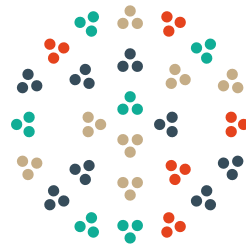
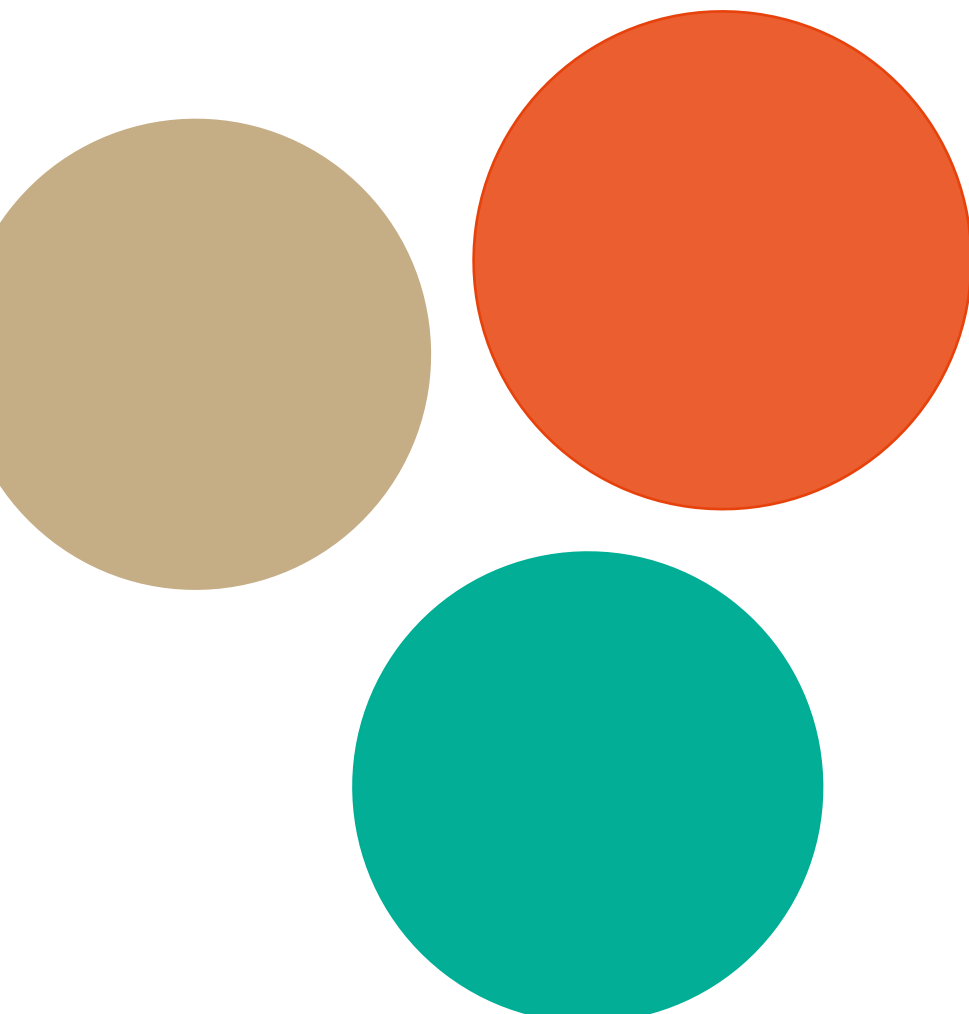


**GLOBAL
AMR R&D
HUB**



**Summary of the results from the public consultation on the
Global AMR R&D Hub's draft Collaboration Framework**

November 2019





Disclaimer

The views, thoughts and opinions expressed in this document are extracted solely from the feedback received through the public consultation on the draft Collaboration Framework and not necessarily the Global AMR R&D Hub's Board of Members or Secretariat.



Executive summary

The Global AMR R&D Hub released a draft version of its Collaboration Framework for public consultation from 2 September to 10 October 2019. The aim of the consultation was to seek suggestions and ideas on how improved coordination and collaboration of AMR R&D could be realized from a broad range of stakeholders. Views were also sought on the Global AMR R&D Hub's approach to collaboration and how this can be enhanced.

A total of 132 responses were received via survey (124), email (3) and verbally (5). Of these, 121 were included in the analysis.

The need for greater coordination and collaboration of global AMR R&D

There was strong agreement that greater coordination and collaboration is needed of global AMR R&D to reduce duplication of resources and efforts. The key areas for action that were identified in the feedback received were:

- Coordination of the large number of AMR organisations and initiatives so that the response is not fragmented, the global message is delivered as a single voice, and that there is better cooperation between R&D funders
- Better sharing of research and development information and data so that there is visibility of the global R&D landscape, researchers are able to learn from mistakes and build on innovations, and research priorities are set across One Health sectors, and
- Collaborative approaches must be truly One Health and global and engage areas not traditionally included in AMR discussions for fresh perspectives and solutions.

The key actors/sectors identified that need greater coordination and collaboration

The five actor/sector combinations identified as the highest priority for improved coordination and collaboration were between:

1. One Health sectors
2. Private and public sectors
3. Specific technology sectors
4. Funders and beneficiaries, and
5. funders/researchers and implementers or adaptors.

While the barriers identified for improving collaboration and coordination differed between these actor/sector combinations the top one identified for all was that there were different priorities. Other common barriers were an insufficient or lack of understanding of the interconnectedness of AMR or of the different actors' worlds.

Feedback on the areas identified in the draft Collaboration Framework

Four high-level areas where the Global AMR R&D will work towards increasing or improving collaboration and coordination were proposed in the draft Collaboration Framework. Respondents indicated that all of the proposed areas were important, and overall ranked them in the following order:

- Creating mechanisms to linkage funders, researchers and developers.
- Engaging a broad range of stakeholders to build a consensus on gaps and opportunities in AMR R&D
- Increasing information sharing among key stakeholders, and
- Collecting and presenting information about past, present and planned investments



Many ideas and suggestions were received on how to improve collaboration and coordination in these four high level areas and key themes or important considerations that emerged are summarized in Table 1.

Table 1 – key themes or important considerations for the four high level areas identified in the draft Collaboration Framework

