



AMERICAN UNIVERSITY^{OF} BEIRUT

FACULTY OF MEDICINE





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AN UNUSUAL TWO-STRAIN CHOLERA OUTBREAK IN LEBANON, 2022-2023

Dr. Antoine Abou Fayad, Assistant Professor

GTFCC LWG Meeting- May 23, 2024

Department of Experimental Pathology, Immunology & Microbiology | American University of Beirut

WHO Collaborating Center for Reference and Research on Bacterial Pathogens

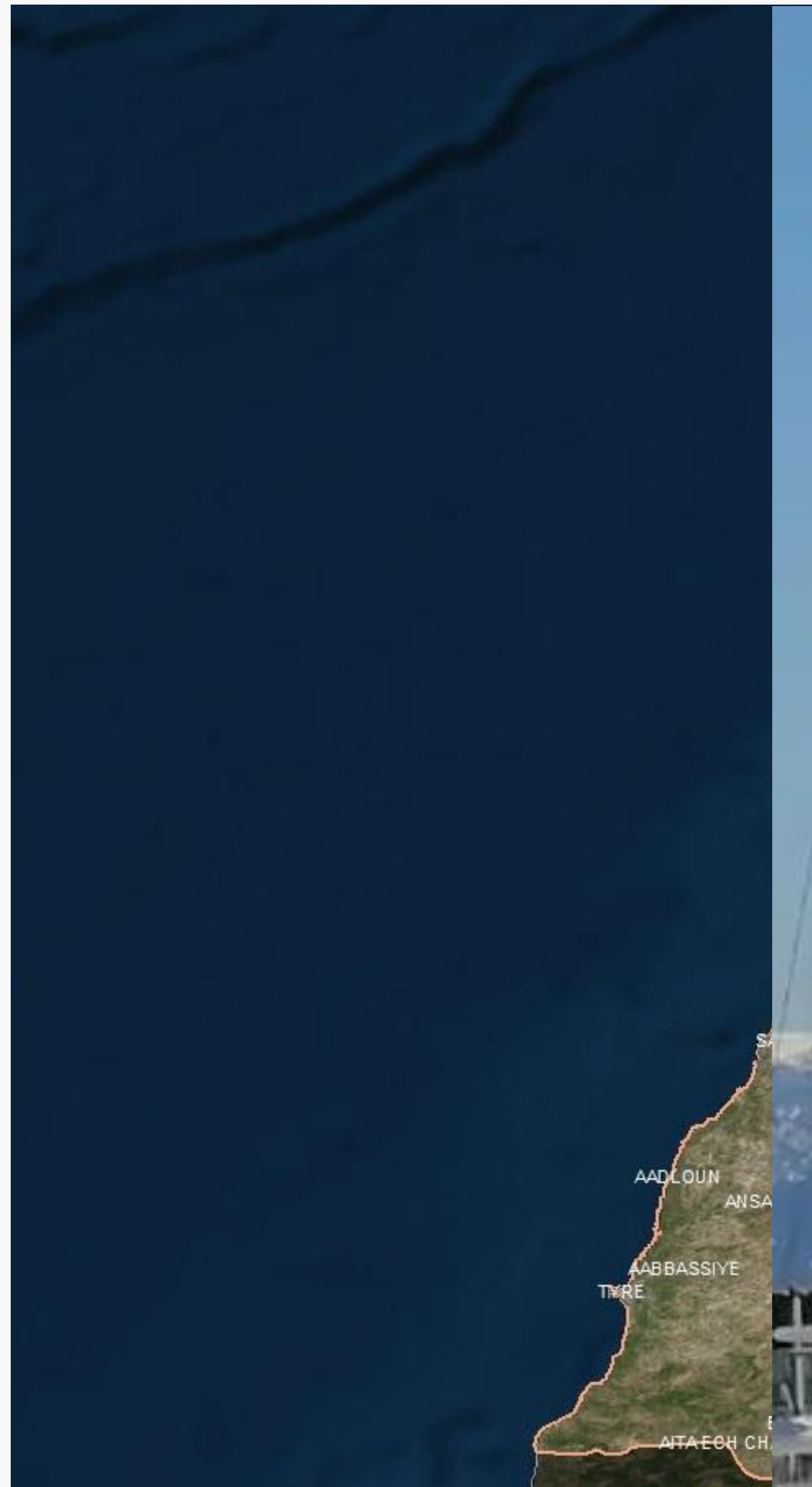
Center for Infectious Diseases Research (CIDR)

