

## Impact of a hospital-wide multifaceted programme for reducing carbapenem-resistant Enterobacteriaceae infections in a large teaching hospital in northern Italy

Viale P, Tumietto F, Giannella M, Bartoletti M, Tedeschi S, Ambretti S, Cristini F, Gibertoni C, Venturi S, Cavalli M, De Palma A, Puggioli MC, Mosci D, Callea E, Masina R, Moro ML, Lewis RE.

### Abstract

We performed a quasi-experimental study of a multifaceted infection control programme for reducing carbapenem-resistant Enterobacteriaceae (CRE) transmission and bloodstream infections (BSIs) in a 1420-bed university-affiliated teaching hospital during 2010-2014, with 30 months of follow-up.

The programme consisted of the following: (a) rectal swab cultures were performed in all patients admitted to high-risk units (intensive-care units, transplantation, and haematology) to screen for CRE carriage, or for any room-mates of CRE-positive patients in other units; (b) cohorting of carriers, managed with strict contact precautions; (c) intensification of education, cleaning and hand-washing programmes; and (d) promotion of an antibiotic stewardship programme carbapenem-sparing regimen.

The 30-month incidence rates of CRE-positive rectal cultures and BSIs were analysed with Poisson regression. Following the intervention, the incidence rate of CRE BSI (risk reduction 0.96, 95% CI 0.92-0.99,  $p$  0.03) and CRE colonization (risk reduction 0.96, 95% CI 0.95-0.97,  $p$  <0.0001) significantly decreased over a period of 30 months.

After accounting for changes in monthly census and percentage of externally acquired cases (positive at  $\leq 72$  h), the average institutional monthly rate of compliance with CRE screening procedures was the only independent variable associated with a declining monthly incidence of CRE colonization ( $p$  0.002). The monthly incidence of CRE carriage was predictive of BSI ( $p$  0.01).

Targeted screening and cohorting of CRE carriers and infections, combined with cleaning, education, and antimicrobial stewardship measures, significantly decreased the institutional incidence of CRE BSI and colonization, despite endemically high CRE carriage rates in the region.