



Innovate
UK

Global Insights: AMR in India



UK Research
and Innovation

India
भारत



UK Science
& Innovation
Network

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Housekeeping

- Please note that this session is being recorded and will be shared on the Innovate UK Business Connect website
- Should you have any technical issues during the session, please let us know in the chat box
- Please feel free to use the Q&A tab or raise your hands to ask any questions
- All participants will be muted and cameras will be turned off

Agenda

1 Introduction to Global Expert Missions

10:00 - 10:10 | Syed Ahmed, Programme Lead - Global Expert Missions

2 Overview of UK AMR Landscape

10:10 - 10:25 | Phil Packer, Innovation Lead AMR and Vaccines

3 AMR in India: Market and Innovation insights

10:25 - 10:35 | Syed Ahmed, Programme Lead - Global Expert Missions

4 Opportunities for collaboration

10:35 - 10:50 | Phil Packer, Innovation Lead AMR and Vaccines

5 UK Delegate panel

10:50 - 11:40 | UK GEM Delegation

6 Next steps

11:40- 11:50 | Charlie Fraser, India Partnership Manager

7 Final questions & close

11:50 - 12:00 | Syed Ahmed, Programme Lead - Global Expert Missions



Innovate UK

We are a key delivery body of the UK Government's Innovation Strategy

We support business-led innovation in all sectors, technologies and UK regions

Our Mission

To help UK businesses grow through the development and commercialisation of new products, processes, and services, supported by an outstanding innovation ecosystem that is agile, inclusive, and easy to navigate

UK Research and Innovation

UK Research and Innovation (UKRI) brings together the seven Research Councils, Innovate UK and Research England.

We work with the UK Government to invest over £7 billion a year in research and innovation by partnering with academia and industry to make the impossible, possible.

Through the UK's nine leading academic and industrial funding councils, **we create knowledge with impact.**

Innovate UK drives productivity and economic growth by supporting businesses to develop and realise the potential of new ideas including those from the UK's world-class research base



**UK Research
and Innovation**



Overview of Innovate UK Global Programme

Global Scoping Workshops

Bring together in a workshop, UK businesses, research organisations and other stakeholders in specific technology and sector areas to help identify countries offering the best prospects for partnership and collaboration with the UK.

The outputs of the workshop(s) will help to narrow down where Global Expert Missions could be used to scope opportunities in more detail.

Global Expert Missions

Group of 6-8 experts scoping opportunities for UK businesses in specific countries and technology and sector areas.

- Three stages –
- Scoping visit
 - Dissemination report
 - Dissemination workshop

Global Business Innovation Programmes

Cohort of c.15 innovative high growth businesses exploring opportunities and building collaborations and partnerships in specific countries and technology and sector areas.

- Programme over 9-12 months with 3 phases –
- Get ready
 - Visit the market
 - Exploit the opportunity

Global Incubator Programmes

Cohort of c.6-8 innovative high growth businesses building long-term relationships and foundations for future market growth.

- Programme over 12-18 months with 4 phases –
- Prepare
 - Participate
 - Pursue – 3-6 months in an incubator in country
 - Exploit

GEM Objectives

Building International Collaboration

Establish expert insights and objective evidence to inform and enhance the UK's innovation partnerships with key global economies.

Informing UK businesses and Government

Disseminate expert-based insights to maximise knowledge of UK businesses and identify strategic actions to facilitate Government initiative to exploit new opportunities.

Showcasing UK Capabilities

Promote the UK's technological and business strengths to be the "Partner of Choice" in future innovation partnerships with strategic global economies.



Thematic areas

- **Environmental:** To better understand the antimicrobial pollution from waste effluents such as agriculture, livestock, aquaculture, and manufacturing waste.
- **Animal:** What are the infrastructure and processes for disease surveillance in livestock and the practices for better stewardship.
- **Diagnostics:** Review R&I for diagnostics in India, focusing on microbial diagnostics and their approach to primary and secondary care.
- **Therapeutics:** What are the regulatory processes for new therapeutics and strategies to mitigate AMR through investment in non-traditional antimicrobials.
- **Vaccines:** Review India's manufacturing capability and the development of new technology for production and scale-up.





IUK programme to address AMR as part of the UK AMR response

Phil Packer
Innovation Lead AMR and Vaccines
phil.packer@iuk.ukri.org

AMR – A Global Threat

The emergence and spread of drug-resistant pathogens **continues to threaten** our ability to treat infection

In 2019, **1.27 million deaths** worldwide were attributable to AMR

By 2050, deaths due to AMR are estimated at **10 million every year**

By 2050, expenditure on healthcare alone as a result of AMR is estimated at **3.5 billion USD per year**

