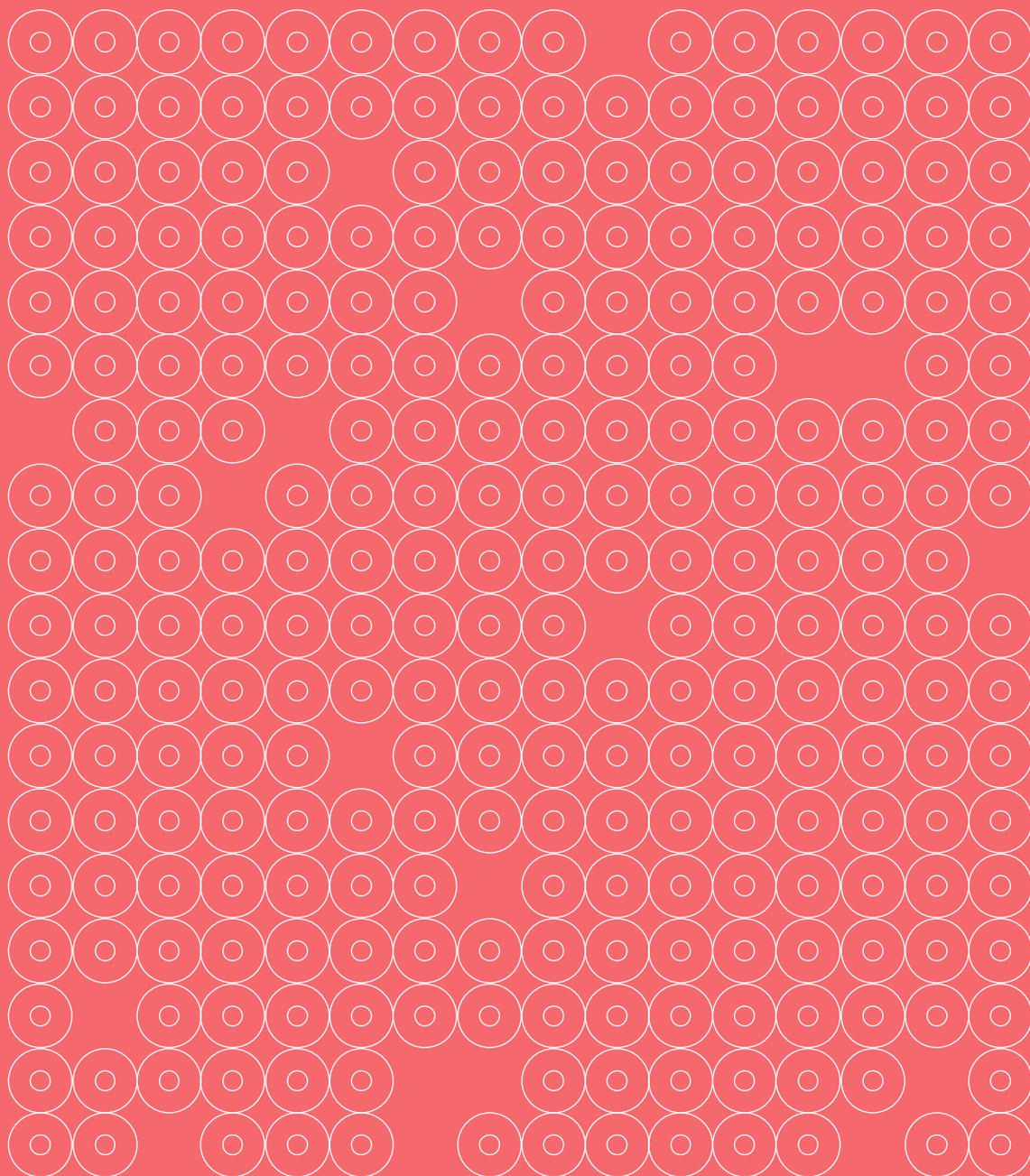


Establishing the JPIAMR- Virtual Research Institute

April 2019



Establishing the Joint Programming Initiative on Antimicrobial Resistance Virtual Research Institute (JPIAMR-VRI)

