Active screening in high-risk units is an effective and cost-avoidant method to reduce the rate of methicillin-resistant Staphylococcus aureus infection in the hospital


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 clinical and economic impact of a targeted active surveillance programme of screening for methicillin-resistant Staphylococcus aureus (MRSA) in high-risk hospital wards such as adult medical and surgical intensive care units. The authors concluded that the targeted active surveillance programme reduced rates of MRSA infection and led to cost savings throughout the hospital. The analysis was well-presented but had some methodological limitations. The authors’ conclusions should be treated with caution.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The study examined the clinical and economic impact of a targeted active surveillance programme of screening for methicillin-resistant Staphylococcus aureus (MRSA) in high-risk hospital wards such as adult medical and surgical intensive care units.

Interventions
The targeted active surveillance programme consisted of screening for MRSA nasal carriage on admission and weekly thereafter for all adult medical and surgical intensive care units. MRSA-positive patients were placed in contact isolation (defined as hospitalisation in a private room in which all persons were required to wear gloves and gowns when entering). The comparator was the conventional pattern of care before the introduction of the targeted active surveillance programme (no surveillance).

Location/setting
USA/hospital.

Methods
Analytical approach:
The analysis was based on a single study with a short-term time horizon (from admission to hospital discharge). The perspective of the study was not stated explicitly.

Effectiveness data:
Clinical analysis was based on a retrospective cohort study with historical control carried out at a single public hospital (Denver Health Medical Center). The pre-intervention period started in January 2002 and ended in March 2003. The post-intervention period started in April 2003 and ended in June 2004. No information was provided on patient characteristics or sample sizes. Patients were followed until hospital discharge. Incidence of MRSA infection was the primary endpoint and was estimated for medical and surgical intensive care units as well as for normal wards. Various secondary outcomes were reported.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
No summary benefit measure was used. Rate of MRSA was the primary outcome of the clinical analysis.
Cost data:
The economic analysis included costs of screening (swabs plus laboratory testing and time required by the technologist) and placing patient in isolation and cost avoidance in post-intervention due to the number of averted MRSA infections. Resource quantities used after implementation of the surveillance programme were taken from actual consumption observed in the sample of patients included in the clinical analysis. Costs of screening were derived from the hospital accounting system. Costs of MRSA infections were taken from published sources. Costs were in US dollars ($).

Analysis of uncertainty:
Not considered.

Results
The total MRSA infection rate for all three areas combined (medical and surgical intensive care units and normal wards) decreased from a mean 6.1 infections per 1,000 census-days pre-intervention to 4.1 infections per 1,000 census-days post-intervention (p<0.01). The difference remained statistically significant when only nosocomial infections (first clinical specimen positive more than 72 hours after admission) were considered (4.5 versus 2.8 infections per 1,000 census-days). Surgical intensive care units experienced the highest decrease in MRSA infections (from 9.4 to 4.9 infections per 1,000 census-days, p<0.005). The reduction in medical intensive care units (from 7.8 to 5.6 per 1,000 census days, p=0.17) was not statistically significant.

The monthly cost of the surveillance programme was approximately $3,475. At an excess cost of $9,275 per MRSA infection (the lowest found in the literature) there was a cost avoidance of $19,714 per month in intensive care units following implementation of the active surveillance after accounting for the monthly cost of the programme.

Authors' conclusions
The authors concluded that the targeted active surveillance programme reduced rates of MRSA infections and led to cost savings throughout the hospital.

CRD commentary
Interventions:
The rationale for selection of the comparators was clear. Pre- and post-intervention periods were compared to assess the efficacy of the screening programme. Limited information was given on the conventional pattern of care prior to the active surveillance programme.

Effectiveness/benefits:
The clinical analysis was subject to potential limitations such as the retrospective nature of the study and limited information on the clinical and demographic characteristics of the pre- and post-intervention groups of patients. Another critical issue was the lack of contemporaneous assessment of outcomes: as the two patient samples were considered over two different periods of time, the impact of time-related bias could not be ruled out because factors other than the study intervention might have affected the endpoints. No statistical analysis was conducted to adjust clinical results for potential differences in patient groups. Evidence came from a single medical institution which might not be representative of other health care systems. The endpoints used in the analysis represented the natural outcomes of the surveillance programme but were intermediate measures of the impact of the interventions on patients' health.

Costs:
The economic analysis was performed from the economic viewpoint of the hospital. Details of unit costs and resource quantities for the surveillance programme were reported extensively and this enhanced the transparency of the economic side of the study. The value used for MRSA infection was the lowest found in the literature in order to be conservative against the surveillance intervention. Methodological details were not provided for the selected study. The price year was not stated so reflation exercises in other time periods was not possible. The impact of variations in economic estimates was not investigated.

Analysis and results:
The study results were presented extensively. Cost-effectiveness ratios were not calculated because of the cost-consequences framework of the analysis. No sensitivity analyses were carried out to deal with the issue of uncertainty and this represented a limitation of the analysis. The authors highlighted the difference found between surgical and
medical intensive care units and explained possible reasons. The authors acknowledged some potential drawbacks of the analysis (such as use of census-days instead of days at risk) but did not underline the issues related to the use of a clinical study with potential bias.

Concluding remarks:
The analysis was well-presented but had some methodological limitations. The authors’ conclusions should be treated with caution.

Bibliographic details
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