KMJ

Clinical Audit

Antibiogram: A clinical audit

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Abstract: An antibiogram is a valuable tool in clinical microbiology that provides a summary of antimicrobial susceptibility patterns for various bacterial pathogens within a healthcare facility or region. A clinical audit of antibiograms involves systematically reviewing and analyzing these susceptibility reports to assess the effectiveness of current antibiotic prescribing practices and guide future treatment decisions. This process typically includes collecting data on bacterial isolates, their sources, and their susceptibility to different antibiotics over a specified period. The audit may evaluate trends in resistance patterns, identify emerging multidrug-resistant organisms, and compare local susceptibility data with national or international benchmarks. By conducting regular antibiogram audits, healthcare institutions can optimize antimicrobial stewardship programs, update empiric therapy guidelines, and ultimately improve patient outcomes by ensuring the most appropriate and effective antibiotic choices are made based on local resistance patterns.

Keywords: Antimicrobial susceptibility; clinical audit; infection control; antibiotic resistance; pathogen profiling

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1. Introduction

An antibiogram is a valuable tool in clinical microbiology and infectious disease management, serving as a cornerstone for evidence-based antimicrobial therapy. It provides a comprehensive overview of antimicrobial susceptibility patterns within a specific healthcare setting, offering crucial insights into the local landscape of drug resistance. By compiling and analyzing susceptibility test results from various cultures over a defined period, typically annually, an antibiogram offers detailed insights into the effectiveness of different antimicrobials against common pathogens encountered in that particular environment.

This information is typically presented in a tabular format, allowing healthcare professionals to quickly assess the susceptibility of particular organisms to various antimicrobial agents. The data is often color-coded or numerically represented, indicating the percentage of isolates susceptible to each antibiotic. This visual representation enables rapid interpretation and facilitates decision-making in clinical settings, especially in situations where prompt empiric therapy is necessary.

Antibiograms are usually tailored to a specific healthcare facility or system, reflecting local resistance patterns and guiding empiric antibiotic therapy decisions. This localized approach is crucial, as antimicrobial resistance patterns can vary significantly between different geographic regions, healthcare institutions, and even between different units within the same hospital. Factors such as local prescribing practices, patient population characteristics, and infection control measures can all influence the development and spread of resistant organisms, making institution-specific data invaluable.

The creation of an antibiogram involves a systematic process of data collection and analysis. Microbiology laboratories collect susceptibility data from clinical isolates throughout the year, ensuring a representative sample size for each organism-antibiotic combination. Statistical analysis is then performed to generate meaningful percentages of susceptibility. It's important to note that antibiograms typically exclude duplicate isolates from the same patient to prevent skewing of the data.

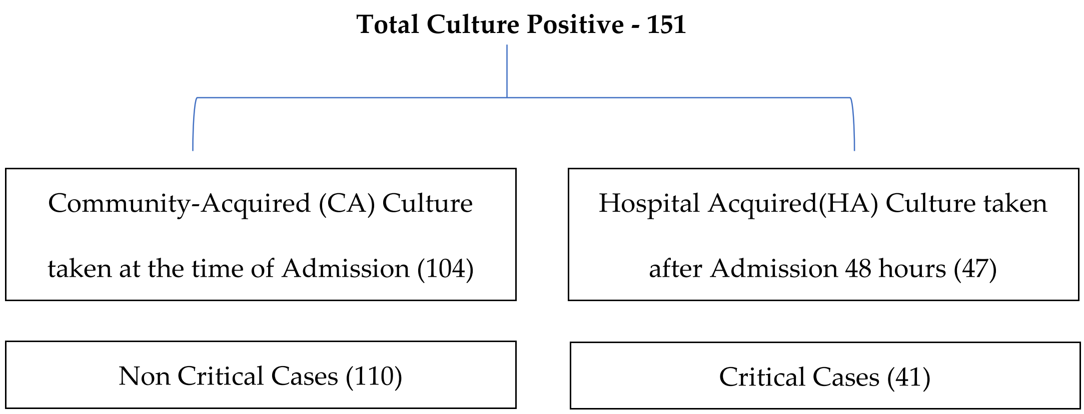
Healthcare providers use antibiograms in various ways. In the emergency department or outpatient setting, they guide the selection of empiric therapy for common infections such as urinary tract infections or pneumonia. In hospital wards, they inform decisions about escalation or de-escalation of antibiotic therapy. For infectious disease specialists, antibiograms serve as a valuable tool for developing institutional guidelines and policies for antibiotic use.

