AMR surveillance in India

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

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WHO Country Office for India

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AMR stakeholders

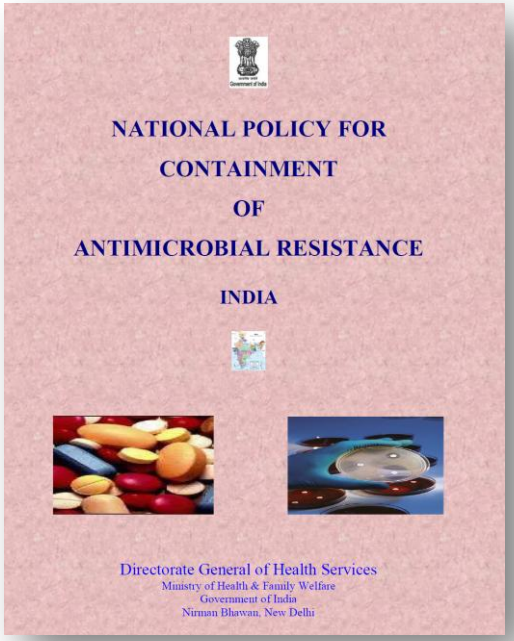
- **Health and Family Welfare**
  (**NCDC**, **ICMR**, CDSCO, FSSAI, NHM)
- **Agriculture and Farmers Welfare**
  (DAHD, DoF, ICAR)
- **Environment Forest & Climate Change**
  (CPCB, SPCB)

- **States & Union Territories**
- **Tripartite** (**FAO-OIE-WHO**)
- *Others* – professional councils, medical colleges, professional associations, accreditation bodies, NGOs/civil society, private sector, donors/partners

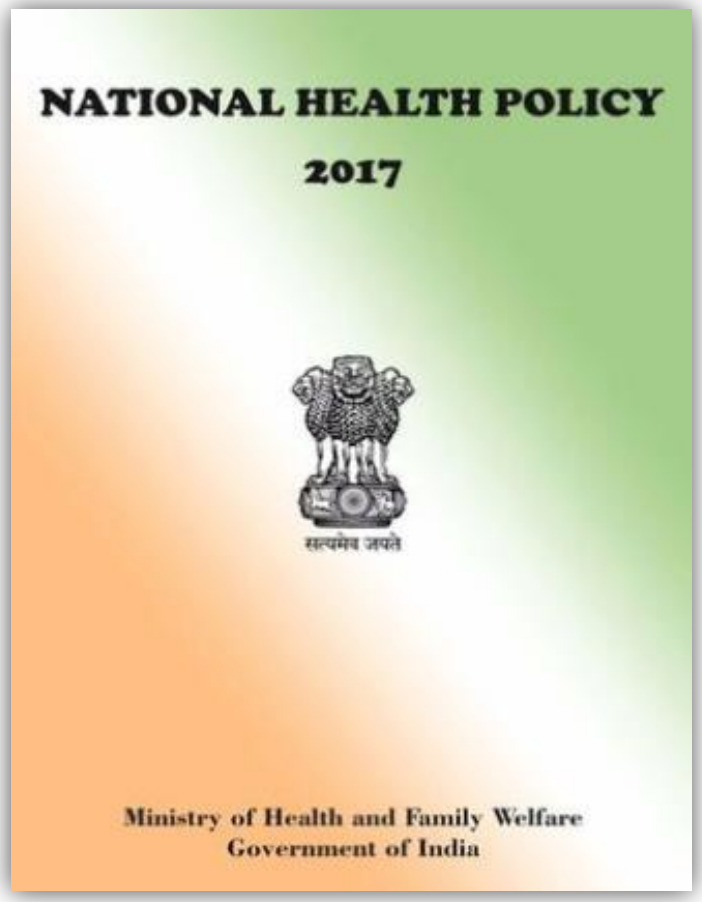
10 other ministries

- 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)

World Health Organization


NATIONAL POLICY FOR
CONTAINMENT
OF
ANTIMICROBIAL RESISTANCE
INDIA
Directorate General of Health Services
Ministry of Health & Family Welfare
Government of India
Nirman Bhawan, New Delhi

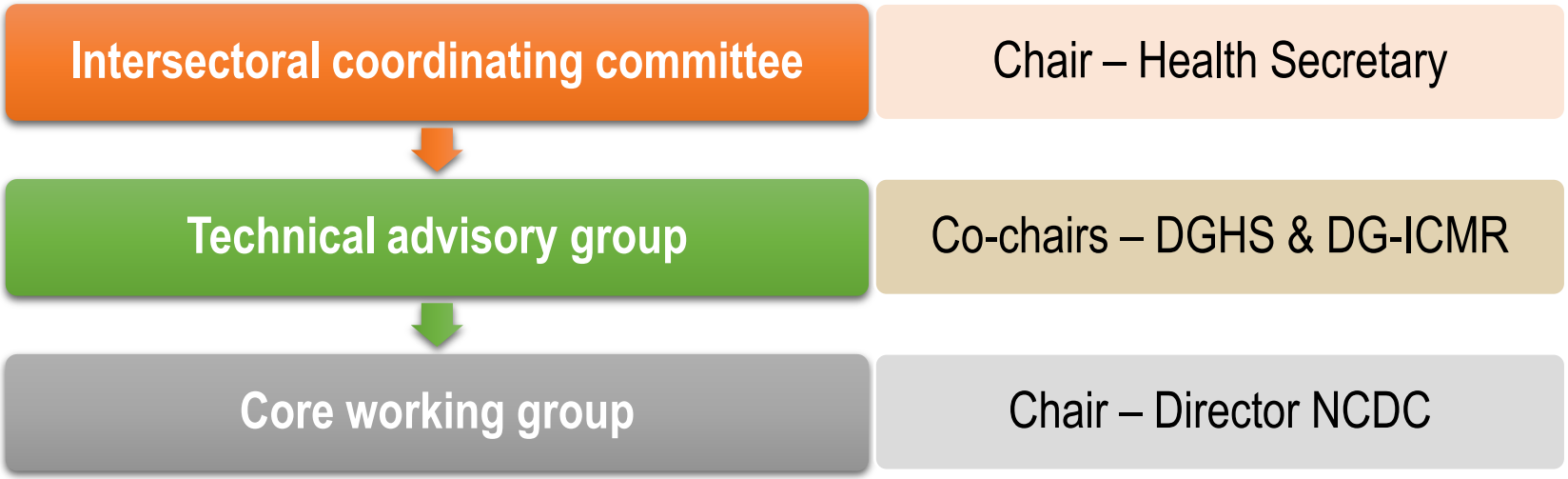

Jaipur Declaration
on Antimicrobial Resistance


NATIONAL HEALTH POLICY
2017
सत्यमेव जयते
Ministry of Health and Family Welfare
Government of India

