further the roadmap for the implementation activities performed by the JPIAMR consortium.

2.3.1.2 Funding Activities

Joint funding will be implemented through co-operative activities that re-align or link national investments in order to achieve increased impact and the provision of new funding. An initial prioritisation of the SRA topics for collaborative transnational initiatives will be used as a basis for decisions on a catalogue of joint actions.

2.3.1.3 Exploring Emerging Topics

To explore emerging topics and needs of the society and research community and subsequently to be able to name scientific priorities the area of AMR has not only to be looked at from the funder perspective. Furthermore, JPIAMR works in close relation to the knowledge engaging experts in the SAB as well as consulting further experts. This allows going into depth of the six different priority topics defined within the framework of the SRA.

2.3.2 Alignment of Activities

A crucial element of Joint Programming is the alignment of national and European Strategies with the SRA of JPIs. By aligning and co-ordinating AMR activities and national funding committed, the JPIAMR can better exploit its resources for maximal societal impact.

It was recognized that in some areas research is carried out and funded by different national programmes in parallel. Other research topics are concentrated in geographical regions or well covered in some, but not all countries. These areas are considered as research subjects that will benefit by effective alignment of national strategies and programming between the member states. In some cases, where there is research that is more advanced, the area will be further explored for its economic value (please refer to Annex 3, the “Alignment Plan” of the JPIAMR).

2.3.3 Evaluation Activities

Funding agencies and research organisations today, as well as JPIAMR, need to demonstrate that their funding goes to excellent scientists, who produce excellent results. Monitoring and evaluation is one means to approach this challenge. Evaluation of research helps to identify conditions that are conducive to science and to assess the contribution of funding organisations. The objective of the evaluation is to implement a monitoring and evaluation strategy, to gather information from the different countries on the feasibility of the completion of a national AMR research projects database as well as to develop a common database used by the participating member states.

2.3.4 Internationalisation and Cooperation

The AMR challenge is not restricted to Europe and a global approach is thus necessary to more effectively promote AMR research. Consequently, the objective is to expand the basis of the joint programming activities and assume a more global approach. This will additionally promote the importance of the SRA, which is a generally accepted approach. Furthermore, the internationalisation will further promote the JPIAMR in the key international platforms and will lead to establishing a relationship strategy with the (international) industry.

3. ACTIVITIES AND INSTRUMENTS

The previously described categories of implementation will be achieved through different joint actions and strategies, which will be implemented through different instruments. Suggestions of these are listed in the following.

3.1 Delivery of the Strategic Research Agenda

The following different funding activities can be considered:

- Fund collaborative joint calls
- Fund collaborative research projects through ERA-NETs
- Influence new calls in Horizon 2020 (H2020)
- Influence new calls in IMI
- Establish “bolt-on strategy” to top up projects
- Funding new research infrastructure
- Funding fellowships (PhD award/young scientist exchange)
- Fund research networks
- Support research performing organisations (via virtual instruments)

The following different instruments can be used for further explorations of emerging topics in the field of AMR:

- exploratory workshops or expert workshops on the different priority topics of the SRA, which could support or develop into calls or updates and adapt prioritisation of the SRA
- strategic workshops to map the situation of the AMR landscape (e.g. funding, policies, infrastructures) and discover the possibilities for harmonisation

3.2 Alignment

- Alignment with national strategies and policies on AMR
- Alignment with national funding
- Alignment at institutional level
- Aligning resources and technologies
- Alignment with Industry

3.3 Evaluation

- Mappings
- Databases
- Surveys
- Setting ex-post evaluation and monitoring plans and strategies
- Benchmarking exercises

3.4 Internationalisation and Cooperation

- Dissemination
- Enlarging the consortium
- Targeting of key nations
- Mapping of contact persons

4. IMPLEMENTATION ACTIVITIES 2014-2018

This Implementation Plan is accompanied by different matrices describing the ongoing and planned joint activities of the JPIAMR in more detail.

4.1 Annex 1: Joint Actions Matrix

This matrix includes joint actions of the JPIAMR described for all four above described implementation categories (section 2.3) including suggested participants, the deliverables as well as a timeline.