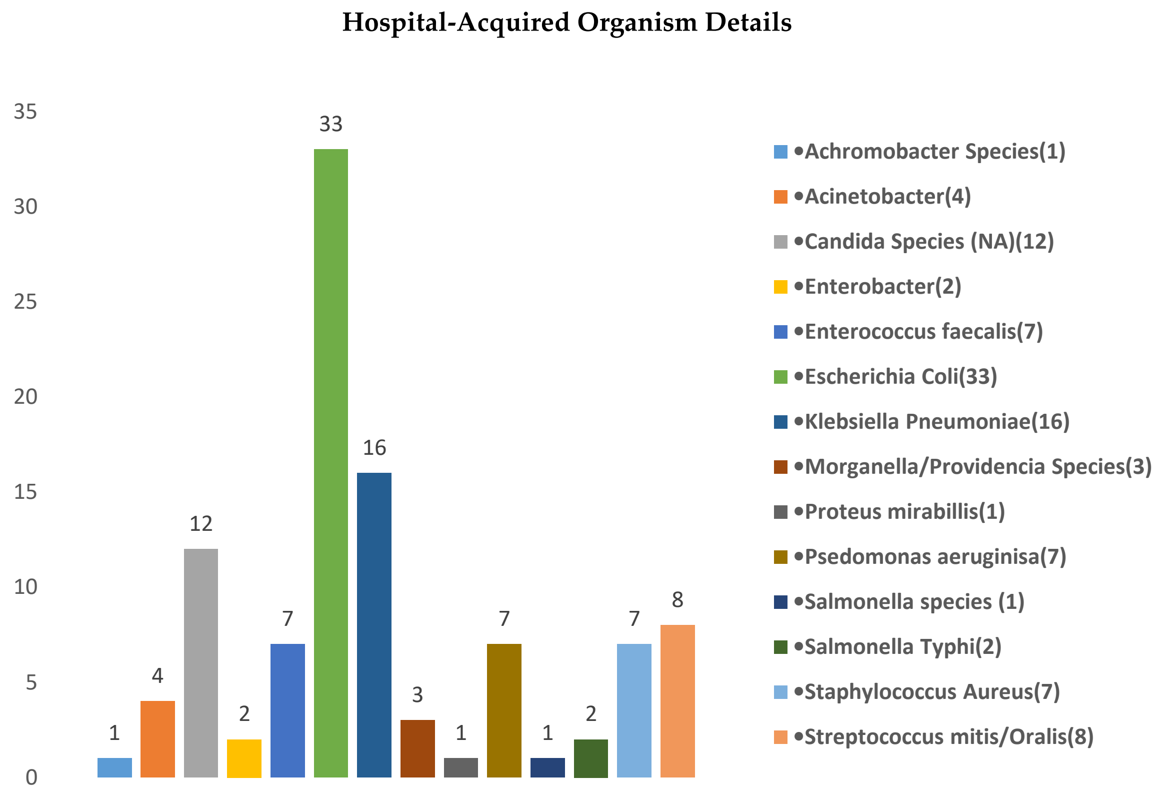
Moreover, antibiograms play a crucial role in antimicrobial stewardship programs. By highlighting trends in resistance patterns, they help identify areas where interventions may be necessary to preserve antibiotic efficacy. For instance, if a significant increase in resistance to a particular antibiotic is observed, strategies can be implemented to restrict its use and promote alternative agents. By regularly updating and reviewing antibiograms, typically on an annual basis, healthcare providers can make informed decisions about appropriate antibiotic selection, potentially improving patient outcomes and contributing to antimicrobial stewardship efforts. This periodic review also allows for the identification of long-term trends in antimicrobial resistance, which can inform broader public health strategies and research directions.

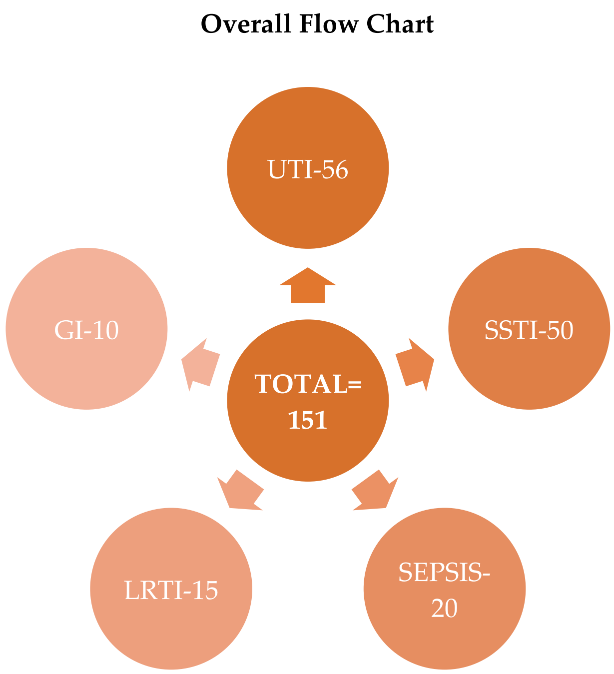
It's worth noting that while antibiograms are powerful tools, they do have limitations. They represent aggregate data and may not predict the susceptibility of a specific isolate from an individual patient. Additionally, they do not account for patient-specific factors such as drug allergies, renal function, or potential drug interactions. Therefore, while antibiograms guide initial empiric therapy, they should be used in conjunction with clinical judgment and patient-specific culture results when available.

In conclusion, antibiograms are indispensable resources in modern healthcare, bridging the gap between laboratory data and clinical practice. They empower healthcare providers with the knowledge to make informed decisions about antibiotic therapy, ultimately contributing to better patient care and responsible antibiotic use in the face of growing antimicrobial resistance challenges.

