

# Etiology and Susceptibility of Central line-associated bloodstream infections (CLABSI) in Cancer patients: Regular Pointwise audit of Central Line Insertion Practices (CLIP)



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## INTRODUCTION

- According to the WHO, at any time, up to 7% of patients in developed and 10% in developing countries will acquire at least one HAI
- Cancer patients have a 3 to 5 fold greater risk of severe sepsis in comparison with non-cancer patients, with an increased risk for HAI particularly with multidrug resistant organism (MDRO)
- Malignancy carries an Odds Ratio of 1.35 for HAIs in India
- The cancer patient is immunocompromised because of the nature of the disease itself and also due to chemotherapy
- Oncologic patient populations might be uniquely affected by emerging antimicrobial-resistant strains because frequently exposed to multiple antimicrobial regimens, creating selective pressure on this population
- As per western literature, Gram-positive infections, which are frequently associated with these IV devices, became predominant
- In Indian cancer settings, Gram-negative isolates were found to be more common cause of infections
- CDC emphasise Central Line Insertion Practices (CLIP) for controlling CLABSI

### CLABSI DATA: Overall

- Central venous catheters (CVCs) are essential component for care of cancer patients.
- Deadly cost of CLABSIs is prolonged hospitalization, increased hospitalization costs and mortality.
- In U.S., studies report prevalence ranging from 1.8 to 7.6/1,000 catheter-days for CLABSI
- In research conducted in eight developing countries, the rate varied between 4.2 and 14.4/1,000 catheter-days.

Infect Control Hosp Epidemiol. 2012;33:865–8

J Crit Care. 2014;29:618–26

- In studies from Brazil and Canada, CLABSI in Cancer patients, CLABSI rate was 5.2 and 5.86 per 1,000 catheter-days respectively

Presented in 27<sup>th</sup> ECCMID, Vienna, Austria, 2017  
American Society of Clinical Oncology 2015;12:1

