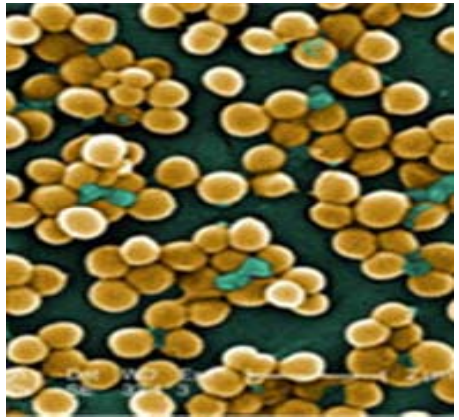
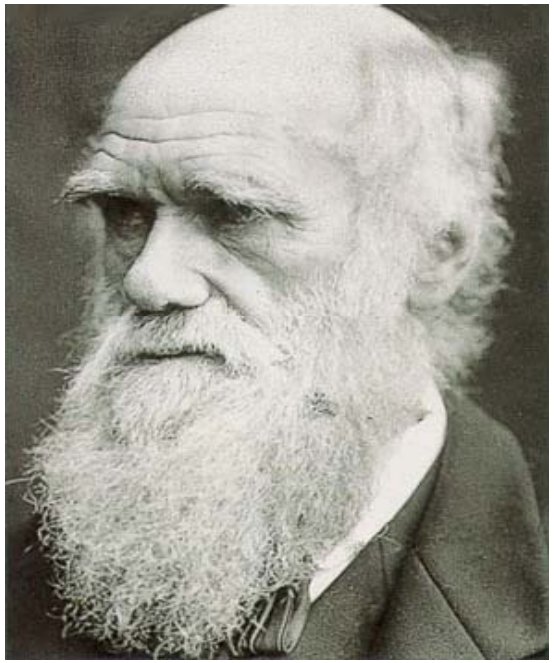


AMR SURVEILLANCE Framework in human health and possible integration

Dr. Sunil Gupta
Addl Director
National Centre for Disease Control, Delhi
Aug 17

It is not the strongest in the species
that survive or the most intelligent..

but the ones most responsive to change

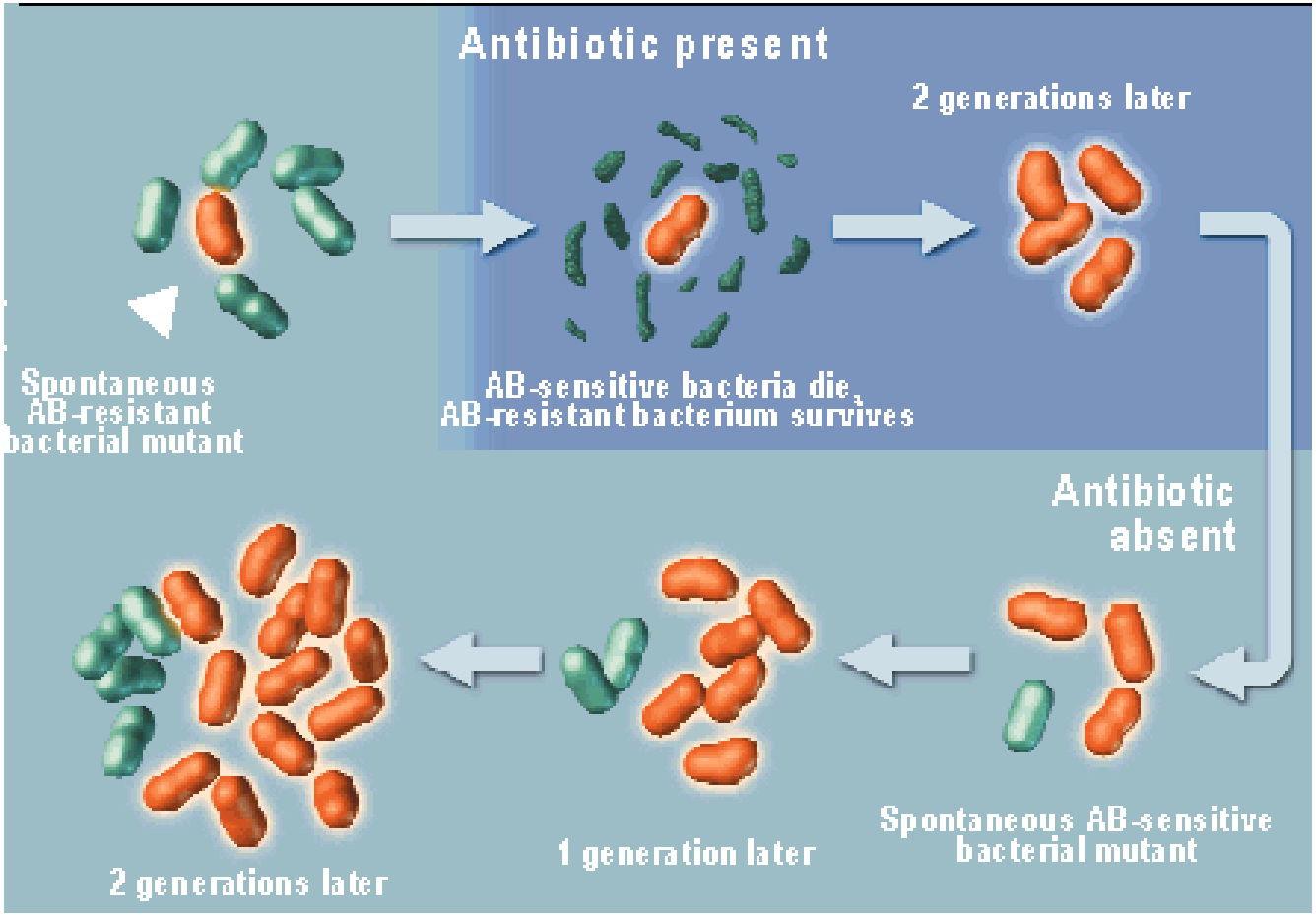


Charles Darwin

“Drug resistance follows the drug like a faithful shadow.”

- **Paul Erhlich 1854-1915**

Antibiotic Selection for Resistant Bacteria



Why Do Microbes Develop Resistance

- **Development of Persisters (*Metabolically inactive forms),* L forms (Mycoplasma), Biofilms**
- **Continuously Occuring Changes in Genetic Material (Mutation)**
- **Acquisition of Genetic Material (plasmids) from other Previously Resistant Organisms**
- **Selection and spread of resistant organisms in the presence of antimicrobials facillitated by**
- **1) Irrational use of drugs**
- **2) Self medication and**
- **3) Misuse of drugs**

Mechanism of Antimicrobial Resistance

- **Production of inactivating enzymes**

  Chloramphenicol, aminoglycosides, Penicillin etc

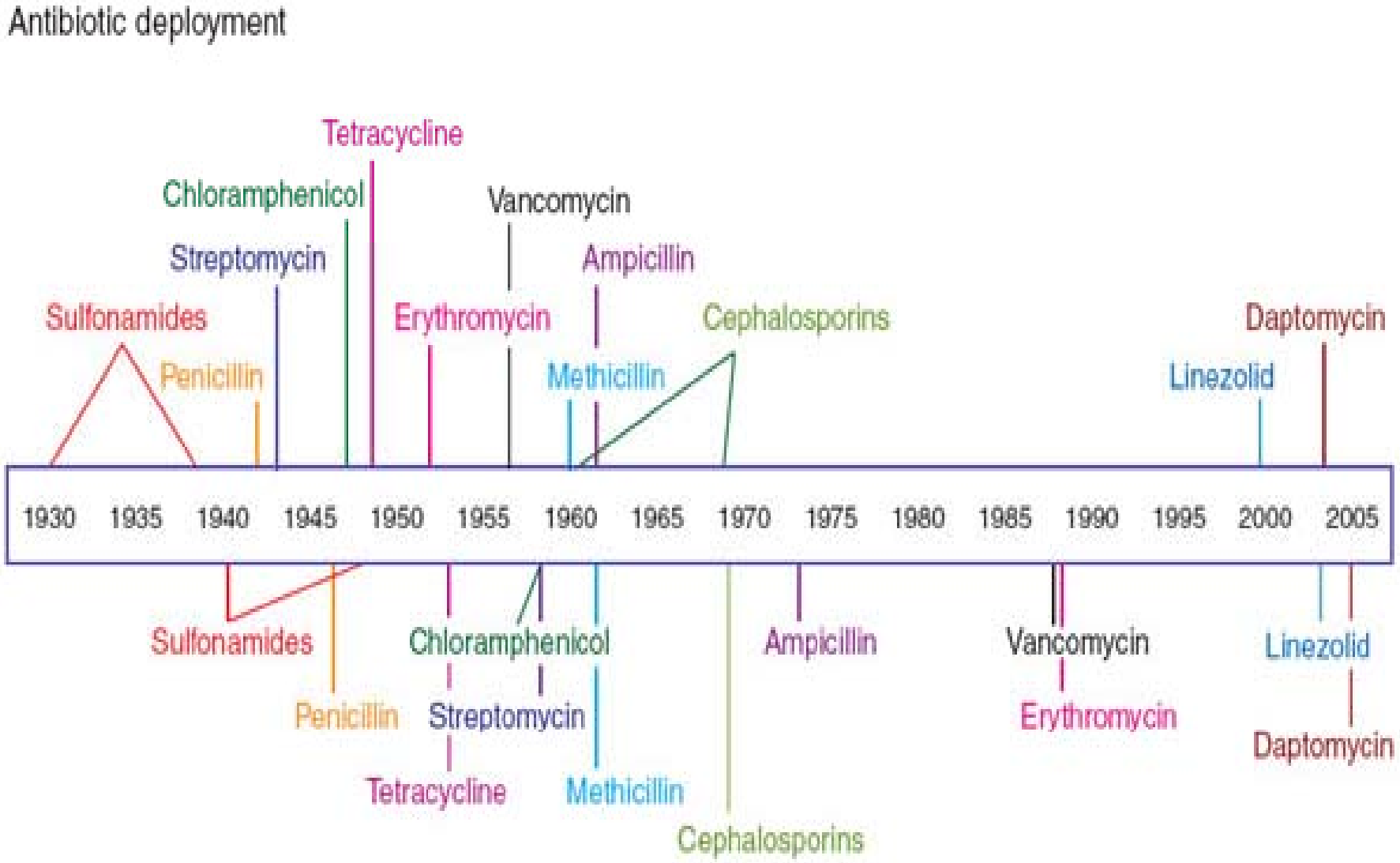
- **Alteration of drug targets** ***penicillins, methicillins, Oxacillin, Macrolides, quinolones etc***

- **Altered drug uptake/Increased Efflux eg*, Penicillins ,Tetracycline***

- **Altered Metabolic Pathway eg *Sulfa Drug Resistance***

Why AMR surveillance

- **AMR Confirmation : Laboratory evidence only**
- **Feed back to Clinicians/Field epidemiologists**
- **Feed back to Disease Programme Managers**
- **Feed back to regulatory authoroties**
- **Feed Back to Policy makers**
- **Feed back to researchers**


Antibiotic deployment
Tetracycline
Chloramphenicol
Vancomycin
Streptomycin
Ampicillin
Sulfonamides
Erythromycin
Cephalosporins
Daptomycin
Penicillin
Methicillin
Linezolid
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
Sulfonamides
Chloramphenicol
Ampicillin
Vancomycin
Linezolid
Penicillin
Streptomycin
Erythromycin
Daptomycin
Tetracycline
Methicillin
Cephalosporins
Antibiotic resistance observed

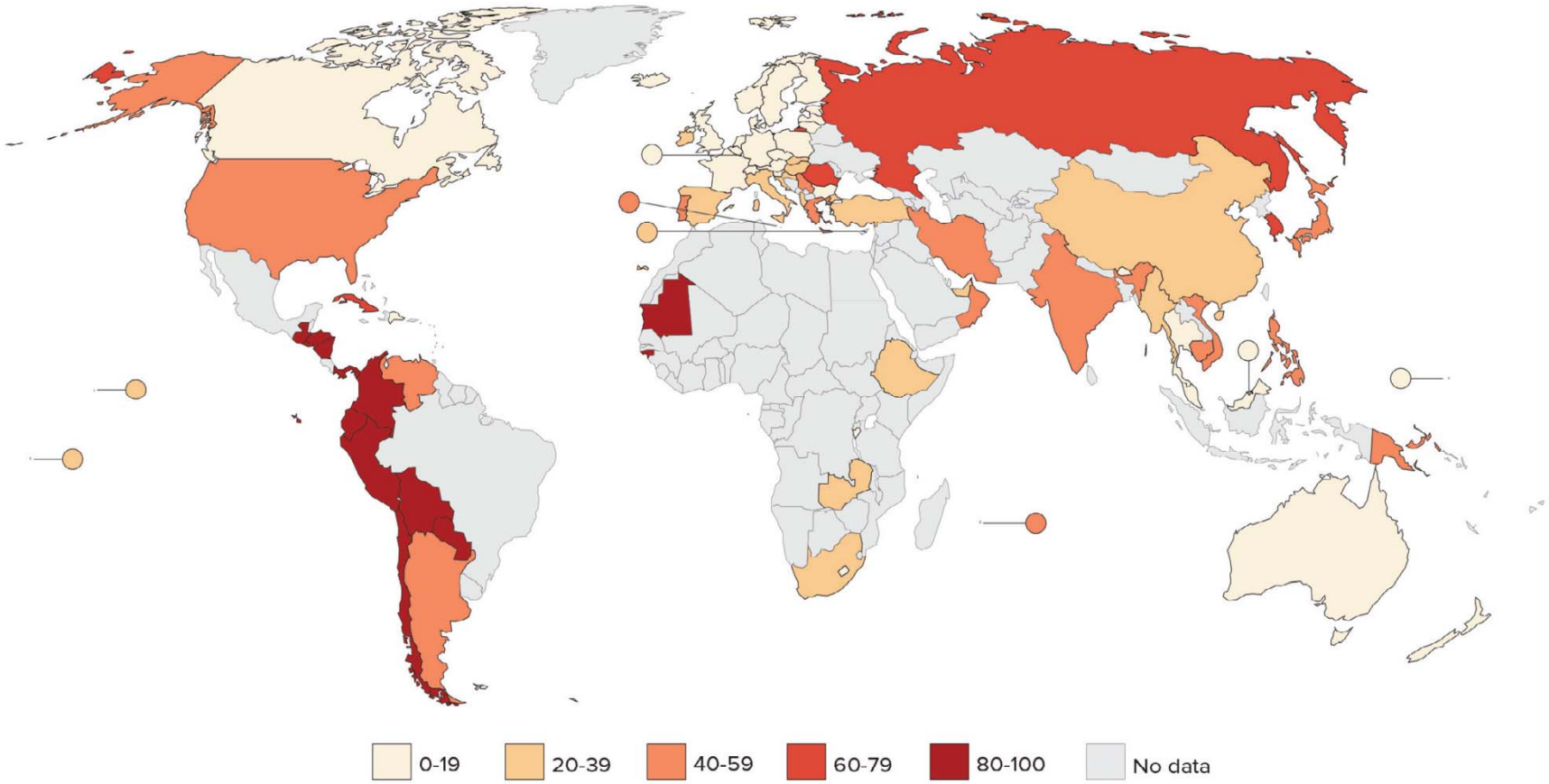
Increasing Prevalence of AMR

- **Community-acquired infections: Multidrug resistant pneumococci, *H. influenzae, Salmonella, Shigella, Gono*nococci, Multidrug-resistant *M. tuberculosis,* Drug-resistant Malaria, Drug-resistant HIV**

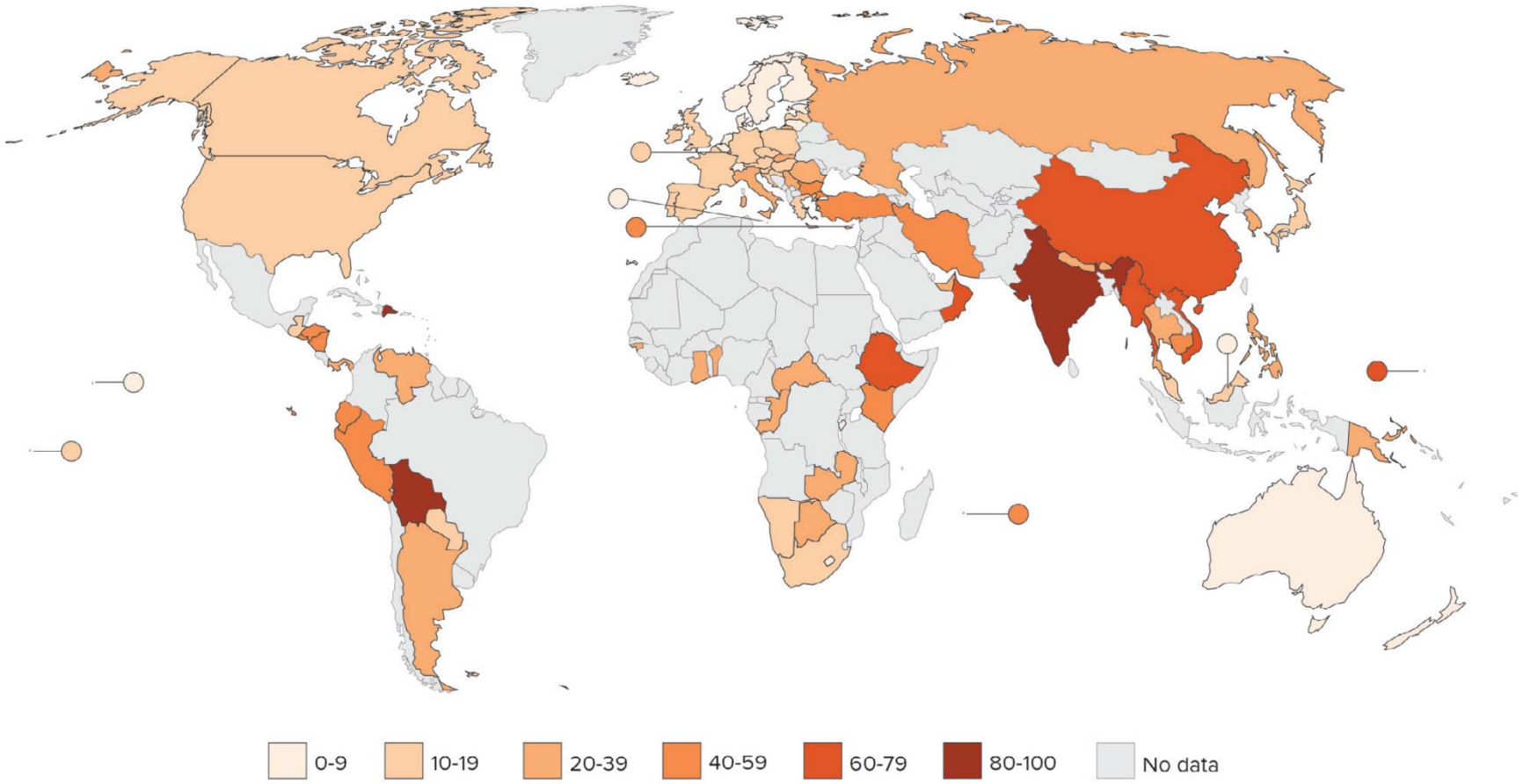
- **Hospital-acquired infections: Methicillin-resistant staphylococci(MRSA), Vancomycin-resistant enterococci(VRE), ESBL positive and Carbapenem res Gram-negative bacteria, Azole-resistant yeasts**