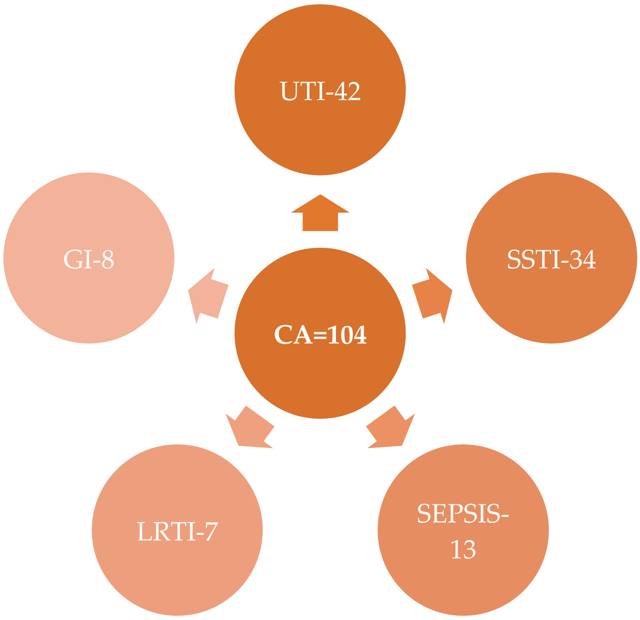
2. Case Presentation



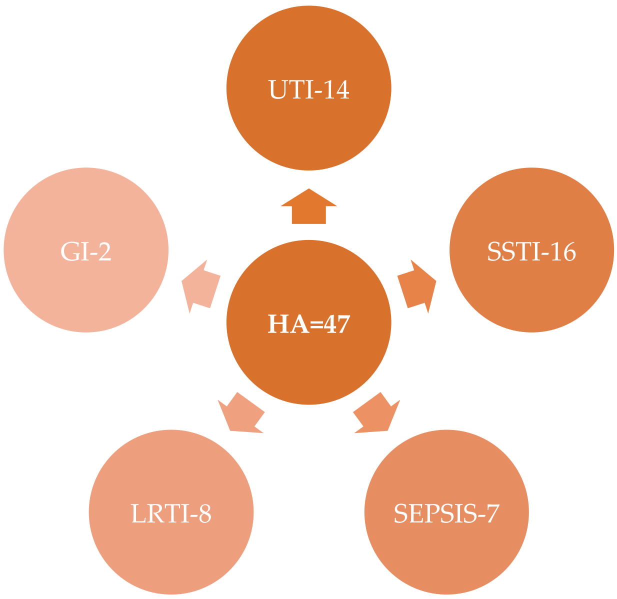

Hospital-Acquired Organism Details
35
30
25
20
15
10
5
0
1
4
12
2
7
33
16
3
1
7
1
2
7
8
•Achromobacter Species(1)
•Acinetobacter(4)
•Candida Species (NA)(12)
•Enterobacter(2)
•Enterococcus faecalis(7)
•Escherichia Coli(33)
•Klebsiella Pneumoniae(16)
•Morganella/Providencia Species(3)
•Proteus mirabillis(1)
•Psedomonas aeruginisa(7)
•Salmonella species (1)
•Salmonella Typhi(2)
•Staphylococcus Aureus(7)
•Streptococcus mitis/Oralis(8)