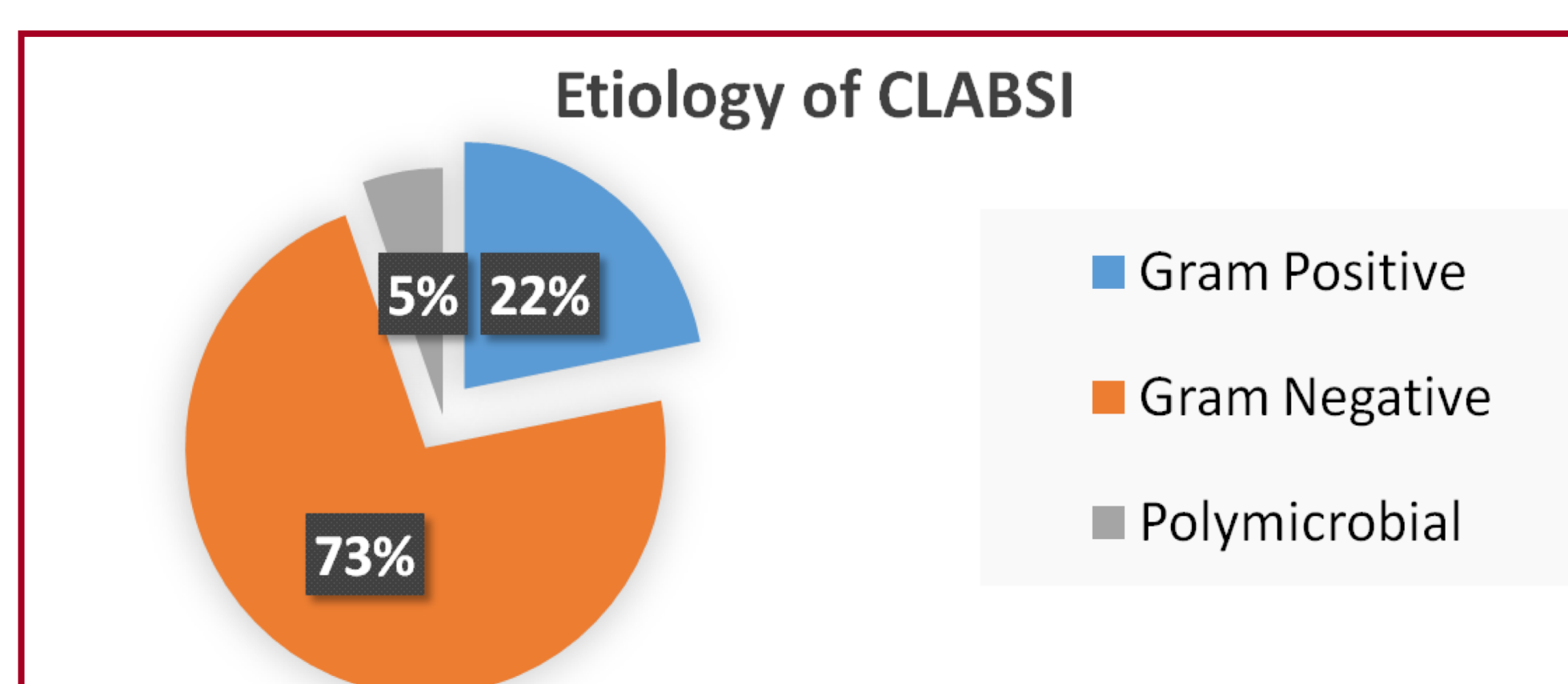
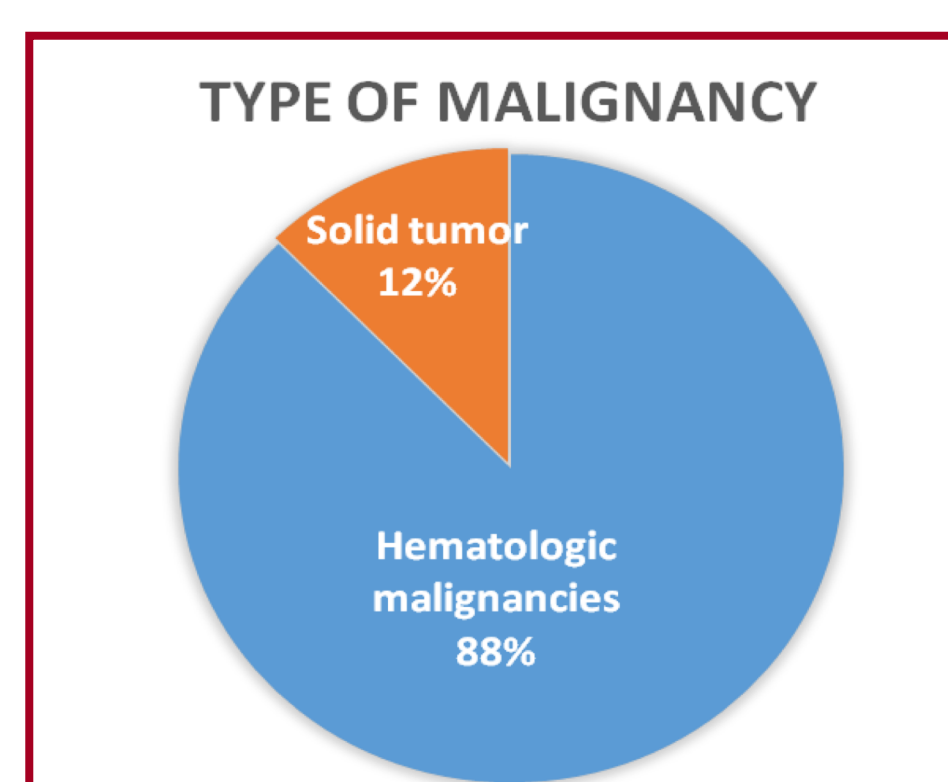
## STUDY

- Prospective CLABSI surveillance study (CDC/NHSN criteria) from January 2017 to June 2018 with microorganisms isolated and their anti-microbial susceptibility status from tertiary-care centre, Dr. BRAIRCH, Cancer Division, All India Institute of Medical Sciences (AIIMS), New Delhi, India
- CDC's-CLIP educational activity potentiated with continuous audit of CLIP
- Role of Central Line Insertion Practices (CLIP) and Audit System in prevention