AMR : Global Scenario

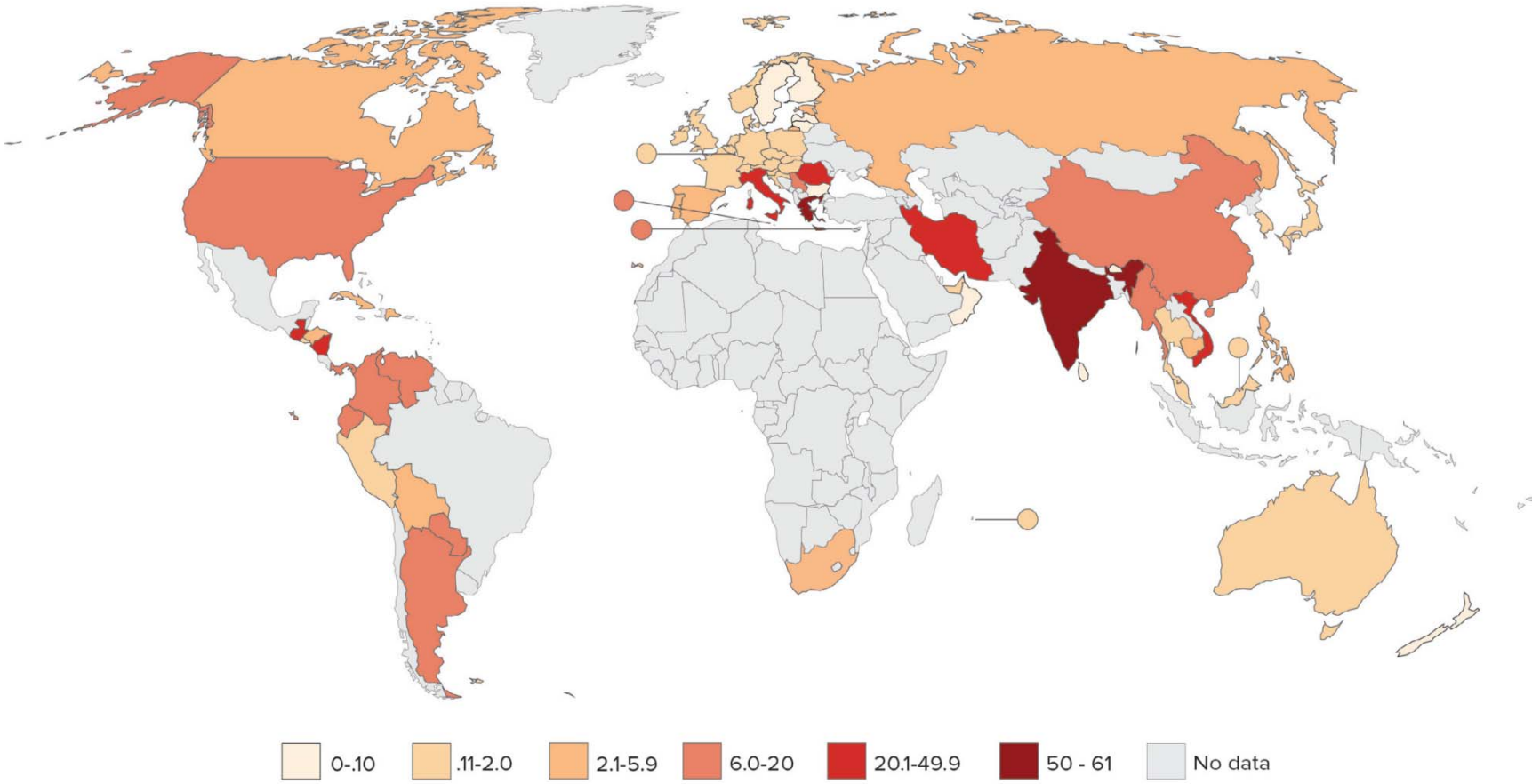
Percentage of (MRSA), by country (most recent year, 2011–14)



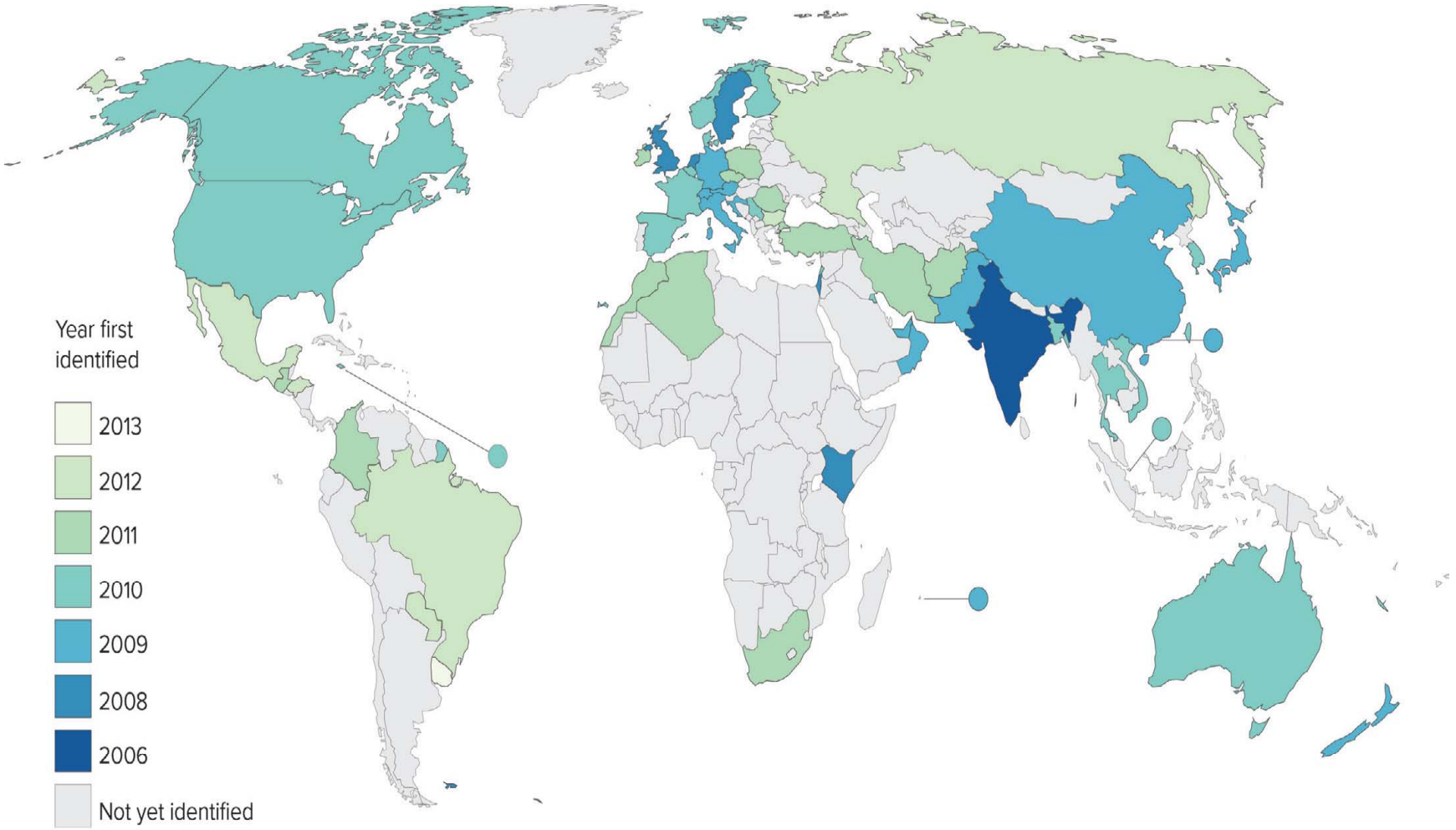
Percentage of ESBL producing Escherichia coli (2011–2014)



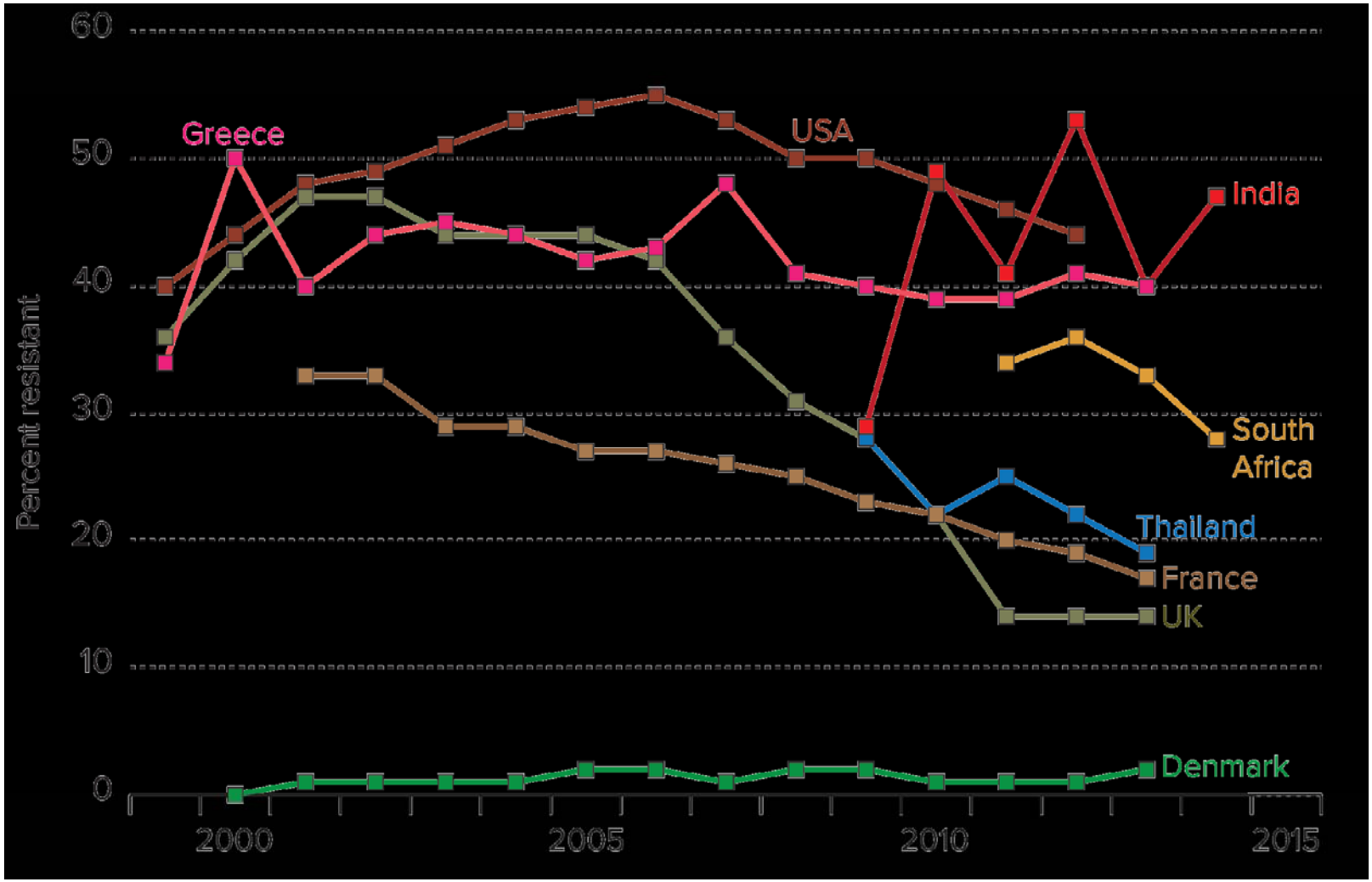
Percentage of carbapenem-resistant Klebsiella pneumoniae, by country (most recent year, 2011–2014)



Spread of New Delhi metallo-beta-lactamase-1: first detection



Percentage of Staphylococcus aureus isolates that are methicillin resistant (MRSA) in selected countries, 1999–2014 (GARP report)



AMR Surveillance : India

- Data available from some public health programmes eg RNTCP, NVBDCP, NLEP, NACO for specific diseases/pathogens
- GASP for Gonococcus(network of 15 labs)
- Indiaclen :Data generated by (India clinical epidemiology network) through IBIS and CAMR surveillance for Pneumococcus, H.inf
- INSAR (2008-10): Network of 20 labs with WHO support not existent anymore
- However , till couple of years back No national AMR surveillance for other pathogens eg Salmonella, Shigella, Staph, Klebsiella, Acinetobacter etc
- ICMR initiated AMR surveillance with Network of 4 Centres/6 labs
- DGHS/NCDC initiated AMR surveillance with network of 10 labs

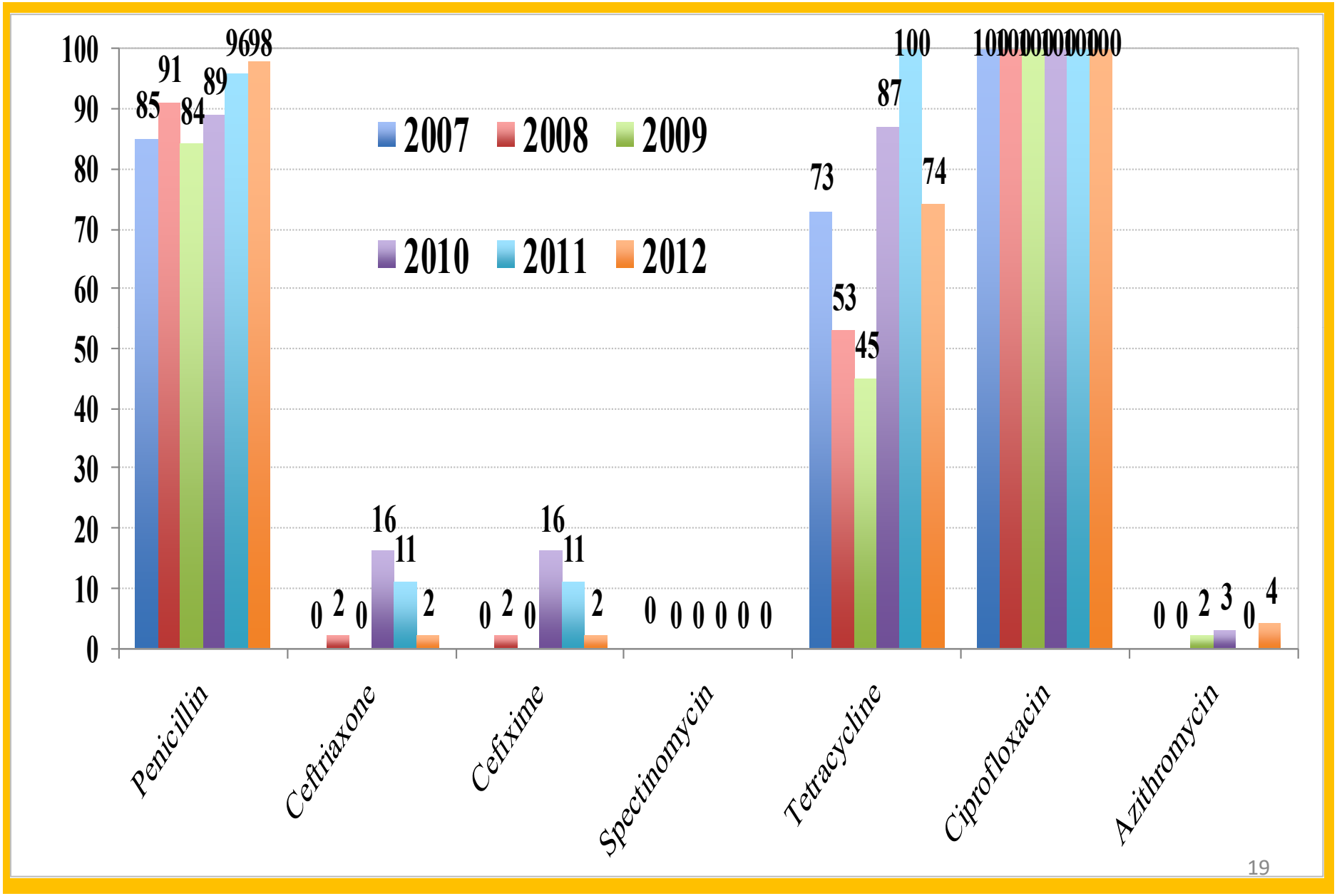
AMR SURVEILLANCE : INDIAN ….

- Very few Quality assured labs for antibiotic St testing
- Insufficient data analysis
- Not much Networking of labs
- Precise quantitation and trend analysis very sketchy
- Increasing drug resistance trends in the country based on available data

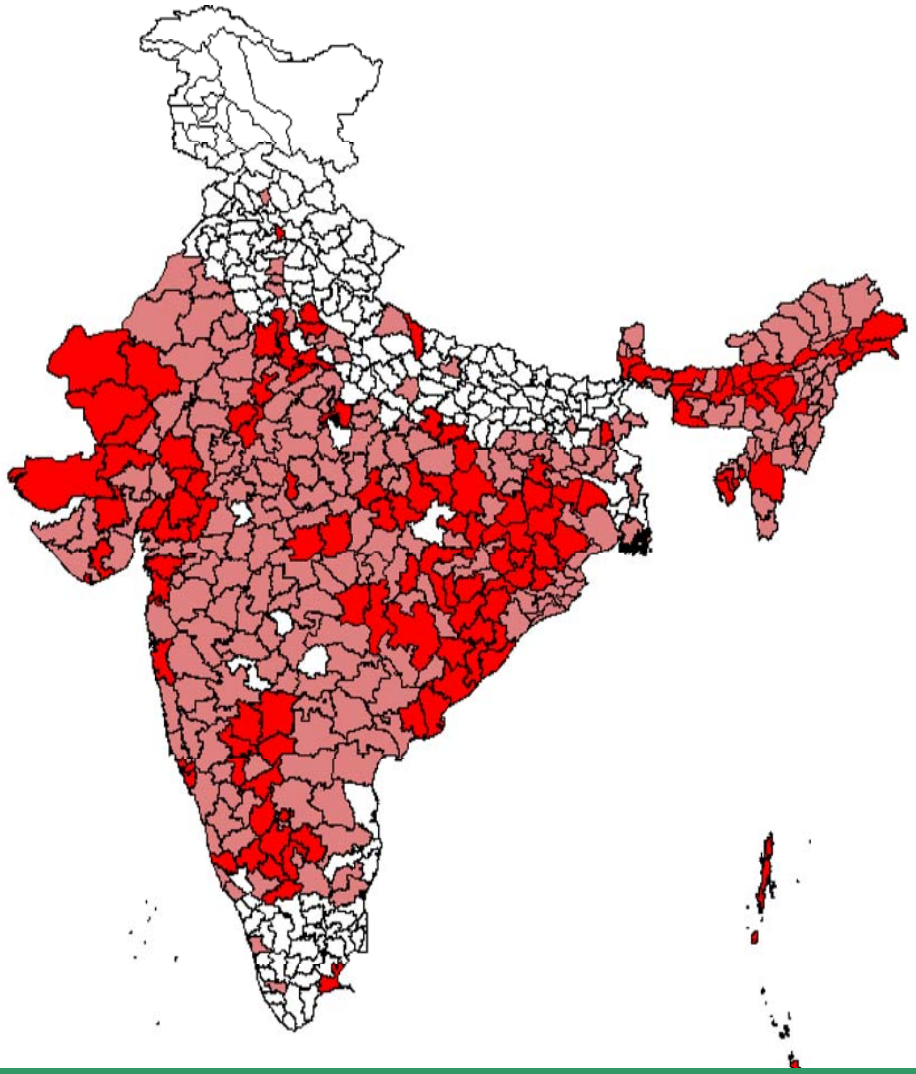
AMR trends: India

- **Enteric Fever:** Chloramphenicol, Ampicillin, Co-trimoxazole (10-15 %), Quinolones (up to 30%), recently reversal seen to Chloro, Cotrimoxazole and Ampicillin
- **Meningococcal Infections:** Penicillin (5-10%) Co-trimoxazole, Ciprofloxacin and Tetracycline (50-100%)
- **Gonococcal Infections:** Penicillin (50-80%), Ciprofloxacin (20-80%), Ceftriaxone (2-10%)
- **ESBL**: 30-60%, **MRSA**: 20-30%
- **Malaria** : Chloroquine(30-40%) and Sulpha-Pyrimethamine(25%) Res in **Falciparum** Malaria
- **TB : MDR :** 3-5% in new cases, 10-15% In treated cases **XDR** : 4-7%of MDR Cases, High MDR in Sikkim, Mumbai
- **HIV:** Primary and secondary low level resistance reported.

