Antimicrobial Resistance in Zambia: A Systematic Review

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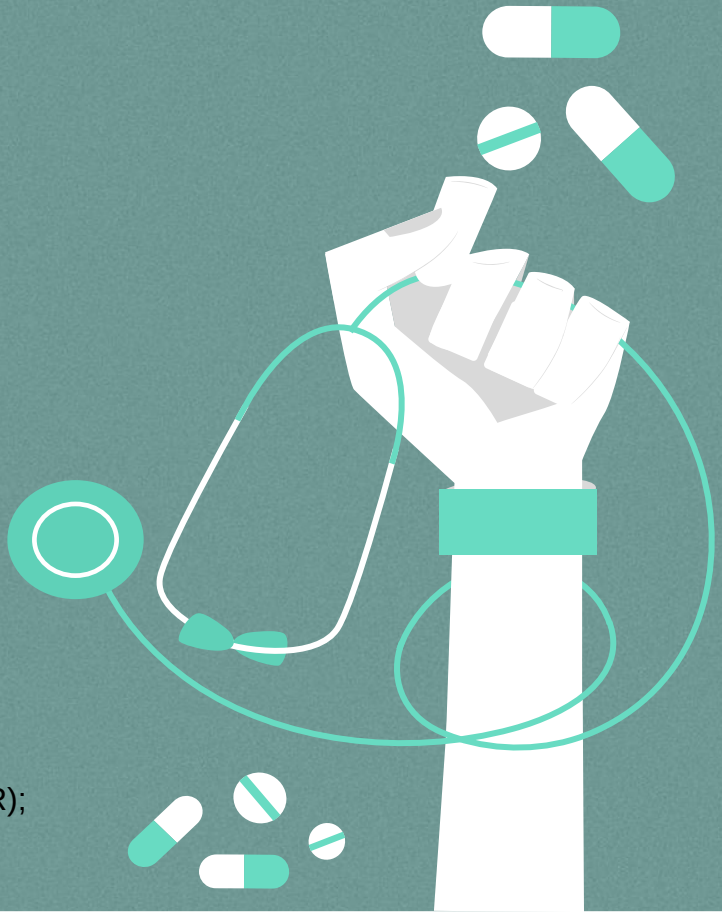

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BACKGROUND

Antimicrobials

- Antibiotics
- Antivirals
- Antifungals
- Antiparasitics

Antimicrobial Resistance (AMR)

Microorganisms **change over time** and no longer respond to medicines

Minor injuries and infections = deadly

Global Health Crisis

As dangerous as COVID-19 Pandemic[2]

Threatens to erode centuries of progress[3]

Zambia

Epidemics: malaria, HIV, TB, COVID-19[4]

Access, use, control of antimicrobials in humans, animals and environment remain unknown

AIM

This study reviewed published studies of **AMR prevalence** across **human-animal-environmental** domains in **Zambia**.

METHODOLOGY

Search Terms:
"multiresistant OR multi-drug resistant OR antimicrobial resistance OR drug resistance OR bacterial resistance" "AND Zambia", with spelling variations included