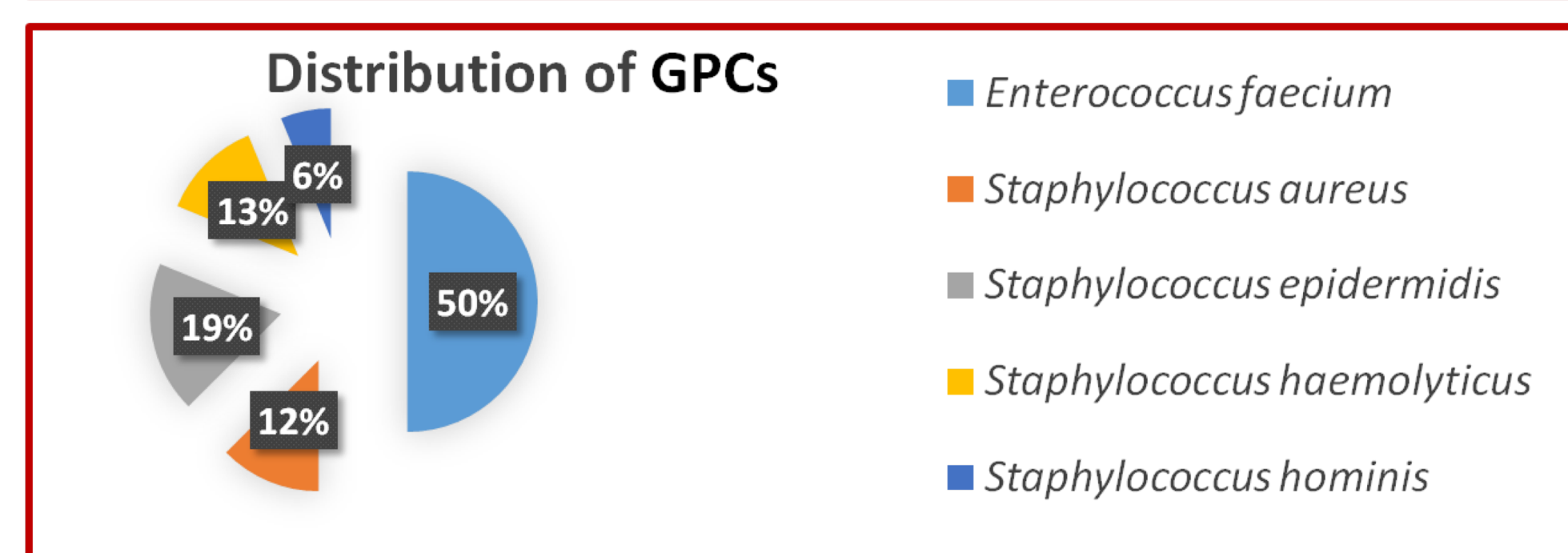
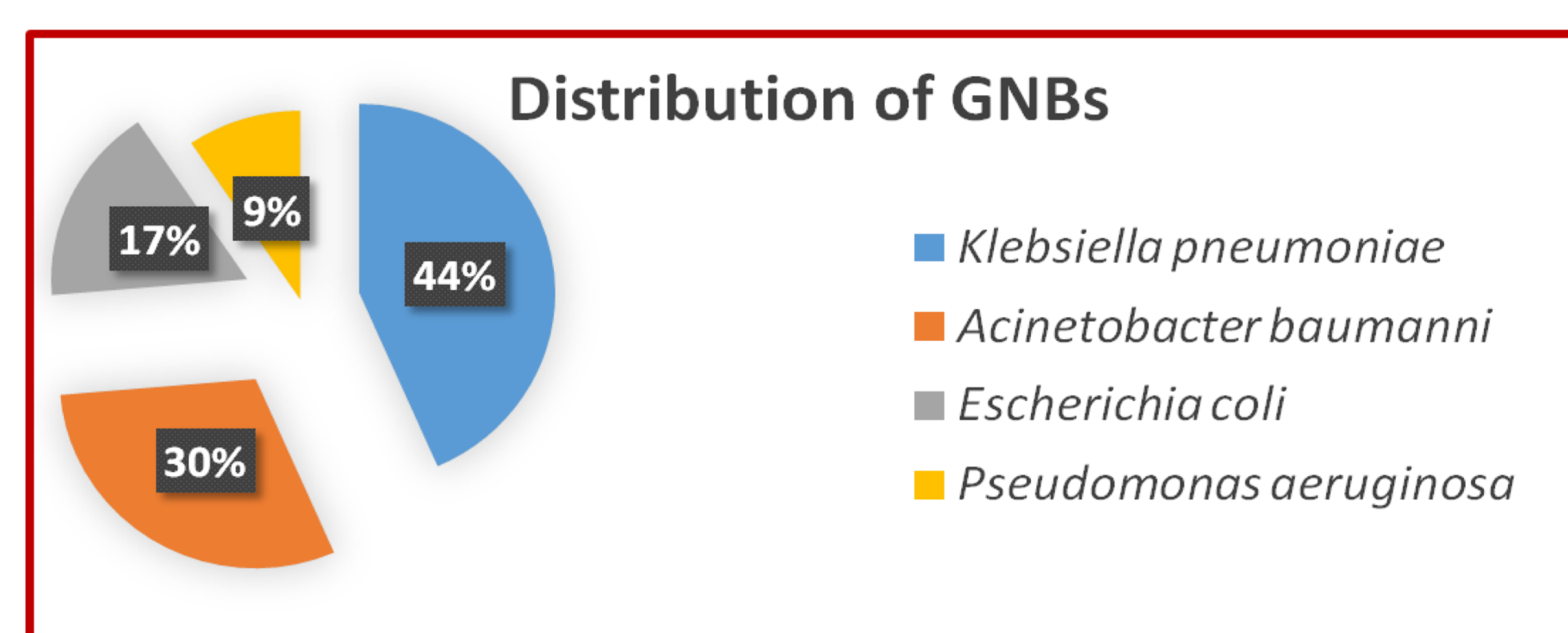
## METHODS