AMR(%R) : N.gonorrhoeae



Chloroquine Resistance in Pf in India



Districts with CQ treatment failure ≥10% (red) in any trial between 1978 and 2007 and Pf endemic areas (pink)

Lancet Infectious Diseases 2011, 11, 54-67

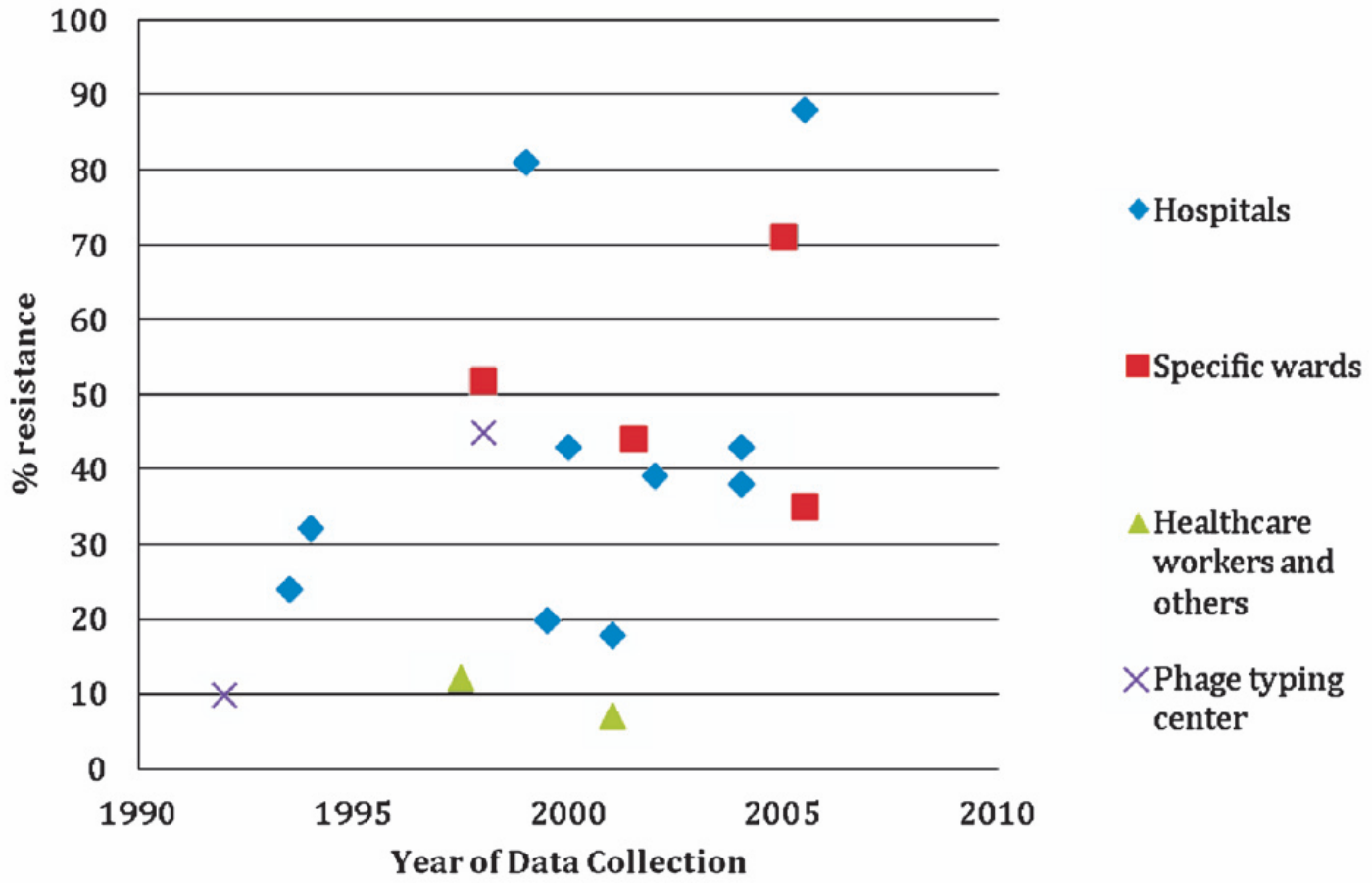
AMR : MENINGOCOCCUS

- No Res In India reported till 2005
- Following 2005 outbreak in Delhi increasing resistance (50-100%) seen towards Co-trimoxazole, Ciprofloxacin, Vancomycin and Tetracycline
- Other flouroquinolones (Ofloxacin , Levofloxacin, Gatifloxacin) (40-80%) also observed
- Increasing Res to Penicillin (0 -10%)
- No res to Ampicilln ,Rifampicin, Macrolides,
- Increased MIC to Chloro, Cephalosporins except 3rd Generation
- Similar trends seen in Meghalaya (2008) and Tripura (2009) outbreaks

AMR : Strept. Pneumoniae

- **T/t failure in Pneumococcal meningitis/Pneumonias increasingly reported since mid 90,s**
- **Increasing penicillin resistance PRSP(penicillin resistant Str.pneumoniae)(10-30%)**
- **Chloro (10-15%),Tetracycline (20-40%), Cotrimoxazole (50-65%), Oxacillin (10-15%)**
- **Increasing low level Resistance also seen towards macrolides (0-4%), flouroquinolones (0-2%), Cephalosporins (1-2%)**
- **However, so far No Res to 3rd Generation Cephalosporins**

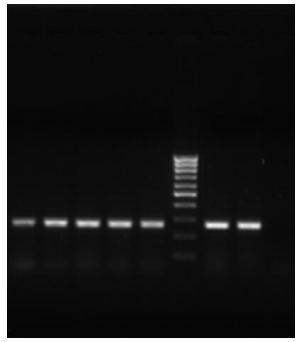
MRSA resistance rates from various Indian studies vary but appear to increase over time



Carbapenem Resistance

- Since 2005, more and more resistance to various carbapenems being reported in various Gram Negative pathogens eg Klebsiella, Acinetobacter, Pseudomonas from different parts of the country
- Reports of occurrence of NDM-1 strains from India (Reported in lancet Infectious disease August 2010) raised a lot of hue and cry specially on the issue of naming these strains as NDM-1(New Delhi Metallo b lactamse-1) and linking the origin of these strains from India, though these have been reported in many other countries also.

Prevalence of ESBL, Carbapenem resistance in E.coli in Environment & Community



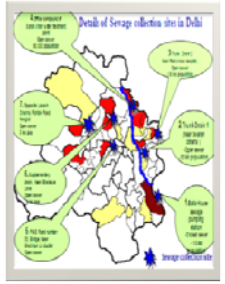
NCDC Study (2011-2014)

1. Community: 763 E.Coli isolates obtained from stool samples (Healthy children).

- **ESBL production :**13 % - 15 %, **Carbapenem Res** : 6-10% **NDM-1 production :** 3.2% - 4.5%

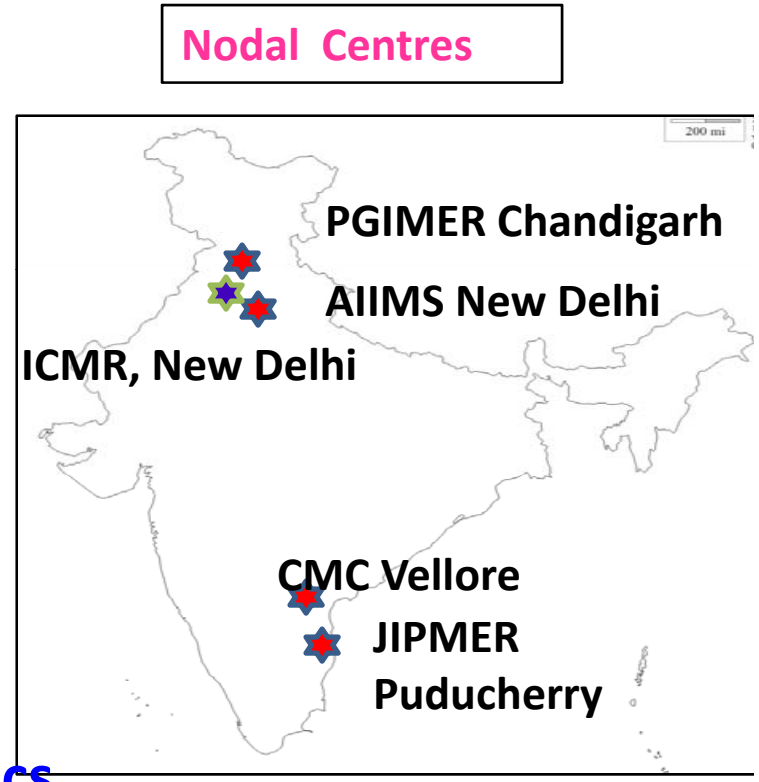
2. Sewage : Seven collection sites selected in Delhi for study from October 2011 to Dec 2014, total of **976 E. coli isolates** obtained from sewage samples

ESBL : 20-60%, **Carbepenem** Res : 12-20%, **NDM-1** : 5- 7.2 %



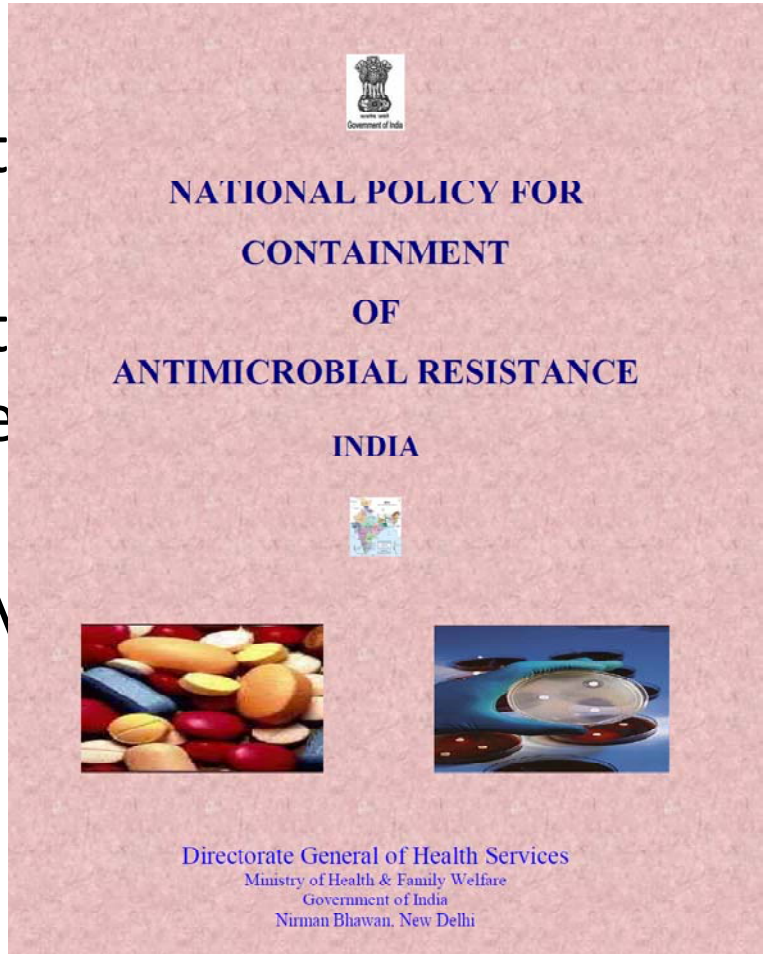
AMR Surveillance ICMR

- **Nodal centres are focal points for six pathogenic groups:**
  - ***Enterobacteriaceae* / sepsis (PGIMER)**
  - **Gram negative non-fermenters (CMC)**
  - **Enteric fever organisms (AIIMS)**
  - **Diarrhoeagenic organisms (CMC)**
  - **MRSA, Enterococcus (JIPMER)**
  - **Fungal pathogens (PGIMER)**
  - **Data management unit in Bioinformatics Center, ICMR Hqs**
- **15 Regional Centres (RC) proposed**



The National Policy for Containment of Antimicrobial Resistance

- A National task force was set in 2010 under t chairpersonship of the DGHS review AMR situation in t country and formulate a strate for containment.
- The National Policy for AM containment were formulated 2011 with following objectives.



JAIPUR DECLARATION ON AMR BY HEALTH MINISTERS OF THE SOUTH-EAST ASIA REGION

Sept 2011

Strong commitment to tackle AMR in the Region

National Programme on Containment of Antimicrobial Resistance

- As per National Policy, National Programme on AMR was developed and approved for implementation during 12th Five Year Plan.
- National Centre for Disease Control, Delhi identified as the nodal institution for this activity

Specific areas covered under National antibiotic policy

I. Review the current situation regarding manufacture , use & misuse of antibiotics in the country.

II. Design for creation of a National Surveillance System for Antibiotic Resistance.

III. Initiate studies documenting prescriptions patterns & establish a Monitoring System for the same.

IV. Enforce and enhance regulatory provisions for use of antibiotics in human , veterinary and industrial use.

V. Recommend specific intervention measures such as rationale use of antibiotics & antibiotic policies in hospitals which can be implemented as early as possible.

VI. Diagnostic Methods pertaining to antimicrobial Resistance Monitoring

Activities Envisaged Under AMR containment

- National advocacy meetings with State Health Ministers, Health Secretaries, Technical Officers, Hospital Authorities etc.
- Establishment of Quality Assured AST Lab Network for AMR surveillance.
- Surveillance of antibiotic usage & operational research.
- Strengthening of diagnostic tools to prevent misuse of antimicrobials.

Activities Envisaged Under AMR containment..2

- Co-ordination with DCGI/FSSAI for regulatory issues.
- Monitoring implementation of Hospital Infection Control and rational drug use policies in public and private sectors.
- Technical manpower training and development.
- IEC /BCC about rational use of antibiotics.
- Interface with Animal Husbandry/Agriculture etc. to rationalize use of antibiotics.

Action taken:

- Promote rationale use of antibiotics.(National treatment guidelines developed)
- AMR surveillance established
- Schedule H1 enacted to regulate sale of antibiotics (March 2014)
- Hospital Infection control: To strengthen hospital infection control guidelines and practices (Draft guidelines developed)

Regulatory mechanism is being strengthened by adding Schedule H1 for use of antibiotics as well as starting Pharmaco-vigilance activity under DCGI.

Treatment Guidelines :The Highlights

Therapy of Common Infections: Syndrome vise

- Gastro-intestinal system
- Central Nervous System
- Cardio-vascular system
- Skin and Soft tissue
- Respiratory tract
- Genitourinary tract
- Pediatric and Neonatal infections
- Obstetrics & Gynecological infections
- Ophthalmic Infections
- Infections of Ear, Nose & Throat

AMR Surveillance(NCDC Network)

- A total of 30 labs in state medical colleges will be strengthened in a phased manner to carry out surveillance.

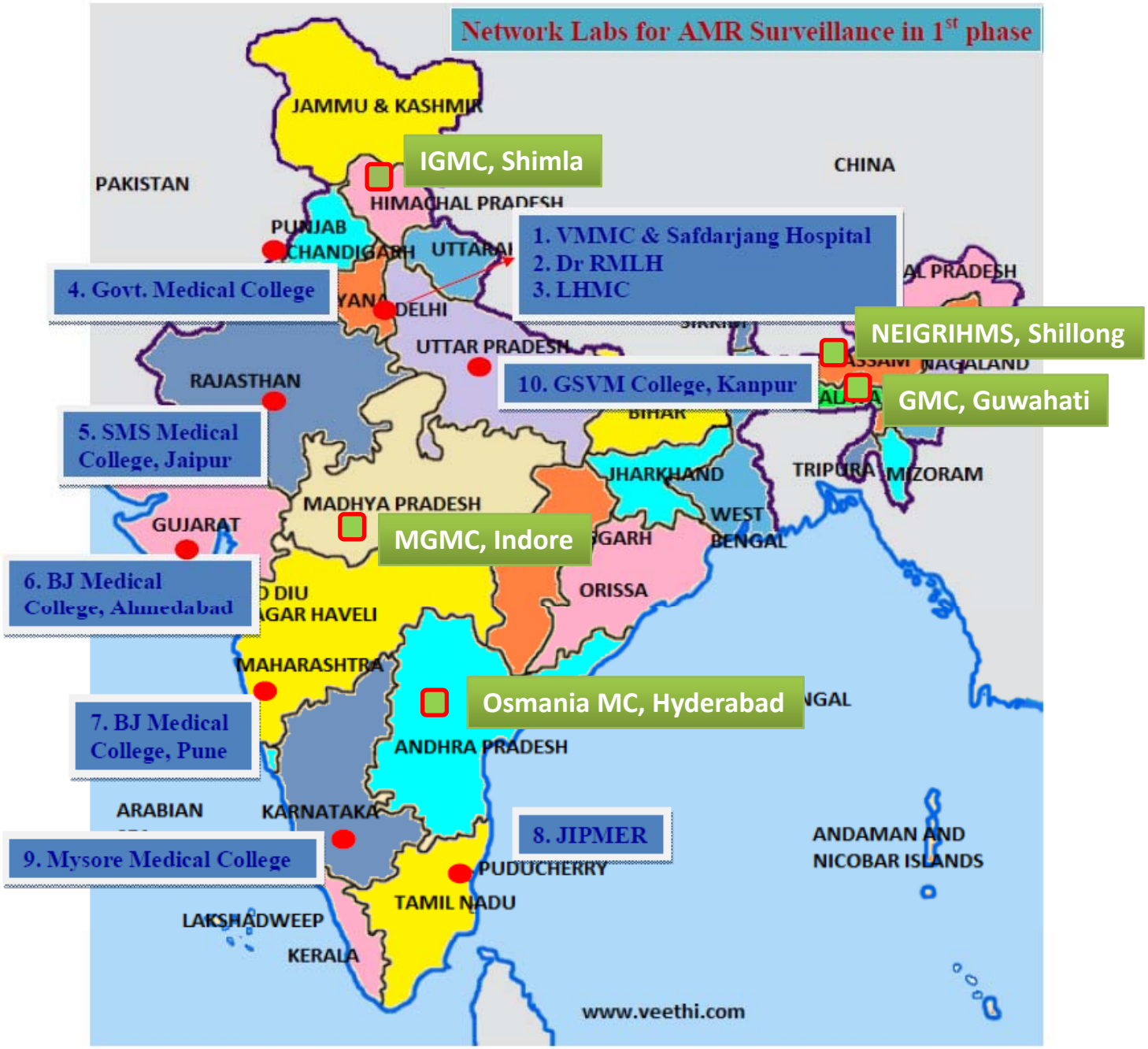
- Ten labs selected in the first phase(2015) in different geographical regions, five more being added in 2017

