**O386**
**2-hour Oral Session**
**New insights in the control of multi-resistant Gram-negatives**

## Epidemiological differences in controlling the spreading of carbapenem-resistant bacterial strains in hospitalized patients

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**Background:** Carbepenem-resistance among gram-negative bacteria represents a public health priority being associated with significant patients´ mortality and morbidity. The aim of this study was to analyse differences in attack rates and determinants of infection control success among *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Escherichia coli*, and *Klebsiella pneumoniae* expressing carbapenem-resistance.

**Material/methods:** All outbreaks in hospitalized patients caused by the target microorganisms until December 2014 were identified by a systematic literature search. No language restriction was applied. Study level and patient level data related to outbreak epidemiology, microbiology, and infection control measures were extracted. The overall attack rate was calculated as the number of cases divided by the person-months (pm) of observation and stratified by infection and colonization rates. Unsuccessful containment of the outbreak was defined as persistence of endemicity after implementation of infection control bundles. Drivers of success were studied using logistic regression analysis.

**Results:** Overall, 780 articles were reviewed in details and 222 outbreaks due to *A. baumannii (n=96), K. pneumoniae (n=84)*, *P. aeruginosa* (n=39), and *E.coli (n=3 )*were included in the study, The outbreaks involved 6,638 patients with a median duration of 9 months (IQR 3-17 months). ICUs were the most common outbreak setting with blood stream infections (BSI) as the commonest infection. *A. baumannii* had the highest attack rate (21/1000 pm) and infection rate (20.8/1000 pm) followed by *K.pneumoniae* (2.7 and 1.5 ) and *P.aeruginosa* (3.4 and 1.5). The sentinel case of the outbreak was more often detected through surveillance screening for *P.aeruginosa,* while first case of *K. pneumoniae* and *A. baumannii* were detected in clinical samples. Bundles of interventions included more frequently hand hygiene implementation and audit (63%), universal screening at hospital admission and periodic (58%), isolation room (57%), and environmental screening (51%). In 35 (15.8%) outbreaks control was not achieved. Outbreaks due to *K.pneumoniae* (OR=3.9; 95%CI: 1.6 - 9.3, p=0.002) and involving urinary tract infections (UTI) (OR=5.1; 95%CI: 2.3 - 10.9, p<0.001) had a significantly higher risk of resulting in endemicity. Environmental screening included in a multifaceted approach was found to play a major role in the successful containment of the outbreaks (OR= 0.36; 95%CI: 0.15 - 0.88, p=0.02). Adjusted multivariate regression, showed that outbreaks involving UTI (OR=5.04, p<0.001) and due to *K.pneumoniae* (OR=2.93, p=0.03) were significantly more difficult to contain.

**Conclusions:** Attack rate and determinants of infection control success are different among carbapenem-resistant gram negative bacteria. Bundles of interventions to reduce the spread of these bacteria in hospitalised patients need to be patient and microorganism calibrated.