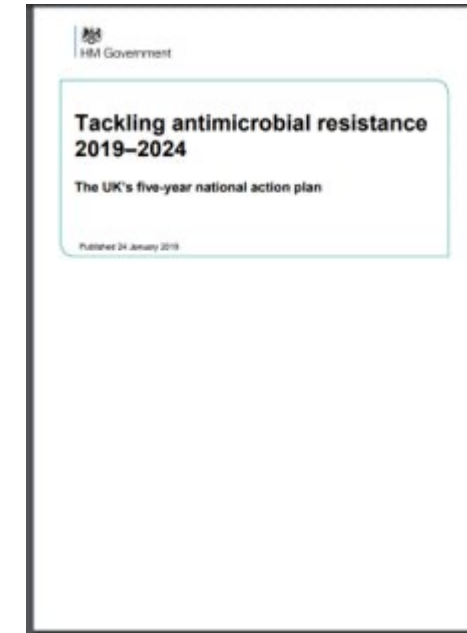
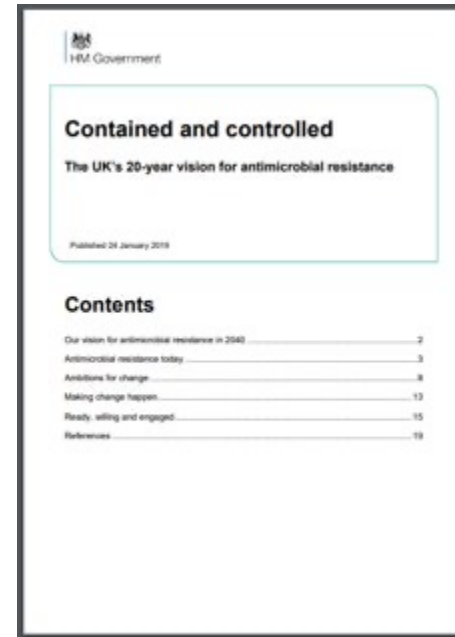
AMR is a global challenge that needs a global response

Without effective antimicrobials and better diagnostics, modern medicine is at significant risk



The UK's 20-year vision for AMR and five-year national action plan (NAP) were published in January 2019

“By 2040, our vision is of a world in which antimicrobial resistance (AMR) is effectively contained, controlled and mitigated”



An [addendum to the UK AMR NAP](#) was published on 16 May 2022

Principles for developing the UK's five-year action plans



IMPACT-FOCUSED

Understanding the effectiveness of interventions and focusing on areas that offer value for money and a real opportunity to make an impact.



STEP-WISE

Using surveillance data and research to evaluate risks, monitor trends over time and understand what works to prevent and slow the spread of AMR.



EVIDENCE-BASED

Establishing a robust evidence base and building predictive models that allow us to develop the right tools to embed effective interventions.



FLEXIBLE

Using emerging information to guide investment decisions and set delivery timescales and remaining open to changes based on the latest evidence of risk.



RESPONSIVE

Learning from the experience of others, including from fields with established knowledge and expertise and from other countries' good practice.



HARMONISED

Collaborating across sectors and groups (professionals, patients and the public) in the UK, and aligning with other relevant global initiatives.

■ The 2024 NAP will...

1. Be 'One Health,' recognising the close connection between the health of people, animals, and the environment
2. Be UK-wide and include action at a global level, reflecting the need for a collaborative approach to tackling AMR
3. Include specific actions and quantifiable targets, that translate to tangible impact and progress towards the 20-year Vision
4. Be guided by the UN Interagency Coordination Group on AMR (IACG) framework for action
5. Align with other government strategies, both existing and in development
6. Be evidence-based, seeking input from experts across a wide range of fields, as well as patients and practitioners

Health Living and Agriculture

World population is expected to grow by more than 2 billion by 2050, placing significant demand on our health, care and food systems.

An ageing population and increased expectations pose particular challenges. We support businesses in tackling some of the biggest global health and food challenges.



Biomedical Catalyst

Overview

- Primary Innovate UK grant funding mechanism for supporting UK health & life sciences SMEs
- Running since 2012 & Innovate UK provided £210 million funding awards

Aims of the programme

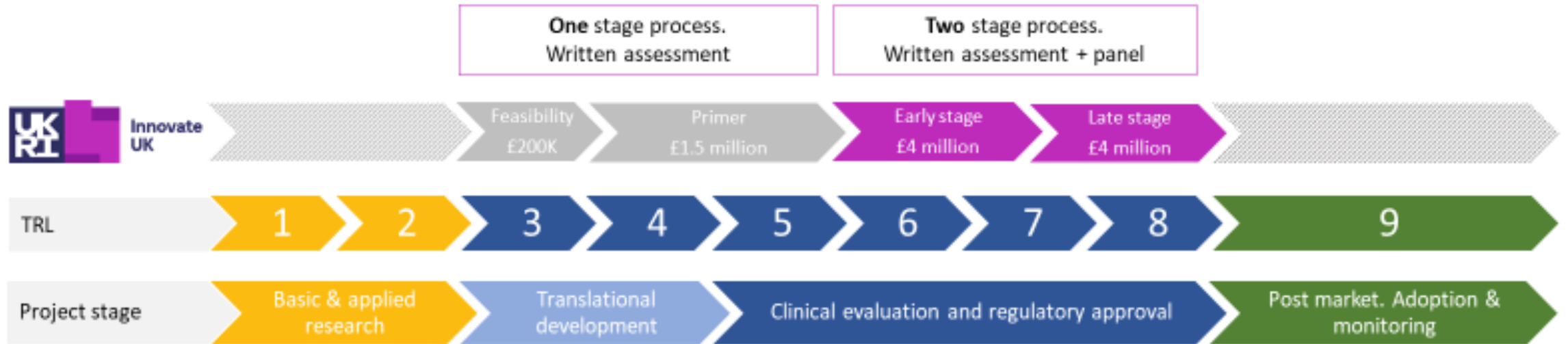
1. deliver growth to the UK health & life sciences sectors
2. deliver innovative life sciences products and services more quickly and more effectively into healthcare
3. provide support to commercially led R&D in a seamless, effective and efficient manner