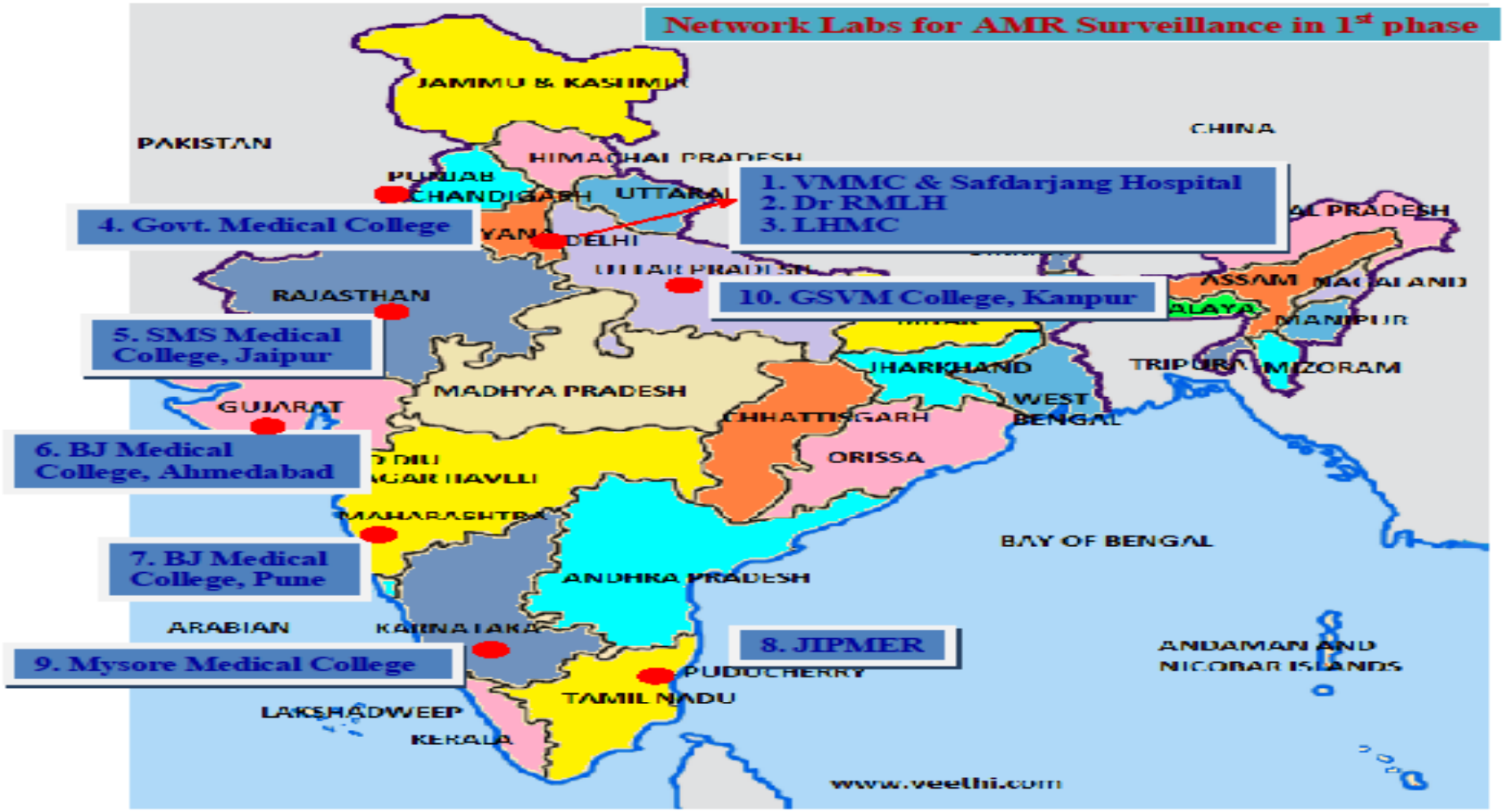
- Pathogens identified

- Panel of antibiotics finalised

- AST (disc Diffusion) methodology finalised based on CLSI guidelines

- Data analysis tools identified


Network Labs for AMR Surveillance in 1st phase
JAMMU & KASHMIR
IGMC, Shimla
PAKISTAN
CHINA
HIMACHAL PRADESH
PUNJAB
CHANDIGARH
UTTARAI
1. VMMC & Safdarjang Hospital
2. Dr RMLH
3. LHMC
4. Govt. Medical College
DELHI
NEIGRIHMS, Shillong
UTTAR PRADESH
NAGALAND
GMC, Guwahati
RAJASTHAN
10. GSVM College, Kanpur
BIHAR
5. SMS Medical College, Jaipur
JHARKHAND
TRIPURA
MIZORAM
MADHYA PRADESH
WEST BENGAL
GUJARAT
MGMC, Indore
6. BJ Medical College, Ahmedabad
ORISSA
MAHARASHTRA
Osmania MC, Hyderabad
7. BJ Medical College, Pune
ANDHRA PRADESH
ARABIAN
KARNATAKA
8. JIPMER
ANDAMAN AND NICOBAR ISLANDS
9. Mysore Medical College
PUDUCHERRY
TAMIL NADU
LAKSHADWEEP
KERALA
www.veethi.com


Network Labs for AMR Surveillance in 1st phase
1. VMMC & Safdarjang Hospital
2. Dr RMLH
3. LHMC
4. Govt. Medical College
5. SMS Medical College, Jaipur
6. BJ Medical College, Ahmedabad
7. BJ Medical College, Pune
8. JIPMER
9. Mysore Medical College
10. GSVM College, Kanpur
JAMMU & KASHMIR
PAKISTAN
CHINA
HIMACHAL PRADESH
PUNJAB
CHANDIGARH
UTTARAKHAND
DELHI
UTTAR PRADESH
RAJASTHAN
ASSAM
MANIPUR
TRIPURA
MIZORAM
JHARKHAND
WEST BENGAL
MADHYA PRADESH
CHHATTISGARH
GUJARAT
ORISSA
MAHARASHTRA
BAY OF BENGAL
ANDHRA PRADESH
ARABIAN
KARNATAKA
PUDUCHERRY
TAMIL NADU
LAKSHADWEEP
KERALA
ANDAMAN AND NICOBAR ISLANDS
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AMR Network labs

- The ten laboratories in the network are as below:
- a) Dr Ram Manohar Lohia Hospital,Delhi
- b) Smt Sucheta Kriplani Hospital,Delhi
- c) Vardhman mahavir Medical college and S.J Hospital,Delhi
- d) GVS Medical College, Kanpur(UP)
- e) SMS medical College, Jaipur(Rajasthan)
- f) B.J Medical College, Ahmedabad(Gujarat)
- g) B.J Medical college, Pune (Maharashtra)
- h) Govt Medical college, Chandigarh
- i) Mysore Medical college, Mysuru (Karnataka)
- j) JIPMER, Puducherry(T.N)
- Five more laboratories would be added in the network this year 1.(I.G.M.C. Shimla) 2. GMC, Assam, 3. NEEIGRHIM, Shillong, 4. MGM college, Indore (M.P) 5. Osmania Medical college, Hyderabad(Telangana)

Pathogen selection for AMR surveillance

- To begin with the following bacteria included for the AMR surveillance:(Initially four pathogens out of WHO priority list)
- Klebsiella pneumoniae
- Escherichia coli
- Staphylococcus aureus
- Enterococcus sp
- Typhoidal Salmonella, Pseudomonas aeruginosa and Acinetobacter added 2016/17

- Isolates both from community acquired infections and hospital acquired infections included.

Support to Network Labs

- **Manpower : Funds for recruiting Lab technician and data entry operator**
- **Reagents : Quality antibiotics procured centrally and supplied funds given for purchase of other minor reagents**
- **Equipments: Funds for purchase as well as Repair/maintenance**
- **Training : On Data analysis and quality control**
- **Guidelines : Made available current CLSI Guidelines, SOP,s developed**

AMR SURVIELLANCE METHODOLOGY

Samples/Isolates to be tested

- **CLINICAL -**
  - **OPD**
  - **IPD**
  - **ICU**
- **(COMMUNITY)**
- **ENVIRONMENTAL**

Format for Reporting under AMR Surveillance

S. No	**Isolat ID**	Age	Sex	Address	OPD/ IPD/ICU/ Community	Location Deptt Med/surg	Provisional Diagnosis	D.O.Admission	Date of sample collection	Clinical Sample	Pathogen Isolated	AST pattern/Zone diameter

Antibiotic Panel

Staphylococcus aureus	
Penicillin	10 units
Cefoxitin	30µg
Erythromycin	15 µg
Clindamycin	2 µg
Co-trimoxazole	25 µg
Gentamicin	10 µg
Ciprofloxacin	5 µg
Vancomycin	Vanco Screen/MIC
Teicoplanin	MIC
Doxycycline	30 µg
Linezolid	30 µg
Chloramphenicol	30 µg
Norfloxacin (urine)	10 µg
Nitrofurantoin (urine)	300 µg

E. coli and Klebsiella pneumoniae	
Ampicillin	10 µg
Amoxicillin-clavulanic acid	20/10 µg
Cefoxitin	30 µg
Cefotaxime	30 µg
Cefotaxime- clavulanic acid	30/10 µg
Ceftazidime	30 µg
Ceftazidime - clavulanic acid	30/10 µg
Co-trimoxazole	25 µg
Gentamicin	10 µg
Amikacin	30 µg
Ciprofloxacin	5 µg
Piperacillin-tazobactam	100/10 µg
Imepenem	10 µg
Meropenem	10 µg
Colistin	MIC
Nitrofurantoin (Only urine)	300 µg

Enterococcus sp.	
Ampicillin	10 µg
Penicillin	10 units
Amoxicillin-clavulanic acid	20/10 µg
Gentamicin (high level)	120 µg
Erythromycin	15 µg
Vancomycin	30 µg
Teicoplanin	30 µg
Chloramphenicol	30 µg
Ciprofloxacin	5 µg
Linezolid	30 µg
Tetracycline	30 µg
Norfloxacin (urine)	10 µg
Nitrofurantoin (urine)	300 µg

Salmonella (Typhoidal)	
Ampicillin	10 µg
Cefixime	30 µg
Ceftriaxone	30 µg
Nalidixic acid	30 µg
Ciprofloxacin	5 µg
Chloramphenicol	30 µg
Tetracycline	30 µg
Trimethopirim-sulphamethoxazole	25 µg
Azithromycin	15 µg
Imipenem	**10 ug**

Pseudomonas aeruginosa	
Ceftazidime	30 µg
Levofloxacin	5 µg
Tobramycin	10 µg
Amikacin	30 µg
Netilmicin	30 µg
Gentamicin	10 µg
Colistin	MIC
Ciprofloxacin	5 µg
Cefepime	30 µg
Piperacillin-tazobactam	100/10 µg
Imipenem	10 µg
Meropenem	10 µg
Aztreonam	30 µg

Acinetobacter baumannii	
Ceftazidime	30 µg
Levofloxacin	5 µg
Amikacin	30 µg
Netilmicin	30 µg
Colistin	MIC
Cefepime	30 µg
Piperacillin-tazobactam	100/10 µg
Imipenem	10 µg
Meropenem	10 µg
Cefoperazone-sulbactam	75/30 µg
Tetracycline	30 µg

Quality Assurance

- **IQC** : **Being Practiced by network Labs**

- **EQA : 1% isolates sent to NCDC for reconfirmation**

  90-95 % concordance in results

- **Independent EQA: Being explored with IAMM,WHO**

- **Some of the network labs already participating in EQA run by IAMM and some are NABL accredited**

DATA ANALYSIS /TRANSMISSION & FREQUENCY

WHO Net/Excel

Quarterly/Six monthly Through E mail

AMR Resistance Trend from Network Labs (2015-16)

LHMC, DELHI (LHMC)

RMLH, DELHI (RML)

SJH, DELHI (SJH)

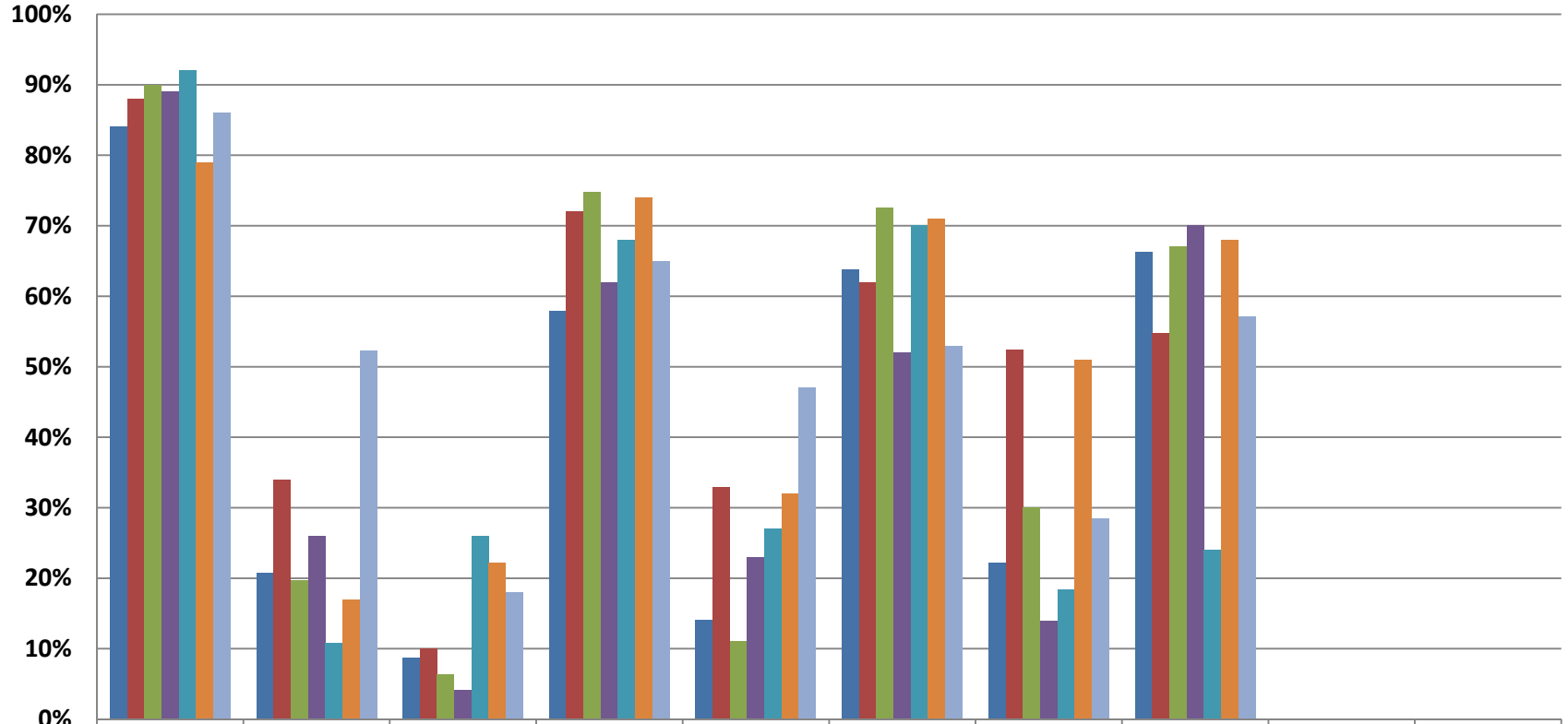
GMCH, CHANDIGARH(CHN)

BJ MC, AHMEDABAD (AHM)

BJMC, PUNE (PUN)

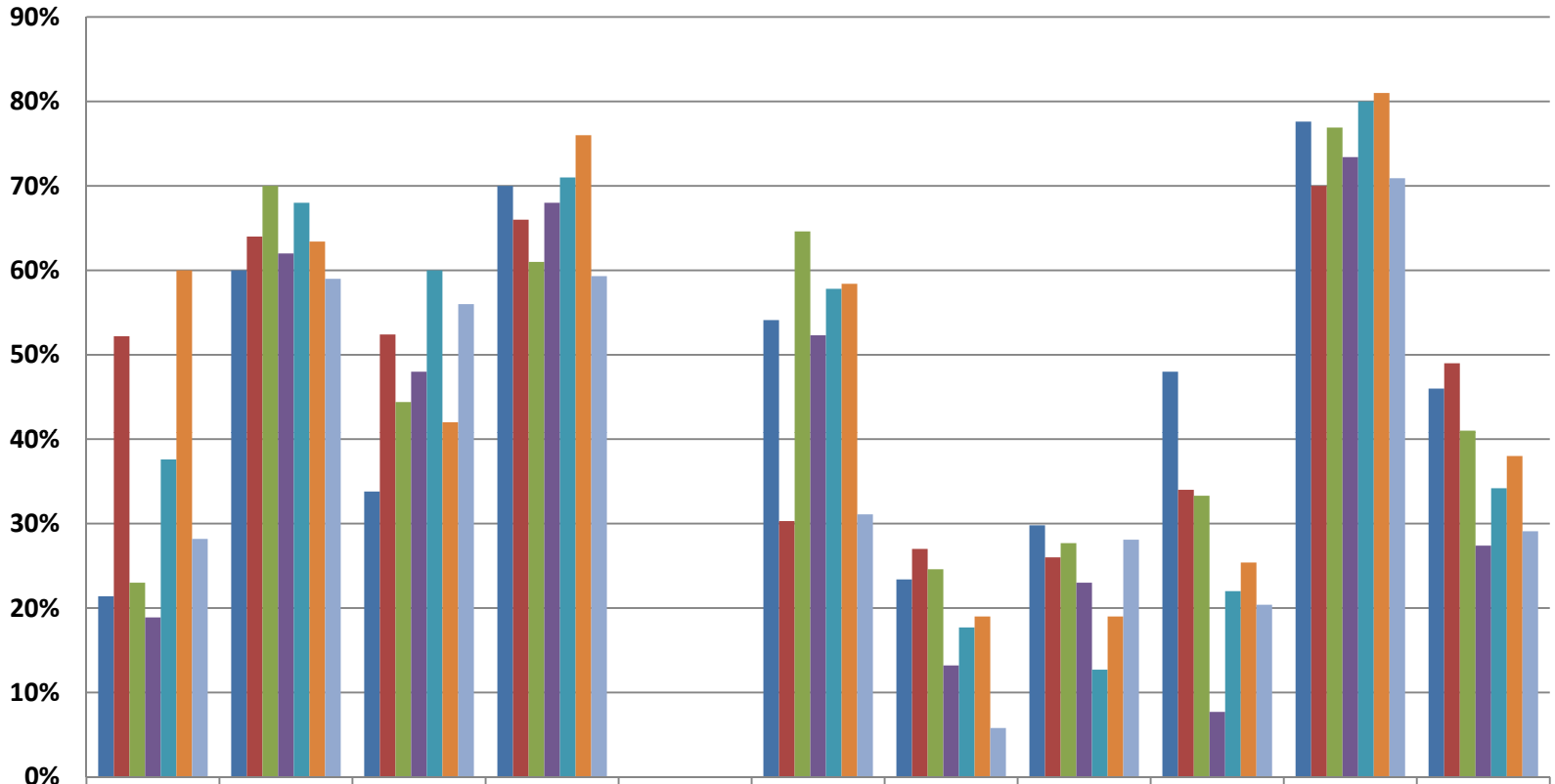
GVSM , KANPUR (KAN)

