

ADVERSE EVENTS

Sepsis



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Sepsis is the systemic response to infection by an individual. It has significant associated morbidity and mortality, with an estimated 10,000 deaths per year in the UK associated with sepsis. Delayed antibiotic treatment among patients who present to hospital with sepsis, especially those ill enough to need intensive care, has been shown to increase mortality. There is a lack of research examining the recognition and treatment of sepsis arising in patients who are already in hospital, although pilot work had identified that deficiencies exist in this area. The aim of this project was to define these deficiencies, identify barriers to, and facilitators of, appropriate management of sepsis, and to use this information to develop an intervention to improve the management of sepsis in NHS hospitals.

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Design, implementation and primary evaluation of a complex intervention to improve the management of hospital-acquired sepsis.

Patients developing sepsis were identified prospectively by screening patients who had blood cultures taken in medical, surgical and orthopaedic wards. The primary study outcome measure was the proportion of septic patients that received antibiotics within four hours of sepsis onset. Among the 241 baseline patients identified, only 91 (38%, 95% CI 32-44%) received antibiotics within four hours. The mean and median times to administration were 11.0 hours (95% CI 9.3-12.7hrs) and 6.0 hours (IQR 2.5-13.3hrs) respectively.

Problems identified in the clinical data, and in the findings of a questionnaire study with a purposive sample of junior and middle-grade medical staff (n = 147) included delays in the recognition of sepsis and in clinical decision-making. A follow up interview study with junior doctors (n = 10) identified barriers to good clinical care and to improvement interventions.

The design of the intervention was informed by the baseline clinical data and the findings of the questionnaire and interview survey of junior medical staff. A multifaceted intervention consisting of education, a care pathway, and audit and feedback was developed. The effect of the intervention was evaluated by segmented regression analysis of interrupted time series (ITS) data.

Post-intervention, 139/297 (47%, 95% CI 41-52%) patients met the primary outcome measure of antibiotics within four hours of sepsis onset. Run charts of the data pre- and post-intervention suggested a chaotic process and formal run chart analysis indicated non-random variation. Segmented regression analysis of ITS data did not show a statistically significant intervention effect.

The management of patients with sepsis in hospital leaves room for improvement.

Uncontrolled before and after analysis indicated that the intervention developed in this study

had some effect, but this was not confirmed as a statistically significant intervention effect in ITS analysis. Most sepsis intervention studies only report as uncontrolled before and after studies, so any effect cannot be confidently attributed to the intervention. Further rigorous research informing quality improvement in this area is required.

Publications

Marwick, C., Rae, N., Irvine, N., & Davey, P. (2012). Prospective study of severity assessment and management of acute medical admissions with skin and soft tissue infection. *Journal of Antimicrobial Chemotherapy*, 1 – 4.

Marwick, C., Broomhall, J., McCowan, C., Philips, G., Gonzalez-McQuire, S., Akhras, K., Merchant, S., Nathwani, D., & Davey, P. (2011). Severity assessment of skin and soft tissue infections: cohort study of management and outcomes for hospitalised patients. *Journal of Antimicrobial Chemotherapy*, 66, 387 – 97.

Marwick, C. & Davey, P. (2009) Care bundles: the holy grail of infectious risk management in hospital? *Current Opinion Infectious Diseases*, 22, 364 – 369.

Marwick, C., Watts, E., Evans, J., & Davey, P. (2007). Quality of care in sepsis management: development and testing of measures for improvement. *Journal of Antimicrobial Chemotherapy*, 60, 694 – 697.