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Call to Action on Antimicrobial Resistance

Post-Event Report
12 and 13 October 2017

In partnership with the

IACG | Interagency Coordination Group on
Antimicrobial Resistance

Acknowledgements

Thank you to the contributors to this report: Samantha Chivers, Lori Sloate, Helena Wilcox, Minnie Rinvulcri, Yasmin Winslade, Peter Williams, George Phillips, Lucy Turner, Louise Norton-Smith and Ruth Atkinson.

This report is a record of discussions at the Call to Action event and does not reflect the views of the co-hosts.

Background

This global 'Call to Action' was organised by the Wellcome Trust, the UN Foundation, and the UK, Ghanaian and Thai governments, to accelerate action on tackling antimicrobial resistance (AMR). It brought together government ministers, policymakers, researchers, those working on the frontline, and leaders from industry, philanthropy and civil society to focus on the most critical gaps in tackling the development and spread of drug-resistant infections, and to commit to concerted and tangible actions.

The event was organised in partnership with the UN's ad hoc Inter-Agency Coordination Group on Antimicrobial Resistance (IACG), established earlier in 2017. The outputs of the event will be shared with the IACG to inform their report to the UN Secretary General during the 73rd UN General Assembly (UNGA) in 2019.

Day 1: Welcome address

Speakers:

Tedros Adhanom Ghebreyesus

WHO Director-General (by video)

Michelle Gyles-McDonnough

Director of the UN Sustainable Development Unit speaking on behalf of the UN Deputy Secretary-General

Jim O'Neill

Former Chair of the Review on Antimicrobial Resistance

Key messages

- AMR is now a recognised issue at the highest political levels. This is shown by the political declaration of the high-level meeting on AMR at the September 2016 UNGA and by renewed commitments to address AMR in the G20 Health Ministers' meeting and the G20 Leaders' Declaration in May and July 2017 respectively.
- Political rhetoric has not consistently translated into action. Jim O'Neill highlighted that significant progress appears to have been made in only a third of the areas his 2016 review highlighted as priorities.
- AMR poses a threat to us all in today's interconnected world, and is deeply tied up with the achievement of the Sustainable Development Goals (SDGs), universal health coverage and health security.
- The Call to Action on AMR builds momentum towards concrete and tangible actions by acting as the first step to an effective and coordinated response that transcends borders.
- The community present at the Call to Action on AMR and beyond must support and input into the work of the IACG to achieve these goals.

IACG 101

This session provided an opportunity for members of the IACG to engage with the wider AMR community, set out their work plan, present their preliminary AMR activity mapping, and receive input from key stakeholders on priorities for the IACG.

Speakers:

Sally Davies

Chief Medical Officer for England
and IACG Co-Convenor

Michelle Gyles-McDonnough

Director of the UN Sustainable Development
Unit speaking on behalf of the UN Deputy
Secretary-General

Hajime Inoue

Special Representative for Antimicrobial
Resistance in the Office of the WHO
Director-General

Matthew Stone

Deputy Director General, World Organisation
for Animal Health (OIE).

IACG activities

- The IACG's goals are to reduce fragmentation and improve coordination across sectors and agencies, and to provide comprehensive recommendations for collective actions as well as advocating for political will and financial resources to address AMR.
- The IACG has established six subgroups, covering: communication and behaviour change; National Action Plans; reducing need for antimicrobials, optimising use and reducing environmental contamination; R&D, innovation and access; aligning with SDGs, global governance and the role of the UN; and surveillance of antimicrobial use and resistance.
- The IACG will continue engaging proactively, transparently and inclusively with stakeholders and Member States. At each of its meetings, the IACG will hold open consultations to engage different stakeholder groups, and in June 2018 plans to hold a consultation with Member States.

Panellists:

Enis Baris

World Bank Otto Cars, ReAct Group

Martha Gyansa-Lutterodt

Chief Pharmacist, Ministry of Health,
Ghana, and IACG Co-Convenor

Lelio Marmora

UNITAID

IACG framework for action

- A forward-looking Framework for Action has been developed that situates AMR in the wider context of the SDGs, helping to align political agendas and provide shared language and a dynamic framework for all sectors to work from.
- The Framework establishes three broad approaches to tackling AMR: reducing the need for antimicrobials through infection control and an uncontaminated environment; optimising the use of medicines; and investing in innovation, supply and access. It then divides these three approaches into 14 areas for action, which are to varying degrees either 'specific' to AMR (i.e. delivering benefits primarily in relation to AMR), such as environmental contamination, basic research or development of new therapeutics, or 'sensitive' (i.e. having broader benefits beyond AMR), such as clean water and sanitation, access to all therapeutics and food safety.
- Delegates were invited to signal the current gaps in action on the Framework, and which sectors should be leading on these areas. The results are captured in the box opposite.