RESISTANCE (%) STAPH. AUREUS



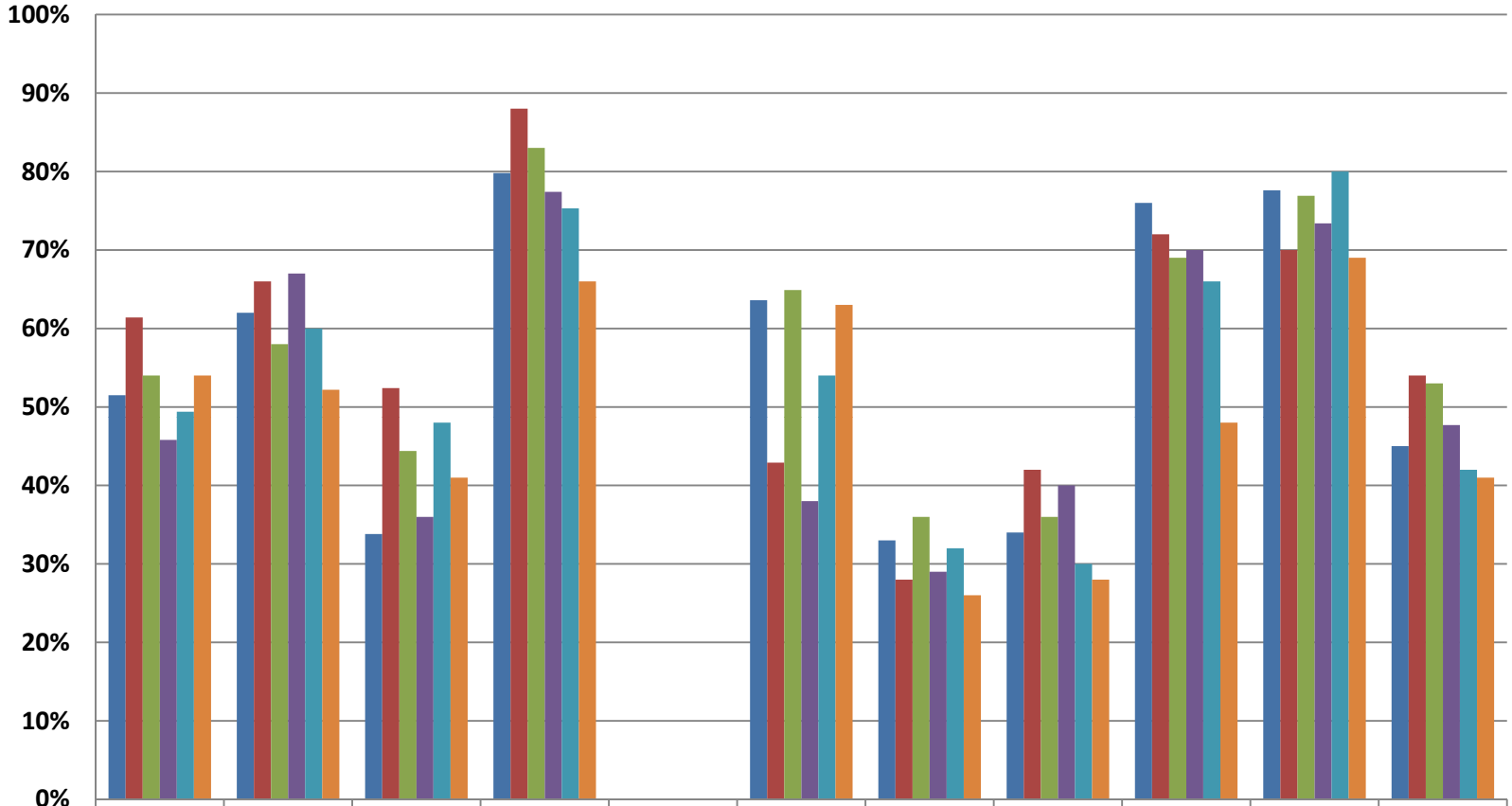
	PEN	CEFOX	CHL	CIP	CLIN	ERY	GEN	SXT	VAN	LNZ
DL RML	84%	21%	9%	58%	14%	64%	22%	66%	0%	0%
DL SJH	88%	34%	10%	72%	33%	62%	52%	55%	0%	0%
DL LHMC	90%	20%	6%	75%	11%	73%	30%	67%	0%	0%
CHN	89%	26%	4%	62%	23%	52%	14%	70%	0%	0%
AHM	92%	11%	26%	68%	27%	70%	18%	24%	0%	0%
KAN	79%	17%	22%	74%	32%	71%	51%	68%	0%	0%
PUNE	86%	52%	18%	65%	47%	53%	29%	57%	0%	0%

RESISTANCE (%) E.COLI



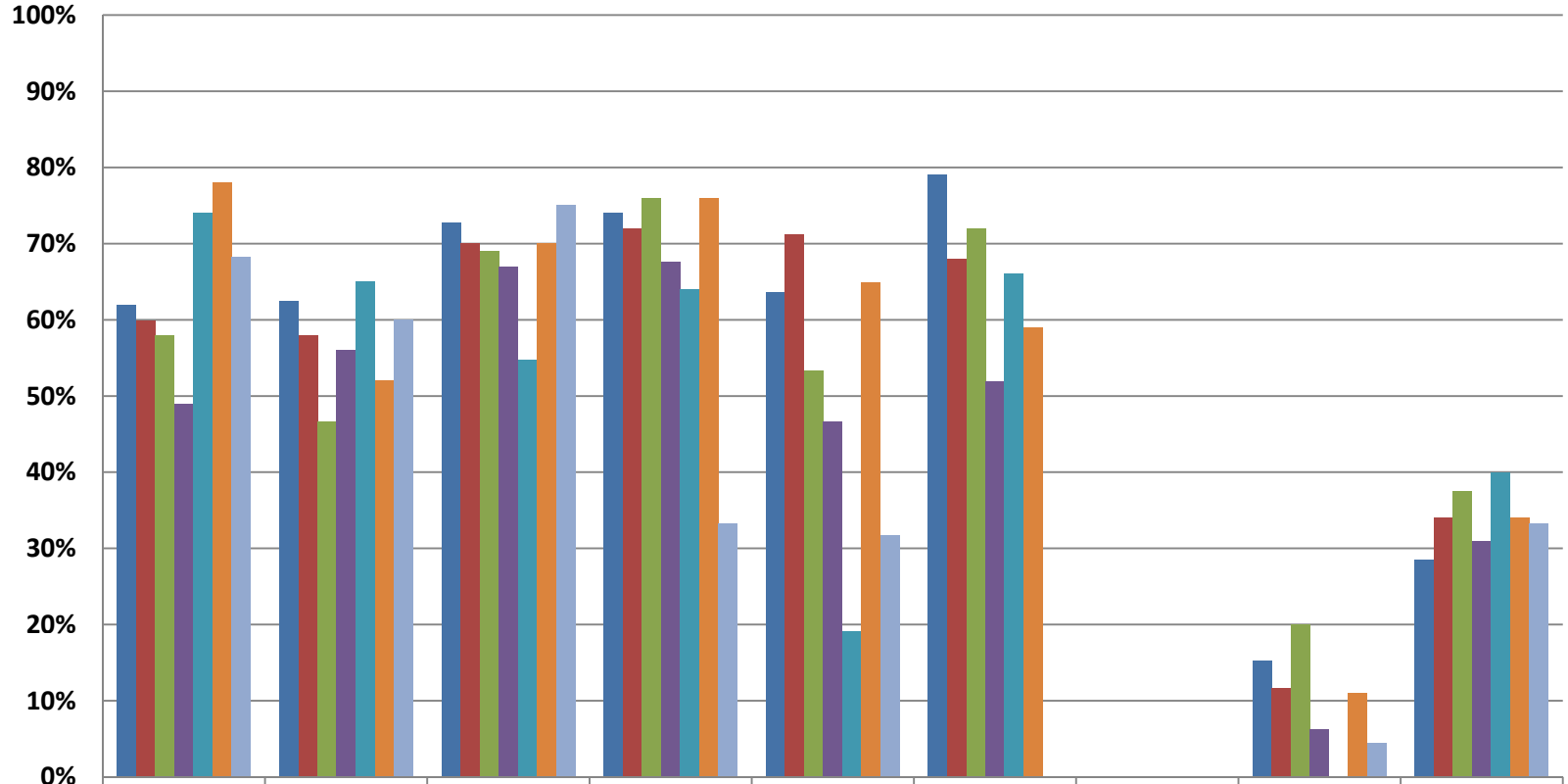
	AMK	CEFO	ESBL	CIP	COL	GEN	IPM	MEM	NIT	SXT	TZP
DL RML	21%	60%	34%	70%	0%	54%	23%	30%	48%	78%	46%
DL SJH	52%	64%	52%	66%	0%	30%	27%	26%	34%	70%	49%
Dl LHMC	23%	70%	44%	61%	0%	65%	25%	28%	33%	77%	41%
CHN	19%	62%	48%	68%	0%	52%	13%	23%	8%	73%	27%
AHM	38%	68%	60%	71%	0%	58%	18%	13%	22%	80%	34%
KAN	60%	63%	42%	76%	0%	58%	19%	19%	25%	81%	38%
PUN	28%	59%	56%	59%	0%	31%	6%	28%	20%	71%	29%

RESISTANCE (%) KLEBSIELLA.SP



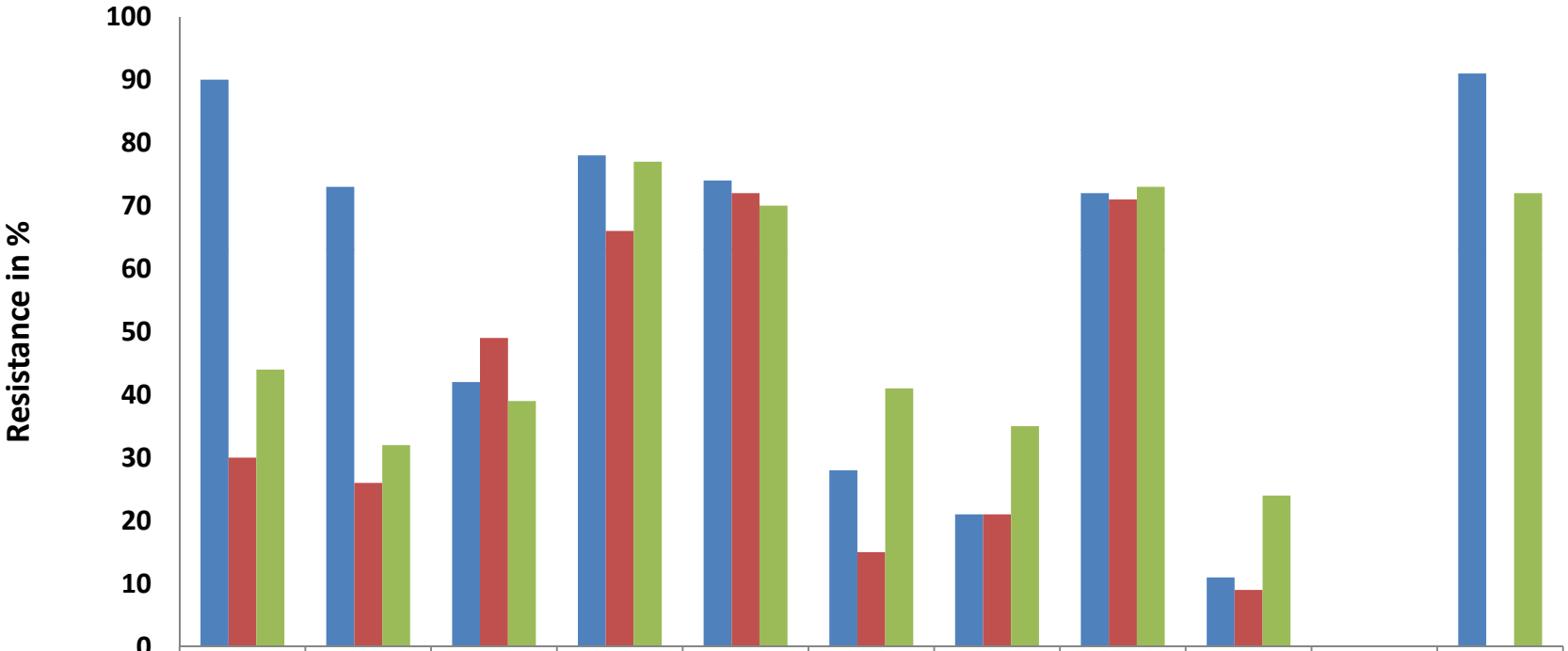
	AMK	CEFO	ESBL	CIP	COL	GEN	IPM	MEM	NIT	SXT	TZP
DL RML	52%	62%	34%	80%	0%	64%	33%	34%	76%	78%	45%
DL SJH	61%	66%	52%	88%	0%	43%	28%	42%	72%	70%	54%
DL LHMC	54%	58%	44%	83%	0%	65%	36%	36%	69%	77%	53%
CHN	46%	67%	36%	77%	0%	38%	29%	40%	70%	73%	48%
AHM	49%	60%	48%	75%	0%	54%	32%	30%	66%	80%	42%
KAN	54%	52%	41%	66%	0%	63%	26%	28%	48%	69%	41%

RESISTANCE (%) ENTEROCOCCUS



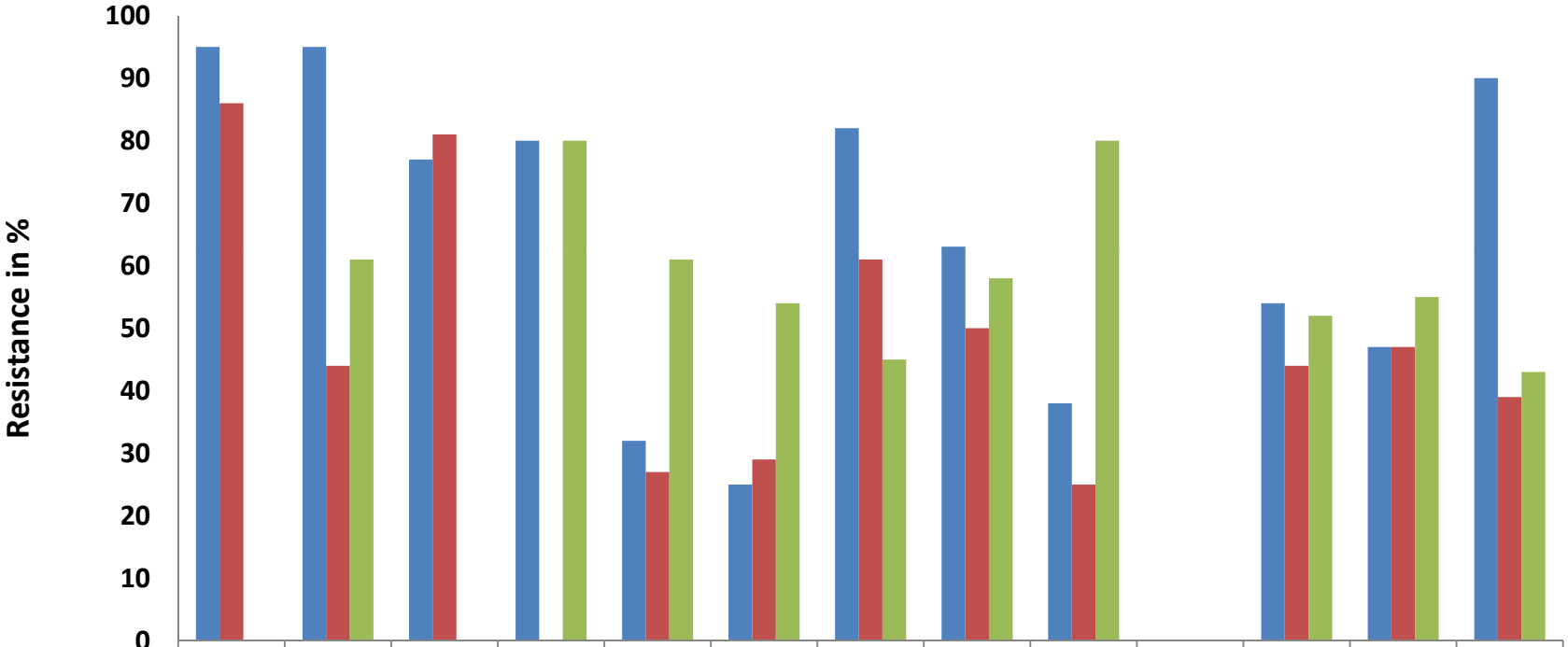
	PEN	CHL	CIP	ERY	GEN	TETRA	LNZ	VAN	NIT
DL RML	62%	63%	73%	74%	64%	79%	0%	15%	29%
DL SJH	60%	58%	70%	72%	71%	68%	0%	12%	34%
DL LHMC	58%	47%	69%	76%	53%	72%	0%	20%	38%
CHN	49%	56%	67%	68%	47%	52%	0%	6%	31%
AHM	74%	65%	55%	64%	19%	66%	0%	0%	40%
KAN	78%	52%	70%	76%	65%	59%	0%	11%	34%
PUN	68%	60%	75%	33%	32%		0%	5%	33%

E. Coli (% Res) – 2016-17



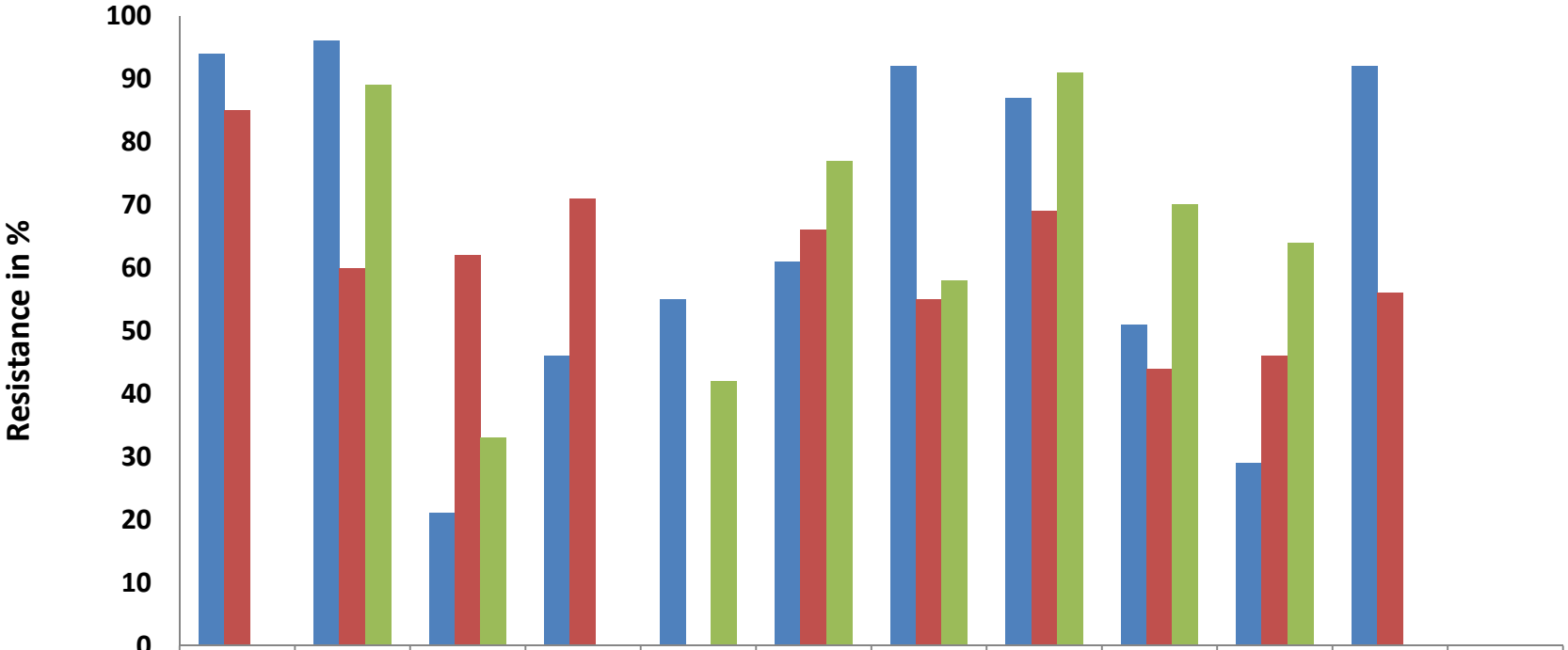
	TZP	AMK	GEN	CIP	NOR	IPM	MEM	STX	NIT	COL	CAZ
Maysore	90	73	42	78	74	28	21	72	11	0	91
Kanpur	30	26	49	66	72	15	21	71	9	0	
LHMC	44	32	39	77	70	41	35	73	24	0	72