4.2 Annex 2: SRA Delivery Matrix

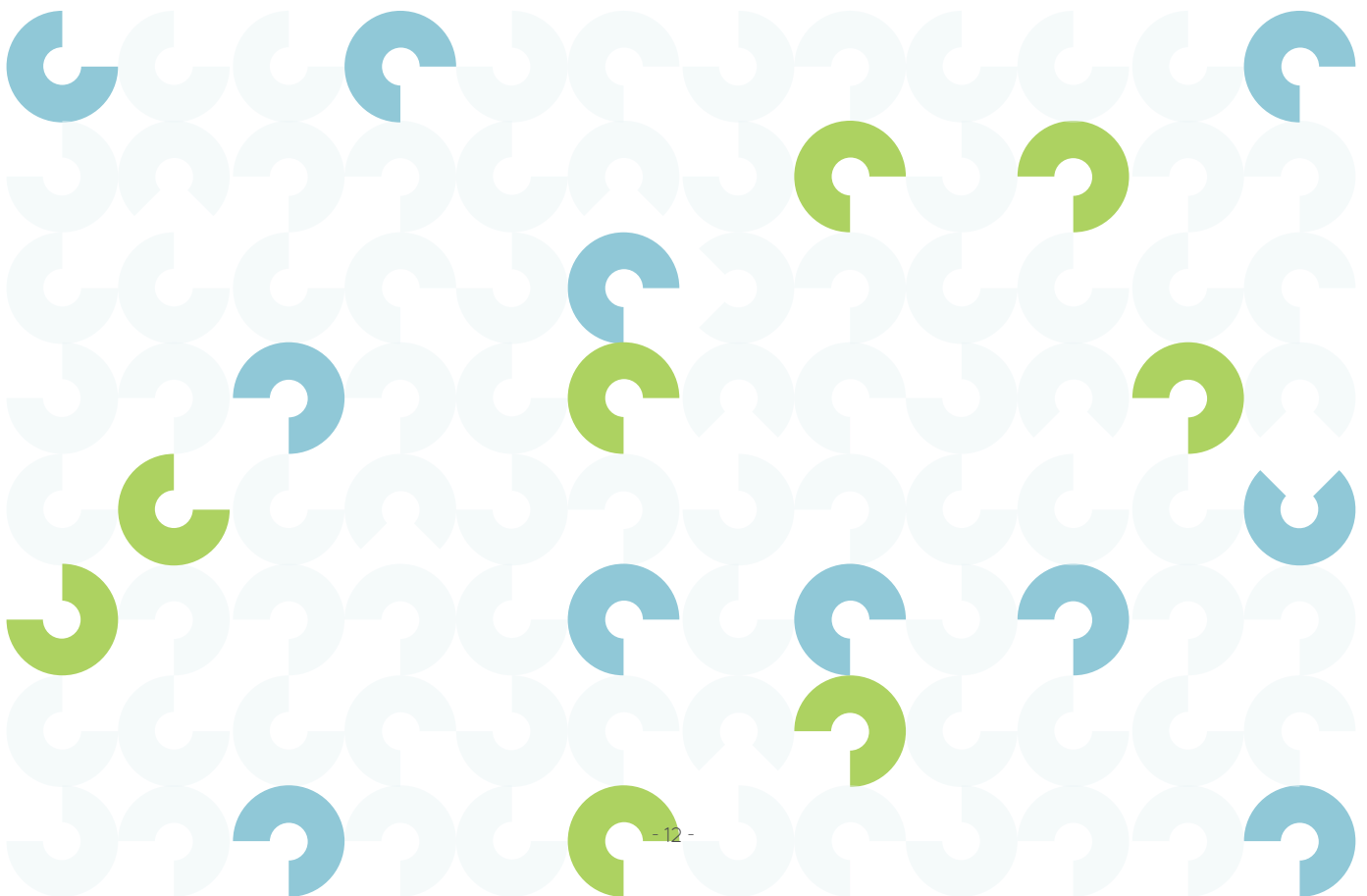
This matrix maps the activities suggested by the WG on SRA delivery (section 2.3.1) onto the six topics of the SRA. This gives a full picture of the coverage of topics and will furthermore facilitate identifying gaps to be filled by future activities.

4.3 Annex 3: Alignment Plan

This plan gives an overview of alignment actions planned by the WG on Alignment (section 2.3.2).