- CLABSI Definition: As per CDC. NHSN Criteria
- Criteria 1: Laboratory Confirmed Blood Stream Infection
- Criteria 2: Exposure to central Intra-venous catheter in Hospital Setting
- Criteria 3: No evidence of another site-specific infection caused by the same organism
- Microorganisms identification was done by Matrix assisted Laser Desorption Ionization-Time of Flight Mass Spectroscopy (MALDI-TOF).
- Antimicrobial resistance was performed either by CLSI recommended Kirby-Bauer Method or automated VITEK-2 system
- Documentation of Central Line Insertion Practices (CLIP) as per CDC's Healthcare Infection Control Practices Advisory Committee (CDC/HICPAC) Guidelines for the Prevention of Intravascular Catheter-Related Infections
  - CLABSI Prevention Insertion Bundles
  - CLABSI Prevention Handle & Maintenance Bundles
  - CLABSI Prevention Facilities Bundles
- Audit of Central Line Insertion Practices (CLIP) to look for the Compliance to CLABSI Preventive Practices

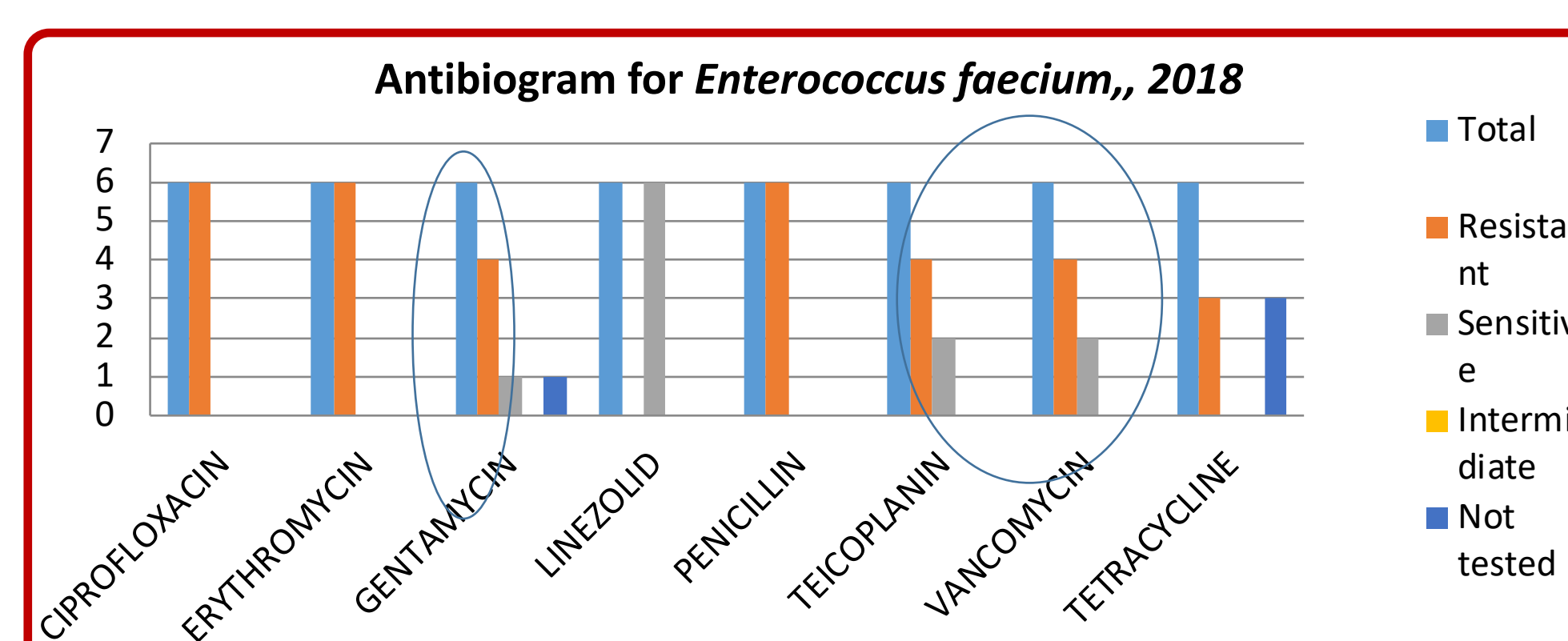
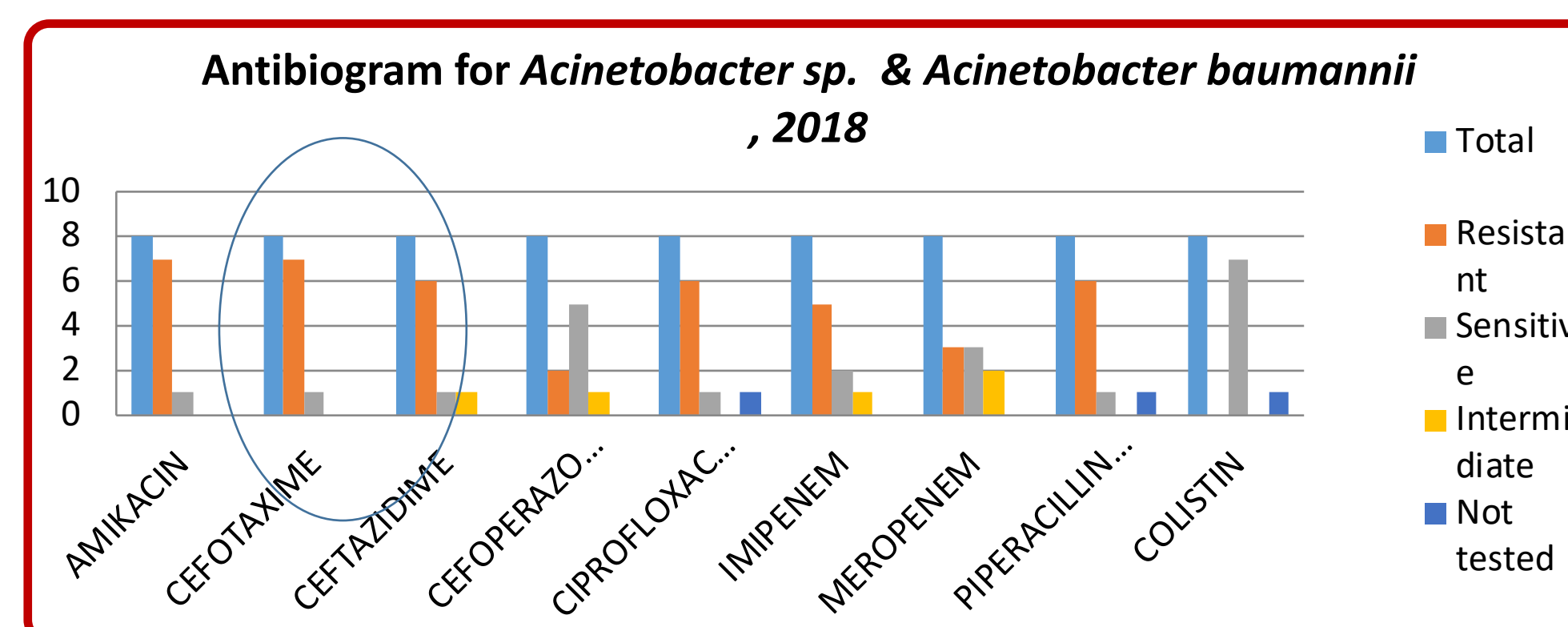
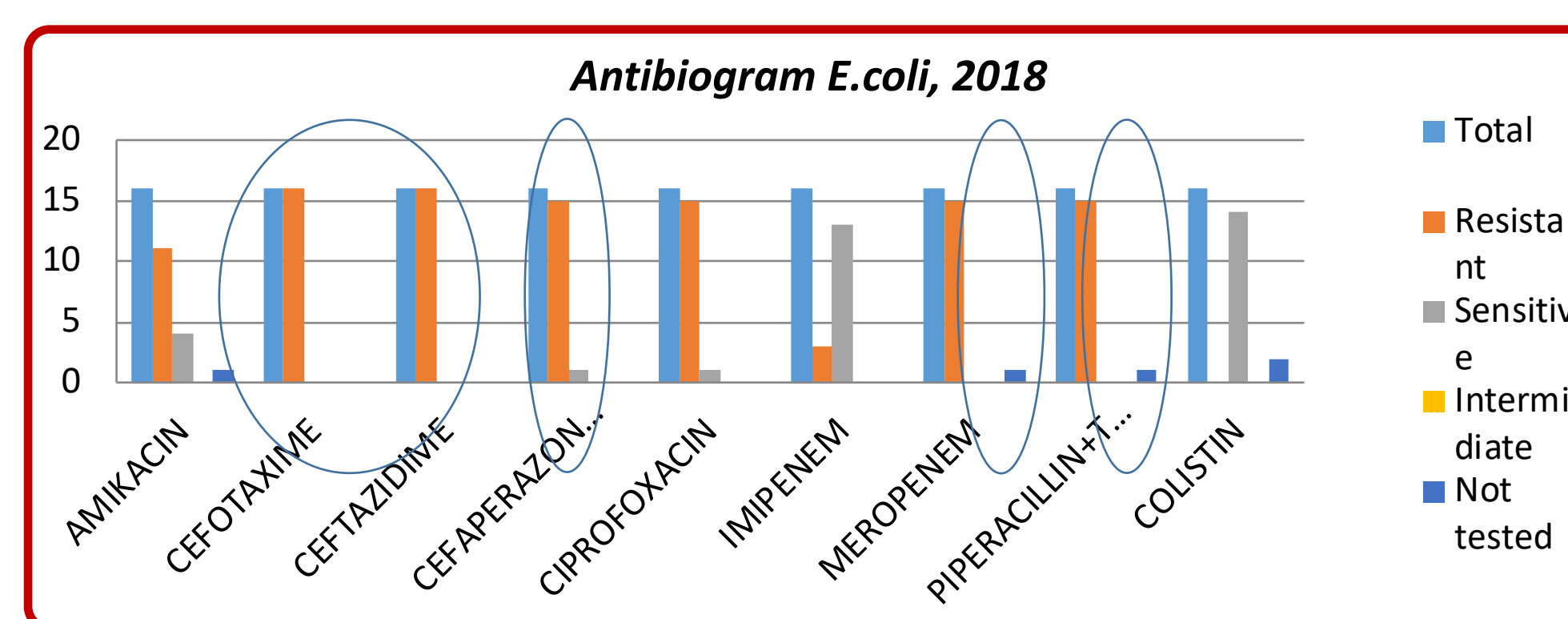
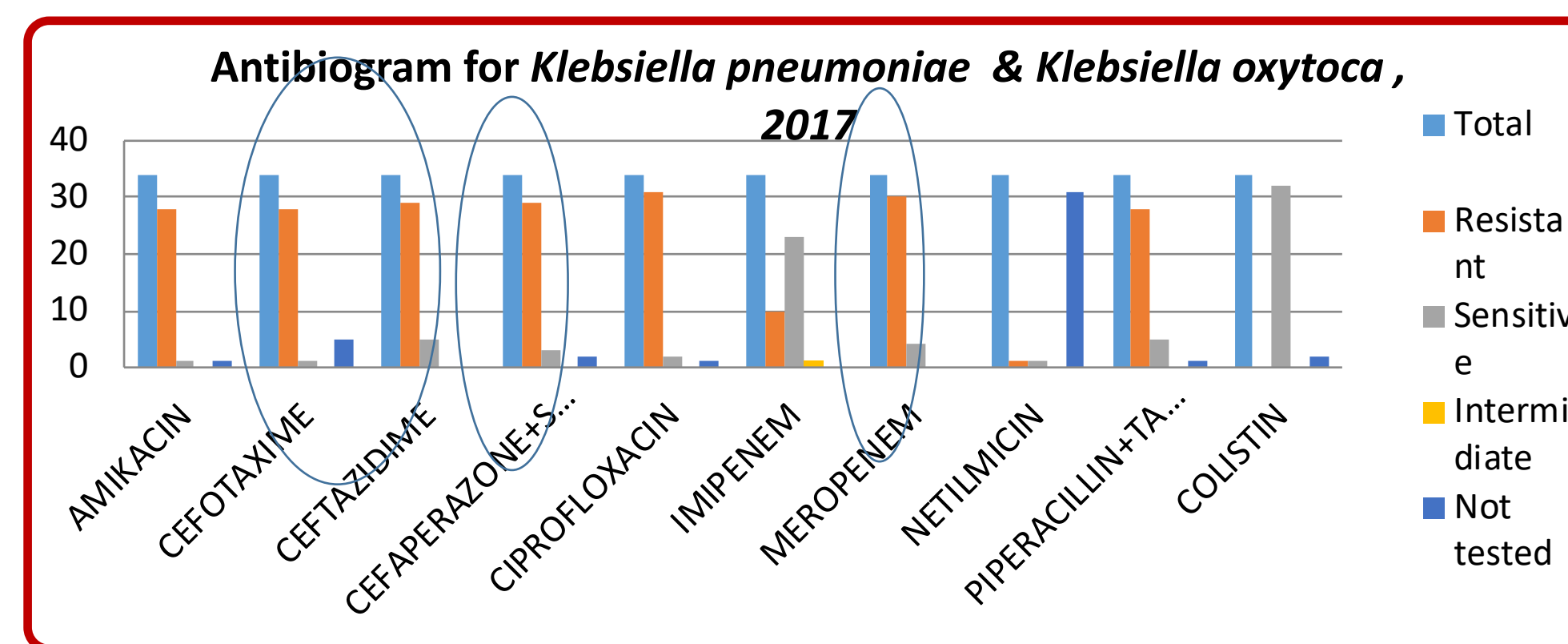
## RESULTS



