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### Introduction:

Infection is one of the major concerns in the Intensive Care Unit (ICU) and the main reason for several admissions. Sepsis and septic shock are associated with significant morbidity and mortality and pose great pressure on the ICU and the entire health system. Studies have shown a close relationship between infection, hospital length of stay, and mortality.

### Methods:

Retrospective cohort study including all patients admitted to a multipurpose ICU between 2015-2019. Demographic and clinical data were collected as microbiological isolates, along with their antibiotic resistance profile. A two-step cluster analysis was performed to identify patterns.

### Results:

We evaluate 2085 admissions of which 820 have a microbiological isolate. As much as 55 different bacteria were found. Male gender was predominant (61.9%). The mean age and mean SAPSII Score were 67.4±13.6 years and 50.4±18.9 respectively. The median ICU Length of Stay was 4.2 days (IQR 5.83). ICU and In-hospital mortality were 20.8% and 34.3%, respectively.

It was possible to segregate the sample into 3 different clusters. The major predictors for each cluster were resistance to common antibiotics: Cluster 1 (*Amoxicillin* resistant); Cluster 2 (multi-sensible) and Cluster 3 (Quinolone and Penicillin resistance). Both ICU LOS and time of mechanical ventilation were statistically significant higher in Cluster 3. Clusters 1 and 2 were similar in our model. This classification was not helpful to identify different patterns of risk for ICU and Hospital mortality. (table1)

### Conclusion:

Cluster analysis techniques are a new and powerful method to analyze and discriminate different groups within large samples.

In this exploratory analysis, we developed a model with good internal coherence. This was able to point to differences in patients' profiles according to isolated bacteria antibiotic resistance patterns. Accordingly, we were able to identify a sub-group with higher ICU LOS and time on mechanical ventilation, although without different mortality risks.

### Table:

Variable   Sample	Cluster 1	Cluster2	Cluster3	p value
N   (746)	248 (33.2%)	441 (59.1%)	57 (7.6%)	
ICU-LOS (mean)   6.58±6.8	6.23±6.4	6.35±6.3	9.85±9.9	0.001†
SAPS II Score (mean)   50.38±18.9	49.4±18.6	50.8±19.3	51.3±17.2	0.588†
Ventilation days. (mean)   6.33±6.6	5.92±6.5	6.16±6.2	9.47±8.9	0.001†
Age (mean)   67.45±13.6	67.13±13	67.78±13.7	66.2±15.1	0.643†
ICU mortality (%)   20.8	20.2	21.3	19.3	0.9∅
In-Hosp. mortality (%)   34.3	36.7	32.7	36.8	0.516∅

*Table 1 —Sample characteristics. LOS - Length of Stay. SAPS II - Simplified Acute Physiology Score II. Statistical comparison between cluster variances (‡ANOVA test; † Qui square test)*