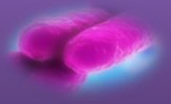
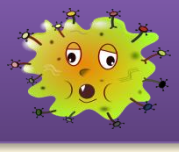


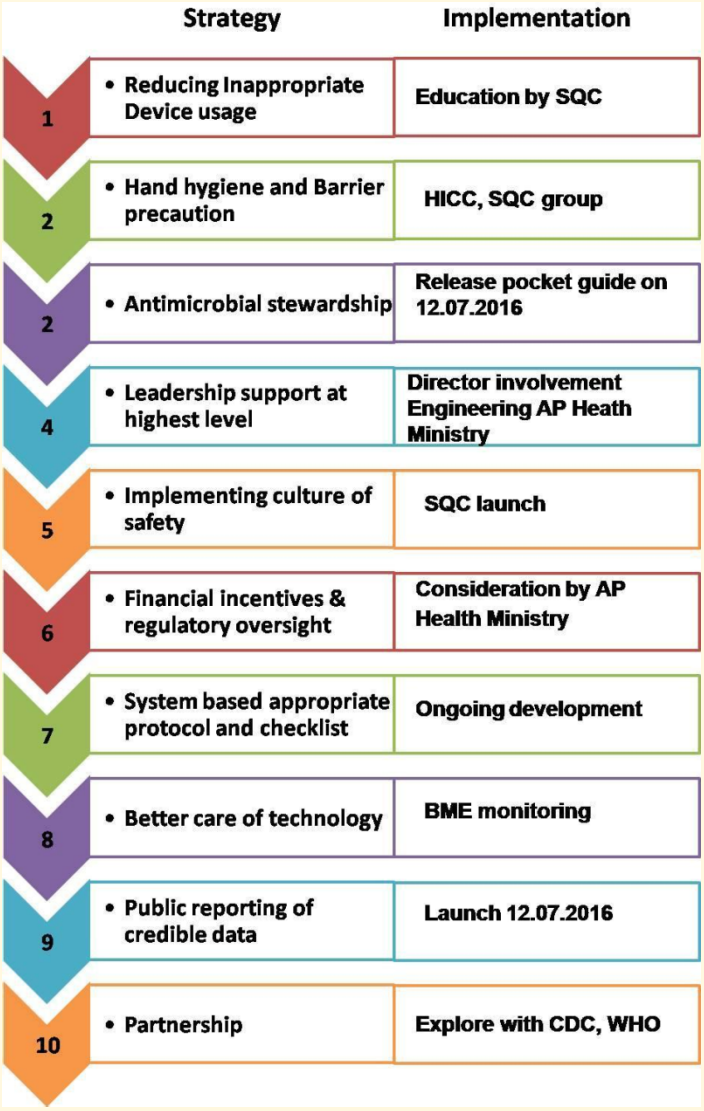



Healthcare Associated Infections (HAI)

Between 5% and 10% of patients admitted to hospitals acquire one or more infections, based on reporting data largely from developed countries. In the USA, it is reported that 1 out of every 136 hospital patients becomes seriously ill as a result of acquiring an infection in the hospital. It is estimated that in developing countries (including India) the risk of Healthcare Associated Infections (HAI) is 2 to 20 times higher than in developed countries. In India, indiscriminate use of antibiotics both in community settings and in hospital settings contributes to development of antibiotic resistance. Further there is need for robust reporting of HAI in India. This 'double-edged-sword' of indiscriminate antibiotic use and lack of reporting of healthcare associated infections needs to be addressed. The Director-cum-Vice Chancellor of SVIMS Dr. T.S.Ravikumar announced that SVIMS is taking a step forward to contribute in containing HAI in India. Adapting international guidelines (eg WHO, CDC) SVIMS is invoking a ten pronged strategy. One key component is 'Antimicrobial Stewardship', which aims to optimize antibiotic use among patients in order to reduce antibiotic resistance, improve patient outcomes and safety and ensure cost effective therapy. Hon'ble Health Minister of Andhra Pradesh, Dr. Kamineni Srinivas garu released the first edition of "SVIMS Antimicrobial Stewardship pocket guide" on 12.07.2016. This is revised 6 monthly and new editions are released every January and July to inform all health care personnel (doctors, nurses, and allied health staff) of pathogen surveillance, antimicrobial use, infection control measures and outcomes. This programme is jointly monitored by Hospital Infection Control Committee and SVIMS QualityCouncil.

CONTENTS

1) Healthcare Associated Infections (HAI): SVIMS Ten Pronged Strategy



SQC = SVIMS Quality Council

HICC = Hospital Infection Control Committee

BME = Biomedical Engineering

CDC = Center for Disease Control

WHO = World Health Organization

2) Hospital Infection Control (HIC) Committees

HIC Committee Members:

- HICC Chairman – Dr T.S.Ravikumar, Director cum Vice Chancellor
- HICC Co-Chairman Dr. Aloksachan,Medical Superintendent
- Member Secretary- Dr K.K.Sharma,HOD of Microbiology
- Hospital Infection Control Officers -Dr.R.Jayaprada, Dr.N.Ramakrishna.
- Senior Consultant- Dr A. Mohan, Senior professor& HOD of Medicine-Member
- All the heads of the departments- Members
- Nursing Superintendent- Mrs.C.Sunitha-Member
- Infection Control Nurses- V.Karpugam, D.Redemma, A.Shobharani, N.Bayamma & all 47 Head nurses-Members

Operating theatre Incharge- Mrs Shakira- Member

- In-charge of Central Sterile Supplies Department- Mrs.C.Sunitha-Member
- Health inspector – Mrs. A.Umamaheswari-Member
- In-charge of pharmacy- Dr. P.Subramanyam-Member
- In-charge of hospital linen- Mrs. C.Sunitha-Member
- In-charge of hospital laundry- D.Indiramma-Member
- In-charge of hospital kitchen- Mrs M.Sunitha-Member
- Epidemiologist- Dr Ravishankar, Assistant professor, Social & Preventive medicine-Member
- Member Secretary- Dr K.K.Sharma, HOD of Microbiology
- Hospital Infection Control Officers - Dr. R. Jayaprada, Dr. N. Ramakrishna.
- Infection Control Nurses- V. Karpugam, D.Redemma, A. Shobharani, N.Bayamma & all 47 Head nurses- Members
- Infection Control technicians: Mr P.Yashodhar, Mr. P.Rammurthy

3) HIC Terms of Reference

1. Health care associated infections

    i) VAP
    ii) CLABSI
    iii) CAUTI
    iv) SSI
    v) Standardized infection ratio (SIR)

2. Bed sore analysis
3. O.T. surveillance (Monthly)
4. Blood bank surveillance
5. Environmental surveillance (water& air) (Monthly)
6. Hand hygiene
7. Dialysate fluid testing
8. Needle-stick injuries incidence
9. Multi drug-resistant organisms (MDRO's) Surveillance
10. Outbreak investigation
11. Biomedical waste management
12. High end antibiotic monitoring
13. AMR surveillance
14. HBs Ag antibody titre testing
15. Endotoxin (LAL) assay for Dialysate fluid & water

4) Hand Hygiene

- The organization adheres to standard precautions at all times regarding the use of PPE, prevention of sharp injury etc.
- Hand Hygiene guidelines are followed in all areas of the hospital-Posters regarding Hand Hygiene are available.
- Specific precautions are being followed when required.
- Safe Injection and Infusion practices are followed.
- Cleaning, disinfection and sterilization practices being followed

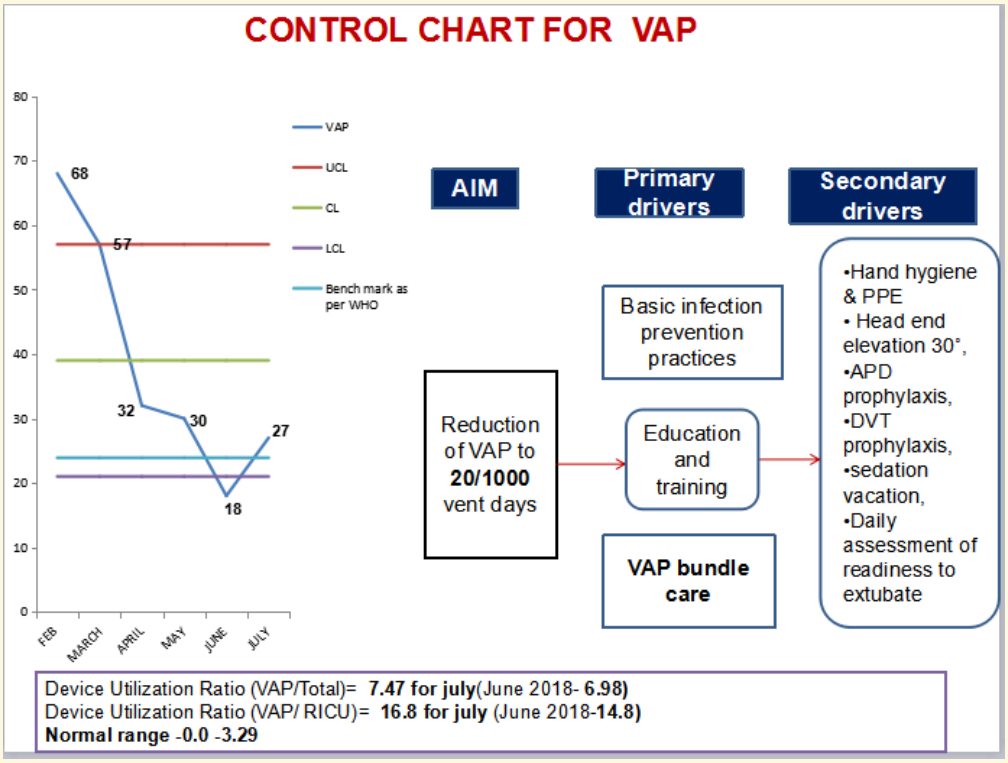
Steps of Procedure Hand Washing

Surgical Hand Wash (3-5mts)