Annex 1
JPIAMR Joint Actions Matrix



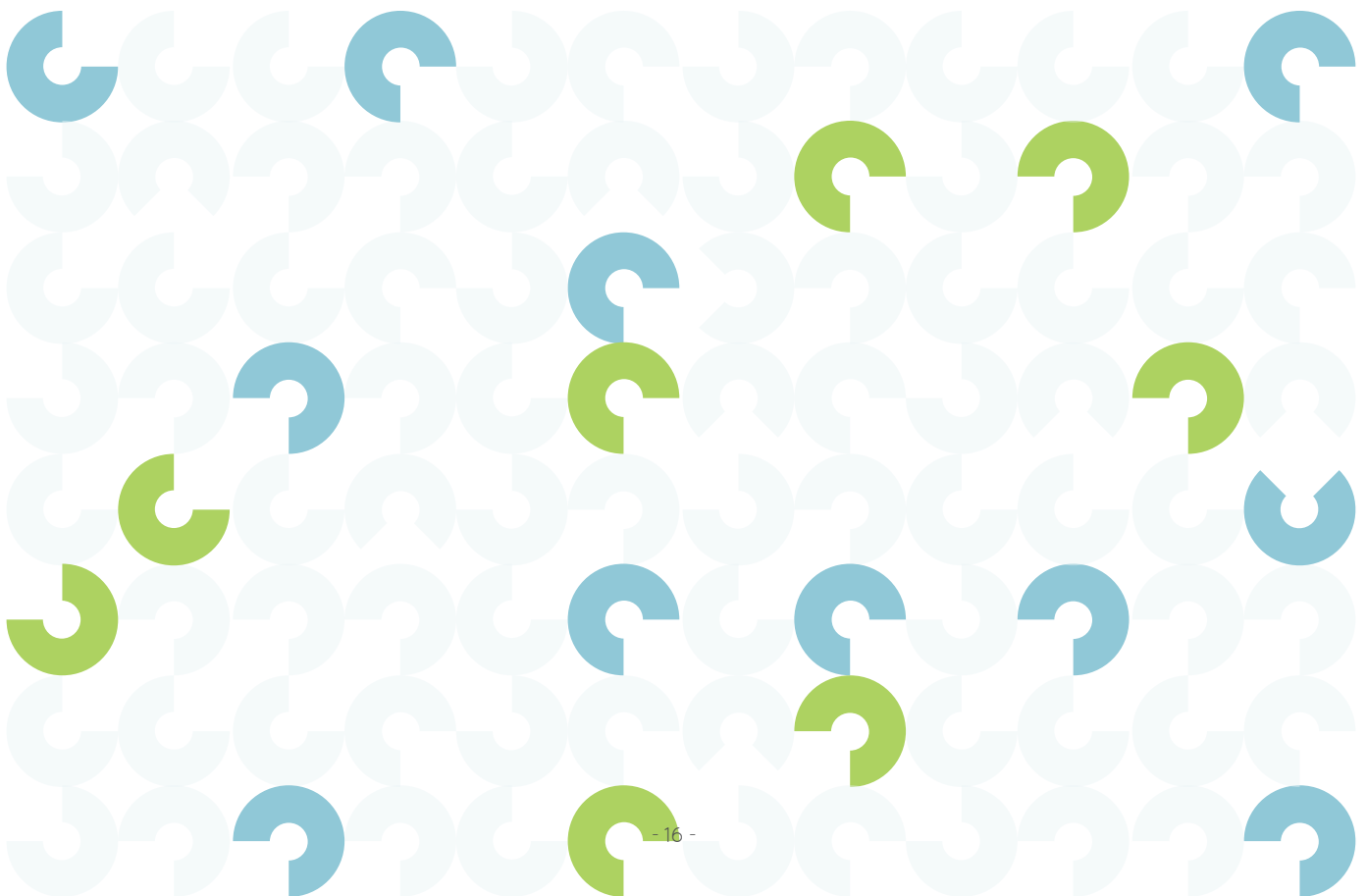
MAJOR WG ACTIVITY	SPECIFIC ACTIVITY	INSTRUMENT	PARTICIPANT	DELIVERABLE	TIMELINE
SRA DELIVERY	1st Joint Call “InnovaResistance: Innovative approaches to address antibacterial resistance” SRA TOPIC: A	Joint transnational call	Partner Countries	Transnational Research Funding	2014-2018
	2nd Joint Call “Translational research on development of neglected antibiotics/ combinations by testing for activity/synergy in vitro, validated animal models with PK/PD” SRA TOPIC: A	Joint transnational call – “proof of concept”	Partner Countries	Transnational Research Funding	2015-2019
	3rd Joint Call “Unravel the dynamics of transmission and selection of antimicrobial resistance at genetic, bacterial, animal, human, societal and environmental levels, in order to design and evaluate preventive and intervening measures for controlling resistance” SRA TOPIC: D/E	Joint transnational call (within the ERA-NET cofund)	Partner Countries	Transnational Research Funding	1st semester 2016
	4th Joint Call Research Networking programme “Developing new methodological options” SRA TOPIC: all under development	Joint transnational call	Partner Countries	Development of Roadmaps	2016
	5th Joint Call under development	Joint transnational call	Partner Countries	Transnational Research Funding	1st semester 2017
	6th Fellowship Call under development	Joint transnational call	Partner Countries	Transnational Research Funding	1st semester 2017
	7th Joint Call under development	Joint transnational call	Partner Countries	Transnational Research Funding	1st semester 2018
	Conference among JPIAMR funded projects	Status seminar/ workshop	Coordinators of projects, parts of PRP/SAB/ MB	Dissemination and exchange	2017

SRA DELIVERY	Diagnostics Workshop SRA TOPIC: B	Workshop (strategic)	Experts, SAB members	Identify the challenges of developing diagnostics Highlight action plan	1st semester 2015
	Research Infrastructures Workshop SRA TOPIC: all	Workshop (strategic)	Partners, experts, SAB members	Development and support of joint actions	2nd semester 2015
	Transmission Workshop SRA TOPIC: D	Workshop (strategic)	Partners, experts, SAB members	Development and support of joint actions	2nd semester 2015
	Joint workshop with NIH in Alternative therapeutics SRA TOPIC: A	Workshop (strategic)	Experts, SAB members	Support calls elaboration and dissemination	1st semester 2016
	2nd Brainstorming for Prioritisation (TBD) SRA TOPIC: all	Workshop (exploratory)	Experts, SAB members	Prioritisation of the SRA topics for future joint actions	1st semester 2016
	Surveillance Workshop SRA TOPIC: C	Workshop (strategic)	Partners, experts, SAB members	Development and support of joint actions	2nd semester 2016
	Hygiene Workshop SRA TOPIC: F	Workshop (strategic)	Partners, experts, SAB members	Development and support of joint actions	2nd semester 2016
	Workshop SRA TOPIC: TBD	Workshop (strategic)	Partners, experts, SAB members	Development and support of joint actions	1st semester 2017
	Series of Webinars	Educational material	Experts, SAB members	Education, dissemination	2nd semester 2015
	Summer School	Educational material, seminars, talks	Young Scientists, Experts	Education, dissemination	2nd semester 2016
	Setting up a Virtual Research Institute	Common research infrastructure	Partners	Transnational Research Funding	2016-2018
	Update of the SRA SRA topics: all	SRA Update	SAB members	Updated version of the SRA	1st semester 2017
ALIGNMENT OF ANTIMICROBIAL RESISTANCE ACTIVITIES	Results of the Mapping - new strategies of funding - research policies and programmes	Workshop	JPIAMR, IMI, EFPIA	Public information on European and global state of the art AMR-activities	2015
	National alignment workshops	Policy Workshop	Partner Countries, policy makers	International harmonisation of research activities	2015/2016
	Coordinate calls across countries	Alignment	Partner Countries	International call implementation	ongoing