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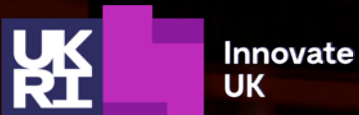
Biomedical Catalyst Programme architecture



Smart Grants

Funding for innovative businesses in any sector

- Smart funding enables SME businesses, and their partners, to apply for grant funding regardless of technical or industrial area of focus
- For game-changing and commercially viable R&D innovation that can significantly impact the UK economy
- Funding is offered to businesses that submit the best proposals in a highly competitive application process
- 4 Smart Grants competitions run per year, each offering up to £25 million funding



Paul Holt, founder,
Photocentric



Anti-Microbial Resistance (AMR)

- 1.27 million deaths were attributable to bacterial AMR in 2019
- By 2050, as many as 10 million people could die annually
 - Costing more than US\$50 trillion (UK£41 trillion) worldwide if no action is taken

PACE
Pathways to Antimicrobial Clinical Efficacy

lifeArc   

PACE

**Pathways to Antimicrobial
Clinical Efficacy**



Empowering Innovation: Accelerating Early Translation

£30M Programme
To bring together the sector
to help innovators with
early-stage antimicrobial and diagnostics
projects move forward with greater speed
and confidence, accelerating the delivery of
new innovations to tackle AMR

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Going Global

Supporting our future global competitiveness and tackling societal challenges

- Help innovative UK businesses understand new markets and gain insights that will allow them to explore and exploit new opportunities
- Build an understanding of the culture, laws and legislation of your target market, to de-risk innovation and protect UK businesses when working overseas
- Support businesses to undertake leading edge R&D through bilateral and multilateral programmes, including those through ODA funding and the Eureka framework
- Maximise engagement in the EU's Horizon Europe programme
- Promote the UK's reputation and attractiveness as an international innovation partner of choice and one of the most attractive places in the world to do innovation.

UKRI Tackling Infections: AMR Flagship Programme

- A transdisciplinary initiative to better understand, prevent and manage antimicrobial resistance
- Initial investments will support **transdisciplinary research networks**, building on the best of the current landscape
- Large scale programme investments will follow, tackling major challenges in AMR to facilitate evidence-based decision making
- £10m overall commitment



Transdisciplinary AMR funding

- Phase one (£3 million): connect and expand UK AMR communities, building knowledge and skills to transform our understanding of AMR.
- Phase two (£7 million from UKRI): programmatic awards supporting transdisciplinary partnerships to deliver novel understanding and insight into current and future AMR threats.





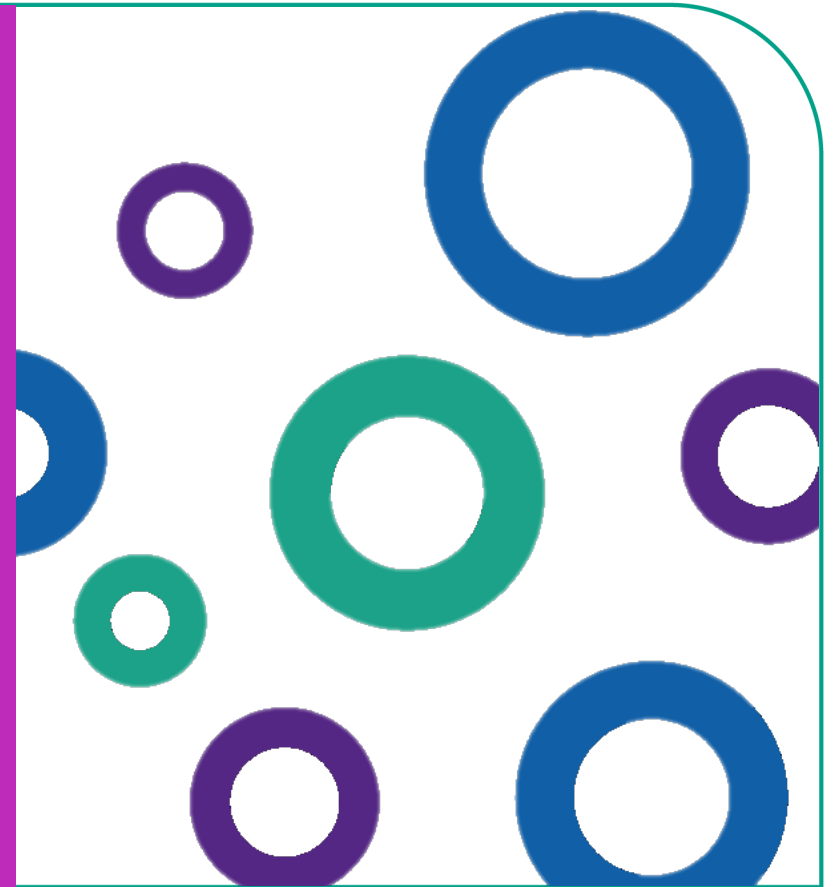
Department
of Health &
Social Care



Global AMR Innovation Fund (GAMRIF)