5) Outcomes & KPIs for Infections

i) Ventilator Associated Pneumonia (VAP)

Parameters	All Ventilated patients	RICU
Total no. of infections - July	22	11
Total ventilator days for July	814 (109 patients)	386 (23 patients)
July 2018	27/1000 Days	28.5/1000 Days
June 2018	18/1000 Days	24.8/1000 Days
May 2018	29.5/1000 Days	30.3/1000 Days
April 2018	32/1000 Days	22.6/1000 Days
March 2018	57/1000 Days	48 /1000Days
February 2018	68/1000 Days	48/1000 Days

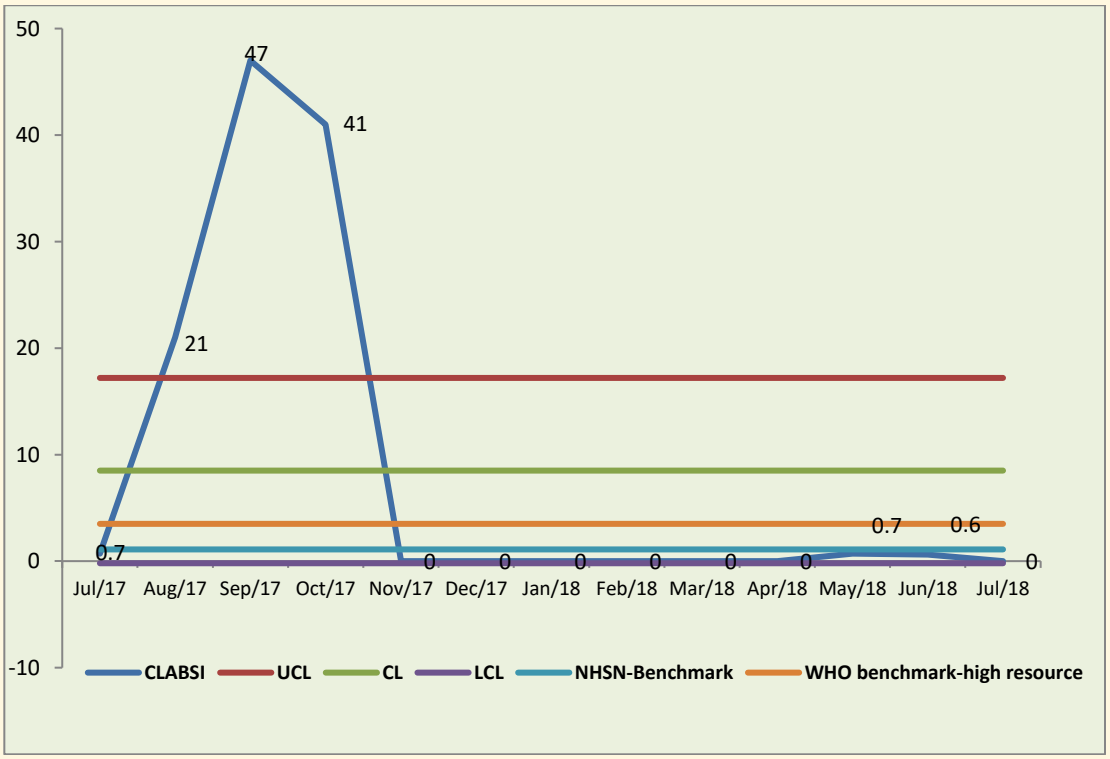


ii) Central Line Associated Blood Stream Infection Rate (CLABSI)

PARAMETERS	CLABSI rate
no of infections-July	*Zero*
total no of line days for July	1876 Days(177 patients)
CLABI rate July 2018	Zero
CLABI rate June 2018	0.6
CLABI rate May 2018	0.7
CLABI rate April 2018	Zero
CLABI rate March 2018	Zero
CLABI Rate February 2018	Zero

Two blood cultures has grown different organisms (Acinetobacter, Enterococcus spp). Rest 17 were sterile.

Control Chart for CLABSI

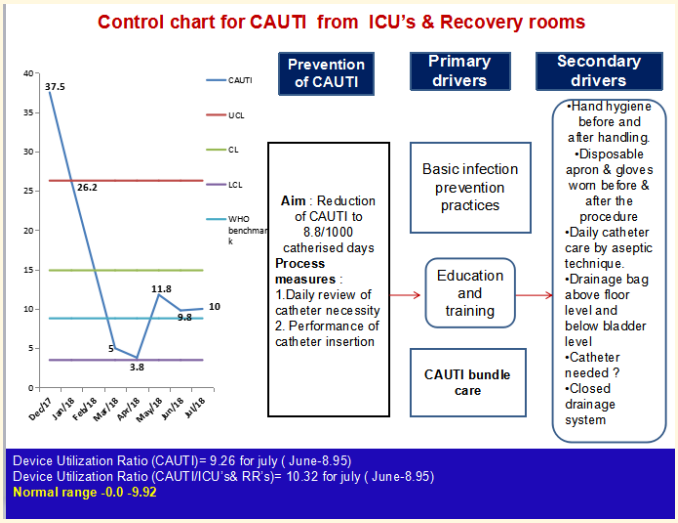


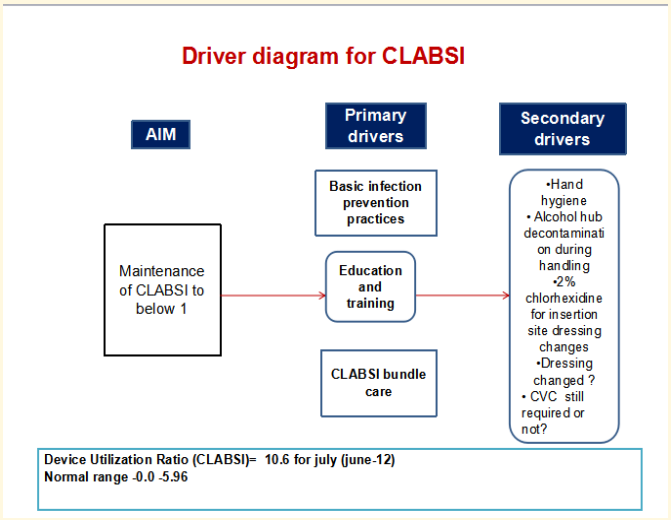
iii) CAUTI

CAUTI from ICU's & Recovery rooms

PARAMETERS	RICU AND MICU,CTRR,GS ICU, ANCU patients
No. of Infections -July	09
Total no of Catheterized days for July	898(87Patients)
July 2018	10/1000 days
June 2018	9.8/1000 Days
May 2018	11.8/1000 Days
April 2018	3.8/1000 days
March 2018	05/1000 days

