

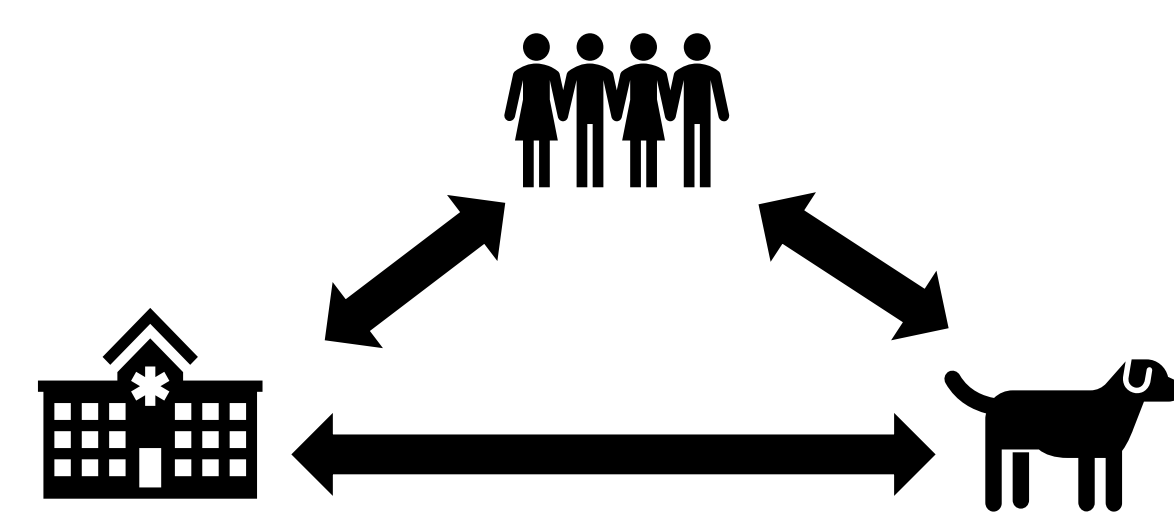


INTRODUCTION

Carbapenem-resistant Enterobacterales (CRE) are bacteria within the order Enterobacterales that are resistant to at least one carbapenem antimicrobial

Includes bacterial species such as *E. coli*, *Klebsiella* spp., and *Enterobacter* spp.

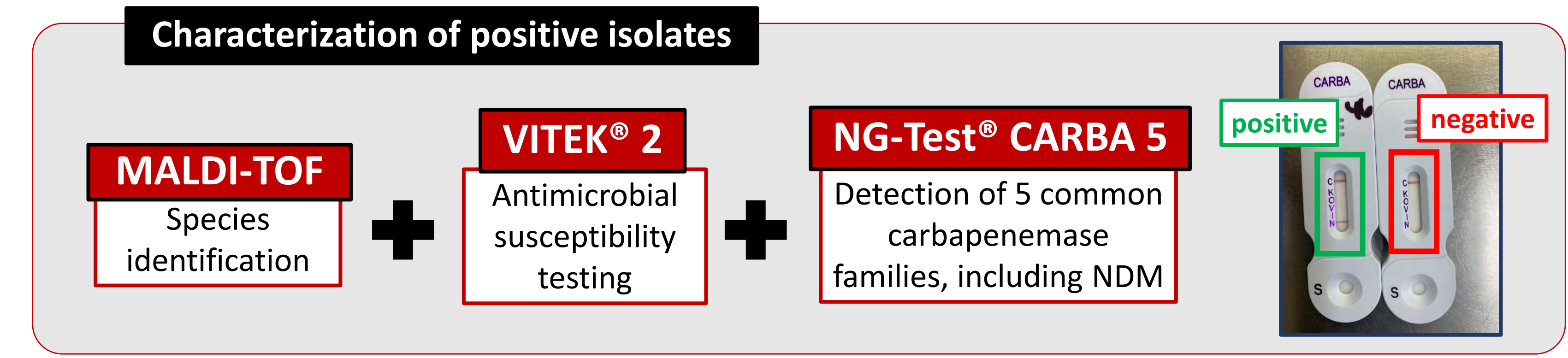
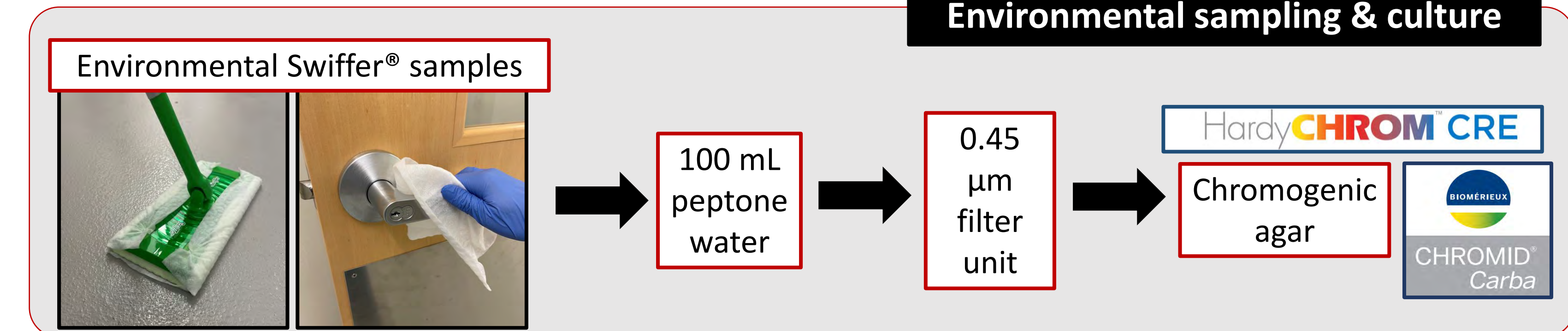
May produce carbapenemases, such as the New Delhi metallo-β-lactamase, which limit treatment options and are often associated with rapid spread of antimicrobial resistance among organisms¹



