AMR surveillance in Kerala : initiative, approach and networks

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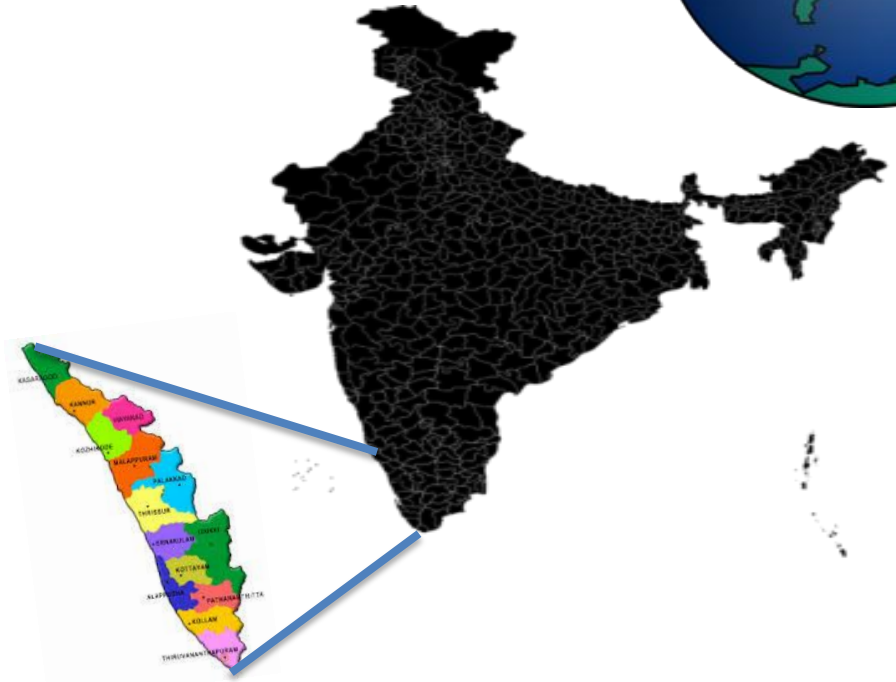
Journal of Antimicrobial Chemotherapy

Increasing prevalence and dissemination of NDM-1 metallo-β-lactamase in India: data from the SMART study (2009)

Christine Lascols ✉, Meredith Hackel, Steven H. Marshall, Andrea M. Hujer, Sam Bouchillon, Robert Badal, Daryl Hoban, Robert A. Bonomo

Journal of Antimicrobial Chemotherapy, Volume 66, Issue 9, September 2011, Pages 1992–



GAP-AMR

- 2015

NAP-AMR

- 2017

KARSAP

- 2018

Strategic priorities –KARSAP

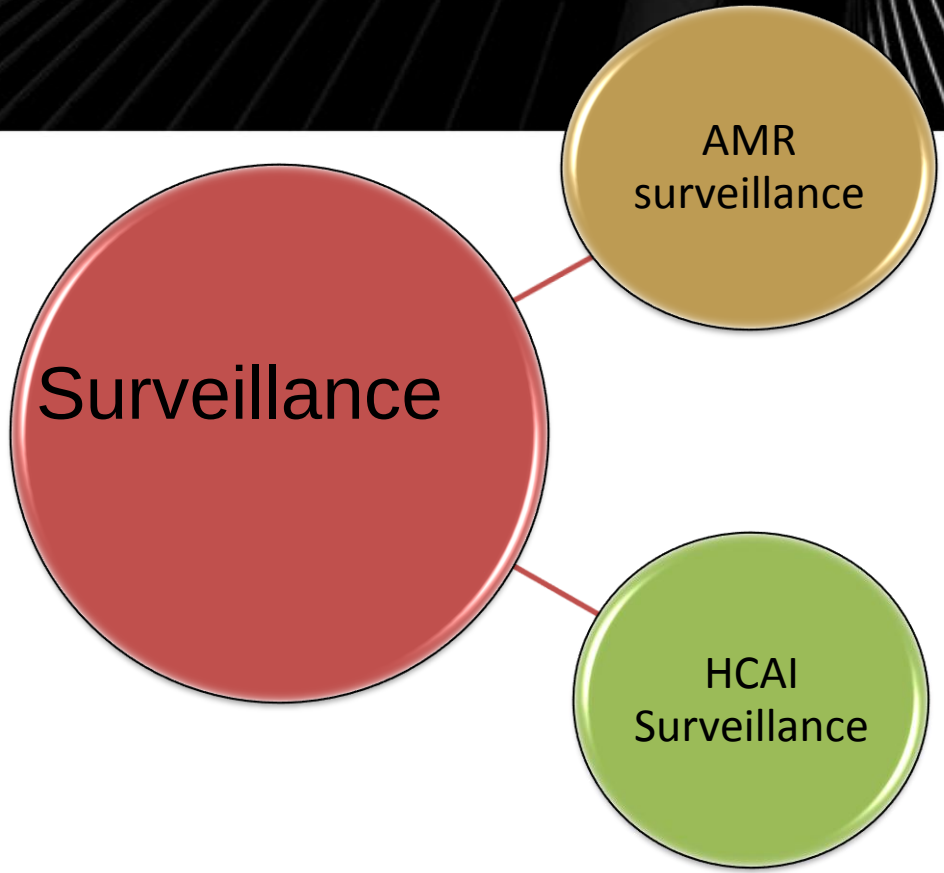
Improve awareness and understanding of AMR- communication, education, training

Strengthen knowledge and evidence base through surveillance and research

Reduce infection through effective sanitation, hygiene and infection prevention methods

Optimize and regulate the use of antimicrobials in human and animal health

Research priorities


Surveillance
AMR surveillance
HCAI Surveillance

AMR surveillance

- For assessing the burden of AMR & for providing the information for action in support of local, national & global strategies
- Tracks changes in microbial populations
- Permits the early detection of resistant strains of public health importance
- Supports the prompt notification & investigation of outbreaks
- Surveillance findings are needed to guide policy recommendations & to assess the impact of resistance containment interventions

Antibiogram

- Presentation of cumulative AST data from a single institution on an annual basis.
- Monitor resistance trends
- Reveal emergence of potential novel resistance mechanisms.
- Aid clinicians in empiric treatment of infections
- CLSI guidelines [M 39-A 4]- for preparation of cumulative antibiograms.