Overall Flow Chart
UTI-56
GI-10
SSTI-50
TOTAL=
151
LRTI-15
SEPSIS-
20

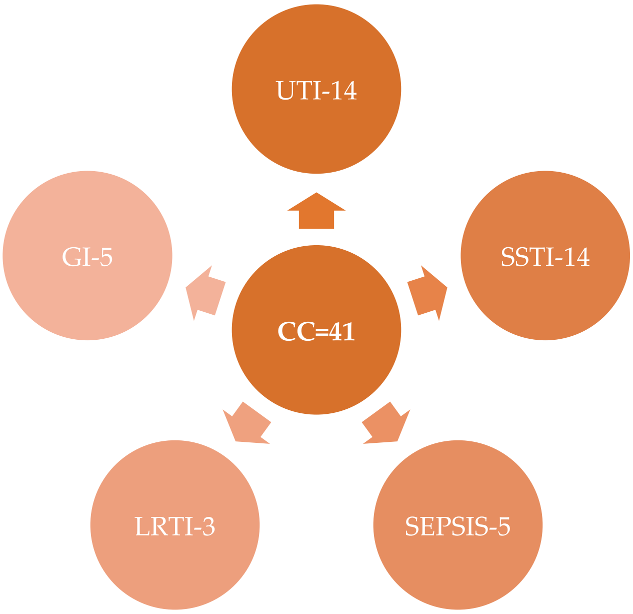
Community-Acquired



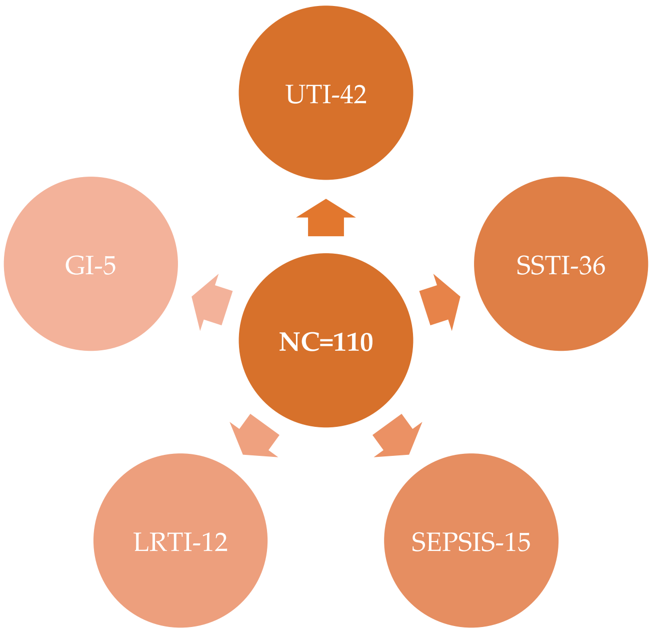
Hospital Acquired

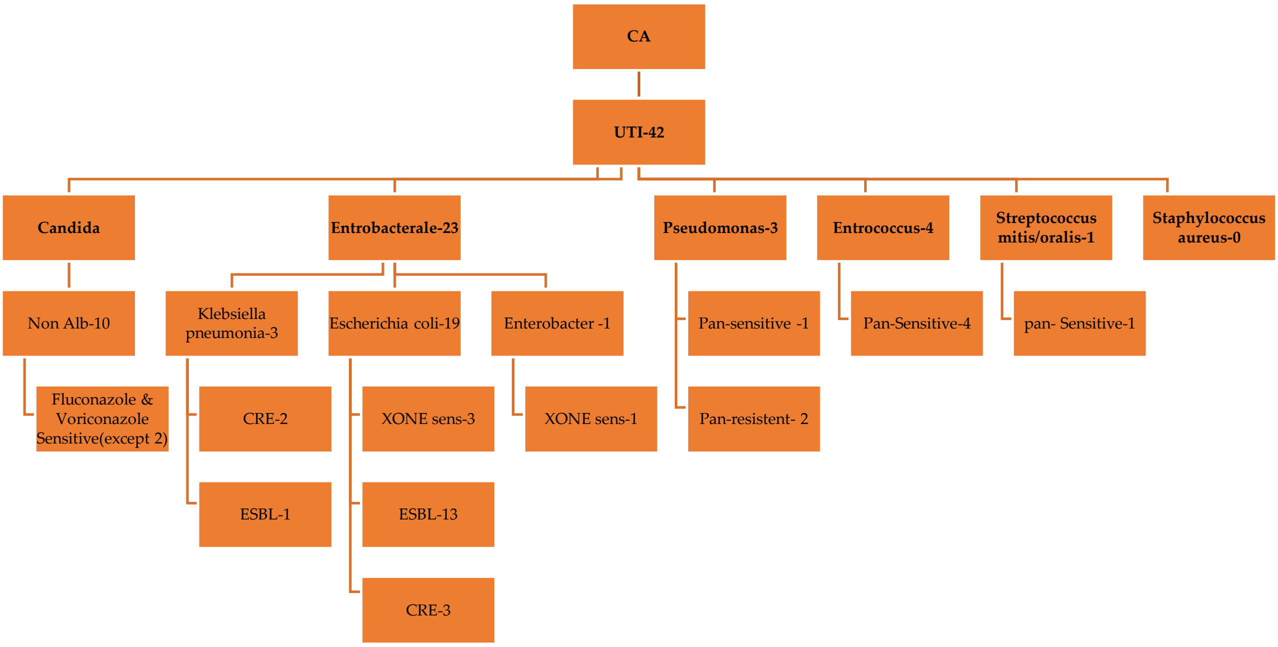


Critical Care



Non Critical Care

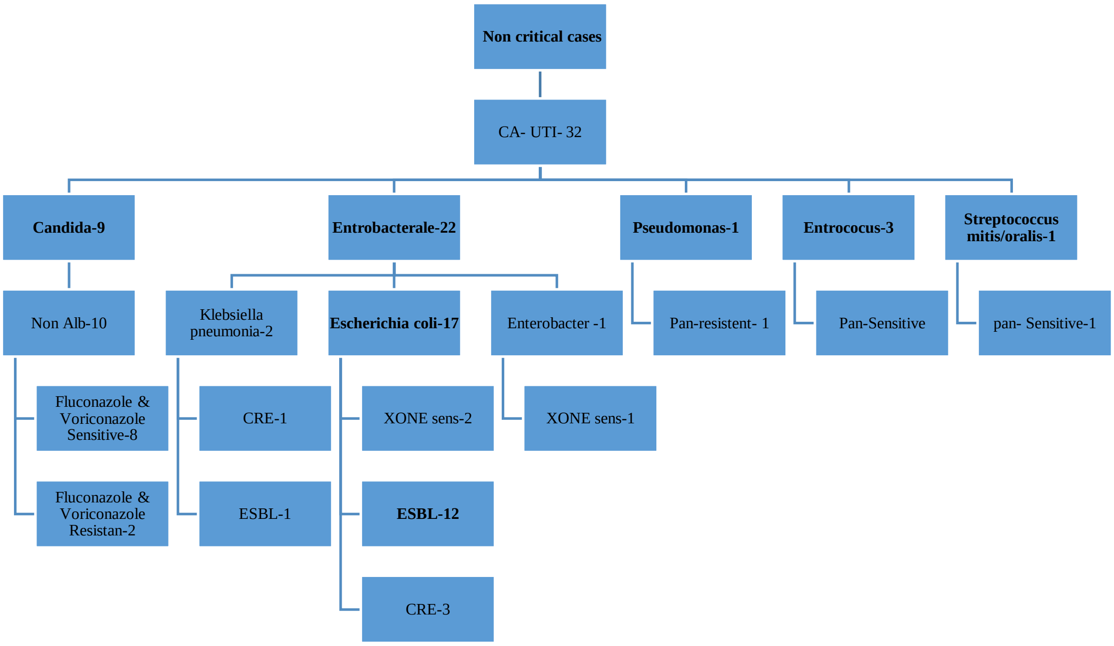


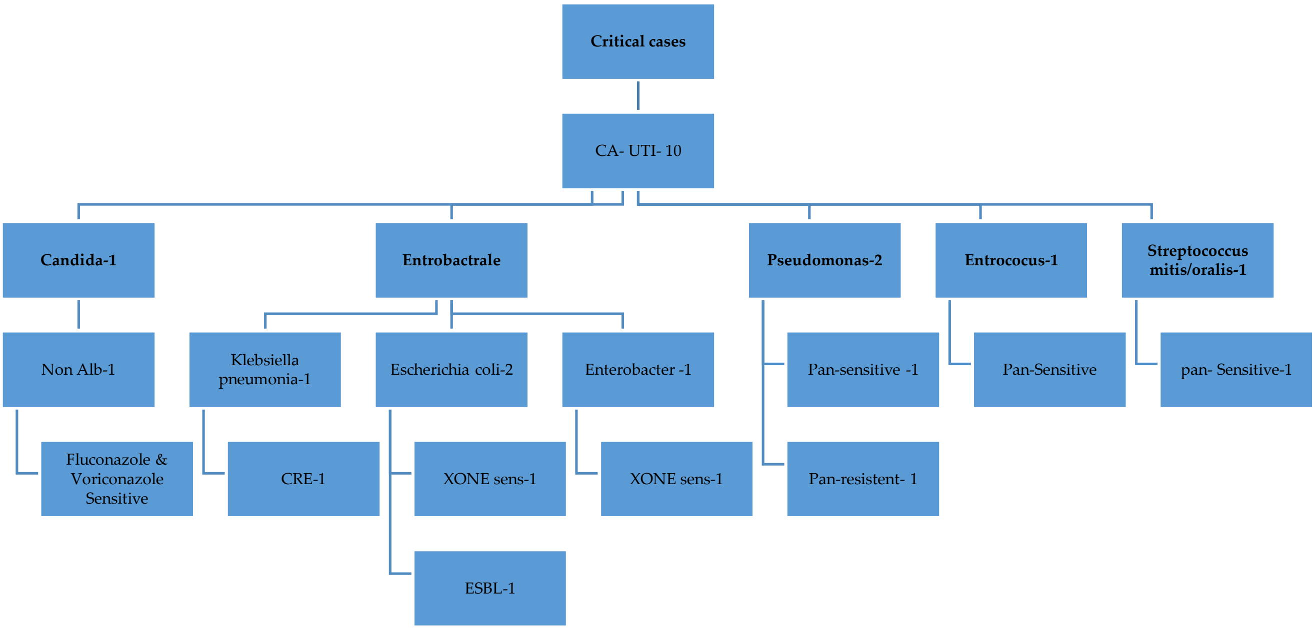


