Antimicrobial Resistance Trends at a Pediatric Hospital in Guatemala City, 2005-2019

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BACKGROUND

- Antimicrobial Resistance (AMR) is an increasing threat world-wide.
- AMR leads to increased resource utilization, costs, and mortality.
- Latin America has shown increased AMR trends in adult patients, but there is limited data among pediatric patients.

METHODS

- We analyzed AMR rates for six bacterial species from blood culture isolates at a Pediatric Hospital in Guatemala City (2005-2019):
  - *Acinetobacter baumannii*
  - *Enterobacter cloacae*
  - *Escherichia coli*
  - *Klebsiella pneumoniae*
  - *Pseudomonas aeruginosa*
  - *Staphylococcus aureus*
- We retrospectively reviewed 99 pediatric patient charts with positive blood cultures (June 2018-May 2019) to assess clinical outcomes.

RESULTS

- *Klebsiella* and *Acinetobacter* were the most prevalent organisms during surveillance.
- Carbapenem-resistance was prevalent in 60% of *Klebsiella* isolates, with 93% of these harboring the New Delhi metallo-beta-lactamase (NDM) gene.

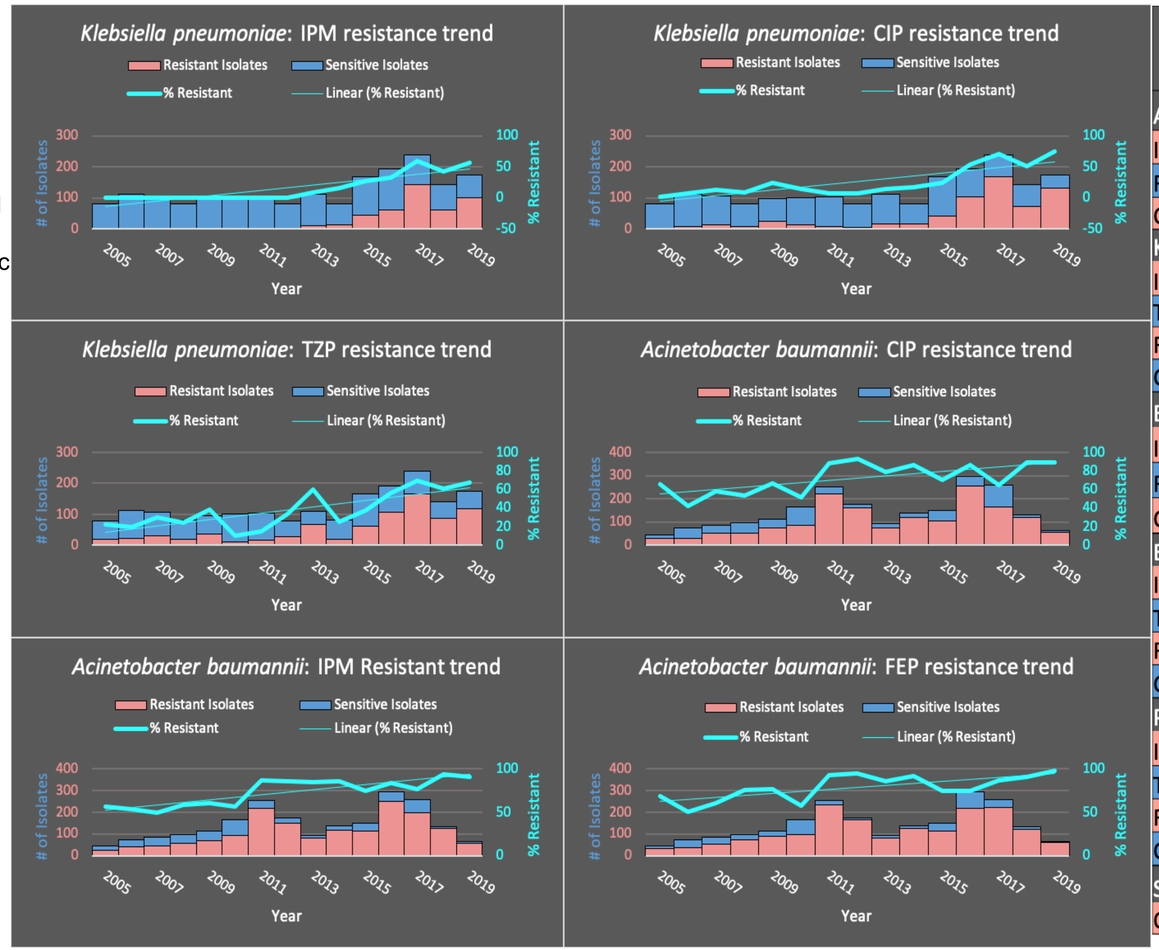

Figure 1: *Klebsiella pneumoniae* and *Acinetobacter baumannii* resistance trends from 2005-2019. Bars represent the absolute number of resistant and sensitive isolates each year. Line represents percent resistance each year with its associated trend line. IPM=imipenem, CIP=ciprofloxacin, TZP=piperacillin-tazobactam, FEP=cefepime

Table 1: Summary of resistance trends 2005-2019

	Rate/year	p-value	Cumulative rate
Acinetobacter baumanni			
IPM*	2.92	<0.0001	43.8
FEP*	1.7	<0.0001	25.5
CIP*	2.45	0.0002	36.75
Klebsiella pneumoniae			
IPM*	4.27	<0.0001	64.05
TZP*	3.41	<0.0001	51.15
FEP	0.37	0.2701	5.55
CIP*	4.52	<0.0001	67.8
Enterobacter cloacae			
IPM*	1.78	0.0006	26.7
FEP	0.21	0.8267	3.15
CIP	-1.5	0.1384	-22.5
Escherichia coli			
IPM*	2.15	0.0003	32.25
TZP*	3	0.0001	45
FEP	0.69	0.4153	10.35
CIP	0.69	0.3502	10.35
Psuedomonas aeruginosa			
IPM	1.16	0.1651	17.4
TZP*	2.33	0.0036	34.95
FEP	0.98	0.1735	14.7
CIP	0.91	0.2265	13.65
Staphylococcus aureus			
OXA*	-2.71	0.0015	-40.65

*Represents statistically significant with p-value <0.05. IPM=imipenem, FEP=cefepime, CIP=ciprofloxacin, TZP=piperacillin-tazobactam, OXA=oxacillin

- Only 37% of patients in our cohort received optimal therapy, with a median time to optimal therapy of 90 hours.
- Mortality rate was 20% among our 99-patient cohort.

CONCLUSIONS

- Significant rises in AMR among pediatric patients in a large tertiary hospital in Guatemala City have occurred over 15 years, particularly among Gram-negative organisms.
- *Staph aureus* showed a significant decline in oxacillin-resistance.
- High rates of carbapenem-resistant *Enterobacteriaciae* are present, particularly harboring the NDM gene.
- A high mortality rate was seen among our cohort of patients with bacteremia.

IMPLICATIONS

- This growing resistance is likely due to delays in optimal antimicrobial therapy and increased exposure to broad spectrum antibiotics, resulting in increased mortality.
- Improved antimicrobial stewardship, infection prevention, and rapid diagnostic testing are needed in order to combat this growing problem.

DISCLOSURES

The authors of this study have no disclosures.