Mapping exercise




















- The IACG has started a mapping exercise that plots AMR-related initiatives at 11 UN agencies against the Global Action Plan's five priorities on AMR and the 17 SDGs. Following publication of the IACG Framework for Action, the mapping template will be adjusted to align with the Framework. The IACG is currently considering whether and how to expand its mapping to encompass the activities of other stakeholders.

Key messages

- The IACG needs to work closely with the wider community of government and non-government stakeholders, as its impact and legacy must extend beyond the end of its mandate in September 2019. An effective global governance mechanism must be put in place by that time to continue the work of the IACG.
- Effective governance requires sustained high-level political commitment, underpinned by ongoing demands from patient communities and the general public for action by political leaders.
- The development and spread of drug-resistant infections cannot be entirely eradicated, but to slow this process and mitigate its impact will require well-functioning and integrated systems in health, sanitation, agriculture, research and development, regulation, and governance.
- Strategies to mitigate AMR do not equally apply in different resource settings and therefore guidance should be context-specific – the way to do this is to draw voices from the Global South and those at the frontlines of AMR into high-level discussions.

● International organizations
 ● Private sector
● Governments
 ● Civil society

Levers

Content areas ¹		 Awareness & capacity building	 Measurement/ surveillance	 Funding & financial incentives	 Policy & Regulation	 Championing & piloting
Reduce need and unintentional exposure	 Human infection prevention and control	1 1 3 12	3 2 1	1 2 1	5 1	2 1 1 1
	 Clean water and sanitation	1 1 1 3	1 2 1	7 1 3	1 2 3	2 1 1 1
	 Animal infection prevention and control	5 1 4 3	1 4 2	2 2	2 3 1	1 3 1
	 Food safety	2 2 1 3	1 3 2		2 4 1	
	 Environmental contamination	2 2 2 7	7 6 1	1 5 1 1	1 10 1 2	2 2 6
Optimize use of medicines	 Human use	9	1 3 1 1		10 1	1 1 1
	 Animal & agricultural use	3 1 1 13	4 10 2 1	1 2	5 10 1	8 1 2
	 Laboratory capacity & surveillance		2 3 1	3 1		1
Invest in innovation, supply and access	 Basic research	1 1	1 1	3 9 13	1	1 1
	 Development of new therapeutics	1	1 1	1 12 11	6 2	2 1 1 1
	 Access to all therapeutics	2 1 1 2	1	4 1 8 1	2	3 1 3 1
	 Diagnostics development and access	1 2 4	3	3 5 12 1	7	5 2
	 Vaccine development and access	1 3	1 1	2 2 12 1	3 2	2 1 2
	 Quality	1 1 2 2	1 1 3 2	1 3	1 3	1 2
Enablers	National action plans, System Strengthening ² and alignment with SDGs (including logistics for access)					
	Global roadmap, governance & coordination (including evidence base)					
	Coalition building and political commitment (including data transparency)					

¹ Content areas are not classified by order of importance

² Covers strengthening human, agricultural, food and environmental systems

Supported by the Interagency Coordination Group on Antimicrobial Resistance (IACG) ¹

IACG framework for action gap analysis exercise

Delegates used coloured stickers to indicate the five most important priorities/gaps on the IACG Framework for Action and the type of organisation best placed to close that gap. In the table below, the coloured circles represent where delegates put these stickers.

Attendees suggested that:

- Civil society should focus on awareness and capacity building to reduce need and optimise use of antimicrobials in humans, animals and the environment.

- International organisations are important in most areas but only recommended as leads in funding clean water and sanitation, suggesting a potential role as coordinators and enablers.
- The private sector should take a lead in funding innovation and in championing and piloting action against environmental contamination.
- Governments are expected to push policy and regulation, especially on human use, environment contamination and animal/ agricultural use, as well as research and development, and to a lesser extent lead on measurement and surveillance.

