Cost-effectiveness of adding decolonization to a surveillance strategy of screening and isolation for methicillin-resistant Staphylococcus aureus carriers


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 adding methicillin-resistant Staphylococcus aureus decolonisation to an active surveillance programme at a hospital level. The authors concluded that the model results strongly supported the implementation of the active surveillance plus decolonisation protocol from the perspective of the hospital. The study was based on valid methodology that considered various areas of uncertainty but data sources were not described clearly. The authors’ conclusions appear robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The study examined the cost-effectiveness of adding methicillin-resistant Staphylococcus aureus decolonisation to an active surveillance programme at a hospital level.

Interventions
Three strategies were examined: active surveillance plus decolonisation; active surveillance alone; and no surveillance. Active surveillance consisted of MRSA screening with a nasal swab and isolation for colonised and infected patients. Decolonisation was made with topical treatments such as mupirocin or chlorhexidine bathing.

Location/setting
USA/hospital.

Methods
Analytical approach:
The analysis was based on a decision-analytical model with a time horizon corresponding to duration of in-patient stay. The authors stated that the perspective was that of the health care provider (Veterans Health Administration).

Effectiveness data:
Clinical inputs were taken from the published literature. No information on a literature review was provided. A key assumption based on authors’ experience was made on the indirect benefit of decolonisation (reduction in risk of infection in non-colonised patients in hospital that used the decolonisation strategy). No details of data sources were reported. Mean values and ranges were presented for each parameter. Some inputs were based on more than one study but methods used to pool data were not reported. Rate of nosocomial MRSA infection was the main endpoint.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
Two summary benefit measures were used: nosocomial MRSA infections avoided and infection-related deaths avoided.

Cost data:
The economic analysis included costs of screening (nasal swabs), decolonisation (topical treatment with mupirocin ointment, chlorhexidine showers and nurse time to administer the treatment), isolation (personnel time and supplies)
and MRSA infection. Most costs were taken from the published literature. Decolonisation costs were based on local estimates. Costs were in US dollars ($).

Analysis of uncertainty:
One-way sensitivity analyses were carried out for each input of the model using plausible published ranges of values. These sensitivity analyses were presented as a threshold analysis. Two-way sensitivity analyses were performed on several important inputs. A probabilistic sensitivity analysis was carried out using 1,000 Monte Carlo simulations and conventional probability distributions (beta for clinical inputs and gamma for costs).

Results
The expected costs were $93,538 with active surveillance plus decolonisation, $107,971 with active surveillance alone, and $141,300 with no surveillance. Projected rates of MRSA infection avoided and infection-related deaths avoided were 96.07 and 99.57 with active surveillance plus decolonisation, 95.69 and 99.49 with active surveillance alone and 92.94 and 99.29 with no surveillance. Incremental analysis showed that active surveillance plus decolonisation was the dominant strategy as it was simultaneously more effective and less expensive than the other comparators. Active surveillance alone dominated no surveillance.

The base case results held in almost all scenarios. Exceptions were when assuming extremely low estimates for the direct benefit of decolonisation (active surveillance alone was the dominant strategy in this case) or very low risk of hospital-acquired MRSA infection in non-carriers or very low cost of hospital-acquired MRSA infection (in these cases no surveillance was the dominant strategy).

The probabilistic analysis showed that active surveillance plus decolonisation remained the dominant strategy in all simulations.

Authors' conclusions
The authors concluded that the model results strongly supported implementation of an active surveillance plus decolonisation protocol from the perspective of the hospital.

CRD commentary
Interventions:
The selection of comparators was appropriate and applicable to other health care settings and institutions. Active surveillance alone was the practice at Veterans Health Administration facilities at the time of the study.

Effectiveness/benefits:
Clinical inputs were retrieved by means of a review of the literature that should have identified key studies for each model parameter. However, the selected studies were not described and this hindered an objective assessment of the validity of the clinical sources. Some assumptions were required and were justified. Clinical parameters varied extensively in the sensitivity analyses. Both benefit measures were disease-specific and did not allow comparison with the benefits of other health care interventions.

Costs:
The cost categories were appropriate given the viewpoint of the hospital. Details of unit costs were presented for most items. Cost of MRSA infection was reported as a macro-category. Most economic data were based on published sources but the methodological features were not reported. The impact of variations in economic inputs was investigated extensively in sensitivity analyses, which also considered probability distributions for costs. Reflation exercises in other time periods would not be feasible as the price year was not clearly stated.

Analysis and results:
The study results were clearly presented. Use of an incremental analysis allowed the identification of the optimal (dominant) strategy. The authors provided a clear description of the decision models. Some shortcomings of the simulation (short time horizon and static nature of the model) were pointed out. A longer time horizon might have allowed analysis of potential recolonisation, which can have consequences for the cost-effectiveness issue of the active surveillance plus decolonisation strategy. The issue of uncertainty was investigated satisfactorily. Results of the sensitivity analyses were presented clearly and discussed. The authors stated that previous economic evaluations had
shown similar results and it was likely that these findings were relevant in other settings with similar costs and epidemiologic characteristics.

Concluding remarks:
The study was based on valid methodology that considered various areas of uncertainty but data sources were not described clearly. The authors’ conclusions appear robust.

Bibliographic details

PubMedID
20673265

DOI
10.1111/j.1469-0691.2010.03324.x

Original Paper URL

Indexing Status
Subject indexing assigned by NLM

MeSH
Carrier State; Chlorhexidine; Cost-Benefit Analysis; Cross Infection /prevention & control; Data Interpretation, Statistical; Disinfectants; Hospitalization; Humans; Length of Stay; Methicillin-Resistant Staphylococcus aureus; Monte Carlo Method; Mupirocin; Sentinel Surveillance; Staphylococcal Infections /diagnosis /economics /epidemiology /prevention & control; Veterans Health

AccessionNumber
22010002140

Date bibliographic record published
18/05/2011

Date abstract record published
15/08/2012