

O192

**Oral Session**

**Healthcare - associated infections - from analysis to interventions**

**THE BURDEN OF BLOODSTREAM INFECTIONS CAUSED BY MULTIRESTANT BACTERIA IN EUROPEAN HOSPITALS: A MULTICENTRE RETROSPECTIVE COHORT STUDY**

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**Objectives**

To determine the additional impact of methicillin resistance and third-generation cephalosporin resistance on the excess length of stay (LoS) and hospital mortality associated with bloodstream infections (BSIs) caused by *Staphylococcus aureus* and *Enterobacteriaceae*, respectively.

**Methods**

We performed a multicentre retrospective cohort study involving 10 European hospitals. All acute inpatient admissions from January 2010 to December 2011 were included. Demographic, clinical, microbiologic and administrative data were extracted electronically. BSIs were the time-varying exposure of interest. BSI due to *Escherichia coli*, *Klebsiella* spp. and *Proteus* spp. were classified as third generation cephalosporin susceptible (3GCS-E) or resistant *Enterobacteriaceae* (3GCR-E). *S. aureus* BSIs were classified as methicillin susceptible (MSSA) or resistant (MRSA). LoS in hospital attributable to each BSI type was estimated using multistate models. 95% confidence intervals for the excess LoS were obtained via bootstrap resampling. Multivariable Cox proportional hazards models were used to estimate separately the hazard of inpatient mortality and discharge alive compared to

non-infected patients, adjusted for age, sex, elective versus emergent admission, previous hospitalisation, 17 comorbidities, and intensive care admission or surgery prior to BSI.

## Results

Ten public hospitals from Italy (n=3), United Kingdom (2), Germany (2), Spain (1), France (1) and Switzerland (1) participated, providing a cohort of 606,649 acute-care episodes. Median patient age at admission was 49 years (interquartile range; 28, 69); 53% were female. Median LoS was 4 days (IQR; 2, 7) and 588,118 (97%) patients were discharged alive. The impact of BSIs on LoS and the daily hazard of discharge alive (adjusted end-LoS HR) or death (adjusted mortality HR) when compared with patients without BSI are presented in the table below:

Exposure	In-hospital Deaths count (%)	Adjusted Mortality HR* (95% confidence interval)	Excess LoS* days (95% confidence interval)	Adjusted End-LoS HR* (95% confidence interval)
MSSA BSI (n=898)	153 (17.04%)	1.82 (1.50, 2.21)	10.35 (9.44, 11.26)	0.54 (0.49, 0.60)
MRSA BSI (n=167)	38 (22.75%)	2.38 (1.64, 3.45)	12.22 (9.89, 14.55)	0.47 (0.37, 0.60)
3GCS-E BSI (n=2094)	215 (10.27%)	1.16 (0.99, 1.36)	4.36 (3.91, 4.81)	0.80 (0.76, 0.85)
3GCR-E BSI (n=366)	60 (16.39%)	1.79 (1.33, 2.41)	7.91 (6.66, 9.16)	0.58 (0.49, 0.67)

\*Note: patients without BSI are the comparator group for these effect measures.

Comparing outcomes attributable to BSI with resistant *versus* sensitive organisms, MRSA did not have significantly different impact on LoS (1.87 days, [95% CI, -0.45, 4.19]) or mortality (aHR 1.11, p = 0.6) compared with MSSA, but 3GCR-E had a significantly greater LoS (3.55 days, [95% CI, 2.32, 4.80]) and a trend toward greater mortality (aHR 1.33, p=0.08) compared with 3GCS-E.

## Conclusion

While BSI with *S. aureus* has a greater impact on mortality and excess LoS per infection than *Enterobacteriaceae*, the additional burden of antimicrobial resistance is greater amongst BSIs caused by *Enterobacteriaceae*.