Side sessions

Ministerial and Chief Executive Officer Roundtable

The Call to Action included a Ministerial and CEO roundtable, which was attended by eight representatives of government (including ministers from the UK, Ghana and Qatar) and 21 directors of international bodies and CEOs of organisations across the One Health agenda working to tackle AMR. The discussion focused on access, equity and the synergy between AMR and the SDGs. A co-hosts' summary is available [here](#).

Evening reception

Attendees joined an evening reception at the British Embassy on the first day. Speeches highlighted the strength of international political support for the Call to Action and for tackling AMR more generally. Speakers: Nick Leake, Deputy Head of Mission to Germany; Minister Alistair Burt, Minister of State for the Department for International Development and Minister of State for the Foreign and Commonwealth Office; Vytenis Andriukaitis, European Commissioner for Health and Food Safety; Minister Kwaku Agyeman-Manu, Ghana's Minister of Health.

Civil Society pop-up sessions

Invited civil society organisations (CARB-X/ GARDP, Consumers Union and Brooke) hosted interactive 'pop-up' discussions about their work during the course of the afternoon.



Day 2: Keynote address

Speakers:

Sally Davies

Chief Medical Officer for England

Lucica Ditiu

Executive Director of the Stop TB Partnership

Jeremy Farrar

Director of the Wellcome Trust

Key messages

- The IACG has a clear a mandate to lead global action against AMR over the next 18 months; it should be given strong support in order to achieve this effectively.
- The IACG must operate a big-tent mentality and not exclude any disease-specific communities, such as tuberculosis, malaria and HIV.
- Innovation can extend far wider than research and development, and AMR could benefit from lateral thinking in many other areas, such as communication and behaviour change.
- By acting inclusively and reaching out to people directly impacted by AMR, the IACG can and should build an effective advocacy community stretching across sectors. As with many major health issues, while we may think globally, we must act locally – i.e. international recommendations need to be context-specific.

Environmental contribution

The contamination of the environment with antimicrobial agents – whether from agricultural usage, manufacturing pollution or other sources – is a cause of growing concern. However, our understanding of the contribution that this pollution makes to the development and transmission of drug-resistant infections remains comparatively limited, with significant gaps in the evidence base. This session aimed to set out what we do know, what we can learn from actions already taken (particularly by the pharmaceutical industry) and how we can best focus future action in order to make the most impact.

Speakers:

Joakim Larsson

University of Gothenburg

Ed Topp

Agriculture and Agri-Food Canada

Nina Renshaw

European Public Health Alliance

Panellists:

Denise Cardo

Centers for Disease Control and Prevention

Rai Kookana

Commonwealth Science and Industrial
Research Organisation

Ramanan Laxminarayan

Center for Disease Dynamics,
Economics and Policy

Ana Maria de Roda Husman

Dutch National Institute for
Public Health and the Environment

Harish Verma

Cipla

Key messages

What needs to be done?

- While it is recognised that antimicrobials in the environment drive drug resistance, we need further research for a deeper understanding. Industrial pollution (from the manufacturing of antimicrobial active pharmaceutical ingredients), livestock faecal matter and hospital discharge are the major emission sources.
- It was proposed that action to address waste water effluent from the manufacturing of antibiotics should be prioritised. In some areas in close proximity to manufacturing sites, the concentration of active antibiotic agents has been found to be in the mg/L range – a higher concentration than might be found in the blood of a patient being treated with the antibiotic in question. Concentrations in treated sewage effluents, whilst possibly significant, are generally found to be in the ng/L range – concentrations approximately one million times lower than some identified instances of manufacturing pollution.
- Regulation and pressure (from civil society advocacy or consumer power) could provide incentives to encourage positive action and correct the current circumstances that often incentivise irresponsible behaviour, e.g. dumping waste. There is a need to identify and enforce safe discharge limits, to improve knowledge of complex global pharmaceutical supply chains (and monitor the behaviour of suppliers along these), to discourage excessive antimicrobial use in agriculture, to place regulations on the use of faecal matter as agricultural fertilisers, and to establish systems which reward responsible industry practice.