Klebsiella(%Res): 2016-17



	AMC	TZP	CTX	CAZ	IPM	MEM	SXT	NOR	NIT	COL	CIP	GEN	AMK
Maysore	95	95	77	80	32	25	82	63	38	0	54	47	90
Kanpur	86	44	81		27	29	61	50	25	0	44	47	39
LHMC		61		80	61	54	45	58	80	0	52	55	43

Acinetobacter (%Res) : 2016-17



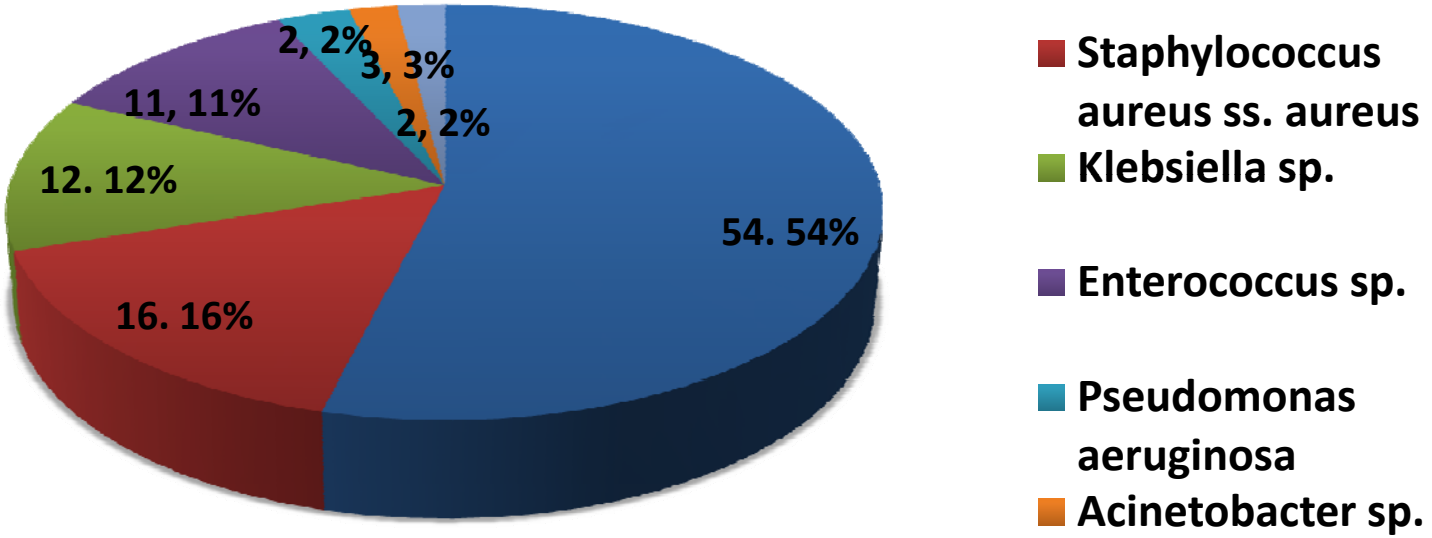
	AMP	AMK	NOR	SXT	GEN	CIP	TZP	CAZ	IPM	MEM	NIT	COL
Maysore	94	96	21	46	55	61	92	87	51	29	92	0
Kanpur	85	60	62	71		66	55	69	44	46	56	0
LHMC		89	33		42	77	58	91	70	64		0

Antimicrobial Resistance : 2015

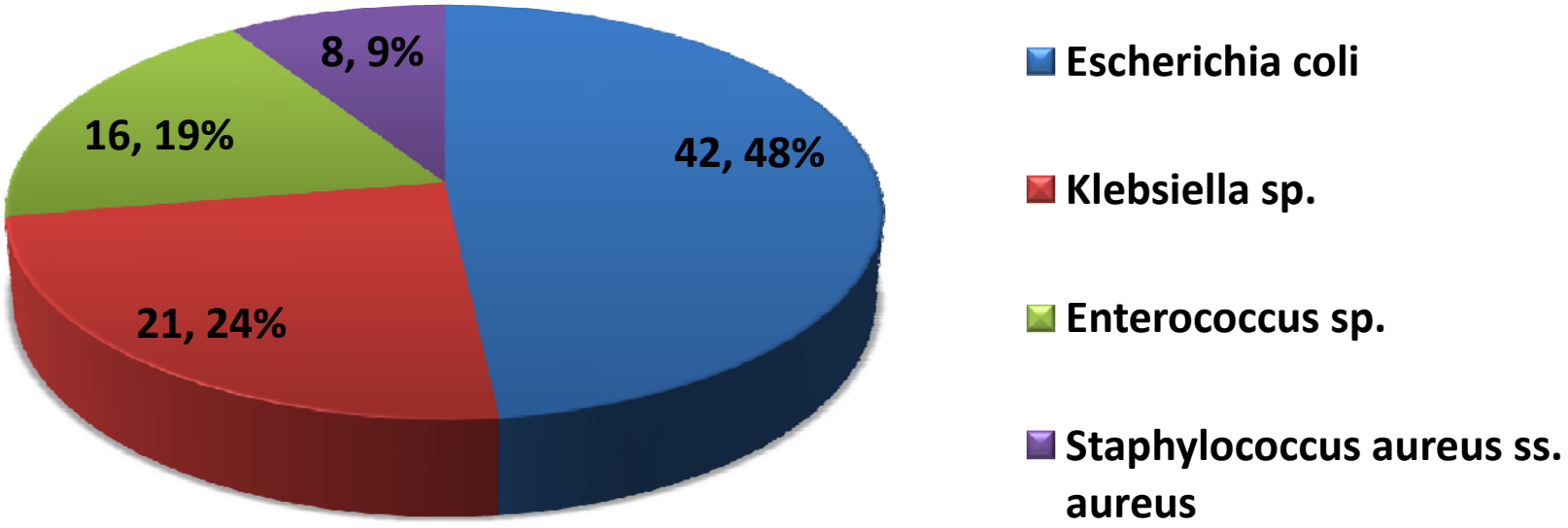
SJ Hospital/VMMC, DELHI

Blood Urinary isolates

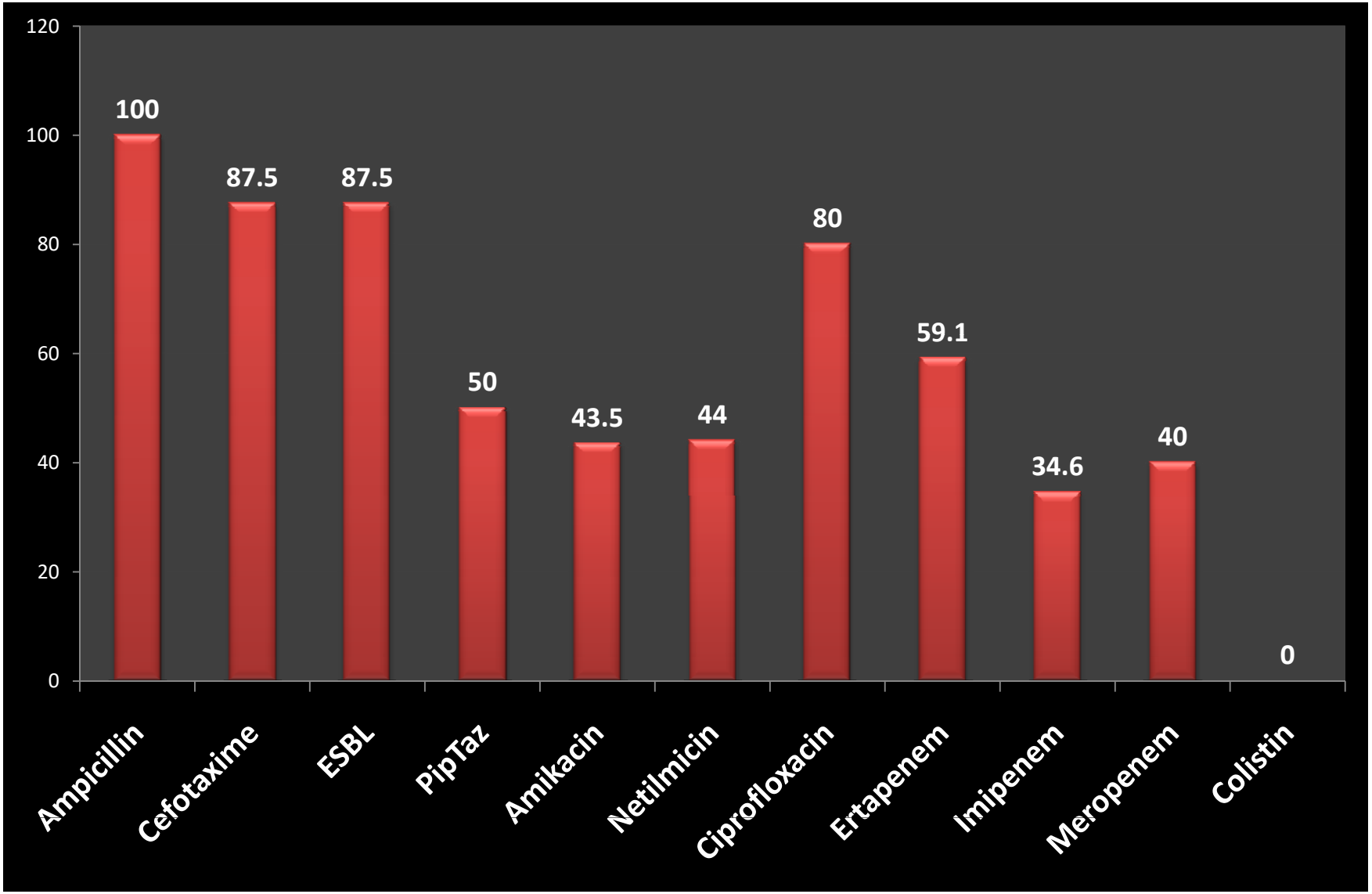
Urinary Isolates Outpatients (84)



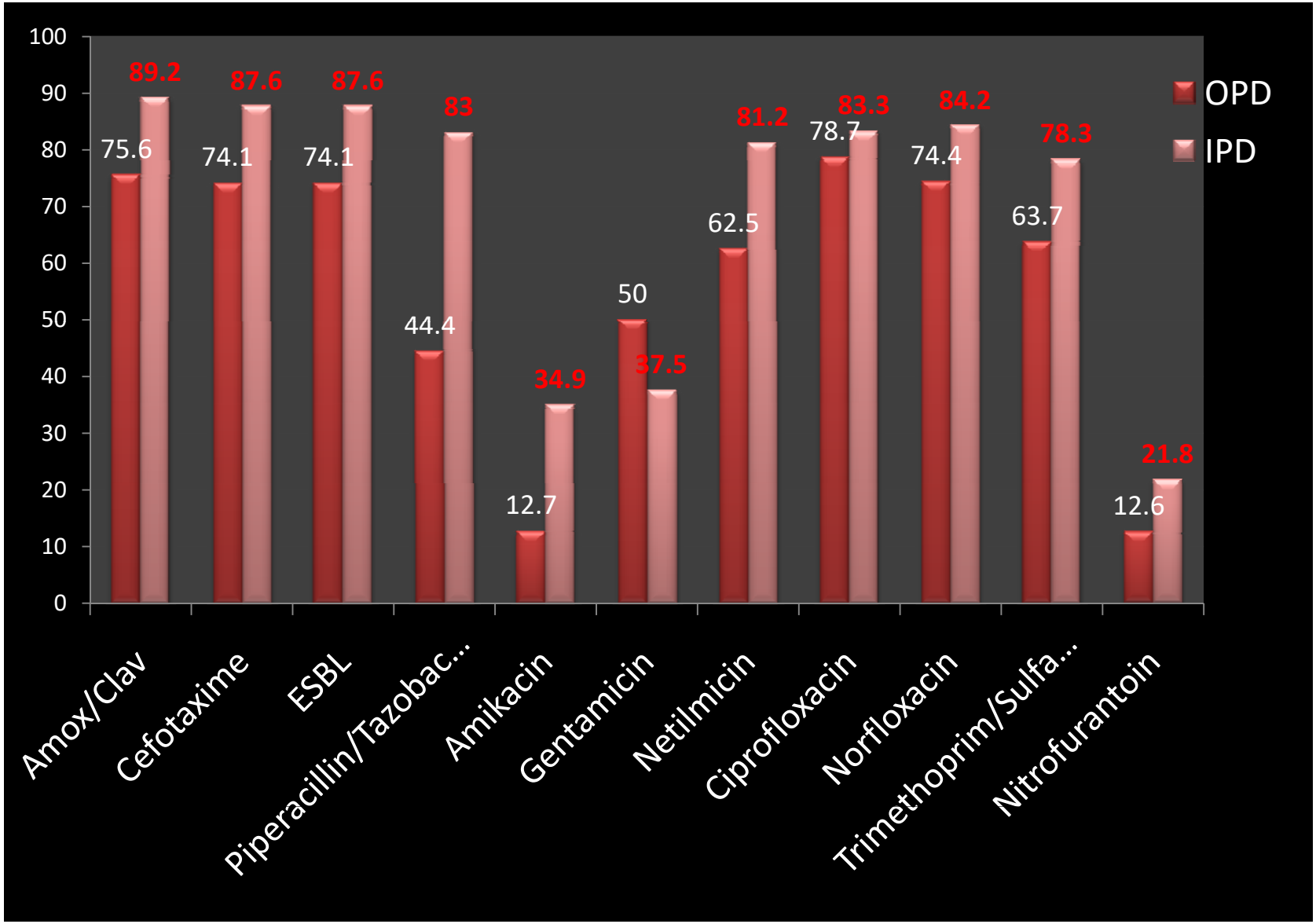
Urinary isolates : IPD



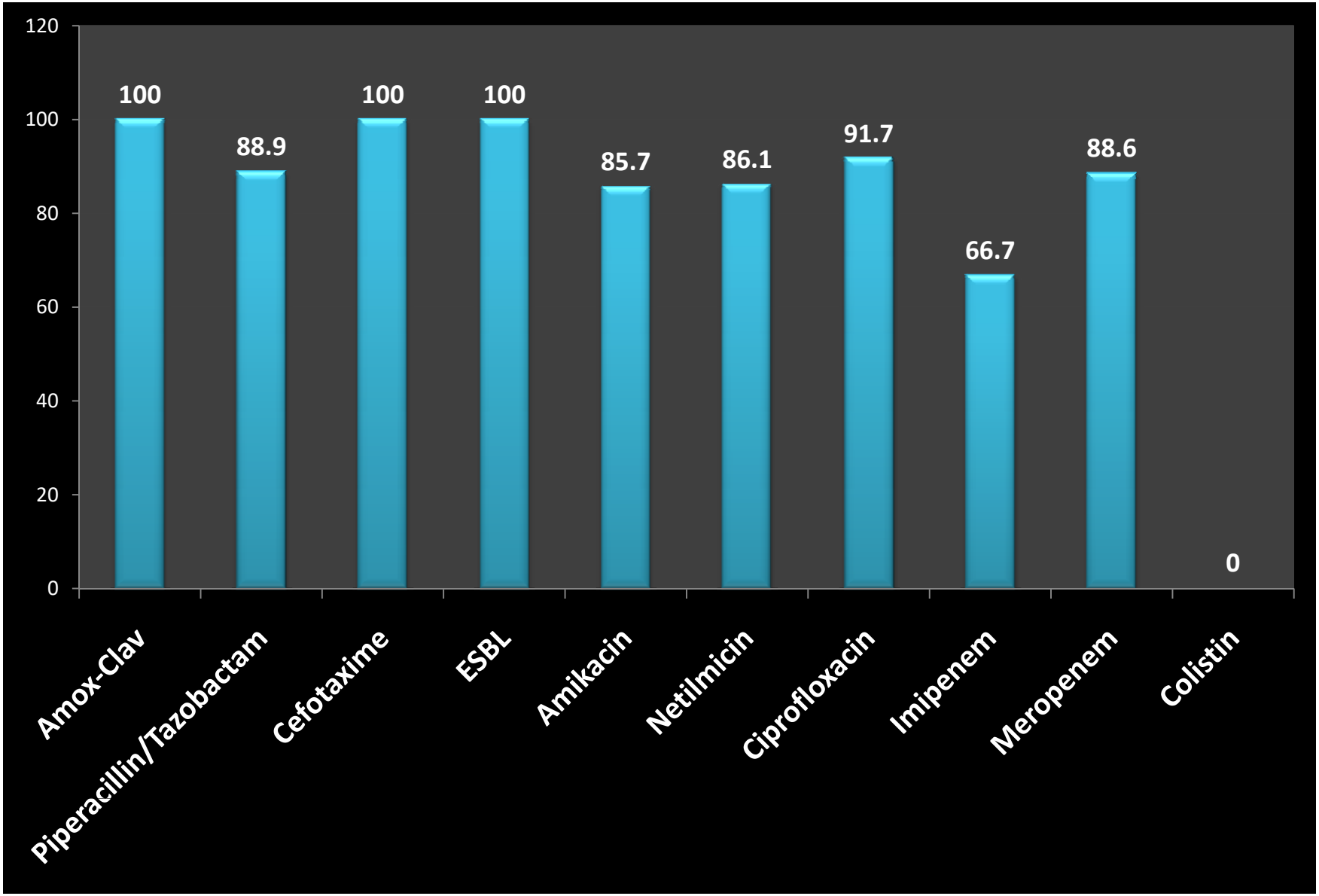
% Resistance in E. coli Blood isolates (36)