Activities

- Strengthening & standardization of Microbiology labs.
- Establishing a nodal centre for HCAI surveillance and training at MCH TVM.
- Whole genome sequencing of colistin resistant isolates in kerala-RGCB

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

AMR surveillance

- Based on National Policy for Control of AMR, 2011 & National Action Plan on AMR (NAP-AMR) 2017-21

Identification of infections of public health importance for surveillance

1. Blood stream infections (BSIs)
2. Skin and soft tissue infections (SSTI)
3. Respiratory tract infections (RTIs)
4. Urinary tract infections (UTI)

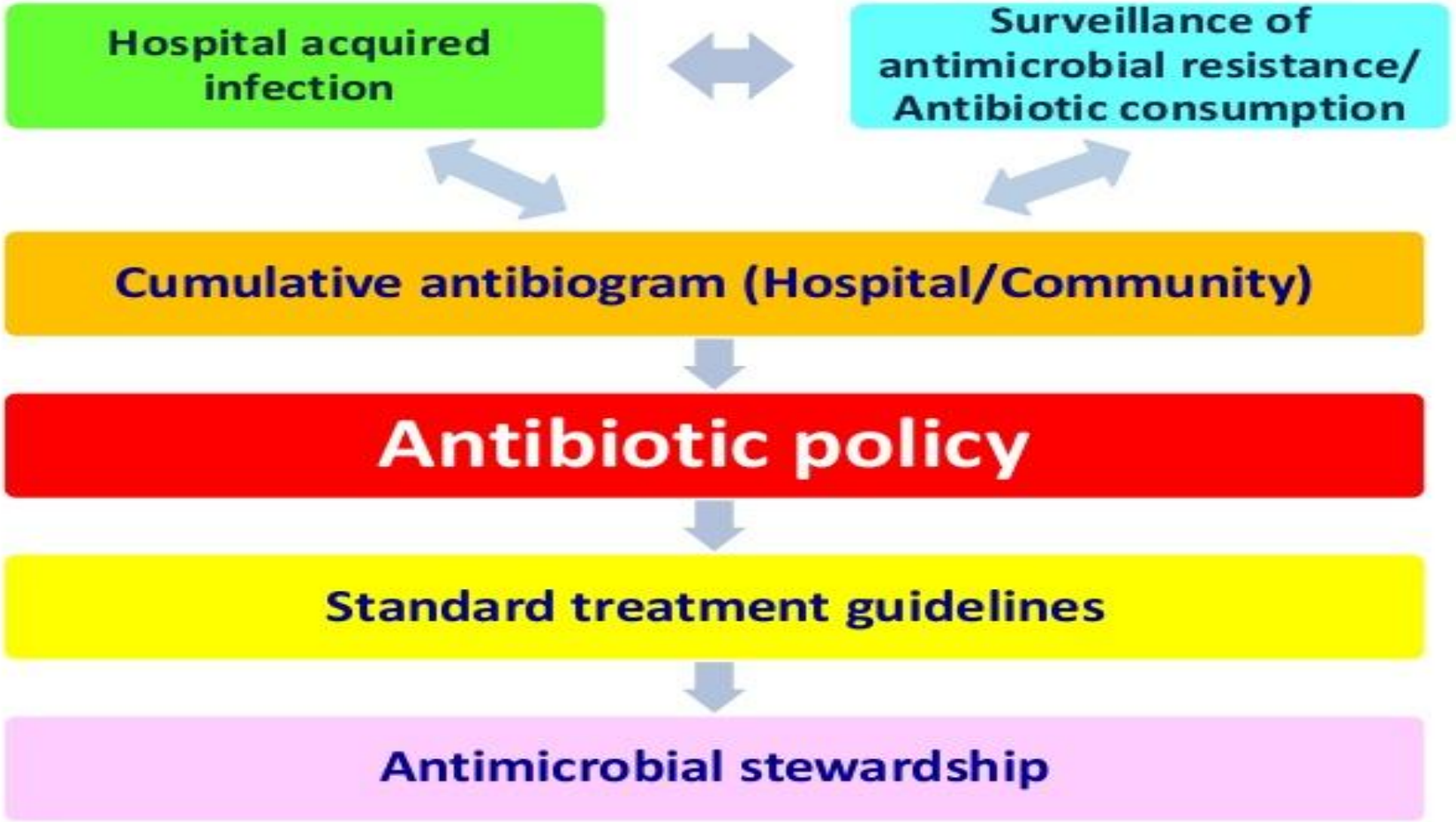
6 pathogens for AMR surveillance

1. *Acinetobacter* spp
2. *E. coli*
3. *Klebsiella* spp
4. *Pseudomonas aeruginosa*

GNB

5. *Staphylococcus aureus*
6. *Enterococcus* spp

GPC


Hospital acquired infection
Surveillance of antimicrobial resistance/ Antibiotic consumption
Cumulative antibiogram (Hospital/Community)
Antibiotic policy
Standard treatment guidelines
Antimicrobial stewardship