(version of 10 April 2019)

Aim

The Joint Programming Initiative on Antimicrobial resistance (JPIAMR) is establishing a Virtual Research Institute on antimicrobial resistance (the JPIAMR-VRI). A virtual platform that will increase coordination, improve visibility of the AMR research networks, research performing institutes/centres and infrastructures, and facilitate knowledge exchange and capacity development across the globe, covering the full One Health spectrum.

Setting the stage

As microbes evolve to resist the action of drugs, an increasing number of treatments are becoming inadequate in effectively treat infections. As a result, we have reached a point where we are running out of treatment options to adequately fight infections. Antimicrobial resistance and the management of antibiotic resistant infections have become more frequent and increasingly difficult to treat.

Indeed, without any new drug and/or better management of the current repertoire of antibiotics, it is anticipated that annual death consequent to drug resistant infections may reach 10 million worldwide¹, surpassing diabetes and cancer combined. Additionally, over and indiscriminate use of antibiotics is also affecting animal health and the environment which in turn affects human health. Thus, the problem of AMR must be addressed from an inclusive “One Health” perspective involving coordination among numerous sectors and actors, including human and veterinary medicine, agriculture, environment, and finance.

Given that AMR knows no geographical boundaries and impacts us all, it has garnered the attention and support of the highest political levels. In 2015, the World Health Organization (WHO) announced AMR as one of the greatest threats to public health. It is estimated that the Sustainable Development Goals² adopted by all United Nation Member States in 2015 would be impossible to deliver if the AMR challenge is not addressed imperatively. In consequence, a Global Action Plan on AMR³ was endorsed which underscores the One Health approach.

AMR has been part of the global health agenda with numerous institutions such as the UN Environment Assembly, the Council of the European Union, the G7, the G20, the

¹O’Neil J., Tackling Drug-Resistant Infections Globally: final report and recommendations, 2016
https://amr-review.org/sites/default/files/160525_Final%20paper_with%20cover.pdf

² <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

³ WHO – Global Action Plan on AMR
https://apps.who.int/iris/bitstream/handle/10665/193736/9789241509763_eng.pdf?sequence=1

European Union and the UN General Assembly that resulted in the creation of the UN Interagency Coordination Group on AMR (IACG).

Joint Programming Initiative on Antimicrobial Resistance (JPIAMR)

JPIAMR, the largest joint venture in research coordination and support for AMR, adopted the One Health approach through its Strategic Research Agenda⁴ (SRA) in 2014, and it is now used as a model for the WHO Global Action Plan on Antimicrobial resistance. Specifically, JPIAMR's SRA is referred to as being a possible initial framework for the further development of a similar document applicable globally to avoid overlaps and duplication of efforts.

Now engaging 27 nations to curb antibiotic resistance, the initiative coordinates national public funding and funds transnational research and activities within the six priority areas of the shared JPIAMR SRA – therapeutics, diagnostics, surveillance, transmission, environment and interventions.

Numerous national plans have since then referred to JPIAMR SRA's elements as those to be prioritised in order to successfully enhance the impacts of research investments and co-investments. JPIAMR's role is acknowledged and well recognized as a key initiative to combat AMR by both G7 and G20 resolutions and the European Union One Health Action Plan against AMR⁵ which outlines JPIAMR as a key mechanism for global collaboration, coordinating calls and for aligning a global research agenda to tackle AMR.

Furthermore, in their official statement, the Ministers of Health of the European Union acknowledge the work of JPIAMR and call all the Member States to “join or strengthen their commitment to the existing Joint Programming Initiative on AMR”.

Why do we need a Virtual Research Institute on AMR?