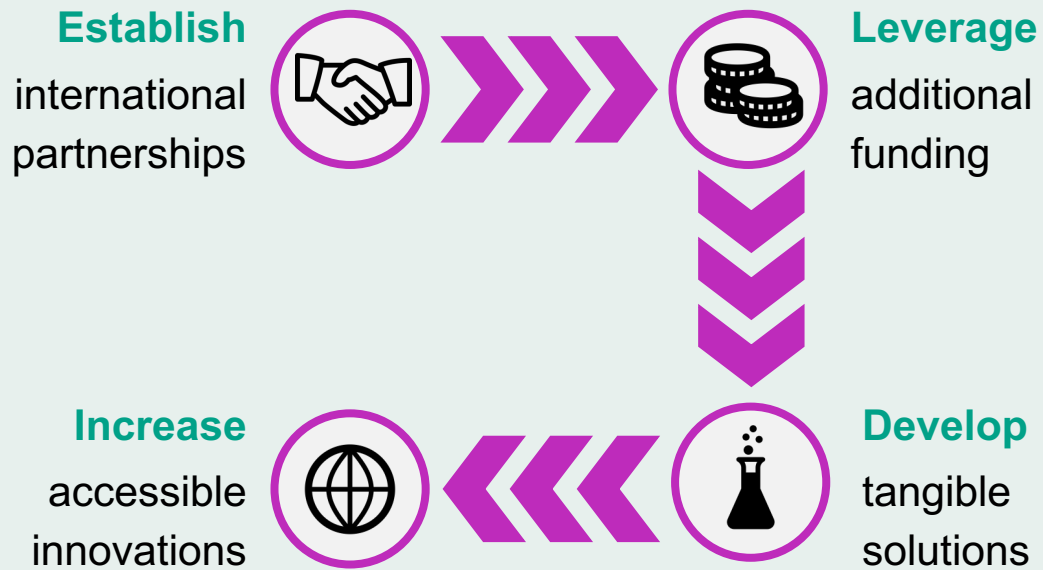
An Overview

30 January 2024



GAMRIF – the Objectives


GAMRIF is a **One Health UK aid fund that supports R&D** around the world to reduce the threat of AMR in humans, animals and the environment for the **benefit of people in low- and middle-income countries**



Press release


£39 million for AMR research as UK launches Global Health Framework

UK government announces up to £39 million cash injection for antimicrobial resistance (AMR) research through the Global AMR Innovation Fund (GAMRIF).



From: [Department of Health and Social Care, Foreign, Commonwealth & Development Office, The Rt Hon Andrew Mitchell MP, and Will Quince MP](#)

Published 22 May 2023



...GAMRIF is supporting cutting-edge research and developing vital new treatments to prevent death and disease across the world. This funding will provide a much-needed boost to protect people from diseases such as drug-resistant gonorrhoea, life-threatening sepsis in newborn babies and serious bacterial infections.

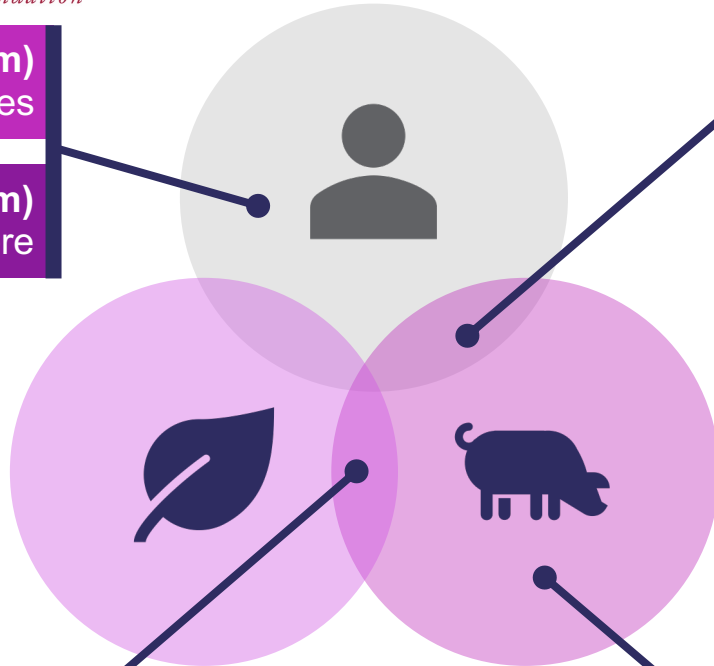
GAMRIF 1.0 – the Portfolio



CARB-X Combating Antibiotic Resistant Bacteria
 BILL & MELINDA GATES foundation

CARB-X (£20m)
 Vaccines & alternatives

GARDP (£11.5m)
 Antibiotics – gonorrhoea & core



UK-China bilateral (£10m)
 Vaccines, alternatives & diagnostics



BactiVac (£1.4m)
 Vaccines



FIND (£10.6m)
 Diagnostics – connectivity & gonorrhoea



CHAI (£645k)
 Market shaping – gonorrhoea & sepsis



- Global initiatives
- PDPs
- Bilaterals

UK-Argentina bilateral (£5m)
 Tools for the environment

InnoVet-AMR (£11m)
 Vaccines & alternatives



ICARS (£50k)
 Diagnostics implementation



Thank you!