Priority Pathogen Isolates, 2018

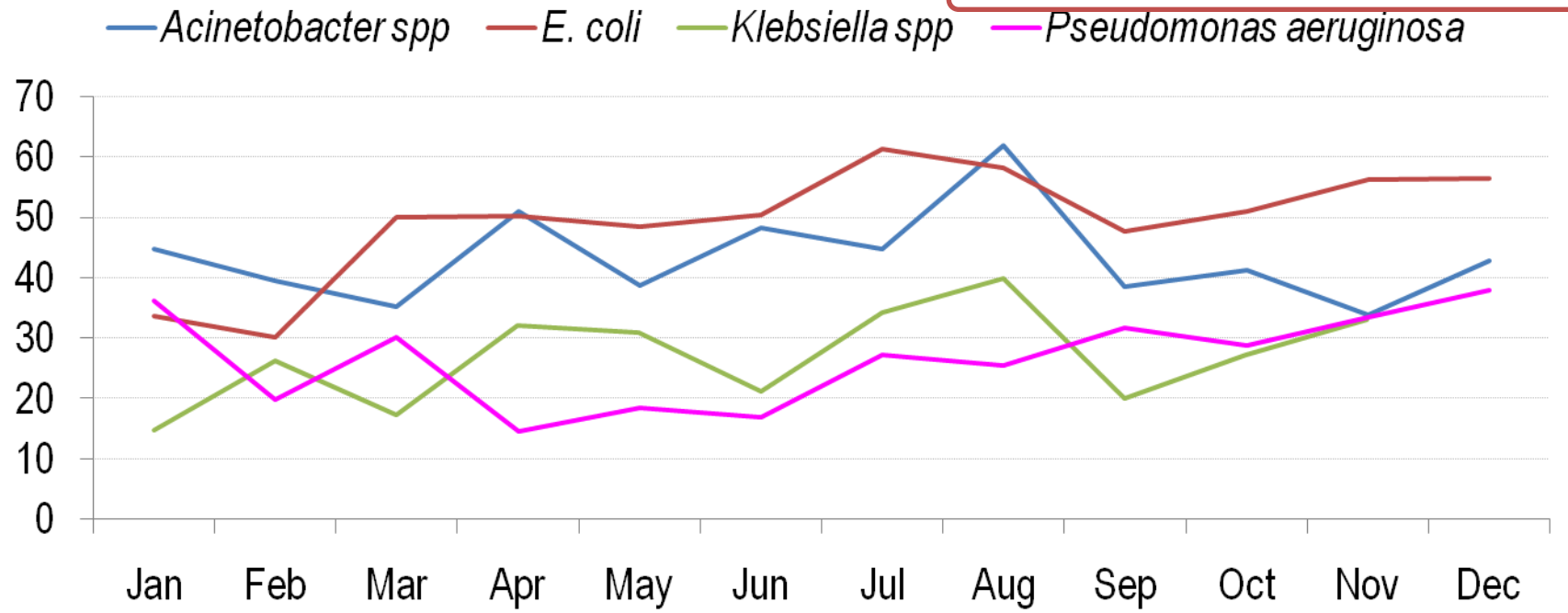
Priority pathogens	Number of blood isolates	Number of urine isolates	Number of aspirated pus isolates	Number of other body fluid* isolates
S. aureus	67	12	338	3
E. coli	75	1281	307	13
Klebsiella species	108	474	281	23
Enterococcus species	36	64	54	7
Pseudomonas aeruginosa	58	95	105	12
Acinetobacter species	110	36	51	17