Governance mechanisms notified

Sep 2016

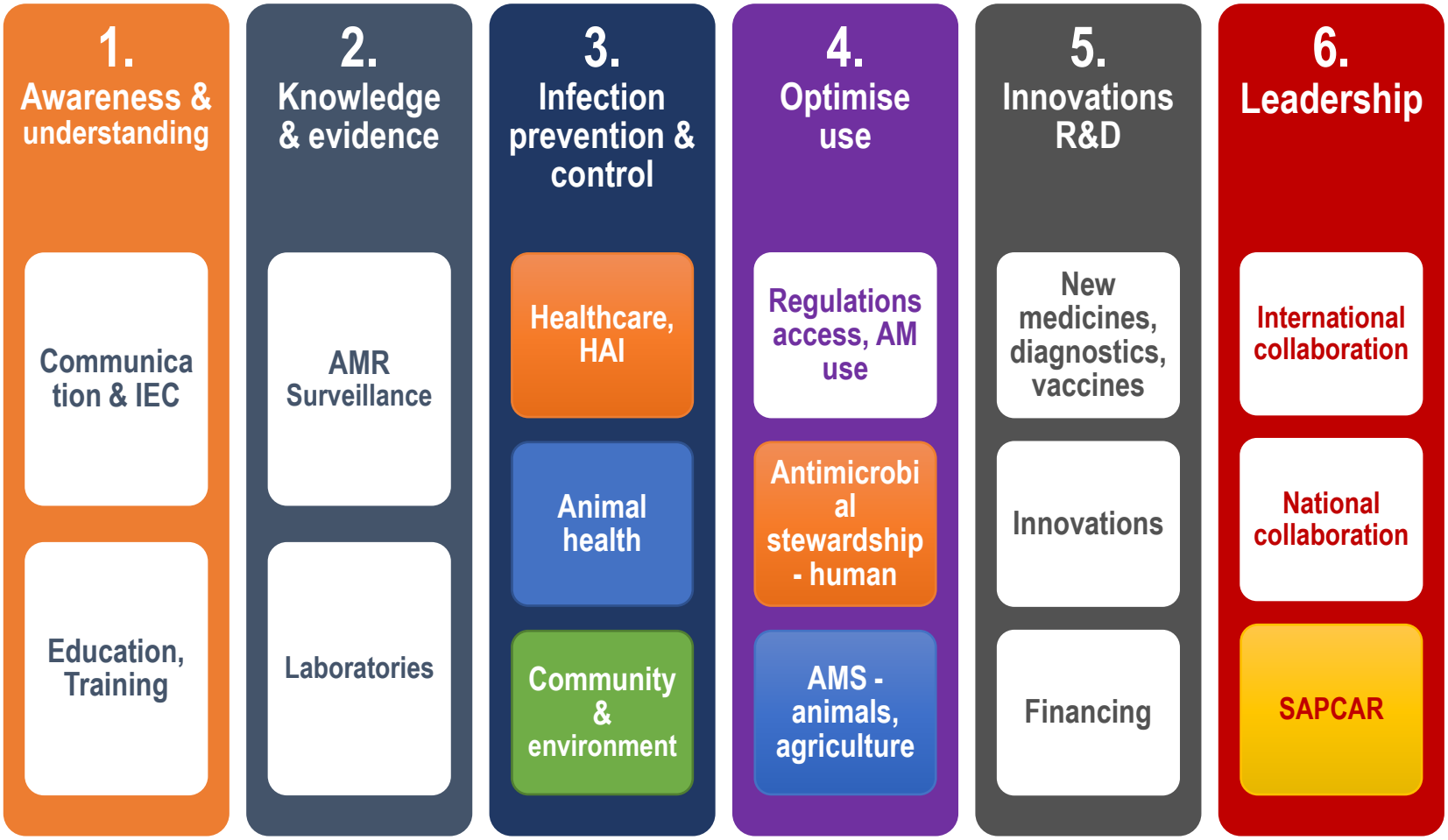
- Strategic framework for development of National Action Plan on AMR



- National Workshop on NAP-AMR (Dec 2016)

World Health Organization

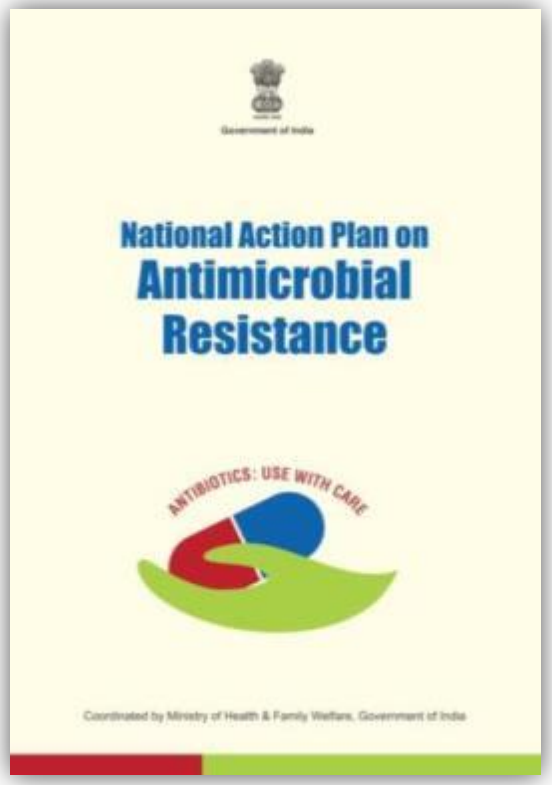
NAP-AMR

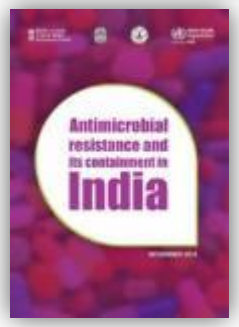


World Health Organization

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

World Health Organization

Delhi Declaration on AMR

Inter-Ministerial Consultation on AMR (19 April 2017)