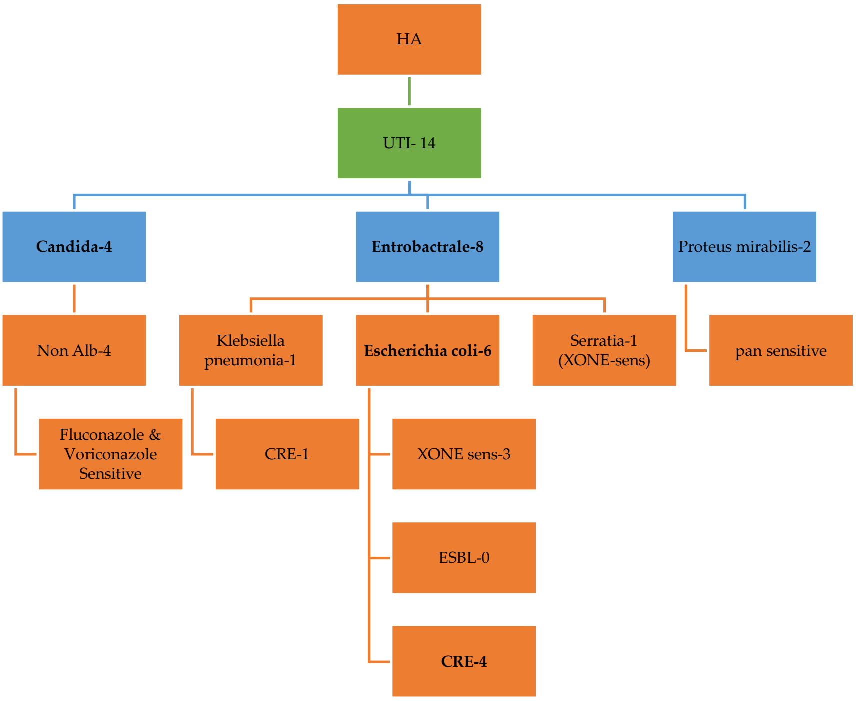
*Xone sensitive - suspected to most of the cephalosporins

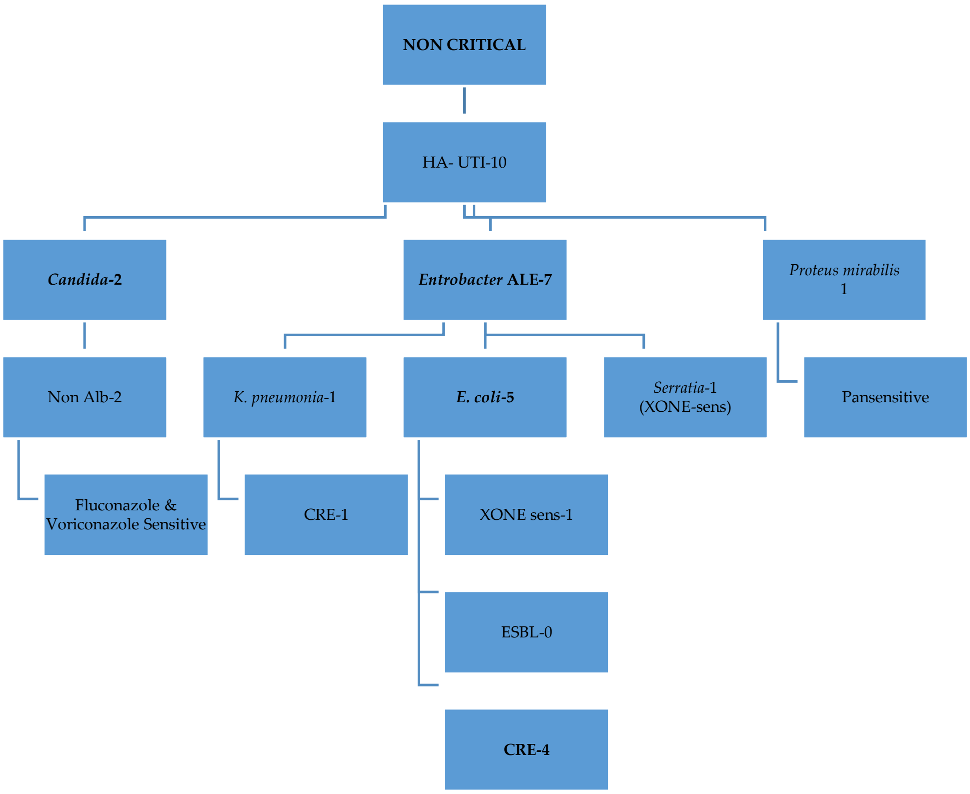
ESBL - resistant to Ceftriaxone (=III gen cephalosporin)

CRE - resistant to Carbapenem (Meropenem)




Critical cases
CA- UTI- 10
Candida-1
Entrobactrale
Pseudomonas-2
Entrococus-1
Streptococcus mitis/oralis-1
Non Alb-1
Klebsiella pneumonia-1
Escherichia coli-2
Enterobacter -1
Pan-sensitive -1
Pan-Sensitive
pan- Sensitive-1
Fluconazole & Voriconazole Sensitive
CRE-1
XONE sens-1
XONE sens-1
Pan-resistent- 1
ESBL-1


HA
UTI- 14
Candida-4
Entrobactrale-8
Proteus mirabilis-2
Non Alb-4
Klebsiella pneumonia-1
Escherichia coli-6
Serratia-1 (XONE-sens)
pan sensitive
Fluconazole & Voriconazole Sensitive
CRE-1
XONE sens-3
ESBL-0
CRE-4