For more information on GAMRIF, please visit:

<https://www.gov.uk/government/groups/the-global-amr-innovation-fund>

Follow us on Twitter [@UKgovGHS](https://twitter.com/UKgovGHS)



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AMR in India: Market and Innovation Insights

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AMR in India: Key insights and statistics

- In 2019, 297,000 deaths were attributed to AMR and a further 1M deaths associated with drug resistant bacteria.
- It is estimated by 2050 India will account for 20% of the projected 10 million AMR related deaths.
- India has a unique combination of dense population, diverse healthcare practices and significant disease burden.
- India represents one of the largest exporters of shrimps with an annual production of 850,000 metric tons in 2022.

India AMR Challenge

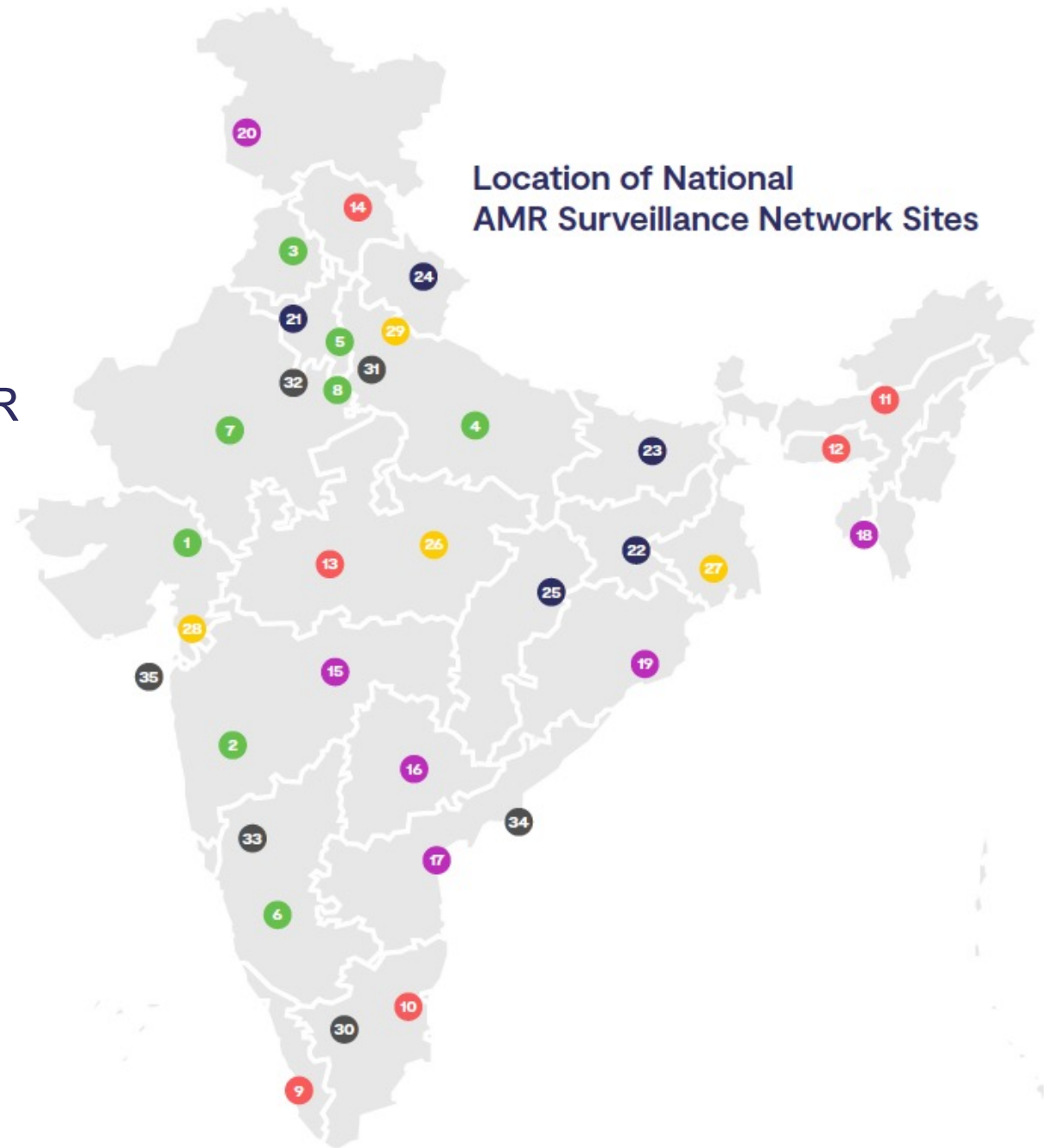
- **High rates of AMR and newborn mortality rates:** India has one of the highest rate of AMR worldwide with 60,000 neonates succumbing to antibiotic-resistant infections annually.
- **High burden of infectious diseases:** Prevalence of infectious diseases such as pneumonia, typhoid, cholera and TB make it difficult to treat and address AMR.
- **Unregulated antibiotic market and poor stewardship:** High use of broad-spectrum antibiotics in India. Private sector antibiotic use contributes significantly to overall consumption.
- **Farming practices:** High volume and indiscriminate use of antibiotics in the agri- and aquaculture industry.