Salmonella – Typhi & Paratyphi	# Blood isolates	# Stool Isolates
	1	0

*Pleural fluid, CSF, synovial fluid, ascites

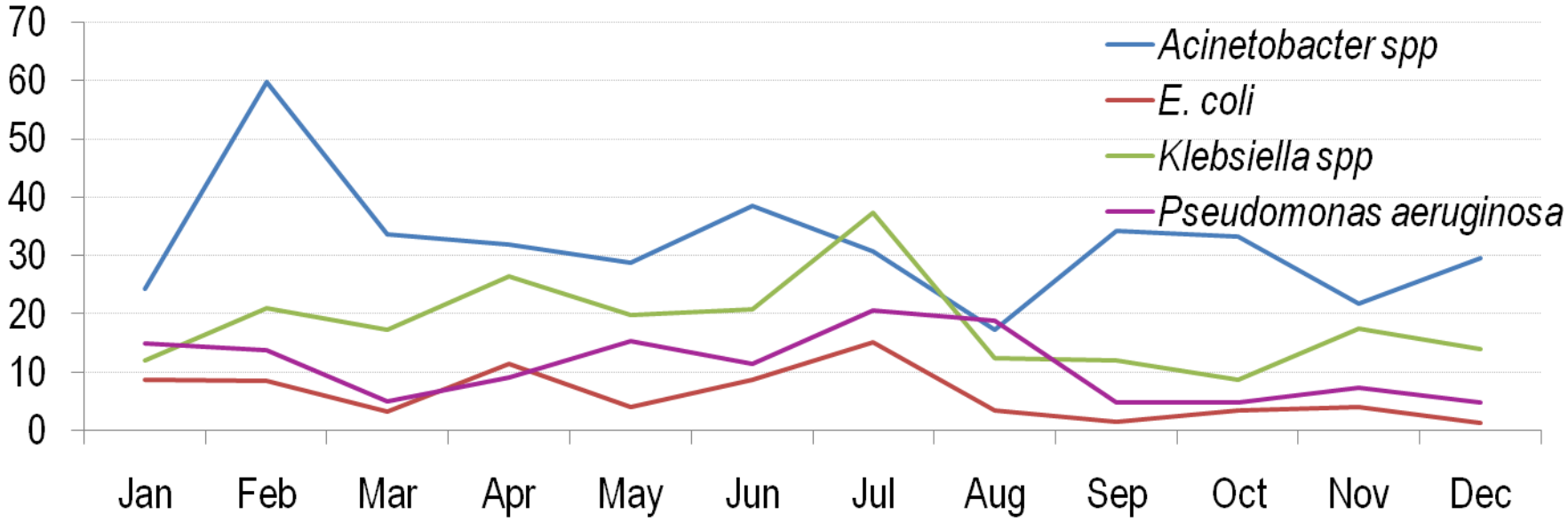
% of ESBL producers

% of ESBL producers (India)	
Acinetobacter spp	65
E. coli	61
Klebsiella spp	62
Pseud. aeruginosa	65



Carbapenem resistance

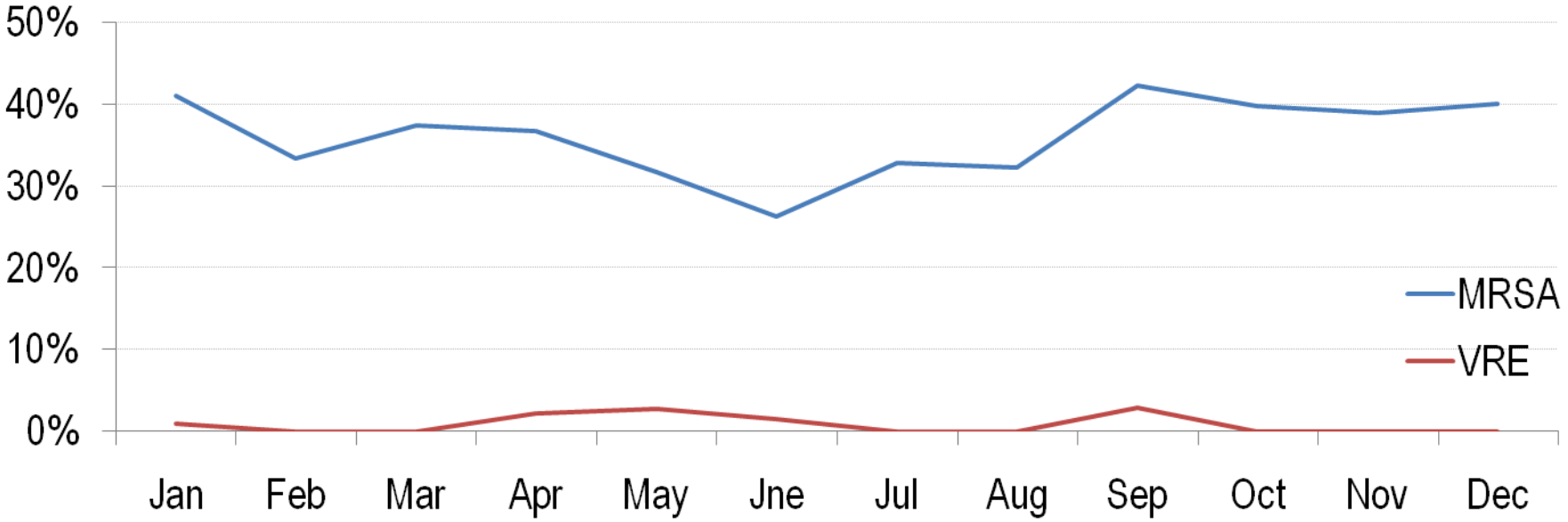
Carbepenem resistance (India)	
Acinetobacter spp	70
E. coli	12
Klebsiella spp	51
Pseud. aeruginosa	42