Center for Drug Discovery



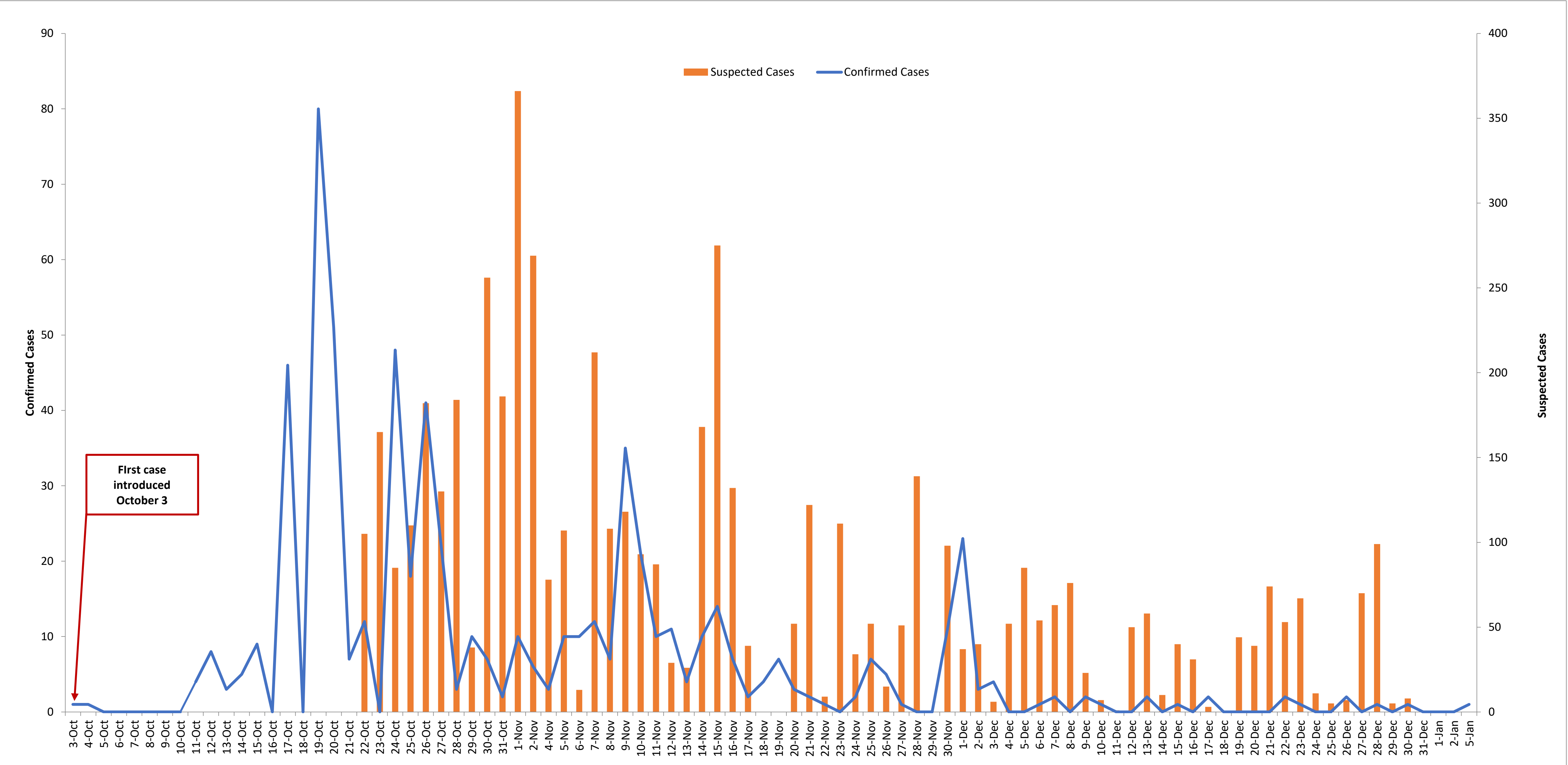


LEBANON



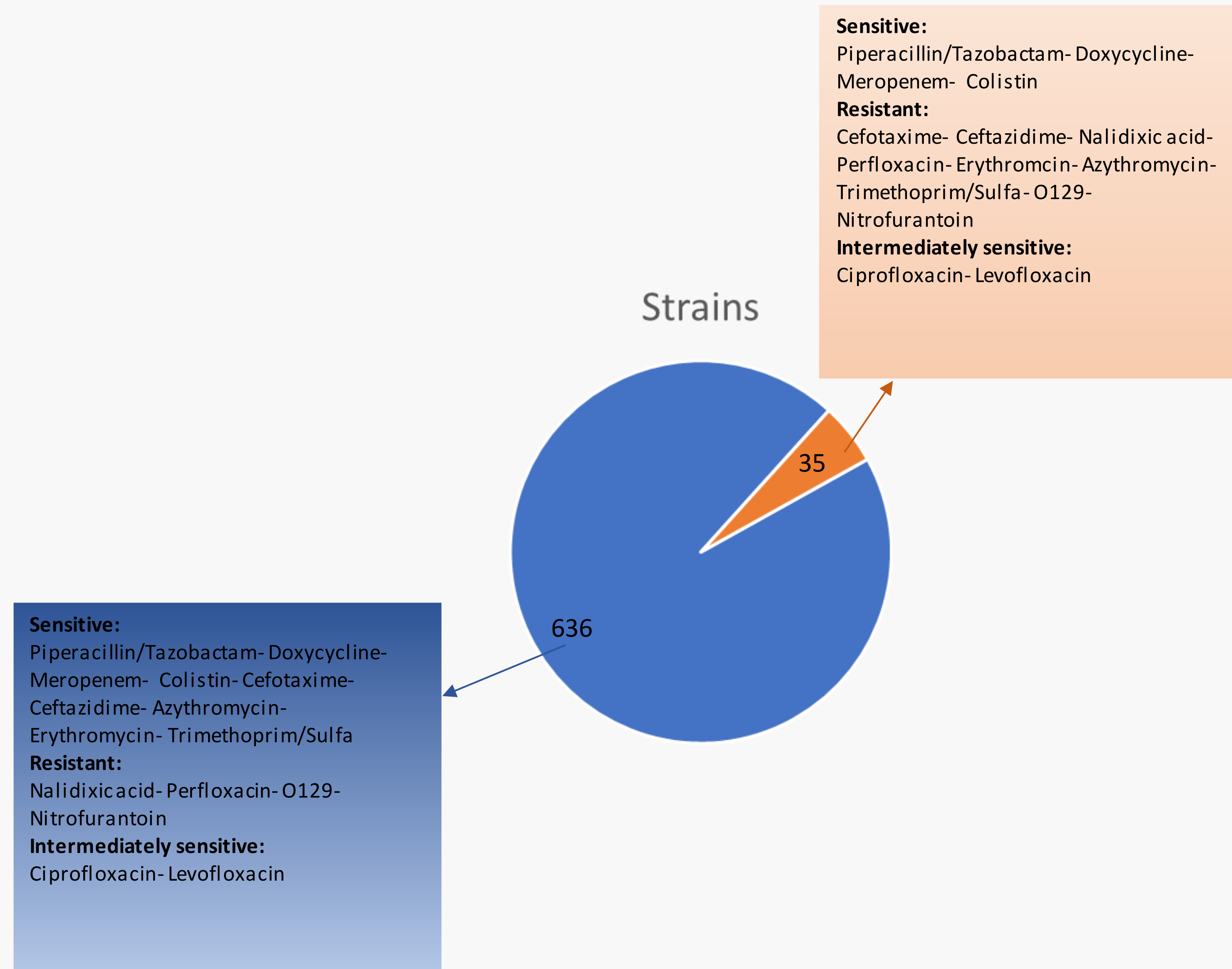


THE OUTBREAK



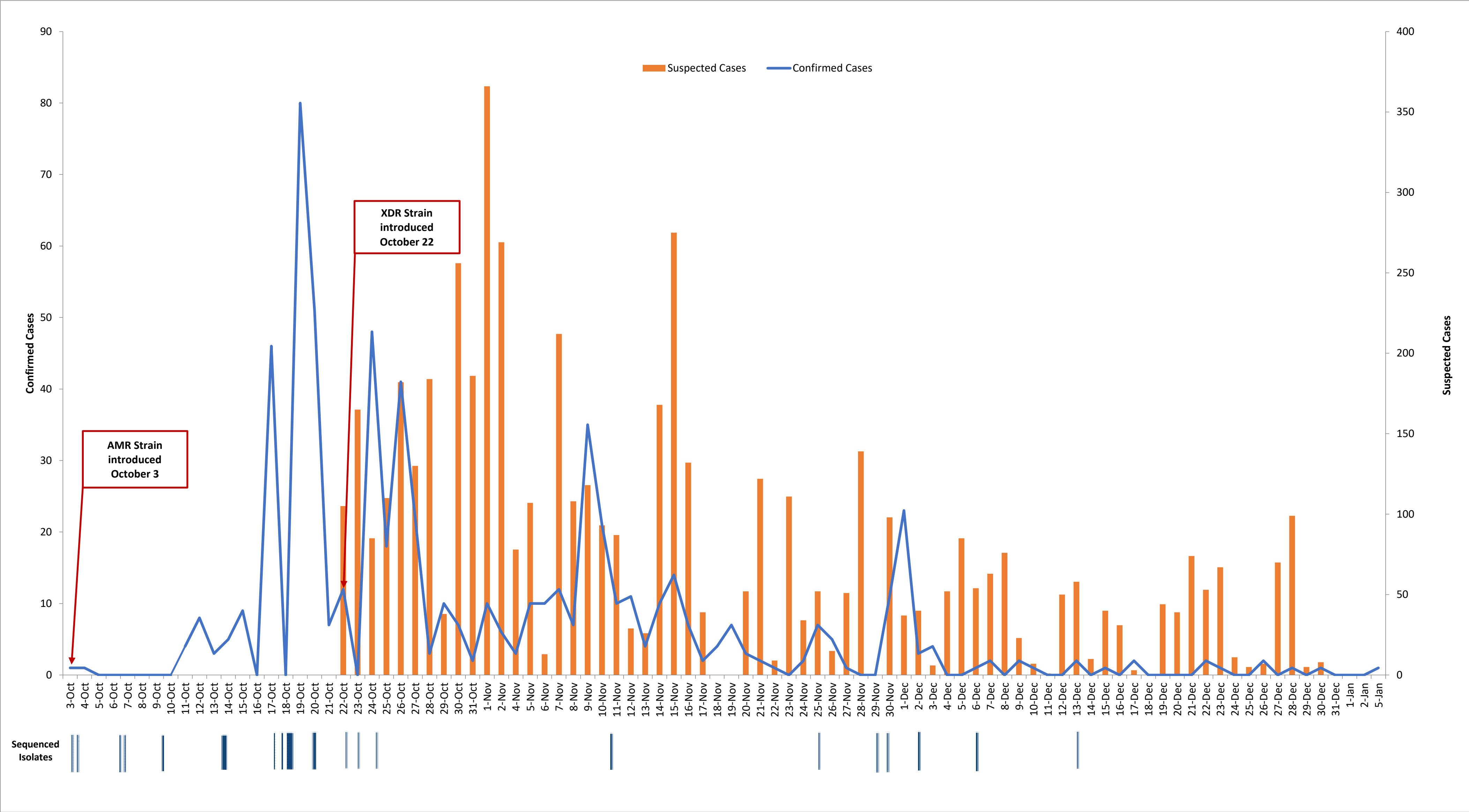


ANTIMICROBIAL SUSCEPTIBILITY

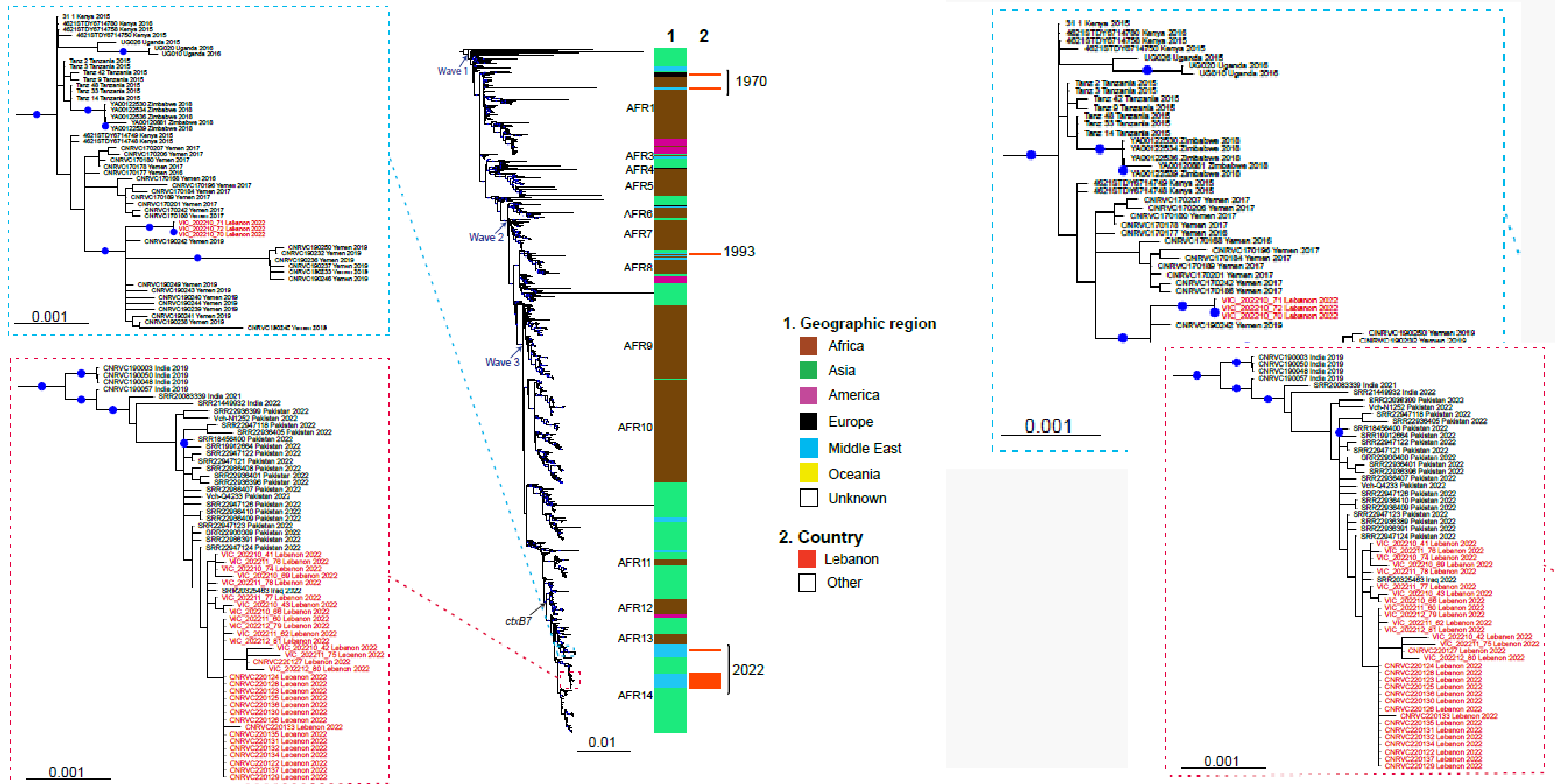




TRACING CHOLERA



TRACING CHOLERA





GENOTYPE VS PHENOTYPE

Summary (summary counts and figures only include Loose hits of e-10 or better)

Filename	Date (UTC)	RGI Criteria	# Perfect Hits	# Strict Hits	# Loose Hits	Download
A72	May 16, 2024 21:55:59	Perfect, Strict, complete genes only	5	6	0	Download