India's response to AMR

- In the G20 Presidency, India has pledged to improve their response to pandemic preparedness and strengthen the healthcare architecture in the country.
- A revised National Action Plan is being prepared to prioritise investment in R&D, infection prevention and antimicrobial stewardship.
- The Government of India has set up a network of AMR surveillance sites across India through the National AMR Surveillance Network (NARS-Net).
- State-level AMR action plans are being developed with three currently published in Kerala, Madhya Pradesh and Delhi.

The programme was established to identify AMR trends in different geographical regions

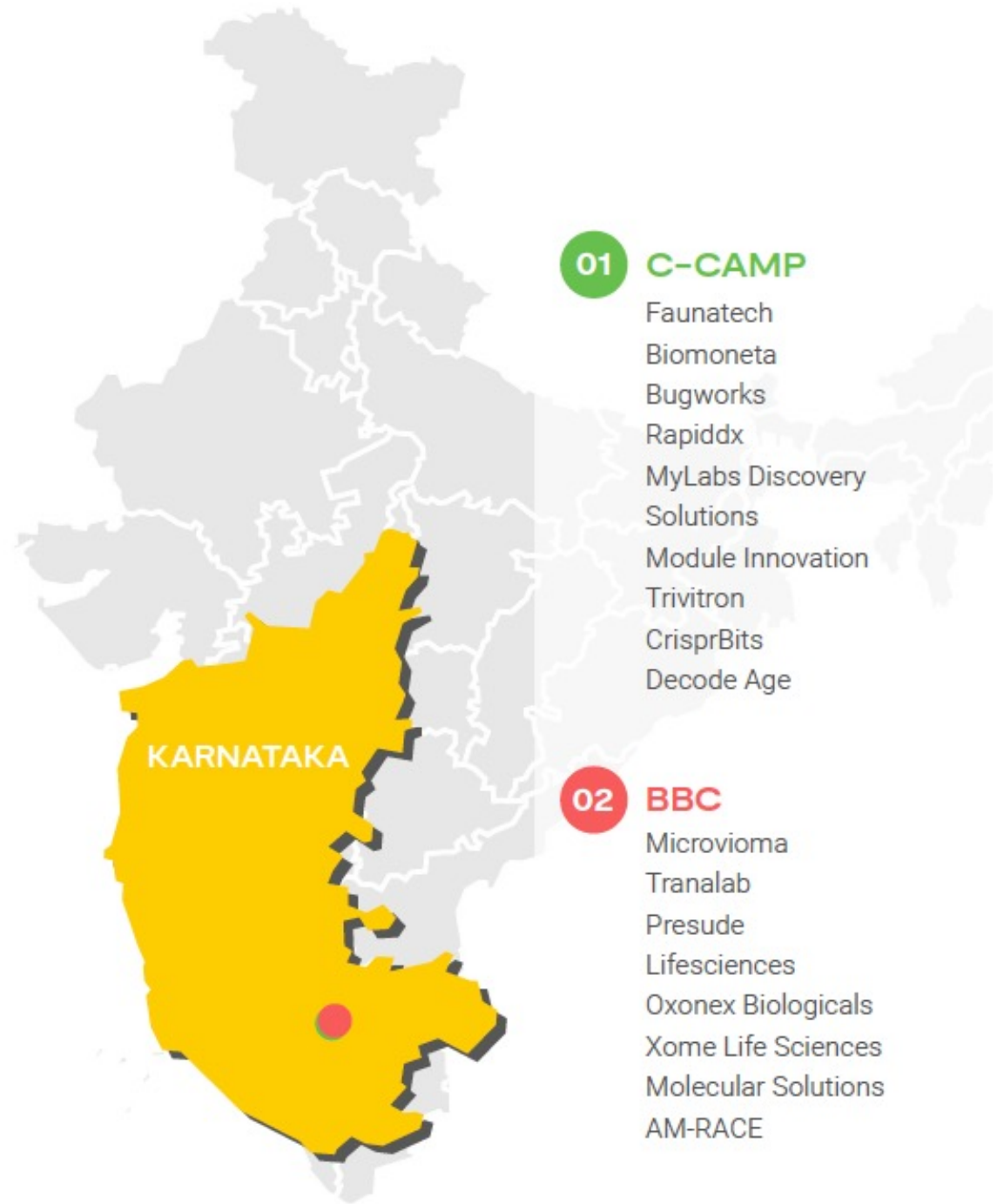
35 reference laboratories across 31 states



India has a vibrant lifescience R&D ecosystem with many of the innovation in AMR situated in Bengaluru.

