Impact and cost of infection control measures to reduce nosocomial transmission of extended-spectrum beta-lactamase-producing organisms in a non-outbreak setting

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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 aim of the study was to examine the clinical and economic impact of control measures to prevent extended-spectrum β-lactamase-producing organisms (ESBLs) in a non-outbreak nosocomial setting. The authors concluded that, from the perspective of a large Canadian hospital, control measures reduced the rate of transmission of nosocomial ESBLs at a cost of CAD 3,191.83 per case admitted. The study methodology was characterised by transparent reporting of the costs and clinical data. The authors’ conclusions appear valid, although the results seem conservative for the study intervention.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The aim of the study was to examine the clinical and economic impact of control measures to prevent extended-spectrum β-lactamase-producing organisms (ESBLs) in a non-outbreak nosocomial setting (hospital).

Interventions
The infection control measures consisted of infected patients being placed in a private room for the duration of their hospital stay. Contact precautions (i.e. use of gown and gloves by anyone entering the patient's room, hand hygiene upon entering the patient's room, dedicated patient care equipment, and thorough environmental cleaning upon patient discharge) were also implemented. Furthermore, an alert code was added to these patients' electronic chart, prompting the initiation of the infection control measures on readmission. The same approach was used for patients admitted to an intensive care unit, with uncontained drainage from culture-positive site, and with diarrhoea or incontinence of urine or stool.

Location/setting
Canada/hospital.

Methods
Analytical approach:
This economic evaluation was based on a single clinical study, which was carried out at the authors' institution. The time horizon of the analysis was 7 years. The authors stated that a hospital perspective was adopted in the analysis.

Effectiveness data:
The effectiveness of the infection control intervention was assessed in a prospective comparative study intended to monitor the ESBL incidence from 1999 through 2005, the trend of which was the key clinical estimate. The control measures were implemented from January 2002. The potential impact of confounding factors (antibiotic use, occupancy rates, length of stay and compliance rates with infection control measures) was considered in the analysis. The study covered a 7-year period (3 years before and 4 years after the implementation of the intervention).

Monetary benefit and utility valuations:
None.

Measure of benefit:
No summary benefit measure was used since a cost-consequences analysis was performed. The key clinical estimates were the data concerning the incidence of disease.

Cost data:
The economic analysis considered the costs of private room use, contact precautions (supplies and additional nursing time), infection control and housekeeping. The unit costs and the quantities of resources used were presented separately. The costs and resources were mainly derived from the authors’ institution. The price year was 2005 and the costs were in Canadian dollars (CAD). A few items were valued using data from comparable Canadian hospitals.

Analysis of uncertainty:
No sensitivity analysis was performed.

Results
At the authors’ institution, the incidence of ESBL increased significantly from 0.28 to 0.67 per 1,000 admissions during the study period, (p<0.001), but the increase was much higher in the regional ESBL incidence (from 1.32 to 9.28 per 100,000 population; p<0.001). Moreover, nosocomial ESBL rates increased only marginally, suggesting that infection control measures had a beneficial impact on nosocomial transmission.

The cost of the control measures (which was evaluated only in the post-intervention period) from the perspective of the hospital was CAD 138,046.63 per year and CAD 3,191.83 per case admitted. The use of a private room was the key determinant of the cost analysis (85% of total costs), followed by the cost of supplies for contact precautions (7.8%) and additional nursing time (6.5%).

Authors’ conclusions
The authors concluded that control measures, including active surveillance cultures and contact precautions, reduced the rate of transmission of nosocomial ESBLs at a cost of CAD 3,191.83 per case admitted from the perspective of a large Canadian hospital.

CRD commentary
Interventions:
The selection of the comparators (before and after the implementation of control measures) was appropriate in that they reflected the change in hospital policy.

Effectiveness/benefits:
The design of the study was chosen to reflect the objective of the analysis, which aimed to compare the incidence of disease before and after the implementation of control measures. Clearly, a full prospective, parallel, simultaneous evaluation of the two strategies would have been more appropriate. Nevertheless, given the long-term observation period, the authors took the potential impact of factors other than the study intervention into account. The data came from a large hospital that covers a wide population. Thus, despite the involvement of a single institution, the epidemiological data observed in the study can be considered to be representative of a large sample of patients. These aspects of the study strengthen the validity of the clinical analysis.

Costs:
The economic analysis was carried out in a transparent fashion. Extensive information on the analysis of the costs was presented. The unit costs and the resource quantities were reported separately. The costing approach reflected that of the authors’ institution, and the price year was appropriately reported. Statistical analyses of the costs were performed. The main drawback of the analysis was the fact that the authors did not calculate the cost-savings to the hospital accruing from the reduction in infections as a result of the preventive measures.

Analysis and results:
The costs and benefits were not combined, owing to the cost-consequences framework of the analysis. The issue of uncertainty was not explicitly addressed. Similarly, the authors did not discuss the generalisability of their findings to other settings.
Concluding remarks:
Overall, the study methodology was satisfactory, with transparent reporting of the costs and clinical data. The authors’ conclusions appear valid, although the results may be somewhat conservative for the study intervention.

Funding
Ministry of Education Brazil, Coordenacao de Pessoal de Nivel Superior; CHICA Canada, 3M Infection Prevention and Control Research Grant.

Bibliographic details

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
beta-Lactamases /adverse effects /biosynthesis; Cross Infection /economics /prevention & control; Gram-Negative Bacteria /enzymology /isolation & purification /pathogenicity; Gram-Negative Bacterial Infections /drug therapy /prevention & control; Humans; Ontario

AccessionNumber
22007000865

Date bibliographic record published
10/05/2007

Date abstract record published
03/11/2008