Barriers and opportunities to progress

- It will always be challenging to pinpoint the exact extent to which environmental contamination contributes to the transmission of AMR, since transmission is driven through many pathways. We should identify the most significant gaps in our understanding and how these can be addressed by researchers and others. In addition, work is needed to set out the practical challenges of monitoring environmental pollution across different resource settings and assessing this risk in the bigger picture of AMR.
- Three issues challenge industry's ability to act: variable influence along the length of often complex supply chains; limited understanding of waste management in some companies; and lack of agreement on the right indicators and levels for antibiotic concentrations in effluent – although the AMR Industry Alliance is developing a methodology to determine safe concentrations of antibiotic in effluent.
- Some progress has been made, but more must be done. Generic manufacturers are under-represented in the AMR Industry Alliance, which includes only one of the top ten generic manufacturers by volume.
- We need to better understand the ways in which food producers and pharmaceutical manufacturers are currently disincentivised from acting and look at how this can be reversed.
- Consumers and investors should start applying pressure on industry, and governments must implement and coordinate regulation and transparency globally. Best-practice models which have been developed for high-income countries need to be adapted to low- and middle-income country (LMIC) settings. What are the high-impact interventions that could be taken in the short to medium term?

Innovations in the multi-sectoral response to AMR

Speaker:

Sally Davies,
Chief Medical Officer of England

Panellists:

Abigail Herron
Aviva Investors

Tim Jinks
Wellcome Trust

David Ripin
Clinton Health Access Initiative

Kathy Talkington
Pew Charitable Trusts

Nana Taona Kuo
UN

Interactive Café Sessions:

Creating Innovative Partnerships, Financially Sustainable Innovation in Food Production, Social Innovations, Innovation in Access

Key messages

- Innovative partnerships are needed to tackle multi-sectoral issues like AMR. With the problem spread across sectors and areas of responsibility, there is a need for independent organisations to step into the void, create common purpose and mobilise resources to underpin these partnerships.
- Currently, the lack of shared vocabulary hinders partnerships and cohesive global action.
- Partnerships delivering funding, like CARB-X or the Innovative Medicines Initiative, can pool resources and expertise across regions and sectors.
- Coalitions of international agencies can coordinate action across sectors and amplify advocacy efforts.
- Product innovation can generate new treatments for infectious diseases and improved diagnostic technologies to guide more appropriate use and better resistance monitoring.
- Innovation in livestock management, wastewater treatment and behavioural interventions to reduce use can minimise the drivers of resistance.
- Accountability of resources and commitments is important to ensure follow-through on public pledges is important to ensure delivery.
- New investment practices can reward those organisations which are driving progress against AMR whilst discouraging irresponsible activities.

Actions

Organisations represented at the conference committed to a number of actions:

- **Aviva** will work with investors to raise awareness of the business risks from AMR.
- **The Yusuf and Farida Hamied Foundation-Academy of Medical Sciences** have developed a UK/India Exchange Programme on AMR. This scheme will support 25 visiting professorships between India and the UK to strengthen links between the two countries, share knowledge, foster research collaborations and increase awareness.
- **Becton Dickinson/London School of Hygiene and Tropical Medicine** will develop a new AMR training curriculum to improve diagnostic stewardship through education and capacity building.
- **Becton Dickinson and partners** will launch a new communications and coalition-building campaign – ‘*Resistance Fighters*’ – to raise awareness of the threat of AMR and mobilise clinician, laboratorians and patients to take personal responsibility for combatting AMR.

Measuring success

Speakers:

Jayasree Iyer

Access to Medicines Foundation

Marc Mendelson

University of Cape Town

Chris Murray

Institute of Health Metrics and Evaluation (IHME)

Panellists:

Enis Baris

World Bank

Helen Boucher

Infectious Diseases Society of America

Helen Hamilton

WaterAid

Ulf Magnusson

Swedish University of Agriculture Sciences;

Stefan Swartling Peterson

UNICEF

Danie du Plessis

GlaxoSmithKline

Interactive Café Sessions:

AMR Sensitive and AMR Specific Indicators,
Conventional Indicators in AMR – Where Are We
Now and How far Can They Take Us?, Boldly
Going Where No [Wo]man has Gone Before
– Mining for Hidden Indicators, How Do We Use
Indicators Creatively?