While CRE are typically a cause of healthcare-associated infections in human hospitals, they have been increasingly recognized among companion animals in veterinary hospitals, where they pose a risk of infection to both patients and personnel^{2,3}

In early July 2022, two dogs hospitalized at the UGA Veterinary Teaching Hospital were culture-positive for New Delhi metallo-β-lactamase-producing *E. coli*, prompting environmental surveillance efforts throughout the Small Animal Hospital

OVERVIEW & METHODS



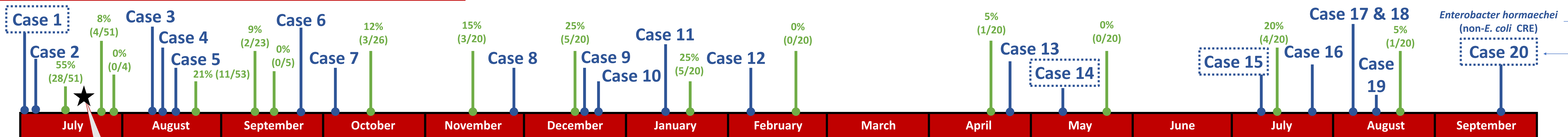
OBJECTIVES

Describe the detection of a carbapenem-resistant *E. coli* among patients and the environment in a small animal veterinary teaching hospital

Discuss measures taken to mitigate transmission, and the associated challenges and successes

Figure 1: Timeline of the identification of clinical cases and environmental surveillance for CRE between July 2022 and September 2023