High level area	Key themes or important considerations
Increasing information sharing among key stakeholders	<ul style="list-style-type: none"> • Face to face communication is extremely important for encouraging information sharing and developing collaborations and meetings or engagement on specific topics will stimulate more sharing of ideas • Communication between stakeholders should be regular and targeted (on a specific topic), easy to access and quick to digest • Overcoming barriers to sharing information may require an incentive • There are a large amount of initiatives and organisations active in the AMR field and increased communication coordination of these is needed
Collecting and presenting information about past, present and planned investments	<ul style="list-style-type: none"> • Must be able to compare information on AMR R&D projects and investments across funders, sectors and years so that strengths and gaps can be identified • Up to date information on AMR R&D projects and investments must be presented in a simple and interactive way that is easy to interpret • Project level information must be included (such as abstracts, details of principal investigators and links to additional information) so that collaborations/synergies can be identified/created and the data can be used to inform other work • Information collected and presented must be broader than just R&D into new antibiotics • Regular communication (weekly or fortnightly) about key analyses from the Dynamic Dashboard was requested
Engaging a broad range of stakeholders to build a consensus on gaps and opportunities in AMR R&D	<ul style="list-style-type: none"> • Emphasis on engaging via face to face mechanisms especially workshops or focus groups on a specific topic • The need to be transparent on outcomes and decisions of any workshops/groups so that these can be actioned • The stakeholders that should be engaged were industry, funders, low- and middle-income countries, all One Health sectors and also nontraditional AMR stakeholders • It was recommended that a mapping exercise is conducted to identify the stakeholders
Creating mechanisms to link funders, researchers and developers	<ul style="list-style-type: none"> • Need to engage more broadly than the usual AMR experts and organisations • Researchers conducting pure, fundamental or basic research should be linked with developers, clinicians, and regulators to ensure that research can be developed into viable products • Better visibility of funding opportunities at the global level was requested • The importance of face to face mechanisms was emphasized again
Formal collaboration with the Global AMR R&D Hub	<ul style="list-style-type: none"> • Formal collaboration mechanisms were viewed as important • The most useful types of collaboration would be a strategic alliance or developing networks • The key drivers for collaboration were to work on a project with the Global AMR R&D Hub or to have access to information, networks or policy and decision makers



Additional feedback for consideration by the Global AMR R&D Hub

It was highlighted that the Global AMR R&D Hub must take a truly global and One Health approach and be output orientated. To ensure that the desired impact of the work is achieved, visibility and awareness of the Global AMR R&D Hub needs to be increased. In addition, the value add or unique selling point of the Global AMR R&D Hub must be clearly identified and communicated.

Any collaboration or coordination mechanisms must not be too prescriptive or impose a burden to those involved. It is important that any efforts should complement, and not duplicate, existing priority setting efforts from governments and international agencies (WHO, FAO, OIE, UNEP).

Further consideration on how to collect and manage confidential information on AMR R&D projects and investments is needed as is how to contextualise the information presented on the Dynamic Dashboard so that there are no unintended consequences.

Next steps

The Global AMR R&D Hub will consider the responses received as part of the public consultation. The draft Collaboration Framework will be updated and published by January 2020. The appendix, supporting the Collaboration Framework, that outlines the collaboration mechanisms where the Global AMR R&D will either: advocate for; facilitate, promote or encourage others; or implement activities, will be developed and published in early 2020 following extensive consultation with key stakeholders.



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Introduction

The Global AMR R&D Hub, launched in May 2018, supports global priority setting and evidence-based decision-making on allocation of resources for AMR R&D through the identification of gaps, overlaps and potential for cross-sectoral collaboration and leverage in AMR R&D. It is a global partnership of 16 countries, the European Commission and two philanthropic foundations. The Global AMR R&D Hub is ideally placed to help drive and coordinate the improvement of global AMR R&D collaboration. In addition, to achieve its vision and objectives, the Global AMR R&D Hub will need to consult, cooperate and collaborate with different partners globally.

To help guide the Global AMR R&D Hub's collaborations, both globally and individually (formal), a draft Collaboration Framework was developed and released for public consultation. The draft Collaboration Framework had two objectives, to provide:

1. An outline on how the Global AMR R&D Hub will increase collaboration and improve coordination of AMR R&D globally, and
2. High-level guidance on formal collaboration between the Global AMR R&D Hub and relevant parties for specific projects.

The draft Collaboration Framework was released for public consultation from 2 September to 10 October 2019. The aim of the consultation was to seek suggestions and ideas on how improved coordination and collaboration of AMR R&D could be realized from a broad range of stakeholders. Views were also sought on the Global AMR R&D Hub's approach to collaboration and how this can be enhanced.

Methodology

Feedback on the draft Framework were sought via an online survey. The survey consisted of 44 questions, of which five were survey navigation questions and nine were demographic or contact information questions. Questions were a mix of multiple choice, scaled and free text options. No questions were mandatory but respondents were encouraged to provide as much feedback as possible in order to maximise the impact. Comments were also invited and received via email and verbally.

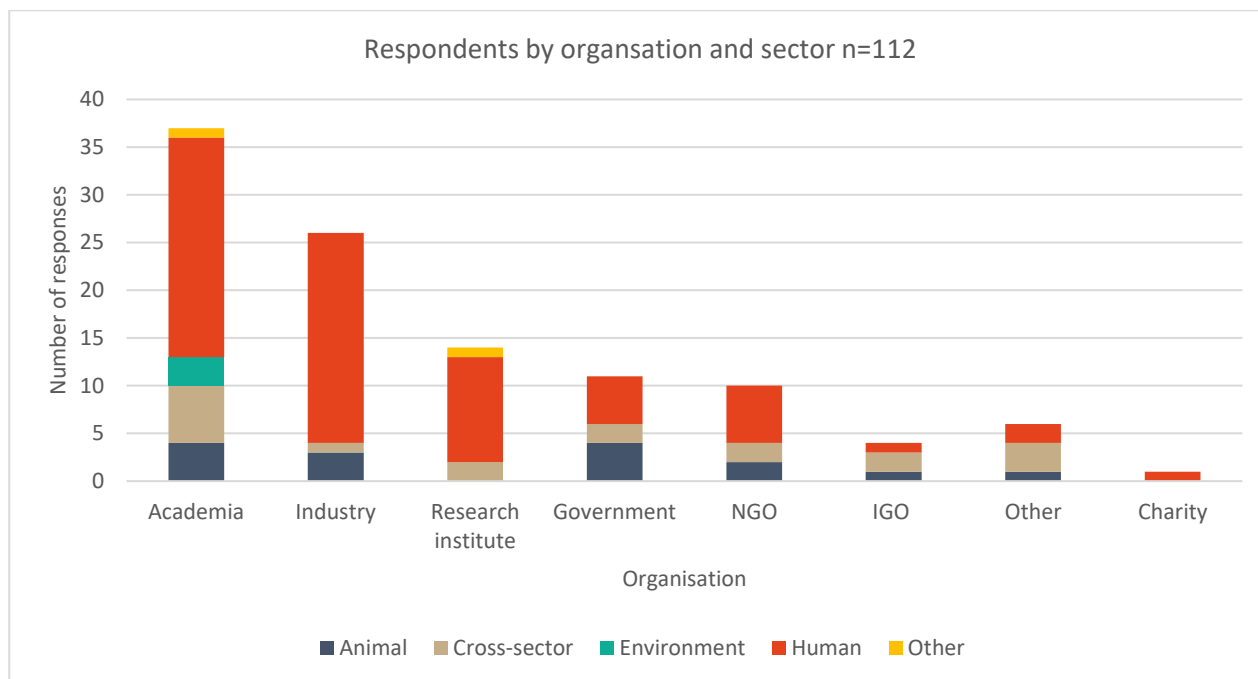
Results

A total of 124 responses were received via the survey with 14 minutes being the typical time spent completing the survey. Three responses were provided via email and five individuals provided verbal feedback. Responses were discarded if only demographic or contact information was provided or if only navigation questions were answered (n=11).

Respondents

Responses were received from 29 different countries (n=111), with the majority from Germany (16%), United States (15%), United Kingdom (12%), The Netherlands (11%), Australia (7%), Switzerland (5%), and France (5%). The top three R&D areas of work reported by respondents (n=109) were therapeutics (28%), preventives (11%) and policy (10%). Over 60% of respondents had not previously interacted with the Global AMR R&D Hub.