Key messages

Current and forthcoming measurement initiatives

- Measures of success must be articulated in a way that is understandable by all, and not just specialists.
- We do not yet have the ability to comprehensively assess the success or otherwise of initiatives against AMR.
- Sector-specific indexes can drive action by highlighting leadership and good practice and challenging organisations to take action. The Access to Medicine Foundation's forthcoming AMR Benchmark aims to do just that in the pharmaceutical sector.
- The OIE, FAO and WHO have recently compiled a large and complex set of conventional indicators aligned to the Global Action Plan, but we need to translate this to a simpler, minimum set of indicators (looking for overlaps with the SDGs) that can be used to communicate with non-specialists.
- The role of AMR within disease burden generally needs to be better understood, which is why the IHME will start embedding the quantification of AMR presence, morbidity, and mortality in their annual Global Burden of Disease study.

AMR and the SDGs

- AMR cuts across all SDGs, but most directly impacts the ‘no poverty’, ‘zero hunger’, ‘good health and well-being’, ‘clean water and sanitation’, and ‘responsible consumption and production’ goals. Activities to tackle AMR should be embedded within SDG-oriented activities and linked to relevant indicators. An integrated approach to tackling these issues will avoid competition for resources between uncoordinated programmes.
- We know that one in three people do not have access to adequate sanitation and 40% of health facilities in LMICs do not have access to adequate water supplies. The World Bank puts a lot of investment into water, sanitation and agricultural systems. It was suggested that the IACG could work with the Bank and the private sector to incorporate AMR provisions into development finance.
- There is also a need to work with the private sector and governments on delinking commercial returns from antibiotic volume sales. Without this change we cannot create responsible consumption and production patterns. Early-stage research funding and new business models are necessary to spur reinvestment in antibiotic development and re-establish a community of expertise and a pipeline of products.

Actions

Organisations represented at the conference committed to a number of actions:

- **Open Data Institute** will develop a common platform to share retrospective data from private pharmaceutical companies.
- **Institute of Health Metrics Evaluation** will incorporate AMR data into the Global Burden of Disease.
- **South Centre** will fund civil society organisations in G77 countries to promote AMR and support national action to address AMR.
- **UNICEF** will collaborate with Wellcome Trust to improve access to generic antibiotics in LMICs and undertake implementation research to understand the barriers to access.

Building momentum: Moving forwards together

Panellists:

Kate Dodson

UN Foundation

Keiji Fukuda

Hong Kong University School of Public Health

Martha Gyansa-Lutterodt

Ministry of Health, Ghana,
and IACG Co-Convenor

Paul Stoffels

Johnson & Johnson

Key messages

Solutions can be produced if barriers are removed

- This Call to Action on AMR brought together a community of people who are able to tackle the problem. The value of the event's format in being a catalyst for continued action was recognised.
- The ability to develop solutions already exists in the private sector, but the right incentives need to be put in place to galvanise and align efforts. Product development can be accelerated and cheapened if regulatory pathways can be simplified, clinical trial platforms established, and breakthrough therapy designations used effectively.

Effective community building can create momentum for better governance

- Outside of the private sector, we need to communicate the relevance of this issue more effectively and saliently to people who are at risk or affected by AMR. By building a community committed to tackling AMR, instilled with a culture of mutual accountability, we can create momentum towards improving governance on this issue.
- This momentum needs to translate into long-lasting governance mechanisms at the global, national and sub-national levels.
- The next Call to Action on AMR should be hosted in the Global South, to include more representatives from LMICs, as well as people who are directly affected by AMR and can give an insight into the daily trade-offs which influence the spread of resistance.

Actions submitted

As part of the call to action, over 103 actions from 70 stakeholders were submitted.

The actors submitting actions were evenly distributed between five major stakeholder groups.

- The private sector, including groups such as Becton Dickinson, bioMérieux, Pfizer, Johnson & Johnson, and MSD Merck.
- Civil society, including the ACTION Global Health Partnership, the Global TB Caucus, Consumer Reports, Pew Trusts, the International Union Against Tuberculosis and Lung Disease, and Sabin Vaccine Institute.

- Governments, including the Governments of Canada, Vietnam, Singapore, Malaysia, Nigeria, the UK, and Australia,
- Research groups and academia, including Chatham House and the Institute Pasteur.
- Coalitions and multilateral organisations, including the Stop TB Partnership, UNITAID, Presidential Advisory Committee on Combating Antimicrobial Resistance, and the OECD.

See [here](#) for details of all the actions submitted.