EVALUATION ACTIVITIES	AMR research funding and research capability in Europe online database	Database	Partner Countries	SWOT-Analyses on European AMR-related Funding	2014-2015
	Research Infrastructures online database of AMR/ Infectious diseases national infrastructures (in collaboration with ERA-NET "Infect-ERA")	Database	Partner Countries, ERA-NET "Infect-ERA"	Capacity analysis of European research infrastructures	2015
	JPI Self-assessment	Survey	MB; SAB; SHAB	Report on results of the survey	Spring 2015 Spring 2017
	Information systems workshop	Strategic Workshop	Partner Countries	Recommendation paper on information system alignment Recommendation for JPI AMR database design	1st semester 2015 Winter 2016
	Joint Database of Peer Reviewers	Database	Call Secretariats	Collection of experts	1st semester 2016
	Common database	Database	Partner Countries	Collection of information on funded research	Autumn 2016
INTERNATIONALISATION AND COOPERATION	Membership policy	Policy Action	JPIAMR	International harmonization of policies	2nd semester 2014
	New partnerships (incl. alignment of research agendas)	Policy Action	JPIAMR	Find further collaborators and new member countries	2014 - 2018
	Developing appropriate tools for international partnerships	Policy Action	JPIAMR	Exploration of new / enhanced funding models	2014 - 2016
	Cooperation with DG Santé re. a Joint Action	Policy Action	JPIAMR, DG Santé	Joint Action	2016
	Cooperation with the WHO re. an AMR Global Research Agenda	Alignment / Policy Action	JPIAMR, WHO	Global AMR Research Agenda	2015-2016
	Cooperation with the WHO re. Global R&D Observatory	Alignment / Policy Action	JPIAMR, WHO	Global AMR Research Agenda	2015-2016
	Cooperation with G7 to follow up on previous AMR statements	Policy Action	JPIAMR	Document on AMR policies	2014-2016
	Cooperation with TAFTAR	Alignment / Policy Action	JPIAMR, TAFTAR	Document on AMR policies	2015-2018
	Cooperation with industry (incl. EFPIA and IMI)	Policy Action	JPIAMR, EC, IMI, EFPIA	EC-JPIAMR-IMI-EFPIA meetings, exchange, JPIAMR industry task force	2014-2018

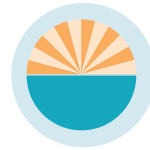


Annex 2
JPIAMR SRA Delivery Matrix





	THERAPEUTICS	DIAGNOSTICS	SURVEILLANCE	TRANSMISSION	ENVIRONMENT	INTERVENTIONS
2015	1st Joint Call “InnovaResistance: Innovative approaches to address antibacterial resistance”	Diagnostics Workshop (SAB Member Involvement)				
	2nd Joint Call “Translational research on development of neglected antibiotics/ combinations by testing for activity/ synergy in vitro, validated animal models with PK/PD”			Transmission Workshop (SAB Member Involvement)		
	Research Infrastructures Workshop - (SAB Member Involvement)					
	Series of Webinars - (SAB Feedback on topics)					
2016				3rd Joint Call “Unravel the dynamics of transmission and selection of antimicrobial resistance at genetic, bacterial, animal, human, societal and environmental levels, in order to design and evaluate preventive and intervening measures for controlling resistance” (SAB Feedback)		
	4th Joint Call - Research Networking programme “Developing new methodological options” (SAB Feedback on topics and on the review process)					
	Virtual Research Institute - (SAB Feedback on topics and on the review process)					
	2nd Prioritisation Workshop (tbd) - (SAB Member Involvement)					
	Summer School - (SAB Feedback)					
		Joint workshop with NIH in Alternative therapeutics (SAB Member Involvement)		Surveillance Workshop (SAB Feedback on topic and involvement in scientific committee)		



	THERAPEUTICS	DIAGNOSTICS	SURVEILLANCE	TRANSMISSION	ENVIRONMENT	INTERVENTIONS
2017	5 th Joint Call (tbd) - (SAB feedback on topic)					
	6 th Joint Call on Fellowships (tbd) - (SAB feedback on topic)					
	Conference among JPIAMR funded projects					
	Update of the SRA topics - (SAB leadership in development)					
	Workshops (tbd) - (SAB Feedback on topic and involvement in scientific committee)					
2018	7 th Joint Call (tbd) - (SAB Feedback on topic)					
	Workshops (tbd) - (SAB Feedback on topic and involvement in scientific committee)					