The majority of respondents worked in academia followed by industry, research institutes and government (Figure 1). Two thirds of respondents work in the human health sector and nearly one fifth work cross-sectorally.



NGO – non-governmental organisation, IGO – inter-governmental organisation.

Figure 1 – respondents by organisation and One Health sector

General coordination and collaboration feedback

Over 90% of respondents (73/80) agreed that greater coordination and collaboration is needed of global AMR R&D. From the written feedback received a key theme emerged that there is ongoing duplication of resources, efforts and research happening and better coordination and collaboration was needed to reduce this. Other areas highlighted in the written feedback were grouped into three key areas which were:

- Coordination of the large number of AMR organisations and initiatives
- Better sharing of research and development information and data, and
- Collaborative approaches that are needed.

A summary of the feedback for these three key areas is provided in Table 2. The feedback also provided cautions to the Global AMR R&D Hub when trying to improve global coordination and collaboration in the AMR R&D field and these included:

- Not to be too prescriptive or set rules for collaboration (light touch approach)
- Do not prevent healthy competition which can provide additional insights
- Complement and support, do not duplicate, existing priority setting efforts from governments and international agencies (WHO, FAO, OIE, UNEP)
- Any response needs to be truly global and long term with solid and permanent mechanisms for interaction
- There are not enough organizations or initiatives doing the actual work
- Awareness of the Global AMR R&D Hub needs to be increased so that it can have an impact, and
- The Global AMR R&D Hub needs to be operational, output orientated, it must act.



Table 2 – the key issues identified for global coordination and collaboration by key area

Key area	What is the issue
Organisations and initiatives	<p><u>Fragmented response and no global linkage or network</u> There are many different organisations and initiatives individually discussing, convening meetings and making recommendations for AMR R&D. This has fragmented the response and led to some competitiveness rather than synergy. There is no global linkage or network.</p>
	<p><u>The global message needs to be delivered as a single voice</u> There is a large amount of information and messages arising from the different initiatives and organisations. Sometimes this can be inconsistent and contradictory.</p>
	<p><u>Better cooperation between R&D funders</u> There is a need for better communication, cooperation and information sharing between R&D investment organisations so that these actors can leverage on synergies, learn from mistakes, and avoid duplication of efforts.</p>
Research, development and data	<p><u>No visibility of the global R&D landscape</u> There is a lack of visibility or awareness of the global R&D landscape. This includes what research is happening and where funding is going. AMR R&D is happening in silos and there are too many isolated activities happening without feeding into the broader context or creating linkages to relevant areas.</p>
	<p><u>Repeating mistakes and hidden solutions</u> Need to learn from failed R&D and this can be done through better sharing of research information and data especially when something hasn't worked and why. This information is not only important for researchers and developers but also funders so that the same questions are not repeatedly asked.</p> <p>Sharing successful or innovative solutions can help to streamline processes and aid in quicker research/program progression. Sharing of research information will also assist researchers by highlighting their contribution to curbing AMR and putting their work in a more global perspective which may lead to collaboration and synergies.</p>
	<p><u>No joint research priorities</u> There has not been consideration on what is the appropriate split of AMR R&D funding within and across One Health sectors. Such consideration should ensure the appropriate distribution of resources so no areas are neglected, there is minimal overlap and also identify opportunities for synergy and cross fertilization. The R&D focus should also be broadened to areas other than new antibiotics (such as diagnostics, alternatives (such as phages), new stewardship tools/strategies, socio-economic trends) and incorporate the priorities of the different sectors.</p>
Collaborative approach	<p><u>There is no One Health approach</u> An integrated and coordinated One Health approach is needed that provides insights on methods, approaches, priorities and targets across the sectors. Such an approach would lead to the development of applicable joint research priorities.</p>
	<p><u>Need a truly global approach</u> A coordinated global approach that aids the development of partnerships, sets priorities, standards and develops messages that are adaptable to local situations. The need to develop partnerships between developed and less developed countries and sharing of best practice was highlighted. A theme of ensuring a truly global approach emerged that did not just consider or engage developed countries.</p>
	<p><u>Broader engagement and involvement</u> Engage other areas that are not traditionally included in AMR discussions so that lessons learnt can be incorporated and also facilitate new collaborations. Areas that were suggested included traditional medicine, cancer, gastrointestinal disease or reproductive health research areas and regulatory agencies and finance departments.</p>



<p><u>Better communication between actors</u> Better communication generally between policy makers, researchers, funding agencies and relevant stakeholders but noting the challenges of different interests and priorities. All stakeholders should be heard fairly.</p> <p>Public messaging is also poorly coordinated leading to low public buy-in and low political priority.</p>

Where is coordination and collaboration needed most?

Respondents were provided with a list of different AMR R&D actor/sector combinations and asked to prioritise where improved coordination and collaboration is needed most, a summary of the results is depicted in Figure 2. The four actor/sector combinations identified as the highest priority for improved coordination and collaboration were between:

1. One Health sectors
2. Private and public sectors
3. Specific technology sectors, and
4. Funders and beneficiaries.

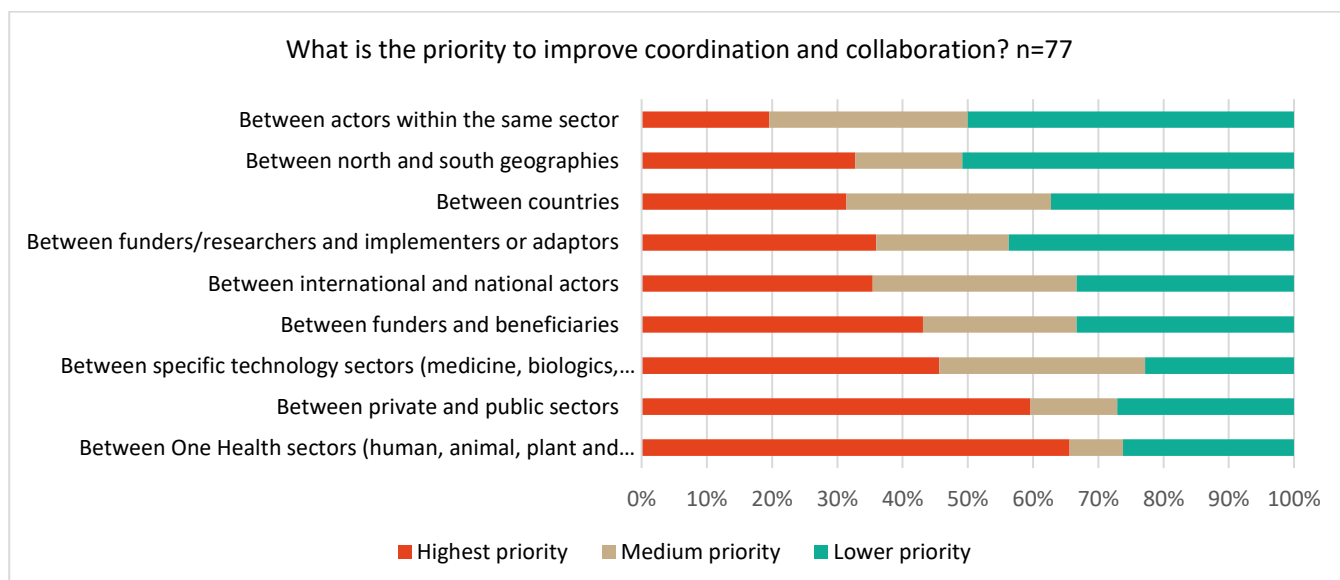


Figure 2 – Summary of the prioritization results of where improved coordination and collaboration is needed most

When the prioritization results were examined by One Health sector (when there were more than 5 responses per sector) the highest priorities were:

- For human health respondents (n=71)
 1. Between One Health sectors
 2. Between private and public sectors
 3. Between funders and beneficiaries
- For animal health respondents (n=15)
 1. Between One Health sectors
 2. Between specific technologies
 2. Between private and public sectors
 2. Between funders/researchers and implementers or adaptors
- For cross sector respondents (n=19)



1. Between One Health sectors
2. Between funders/researchers and implementers or adaptors
3. Between north and south geographies

While there was only a small number of respondents from the environmental health sector (n=3) the top priority identified was also between One Health sectors.