The rising threat of AMR urgently requires a holistic and multisectoral, multi-disciplinary approach, and that AMR is a multifaceted issue that cannot be addressed by any one solution nor that any one country can resolve it on its own.

Since its inception, JPIAMR has been addressing the issues of AMR by increasing coordination and support of the AMR research Agenda through the various joint funding opportunities. In its most recent plan, the European Commission asserts their support to both JPIAMR and to the establishment of the JPIAMR-VRI to promote alignment of national and European strategies with its SRA.

The JPIAMR recognizes that urgent action is needed to strengthen research collaboration, coordination, sharing of knowledge, data and other resources, amongst different sectors and geographies from around the world to address the recommendations of the United Nations IACG.

These recently published IACG Draft Recommendations⁶ state that “current efforts to support research into and development of new antimicrobials, diagnostics, vaccines,

⁴ JPIAMR SRA - https://www.jpiamr.eu/wp-content/uploads/2014/05/SRA1_JPIAMR.pdf

⁵ https://ec.europa.eu/health/amr/sites/amr/files/amr_action_plan_2017_en.pdf

⁶ UN Interagency coordination group (IACG) draft Recommendations, 2019. https://www.who.int/antimicrobial-resistance/interagency-coordination-group/Draft_IACG_recommendations_for_public_discussion_290119.pdf?ua=1

waste management tools, and safe and effective alternatives to antimicrobials across the One Health spectrum remain inadequate and need to be intensified with sustained investment and increased scientific engagement and collaboration". Within the same document the IACG independently called upon research funders to:

- Undertake coordinated global mapping of research and development activities and funding to address antimicrobial resistance;
- Establish and maintain a platform for sharing information on research and compounds in development in both ongoing and completed research and development activities;
- Promote synergies and opportunities for collaboration among funders and researchers in human, animal and plant health, and the environment; and
- Promote openness and transparency in data from all research and monitoring and surveillance sources.

It exists a plethora of initiatives at the Global level when it comes to AMR⁷. However, JPIAMR opted to respond to these IACG recommendations by not only delivering a coordinated global mapping of research and funding activities⁸ but also by adding, since 2016, a new ammunition in this fight has it embarked on the development of the JPIAMR-VRI as one of its key activities. JPIAMR is currently setting the foundational pieces of the JPIAMR-VRI with its first funded Networks (see Achievements to date section).

Added value of the JPIAMR-VRI

The JPIAMR-VRI is a dynamic network of AMR research facilities that will change the way resources are shared and used, and will ensure a closer, more coordinated and continuous dialogue amongst researchers as well as between researchers, funders and policy makers.

By connecting the global scientific community along the six priority areas of the joint Strategic Research and Innovation Agenda, the JPIAMR-VRI will provide an unprecedented level of knowledge exchange, facilitate the analysis of knowledge gaps, increase capacity, improve coordination, implement breakthrough collaborative research and increase the visibility of the research performed.

By bridging borders and disrupting barriers between fields of research the JPIAMR-VRI will build a virtual "corridor" facilitating alignment of strategies, and the production and sharing of scientific evidence, for developing policy and guidelines to reduce to global burden of AMR.

The JPIAMR-VRI should be viewed as a Network of Networks, a knowledge hub, and a Global Platform with key principles (Box 1) that serve essential aspects to AMR Research stakeholders (Figure 1).

⁷ Article in Trends in Microbiology entitled "Research, Innovation, and Policy: an alliance combating antimicrobial resistance" can be found here [https://www.cell.com/trends/microbiology/fulltext/S0966-842X\(18\)30281-6?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS0966842X18302816%3Fshowall%3Dtrue](https://www.cell.com/trends/microbiology/fulltext/S0966-842X(18)30281-6?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS0966842X18302816%3Fshowall%3Dtrue)

⁸ JPIAMR Global Mapping of research and funding activities, 2019. <https://www.jpiaamr.eu/amr-research-funding-dashboard/>