Results (all Loose hits shown)

Search:								
RGI Criteria	ARO Term	SNP	Detection Criteria	AMR Gene Family	Drug Class	Resistance Mechanism	% Identity of Matching Region	% Length of Reference Sequence
Perfect	Vibrio cholerae varG		protein homolog model	Subclass B1 Vibrio cholerae varG beta-lactamase	carbapenem	antibiotic inactivation	100.0	95.90
Perfect	almG		protein homolog model	lipid A acyltransferase, polymyxin resistance operon	peptide antibiotic	antibiotic target alteration	100.0	100.00
Perfect	almF		protein homolog model	polymyxin resistance operon, alm glycyl carrier protein	peptide antibiotic	antibiotic target alteration	100.0	100.00
Perfect	catB9		protein homolog model	chloramphenicol acetyltransferase (CAT)	phenicol antibiotic	antibiotic inactivation	100.0	100.00
Perfect	QnrD1		protein homolog model	quinolone resistance protein (qnr)	fluoroquinolone antibiotic	antibiotic target protection	100.0	100.00



PROS AND CONS

- Sequencing of cholera in Lebanon did not change the response to the outbreak!
- Sequencing had no impact on public health!
- Confirmation by culture was still necessary and mostly used.
- Antimicrobial susceptibility testing was necessary to confirm genotypic resistance.
- Sequencing was useful to understand the introduction of the second strain.
- Sequencing generated a research article being currently reviewed in a high impact factor journal.



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An unusual two-strain cholera outbreak in Lebanon, 2022-2023

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**World Health
Organization**



Institut Pasteur



THANK YOU



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