List of delegates

Marit Ackermann

Global Health Research,
Federal Ministry of Education and Research

Hon. Kwaku Agyeman Manu

Ministry of Health

Huda Al Katheeri

Ministry of Public Health, Qatar

H. E. Dr Hanan Mohamed Al Kuwari

Ministry of Public Health, Qatar

Al-Anoud Al Thani

Ministry of Public Health, Qatar

Bruce Altevogt

Pfizer Inc.

James Anderson

GlaxoSmithKline

Lina Andersson

Mylan

Christine Ardal

EU Joint Action on AMR and HCAI

Ruth Atkinson

UK Department of Health

Till Bachmann

University of Edinburgh

Manica Balasegaram

Global Antibiotic Research & Development
Partnership

Susanne Baltes

Federal Chancellery, Berlin

Enis Baris

World Bank

Hans Georg Bartels

World Intellectual Property Organization

David Beardmore

Open Data Institute

Alexandra Belias

Aviva Investors

Nicholas Benedict

Allegra

Daniel Berman

Longitude Prize, Nesta

Arnaud Bernaert

World Economic Forum

Roberto Bertolini

Ministry of Public Health, Qatar

Suraya binti Amir Husin

Medical Development Division,
Ministry of Health, Malaysia

Simon Blands

UNAIDS

Helen Boucher

Infectious Disease Society of America

Alan Briefel

Farm Animal Investment Risk and Return (FAIRR)

Grania Brigden

The Union

Judith Bryans

International Dairy Federation

Simon Bunney

AMOS Pictures

Denise Cardo

Centers for Disease Control and Prevention

Jean Carlet

World Alliance Against Antibiotic Resistance

Otto Cars

ReAct Network

James Chau

World Health Ambassador for SDGs and Health

Samantha Chivers

United Nations Foundation

Kieran Clarke

Alere

Gary Cohen

Becton Dickinson

Ronan Collins

Global Public Health, Johnson & Johnson

Polly Compston

Brooke

Graeme Cooke

UK Department of Environment,
Food and Rural Affairs

Matt Cooper

Community for Open Antimicrobial Drug
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Thomas B Cueni

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International Federation of Pharmaceutical
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University of Oxford

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Consumers Union/Consumer Reports

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Ministry of Public Health, Lebanon

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WaterAid

Lars Hartenstein

McKinsey & Company

Kitty Healey

Veterinary Medicines Directorate UK

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Zoetis

Abigail Herron

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World Organisation for Animal Health

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Charles Kenny

Center for Global Development

Larry Kerr

U.S Department of Health and Human Services

Mark Kessel

Foundation for Innovative New Diagnostics

Helmut Kessmann

Polyphor AG

Magdalena Kettis

Nordea

Nadia Khelef

Institut Pasteur

Jeremy Knox

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USP

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UNAIDS

Geoffrey MacDougall

Consumer Reports

Andrew Mace

Bill & Melinda Gates Foundation

Ulf Magnusson

Global Agenda for Sustainable Livestock

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ReAct - Action on Antibiotic Resistance

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Medicines for Europe

Richard Nieman

Teva Pharmaceuticals

Lindsay Noad

Public Health Agency of Canada

Louise Norton-Smith

UK Department of Health

Jim O'Neill

Former Chair of the Review on AMR

Henk Jan Ormel

Food and Agriculture Organization
of the United Nations

Driss Ouakrim

Organisation for Economic Co-operation
and Development

Kevin Outterson

CARB-X & Boston University School of Law

Aaron Oxley

RESULTS UK

Jean-Pierre Paccaud

Drugs for Neglected Diseases Initiative

Mark Pearson

Organisation for Economic Cooperation
and Development

Jaak Peeters
Johnson & Johnson

Manos Perros
Entasis

Marie Petit
BEAM Alliance

George Phillips
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Charles Price
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John Reeder
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Pro Generika e.V.

Konrad Reinhart
Global Sepsis Alliance

Nina Renshaw
European Public Health Alliance

Arunas Ribokas
European Commission

Minnie Rinvulucri
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David Ripin
Clinton Health Access Initiative

Judit Rius Sanjuan
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Shohko Sekine
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Samuel Shanju
Ecumenical Pharmaceutical Network

Anita Sharma
United Nations Foundation

Suzi Shingler
Alliance to Save our Antibiotics

Iain Shone
Global Aquaculture Alliance

Javeed Siddiqui
TeleMed2U

Andrew Singer
Centre for Ecology and Hydrology

Lori Sloate
United Nations Foundation

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