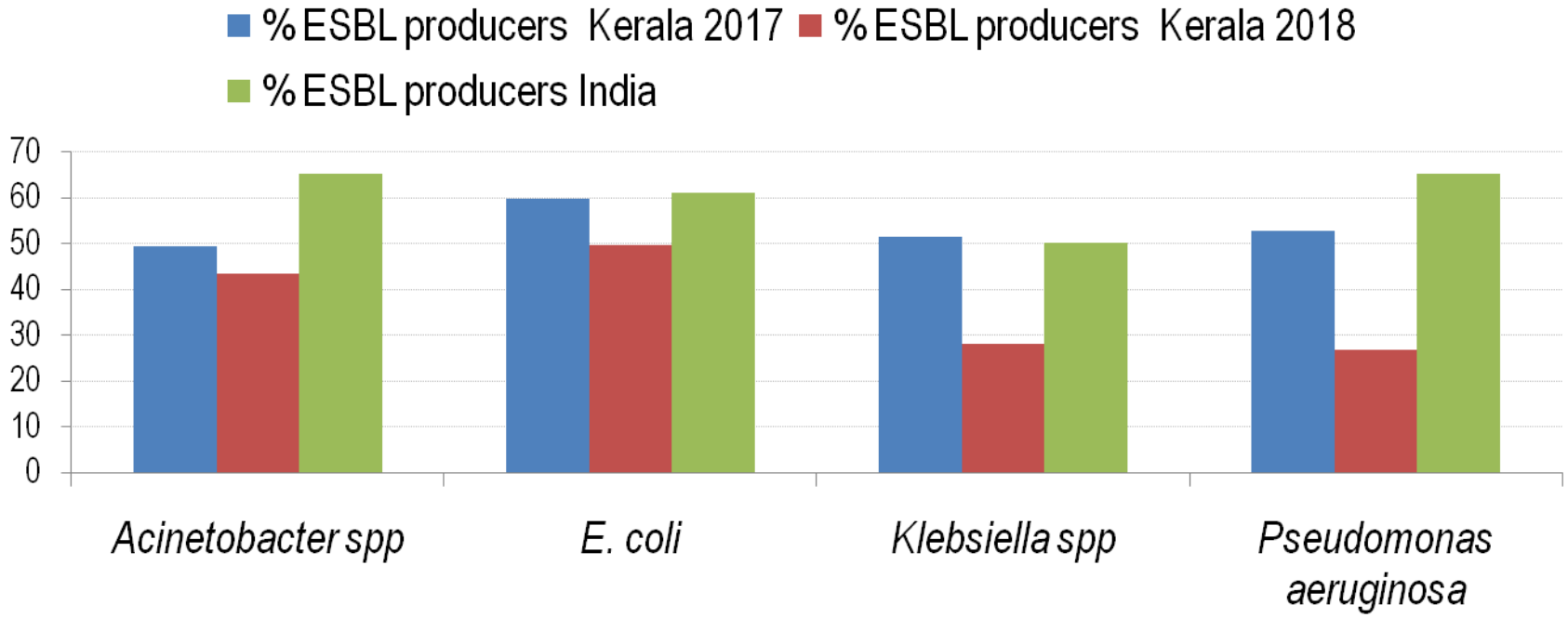
Gram positives

Resistance (India)