C-CAMP and the Bangalore Bioinnovation Centre are leading incubators in the region.

The team also visited the SRM University in Vijayawada to attend the International Conclave on AMR and Future Antibiotics.





Innovate UK Global Expert Mission Report

Antimicrobial Resistance in India

November 2023



Phil Packer
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Mission Overview and Objectives

The Global Expert Mission brought a team of UK industry experts to assess the AMR R&I ecosystem in India, to identify key areas for collaboration and potential programmes needed to enable UK innovators to partner with Indian institutions. The objectives of the Mission were to:

- Help determine how Innovate UK can best support UK businesses more effectively and efficiently when considering AMR innovation partnerships with India. The assessment would include where best to focus efforts on technology and sector areas, locations, and the type of programmes needed to maximise opportunities between India and the UK.
- Develop a deeper understanding of the research and innovation landscape on AMR in India and build relationships with key individuals and organisations.
- Identify synergies between the AMR activities of both countries and relative strengths and weaknesses across the One Health space, including diagnostics, therapeutics, and vaccines.
- To understand the Indian market, key AMR stakeholders and develop long-term engagement strategies to support business collaboration for new products and services.

The process

The team engaged with key stakeholders from industry, government and academia to explore and understand the India AMR innovation landscape and identify opportunities for bilateral engagement.

Focussing on the thematic areas, a series of roundtables were held with senior officials and C-level executives covering:

- i) The role of diagnostics and therapeutics innovation in human and animal health
- ii) The purpose of environmental surveillance and monitoring
- iii) Synergies between the UK and India on research and innovation.

Opportunities for Future Collaboration - Environment

There is a need to work closely with relevant authorities and both state and national level regulators to build capacity for environmental testing. The surveillance of sewage and sharing of environmental AMR data is crucial to India's effort to mitigate environmental spread of AMR.

Key innovation areas include:

- India to implement environmental monitoring of AMR in national and state action plans in collaboration with the UK through joint workshops.
- Implement IoT and real time monitoring of wastewater and sewage samples.
- Develop and scale water cleaning technologies.
- Joint UK – India database for AMR environmental data.



Opportunities for Future Collaboration – Animal health

Opportunities for cooperation between India and the UK including developing guidelines for antimicrobial animal use, co-develop strategies to minimise antimicrobial usage and monitoring, implement learnings from the UK RUMA stewardship programme in India and facilitate cooperation between the British and Indian Veterinary Association.

Key Innovation areas include:

- Rapid, point of care (PoC) diagnostics for animal use.
- Development of alternatives to antibiotics - explore phage technology to combat AMR.
- Develop an innovation pipeline for animal health vaccines.
- Develop a national One-Health AMR dashboard.



Opportunities for Future Collaboration - Vaccines

Engagement with clinicians and government stakeholders identified opportunities for further exploratory work in pathogen surveillance, improving uptake of vaccines for existing diseases and joint UK-India partnership to select target pathogens and designing effective vaccines.

Key innovation areas include:

- Development India-strain vaccines for human & animal health
- Development auto-genous vaccines for aquaculture
- Development of immunomodulators for aquaculture
- Development multi-valent vaccines
- Thermostabilising & improving immunogenicity of existing vaccines
- Access to Indian AMR pathogens and bio samples to drive innovation and development of new vaccines

