AMR surveillance in India
– enabling policies & plans in NAP, and implementation in human health

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AMR stakeholders

- **Health and Family Welfare** (NCDC, ICMR, CDSCO, FSSAI, NHM)
- **Agriculture and Farmers Welfare** (DAHD, DoF, ICAR)
- **Environment Forest & Climate Change** (CPCB, SPCB)

10 other ministries

- AYUSH
- Chemicals & Fertilizers (DoP)
- Consumer Affairs, Food & Public Distribution
- Drinking Water and Sanitation
- External Affairs
- Finance
- Food Processing Industries
- Human Resource Development
- Information and Broadcasting
- Science and Technology (DBT, DST, CSIR)

- **States & Union Territories**
- **Tripartite** (FAO-OIE-WHO)
- **Others** – professional councils, medical colleges, professional associations, accreditation bodies, NGOs/civil society, private sector, donors/partners
NATIONAL POLICY FOR CONTAINMENT OF ANTIMICROBIAL RESISTANCE
INDIA

Directorate General of Health Services
Ministry of Health & Family Welfare
Government of India
New Delhi

Jaiho Declaration on Antimicrobial Resistance

Ministry of Health and Family Welfare
Government of India
Governance mechanisms notified
Sep 2016

- Strategic framework for development of National Action Plan on AMR

Intersectoral coordinating committee
Chair – Health Secretary

Technical advisory group
Co-chairs – DGHS & DG-ICMR

Core working group
Chair – Director NCDC

- National Workshop on NAP-AMR (Dec 2016)
NAP-AMR

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

2. Knowledge & evidence
   - AMR Surveillance
   - 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 collaboration
   - National collaboration
   - SAPCAR
NAP-AMR
Inter-Ministerial Consultation on AMR (19 April 2017)

http://www.searo.who.int/entity/india/topics/antimicrobial_resistance/nap_amr.pdf?ua=1
http://www.searo.who.int/entity/india/topics/antimicrobial_resistance/amr_containment.pdf?ua=1
Delhi Declaration on AMR
Inter-Ministerial Consultation on AMR (19 April 2017)

http://www.searo.who.int/entity/india/topics/antimicrobial_resistance/delhi_dec_amr.pdf?ua=1
SAPCAR

- State Action Plans for Containment of Antimicrobial Resistance
- Critical for action on the ground
- Aligned with NAP-AMR
- Various departments to collaborate for AMR containment with a One Health approach
Initiation of KARSAP

24–25 Aug 2017, New Delhi

• National Consultation to operationalize action plan for AMR containment

11 Oct 2017, Thiruvananthapuram

• Review meeting on AMR by the CM
State Workshop on AMR
17 Oct 2017

- Department of Health & Family Welfare, GoK
- Revised, One Health approach
- Stakeholders from animal husbandry, agriculture, food, environment, research and civil society
Kerala Antimicrobial Resistance Strategic Action Plan
One Health response to AMR Containment

Jointly developed by the Departments of Agriculture Development & Farmers' Welfare, Animal Husbandry, Environment, Fisheries, and Health & Family Welfare
Government of Kerala
KARSAP priorities & focus areas

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

2. Knowledge & evidence
   - Laboratories
   - Surveillance

3. Infection prevention & control
   - IPC in human health
   - Animal feed & food
   - Environment

4. Optimise use of antibiotics
   - Regulations
   - Hospitals & healthcare
   - Veterinary & aquaculture
   - Surveillance of AM use

5. Research & Innovations
   - Research
   - Innovations

6. Collaborations
   - Public private partnerships
   - Disease control programs
KARSAP
INSAR
Indian Network for Surveillance of Antimicrobial Resistance

- Started in 2009
- Supported by WHO (CO & RO)
- Nation-wide, 19 centres (expanded to 23 in 2011)

Outputs
- AMR data sharing with consensus AST panels
- Joint publications & rebuttal to NDM
Methicillin resistant *Staphylococcus aureus* (MRSA) in India: Prevalence & susceptibility pattern

Indian Network for Surveillance of Antimicrobial Resistance (INSAR) group, India

Received July 26, 2011

**Background & objectives:** Methicillin resistant *Staphylococcus aureus* (MRSA) is endemic in India and is a dangerous pathogen for hospital acquired infections. This study was conducted in 15 Indian tertiary care centres during a two year period from January 2008 to December 2009 to determine the prevalence of MRSA and susceptibility pattern of *S. aureus* isolates in India.