Delhi Declaration on Antimicrobial Resistance

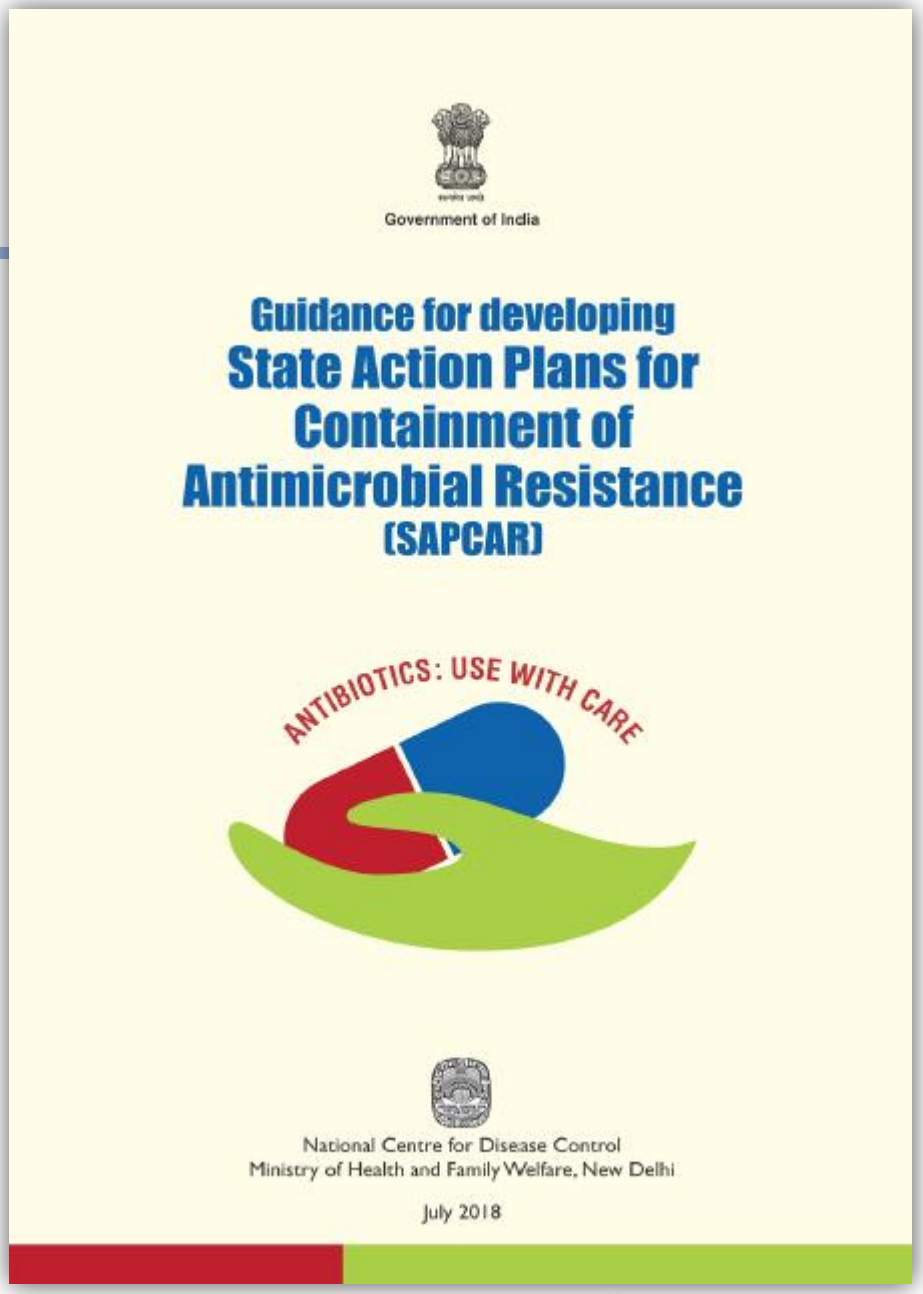
– an inter-ministerial consensus

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

World Health Organization

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



World Health Organization

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

World Health Organization

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

World Health Organization

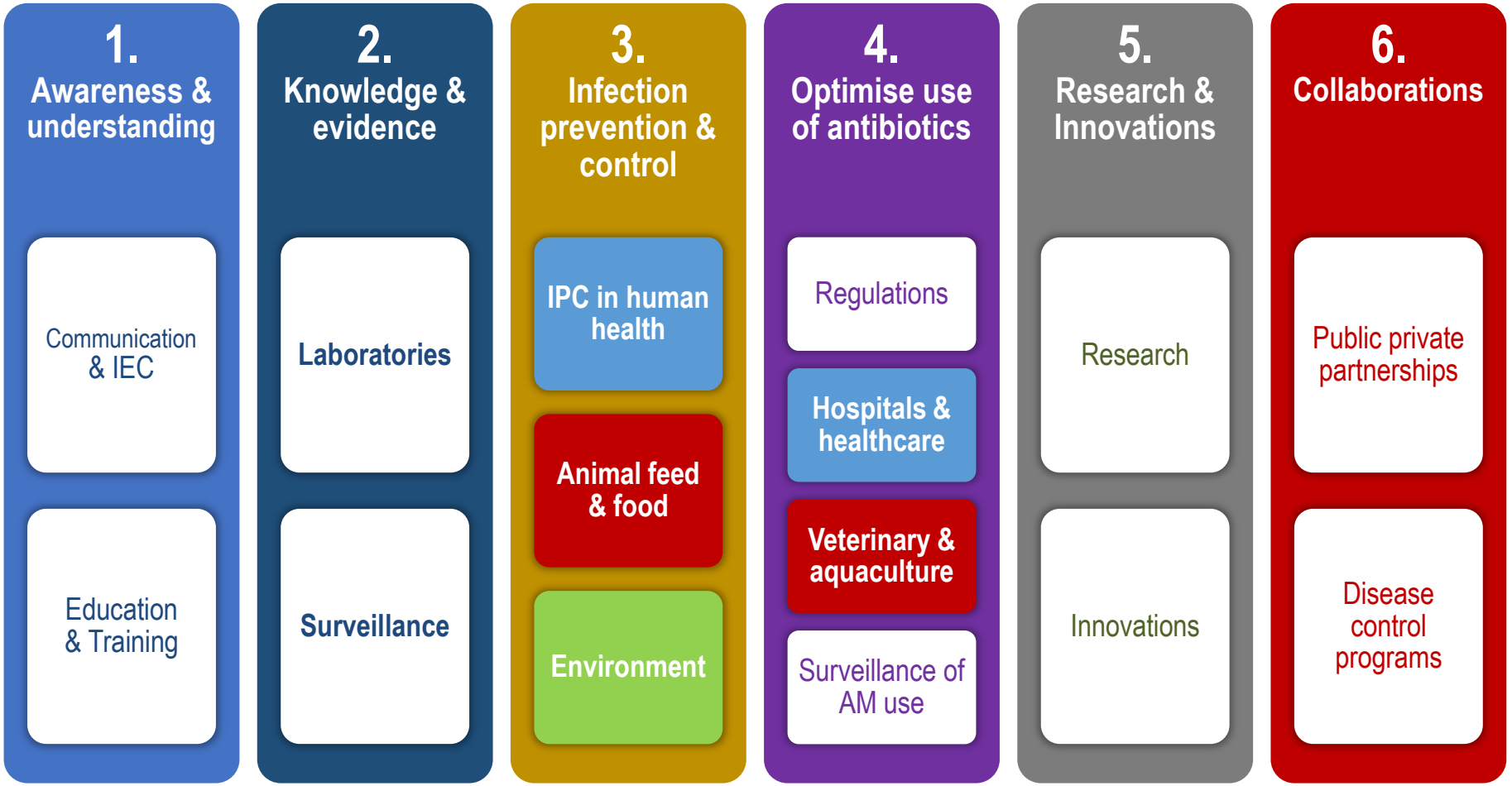
Kerala Antimicrobial Resistance Strategic Action Plan

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



World Health Organization

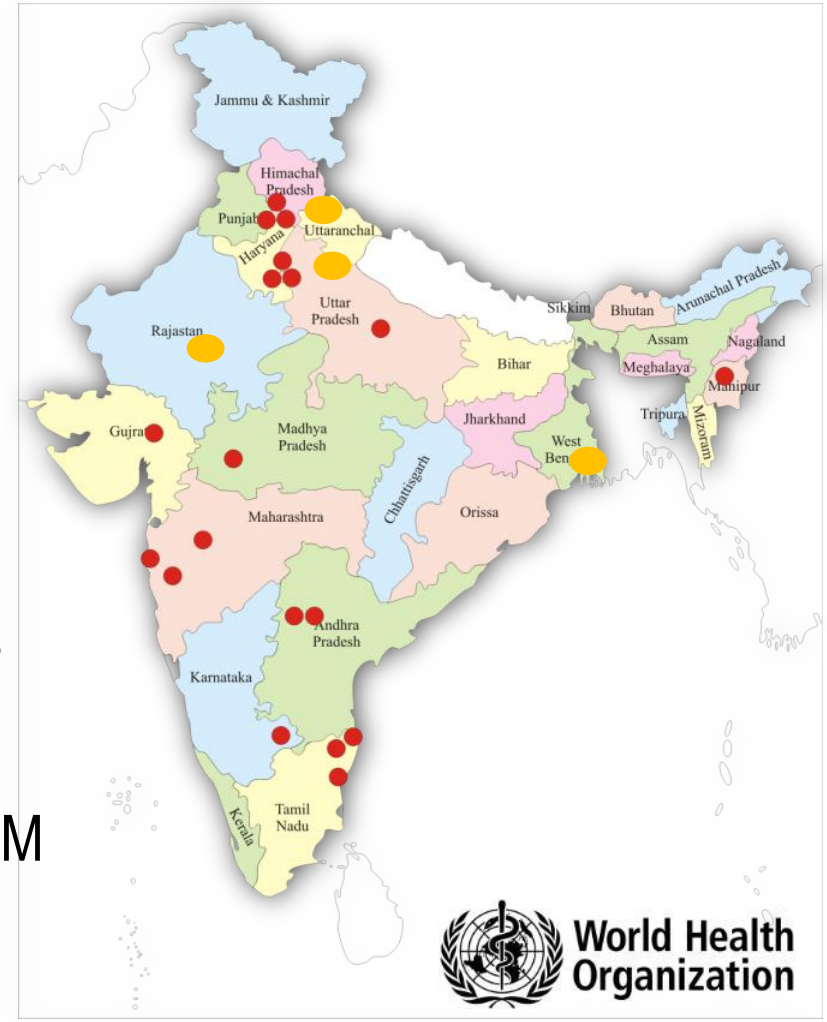
KARSAP

World Health Organization

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



Indian J Med Res 137, February 2013, pp 363-369

IJMR

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**

SEAJPH

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[a]

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.