What are the barriers to coordination and collaboration in the identified actor/sector?

Respondents were asked to identify what the barriers are to coordination and collaboration for the top three actor/sector combinations they selected and the results from the 76 responses are depicted in Figure 3. The top four barriers identified across all actor/sector combination were different priorities, insufficient understanding of the interconnectedness of AMR, a lack of understanding of the different actors' worlds and insufficient resources.

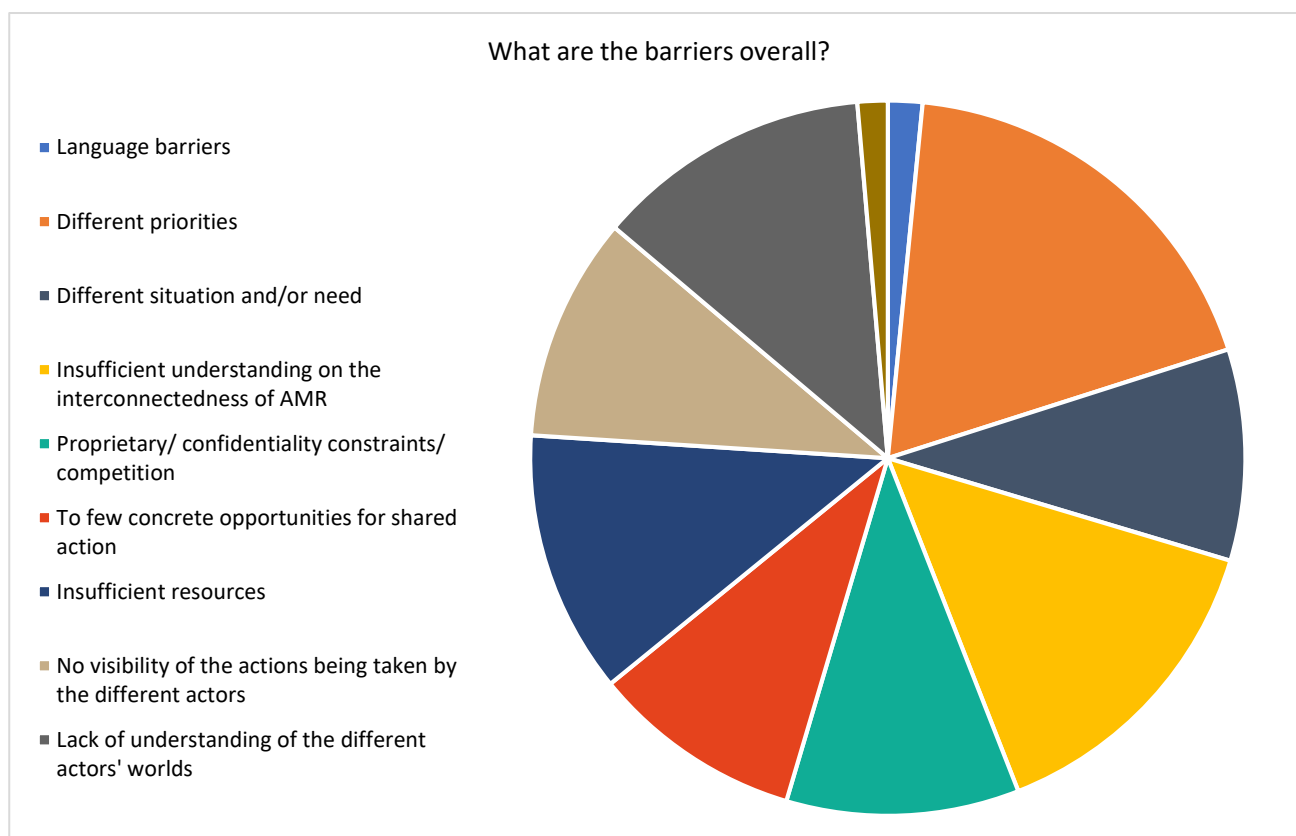


Figure 3 – what are the barriers for cooperation and collaboration between all the key actor/sector combinations

The barriers for the top four actor/sector combinations identified as the highest priority for improved coordination and collaboration and also between funders/researchers and implementers or adaptors (which was identified as a priority by animal health and cross sector respondents) are presented in Table 3.



Table 3 – the top four barriers identified for the priority actor/sector combinations

Actor/sector combination	Barrier
Between One Health sectors	<ol style="list-style-type: none"> 1. Different priorities 2. Insufficient understanding on the interconnectedness of AMR 3. Lack of understanding of the different actors’ worlds 4. Insufficient resources
Between private and public sectors	<ol style="list-style-type: none"> 1. Different priorities 2. Different situation and/or need 2. Lack of understanding of the different actors’ worlds 4. Proprietary/confidentiality constraints/competition
Between specific technology sectors	<ol style="list-style-type: none"> 1. Different priorities 2. Insufficient understanding on the interconnectedness of AMR 2. Proprietary/confidentiality constraints/competition 2. Insufficient resources
Between funders and beneficiaries	<ol style="list-style-type: none"> 1. Different priorities 2. Insufficient understanding on the interconnectedness of AMR 2. Proprietary/confidentiality constraints/competition 4. Lack of understanding of the different actors’ worlds
Between funders/researchers and implementors or adaptors	<ol style="list-style-type: none"> 1. Different priorities 2. Lack of understanding of the different actors’ worlds 3. No visibility of the actions being taken by the different actors 4. Insufficient understanding on the interconnectedness of AMR

Feedback on the areas identified in the draft Collaboration Framework

Four high-level areas where the Global AMR R&D will work towards increasing or improving collaboration and coordination were proposed in the draft Collaboration Framework. These four areas were:

1. increasing information sharing among key stakeholders
2. collecting and presenting information about past, present and planned investments
3. engaging a broad range of stakeholders to build a consensus on gaps and opportunities in AMR R&D, and
4. creating mechanisms to linkage funders, researchers and developers.

While noting that these areas may be reviewed and redefined, based on the results of the feedback received, in the final Collaboration Framework, respondents were asked to identify how important each of these high-level areas were for increasing collaboration and coordination. Over 50% (range 51-54%) of respondents who answered this question (n=97) agreed that increasing information sharing among key stakeholders, engaging a broad range of stakeholders to build consensus on gaps and opportunities and creating mechanisms to link funders, researchers and developers were extremely important. While 37% of respondents agreed that it was very important to collect and present information about past, present and planned number investments. The results are summarized in Figure 4.