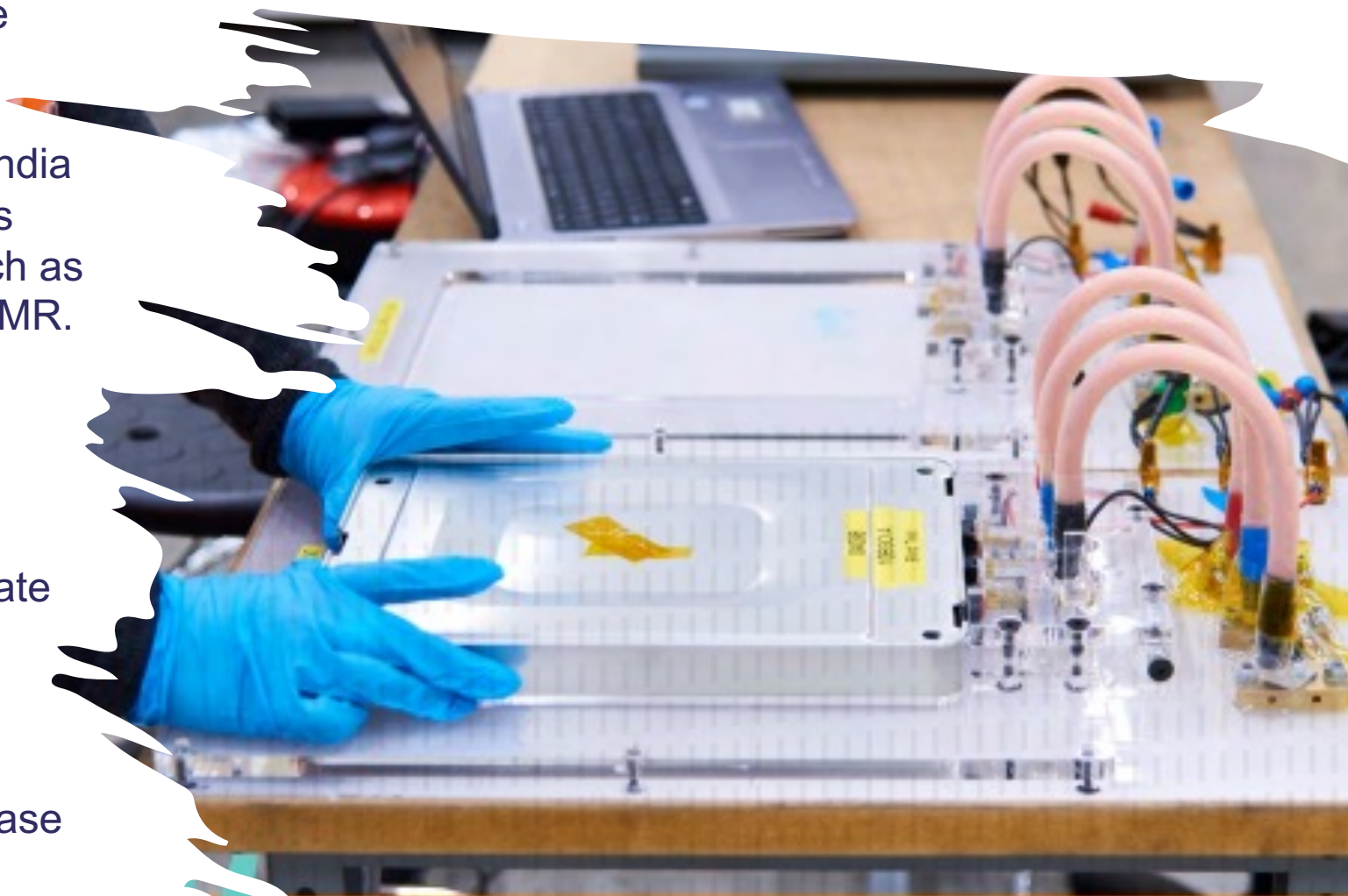


Opportunities for Future Collaboration – Diagnostics

A number of areas were highlighted for future bilateral cooperation such as access to AMR clinical samples, working with clinical trial networks for drug resistant infections, UK – India exchange of clinical and microbiome samples and working closely with innovation hubs such as C-CAMP to co-develop diagnostic tools for AMR.

Key innovation areas include:

- Fast, accurate (sensitive, specific) and affordable diagnostics.
- Testing and monitoring technologies at state and national level.
- Development of new biomarkers and diagnostics.
- Predictive AI models to identify early disease onset and new treatments.
- AI and host derived diagnostics.



Recommendations GEM AMR India 2023

1. **Develop a sustainable collaboration on AMR innovation between the UK and India**
2. **Build a structural collaboration with respect to pandemic preparedness and AMR**
3. **Join forces to tackle the challenges related to the environment and AMR**
4. **Stewardship in Indian aquaculture**
5. **Streamline the AMR Diagnostics value chain in the UK with India**
6. **Strengthen the development and implementation of alternative AMR approaches**
7. **Unlock the potential for large scale clinical trials and validation in India**
8. **Establish a joint working group to develop and implement of state action plans in India**
9. **Build upon the Indian AMR vaccine infrastructure to strengthen the position of India & UK**



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GEM Expert Panel



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GEM Expert Panel



Courtney Soulsby - *Global Director, Healthcare and Life Sciences Sector, BSI*



Mandy Nevel - *Head of Animal Health and Welfare, The Agriculture and Horticulture Development Board (AHDB)*



Mike Strange- *Head of Global Health, LifeArc*



Joanna Więcek- *Chief Scientific Officer, CircaGene*



Robin Cohen– *Chief Executive Officer, aVaxiPen Limited*



Simon Doherty – *Senior Lecturer, Queen's University Belfast*



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AMR in India: Global Business Innovation Programme



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Anti Microbial Resistance Diagnostics - GBIP

- The Global Business Innovation Programme (GBIP) focussing on AMR Diagnostics is run by Innovate UK and will be visiting the Indian cities of Hyderabad and Bangalore
- This competitive programme consists of three phases, these include a pre and post visit training plus a one week innovation visit to India
- The programme is focused on helping businesses to maximise opportunities identified in India and provide international partnership to help develop innovation and bring ideas to commercialisation
- To apply for the GBIP you must be a UK based innovation led company (with fewer than 500 employees) with ambitions to grow and internationalise. You must be able to attend all activities within the programme



Key Dates

- Applications must be submitted by 10th April 2024
- Pre-visit workshop: 8-9th May 2024 (in person)
- Innovation visit: 22nd June – 29th June 2024
- Post-Exploitation workshop: 20th August 2024

[Application form](#)



[Further information can be found here](#)



More information

- You can download the full report from the [Innovate UK Business Connect website](#).
- Innovate UK will review the outputs of the mission and work closely with domain and sector teams to implement recommendations.
- UK Business support through [Innovate UK Business Growth](#)

Contacts for further information:

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