**Methods:** All *S. aureus* isolates obtained during the study period in the participating centres were included in the study. Each centre compiled their data in a predefined template which included data of the antimicrobial susceptibility pattern, location of the patient and specimen type. The data in the submitted templates were collated and analysed.

**Results:** A total of 26310 isolates were included in the study. The overall prevalence of methicillin resistance during the study period was 41 per cent. Isolation rates for MRSA from outpatients, ward inpatients and ICU were 28, 42 and 43 per cent, respectively in 2008 and 27, 49 and 47 per cent, respectively in 2009. The majority of *S. aureus* isolates was obtained from patients with skin and soft tissue infections followed by those suffering from blood stream infections and respiratory infections. Susceptibility to ciprofloxacin was low in both MSSA (53%) and MRSA (21%). MSSA isolates showed a higher susceptibility to gentamicin, co-trimoxazole, erythromycin and clindamycin as compared to MRSA isolates. No isolate
Antibiogram of *S. enterica* serovar Typhi and *S. enterica* serovar Paratyphi A: a multi-centre study from India

Indian Network for Surveillance of Antimicrobial Resistance Group

**Background:** Enteric fever continues to be a public health problem in many countries including India. Emergence of the multidrug resistant strains of *S. enterica* serovar Typhi may render treatment with antibiotics ineffective. A multi-centre surveillance study was, therefore, conducted in India to monitor the time trends in antibiotic susceptibility patterns of *S. enterica* serovar Typhi and *S. enterica* serovar Paratyphi A in India.

**Methods:** All *S. enterica* serovar Typhi and *S. enterica* serovar Paratyphi A strains isolated from January 2008 to December 2010 in the 15 participating centres were included in the study. Each centre compiled their data in a predefined template which included data of the antimicrobial susceptibility pattern, location of the patient and specimen type. The data in the submitted templates was collated and analysed using a common protocol.

**Results:** A total of 3275 isolates of Salmonellae causing enteric fever were included in the study. There were 2511 *S. enterica* serovar Typhi and 764 *S. enterica* serovar Paratyphi A strains during the three-year study period. Resistance to nalidixic acid was seen in 83% of the *S. enterica* serovar Typhi and 93% of *S. enterica* serovar Paratyphi A strains. Majority of the strains were susceptible to third generation cephalosporins.
Indian Network for Antimicrobial Resistance (INSAR) group
(in alphabetical order)

- Bajaj Jyoti, GMC Aurangabad
- Chitnis DS, Choithram Hospital & Res. Centre, Indore
- Gautam Vikas, PGIMER Chandigarh
- Goswami Parijath, GCRI Ahmadabad
- Gupta Varsha, GMCH Chandigarh
- Harish BN, JIPMER Puducherry
- Joshi Sangeeta, Manipal Bangalore
- Kagal Anju, BJMC Pune
- Kapil Arti, AIIMS Delhi
- Manchanda Vikas, CNBC Delhi
- Rao Ratna, Apollo Hyderabad
- Ray Pallab, PGIMER Chandigarh
- V Balaji, CMC Vellore
- Vennila Rosy, SMC Chennai

We read with great interest Kumaresan and colleagues' article on the BLA, gene coding resistance to carbapenem antibiotics. Enterobacteriaceae isolates from clinical specimens in the UK, India, and Pakistan. The extensive molecular characterization is commendable; however, the epidemiological design suggests a sampling bias.