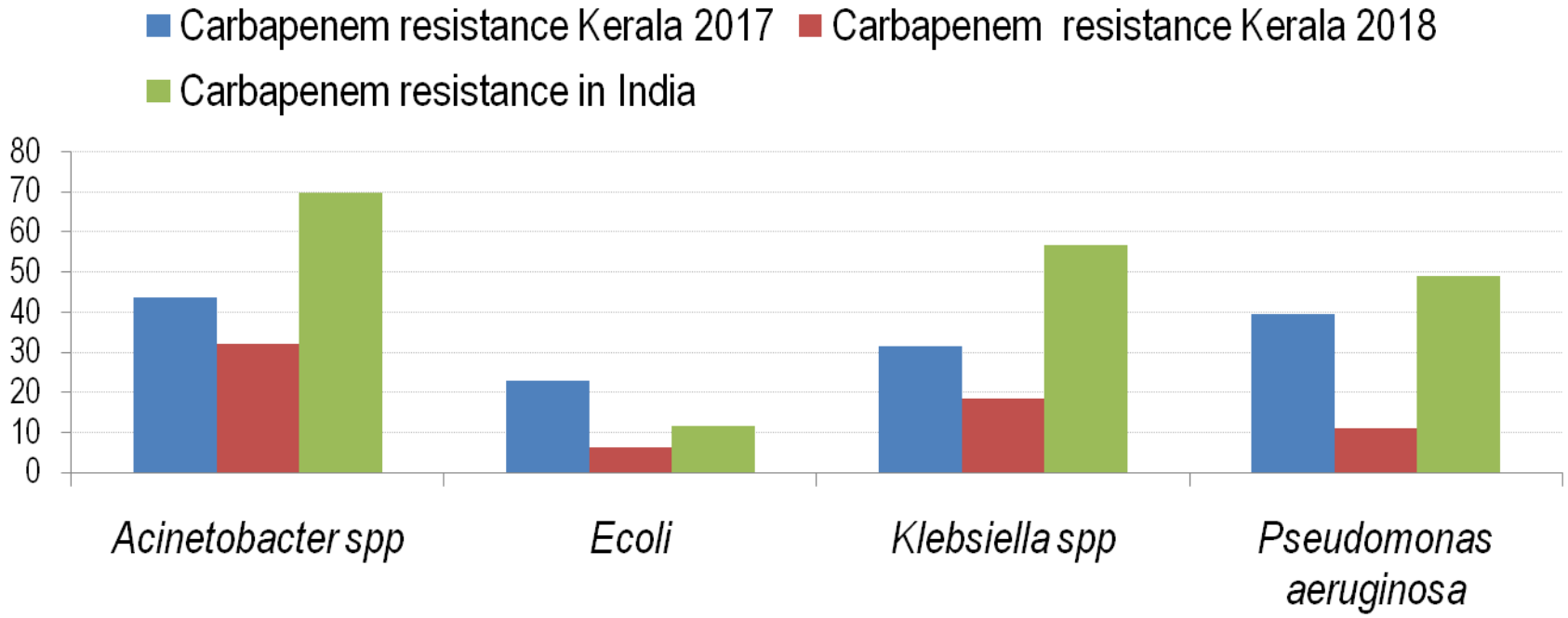
MRSA	47
VRE	12



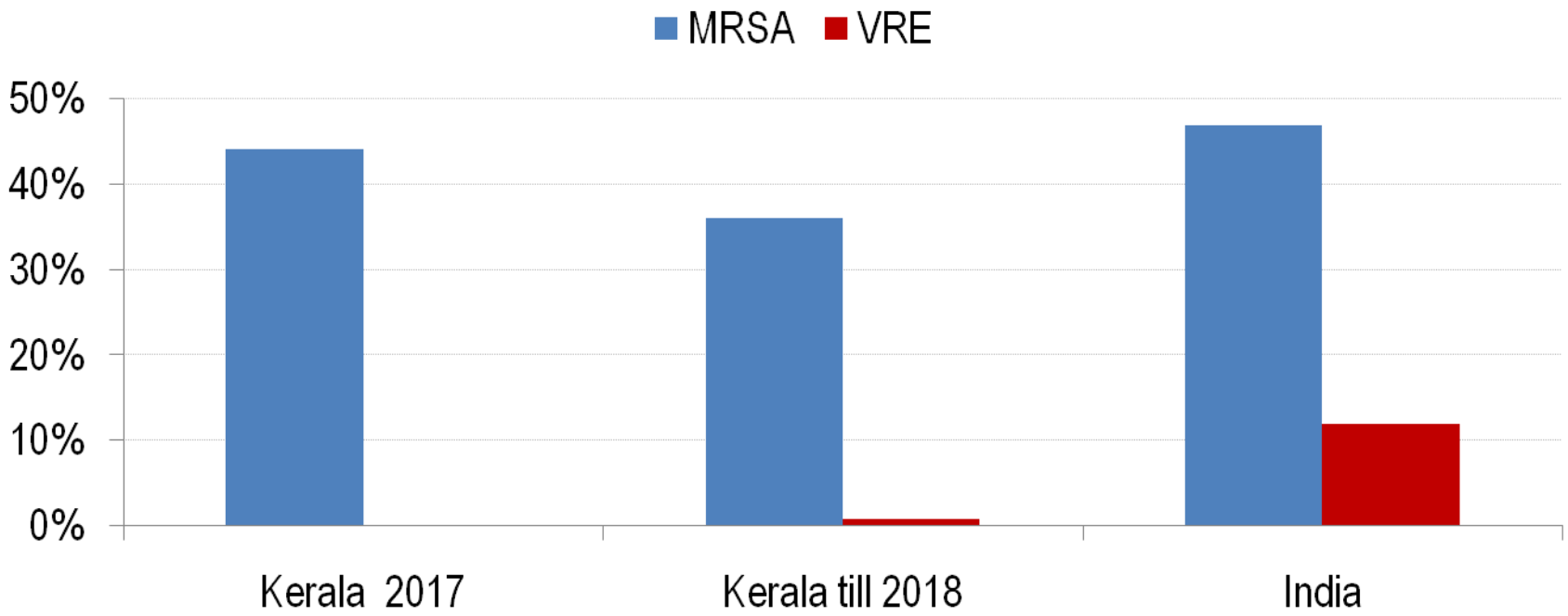
ESBL production



Carbapenem resistance



Gram positives



National AMR surveillance network

- Submit 1% of bacterial isolates on quarterly basis to NCDC for quality control testing
- Vancomycin, Carbapenem & Colistin resistant isolates – molecular characterization
- Share HAIs surveillance data- **ready to join National HAI surveillance net work.**
- Share antimicrobial consumption data .
- Preserve the isolates for future need

NCDC 2016

Condition	Likely Causative Organisms	Empiric antibiotics (presumptive antibiotics)	Alternative antibiotics	Comments
Acute uncomplicated Cystitis	*E.coli*, *Staphylococcus saphrophyticus*(in sexually activeyoungwomen), *Klebsiella pneumoniae*	Nitrofurantoin 100 mg BD for 7 days or Cotrimoxazole 960mg BD for 3-5 days or Ciprofloxacin 500 mg BD for 3-5 days	Cefuroxime 250 mg BD for 3-5 days	Get urine cultures before antibiotics & modify therapy based on sensitivities.
Acute uncomplicated Pyelonephritis	*E.coli*, *Staphylococcus saphrophyticus* (in sexually active young women), *Klebsiella pneumoniae, Proteus mirabilis*	Amikacin 1 g OD IM/IV or Gentamicin 7 mg/kg/day OD (Monitor renal function closely and rationalise according to culture report) Complete total duration of 14 days	Piperacillin-Tazobactam 4.5g IV 6 hourly or Cefoperazone-Sulbactam 3g IV 12 hourly or Ertapenem 1 g IV OD	Urine culture and susceptibilities need to be collected before starting antimicrobial treatment to guide treatment.

ICMR 2017

Clinical Condition	Common Pathogens	Empiric AMA	Alternate AMA	Comments
Acute Cystitis (in absence of cultures)	*E.coli, Proteus* sp *Klebsiella* sp.	●Nitrofurantoin 100 mg BD for 7 days ●Cotrimoxazole 500/125 mg BD for 3-5 days ●Ciprofloxacin 500 mg BD for 3-5 days	●Cefuroxime 250 mg BD for 3-5 days ● Cefixime 400mg BD for 5 days	*Staphylococcus saprophyticus* (in sexually active young women) but is not common in India. In pregnancy the duration of treatment is longer
Acute Pyelonephritis (individualized based on data from each center) If blood culture is positive, a carbapenem is preferred)	*E.coli, Klebsiella* sp *Proteus* sp *S. aureus*	●Piperacillin tazobactam 4.5 gm IV 6 hourly for 10 days ● Ertapenem 1 g IV OD for 7 days	●Imipenem 500 mg IV 8 hourly for 10 days or ●Inj Amikacin 5mg/kg IV once daily x 10 days	Urine and blood culture should be done before start of treatment. Amikacin 1gm OD IV or Gentamicin 7 mg/kg as prescribed doses . Close monitor on renal parameters is needed and watch out for

KARS-Net objectives

- Foster standardization, strengthening and expansion of AMR surveillance in Kerala
- Analyse and report KARS-Net data to State Government and NCDC on regular basis
- Contribute towards the estimation of extent, burden and monitoring of AMR in Kerala
- Detect emerging resistance and its spread in Kerala