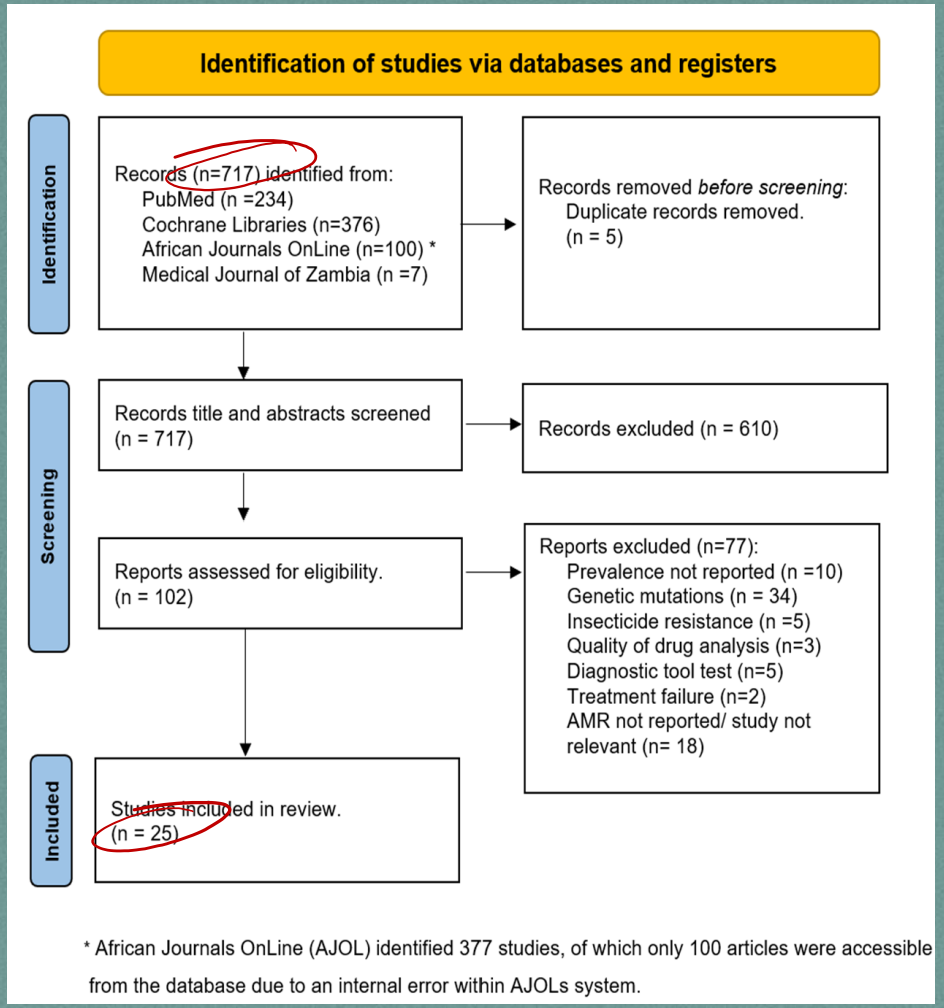


Figure 1: A PRISMA diagram illustrating the search strategy for the review

RESULTS

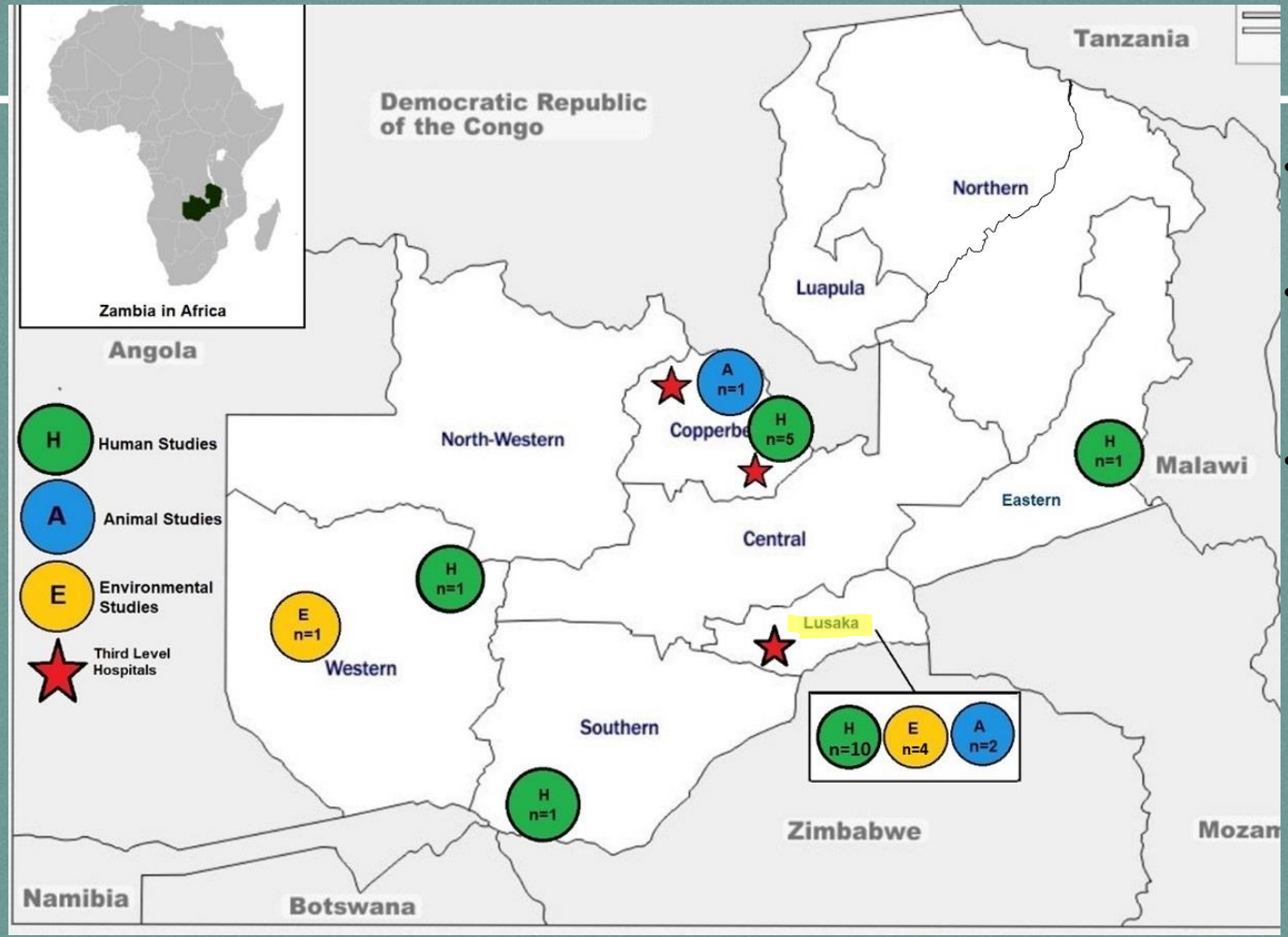


Figure 2:Distribution of studies in Zambia

- Lusaka: **more than half** (16/25) of the studies.
- **6 of the 10** provinces in Zambia had **no AMR data.**
- **15 of the 25 studies** were conducted only on the **human sector**

RESULTS

21 microbes:

- *S. aureus* : most common
- *E. coli* : 11 studies
- *Klebsiella species* : 7 studies
- *M. tuberculosis* : 5 studies
- HIV : 3 studies

Antibacterial studies: 21/25
Antiviral studies: 3/25
Antiparasitic: 1/25
No fungal conditions

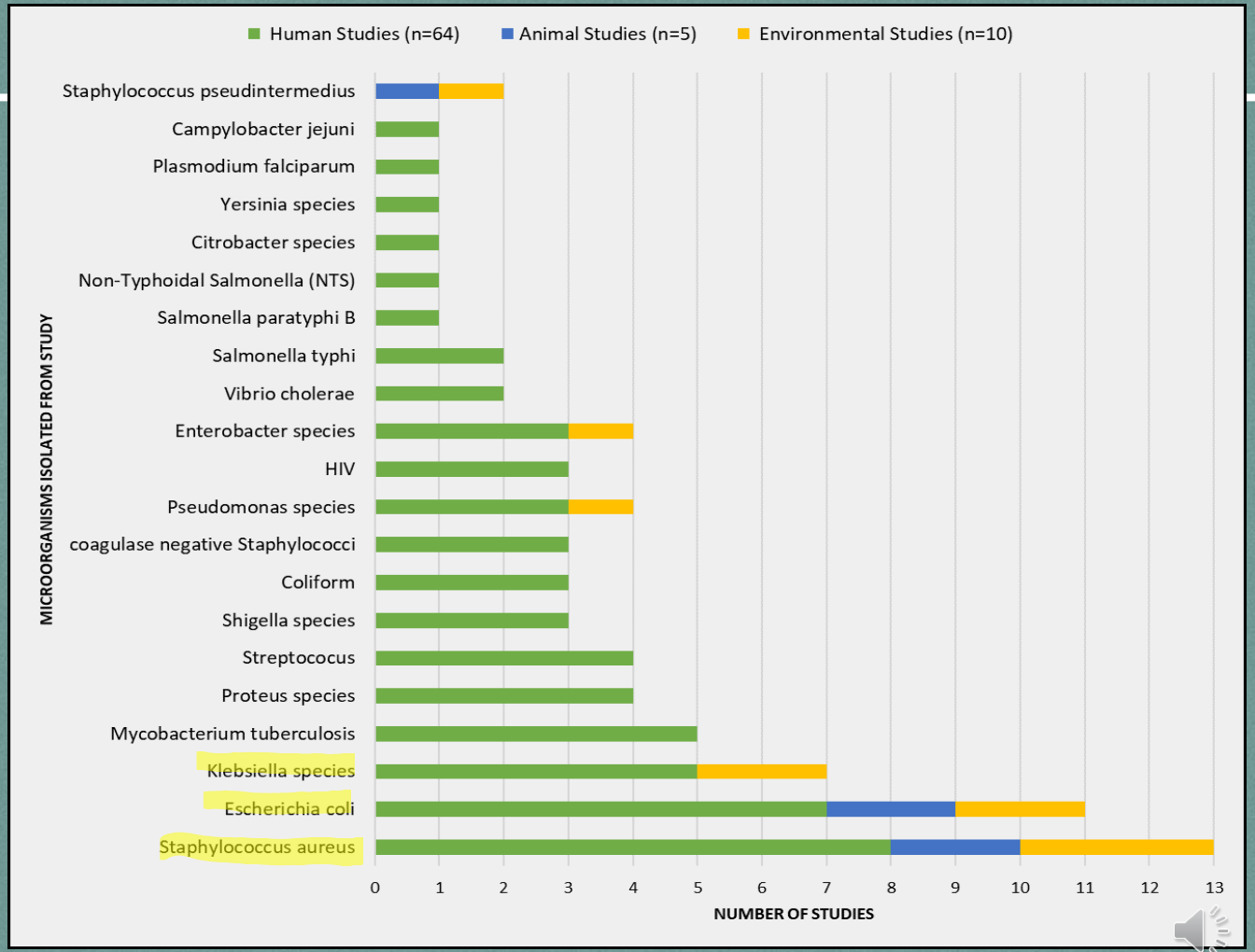


Figure 3: Microorganisms Studied by Sector

RESULTS

Table 1: Resistance rates against antibiotics used for two widely surveyed pathogens: *E. coli* and *Klebsiella spp*.