Average CAUTI the year 2016 -26.5/1000
Average CAUTI the year 2017 -5.7/1000

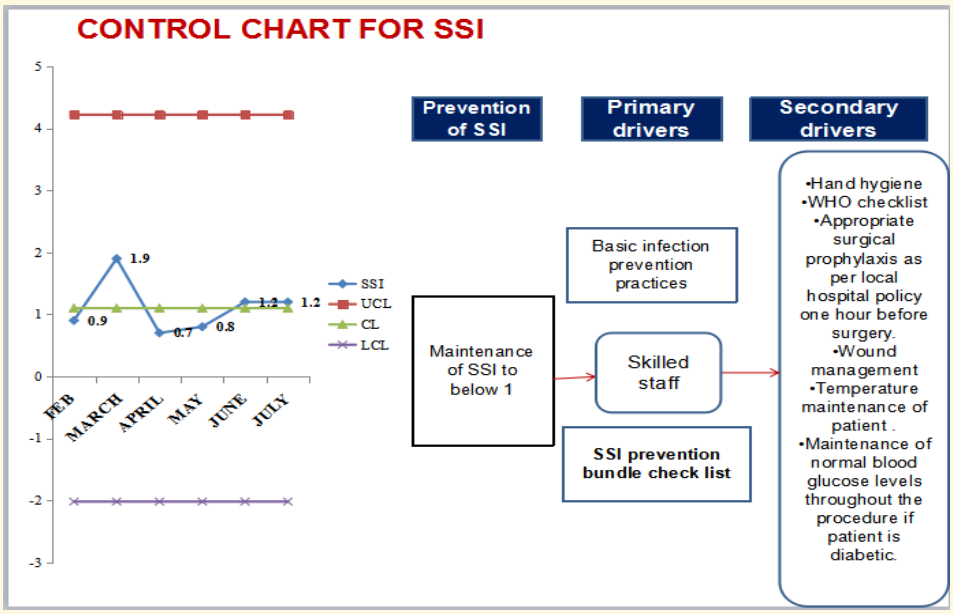




iv) SSI

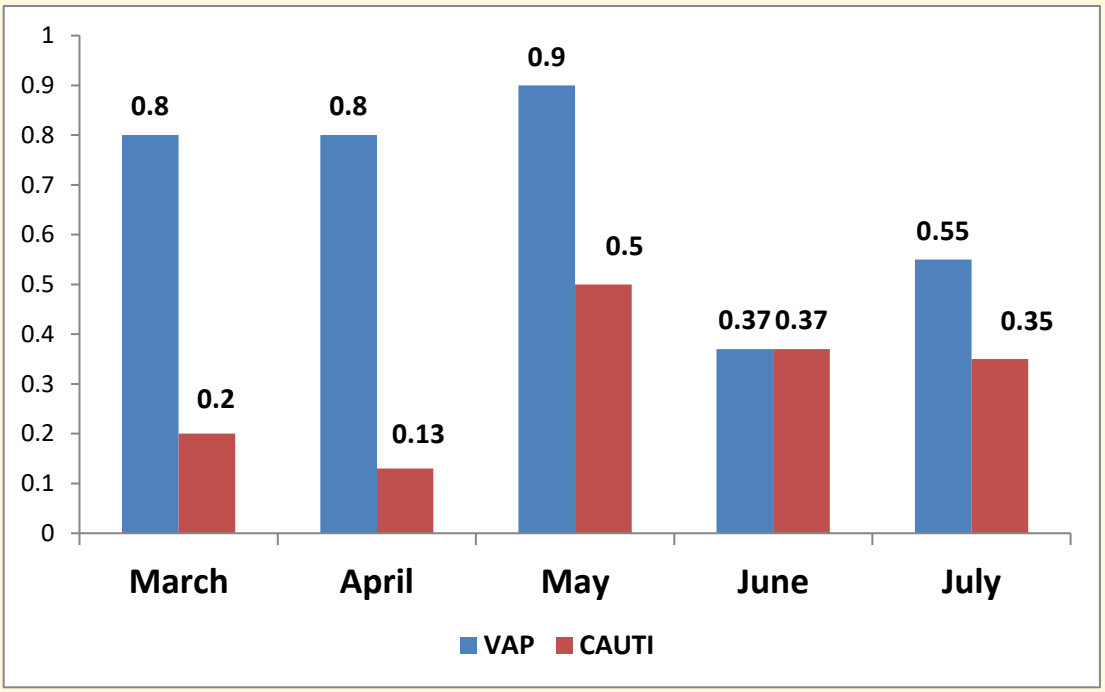
SSI Rate

PARAMETERS	
No. of infections-July	15
Total Number of Surgeries for July	1210
SSI Rate - July 2018-1210	1.2
SSI Rate - June 2018-1082	1.2
SSI Rate - May 2018-593	0.8
SSI Rate - April 2018-1012	0.7
SSI Rate - March 2018-467	1.9
SSI Rate - February 2018-543	0.9
SSI Rate - January 2018-521	2.5



v) Standardized Infection Ratio (SIR)

Trends of Standardized Infection Ratio for the Year 2018



SVIMS

Antimicrobial Stewardship Pocket Guide

JUL 2018 – DEC 2018

5th Edition

Editors

Dr T.S.Ravikumar (Director-cum-VC)

Dr R.Jayaprada

Dr N.Ramakrishna

Dr K.K.Sharma

Dr. KAMINENI SRINIVAS
Minister for Health, Medical
Education & Family Welfare,
Govt. of Andhra Pradesh
Hyderabad.

Office Address :
Room No. 301,
3rd Floor, J-Block,
A.P. Secretariat,
Hyderabad - 500 022.
Office Telephones Nos. :
040-23455976
040-23451135

Message from Health Minister

It is very timely that Sri Venkateswara Institute of Medical sciences is making strides in controlling Health Care Associated Infections and innovating Antimicrobial Stewardship. Congratulations to the institute and I am proud that my Government will be at the forefront of tackling this emerging healthcare menace of misuse / overuse of antibiotics and drug resistance.

Dr. Kamineni Srinivas garu
Hon'ble Minister for Health Medical and Family Welfare
Govt., of Andhra Pradesh

Preface

Healthcare Associated Infections (HAI)

Among patients admitted to hospitals 5%-10% acquire one or more infections, based on reporting data largely from developed countries. It is estimated that in developing countries the risk of HAI is 2 to 20 times higher than in developed countries. In India, indiscriminate use of antibiotics both in community settings and in hospital settings contributes to development of antibiotic resistance. Further there is need for robust reporting of HAI in India. The Director-cum-Vice Chancellor of SVIMS Dr. T.S.Ravikumar announced that SVIMS is taking a step forward to contribute in containing HAI in India. Adapting international guidelines (e.g. WHO, CDC), SVIMS is invoking a ten pronged strategy. One key component is 'Antimicrobial Stewardship', which aims to optimize antibiotic use among patients in order to reduce antibiotic resistance, improve patient outcomes and safety and ensure cost effective therapy. This pocket guide of SVIMS Antimicrobial Stewardship (fist Edition) is released on 12-7-2016 by Hon'ble Health Minister of Andhra Pradesh, Dr. Kamineni Srinivas garu. This will be revised 6 monthly and new editions will be released every January and July to inform all health care personnel (doctors, nurses, and allied health staff) of pathogen surveillance, antimicrobial use, infection control measures and outcomes. This programme is jointly monitored by Hospital Infection Control Committee and SVIMS Quality Council.

Dr. T.S.Ravikumar
Director cum Vice Chancellor

From the desk of editors……..

Greetings from Infection Control team,

- Antimicrobial resistance (AMR) results in increased morbidity, mortality, and costs of healthcare
- Prevention of the emergence of resistance and the dissemination of resistant microorganisms will reduce these adverse effects and their attendantcosts.
- Predominant isolates in ICU's were *Klebsiella* followed by *Acinetobacter, Escherichia coli and Pseudomonas spp.*
- In ICU's empirical choice of antibiotic in our institute is Cefaperazone + sulbactam.
- Based on Gram staining report prophylactic drug of choice for gram negative bacilli is Cefaperazone + sulbactam, and for gram positive bacteria is Linezolid in all ICU's.
- We therefore urge everyone to restrict the use of antimicrobialagents.

