

# Research poster

## Determinants of Patient Outcomes of Blood Infections at the National Hospital of Tropical Disease

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### Introduction

- In Vietnam, antibiotic resistance is on the rise and can contribute to worsened patient outcomes due to rendering antibiotics less effective.
- Carbapenem resistance, which occurs among gram-negative bacteria is a particular concern.

### Objective of the Study

What factors contribute significantly to the survival of patients infected with a blood disease in the Vietnam National Hospital of Tropical Disease?

### Methods

- I used the R language to analyze a dataset of 362 patients.
- Descriptive statistics were used to prepare the summary table.
- Univariate and multivariate logistic regression were used to explore correlations.

### Results

- On the right is a summary table detailing the proportion of patients who survived or died based on different variables, including gram-negativity versus positivity of pathogen, carbapenem resistance, age, sex, days between admission and specimen collection, ICU or non\_ICU, and presence of MRSA.
- Univariate logistic regressions demonstrated the positive significance of **number of days between admission and specimen collection** in the likelihood of death.

Coefficients:

	Estimate	Std. Error	z value	Pr(> z )
(Intercept)	-20.57	3697.04	-0.006	0.996
MRSA_SCRN+	16.69	3697.04	0.005	0.996
CR_GNBNonResistant	-16.69	17730.37	-0.001	0.999

Analysis of Deviance Table

Model: binomial, link: logit

Response: outcome\_bi

Terms added sequentially (first to last)

	Df	Deviance	Resid.	Df	Resid.	Dev
NULL			72		10.5672	
MRSA_SCRN	1	0.76325	71		9.8039	
CR_GNB	1	0.04082	70		9.7631	

Characteristic	Summary			Univariate GLM		
	FALSE, N = 352 <sup>1</sup>	TRUE, N = 10 <sup>1</sup>	N	OR <sup>2</sup>	95% CI <sup>2</sup>	p-value
GNB			362			
GNB	152/352 (43%)	5/10 (50%)		—	—	
GPB	200/352 (57%)	5/10 (50%)		0.76	0.21, 2.78	0.7
CR_GNB			362			
NonResistant	129/352 (37%)	2/10 (20%)				
Resistant	202/352 (57%)	6/10 (60%)		1.92	0.43, 13.2	0.4
CR_GNB	21/352 (6.0%)	2/10 (20%)		6.14	0.71, 53.5	0.077
AGE			361			
Unknown	50 (39, 62)	62 (61, 70)		1.04	1.00, 1.09	0.047
SEX			362			
f	101/352 (29%)	4/10 (40%)		—	—	
m	251/352 (71%)	6/10 (60%)		0.60	0.17, 2.40	0.4
number_of_specdays	2.4 (0.0, 1.3)	9.1 (0.0, 17.3)	362	1.09	1.02, 1.15	0.003
WARD_TYPE			362			
icu	121/352 (34%)	10/10 (100%)		—	—	
in	231/352 (66%)	0/10 (0%)		0.00		>0.9
MRSA_SCRN			73			
-	23/72 (32%)	0/1 (0%)		—	—	
+	49/72 (68%)	1/1 (100%)		17,439,499	0.00, NA	>0.9
Unknown	280	9				
CR_GNB_GPB			345			
GNB_CNR	119/335 (36%)	3/10 (30%)		—	—	
GNB_CR	16/335 (4.8%)	2/10 (20%)		4.96	0.62, 32.2	0.092
GPB	200/335 (60%)	5/10 (50%)		0.99	0.24, 4.90	>0.9
Unknown	17	0				

<sup>1</sup> n/N (%); Mean (IQR)

<sup>2</sup> OR = Odds Ratio, CI = Confidence Interval

- On the left, a multivariate logistic regression and “Analysis of Deviance Table” including outcome as the dependent variable and carbapenem resistance and MRSA positivity as independent variables.
- Multivariate logistic regression found that both carbapenem resistance and MRSA positivity **significantly increased** the likelihood of death.

### Discussion

- Carbapenem resistance is positively correlated with death.
- Carbapenem resistance is worsened by creating environments where patients are unnecessarily given combinations of antibiotics.
- Diagnosis of antibiotics should be monitored.

### Questions

- Further research could explore the relationship between MDR resistance and patient outcome.

### Conclusion

- Carbapenem resistance and MRSA significantly increase the likelihood of death in patients with blood infections at the National Hospital of Tropical Disease.

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