Joint transnational call



Status seminar of funded projects



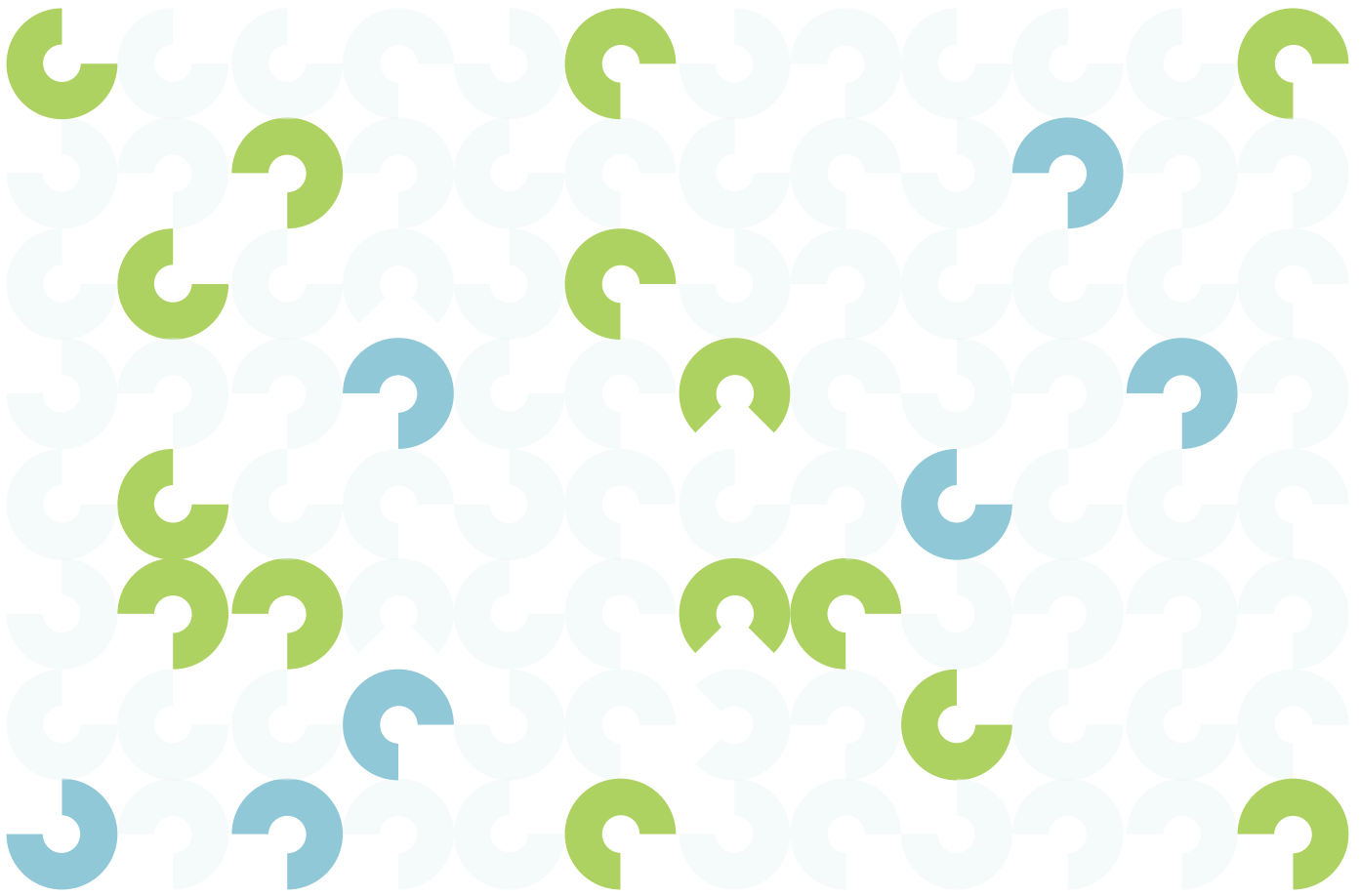
Workshop (strategic, exploratory)



SRA update



Educational material



Annex 3
JPIAMR Alignment Plan



A COMMON DEFINITION OF ALIGNMENT FOR JOINT PROGRAMMING

Alignment is the strategic approach taken by the Member States to modify their national programmes, priorities or activities as a consequence of the adoption of joint research priorities in the context of Joint Programming with a view to implement changes to improve efficiency of investment in research at the level of Member States and ERA. The state of alignment will change and develop over time.



Alignment of National and European research policies and programmes represents a challenge to JPIAMR but is essential to enable the research priorities outlined in the SRA to be addressed. It is important that a variety of funders at different levels (regional, national, European and international) are involved in this process and that the relevant countries and Member States are engaged. Alignment could involve a particular research area or specific topic or alignment with other JPI activities. Advantages to aligning include improving the quality of research, providing access to more research with relevance to national policy development and would contribute to innovation and economic sustainability and growth. It would also ensure that all available resources are better utilised for maximal societal impact and allow greater sight into the portfolio of projects that are funded in each country, preventing duplication of effort and identifying links that can be exploited.

OVERARCHING ACTIVITIES

A number of communication tools used to raise awareness to both the AMR community and a variety of stakeholders could include distribution of leaflets and copies of the SRA, clearly detailing the aim of the JPIAMR. Tailored presentations would also help with awareness and facilitate with aligning the community together. Videos and webinars may also be other mechanisms by which JPIAMR can communicate with the public. Identifying key departments and individuals within these departments would help support and engage the community in national discussions. Relevant individuals could be invited to the JPIAMR Management Board as guests and case studies of countries with experience could be made available to demonstrate good practice and also lessons learnt.