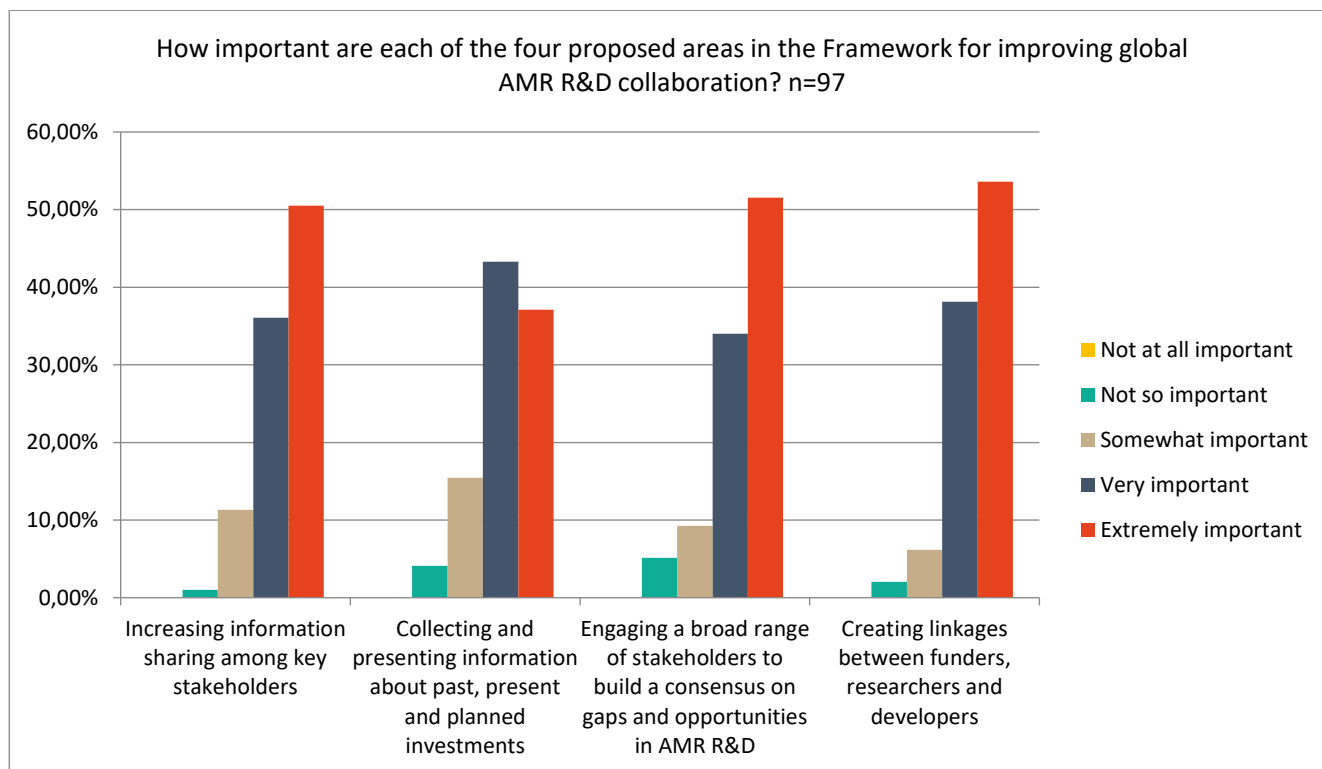


Figure 4 – the importance of the four proposed high-level areas in the draft Collaboration Framework

The most important high-level area by respondents from different organisations (that had more than 5 respondents) were:

- 53% of academics (n=36) thought that creating mechanisms to link funders, researcher and developers was extremely important (this was followed by increasing information sharing among key stakeholders at 50%)
- 58% of research institutes (n=12) also thought that creating mechanisms to link funders, researcher and developers was extremely important (followed by collecting and presenting information about past, present and planned investments at 50%)
- 68% of industry (n=22) thought that engaging a broad range of stakeholders to build a consensus on gaps and opportunities was extremely important (followed by creating mechanisms to link funders, researcher and developers at 59%)
- 50% of NGOs (n=8) also thought that engaging a broad range of stakeholders to build a consensus on gaps and opportunities was extremely important (no close second), and
- 56% of government responders (n=9) thought that both increasing information sharing among key stakeholders and engaging a broad range of stakeholders to build a consensus on gaps and opportunities were extremely important.

Increasing information sharing among key stakeholders

Ideas were sought on what were the opportunities for increasing information sharing among key stakeholders and also suggestions for successful strategies or mechanisms. The feedback is summarized in Table 4.



Table 4 – ideas and suggestion on increasing information sharing among key stakeholders

<p>Person to person /face to face mechanisms</p>	<ul style="list-style-type: none"> • Strategic meetings (between funders; on specific issues; with policy makers, researchers and funders) • Conferences • Focus groups • Targeted training program • Network meetings • Short courses • Round table discussion sessions • Side events at meetings that facilitate meeting new contacts, networking and discussions <p><i>Themes – person to person or face to face communication is extremely important for encouraging information sharing and developing collaborations. While general AMR conferences are valuable, meetings or engagement on specific topics will stimulate more sharing of ideas and collaboration</i></p>
<p>Web-based interactions/mechanisms</p>	<ul style="list-style-type: none"> • Webinars • Social media • Regular email updates • Regular newsletters • Open access journals <p><i>Theme – regular and targeted (on a specific topic) communication that is easy to access and quick to digest.</i></p>
<p>How to overcome reluctance to share</p>	<ul style="list-style-type: none"> • Identify the barriers for sharing information • Include information sharing and emphasize on the importance of collaboration in National Action Plans • Include the sharing of information in national health sector performance reviews or regional reviews • Include sharing of information on research as a requirement of grants • Funding of interdisciplinary projects <p><i>Theme – there is a need to incentivize the sharing of information to overcome current barriers</i></p>
<p>Examples of other initiatives or programs that could be expanded or used as a template</p>	<ul style="list-style-type: none"> • Expand collaboration on PPP models • JPIAMR’s Virtual Research Institute • EU-JAMRAI • ReACT’s Generating and Translating Evidence (GATE) program • CDD Vault SPARK • AMR Insights • Stop TB working groups • STAR IDAZ stakeholder groups <p><i>Theme – potential to learn from other areas or build on/promote what is already available where possible</i></p>
<p>What sort of information should be shared</p>	<ul style="list-style-type: none"> • Failures in drug development including toxicology data • Information on individual research projects • Successful strategies such as clinical trial pathways for novel approaches • Information on the work of the private sector • Research that is happening in different One Health sectors • Stewardship information and activities • Pharmacovigilance information



	<ul style="list-style-type: none"> • Best practices in implementation of One Health strategies • Research and information from non-English speaking countries • Information that would be important for responding to an emerging AMR threat such as association of mechanisms of resistance to diagnostic methods • Reference materials <p><i>Theme – there is diverse amount of information that should be shared more. The key will be the how it is shared and the who it is shared with and what benefit will there be</i></p>
Who are the key stakeholders	<ul style="list-style-type: none"> • Global AMR initiatives and organisations • The Tripartite plus • International banks • Governments • Other areas that are not traditionally included in AMR discussions • R&D push/funding initiatives • High income and low- and middle-income countries <p><i>Themes – there are a large amount of initiatives and organisations active in the AMR field and increased communication coordination of these is needed. Better communication between governments and also between governments and researchers and developers.</i></p>