Box 1. The JPIAMR-VRI Key Principles

- To provide a virtual corridor facilitating the generation of scientific evidence to develop public policy and guidelines, and translation into practice.
- To facilitate and provide a platform for AMR researchers to communicate and coordinate research and other activities
- To reduce the duplication of efforts and leverage and synergise global efforts.
- To have a strong international outreach to the numerous AMR Research Community Stakeholders through the member states of the JPIAMR.
- To be able to mobilise new and existing resources through the JPIAMR.
- To cover all essential areas of One-Health, amalgamating different sectors, research areas, professional expertise.
- To address AMR as a global issue considering the needs and requirements of the AMR community in different geographical locations with various resources availabilities.
- To foster multinational research collaborations to add value to and to build upon the research conducted independently at national level

The JPIAMR-VRI is not a funding instrument in itself but will be eligible for JPIAMR funding programmes. It is not to be seen as an added infrastructure to existing country specific ones.

AMR Research Capacities for the JPIAMR-VRI

The JPIAMR-AMR research capacities can be grouped into six major activity modules encompassing concrete outputs:

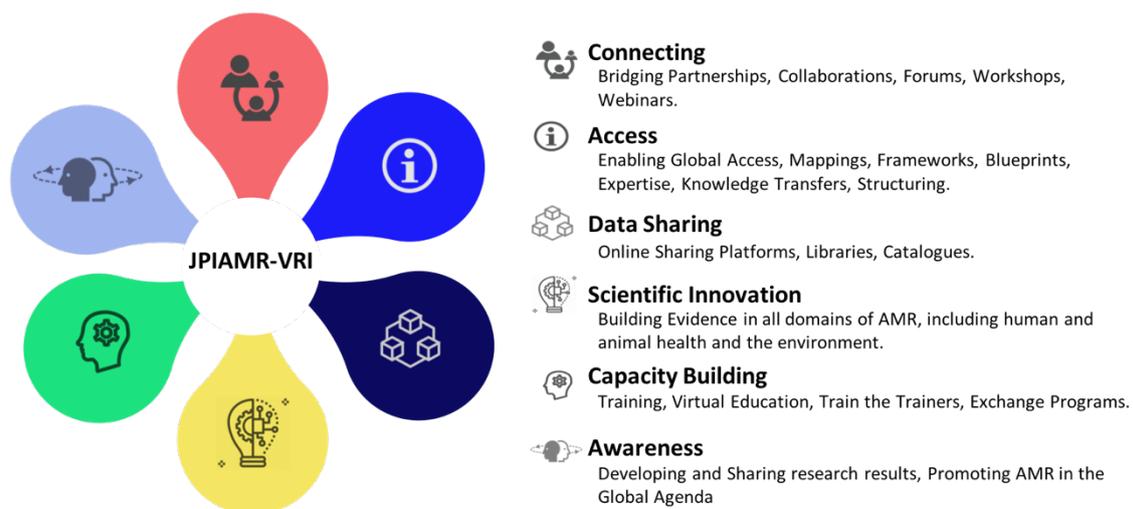


Figure 1: The six major activity modules of the JPIAMR-VRI

CONNECTING

The JPIAMR-VRI will bridge multi-stakeholder partnerships and promote the development of collaborations between all sectors of the AMR community, including researchers, research policy and research funding. Actions will enable integration of activities via for instance forums, workshops, and webinars, as well as the exchange of knowledge between research and innovation and industry.

ACCESS

By enabling global access to knowledge, infrastructures and expertise, the JPIAMR-VRI will allow for the creation and extension of new and existing networks, centres, projects and frameworks to facilitate and structure the AMR community.

DATA SHARING

The JPIAMR-VRI will provide avenues for sharing of AMR knowledge, infrastructures and facilities. In addition, the JPIAMR-VRI will allow for the standardisation and harmonisation of data handling, data distribution, and legal and ethical issues solutions.