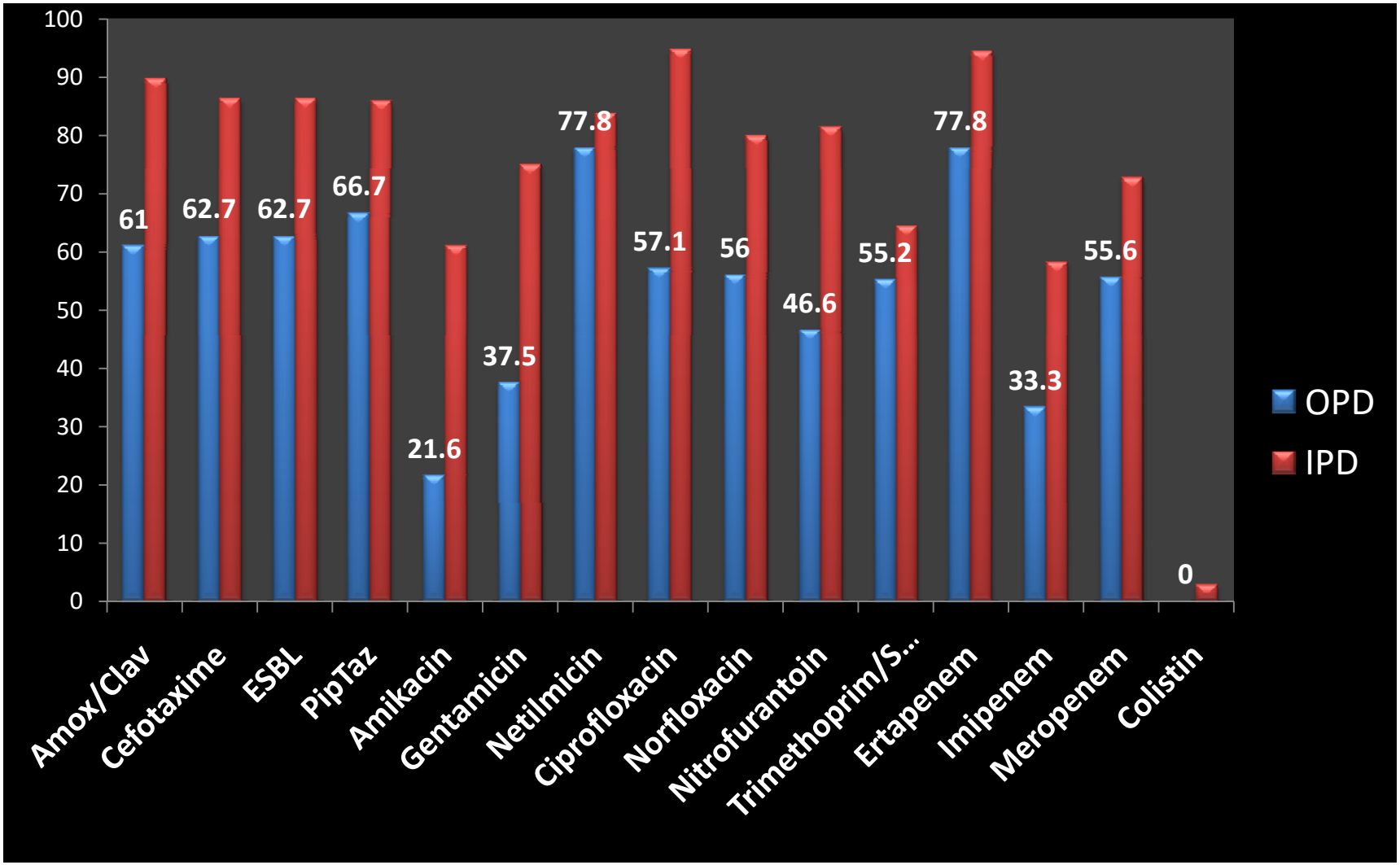
% Res Urinary E. coli (OPD and IPD)



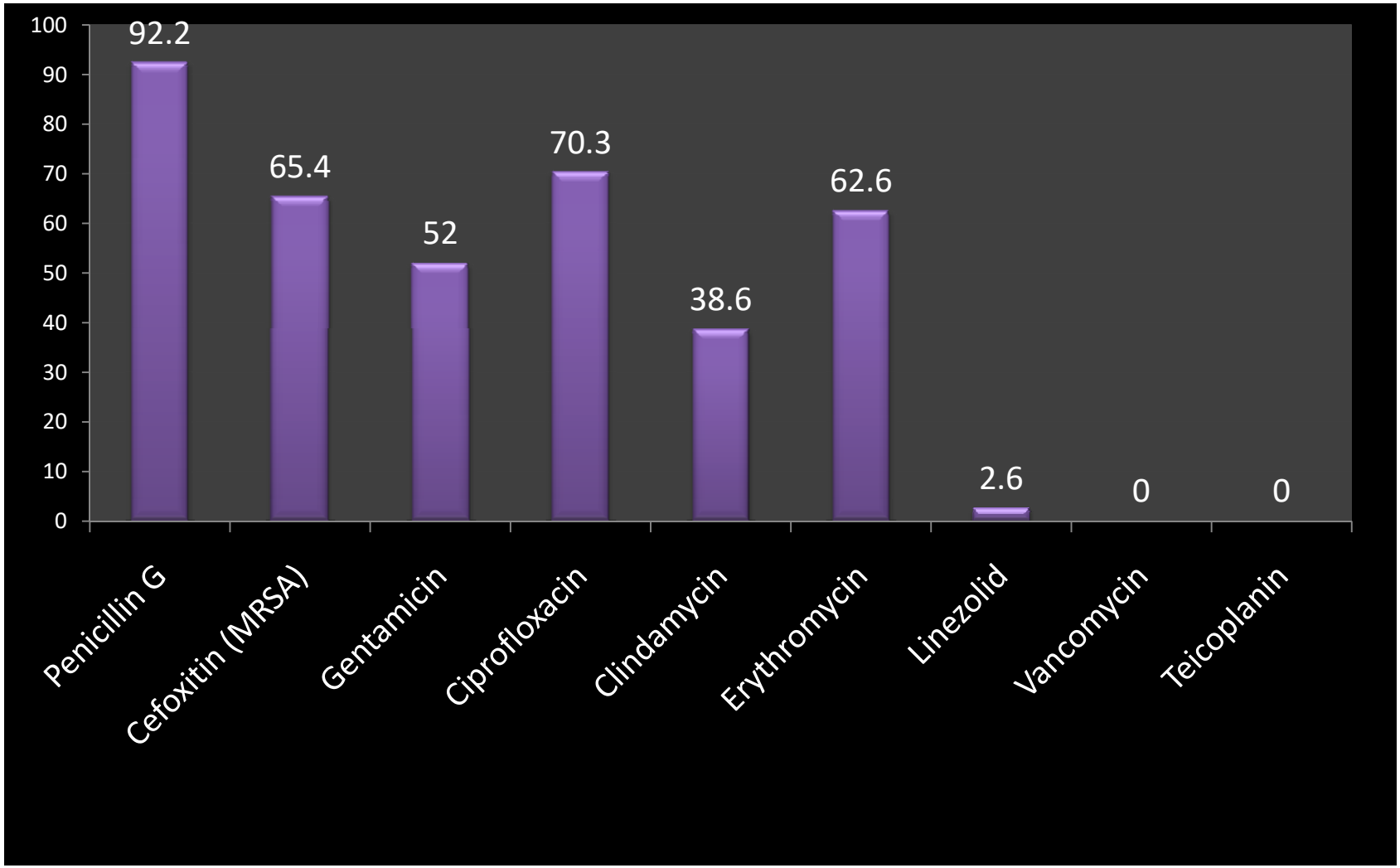
% Resistance in Klebsiella Blood isolates (36)



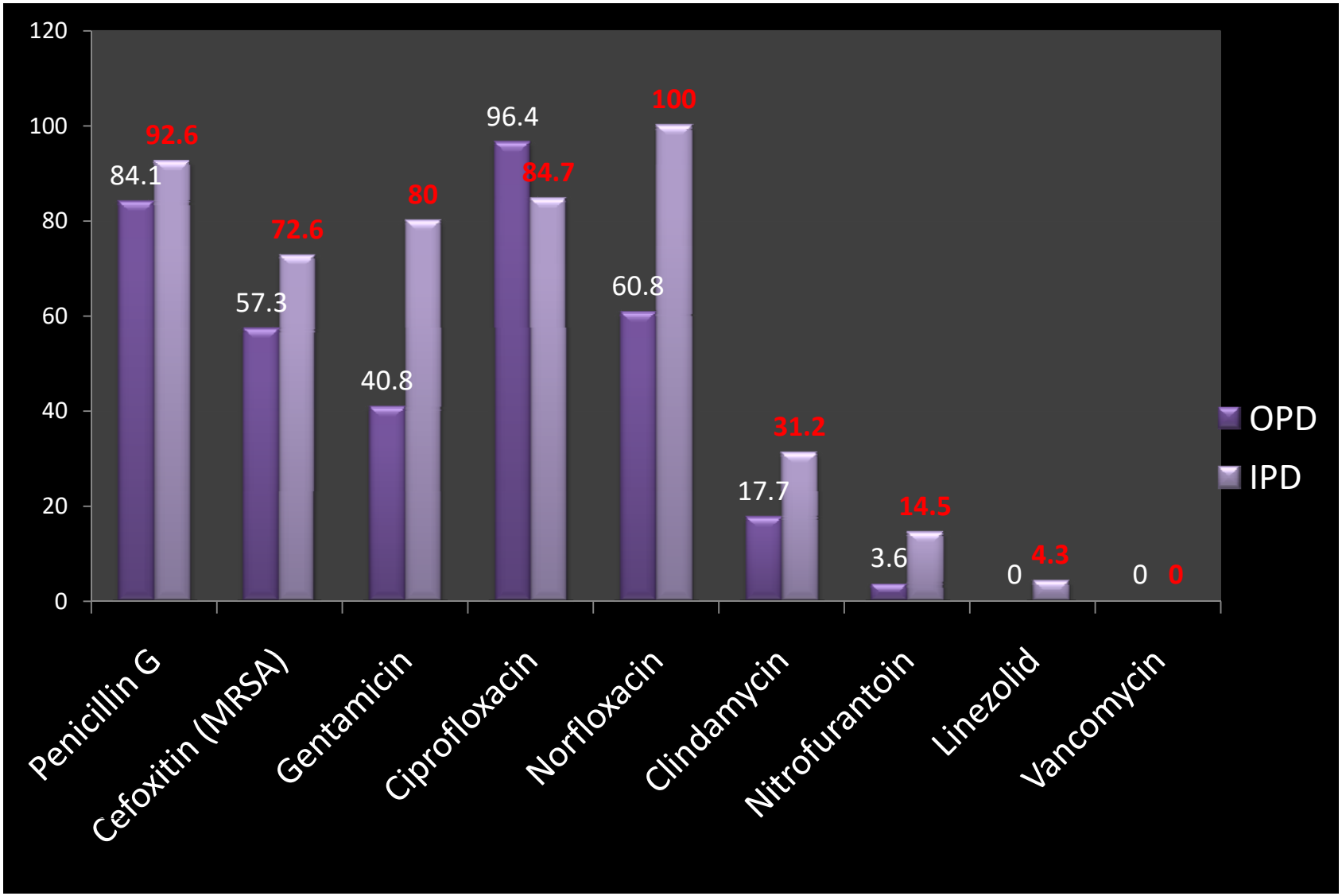
% Res Urinary Klebsiella (OPD,IPD)



% Res S. aureus: Blood (133)

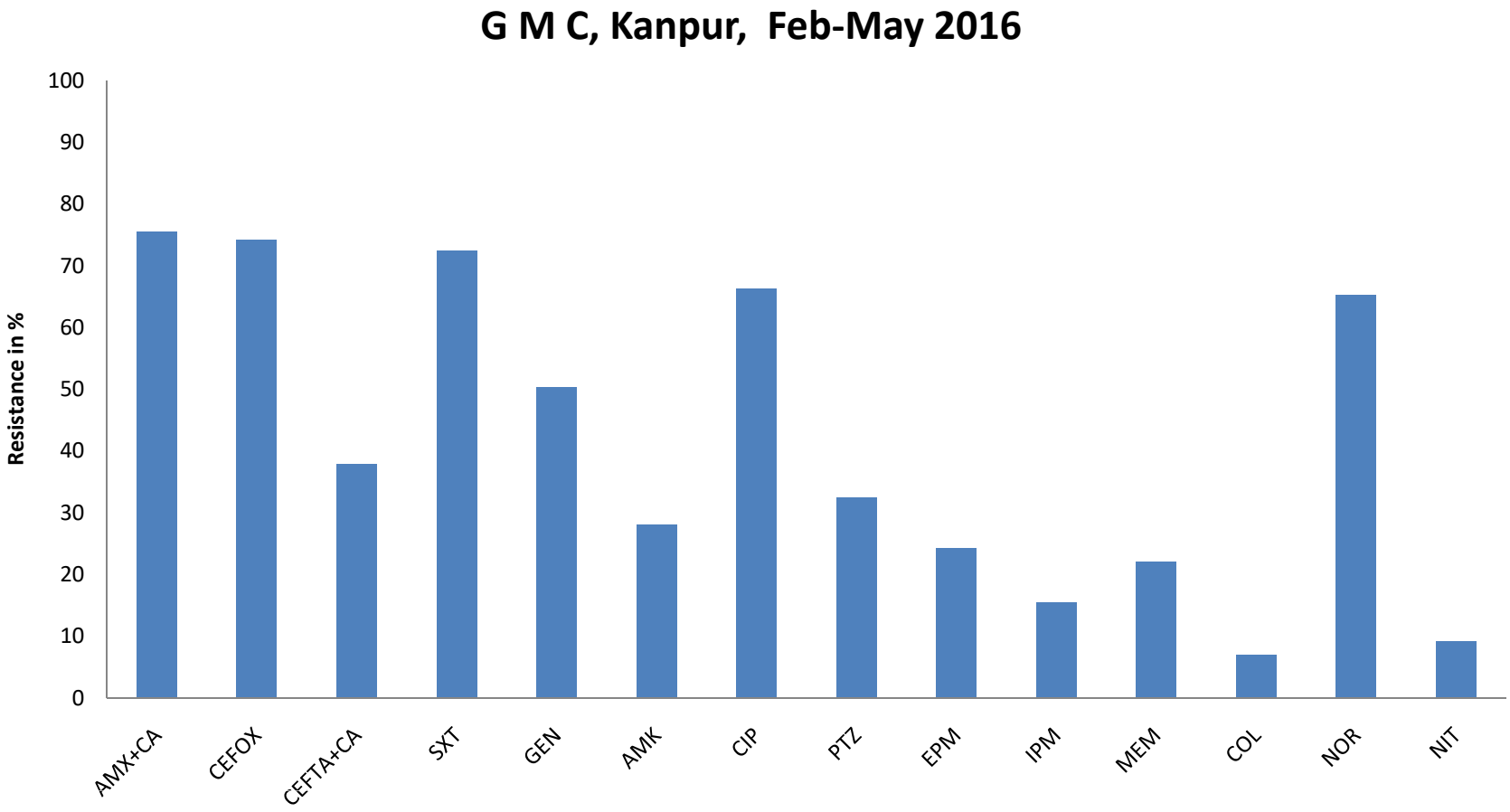


% Res Urine: Staph aureus (OPD,IPD)

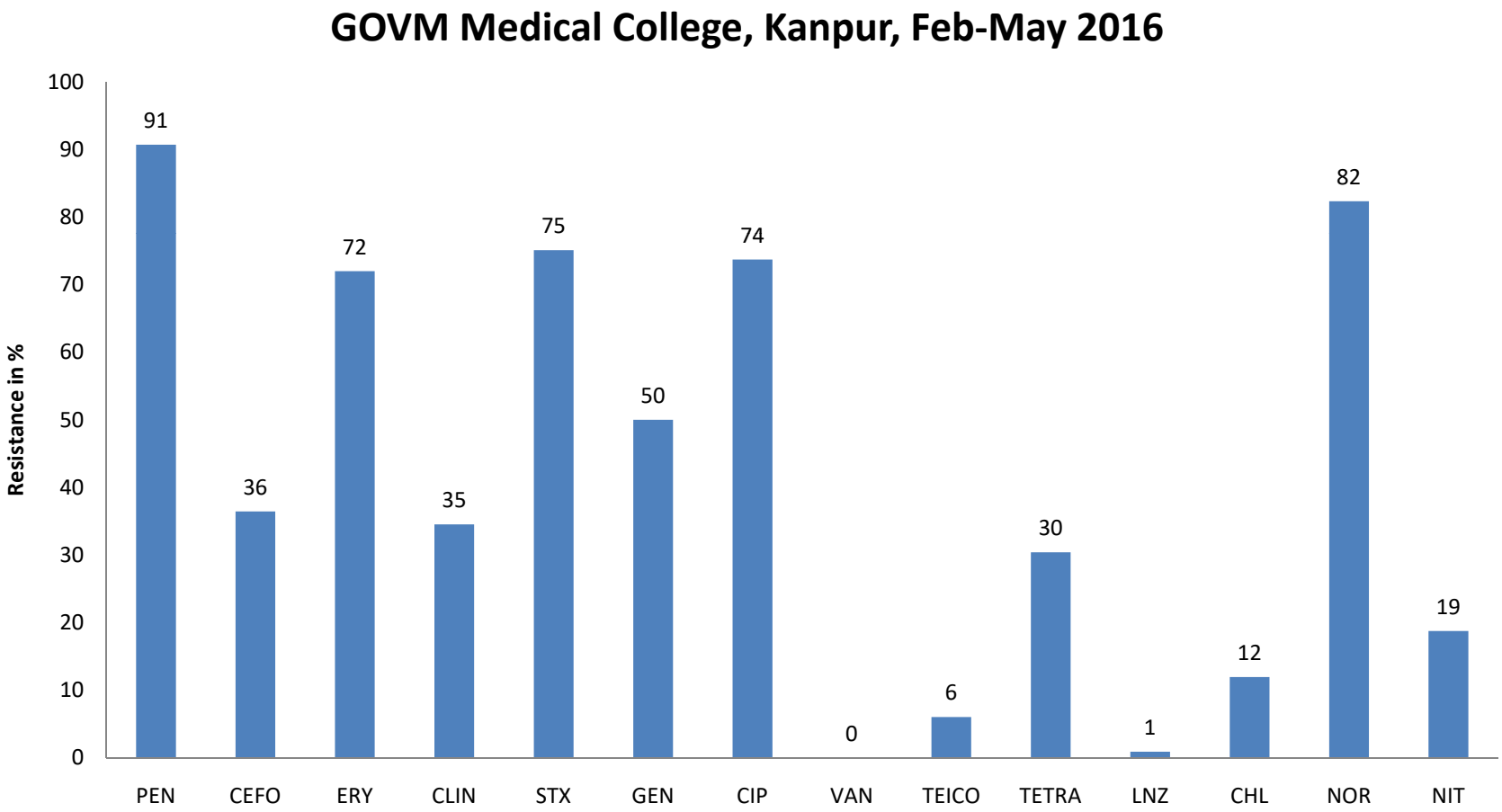


GMC Kanpur : 2016

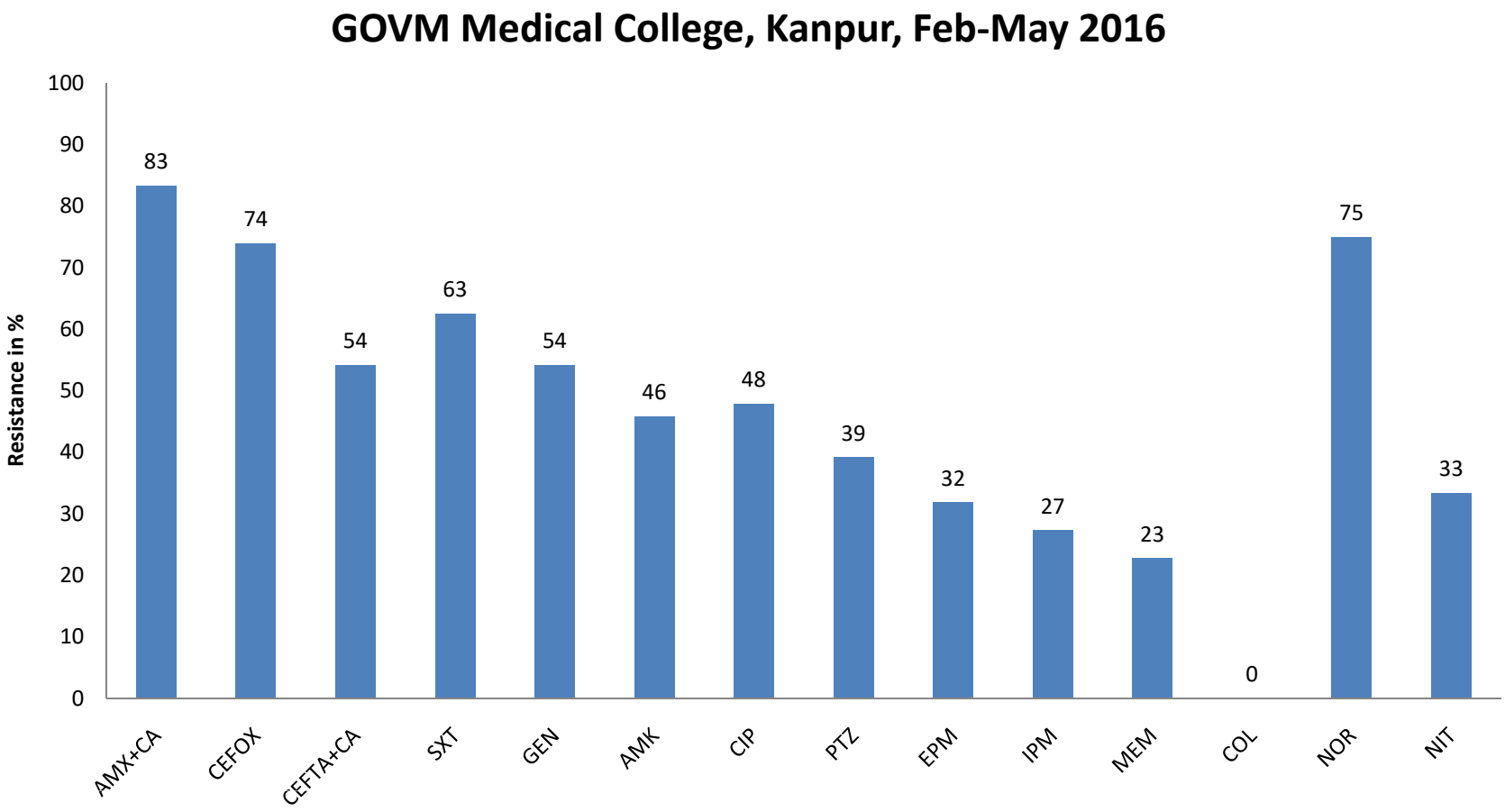
E.Coli Resistance (%)