THE LANCET Infectious Diseases

New Delhi metallo-β-lactamase 1

nd of gene transfer through plasmids. he investigators could link only 17 of 7 UK patients harbouring the bla_{NDM-1} ene to the Indian subcontinent. How nen did the remaining majority who resided and were treated only in the UK get these infections?

Inclusion and exclusion criteria, and ethical, epidemiological, and statistical validity of the enrolled population from India are not mentioned in the study. Sampling is apparently based in tertiary-care hospitals, catering only to referred and complicated cases; outpatient, inpatient, and intensive-care units are not considered. Non-typability of plasmids from over 50% of isolates from Haryana further confounds the interpretation. Non-uniform determination of minimum inhibitory concentrations by many techniques seems methodologically unsound. Because of inclusion of limited bacteria from a limited and biased population, the denominators are epidemiologically skewed; this leaves readers wondering whether other countries that were not investigated, and other species like *Acinetobacter* spp and *Pseudomonas* spp, harbour these genes and contribute to the reservoir.

The amount of controversy generated by this study indicates that the conclusions and recommendations have overstepped the sanctity of science. That the first author has considered dissociating himself from the study is unfortunate.[5] Aside from the non-evidence-based conclusions, extra-scientific recommendations, and the knee-jerk media and political reactions, we feel that the threat of multidrug-resistant pathogens is real. Properly designed scientific studies should assess the worldwide prevalence and epidemiology of such pathogens. Mandatory surveillance of drug resistance and regulatory policies to control abuse of antibiotics in hospitals and communities should be strictly implemented, especially in developing countries. Microbes evolved 3·5 billion years ago and survived many more hostilities on Earth than human beings did with a far shorter evolutionary experience; the scientific community should therefore rise above social and political controversies to prevent the pathogens from having the last laugh.

We have no conflicts of interest.

Indian Network for Surveillance of Antimicrobial Resistance (INSAR) group (webappendix)
microcnbc@gmail.com

Chacha Nehru Bal Chikitsalaya, Clinical Microbiology and Infectious Diseases, Geeta Colony, Delhi 110031, India

1 Kumarasamy KK, Toleman MA, Walsh TR, et al. Emergence of a new antibiotic resistance mechanism in India, Pakistan, and the UK: a molecular, biological, and epidemiological study. *Lancet Infect Dis* 2010; **10**: 597–602.
2 Souli M, Kontopidou FV, Koratzanis E, et al. In vitro activity of tigecycline against multiple-drug-resistant, including pan-resistant, Gram-negative and Gram-positive clinical isolates from Greek hospitals. *Antimicrob Agents Chemother* 2006; **50**: 3166–69.
3 Antoniadou A, Kontopidou F, Poulakou G, et al. Colistin-resistant isolates of *Klebsiella pneumoniae* emerging in intensive care unit patients: first report of a multiclonal cluster. *J Antimicrob Chemother* 2007; **59**: 786–90.
4 Nordmann P, Cuzon G, Naas T. The real threat of *Klebsiella pneumoniae* carbapenemase-producing bacteria. *Lancet Infect Dis* 2009; **9**: 228–36.
5 The Times of India. http://timesofindia.indiatimes.com/india/India-trashes-superbug-report-says-its-doctored/articleshow/6301982.cms. Aug 13, 2010. (accessed Aug 15, 2010).

We read with great interest Kumarasamy and colleagues'[1] Article of the bla_{NDM-1} gene coding resistance to carbapenems among Enterobacteriaceae isolates from clinical specimens in the UK, India, and Pakistan. The extensive molecular characterisation is commendable; however, the epidemiological design suggests a sampling bias.

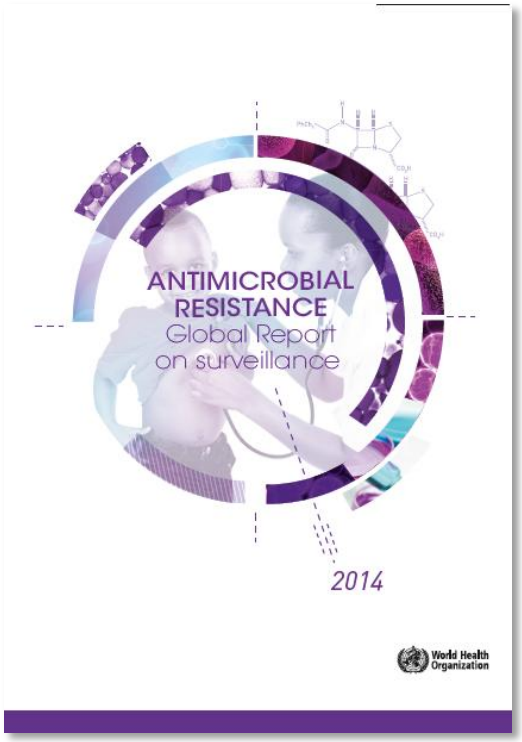
Transmissible resistance of bacteria to many drugs is not new. In Greece, bacteria resistant to colistin existed much earlier than in the Indian subcontinent.[2–4] The study ignores such findings and issues advice against Indian health-care systems. The investigators could not prove statistically significant strain relatedness between Indian and UK isolates, and none were clonally related, which questions the origin of NDM-1 in India. Many strains from UK patients were not epidemiologically investigated. Three UK isolates also carried bla_{NDM-1} on their chromosome. There is an equally logical possibility of such strains being generated in the UK

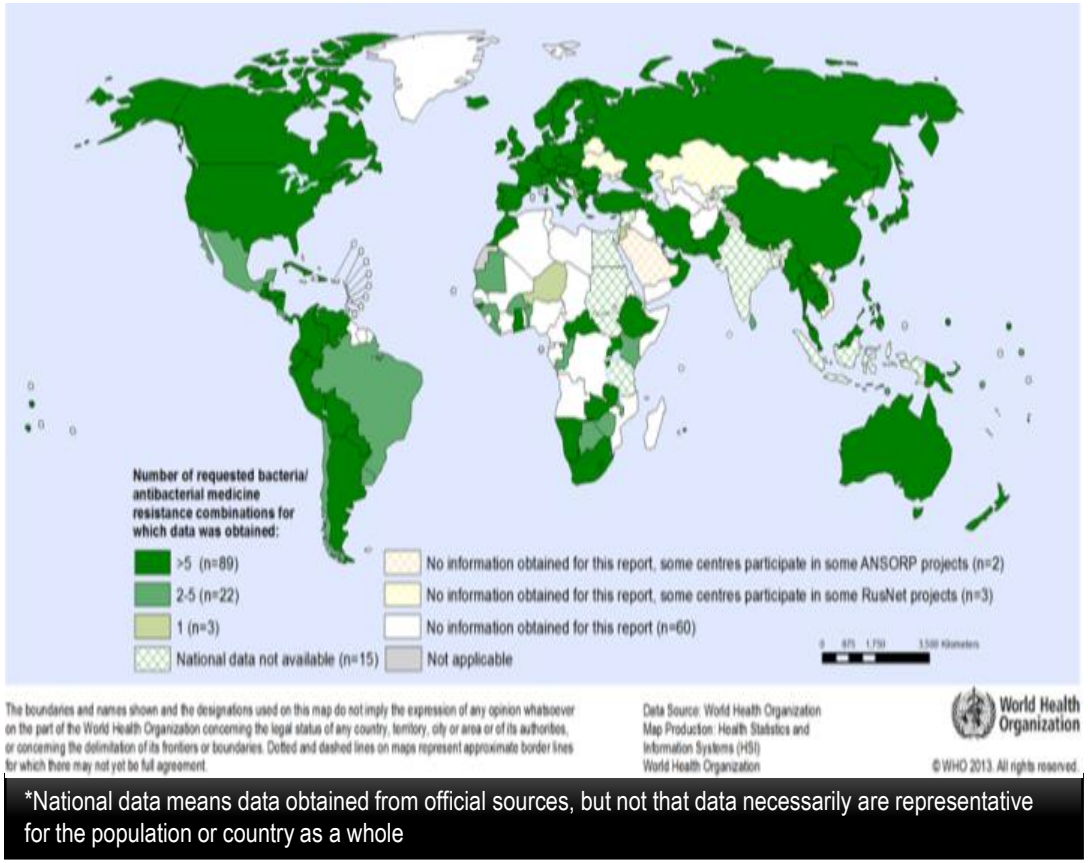
Indian Network for Antimicrobial Resistance (INSAR) group