There are a number of ways to achieve alignment depending on the development of the research areas. These include initiation of new research activities, aligning and co-ordinating existing activities, data sharing, sharing of infrastructure, strategic collaborations with other projects and initiatives, training and mobility of researchers and foresight activities. The process of alignment requires common and or overlapping themes, time, networks and core topics as a starting point for discussion. Long term investment is also important to enable longer time strategies to develop. The selection of the most appropriate tools for alignment will be identified in the first instance by mapping exercises, networking workshops, think tanks and meetings. It is important to monitor and evaluate the short, medium and long term priorities of the Member States to identify and understand obvious opportunities and gaps. **There are a number of overarching activities that would facilitate alignment in the short (S), medium (M) and long term (L) and five areas within alignment that need to be considered for JPIAMR (Figure 1).**

ALIGNMENT

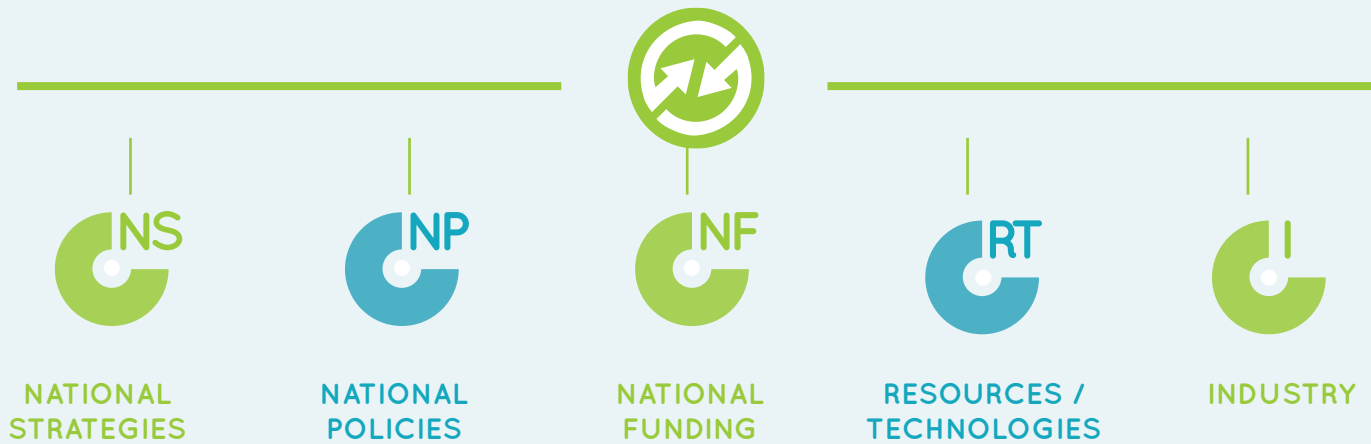


Figure 1. The five areas of the alignment plan of JPIAMR

NATIONAL



STRATEGIES

- Most of the countries within the JPIAMR have a National Strategy for AMR or are in the process of developing one.
- For countries with an AMR strategy, it is necessary to engage with the key stakeholders within the different countries to introduce the Strategic Research Agenda (SRA) and identify complementary interests to work towards common goals (S/M).

- For countries that do not have a strategy, it is essential that the profile of AMR is raised at conferences and meetings and the SRA is presented as a way forward (S/M/L).
- Identifying the national funders and experts within AMR in these countries would enable input into the development of a strategy (S/M).
- Any future strategy under development would ideally be aligned with the research themes in the SRA (M/L)

The JPIAMR Phase 2 mapping exercise has identified the countries that have an AMR strategy in place (S) (Table 1). The JPIAMR should work across all countries to promote the research themes within the SRA and assist those currently developing a strategy.

NATIONAL



POLICIES

- It is essential that the gap between research and policy is addressed, which requires more communication and interaction between key researchers and policy makers in all areas including public health, animal and environmental (M/L).
- Engaging politicians and policymakers help raise awareness of the research conducted and its potential impact. Discussions at early stages would help define research priorities which can be translated into policy and practice (S/M/L).

- The Phase 2 mapping exercise has collected some of the existing policies related to AMR and infection (S) (Table 2). This was a challenging exercise as many of the local and national policies are not well documented.
- Member States should consider these policies and whether some could be adopted widely (M/L).

Workshops organised by JPIAMR (such as the diagnostics workshop in London) brought together researchers, policy makers, clinicians, veterinarians and representatives from industry for discussions on the challenges of developing good diagnostic tools for AMR (M/L)

NATIONAL



FUNDING

- The Phase 1 mapping exercise collated information on AMR relevant research funded nationally by 21 Member States (Kelly et al, in press). This mapping highlighted the need for more available funding for AMR on a national level and the added value of jointly funded research (S/M/L).
- Different funding models should be considered including public-private partnerships and linking with policymakers and end users. Better coordination across countries would ensure resources are better exploited (M/L).
- Stronger national and cross country alignment of funding would add value to the current landscape of research and would avoid duplication (M/L).
- JPIAMR is considering different funding mechanisms that would add value to existing programmes of work, including supporting research projects that will build on the strength of existing research in the Member States. The first two transnational calls launched in 2015 led to 7 projects being funded; early 2016 will see the research networks call being launched across countries with the aim of linking different experts together (S/M/L).