SCIENTIFIC INNOVATION

By facilitating collaborations and communication, the JPIAMR-VRI will build evidence in all domains of AMR including human and animal health and the environment. This evidence will be able to be accessed for the development of policy and guidelines, and could, for example, provide a platform and tools for early discovery, antibiotic pipeline, alternatives to antibiotics, increasing scientific and technological excellence.

CAPACITY BUILDING

One of the major activities of the JPIAMR-VRI is the possibility to provide capacity building within the AMR community. By providing virtual education, training programmes (not only scientific training but also on updating other skills outside the scientific framework including business skills etc.), train-the-trainers, exchange programmes (e.g. fellowship schemes, travel grants etc.), the JPIAMR-VRI has the potential to propel AMR research.

AWARENESS

The JPIAMR-VRI will contribute to maintaining AMR at the forefront of the political momentum for the Global Agenda. It will raise the visibility and profile of AMR by developing and sharing research results and putting this research forward. It will ensure constant flow of discussions and communications to and from the AMR Research community, the policy makers and the general public.

Benefits of the JPIAMR-VRI for the scientific community

- Find the right people/groups to create networks, (research) consortia, research ideas and spin-off ideas, etc.
- Present oneself and remain visible and detectable as an expert or entrepreneur within the AMR field.
- Easy access to AMR databases, collections, biobanks, research infrastructures.
- Overview of ongoing and finalised research projects (mapping).
- Overview of grant schemes/funding database (globally).
- Early notification of (emerging) resistance problems and novel findings.
- Promote/find scientific work (publications, protocols, best practices, guidelines etc.).
- Promote/find workshops, symposia, conferences, summer schools, train-the-trainer etc.
- Promote/find grey literature i.e. supranational/national (e.g. NAPs) reports with policy & research agendas.
- Exchange and learn from best practices, guidelines, protocols, experimental models, etc.
- Invite participants, (keynote) speakers, facilitators.
- Etc.

Achievements to date

In 2018 the JPIAMR launched two network calls. The first one focussed on surveillance to enhance research alignment and boost capacity building, and the second one aimed at Building the Foundation of the JPIAMR-VRI. Eighteen networks are now funded by JPIAMR, ten resulting from the Surveillance Network Call, and eight from the call: Building the Foundation of the JPIAMR-VRI.

On February 19-20, 2019 (Amsterdam), these 18 Networks met at their joint start-up workshop and discussed alignment and enhanced interactions.

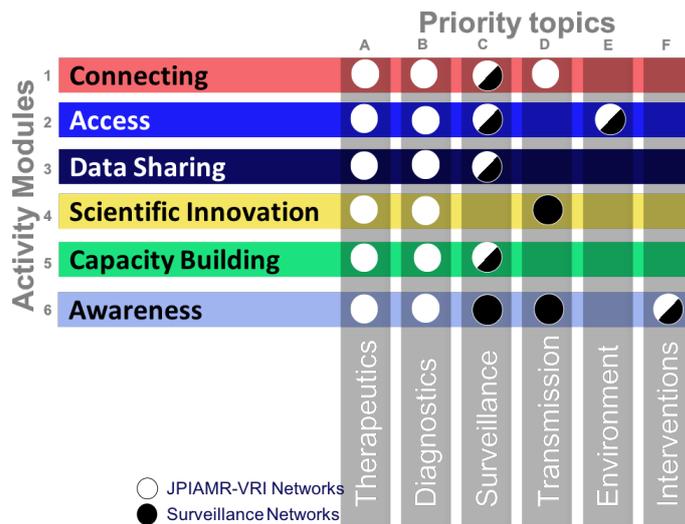


Figure 2: Foundational activities of the JPIAMR-VRI

The activities of the various Networks that lay the foundation of the JPIAMR-VRI are connecting the six priority topics of the Strategic Research and Innovation Agenda (SRIA) with the six JPIAMR-VRI modules as depicted by Figure 2 where these connections are represented by white and/or black dots.