(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

Global Report on AMR Surveillance





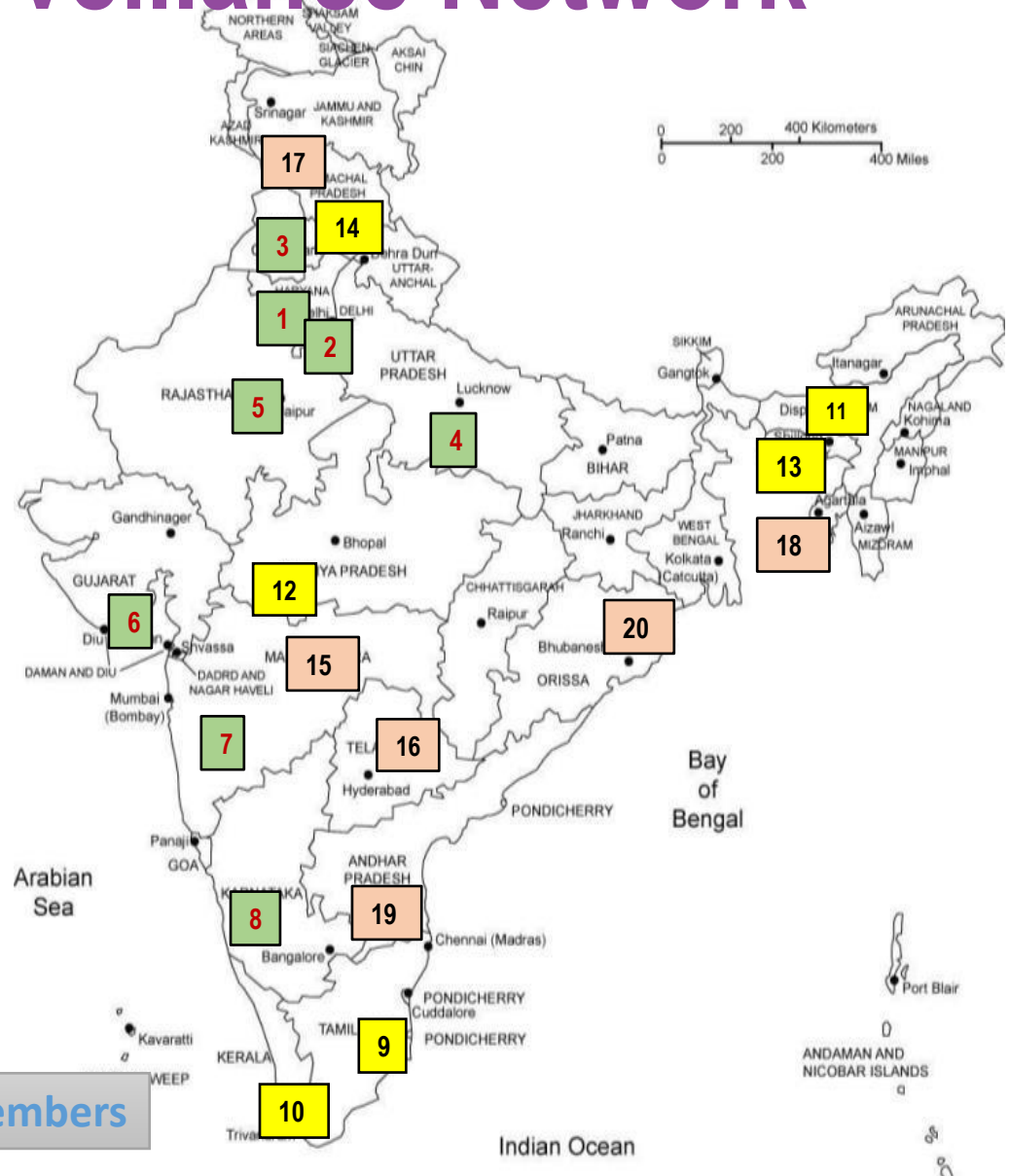
*National data means data obtained from official sources, but not that data necessarily are representative for the population or country as a whole