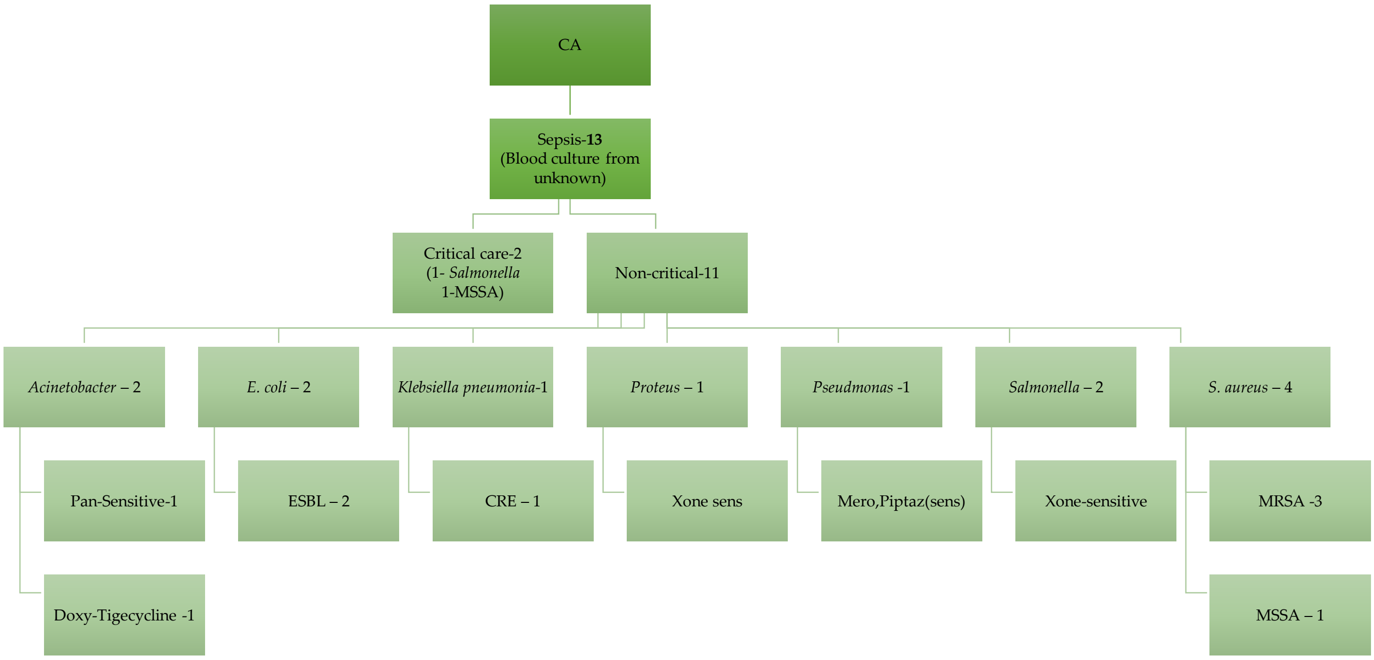
Hospital Acquired (UTI)

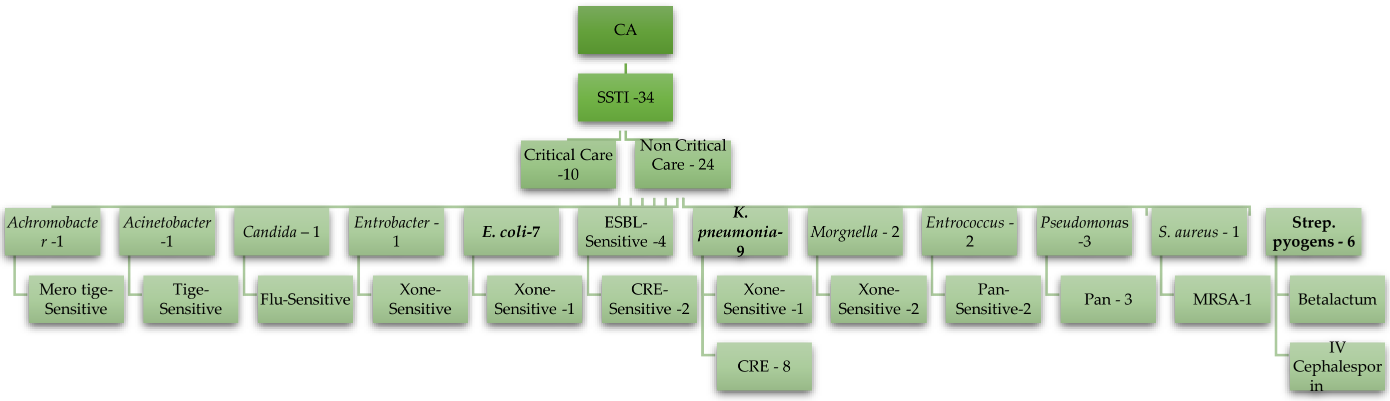
Among the hospital-acquired UTI- only 4 critical cases reported