Collecting and presenting information about past, present and planned investments

Examples and suggestions were sought on the utility and presentation of the Dynamic Dashboard. For the Dynamic Dashboard, respondents highlighted the importance of:

- Being able to compare information on AMR R&D projects and investments across funders, sectors and years and that to achieve this there is a need for systematic collection (such as consistent/standardized language, terminology, metatags etc), a normalization grid and a comprehensive data dictionary.
- Showing where research strengths are, where new knowledge is coming from and where the gaps are and potentially enabling stakeholders to make suggestions to inform funding decisions similar to what the European Research Council is doing for Horizon Europe
- Presenting the data in a simple and interactive way that is easily interpretable and able to inform policy decision making
- Linking to the key international organisations – WHO, OIE, FAO and UNEP
- Having the data on investments and projects as up-to-date as possible so decisions can be based on real time information
- Having the ability to identify product failures and the reasons behind this so that it can be ‘rescued’ for either use in another sector or if it failed due to financial viability issues give the product to an appropriate body to steward so that the product and the supporting information is not lost, and
- Regular communication about key analyses of the Dynamic Dashboard and multiple suggestions for summary statements or interesting results sent to a distribution list (weekly or fortnightly) via email and on the website. The importance of providing interesting and short analysis via social media was also highlighted.

It was noted that the Dynamic Dashboard is an ambitious project and the challenges in collecting such a large amount of information was highlighted. Examples were provided of tools or other successful dashboards that could be used to inform the development of the Dynamic Dashboard and these are summarized in Attachment A. Suggestions were also provided on how to streamline and improve the data collection process and these included:



- Use artificial intelligence, big data analytics, data linkage and data mining tools to extract from the large amount of information available so that trends, synergies and duplications can be identified
- Use an Open Data or registry approach
- Investigate opportunities to integrate into existing websites such as WHO, FAO and OIE
- Assess key terms like Access to Medicine index does
- Incentivizing or penalizing funders to provide timely investment data (potentially monetary or access to additional data on the Dynamic Dashboard)
- Developing relationships with funders to encourage data provision and collection and that an AMR expert could be seconded to spend time on outreach, project promotion and data submission.

Table 5 presents a summary of the responses received on what data should be included in the Dynamic Dashboard and how this information should be presented. A key theme that emerged from the responses was that project level information and investigator information should to be provided on the Dynamic Dashboard and that this information should be used to inform other analyses.

Table 5 – summary of responses about what data should be included and how it should be presented in the Dynamic Dashboard

What data should be included	What should the dynamic dashboard show
<ul style="list-style-type: none"> • Private sector information – noting the challenges in obtaining this. • Not just new antimicrobials, there is a need for research to understand resistance (development and transmission), better stewardship, infection prevention and control, complementary and traditional medicine, improving efficiency of existing generic antibiotics, and policies that encourage the continued production of generic antibiotics. • Information on the different active funders. • Failure/exit/termination statistics. • Must be truly One Health and comparable across sectors. • Must have access to the project level information so researchers can perform additional analysis or the data can be used for multiple purposes such as WHO work. • Link funding to political economy • Contacts of principal investigators so that potential collaborations or synergies can be made. • Consistent reporting of funds (allocated, obligated, awarded, spent). Need to be able to compare and show what the funding reality is not just what is aspirational. • Institutional investments – noting the challenges in obtaining this. 	<ul style="list-style-type: none"> • Interactive platform (easy to use) and visualization that enables users to manipulate the data and with search functions, dedicated filters and drop-down menus. • Projects/investments across the value chain (in a consequent manner). • Contact data of researchers. • Project level information, details of principal investigators, outcome of project, links to more project information. • By pathogen, geography, type of science, sector, topic, funder, principal investigator, target, mode of action, modality and product development stage (all searchable). • Pharmaceutical pipeline, diagnostics pipeline and Software Analytics pipeline. • What collaborations are happening and partners involved. • Able to export information into PDF or Excel file formats and into statistical software programs.



A number of challenges in collecting information for the Dynamic Dashboard were raised and these considerations included:

- How to collect data that could be proprietary?
- How will any intellectual property issues be managed?
- How will confidential information be managed?
- How will the information be used to incentivize change?
- How will the investment data be contextualised? Without context or comparison to other therapy areas, investment in this area could look high, potentially negating the urgency for much-needed additional investment.

Engaging a broad range of stakeholders to build a consensus on gaps and opportunities in AMR R&D

A list of different engagement mechanisms were provided in the survey, and respondents asked to identify which ones would be the best way to engage stakeholders to help identify AMR R&D gaps and opportunities. Nearly 80% of respondents identified workshops as the best approach. The results are summarized in Figure 5. Throughout the survey responses, there was an emphasis on engaging via face-to-face mechanisms, especially on specific thematic areas with interdisciplinary participation (such as focus groups, working groups), and that web-based engagement should complement this and not be the priority. To enable focused and efficient discussions, background and preliminary work should be completed and circulated before any meetings. Where possible, such meetings should be attached to international conferences and outcomes, and most importantly decisions, should be made available (either publicly or to relevant entities) so that they can be actioned. Examples of successful engagement included: Innovative Medicines Initiative (IMI), PDP Funders Group, STAR-IDAZ, Coalition for Epidemic Preparedness Innovations (CEPI), the Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria (US), and how consultations are done for proposed regulations (call for comments and producing a preamble that summarises comments and responses).