http://www.who.int/drugresistance/documentssurveillancereport/en/

17% (22/129) countries – information on all 9 drug-bug combinations

World Health Organization

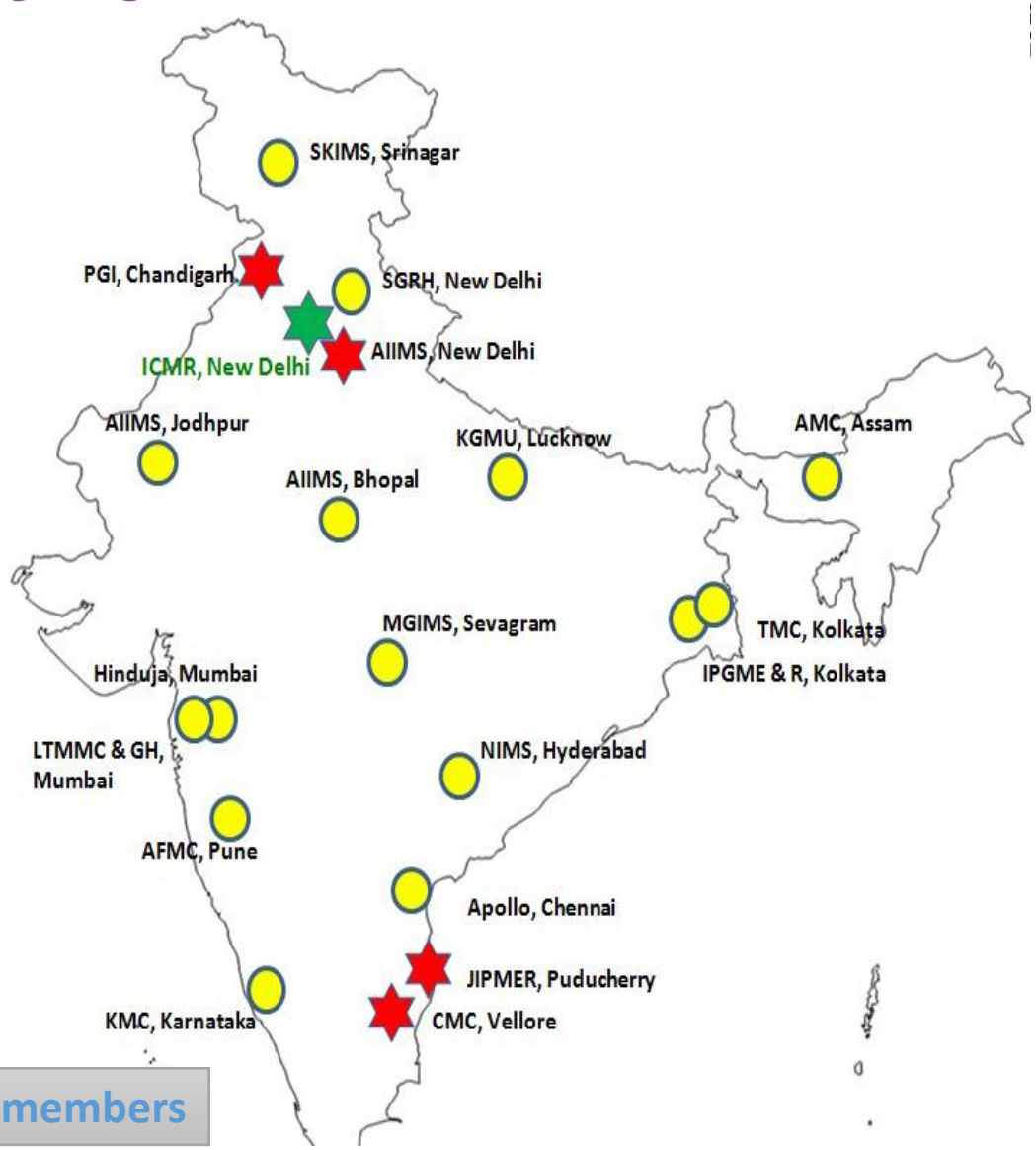
NCDC National AMR Surveillance Network



NCDC Network	
1	LHMC Delhi
2	Safdarjung Delhi
3	GMC Chandigarh*
4	GSVM Kanpur
5	SMS Jaipur
6	BJMC Ahmedabad
7	BJMC Pune*
8	MMC &RI Mysore
9	KAPV GMCH Trichy
10	GMC Trivandrum
11	GMC Guwahati
12	MGM MC Indore
13	NEIGRIHMS Shillong*
14	IGMC Shimla*
15	GMC Aurangabad*
16	OMC Osmania
17	GMCH Jammu
18	AGMC Agartala
19	GMC Guntur
20	SCB MC & H Cuttack

Ex-INSAR members

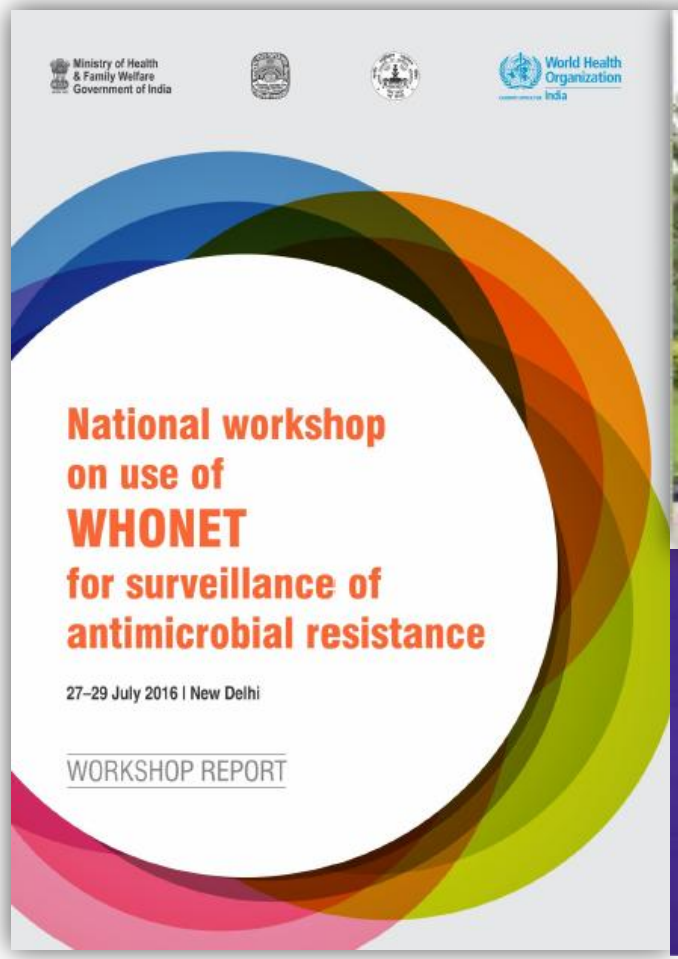
ICMR AMR Surveillance & Research Network



Ex-INSAR members

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

WHONET workshop



World Health Organization

AMR surveillance – Kerala

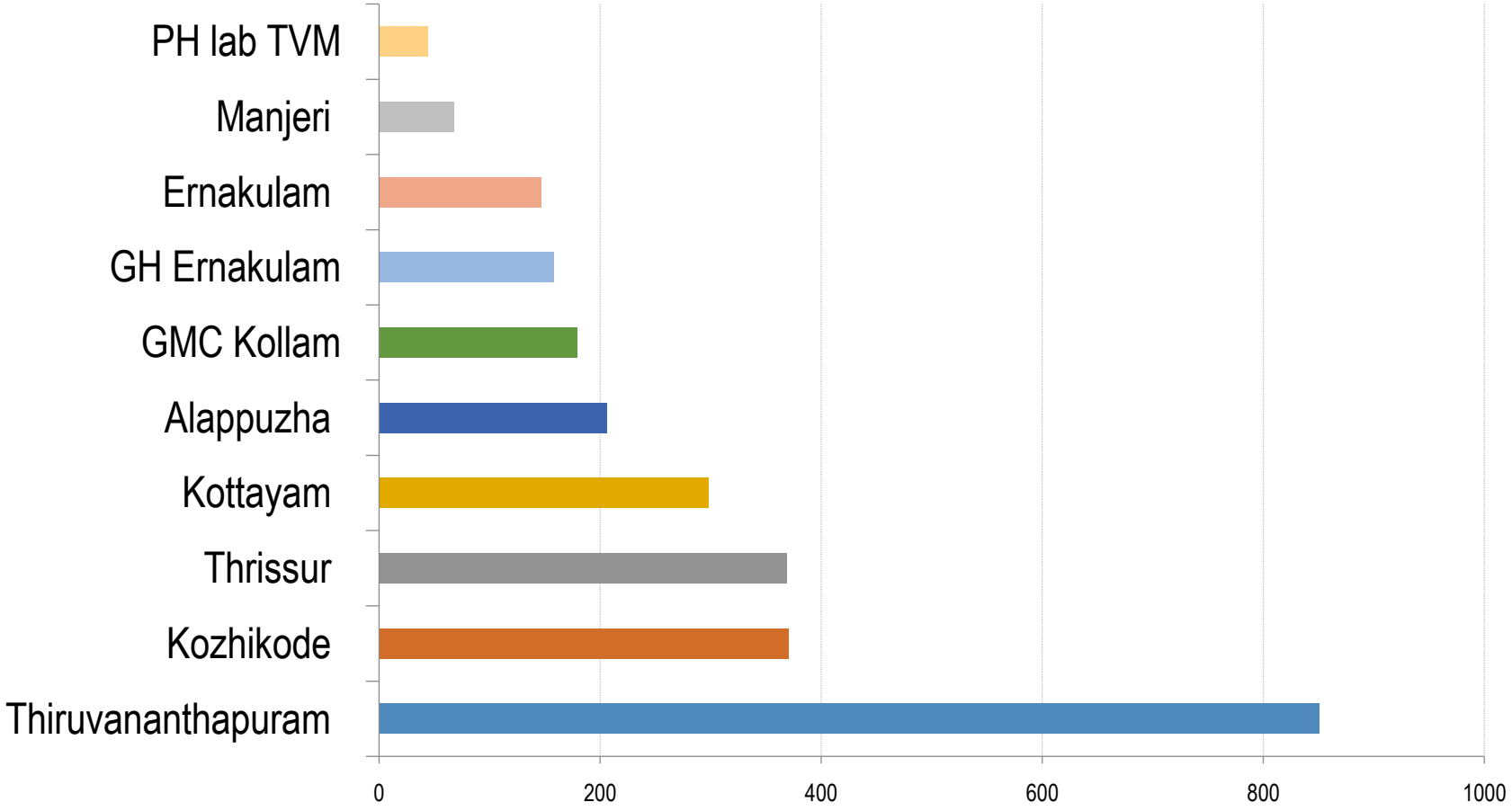
1. GMC Trivandrum
2. GMC Kozhikode
3. GMC Thrissur
4. GMC Kottayam
5. GMC Alappuzha
6. GMC Ernakulam
7. GMC Manjeri
8. GMC Kollam
9. GH Ernakulam
10. State PH Lab, Trivandrum