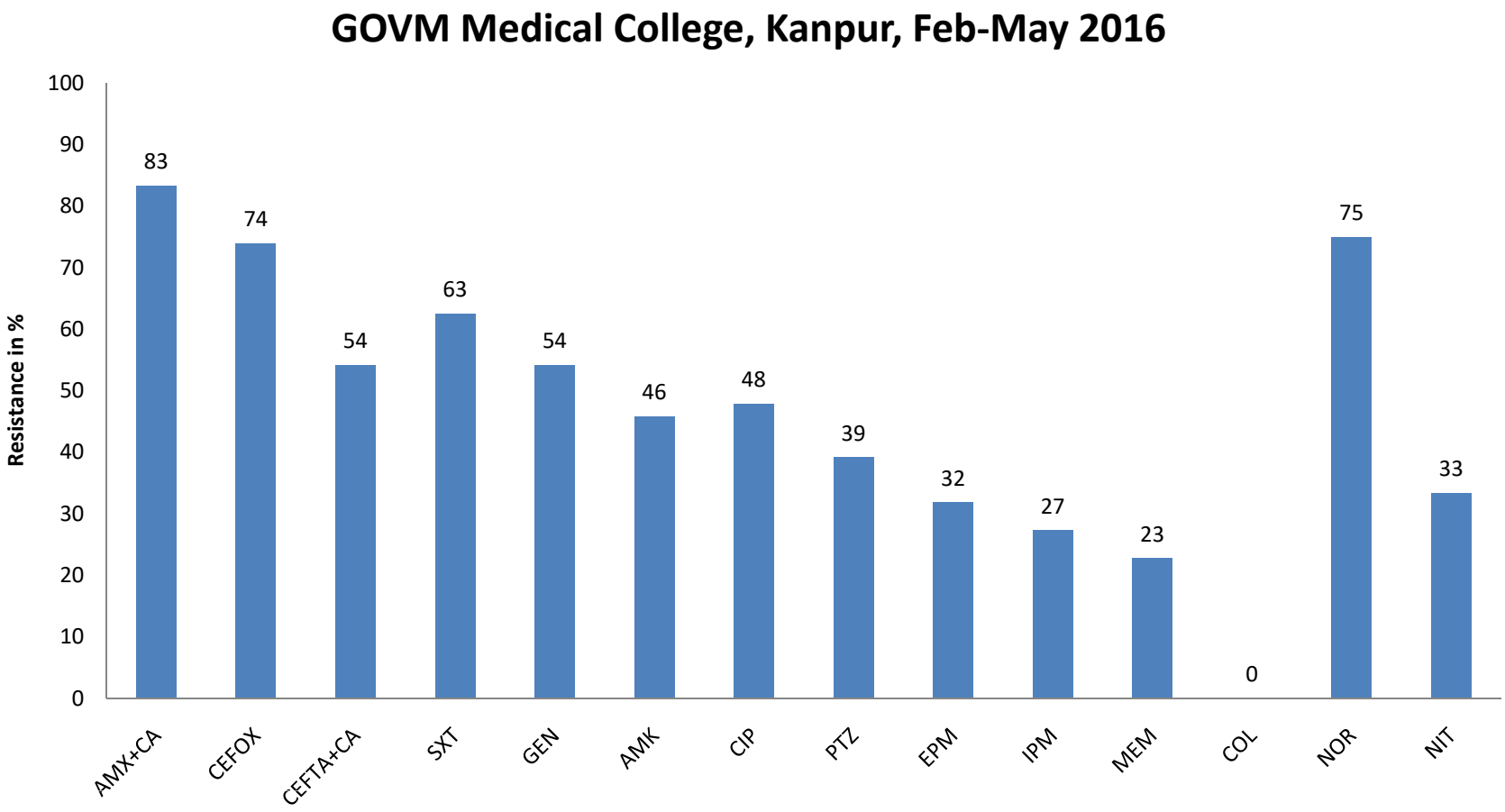
S.Aureus Resistance (%)



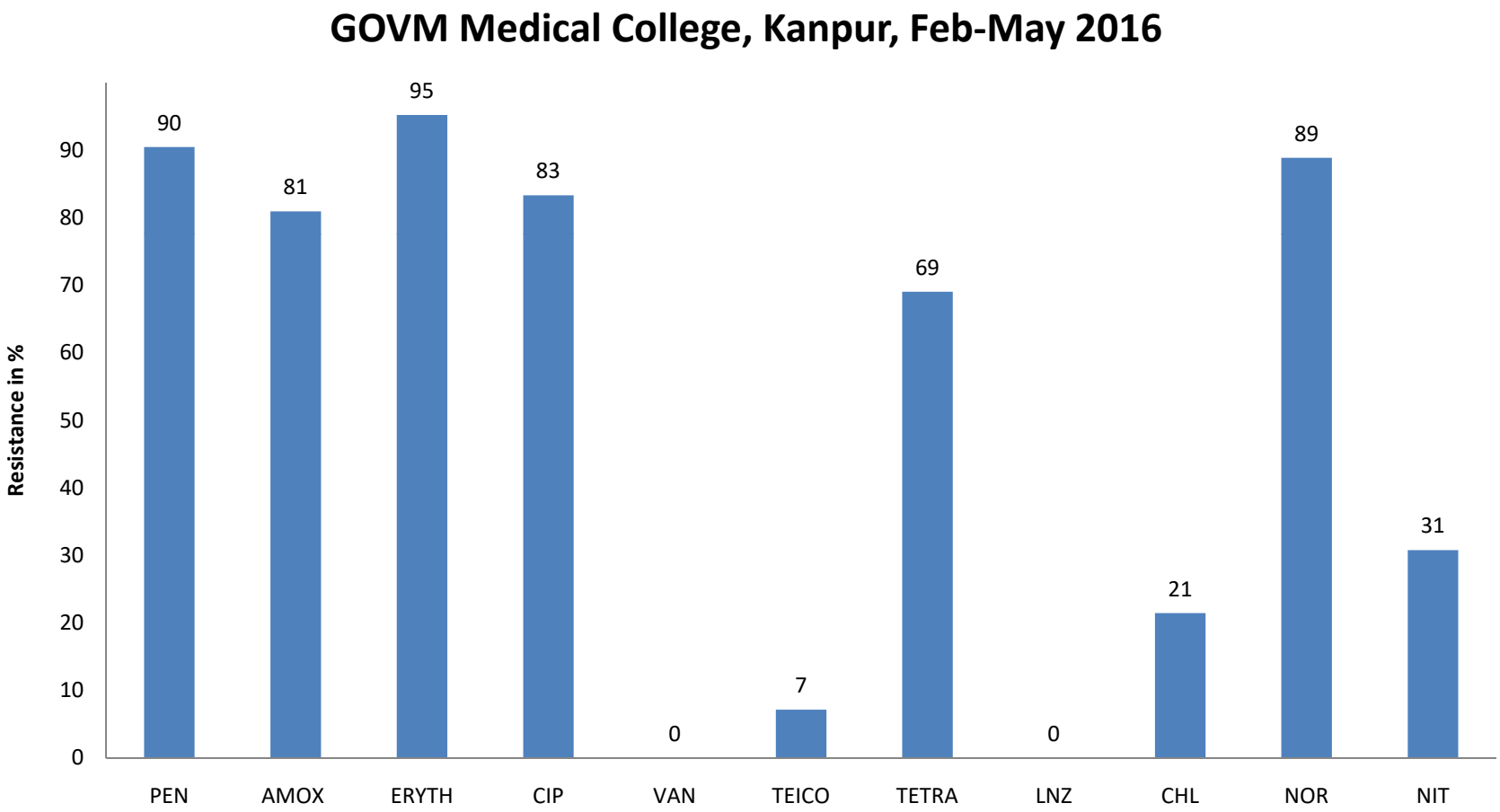
Klebsiella Resistance (%)



Klebsiella Resistance (%) in IPD



Enterococcus Resistance (%)



Proposed New labs NCDC Network

1. I.G. Medical College, Shimla (H.P)
2. NEEIGRHIM, Shillong (Meghalaya)
3. Gauhati Medical College, Guwahati, Assam
4. M.G Medical College, Indore, MP
5. Osmania Medical college Hyderabad, Telangana

Country wide AMR surveillance

- **DGHS written to heads of 200 Medical colleges to provide data on AMR June 2017**

- **H.P(5) , Orissa(4) ,Punjab (3), Rajasthan**(6), **Kerala(8)**

- **Karnataka (**30) **Gujarat (**16) **Bihar**(10) **Chattisgarh**(8) **U.P (**10), **Meghalaya (1) Manipur(1) and others**

- **Encouraging response from some (8 labs) specially from state of kerala**

Enrollment in GLASS: Requirements

- Notified **National Reference Centre**
- Notification of at least One national reference laboratory in the country who should be having state of the art facilities for AST
- There are eight target pathogens for AMR surveillance including
  E.coli, Klebsiella, Gonococcus, Staph aureus, Pseudomonas, Acinetobacter
- Beginning can be made even with one pathogen
- AMR data from the four target anatomical sites eg Blood, Urine, Stool and Uretheral/Cervical area

GLASS Enrollment: India July 2017

World Health Organization

20, AVENUE APPIA – CH-1211 GENEVA 27 – SWITZERLAND – TEL CENTRAL +41 22 791 2111 – FAX CENTRAL +41 22 791 3111 – WWW.WHO.INT

Tel. direct: +41 22 791 2320
Fax direct: +41 22 791 2372
E-mail : glass@who.int

In reply please refer to:

Your reference:

Dr Sunil Gupta
Additional Director & Head (Microbiology)
Division of Microbiology
National Center for Disease Control
Ministry of Health and Family Welfare
New Delhi
India

Dear Dr Gupta,

Welcome to the Global Antimicrobial Resistance Surveillance System (GLASS)!

We are pleased to confirm that as of 21st of July 2017 the Republic of India is fully enrolled into GLASS. Participation in GLASS is a lifelong journey and we look forward to working together on implementation of the Global Action Plan on AMR through the development of the new global AMR surveillance system.

We will contact shortly the nominated GLASS national focal points with more detailed information on the next steps and credentials to access the GLASS IT platform. Please do not hesitate to contact us for any additional information you may require.

Yours sincerely,

Dr Carmem L. Pessoa-Silva
a.i. Coordinator
AMR Surveillance Team
AMR Secretariat
Office of the Director General

Challenges

- Data mainly from Tertiary care centres
- Quality assurance
- Procurement of Quality antibiotic discs
- Manpower issues
- Data analysis

National Action plan: AMR surveillance

Dev of National Action Plan(NAP)

- **Three committees constituted to oversee various activities including development and Implementation of national action Plan**

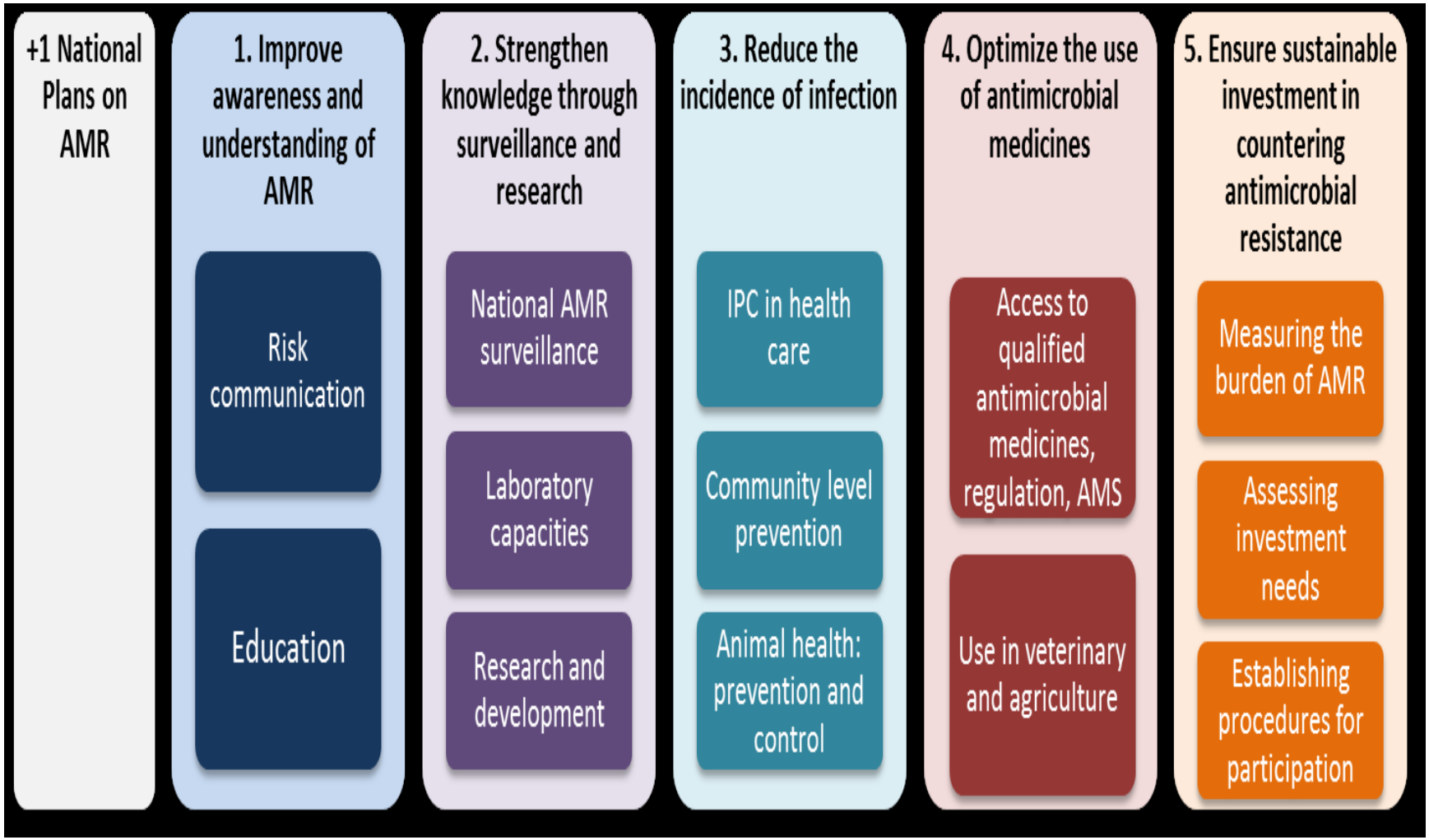
1. **Core Working Group (CWG)**
2. **Technical advisory group (TAG)**
3. **Inter-sectoral coordination committee**

- **National Action plan drafted endorsed by different stakeholder ministries in interministerial meeting chaired by Hon,ble HFM dated 19th April 2017**

- **Operational plan being developed for implementation**

- **Shri C.K. Mishra ,Secy(H&FW) written to concerned ministries July 2017 inviting inputs**

Strategic objectives WHO global action plan for AMR



Strategic priority 2

Strengthen knowledge and evidence through surveillance

Strengthen AMR Surveillance

Objective – Strengthen laboratory capacity for AMR surveillance in human, animal/food and environment

Activities:

- **Strengthen laboratories (including private sector) for antimicrobial susceptibility testing (AST) in medical labs (NCDC, ICMR, WHO) S-M**
- **Strengthen laboratories for antimicrobial susceptibility testing (AST) in Animals, Food, (DAHDF, ICAR, FSSAI FAO,OIE) S-M**
- **Strengthen laboratories (including private sector) for antimicrobial resistance and antimicrobial residues in the environment (MoEFCC, CPCB, SPCB, ICAR, CSE) S-M**
- **Develop National Network of Labs for AMR surveillance**
  - **Short term (S): 15-20**
  - **Medium term (M): 20-50**
  - **Long term (L): >50**

Strengthen AMR surveillance....

- Designate national reference laboratories (2-3 pathogen based labs) for AMR surveillance as a pre-requisite for enrolment in GLASS – S (NCDC, DADF, ICMR, WHO, FAO)

- Monitor/evaluate performance of microbiology laboratories in humans, animals/food and environment by joint monitoring mission M-L (NCDC, ICMR, ICAR, MOEFCC, WHO, FAO)

- Organize joint training workshops for AST and data harmonization in humans, animals, food and environment S-M

(NCDC, ICMR, WHO) (DAHDF, ICAR, FSSAI, FAO, OIE) (MoEFCC,)

Way Forward

- Strengthen Quality Assurance in network labs
- Strengthen Data collection, Reporting, Analysis
- Expand Range of Pathogens for surveillance
- Expand the AMR Network to District level
- Synergize all AMR surveillance at one platform to be submitted to GLASS

Areas/Modalities of Integration

- Identification of Priority Pathogens for surveillance
- Common Antibiotic Panels for susceptibility testing of Pathogens
- Common Data Collection/Reporting formats
- Common data Entry/Analysis tools
- Sharing of analysed data
- Common Independent External Quality Assurance Systems (EQAS)


THANK YOU