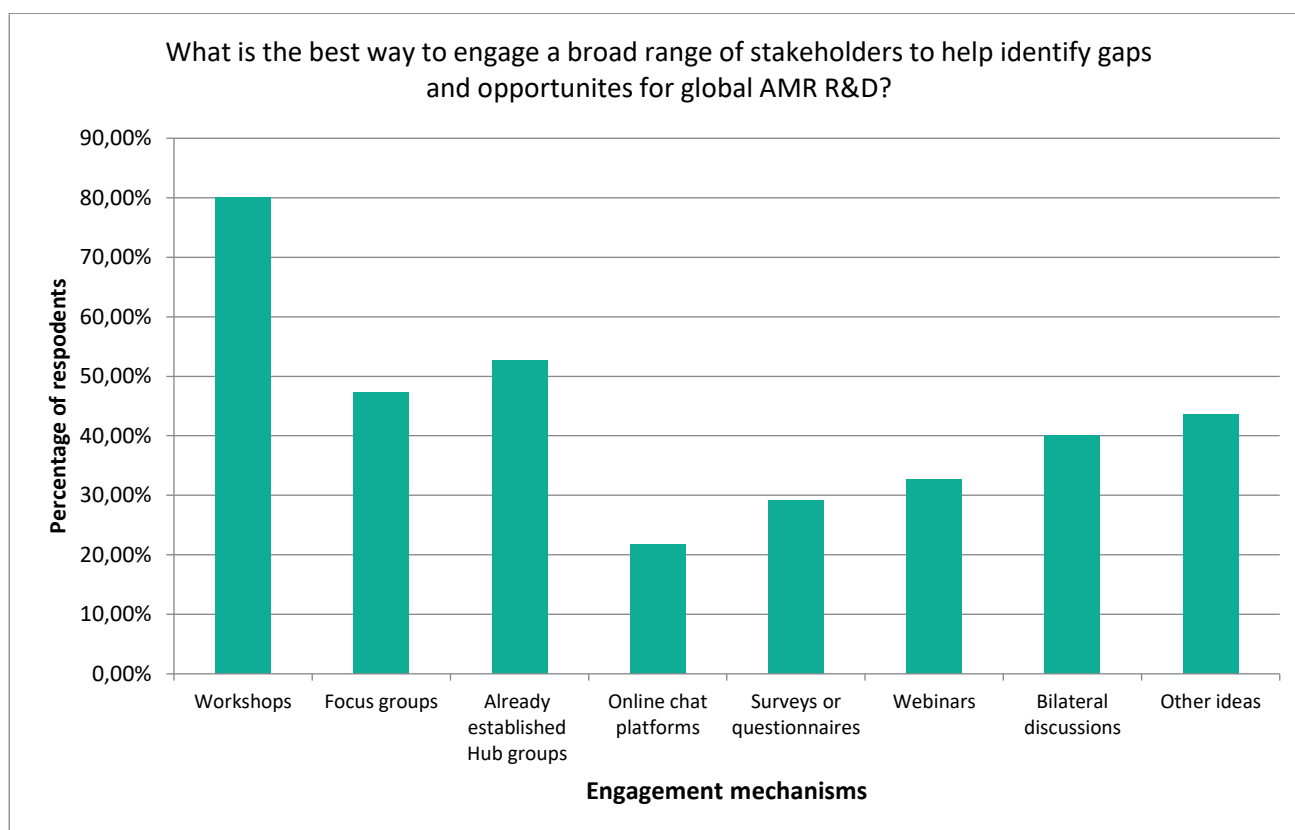


Figure 5 - Mechanisms for engaging a broad range of stakeholders

What stakeholders should be engaged to help identify gaps and opportunities?

Industry

There needs to be greater engagement with industry (private sector), but this must be handled appropriately and transparently to ensure bias is minimized. This should be all relevant industry sectors, not just limited to pharma and large multinational companies.

Funders

A number of respondents highlighted the value of discussions and alignment of the priorities of the different funders and governments. This would provide clearer direction to the researchers on what is most needed.

Low- and middle-income countries (LMICs)

Respondents were specifically asked to identify the best way to engage LMICs to ensure that any R&D priorities respond to their needs, barriers and opportunities for innovation. Sixty-nine percent of respondents suggested that an advisory group with members from LMIC's should be established (Table 6). It was noted that both high level representatives and on the ground staff from LMICs should be engaged. It was also highlighted that the challenges differ greatly between countries, so thematic or multiple regional representatives would be needed.



Table 6 – suggested mechanisms to engage LMICs

Mechanisms to engage LMICs	Percentage of respondents (n=54)
Include additional LMICs on the Board of Members	57%
Establish an advisory group with members from LMICs	69%
Engage with an already established mechanism to seek views of LMICs	39%
Other	13%

Respondents were able to select more than one answer so the percentages will not add up to 100%.

Already established mechanisms that were identified included: the Royal Society for Tropical Medicine and Hygiene, BRICS TB Research Network, DZIF African Partner Sites, the KIC H2020 program (for relevant R&D actors), AMR Insight Ambassadors Network, ReACT and South Centre. Organising meetings alongside other high-level international meetings, such as WHO Executive Board or the World Health Assembly, would be a good opportunity to engage.

Other suggested ways to engage with LMIC were:

- supporting LMICs to develop costed AMR national action plans, establish national AMR committees (if possible with legislative powers), engage a national AMR coordinator, and to express and clarify their needs and barriers
- supporting capacity building in LMICs either directly or including it as a requirement for project funding
- conducting specific market research, and
- broadening the focus of engagement to also include affordability and access.

One Health sectors

Respondents were specifically asked to identify the best way to involve all One Health sectors in the identification and prioritization of AMR R&D gaps and opportunities. Between 45-55% of respondents (n=53) thought that the best way to engage One Health Sectors was to expand the membership of the Global AMR R&D Hub's Stakeholder Group (55%), liaise with relevant UN agencies (51%), expand the membership of the Global AMR R&D Hub's Board of Members (47%) and/or establish an advisory group (45%).

A number of respondents suggested that the stakeholders should be first mapped to identify who should be engaged and for what area. This mapping would then inform identify the best engagement mechanism. In addition, there were suggestions to engage more outwardly with other organisations not typically associated with AMR discussions such as Wall Mart and Amazon.

Concerns raised about the engaging a broad range of stakeholders section

Some respondents expressed concern that any work undertaken from the Global AMR R&D Hub in this area should not duplicate work already underway and that the UN agencies must be driving the work around any priority setting.

Creating mechanisms to link funders, researchers and developers

Creating mechanisms to link funders, researchers and developers was identified as the most important area for improving global AMR R&D collaboration and cooperation (Figure 4). When asked, 83% of the respondents (40/48) agreed that the Global AMR R&D Hub should be the one to work towards creating



these linkages. Other initiatives or organizations that were identified as better placed to do this were JPIAMR, CARB-X and GARDP.

Once again there was feedback to engage more broadly than the usual AMR experts and organisations such as researchers for non-communicable diseases. Noting that if discussions continue to occur with audiences who generally agree with the issues it will not advance the agenda, there is a need to involve, enlighten and create pressure on other audiences.

A number of respondents highlighted the need to link researchers conducting pure, fundamental or basic research with developers, clinicians and regulators to ensure that research is applicable and transferable into product development. The need for better visibility of funding opportunities, preferably globally and in one place such as the Dynamic Dashboard, was suggested. Another theme that emerged was that the Dynamic Dashboard should be used as the backbone/evidence base and this will lead to better linkages and collaborations between funders, researchers and developers.

How could funders, researchers and developers be linked?

Person to person communication was considered to be very important in creating any linkages and collaboration by 80% of the respondents (41/50). Specific suggestions on mechanisms to create linkages between funders, researchers and developers were:

- regional and thematically focuses workshops and groups
- match making side events at conferences
- conference that enables interaction with researchers, developers and funders with policy people and government representatives
- creating a global H2020 funding programme
- table top exercises or blind laboratory tests
- creating an expert board or group that includes multiple areas involved in AMR across the One Health sectors such as academics, research centers, professional organisations and industry
- webinars on specific topics
- social media tools.

Examples of successful strategies to create linkages that could be adapted or promoted included:

- PDP Funders Group
- CARB-X type model but broader
- IMI
- PPP models
- University systems to link researchers and industry such as Cambridge University
- Global Healthcare Innovation Alliance Accelerator's (GHIAA) MAP Guide
- OIE PVS pathway
- JPIAMR Virtual Research Institute
- The eNOTICE project (EU) where the organisation of Joint Activities trigger a mechanism by which a CBRN training center hosts a training activity itself but is allowed to open the event to other participants such as other responders, industry, researchers and developers which creates an unique opportunity to engage.

Concerns raised about the creating mechanisms to link funders, researchers and developers section

Respondents queried what the unique selling point of the Global AMR R&D Hub is so that it would be instrumental in creating additional links. It was also noted that the gap between researchers and developers is large, so need to be clear on what will be achieved in linking these together.