Below are a few tangible examples of how the Networks activities are contributing to shaping the foundation of the JPIAMR-VRI through its six modules and priority topics.

For example, the **connecting module** will ensure, amongst many other things, an exchange of knowledge between Research and Innovation, and the Industry via:

- Knowledge sharing and development of blueprints on research for antibiotic discovery and development by the *IRAADD* Network. This will help researchers to efficiently translate their findings into novel and useful therapeutic products.
- Paving the way to allow for the assessment of alternative antimicrobial treatments by the *VeRi BEAM* Network. This will help to better connect industry and regulators to understand requirements needed for development of alternative to antibiotics.

Whereas, the **access module** demonstrates how the Network activities help to structure AMR Research community by:

- Identifying data elements and providing building blocks for estimating to the burden of AMR with a One-Health approach by the *GapOne* Network. This will help to evaluate the cost-effectiveness of interventions
- Extending on WHO Tricycle surveillance pilot programs in the three sectors of One Health in all countries (especially those with limited surveillance capacities), the *NETESE* Network will be by linking countries together to obtain

yearly rates of ESBL-*E.coli* to enable trends determination, make inter/intra-regional comparisons and build a dynamic dashboard for decision makers.

- The *PRAISE* Network will be building a roadmap to (semi)-automating the manual decision by Infection Prevention Specialists in regards to surveillance of healthcare-associated infections (HAIs).
- Building the capacity to be able to analyse patients' move and identify sentinel hospitals to provide recommendations for development of more parsimonious, cost-efficient surveillance structure to better determine high-risk clones spread between hospitals, by the *NeWis* Network.
- Connecting European and African researchers to enable intercontinental access to knowledge, infrastructures and expertise by the *NEAR AMR* network. This will provide information on preferred global surveillance data sharing platform profile of what is realistically possible within a range of existing healthcare systems from multiple geographical settings and with various resources limitations.

The **data sharing module** is ensured by activities such as:

- Developing a platform by the *AMRIC* Network for global data sharing for acute and critical care environments to determine impacts of AMR.
- Developing a cooperative open-access online platform for data sharing, knowledge transfer and expert advice in the area of antibiotic research (with a focus on early stages of discovery and development) by the *IRAADD* Network.
- Linking datasets to fully incorporate knowledge on compound penetration properties by the *Translocation Transfer* Network. This will improve the process of academic driven antibiotic drug discovery.

Under the **capacity building module** Networks are working on:

- Delivering a Strategic Action Plan for a Virtual School of Diagnostics by the *AMR Dx Global* Network. This will enable training and capacity building focused on Diagnostics
- Identifying, with the *VeRI-Beam* Network, differentiation criteria for alternatives to antibiotics under regulatory review path to assist developers in bringing idea to market while avoiding pitfalls. This Network will share (scientific and non-scientific) knowledge amongst AMR Research community in non-competitive matter.

Governance

The governance of the JPIAMR-VRI lies with the JPIAMR Management Board, led by the JPIAMR-VRI Working Group (WG) lead by Canada and supported by the JPIAMR Secretariat.

The JPIAMR Scientific Advisory Board and JPIAMR Steering Committee ensure oversight of positioning and alignment with the JPIAMR SRIA and the roadmap of actions for 2019-2023.

Membership

The membership model of the JPIAMR-VRI is an open model that is set with different stratification levels (categories of members) in relations to specific benefits, needs, interests and capacity. In its initial phase of development, the JPIAMR-VRI will accept membership requests from research performing institutes, research centres, research organisations, research institutes, research networks and/or research groups where the main applicant is able to demonstrate an affiliation to one of the JPIAMR member states.

The various end users that will benefit from the outcome of the JPIAMR-VRI are seen as any stakeholder with an interest into specific AMR research areas e.g. individual researchers, relevant NGOs industry, policy makers, members at university level, students, public, etc.

The private sector with academic links will also be included as members.