R. Jayaprada
InfectionControlOfficer
Hospital Infection Control Committee

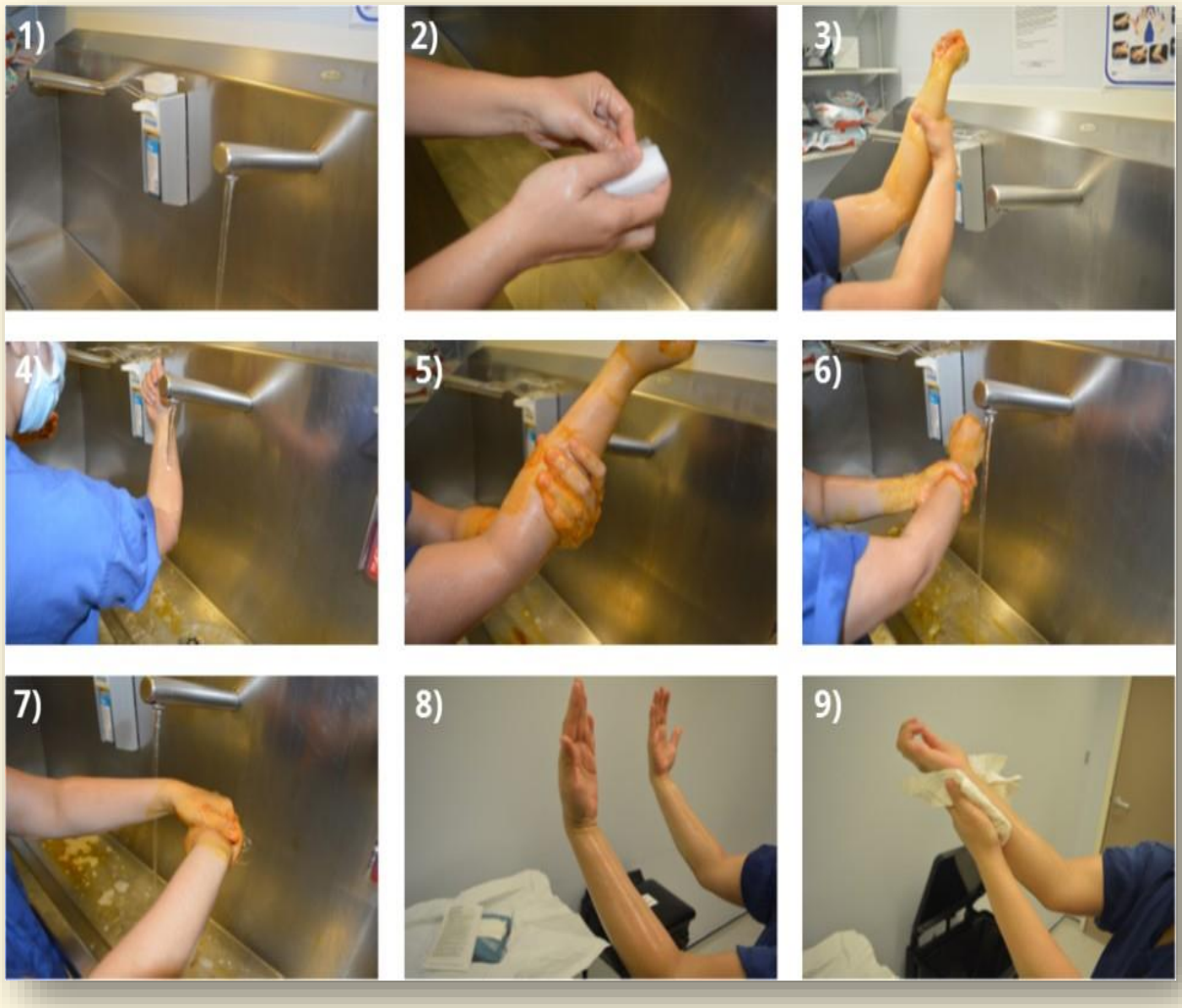
T.S.Ravikumar
Director cum ViceChancellor

INDEX

Steps of Procedure Hand Washing

Courtesy : WHO/ CDC

Surgical Hand Wash (3-5mts)



Courtesy : WHO/ CDC

Greeting each other in Health care

Another dimension
in Hand Hygiene!

Spread Goodwill, not Germs

SVIMS

Prevent droplet spread
when coughing, sneezing

Dr. T.S.Ravikumar
Director cum Vice-Chancellor

Sri Venkateswara Institute of
Medical Sciences, Tirupati.

Key messages.....

- **Predominant isolates in ICU's were *Klebsiella* followed by *Acinetobacter, Pseudomonas spp and Escherichia coli.***
- **In ICU's empirical choice of antibiotic in our institute is Cefaperazone+sulbactam. In case of suspicion of *Pseudomonas* infections, empirical choice of antibiotic is Piperacillin+ Tazobactam.**
- **Based on Gram staining report prophylactic drug of choice for gram negative bacilli is Cefaperazone+sulbactam, and for gram positive bacteria is Linezolid in all ICU's.**

Organism wise Anti Microbial Resistance pattern (Gram negative bacilli) (%)

S.No	Organisms	AK	CFS	CTX	CF	COT	G	M	PTZ	Pb	CTZ
1	*E.coli*(1646)	16	20	89	65	64	27	11	22	0.4	-
2	*Klebsiella* (602)	51	57	94	42	78	55	40	55	2	-
3	*Acinetobacter(*279)	49	44	92	63	67	53	47	68	1	-
4	*Pseudomonas*(270)	30	57	-	77	-	51	77(Imp)	46	Nil	87
5	*Enterobacter* (109)	31	37	83	37	63	39	18	42	2	-

AK-Amikacin, CTX-Cefotaxime, CFS-Cefaperazone +Sulbactum, CF-Ciprofloxacin, COT-Cotrimaxazole, G-Gentamicin, I-Imipenem, PTZ-Piperacillin+ Tazobactam, Pb-Polymixin-B, CTZ-Ceftazidime

Anti Microbial Resistance (AMR) pattern of Isolates in ICU's (%)

S.No	Organisms	AK	CFS	CTX	CF	COT	G	M	PTZ	Pb	CTZ
1	*Klebsiella (66)*	55	56	97	42	89	50	39	52	3	-
2	*Acinetobacter(43)*	67	51	93	67	72	70	53	70	2	
3	*Pseudomonas(25)*	56	76	-	84	-	56	88(Imp)	52	Nil	92
4	*E.coli (19)*	32	53	100	32	84	32	37	58	Nil	-

AK-Amikacin, CTX-Cefotaxime, CFS-Cefaperazone +Sulbactum, CF-Ciprofloxacin, COT-Cotrimaxazole, G-Gentamicin, I-Imipenem, PTZ-Piperacillin+ Tazobactam, Pb-Polymixin-B, CTZ-Ceftazidime

Anti Microbial Resistance (AMR) pattern of gram negative Isolates (%)

Organism	AK	CFS	CTX	CF	COT	G	M	PTZ	Pb
Gram negative bacilli	28	34	89	53	62	38	23	36	1.7

AK-Amikacin, CTX-Cefotaxime, CFS-Cefaperazone +Sulbactum, CF-Ciprofloxacin, COT-Cotrimaxazole, G-Gentamicin, I-Imipenem, PTZ-Piperacillin+ Tazobactam, Pb-Polymixin-B, CTZ-Ceftazidime

Anti Microbial Resistance (AMR) spectrum of *S.aureus, CoNS and Enterococcus spp (%)*

S.No	**Organisms**	**Ampp**	**Cef**	**Cip**	**E**	**CD**	**COT**	**G**	**LZ**	**P**	**VA**	**TE**
1	*S.aureus*	96	66	64	64	46	61	22	4	96	1.4	13
2	*Coagulase negative staphylococcus*	95	71	65	68	47	60	18	4	95	1.5	17
3	*Enterococcus spp*	83	-	91	92	-	-	-	3	84	5	38

Amp-Ampicillin, Cef-Cefoxitin, Cip-Ciprofloxacin, E-Erythromycin, CD-Clindamycin, COT-Cotrimaxazole, G-Gentamicin, LZ-Linezolid, P-Penicillin, VA-Vancomycin, TE-Tetracycline

Percentage of VRE: 5%

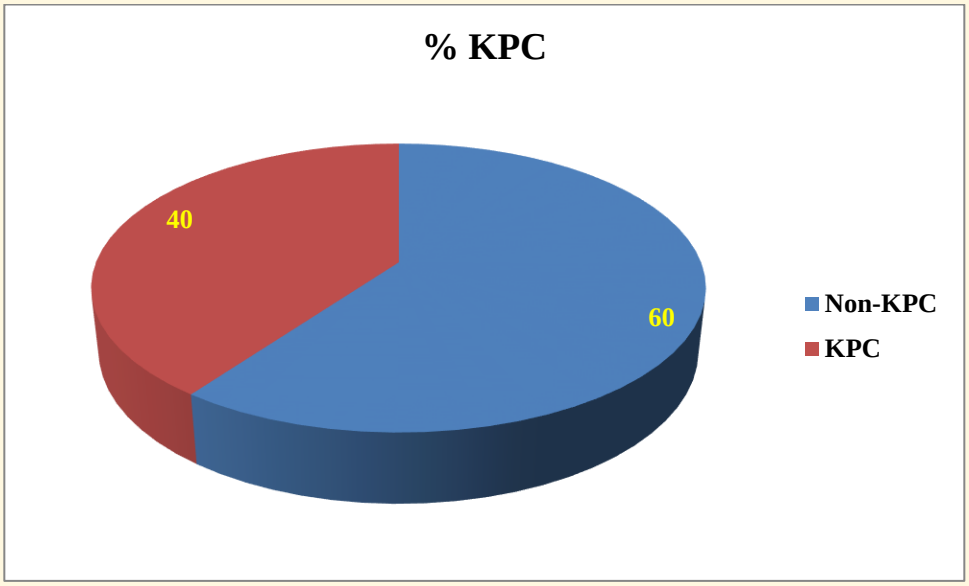
Percentage of MRSA: 66%,

Percentage of MRCoNS: 71%,

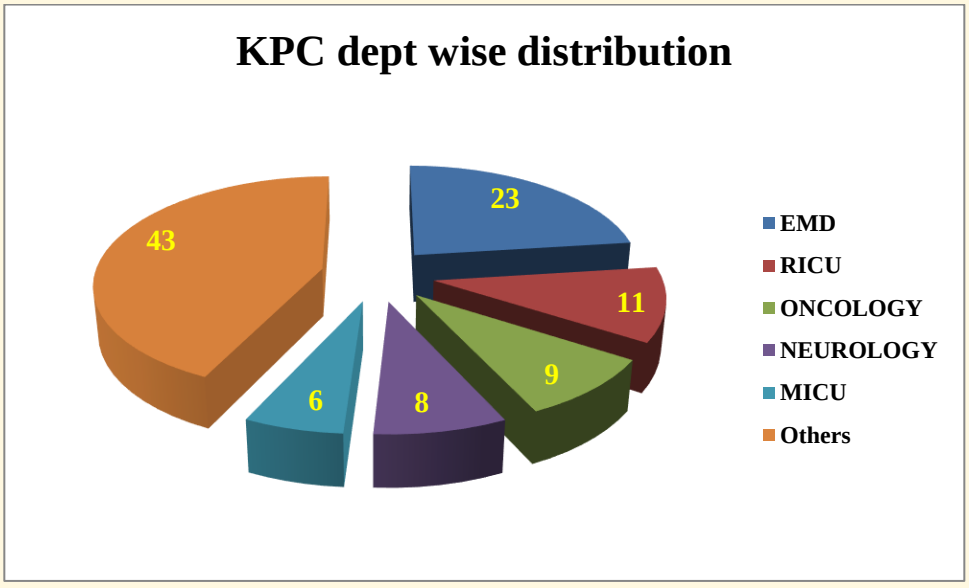
Percentage of VRSA: 1.4%.