KARS-NET

World Health Organization

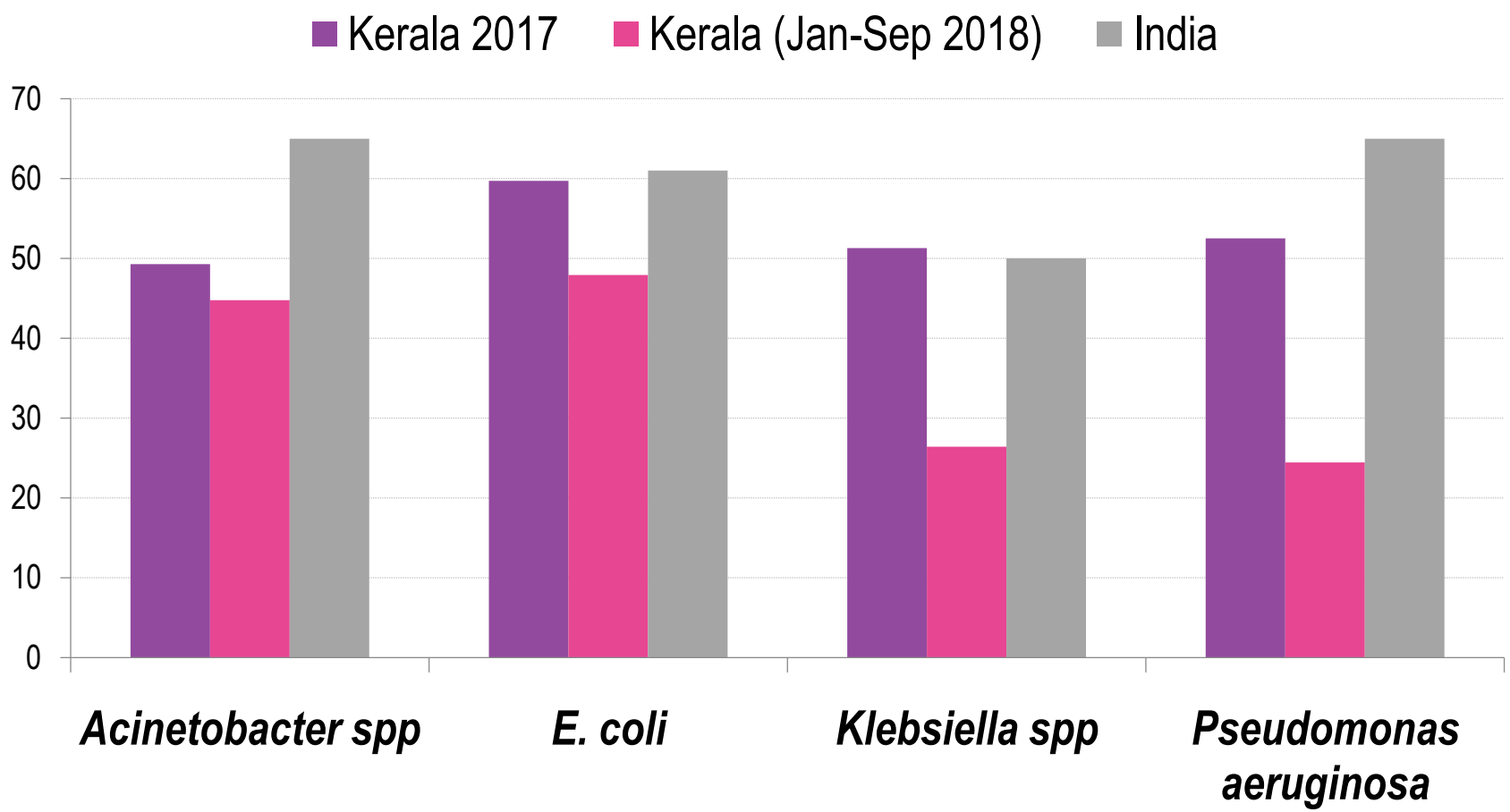
September 2018

Total isolates 2691



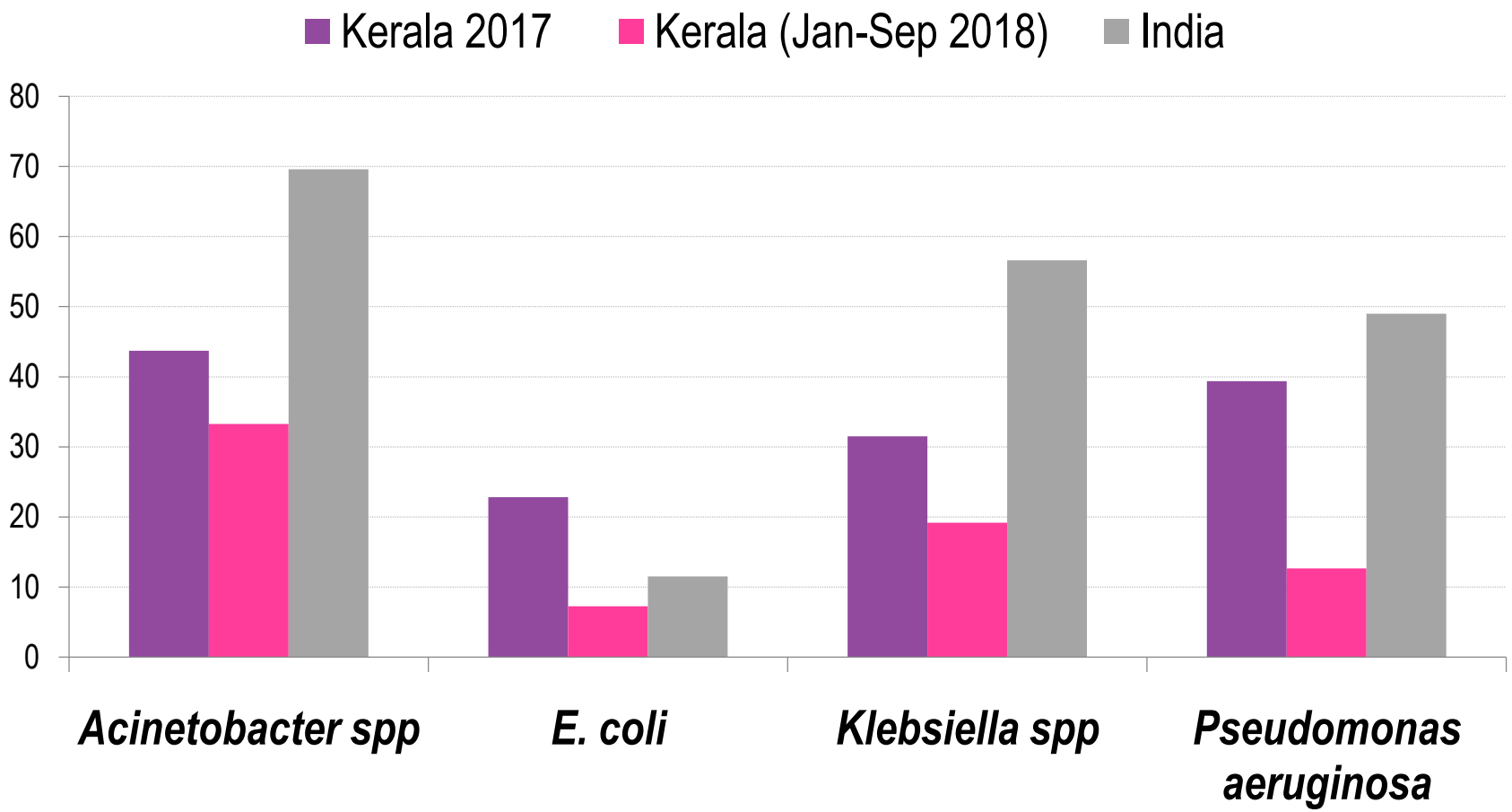
World Health Organization

ESBL production



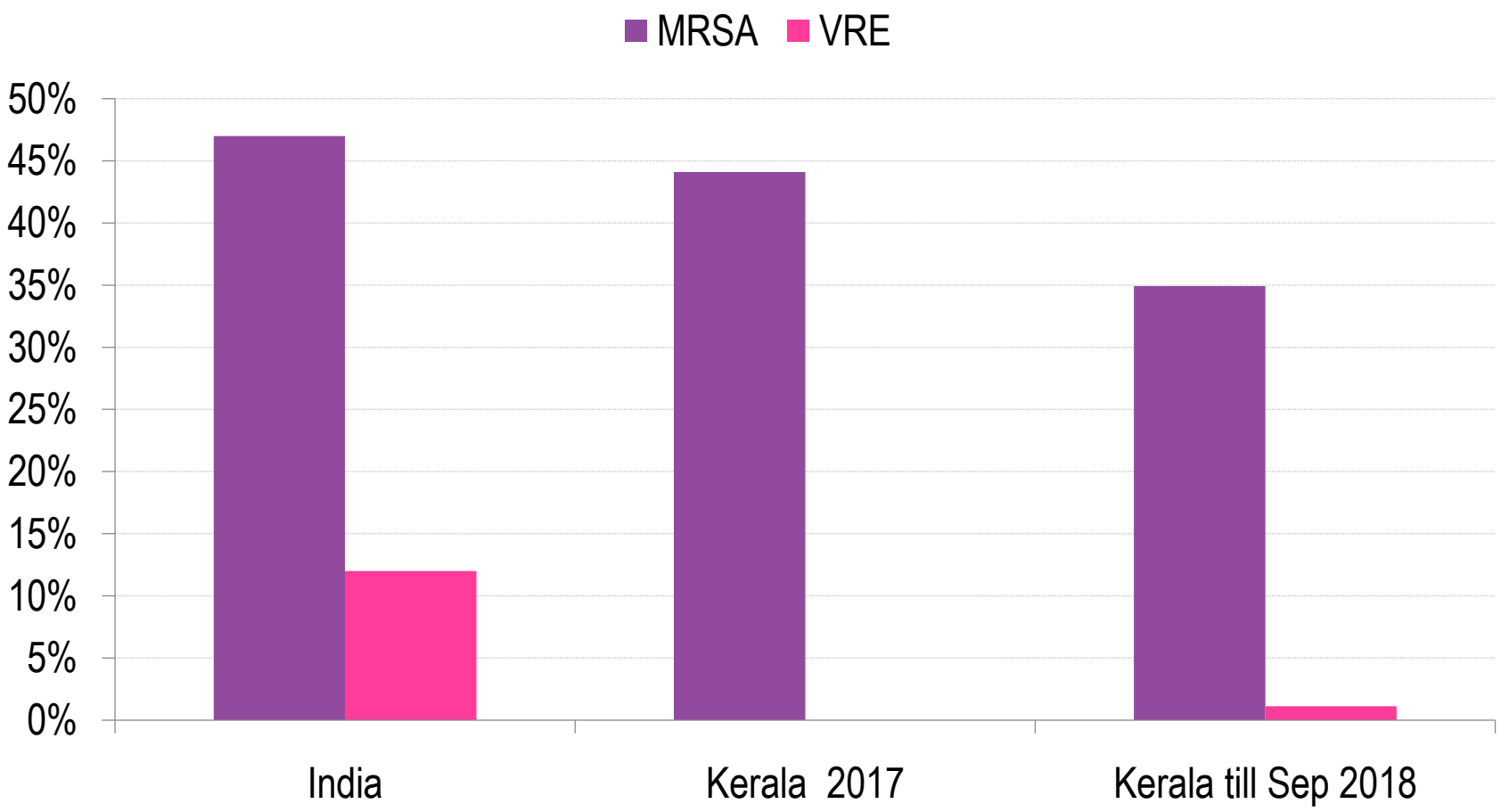
World Health Organization

Carbapenem resistance



World Health Organization

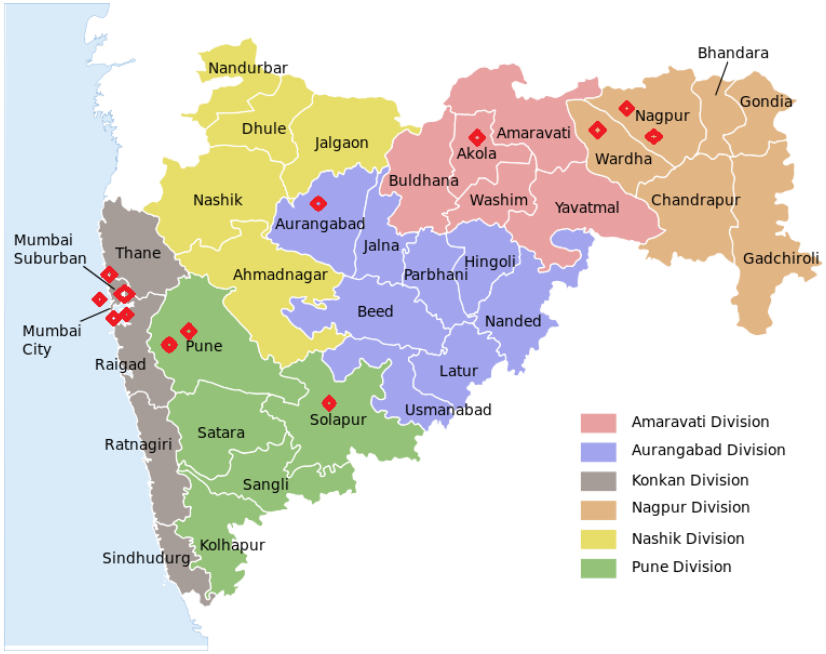
Gram positives



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

World Health Organization

IAMM collaboration
Supplementary surveillance networks

- Third national network
  - **WINSAR** (**W**HO-**I**AMM **N**etwork for **S**urveillance of **A**ntimicrobial **R**esistance)
- State networks
  - MAHASAR, Delhi NCR, MP, North-West Region
- Cities – Bangalore, Chandigarh
- Quality data/information sharing using WHONET
- Aligned with national AMR surveillance system

World Health Organization

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

World Health Organization

Thank you

Acknowledgement
Dr Sarada Devi, GMCT (KARS-NET)

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