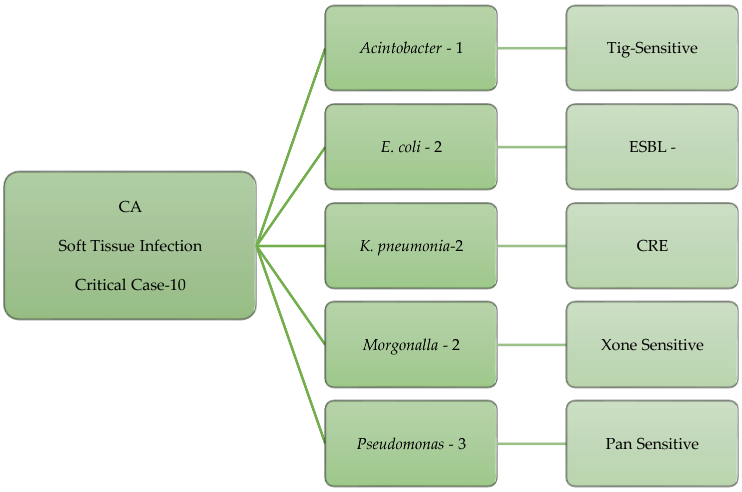
a) 2 - *Candida* (Flu sensitive)

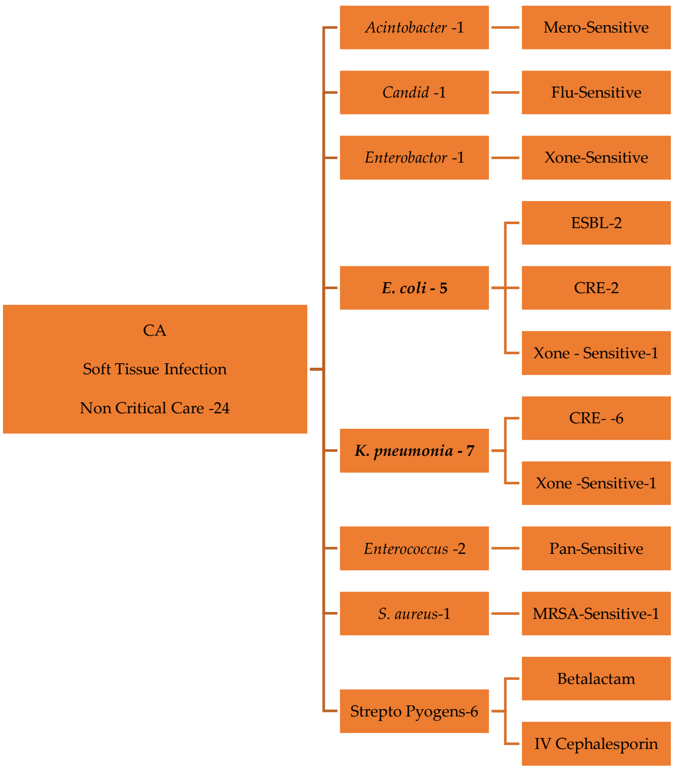
b) 1 - *E. coli* (xone sensitive)

c) 1 - *Proteus mirabilis* (pan sensitive).


CA
Sepsis-13 (Blood culture from unknown)
Critical care-2 (1- Salmonella 1-MSSA)
Non-critical-11
Acinetobacter – 2
E. coli – 2
Klebsiella pneumonia-1
Proteus – 1
Pseudmonas -1
Salmonella – 2
S. aureus – 4
Pan-Sensitive-1
Doxy-Tigecycline -1
ESBL – 2
CRE – 1
Xone sens
Mero,Piptaz(sens)
Xone-sensitive
MRSA -3
MSSA – 1


CA
SSTI -34
Critical Care -10
Non Critical Care - 24
Achromobacter -1
Acinetobacter -1
Candida – 1
Entrobacter - 1
E. coli-7
ESBL-Sensitive -4
K. pneumonia-9
Morgnella - 2
Entrococcus - 2
Pseudomonas -3
S. aureus - 1
Strep. pyogens - 6
Mero tige-Sensitive
Tige-Sensitive
Flu-Sensitive
Xone-Sensitive
Xone-Sensitive -1
CRE-Sensitive -2
Xone-Sensitive -1
CRE - 8
Xone-Sensitive -2
Pan-Sensitive-2
Pan - 3
MRSA-1
Betalactum
IV Cephalesporin





4. Conclusion

Majority were related to UTI

Enterobacterale especially *E. coli* and *Klebsiella* were dominating followed by candida.

UTI-CA-CC	*E-coli*, and *Pseudomonas* sp.
UTI-HA-CC	*Candida* sp.
UTI-CA-NC	*E-coli* ESBL More than Candida
UTI-HA-NC	*E-coli* (VRE)
SSTI-CA-CC	*Pseudomonas* more than *E-coli* and *Klebsiella*
SSTI-CA-NC	*Klebsiella* more than *E-coli*, more than stap-pyrogens
Sepsis-CA-CC	Staph aureus more than *E-coli*, *Acintobactors* and *Salmonella*
Sepsis-HA-CC	*Klebsiella* CRE.
LRTI-CA-CC	*E-coli*, and *Klebsiella* sp.
LRTI-HA-CC	Acintobactor

Abbreviation: UTI - Urinary Tract Infection; SSTI - Superficial soft Tissue Infection; LRTI - Lower Respiratory Tract Infection; GI - Gastero Intustainal