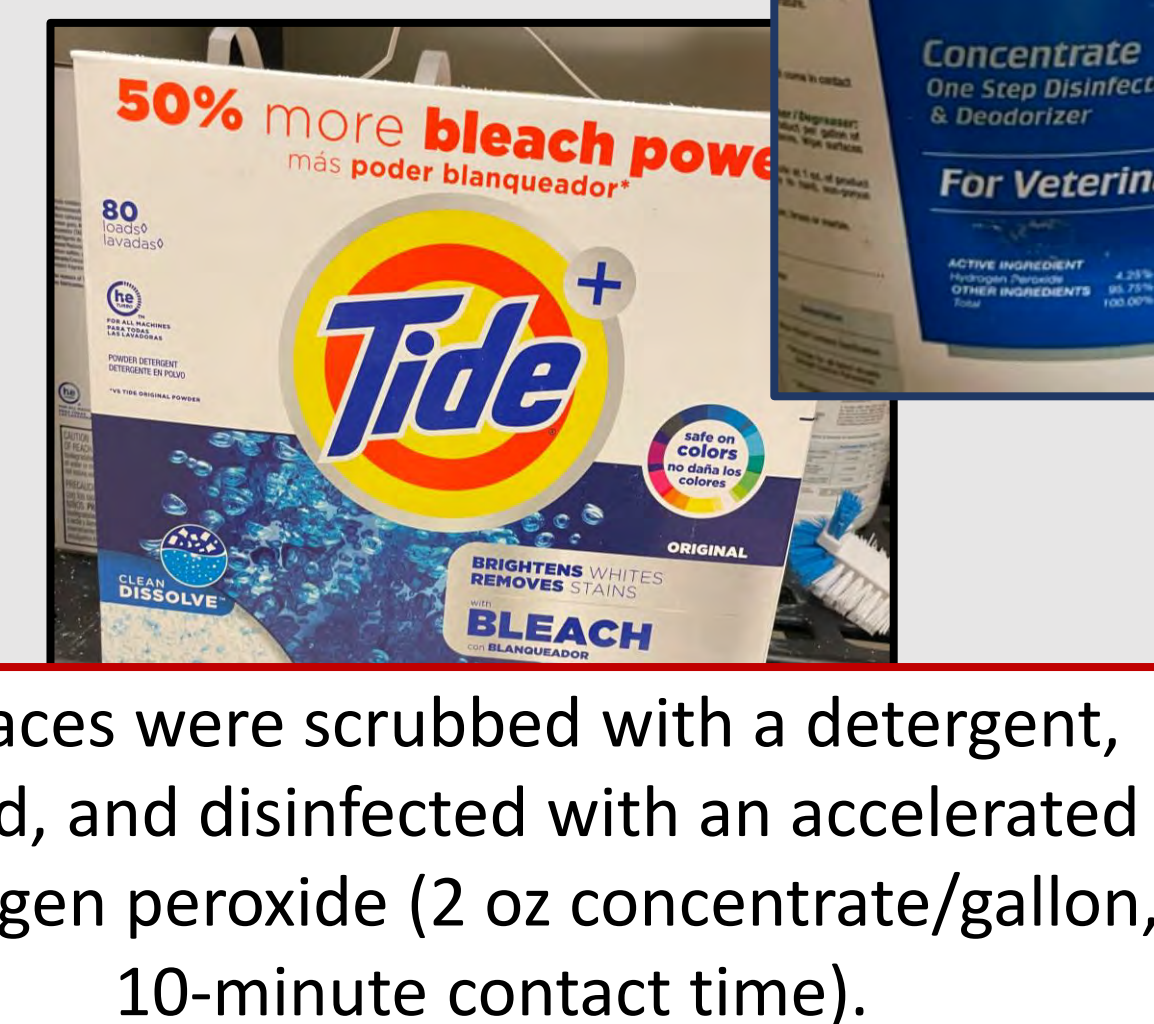
TIMELINE & SURVEILLANCE RESULTS



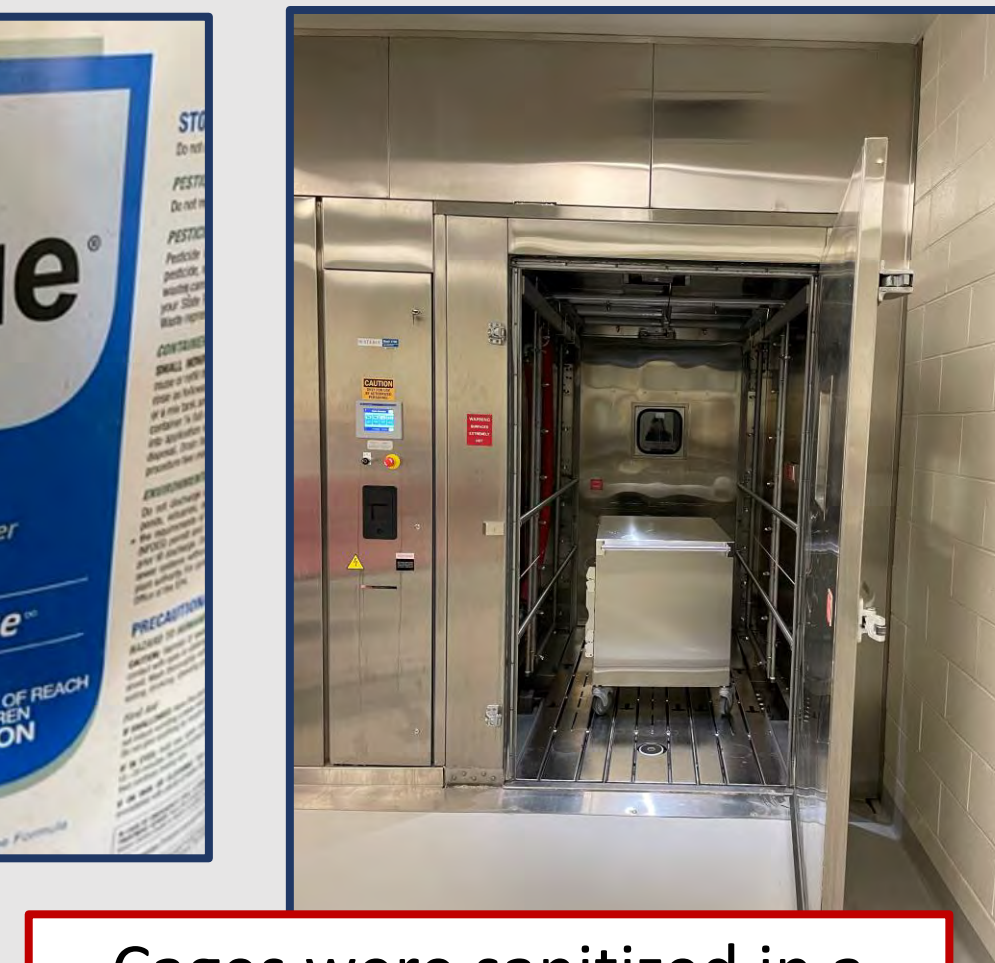
Hospital closure and cleaning

Given the extensive environmental contamination detected, the Small Animal Hospital was closed from July 21-24 to allow for thorough cleaning and disinfection:

All non-critical patients were discharged, and remaining patients were moved as each ward was cleaned.



Surfaces were scrubbed with a detergent, rinsed, and disinfected with an accelerated hydrogen peroxide (2 oz concentrate/gallon, 10-minute contact time).



Cages were sanitized in a cage wash. Equipment was sterilized or disinfected if possible. Supplies that could not be decontaminated were thrown away.