An intergovernmental Workshop held in Paris on the 17th November 2015 brought together ministries, agencies and funding bodies to discuss the current situation of AMR funding in each country and to discuss ways to add value to new and existing programmes of work, through cooperation and coordination within and between countries and discuss the challenges associated with transnational funding (M/L).



www.jpiamr.eu/activities/workshops/intergovernmental-workshop/

RESOURCES



TECHNOLOGIES

- It is important to identify AMR relevant resources both nationally and between countries. This includes available biobanks, clinical samples, data sets as well as technologies that can enable AMR relevant research (S/M).
- Standardisation of technologies, methodologies and data collection would facilitate the use of data generated by different groups (M/L). Networking events focusing on areas such as innovation and enabling technologies and research infrastructures may also be explored.
- Discussions between researchers around sharing data, information and resources would help reduce costs and promote cross country working (S/M).
- A workshop held in Amsterdam on the 28th October 2015 aimed to devise a plan of approach to (better) share data, collections, samples and re-use them in the AMR domain. As preparation for the meeting, JPIAMR carried a short survey on knowledge about and use of Research Infrastructures (RI's) within the field of antimicrobial resistance. The survey was open to all scientists and other interested parties who are involved in this field. The answers from this survey will be presented at the meeting (link) (S/M).

A workshop held in Amsterdam on the 28th October 2015 aimed to devise a plan of approach to (better) share data, collections, and samples and re-use them in the AMR domain. As preparation for the meeting, JPIAMR carried a short survey on knowledge about and use of Research Infrastructures (RI's) within the field of antimicrobial resistance. The survey was open to all scientists and other interested parties who are involved in this field. The answers from this survey will be presented at the meeting (S/M).



www.jpiamr.eu/activities/workshops/research-infrastructures-workshop/

INDUSTRY



- The Phase 2 mapping exercise has identified a large number of companies (over 300) with interest in AMR and how different countries are engaging with industry (S) (Table 3).
- Working in collaboration with pharmaceutical companies and small and medium enterprises is crucial to the success of AMR research especially

when developing new therapeutics and diagnostics tools. Mechanisms to enable closer working between academics and industry (through jointly funded studentships or research projects) should be considered. This would allow expertise, skills and experience to be shared and advice on lessons learnt and best practice to be delivered (M/L).

A JPIAMR industry working group has been established to enable an environment for information exchange. Early discussions with Innovative Medicines Initiative (IMI), the European Federation of Pharmaceutical Industries and Associations (EFPIA), as well as individual companies are underway (S/M/L).

NEXT STEPS FOR ALIGNMENT

Information and burden sharing can prevent duplication of effort and enable the highest quality research to be funded, the output of that research underpinning future policy developments in the AMR area. Alignment requires innovative approaches and it must be recognised that this will change and develop over time as research priorities. Good practices of alignment should be further developed and eventually become best practices, shared among JPIs and promoted throughout Member States. Evaluating progress in this area is important to ensure the JPIAMR is achieving its aim.

Table 1. The countries within JPIAMR that report having a National Strategy on AMR as of March 2015

Total Number of Countries Providing Data	Countries Reporting having an AMR National Strategy	Countries in the Process of Developing a Strategy	Countries Reporting no National Strategy (or plans to develop one)
18	12	3	3

Table 2. The countries within JPIAMR that have a policy or guidelines on AMR or infection

COUNTRY	HUMAN	ANIMAL
Argentina	Not supplied	Not supplied
Belgium	BAPCOC, website www.health.belgium.be/Antibiotiques/index.htm?fodnlang=en	AMCRA 2020 Policy www.amcra.be/sites/default/files/files/AMCRA%202020%20finaal_EN(1).pdf
Canada	The Public Health Agency of Canada has developed infection prevention and control and prescribing guidelines, including those specific to AMR bacteria.	Notice to stakeholders www.hc-sc.gc.ca/dhp-mps/vet/antimicrob/amr-notice-ram-avis-20140410-eng.php
Czech Republic	Action Plan www.szu.cz/narodni-antibioticky-program	Not supplied
Denmark	Denmark Joint Antibiotic Resistance Action Plan www.sum.dk/Aktuelt/Nyheder/Sundhedspolitik/2010/Maj/-/media/Filer%20-%20dokumenter/Antibiotikaresistens/Handlingsplan_mod_antibiotikaresistens.ashx	Denmark Joint Antibiotic Resistance Action Plan www.sum.dk/Aktuelt/Nyheder/Sundhedspolitik/2010/Maj/-/media/Filer%20-%20dokumenter/Antibiotikaresistens/Handlingsplan_mod_antibiotikaresistens.ashx
Estonia	Policies in place for prescribing antibiotics and infection control requirements in health care settings. To be updated in 2015.	Recommendations on antibiotic use www.vet.agri.ee/static/files/1289_antibiootikumide%20kasutamine%20eri%20loomliikide%20puhul.pdf ; www.vet.agri.ee/static/files/1290.ab%20kasutamine%20veised.pdf www.vet.agri.ee/static/files/1291.AB%20kasutamine%20sead.pdf
Finland	Guidelines www.julkari.fi/handle/10024/116266 www.thl.fi/documents/10531/163131/Rekommendation_f%C3%B6r_diagnostik_av_karbapenemasproducerande_bakterier_v1.0.pdf www.thl.fi/documents/10531/163131/Rekommendation_f%C3%B6r_diagnostik_av_ESBL_v1.0.pdf	Not supplied
France	Antibiotics Plan www.plan-antibiotiques.sante.gouv.fr/-DGS-.html www.hcsp.fr/explore.cgi/avisrapportsdomaine?clefr=372	Antibiotics Plan www.plan-antibiotiques.sante.gouv.fr/-Afssaps-.html www.plan-antibiotiques.sante.gouv.fr/-HAS-.html www.plan-antibiotiques.sante.gouv.fr/-DHOS-.html

