Effect of targeted surveillance for control of methicillin-resistant Staphylococcus aureus in a community hospital system

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
The study examined the cost-effectiveness of a targeted active surveillance culture programme for methicillin-resistant Staphylococcus aureus (MRSA) in a hospital system in high-risk patients. The authors concluded that the targeted surveillance programme reduced the rate and costs of MRSA infections in a community hospital system. The study methodology presented potential limitations that should be considered when assessing the robustness of the authors’ conclusions.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The study examined the cost-effectiveness of a targeted active surveillance culture programme for methicillin-resistant Staphylococcus aureus (MRSA) in a hospital system in high-risk patients (transferred from another hospital, admitted from long-term care facilities, readmitted within 30 days after discharge or admitted to a nephrology service).

Interventions
High-risk patients were screened for MRSA colonisation upon admission and weekly thereafter until hospital discharge. Screening consisted of swab samples from the anterior nares of patients. Colonised or infected patients were placed in contact isolation and healthcare workers were required to wear gloves and gowns when entering the rooms and to use alcohol-based hand rubs or wash their hands with antibacterial soap after removing gown and gloves. The targeted surveillance programme was compared against a less intensive programme restricted to patients admitted to the intensive care unit (ICU).

Location/setting
USA/private community hospital.

Methods
Analytical approach:
The analysis was based on a single study with a relatively short time horizon (from hospital admission until discharge). The perspective adopted in the study was not explicitly stated.

Effectiveness data:
The clinical analysis was based on a retrospective cohort study with historical control as outcomes of patients during the eight months before the initiation of expanded surveillance (BES) were compared against those during the 16 months after the initiation of expanded surveillance (AES). The study was carried out at two hospitals in the central metropolitan area of Charleston, South Carolina (Roper Hospital and St. Francis Hospital), USA. Patients were followed from admission until hospital discharge. The rate of nosocomial MRSA infection was the main endpoint.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
No summary benefit measure was used. The rate of nosocomial MRSA infection was the primary outcome.
Cost data:
The economic analysis calculated the difference between costs saved with AES by preventing nosocomial MRSA and bacteremias and surgical site infections and costs of performing MRSA cultures and placing patients with MRSA colonisation in contact isolation. Costs of surveillance included laboratory tests and nursing time and were taken from the participating hospitals. Information from a representative sample of patients colonised with MRSA was used to derive the added cost of contact isolation. Costs of MRSA bacteraemia and surgical site infections were taken from two published studies. Costs were in US dollars ($).

Analysis of uncertainty:
Not considered.

Results
At Roper Hospital, in the BES phase there were 56 nosocomial MRSA infections over 73,328 patient-days (mean number of infections 0.76 per 1,000 patient-days). The programme led to a significant 39% relative decrease in the number of nosocomial MRSA infections as 67 infections occurred over 145,330 patient-days (mean number of infections 0.46 per 1,000 patient-days). The difference was statistically significant (p=0.05).

At St. Francis Hospital, in the BES phase there were 19 nosocomial MRSA infections over 26,539 patient-days (mean number of infections 0.72 per 1,000 patient-days). The programme led to a 21% relative decrease in the number of nosocomial MRSA infections as 31 infections occurred over 54,593 patient-days (mean number of infections 0.57 per 1,000 patient-days). The difference did not reach statistical significance (p=0.35).

Prevention of nosocomial MRSA bacteraemia in the two hospitals led to savings of $596,960 over the 16-month period of AES. The total cost of targeted surveillance was $113,955 ($54,381.48 for cultures plus $59,573 for contact isolation). Overall cost savings amounted to $483,005. Considering also the prevention of surgical site infections, the total savings would be $1,548,740.

Authors' conclusions
The authors concluded that the targeted surveillance programme reduced the rate and costs of MRSA infections in a community hospital system.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear as clinical and economic outcomes of the surveillance programme were compared with the outcomes observed in the period before implementation of the programme.

Effectiveness/benefits:
A retrospective analysis of patient charts was carried out to examine the impact of the surveillance programmes on clinical outcomes. Such a design may be subject to some methodological limitations. The authors did not demonstrate the comparability of the two patient populations in terms of demographic and clinical characteristics. No information was given on sample sizes. Outcomes were assessed in two different periods of time and factors other than the surveillance programmes might have affected the clinical endpoints. In effect, the authors did not consider the potential impact of confounding factors. No statistical analysis was conducted to adjust clinical results for potential differences in patient groups. An intermediate measure of the effect of the programme on patients' health (rate of MRSA) was used. These issues should be considered when judging the internal validity of the clinical analysis.

Costs:
The economic analysis was restricted to costs that were strictly related to the prevention and management of MRSA within the hospital setting. The viewpoint adopted appeared to be that of the hospital. Unit costs were presented for some items related to the surveillance system but costs of MRSA and surgical site infections were presented as macro-categories as they were taken from two published studies. No details of these studies were provided, although they appeared relevant for the USA context. Resource use for the BES period was taken from the two hospitals involved in the clinical analysis and might not be fully representative of other USA hospitals. The impact of variations in cost estimates was not assessed. The price year was not stated explicitly and this limited the possibility of making deflation exercises for other time periods.
Analysis and results:
The study results were presented extensively for the BES and AES periods. Cost-effectiveness ratios were not calculated because of the cost-consequences framework of the analysis. The issue of uncertainty was not investigated. The main limitations of the analysis were related to the design of the clinical study, limited reporting of details of costs and issues related to the variability of data. The study results should be considered specific to the authors’ setting and did not appear to be transferable to other jurisdictions.

Concluding remarks:
The study methodology presented potential limitations that should be considered when assessing the robustness of the authors’ conclusions.

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