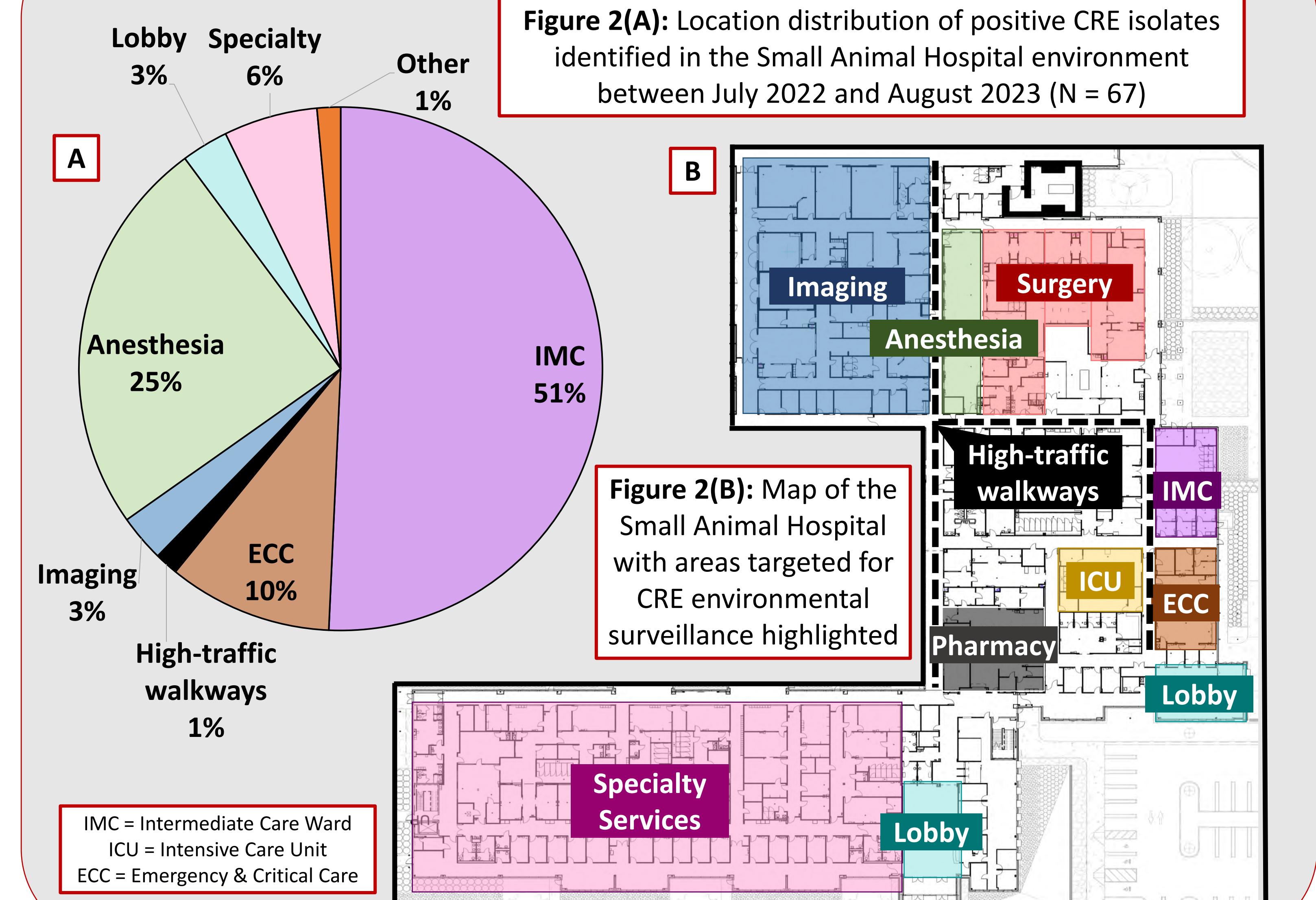
This process was repeated 2-3 times in each area of the hospital before the environment was re-sampled.

Clinical cases

Table 1: Characteristics of dogs that were culture-positive for CRE between July 2022 and September 2023 (N = 20)

Age (Years)	Median (Range)	8.5 (0.4 - 13)
Sex	Female Spayed	7 (35%)
	Female Intact	2 (10%)
	Male Neutered	10 (50%)
	Male Intact	1 (5%)
Breed	Retriever/Retriever Mix	5 (25%)
	Shepherd/Shepherd Mix	3 (15%)
	Pit Bull/Pit Bull Mix	2 (10%)
	Bulldog	2 (10%)
	Other	8 (40%)
	Infection Type	Gastrointestinal
Respiratory		2 (10%)
Surgical Site/Wound		11 (55%)
Urinary		6 (30%)
Days Hospitalized	Median (Range)	9 (0 - 17)
Outcome	Discharged	17 (85%)
	Euthanized	3 (15%)

Distribution of environmental isolates



CONCLUSIONS

CRE has continued to be identified in both clinical and environmental samples from the UGA Small Animal Hospital since its initial detection in July 2022. Distinct antimicrobial susceptibility profiles among isolates may be indicative of multiple introductions.

Thorough cleaning and disinfection was effective at reducing environmental contamination in the hospital, but regular surveillance has continued to identify contaminated areas, especially where high-risk patients are housed.

Swiffer® electrostatic dust pads are an effective, convenient tool to conduct environmental surveillance for CRE in a veterinary teaching hospital.

Affected patients tend to be those at high risk of infection due to a surgical procedure or illness. Those with poor clinical outcomes tend to be severely ill due to pre-existing conditions. However, case fatality rates remain relatively low, indicating that increased antimicrobial resistance does not necessarily equate to increased virulence of the organism.

ACKNOWLEDGEMENTS & REFERENCES

¹Karlsson et al. *Microb Drug Resist* 2022; 28(4):389-397; ²Cole et al. *Emerg Infect Dis* 2020; 26(2):381-383; ³Endimiani et al. *J Antimicrob Chemother* 2020; 75(3):766-768

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