- Among 73 CLABSI cases, Gram-negative rods (GNR) were 72.6% and GPCs 21.9% while 4 polymicrobial infections.

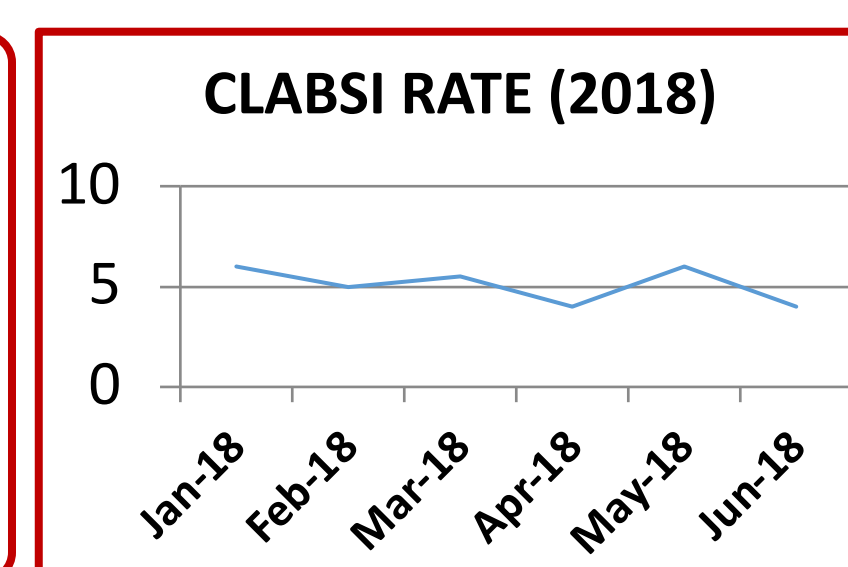
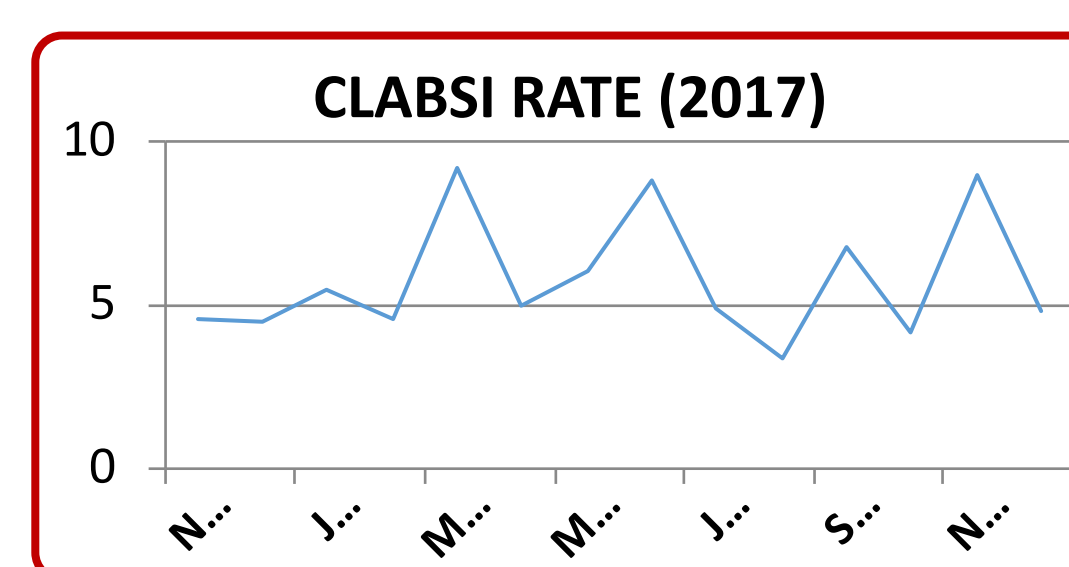