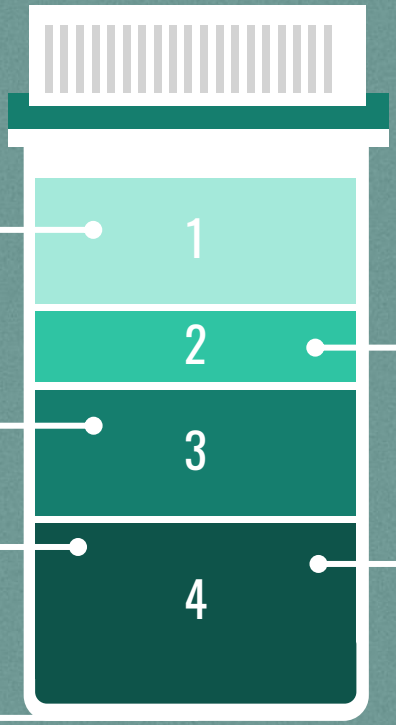
Legend		Gram Negative Bacteria																
		E. coli									***Klebsiella***						
		Human							Animal	Environment		Human					Environment	
100%		**Mainda *et al.***	**Chiyangi *et al.***	**Mainda *et al.***	**Kabwe *et al.***	**Chanda *et al.***	**Chanda *et al.***	**Chanda *et al.***	**Mainda *et al.***	**Songe *et al.***	**Mwamun-gule *et al.***	**Kabwe *et al.***	**Chanda *et al.***	**Chanda *et al.***	**Chanda *et al.***	**Ziwa *et al.***	**Ziwa *et al.***	**Mwamun-gule *et al.***
50-99%																		
10-49%		Stool	Stool	Stool	Blood	Blood	Urine	Wound	Cattle	Fish Markets	Healthcare worker Coats	Blood	Blood	Urine	Wound Swab	Wound Swab	Hydro therapy Bathtub	Healthcare worker Coats
0-9%																		
Gentamycin		27%		1%	**100%**				1%	91%	4%	96%				30%	30%	0%
Streptomycin			34%							88%								
Kanamycin		99%																
Amikacin		47%														20%	20%	
Cefpodoxime		29%	67%	1%					2%							**100%**	**100%**	
Cefotaxime		25%	67%		**100%**					**100%**		96%				**100%**	**100%**	
Cefalexin											**100%**							50%
Ceftriaxone		24%			**100%**							94%				40%	40%	
Ceftazidime		28%	67%		**100%**	40%		50%		95%		97%		69%		**100%**	**100%**	
Ampicillin		61%	67%	8%	**100%**				6%	**100%**	50%	99%				**100%**	**100%**	
Amoxcillin-clavulanic acid		46%			50%							93%						
Trimethoprim-Sulfamethoxazole				5%	**100%**				4%	74%		**100%**						
Co-trimoxazole		57%	**100%**			67%	**100%**						**100%**	0%		90%	90%	**100%**
Ciprofloxacin		20%		0%	80%	57%	63%	**100%**	0%	95%	0%	71%	33%	68%	**100%**	28%	28%	
Nalidixic acid			16%			43%	76%			93%			33%	56%				
Ceftazidime							61%						50%					
Norfloxacin						30%	62%	**100%**		91%			33%	40%				
Erythromycin					**100%**							92%				32%	32%	
Imipenem					0%							1%				0%	0%	
Nitrofurantoin						33%	48%	0%					33%	75%				
Tetracycline		51%	50%	14%					11%	91%	0%					40%	40%	50%
Chloramphenicol		22%	16%		60%	67%	26%			81%	0%	71%	0%	44%	**100%**	21%	21%	50%

CONCLUSION

The level of resistance to commonly prescribed antibiotics is often **extremely high**.

There is a **bias** across many reference centers that don't reflect the disease condition.

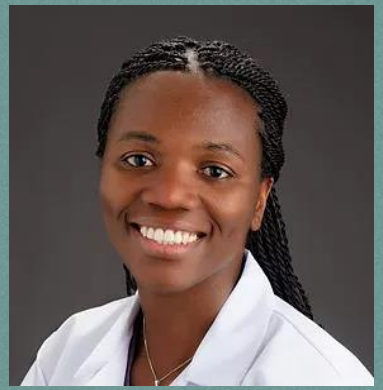
Address the gaps in AMR diagnostic standardization and reporting.



More AMR data is needed for many provinces.

Improve surveillance, stewardship, infection control, and implementations of updated treatment guidelines and monitoring.

Thank you!



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