KARS-Net prerequisites

A. Essential

- Regular documentation of internal quality control (IQC) for antimicrobial susceptibility testing using standard strains and media
- Continuing participation in Microbiology EQAS for at least last 2 years, with minimum 75% score in identification/susceptibility testing
- Willingness to participate and share AMR data with KARS-Net

KARS-Net prerequisites

B. Desirable

- Accreditation of laboratory or institute by National Accreditation Board for Testing and Calibration Laboratories (NABL) or National Accreditation Board for Hospitals & Healthcare Providers (NABH)
- Regular generation of institutional antibiograms
- Using WHONET or other laboratory software to capture AMR data electronically

Future activities

- 10 more institutions shall be inducted into KARS-NET from the list of institutions & labs in Kerala, based on their capacity for AMR testing & Surveillance- assessed using-
- The initial focus of surveillance in KARS-NET shall be bacterial drug resistance
- Key staff from participating institutions shall be trained for

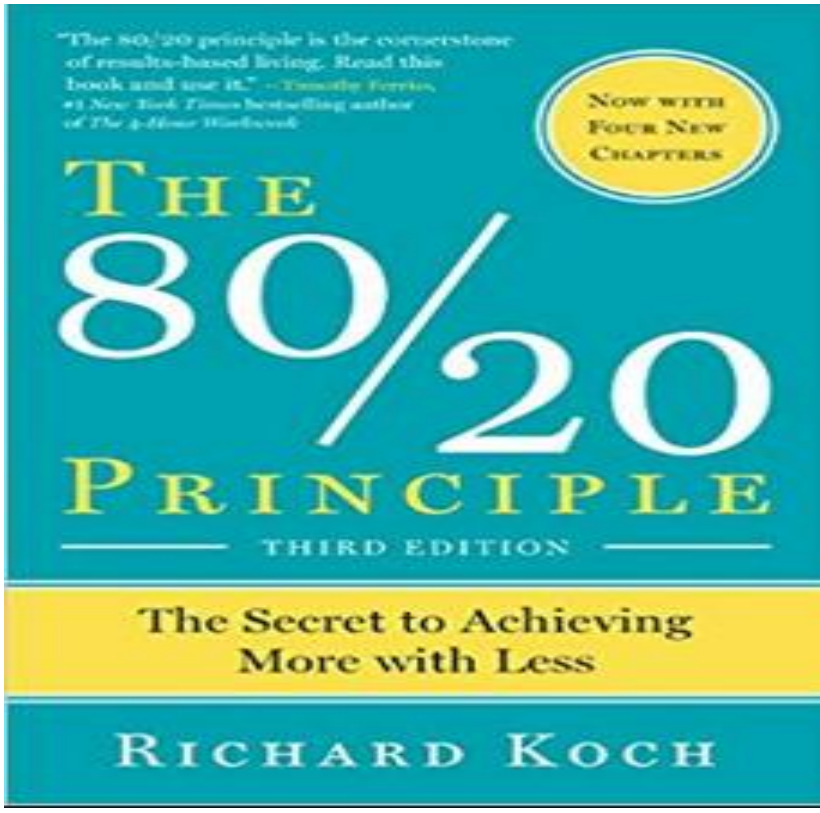
a) Standardized AST

b) Data management- WHONET training

c) Development of antibiograms

d) Preparation of SOPs for all procedures

The Pareto Principle – why you shouldn't focus on everything

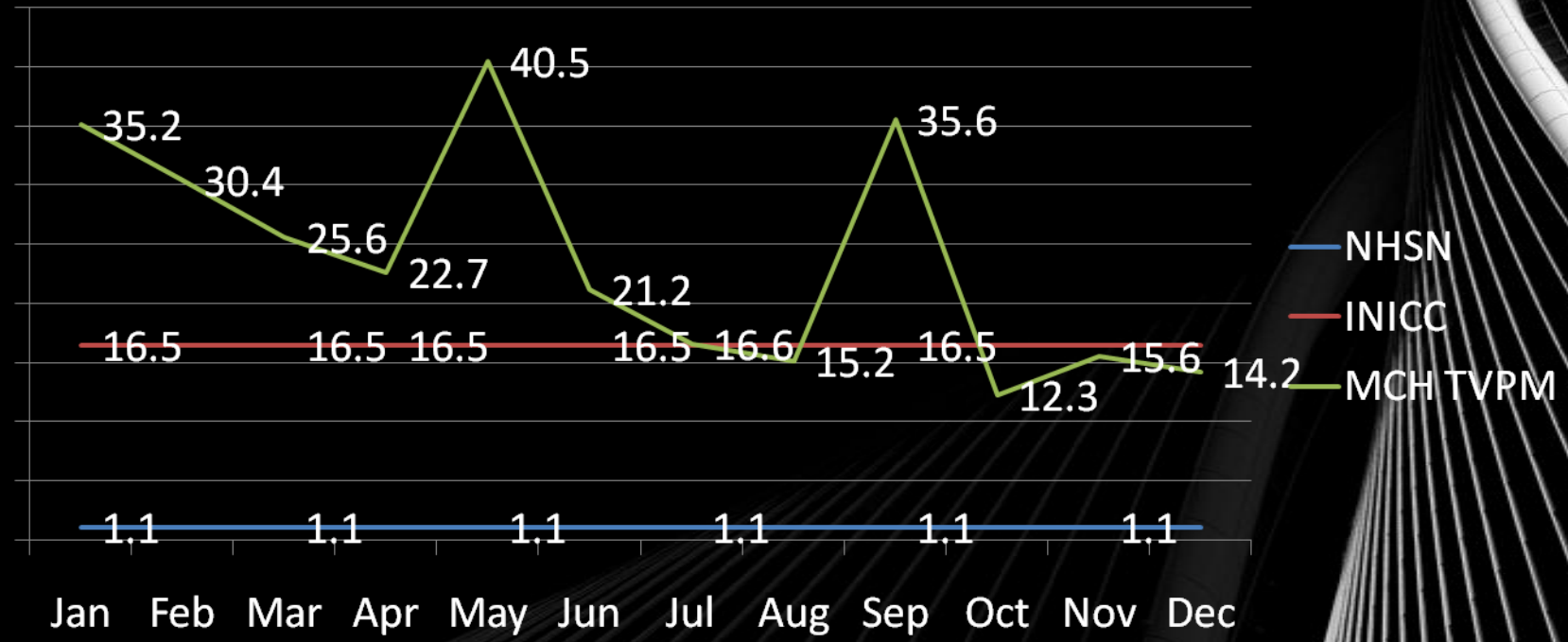


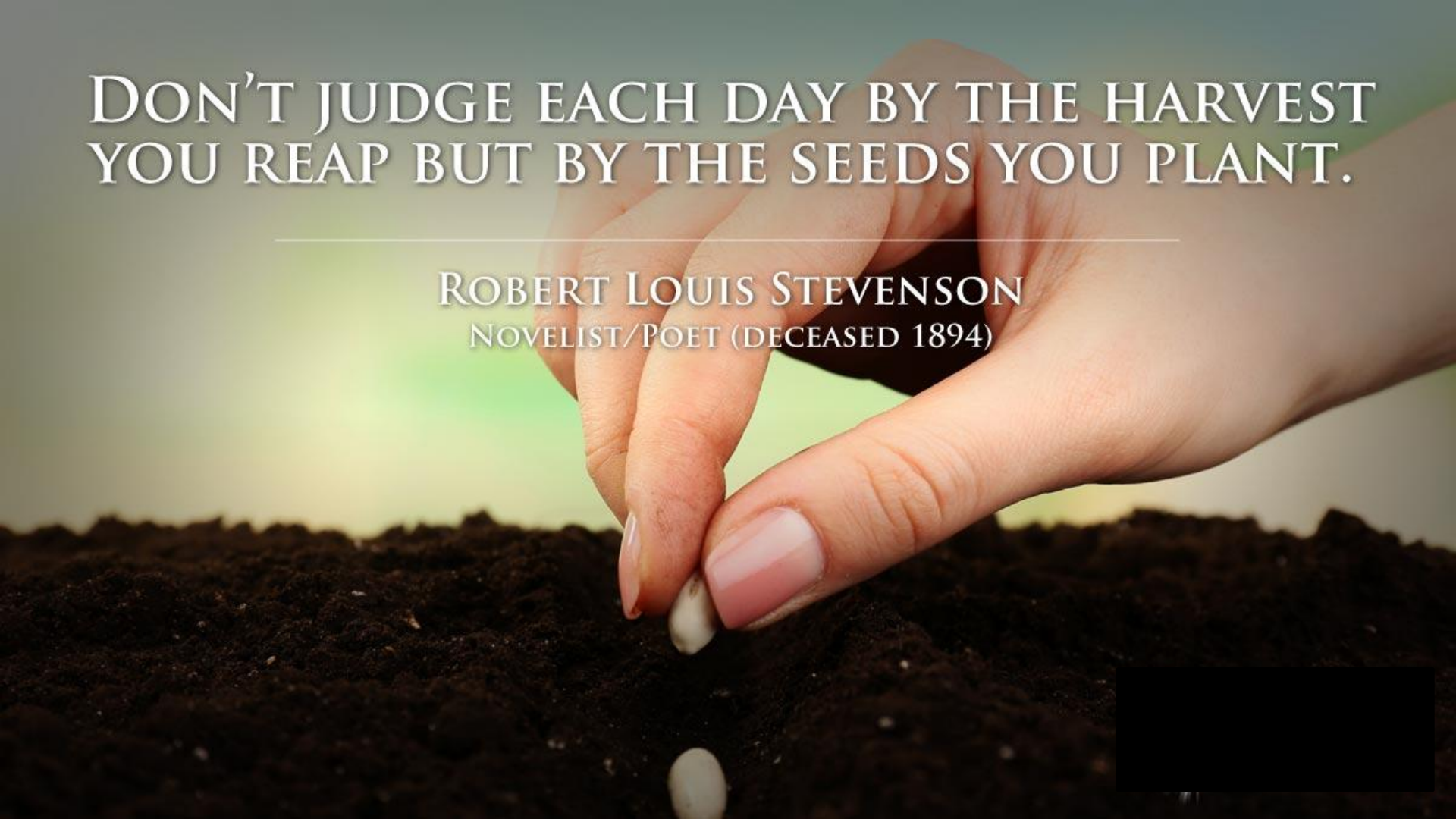
HAI SURVEILLANCE

- Investing in infection control is the need of the hour 1 dollar spent on IPC translates to 246 dollars saved in patient care*
- HAI surveillance data – VAP, CAUTI, CLABSI, SSI – link nurses from ICUs
- DME – conducted 1 week workshop & training for nurses of all MCHs in IPC & HAI rate calculation – link nurses

* Study by Sanjeev Singh, et al from AIMS

VAP Metrics MDICU 2018




Don't judge each day by the harvest you reap but by the seeds you plant.
Robert Louis Stevenson
Novelist/Poet (deceased 1894)


DOCTOR

SMALL GROUP LEARNING

"ALONE WE CAN DO SO LITTLE; TOGETHER WE CAN DO SO MUCH."
- Helen Keller

Thank you