## Antibiograms



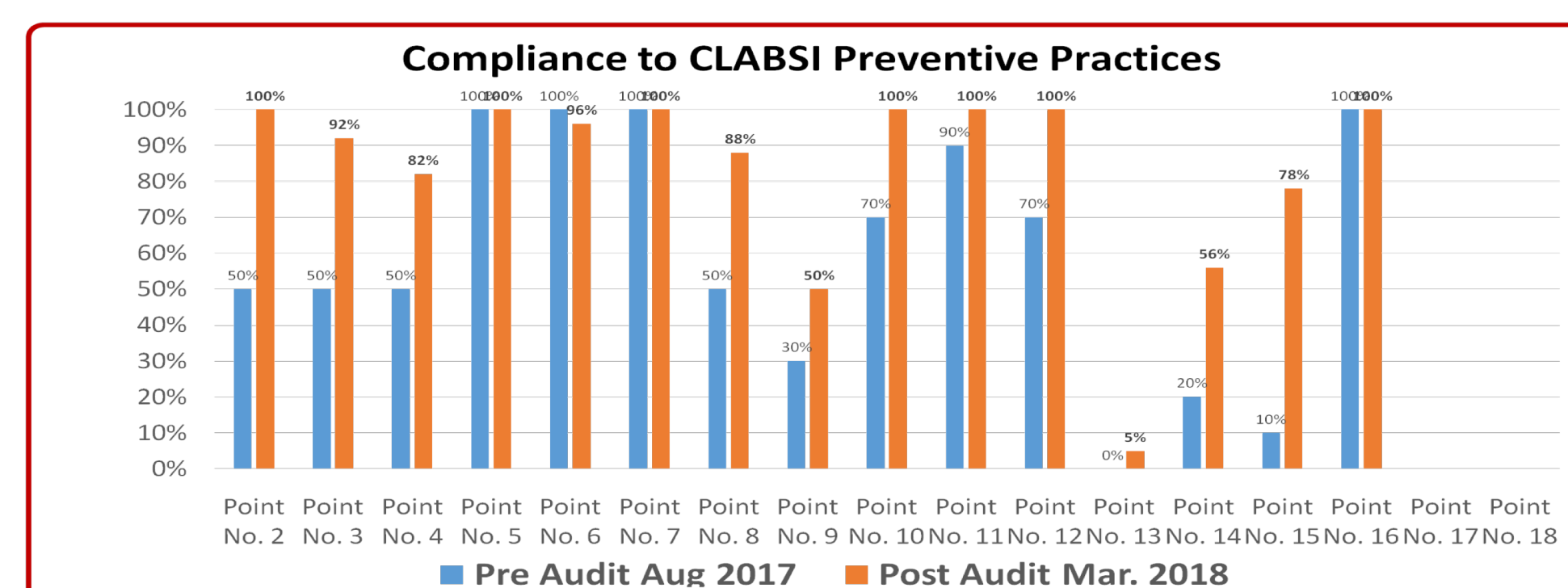
## CLABSI

- There were 62,230 patient-days and 13,039 central-line days in the study duration.
- Mean device utilization rate (DUR) was 0.21
- Mean CLABSI rate was 5.6/1,000 central-line-days



## Check List for prevention of CLABSI

For Clinicians	
Action	
1	Perform daily audits to assess whether each central line is still needed
2	Perform hand hygiene before insertion
3	Adhere to aseptic technique
4	Use maximal sterile barrier precautions (i.e., mask, cap, gown, sterile gloves, and sterile full body drape)
5	Perform skin antisepsis with >0.5% chlorhexidine with alcohol
6	Choose the best site to minimize infections and mechanical complications
7	Cover the site with sterile gauze or sterile, transparent, semi-permeable dressings
For Clinicians and Nurses	
8	Comply with hand hygiene requirements
9	Scrub the access port or hub immediately prior to each use with an appropriate antiseptic (e.g., chlorhexidine, povidone iodine, an iodophor, or 70% alcohol)
10	Access catheters only with sterile devices
11	Replace dressings that are wet, soiled, or dislodged
12	Perform dressing changes under aseptic technique using clean or sterile gloves
For facilities	
13	Empower staff to stop nonemergent insertion if proper procedures are not followed
14	"Bundle" supplies (e.g., in a kit) to ensure items are readily available for use
15	Provide the checklist above to clinicians, to ensure all insertion practices are followed
16	Ensure efficient access to hand hygiene
17	Monitor and provide prompt feedback for adherence to hand hygiene
18	Provide recurring education sessions on central line insertion, handling and maintenance



## CONCLUSION

- CLABSI rate of Cancer Unit in India (5.6) was similar to rates from Brazil (5.2) & Canada (5.8)
- Most organisms isolated were gram-negative with *Klebsiella* spp. being predominant (85% ESBL and 30% Carbapenem resistant), more so a motive to reduce CLABSIs
- Strict compliance to antimicrobial stewardship is essential
- Most CLABSI prevention interventions have concentrated on CVC insertion process, Central Line Insertion Practices (CLIP) educational activity should be accompanied with continuous audit system & broader inter-professional approach
- Only applying CLIP educational activity has a lesser significance when compared to potentiated with audit of CLIP activity
- Younger age (<15years old) seemed to increase the odds for a CVC-related infection but this did not reach statistical significance (OR 1.91, p=0.44)
- Patients with longer periods of catheterization seemed to be more prone to CVC infections, as the majority of patients (70%) had their first episode of bacteremia after the first 20 days of CVC carriage
- As far as myelotoxicity is concerned, the relative risk for a CVC infection was found to be a greater in patients with neutropenia (p=0.001)
- Intensive chemotherapy (p<0.005) as well as prolonged hospitalization with frequent inpatient manipulations (p<0.005) also proved to be significant risk factors for CLABSIs