Percentage of VRCoNS: 1.5%.

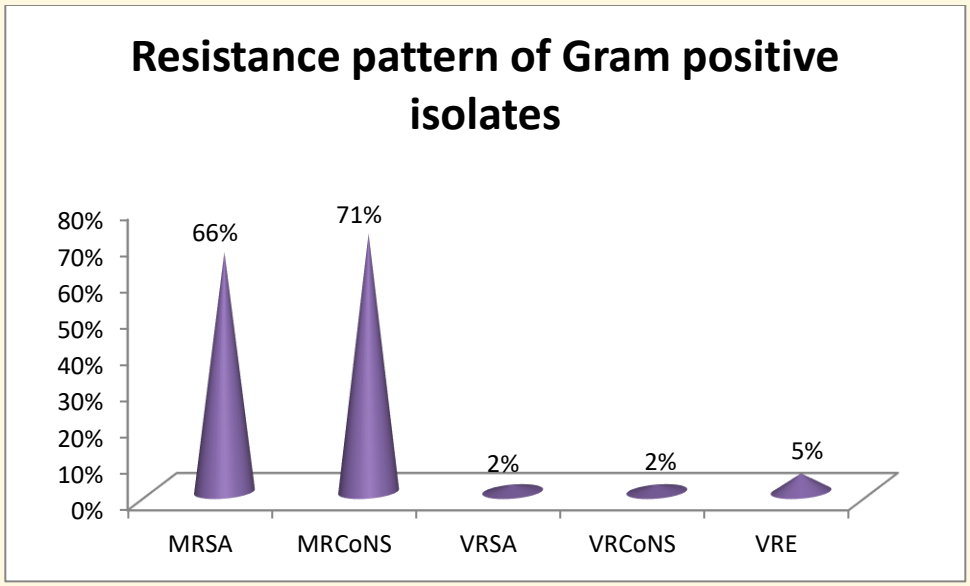
Percentage of Klebsiella pneumoniae Carbapenemases (KPC's)



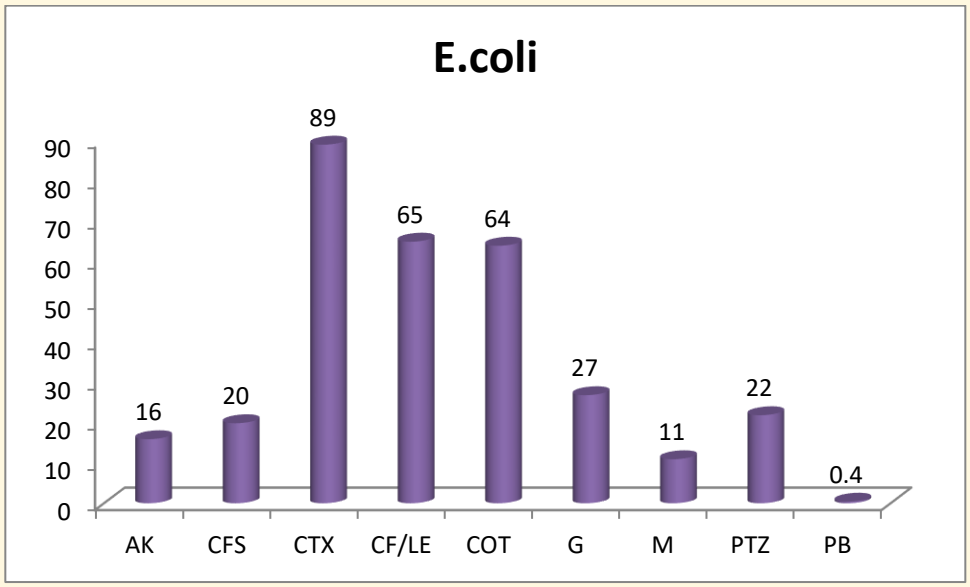
Department wise distribution of KPC



Antimicrobial resistance (AMR) spectrum of *Staphylococcus aureus, Coagulase negative Staphylococci (CONS), Enterococcus*

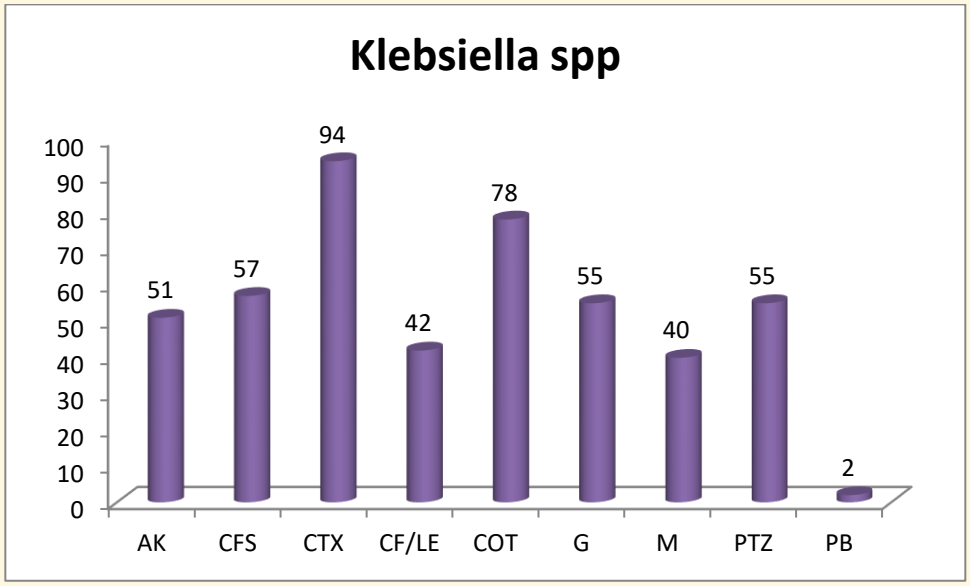


Antimicrobial resistance (AMR) patterns of *Escherichia .coli*



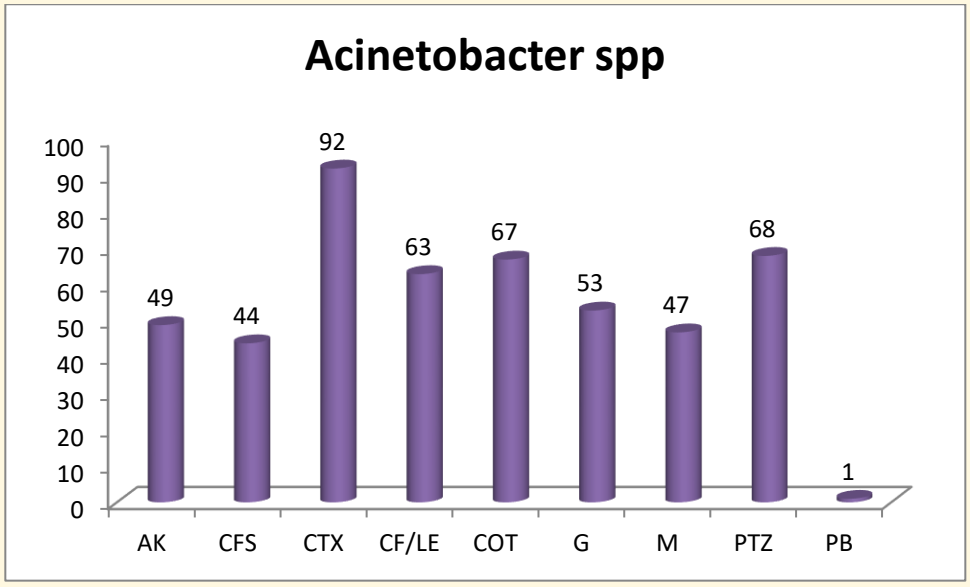
AK-Amikacin, CTX-Cefotaxime, CFS-Cefaperazone +Sulbactum, CF-Ciprofloxacin, COT-Cotrimaxazole, G-Gentamicin, I-Imipenem, PTZ-Piperacillin+ Tazobactam, Pb-Polymixin-B, CTZ-Ceftazidime

