R&D EFFORTS TO ADDRESS AMR IN INDIA

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Disastrous Impact of AMR

Drug-resistant diseases already cause at least 700,000 deaths globally a year, including 230,000 deaths from multidrug-resistant tuberculosis, a figure that could increase to 10 million deaths globally per year by 2050 under the most alarming scenario if no action is taken. Around 2.4 million people could die in high-income countries between 2015 and 2050 without a sustained effort to contain antimicrobial resistance.

The economic damage of uncontrolled antimicrobial resistance could be comparable to the shocks experienced during the 2008-2009 global financial crisis as a result of dramatically increased health care expenditures; impact on food and feed production, trade and livelihoods; and increased poverty and inequality.
One Health response to address the drivers and impact of antimicrobial resistance
National response – containment of AMR

- 2010 National Task Force set up
- 2011 National Policy for Containment of AMR adopted
- 2011 Jaipur Declaration by Health Ministers of South-East Asia Region
- 2012 National Programme on AMR (pilot basis, now programme)
- April 2017 National Action Plan on AMR (NAP-AMR) & Delhi Declaration on AMR
NAP-AMR: strategic priorities

1. Awareness & understanding
   - Communication & IEC
   - Education, Training

2. Knowledge & evidence
   - Surveillance of AMR
   - Laboratories

3. Infection prevention & control
   - Healthcare, HAI
   - Animal health
   - Community & environment

4. Optimise use
   - Regulations, access, AM use
   - Antimicrobial stewardship - human
   - AMS - animals, agriculture

5. Innovations R&D
   - New medicines, diagnostics, vaccines
   - Innovations
   - Financing

6. Leadership
   - International collaborations
   - National collaborations
   - State level collaborations

Department of Biotechnology
Overview on:

➢ Antimicrobial resistance in Humans
➢ Antimicrobial resistance in Livestock, poultry and aquaculture
➢ Pharma Industries as source of AMR
➢ Sewage waste as source of AMR
➢ Spread of AMR through ecosystems.
Preventive Measures: Vaccine

- Supporting R & D projects
- Organization of Training/Workshops

- RePORT India - TB Initiative
- Human Immunology Initiative

- Dengue
- Tuberculosis
- Malaria
- Chikungunya
- Zika
- RSV
- Influenza
- Pneumococcal

India-EU Research and Innovation Action Towards A Next Generation Influenza Vaccine to Protect Citizens Worldwide
Candidate Vaccine

**PRE CLINICAL**

**DEN GUE:** DSV4 ICGEB with Sun Pharma

**CHIK with Bharat Biotech**

**PHASE I**

**DEN GUE:** live attenuated, tetravalent, single dose vaccine

Serum Institute of India (SII), Indian Immunological

**OVERSIGHT**

**PHASE II, III**

**TB:** VPM1002, SII

Phase II completed
Ongoing Activities of DBT

Linked by Common Protocol in 2016, Central Data Management Centre and Central repository

Vaccine trials:
Serum Institute of India using VPM1002

Repository of 143,921 well characterized samples, NIRT, Chennai
National Bio-pharma Mission: Launched in June 2017 with a total cost US$ 250 million in collaboration with World Bank to accelerate biopharmaceutical development in India
DBT-RCUK collaborative projects

DARPI: Drivers for Antimicrobial Resistance in poultry in India
NIAB, Hyderabad
University of Liverpool, UK

DOSA - Diagnostics for One Health and User Driven Solutions for AMR
IIT Delhi
University of Edinburgh, UK

Effect of livestock contribution on AMR in NE India
ICAR-NIVEDI, Bangalore
University of Cambridge, UK

Smart regulation of antibiotic use in India
VPCI, Delhi
University of Edinburgh, UK

DBT-RCUK collaborative projects
EU-India launches EUR30 million Joint Call on Research and Innovation to develop Next Generation Influenza Vaccine

DBT-EU Activities
1. New Antibiotics
2. Alternatives to Antibiotics
   a) Therapeutic antibodies
   b) Phage therapy
   c) Anti-biofilms

Landscaping Report on existing AMR specific Diagnosis
Development of Indigenous AMR specific Diagnosis

NCMR, NCCS-Pune
National Centre for Microbial Resources of National Centre of Cell Sciences, Pune has been notified to function as “Bio-repository for Resistant Microbes/infected agents (bacteria/Fungi)”.  

WHO Country office
Help identification of priority area for future research and Innovation
AMR Mission

Major initiative: **Mission AMR** launched in October, 2018

**Highlights:**

- 378 LoIs received
- 10 full proposals recommended
Recognized by World Intellectual Property Organization (WIPO) as an International Depositary Authority (IDA) under Budapest Treaty

Registered with World Federation of Culture Collection as an affiliate member

Designated Repository (DR) of Ministry of Environment Forests & Climate Change Govt. of India

Bio-repository for resistant microbes/infective agents (bacteria and fungi)
Bio-repository for resistant microbes/infective agents (Bacteria)

Collection, storage, maintenance, preservation and characterization of these microbes across the country

Generate surveillance data & monitor susceptibility patterns of microorganisms to antimicrobial agents

Provide adequate resources and suitable specimens for research
Benefits for the Depositor

The cultures will be preserved for future following international norms and can be availed any time.

Access to all the cultures in the repository.

The depositor can have TWO cultures in gratis for each culture he has deposited.

All the data generated on the cultures by the repository on these cultures like AMR pattern, genotyping, genome sequence will be shared with the depositor.

Preference for the participation of different training programs conducted by NCMR.
MAKING INDIA AN INNOVATION HUB FOR AMR

**BIRAC Activities**

- Program support under BIRAC-Wellcome Trust & USAID
  - Vaccine
  - Diagnostics
  - Therapeutics

- Support for Innovation under BIRAC & Nesta, UK
  - Longitude Prize of £10 million in the area of AMR for innovative diagnostic tools to rule out antibiotic use
  - 9 Indian teams supported under this program during 2016-18

- Global Call with Grand Challenges India, South Africa, Africa and Brazil
  - Solutions for Surveillance
  - Low-Cost Technologies and Products for Infection Control in health care settings

Ongoing R&D Activities of DBT
in order to address the rising threat of antimicrobial resistance (AMR) with a holistic and multi-sectoral (One Health) approach, India’s One Health Initiative to combat problems associated with AMR was launched on 18th February, 2019 in Delhi.

Considering AMR as a multi-sectoral problem, inter-ministerial collaboration holds an immense potential with dedicated, concerted and coherent efforts in unison to target AMR and combat problems associated with it in order to save billions of lives.
### Future Way Forward

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<tr>
<th><strong>Accelerate progress in countries</strong></th>
<th><strong>Collaborate for more effective action</strong></th>
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<td>➢ By accelerating the development and implementation of One Health National Antimicrobial Resistance Action Plans within the context of the SDGs.</td>
<td>➢ Systematic and meaningful engagement of all government organisations, private sectors as well as social study scientist key stakeholders in the One Health response to antimicrobial resistance at global, regional, national and local levels</td>
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<th><strong>Innovate to secure the future</strong></th>
<th><strong>Invest for a Sustainable Response</strong></th>
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<td>➢ Increase investment and innovation along with current research in quality-assured, new antimicrobials (particularly antibiotics), novel compounds, diagnostics, vaccines, waste management tools as well as implementation and operational research</td>
<td>➢ Governments; global, regional, national, bilateral and multilateral and private investors should partner to support R&amp;D in antimicrobial resistance</td>
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Thank you