Digital infrastructure/platform

The JPIAMR-VRI will have to have a solid, multi-featured, flexible yet reliable IT infrastructure to support several key aspects of its plan. Keeping in mind the limitation of available resources and the existence of some other infrastructures that are already active, the following is a non-exhaustive list of IT platform(s) functionalities that the JPIAMR-VRI may envisioned needing and that are worth exploring in a subsequent phase of development of the JPIAMR-VRI:

- Provide an interphase between researchers, groups, networks databases, collections, research infrastructures, biobanks, etc.
- Provide real-time global access to data and analyses, antibiotic usage, diagnostic usage, surveillance data etc., as well as access to relevant regulatory information, clinical trials etc.
- Access to library function, to (grey) literature, publications, etc.
- Alerts on emerging resistance (emerging) problems.
- Post publicly available information section and a restricted section for members only.
- Bear similarities to a LinkedIn-like or ResearchGate-like platform to connect researchers and research performing institutions without competing with LinkedIn or Research Gate.
- Offer a state-of-the art discussion forum (chat room).
- Keep an active calendar of events of worldwide AMR activities (such as workshops, symposia, conferences).
- Have a billboard for advertising vacancy and job search function.
- Expertise exchange platform (e.g. PhD students and / or technical education).
- Give access to E-learning, training, educational facilities, etc.
- Give access to capacity building programmes.

Expertise needed

The successful development and implementation of the JPIAMR-VRI will require input and expertise from various domains:

- International AMR Scientific Research
- General Research Management
- Animal health – veterinary sciences
- Public health – human health
- Environmental sciences
- Microbiology, immunology
- Economics
- Translation Research
- Network Development
- Governance
- Bioinformatics
- Epidemiology
- Data Access and “Big Data”
- Technical/IT experts/ Service Designers
- Capacity Building specific to the AMR field
- Communication

Partners/Collaborators

The JPIAMR-VRI aspires to reach out to partners and collaborations with the whole spectrum of AMR research stakeholders under the One Health approach in various ways through research networks and research performing institutes/centres. The JPIAMR-VRI will connect leaders and experts with industry, public health, and policy makers.

Communications

During the planning and design steps involved in building the JPIAMR-VRI and all other phases moving forward, setting an appropriate communication plan and putting the associated communication activities in motion are essential and are closely linked to JPIAMR-VRI success. The process to shape and refine the communications for the JPIAMR-VRI is an iterative and continuous process that constructs as the JPIAMR-VRI communication needs and requirements evolve.

Therefore, the JPIAMR-VRI communication plan is currently being laid out by the Communications Manager of JPIAMR, but it can be said that both the communication plan and its associated activities will contribute to:

- Make the vision, concept and value of JPIAMR-VRI clear to the key target groups.
- Increase visibility of the JPIAMR-VRI primarily within key target groups.
- Establish trust, obtain engagement and sustain interest from the key target groups.
- Provide accurate and timely information to key target groups.
- Key messages iterated to adapt to progress and key target groups while remaining consistent within a given group.
- Communicate values and activities realized by each of the activity modules

Performance evaluation

Success of the JPIAMR-VRI will be evaluated by the following global key performance indicators that will be further developed as the JPIAMR-VRI evolves:

Key Performance Indicators

- JPIAMR-VRI's ability to mobilise the AMR global research community.
- JPIAMR-VRI's measurable direct and indirect impacts on the fight against AMR.
- JPIAMR-VRI's contribution to moving discoveries from preclinical through clinical development.
- The evolution of JPIAMR-VRI's membership.
- The benefits obtained by the research community from the JPIAMR-VRI networking activities.
- Outreach from other organizations to connect with JPIAMR-VRI.
- JPIAMR-VRI visibility in the world-wide scientific arena.
- JPIAMR-VRI attractiveness to small and medium enterprises and others from the private sector.
- How JPIAMR-VRI has raised to the level of being the essential go-to for AMR research coordination

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