Antimicrobial resistance (AMR) patterns of *Klebsiella spp*



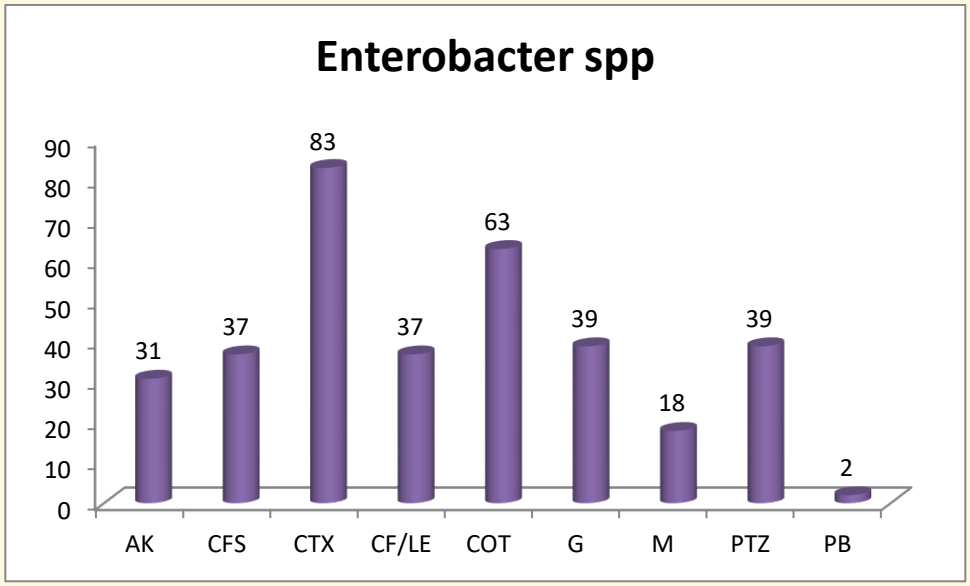
AK-Amikacin, CTX-Cefotaxime, CFS-Cefaperazone +Sulbactum, CF-Ciprofloxacin, COT-Cotrimaxazole, G-Gentamicin, I-Imipenem, PTZ-Piperacillin+ Tazobactam, Pb-Polymixin-B, CTZ-Ceftazidime

Antimicrobial resistance (AMR) patterns of *Acinetobacter spp*



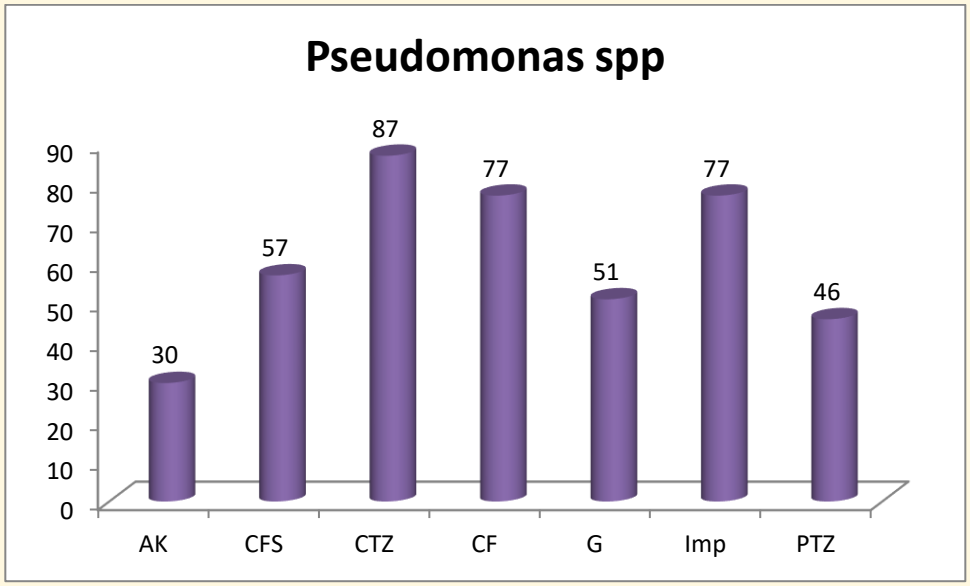
AK-Amikacin, CTX-Cefotaxime, CFS-Cefaperazone +Sulbactum, CF-Ciprofloxacin, COT-Cotrimaxazole, G-Gentamicin, I-Imipenem, PTZ-Piperacillin+ Tazobactam, Pb-Polymixin-B, CTZ-Ceftazidime

Antimicrobial resistance (AMR) patterns of Enterobacter species



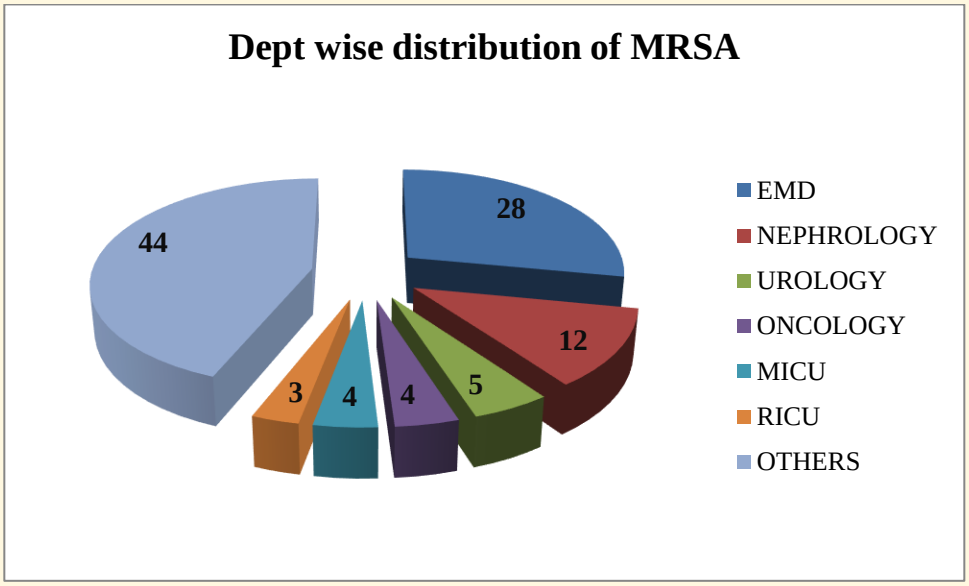
AK-Amikacin, CTX-Cefotaxime, CFS-Cefaperazone +Sulbactum, CF-Ciprofloxacin, COT-Cotrimaxazole, G-Gentamicin, I-Imipenem, PTZ-Piperacillin+ Tazobactam, Pb-Polymixin-B, CTZ-Ceftazidime

Antimicrobial resistance (AMR) patterns of *Pseudomonas spp*

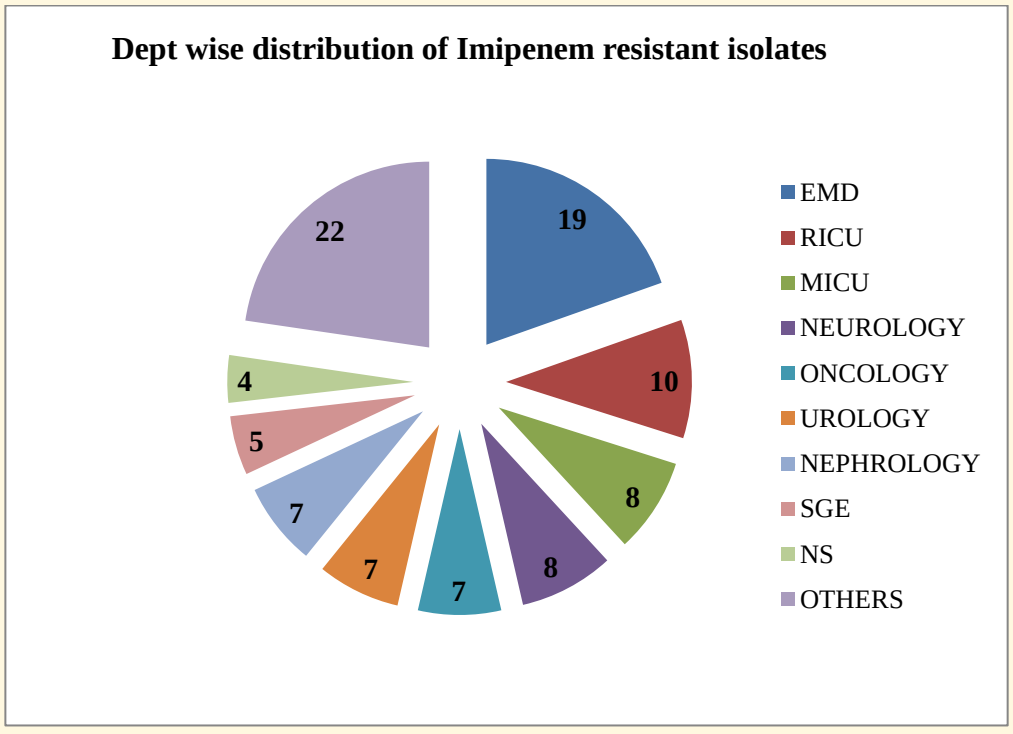


AK-Amikacin, CTX-Cefotaxime, CFS-Cefaperazone +Sulbactum, CF-Ciprofloxacin, COT-Cotrimaxazole, G-Gentamicin, I-Imipenem, PTZ-Piperacillin+ Tazobactam, Pb-Polymixin-B, CTZ-Ceftazidime

