2050

NATIONAL CENTER FOR EMERGING AND ZOONOTIC INFECTIOUS DISEASES

Proportion of hospital-onset infections expressing antibiotic resistant (AR) phenotypes in US Hospitals, 2018 – 2020

Babatunde Olubajo[1], Hannah Wolford[1], Ashley Rose[1], Natalie McCarthy[1], Sujan Reddy[1], John Jernigan[1], James Baggs[1]
[1] Division of Healthcare Quality Promotion (DHQP), Centers for Disease Control and Prevention, Atlanta GA

BACKGROUND

Previous findings suggest the COVID-19 pandemic in 2020 was associated with increases in hospital-onset (HO) antibiotic resistant infections, including:

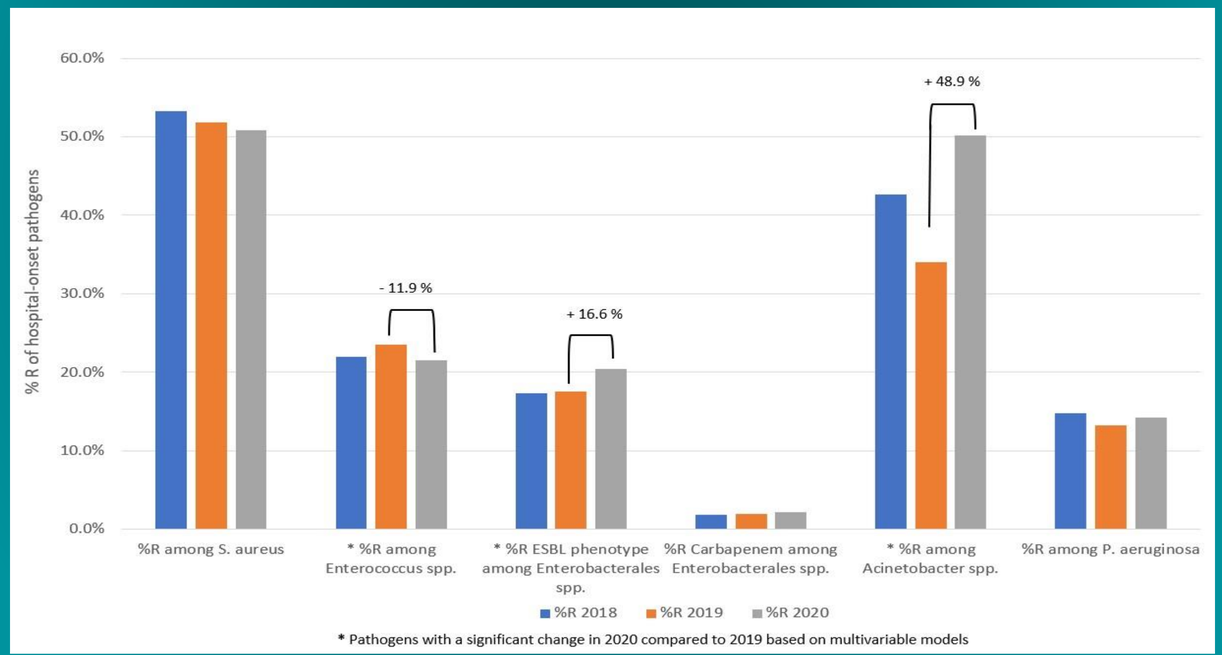
- **Methicillin-resistant *Staphylococcus aureus* (MRSA)**
- **Vancomycin-resistant Enterococcus spp. (VRE)**
- **Carbapenem-resistant Enterobacterales (*E. coli*, Klebsiella spp., and Enterobacter spp.) (CRE)**
- **Carbapenem-resistant Acinetobacter spp. (CRAsp)**
- **Extended-spectrum cephalosporin resistance suggestive of extended-spectrum β-lactamase producing Enterobacterales (ESBL)**
- **Multidrug-resistant *Pseudomonas aeruginosa* (MDR-PA).**

To evaluate whether trends were similar for susceptible and resistant strains, we estimated the proportions of bacterial pathogens expressing resistant phenotypes (%R) among hospital-onset infections in U.S. hospitals.

METHODS

We analyzed 2018–2020 hospital microbiology data in the Premier Healthcare and BD Insights Research Databases. We assessed the %R for inpatients with HO infections, which were those with positive cultures collected after hospital day 3. We used a raking procedure to produce weights to match national hospital characteristics, specifically: U.S. census division, bed size, teaching status, and urban/rural designation. We used a weighted means survey procedure for annual national estimates, and we conducted annual comparisons with multivariable logistic regression models incorporating the survey design and adjusting for hospital characteristics.

Increases in the proportion of Carbapenem resistance among hospital-onset Acinetobacter spp. and the ESBL phenotype among hospital-onset Enterobacterales infections suggest these resistant phenotypes may have had a selective advantage over susceptible strains during the pandemic.



Proportion of hospital-onset pathogens expressing resistant phenotypes, 2018 – 2020

RESULTS

In 589 hospitals, the proportion of carbapenem resistant among HO Acinetobacter spp. and ESBL phenotype among HO Enterobacterales increased from 2019 to 2020 (Table). Among Enterococci, the proportion with vancomycin resistance decreased. Other resistant phenotypes did not change.

AR Phenotype	Change in %R from 2019 - 2020
MRSA	No significant change
VRE	11.9% decrease ↓in HO
CRE	No significant change
ESBL	16.6% increase ↑ in HO
CRAsp	48.9% increase ↑ in HO
MDRPA	No significant change

CONCLUSIONS

Our findings suggest pandemic-related factors, such as changes in antibiotic use or infection control, may have differentially affected susceptible and resistant phenotypes of hospital pathogens.

- **Increases in the proportion of carbapenem resistance among Acinetobacter spp. And ESBL phenotype among Enterobacterales suggest these resistant phenotypes may have had a selective advantage over susceptible strains during the pandemic.**
- **These findings underscore the importance of strategies to prevent hospital-associated infections and AR that are resilient to pandemic-related stresses on the healthcare system.**

CONTACT INFO

Babatunde Olubajo
yzi1@cdc.gov