Formal collaboration with the Global AMR R&D Hub

The level of importance of formal collaboration agreements with the Global AMR R&D Hub varied across the 45 respondents to this section. Twenty-four percent thought that it would be extremely important, 36% very important, and 29% thought it would be somewhat important. The remaining 11% thought that formal collaboration would be either not very important or not important at all.

Figure 6 depicts what type of collaboration that respondents thought would be most useful to them. The top responses were for strategic alliance and networking. The different types of collaboration were defined as:

- Partnership - a time limited agreement where parties share resources (finances, knowledge, people) to complete a specific project.
- Strategic alliance - is an agreement between parties over a sustained period of time to progress a set of agreed objectives and would constitute a strategically important relationship for both parties.
- Network - are largely autonomous agreements between different parties that want to collaborate at a high level to achieve common or compatible goals.

One respondent noted that formal collaboration would only be important if confidential information was shared and another noted that a lot of the work of the Global AMR R&D Hub can be done through informal collaborations.

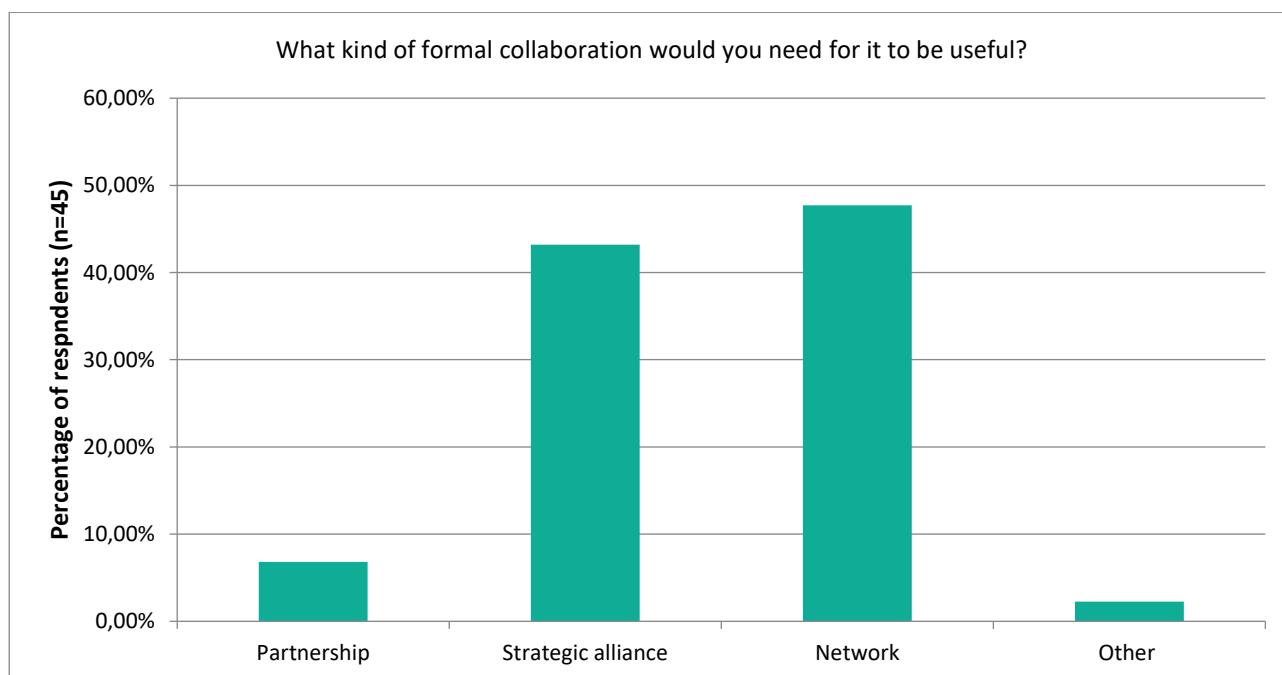


Figure 6 – what would be the most useful type of formal collaboration with the Global AMR R&D Hub

The major key drivers (options with over 60% selected) identified by respondents for collaborating with the Global AMR R&D Hub were to:

- work on a project in partnership with the Global AMR R&D Hub (65%);
- have access to policy and decisions makers (65%)
- have access to information (63%) and networks (61%)



Other feedback received emphasized the importance of flexibility and not making the process too bureaucratic.

Next steps

The Global AMR R&D Hub will consider the anonymized and aggregated feedback from the public consultation. It will not be feasible or desirable for the Global AMR R&D Hub to implement all suggested activities received through the consultation so careful consideration is required on what the role of the Hub can be. This will include identifying where the Global AMR R&D Hub can:

- Advocate for improvement in identified areas or for the creation of activities or mechanism
- Facilitate, promote or encourage others already conducting work or activities that will be able to fulfill identified gaps, or
- Implement activities or mechanisms itself.

The final Collaboration Framework will be published, by January 2020, that incorporates the feedback received. The supporting appendix to this framework, that outlines the collaboration mechanisms identified as needed will be will be developed in consultation with key stakeholders and published in early 2020.



Additional information to assist in data collection for the Dynamic Dashboard

Suggestions and ideas for tools that have been used previously or other initiatives or databases that have successfully used dashboards to communicate information included:

- [Clarivate competitive intelligence](#)
- [International cancer research portfolio](#) (ICRP) that collects and presents to a common typology.
- [CORDIS](#)
- [Research Investments in Global Health](#) at University of Southampton
- [PEW](#)
- [Stanford HIV database](#)
- [Agency for Healthcare Research and Quality](#) (AHRQ) – U.S. Department of Health & Human Services
- [International Commission on Radiological Protection](#) (ICRP)
- [G-FINDER](#)
- [National Institutes of Health](#) (NIH) – U.S Department of Health & Human Services
- [National Science Foundation](#) (NSF)
- [European Food Safety Authority](#) (EFSA)
- [ComBase](#) – A web resources for quantitative and predictive food microbiology
- The [Institute for Health Metrics and Evaluation](#) (IHME)
- [Nature Drug Discovery](#)
- [Journal of Antimicrobial Chemotherapy – Antimicrobial Resistance](#)
- [Joint Programming Initiative of Antimicrobial Resistance](#) (JPIAMR) dashboard
- [Shared Platform for Antibiotic Research and Knowledge](#) (SPARK) database
- WHO [pipeline analysis](#) / [Global Observatory on Health R&D](#)
- [Bill & Melinda Gates Foundation](#)
- [Trialect](#) – streamlining time-sensitive opportunities for health professionals
- Public health surveillance systems or other systems that are using Open Data to strengthen their activities.
 - The United States is the Center for Disease Control and Prevention’s [Behavioral Risk Factor Surveillance System](#) (BRFSS)
 - The [Canadian Notifiable Disease Surveillance System](#) (CNDSS) and its interactive website
 - PHAC’s National Microbiology Laboratory (NML) runs [PulseNet Canada](#) (PNC)
 - Canada’s National Centre for Biotechnology Information’s GenBank online database
 - [DANMAP](#) – Danish Programme for surveillance of antimicrobial consultation and resistance in bacteria from food animals, food and humans
- Public Health Agency of Canada’s (PHAC) [Public Health InfoBase](#)