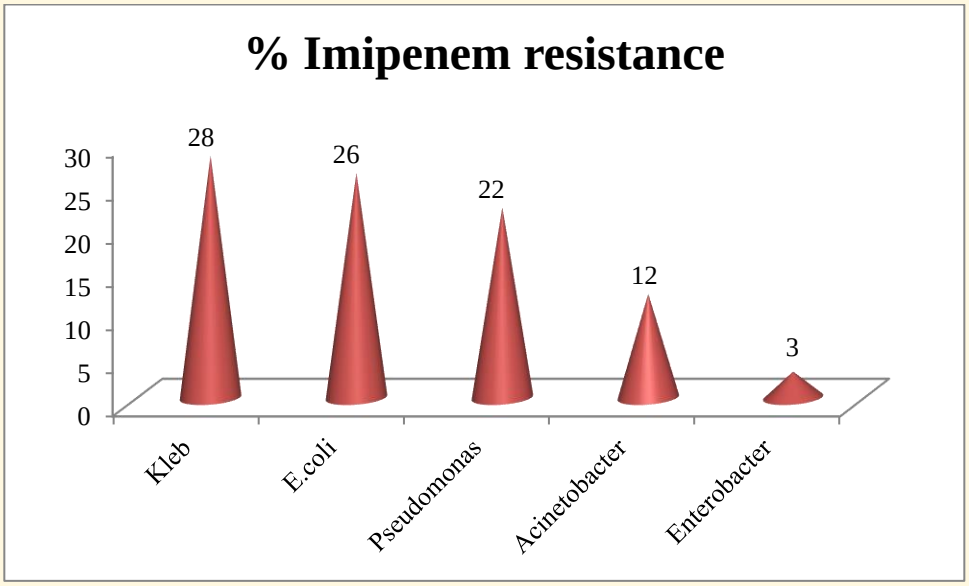
Ward wise distribution of MRSA (%)



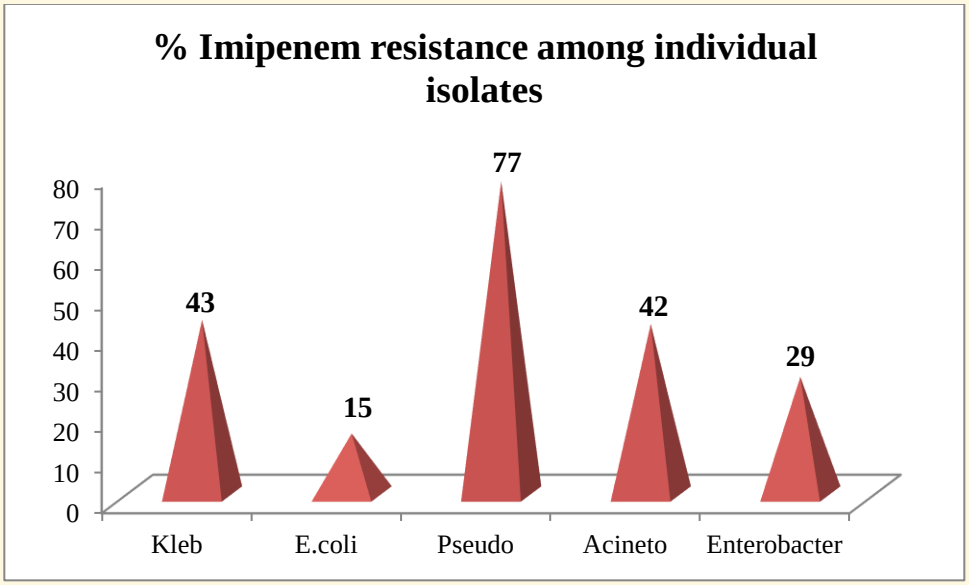
Dept wise distribution of Imipenem resistance (%)