Germany	<p>Guidance</p> <p>www.rki.de/EN/Home/homepage_node.html</p> <p>www.gesetze-im-internet.de/bundesrecht/ifsg/gesamt.pdf</p> <p>www.dgkh.de/pdfdata/MedHygVo/MedHygVO_NRW_13032012.pdf</p>	www.fli.bund.de/en/startseite/home.html
Greece	Not supplied	Not supplied
Israel	Multiple policies and guidelines are in place related to infection control, AMR control, and antibiotic stewardship	Animal feed guidelines are in progress
Italy	<p>National Prevention Plan</p> <p>www.ccm-network.it/pagina.jsp?id=node/1829&idP=89&idF=935</p>	<p>Guidance on antibiotic use in animals</p> <p>www.salute.gov.it/portale/news/p3_2_1_1_1.jsp?lingua=italiano&menu=notizie&p=dalministero&id=2245</p>
Japan	<p>Guidance on the treatment of specific organisms</p> <p>www.mhlw.go.jp/bunya/kenkou/kekkaku-kansenshou1/01-05-42-01.html</p> <p>www.nih.go.jp/niid/ja/kansennohanashi/433-mdr-pa.html</p> <p>www.nih.go.jp/niid/ja/kansennohanashi/469-vre.html</p> <p>www.mhlw.go.jp/bunya/kenkou/kekkaku-kansenshou1/01-05-140912-4.html</p> <p>www.kansensho.or.jp/guidelines/pdf/guideline_mrsa_2014.pdf</p>	Not supplied
Latvia	No national guidelines, but there are 'Regulations Regarding the Basic Requirements for a Hygienic and Counter-Epidemic Regimen in a Medical Treatment Institution (574/2006)' in Latvia	Not supplied
Netherlands	Reduction of antibiotic use in clinical care (SWAB) and infection prevention (WIP). Regulations in place that prevent over the counter sales of antibiotics. Surveillance of Hospital acquired infections as part of quality legislation. Strong supervision through Health Care Inspectorate.	Progressive policy towards the reduction of antibiotics in veterinary health.
Norway	<p>Use of antibiotics</p> <p>www.helsedirektoratet.no/publikasjoner/nasjonale-faglige-retningslinjer-for-antibiotikabruk-i-primerhelsetjenesten/Publikasjoner/IS-2030_nett_low.pdf</p> <p>www.fhi.no/dokumenter/9bc2e5e450.pdf</p> <p>www.legeforeningen.no/Fagmed/Norsk-barnelegeforening/Veiledere/veileder-i-akutt-pediatri/kapittel-3-infeksjoner/</p>	Not supplied
Poland	<p>Antibiotic plan</p> <p>www.antybiotyki.edu.pl</p>	Not supplied
Romania	<p>Website</p> <p>www.ms.ro/?pag=181;</p>	<p>Website</p> <p>www.ansvsa.ro/?pag=845</p>
Spain	<p>Antibiotic guide</p> <p>www.antibioticos.msc.es/guias.htm</p>	<p>Antibiotic guide</p> <p>www.aemps.gob.es/</p>

Sweden	The National Board of Health (Socialstyrelsen) and The Swedish Board of Agriculture has a governmental mission to coordinate an action plan at the national level since 2012	Not supplied
Switzerland	Website www.bag.admin.ch/gesundheit2020/index.html?lang=en	Not supplied
Turkey	Website www.uamdss.thsk.gov.tr/ www.resmigazete.gov.tr/eskiler/2005/08/20050811-6.htm	Strategic Plan http://www.tarim.gov.tr/SGB/Belgeler/2013-2017/Stratejik_Plan2010-2014.pdf
UK	Guidance and information www.gov.uk/government/publications/the-health-and-social-care-act-2008-code-of-practice-on-the-prevention-and-control-of-infections-and-related-guidance www.nice.org.uk/news/article/tackling-the-rise-in-antibiotic-resistance www.his.org.uk/files/3113/8693/4808/epic3_National_Evidence-Based_Guidelines_for_Preventing_HCAI_in_NHSE.pdf www.rcgp.org.uk/TARGETantibiotics/ www.gov.uk/government/uploads/system/uploads/attachment_data/file/417032/Start_Smart_Then_Focus_FINAL.PDF www.survivingsepsis.org/Guidelines/Pages/default.aspx	Guidance www.beva.org.uk/useful-info/Vets/Guidance/AMR

Table 3. The countries within JPIAMR that demonstrate links with industry

	Number of countries
Countries providing data	18
Countries reporting organisation that can directly fund industry	16
Countries reporting organisation that can indirectly fund industry	10
Countries reporting dedicated calls to AMR (that encourage participation)	3
Countries reporting methods of good practice for engaging and working with industry	9