Transmissible resistance to many drugs is not new. In Greece, bacteria resistant to colistin existed much earlier than in the Indian subcontinent. The study ignores such findings and issues advice against Indian health-care systems. The investigators could not prove statistically significant strain relatedness between Indian and UK isolates, nor were donors identified, which questions the origin of DM-1 in India. Many strains from UK patients were not epidemiologically investigated. Three UK isolates also carried BLA on their chromosomes. There is an equally logical possibility of such strains being generated in the UK.
17% (22/129) countries – information on all 9 drug- bug combinations

*National data means data obtained from official sources, but not that data necessarily are representative for the population or country as a whole.

http://www.who.int/drugresistance/documents/surveillancereport/en/
ICMR AMR Surveillance & Research Network

Nodal Centers
- AIIMS, New Delhi
- PGIMER, Chandigarh
- JIPMER, Puducherry
- CMC, Vellore

Regional Centres
- MGIMS, Wardha
- TMC, Kolkata
- SGRH, New Delhi
- Apollo, Chennai
- PDH, Mumbai
- AFMC, Pune
- KGMU, Lucknow
- AIIMS, Bhopal
- LTMMC & GH, Mumbai
- AMCH, Assam
- NIMS, Hyderabad
- KMC, Manipal
- IPGME&R, Kolkata
- SKIMS, Srinagar
- AIIMS, Jodhpur

Ex-INSAR members
WHONET workshop

National workshop on use of WHONET for surveillance of antimicrobial resistance

27-29 July 2016 | New Delhi

WORKSHOP REPORT
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<thead>
<tr>
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<th>AMR surveillance – Kerala</th>
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<tbody>
<tr>
<td>1</td>
<td>GMC Trivandrum</td>
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<tr>
<td>2</td>
<td>GMC Kozhikode</td>
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<tr>
<td>3</td>
<td>GMC Thrissur</td>
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<td>4</td>
<td>GMC Kottayam</td>
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<td>5</td>
<td>GMC Alappuzha</td>
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<td>6</td>
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<td>7</td>
<td>GMC Manjeri</td>
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<td>GMC Kollam</td>
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<td>9</td>
<td>GH Ernakulam</td>
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<tr>
<td>10</td>
<td>State PH Lab, Trivandrum</td>
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September 2018
Total isolates 2691

<table>
<thead>
<tr>
<th>Location</th>
<th>Count</th>
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<tbody>
<tr>
<td>PH lab TVM</td>
<td>50</td>
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<tr>
<td>Manjeri</td>
<td>50</td>
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<tr>
<td>Ernakulam</td>
<td>200</td>
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<tr>
<td>GH Ernakulam</td>
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<tr>
<td>GMC Kollam</td>
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<tr>
<td>Alappuzha</td>
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<tr>
<td>Kottayam</td>
<td>300</td>
</tr>
<tr>
<td>Thrissur</td>
<td>400</td>
</tr>
<tr>
<td>Kozhikode</td>
<td>500</td>
</tr>
<tr>
<td>Thiruvananthapuram</td>
<td>800</td>
</tr>
</tbody>
</table>
ESBL production

Kerala 2017  
Kerala (Jan-Sep 2018)  
India

- **Acinetobacter spp**
- **E. coli**
- **Klebsiella spp**
- **Pseudomonas aeruginosa**

Kerala 2017  
Kerala (Jan-Sep 2018)  
India
Carbapenem resistance

- **Acinetobacter spp**
- **E. coli**
- **Klebsiella spp**
- **Pseudomonas aeruginosa**

Kerala 2017
Kerala (Jan-Sep 2018)
India
Gram positives

- MRSA
- VRE

India
Kerala 2017
Kerala till Sep 2018

World Health Organization
MAHASAR
Maharashtra State Antimicrobial Resistance Surveillance Network

- 14 Labs
- WHO & IAMM-MC + DMER, NCDC, USAID
- SOP
- Trainings – WHONET, AST, BMD
- Monthly review (WHONET)
- MAHASAR review
IAMM collaboration
Supplementary surveillance networks

- Third national network
  - WINSAR (WHO-IAMM Network for Surveillance of Antimicrobial Resistance)

- State networks
  - MAHASAR, Delhi NCR, MP, North-West Region

- Cities – Bangalore, Chandigarh

- Quality data/information sharing using WHONET

- Aligned with national AMR surveillance system
Summary

- Political commitment, action
- National Authority for Containment of AMR
- State level action is critical for action on the ground
- Submit representative data in GLASS
- Standardization of AST, AMR surveillance
- Expansion of surveillance sites and networks
Thank you

Acknowledgement
Dr Sarada Devi, GMCT (KARS-NET)

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