Contribution of individual imipenem resistant isolates

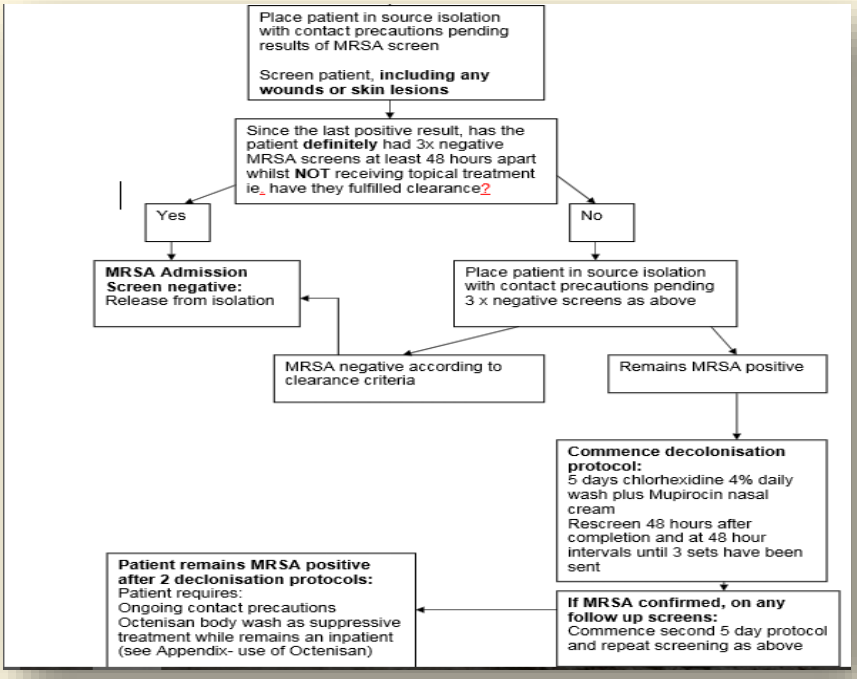


Percentage of imipenem resistance among individual isolates



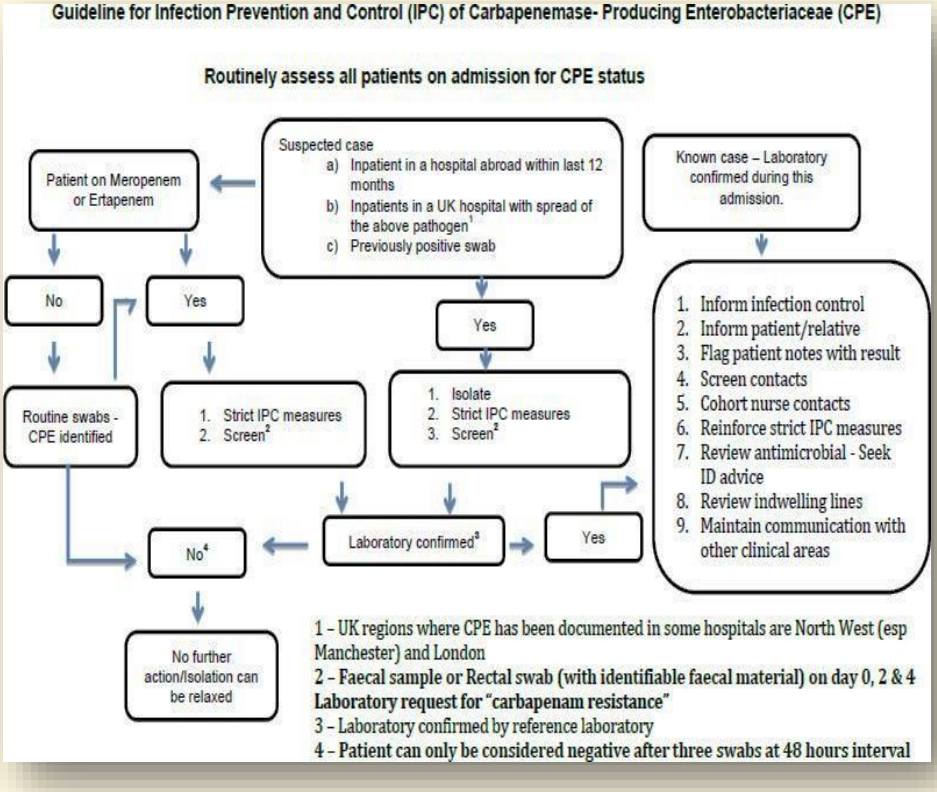
- Most common gram negative isolates were *Escherichia coli, Klebsiella, Acinetobacter spp and Pseudomonas.*
- Escherichia coli isolates were highly resistance to cefotaxime(89%), ciprofloxacin(65%), Cotrimaxazole(64%) and sensitive to Amikacin(84%), Cefaperazone+sulbactam(80%), Gentamicin(73%), Piperacillin +tazobactam(78%), Meropenem(89%) and Colistin/Polymixin B(99.6%).
- Klebsiellae isolates were highly resistance to cefotaxime (94%), Amikacin (51%), Gentamicin (55%), Cotrimaxazole (78%), Cefaperazone+sulbactam (57%) Piperacillin +tazobactam (55%) and sensitive to ciprofloxacin/Levofloxacin (58%), Meropenem (60%) and Colistin/Polymixin B(98%).
- *Acinetobacter* spp isolates were highly resistance to cefotaxime (92%), ciprofloxacin (63), Cotrimaxazole (54%), Amikacin (67%), Gentamicin (53%), Piperacillin +tazobactam (68%) and sensitive to Meropenem (53%), Cefaperazone+sulbactam (56%), and Colistin/Polymixin B (99%)
- *Pseudomonas spp* isolates were highly resistance to ciprofloxacin (77%), ceftazidime (87%),Imipenem(77%),Cefaperazone+sulbactam(57%),Gentamicin(51%),and sensitive to Amikacin(70%), Piperacillin +tazobactam(54%) and Colistin/Polymixin B(100%).
- Most of the Gram negative isolates were shown highly resistance to cephalosporins (89%), cotrimaxazole (62%), ciprofloxacin (53%).
- On the other hand, Gram negative isolates were shown sensitivity to cefoperazone+sulbactum (66%), aminoglycosides (72%), Meropenem(77%), and Polymixin B(98.3).
- ✓ Screening of health care workers (HCW) for MRSA should be done as MRSA(Methicillin resistance Staphylococcus aureus) percentage was 66 &Methicillin resistance Coagulase negative Staphylococcus percentage was 71, and these isolates are predominantly from emergency and Nephrology departments. HCW's must be treated for the same.
- ✓ S.aureus has show high resistance against ciprofloxacin (64%),erythromycin(64%), Clindamycin(46%), and penicillins(96%).
- ✓ VRE (vancomycin resistance Enterococci) percentage was 5.
- ✓ Imipenem resistance was noted high in *Pseudomonas* (77%) followed by Klebsiellae (43%), *Acinetobacter (*42%) *Enterobacter* (29%) and E.coli (15%). So cautious prescription of carbapenems required.

Flow diagram for known MRSA positive patients



Routinely assess all patients on admission for CPE status

Guideline for Infection Prevention and Control (IPC) of Carbapenemase-Producing Enterobacteriaceae (CPE)



Revision of Antibiotic policy as per WHO 2016 guidelines:

As part of the review of antibacterial agents, a new categorization of antibacterial agents into three groups was proposed:

- ACCESS – first and second choice antibiotics for the empiric treatment of most common infectioussyndromes;
- WATCH – antibiotics with higher resistance potential whose use as first and second choice treatment should be limited to a small number of syndromes or patient groups;and
- RESERVE – antibiotics to be used mainly as 'lastresort' treatment options

Access group antibiotics			
Beta-lactam medicines		**Other antibacterials**	
amoxicillin	cefotaxime*	Amikacin	**Gentamicin**
amoxicillin + clavulanic acid	ceftriaxone*	azithromycin*	**Metronidazole**
ampicillin	Cloxacillin	Chloramphenicol	**Nitrofurantoin**
benzathinebenz ylpenicillin	Phenoxymethylpenicill in	ciprofloxacin*	**spectinomycin (EML only)**
benzylpenicillin	piperacillin + tazobactam*	clarithromycin*	**sulfamethoxazole + trimethoprim**
cefalexin	procaine benzyl penicillin	Clindamycin	**vancomycin (oral)***
cefazolin	*meropenem**	Doxycycline	***vancomycin (parenteral)****
cefixime*			

Watch group antibiotics
Quinolones and fluoroquinolones e.g. ciprofloxacin, levofloxacin, moxifloxacin, norfloxacin
3rd-generation cephalosporins (with or without beta-lactamase inhibitor) e.g. cefixime, ceftriaxone, cefotaxime,ceftazidime
Macrolides e.g. azithromycin, clarithromycin, erythromycin
Glycopeptidese.g. teicoplanin, vancomycin
Anti-pseudomonalpenicillins with beta-lactamase inhibitor e.g. piperacillin +tazobactam
Carbapenems e.g. meropenem, imipenem + cilastatin
Penemse.g. faropenem

Reserve group ('last-resort') antibiotics	
Aztreonam	Fosfomycin (IV)
4th generation cephalosporinse.g. cefepime	Oxazolidinones e.g. linezolid
5th generation cephalosporinse.g. ceftaroline	Tigecycline
Polymyxins e.g. polymyxin B, colistin	Daptomycin

Sri Venkateswara Institute of Medical Sciences
Segregation of Biomedical Waste

Yellow (Non-Chlorinated Plastic Bags)	Red (Non-Chlorinated Plastic Bags)	Blue Card Board Boxes	White (Translucent Puncture Proof Container)
Human Anatomical, Infectious Waste & Cytotoxic Waste ➢ Human tissues, organs, body parts and foetus ➢ Items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs ➢ Bags containing residual or discarded blood and blood components ➢ Antibiotics, cytotoxic drugs along with glass or plastic ampoules, vials (with cytotoxic labelled bag) ➢ Discarded disinfectants ➢ Discarded linen, mattresses, beddings contaminated with blood or body fluid ➢ Blood bags ➢ Laboratory culture, stocks or specimens of microorganisms ➢ Live or attenuated vaccines	**Contaminated Waste (Recyclable)** ➢ Disposable items ➢ Tubing ➢ Bottles ➢ Intravenous tubes & sets ➢ Catheters ➢ Urine bags ➢ Gloves ➢ Syringes (without needles and fixed needle syringes) ➢ Vaccutainers with their needles cut	**Glassware** ➢ Broken or discarded and contaminate glass including medicine vials and ampoules except those contaminate with cytotoxic wastes **metallic body implants**	**Waste Sharps Including Metals** ➢ Needles ➢ Syringes with fixed needles ➢ Needles from needle tip cutter or burner ➢ Scalpels ➢ Blades ➢ Any other contaminated sharp object that may cause puncture and cuts ➢ Contaminated sharps

Black/ Green – General Garbage (domestic waste, papers, packaging material, left over food)

Biomedical Waste Management (BMW) RULES 2016

Category	Type ofwaste	Type of Bag/ container	Treatment/ Disposal options
Yellow	Human anatomical waste	Yellow coloured	Incineration/ Plasma pyrolysis/ deepburial
	Animal anatomical waste		
	Soiledwaste	non chlorinated plasticbags	Incineration/ Plasma Pyrolysis/ deepburial/ autoclaving or hydroclaving+ shredding/mutilation
	Expired/ discarded medicines-pharmaceutical waste,cytotoxic drugs	Yellow coloured containers/ non chlorinated plastic bags	Incineration (cytotoxic drugs at temperature > 1200□C)
	Chemicalwaste	Yellow coloured containers/ non chlorinated plastic bags	Incineration or Plasma pyrolysis orEncapsulation
	Discarded linen contaminated with blood/ bodyfluids	Non- chlorinated yellow plastic bags / suitable packing material	Non- chlorinated chemical disinfection followedby incineration/ plasmapyrolysis
	Microbiology, other clinical lab waste, blood bags, live/attenuated vaccines	Autoclave safe plastic bag/container	Pre-treattosterilizewith non-chlorinated chemicals on-site asper NACO/ WHOguidelines+Incineration
Red	Contaminated Waste(Recyclable)	Red coloured non- chlorinated Plastic bags or containers	• Autoclaving/ micro- waving/ hydroclaving + shredding • Mutilation/ sterilization+ shredding. Treated waste sent to registered or authorized recyclers or for energy recovery or plastics to diesel or fuel oil or for road making,
White (Translucent)	Waste sharps including Metals	Puncture proof, Leak proof, tamper proof containers	• Autoclaving/dry heat sterilization+ shredding/ mutilation • Encapsulation in metal container or cement concrete • Sanitary landfill/ designated concrete waste sharppit
Blue	Glassware, Metallic body implants	• Glass test tubes • Empty glass Bottles • Contaminated glass bottles • Broken glass ampoules containing discarded/Expired medicines except chemotherapeutic medicines • Metallic body implants • Reusable glass slide	Disinfection (by soaking the washed glass waste after cleaning with detergent and Sodium Hypochlorite treatment)/ through autoclaving/ microwaving/ hydroclaving + recycling