



Modelling the costs and consequences of reducing healthcare-associated infections

Modelling Study in an average hospital in England

WHAT WAS INVESTIGATED?

- Modelling of **the influence of an electronic audit and feedback system** in a hypothetical general hospital in England.
- The aim was to **estimate the potential clinical and economic impact of reducing healthcare associated infections (HAIs)**.

WHAT WAS THE RESULT?

- An **electronic audit and feedback system** leading to a **reduction in HAI incidence by at least 15 %**, would afford a **cost-effective intervention** in an English hospital.
- **552 HAIs could be avoided** per year per hospital.
- **19 deaths could be avoided per year per hospital**
- **13 % reduction of total hospital costs** per annum attributable to HAIs
- **Around £1,221,852 net benefit** by a 15 % reduction in HAIs

The model suggests that an electronic audit and feedback system to improve hand hygiene compliance is a cost-effective measure, provided that it reduces the incidence of HAIs by at least 15 %.

BACKGROUND

Epidemiological data suggest that transmission via hands is a major factor in acquiring infections in the hospital setting. Transmission can be directly via the hands or indirectly via potentially contaminated surfaces, e.g. commodes, wash bowls, blood pressure monitors or mobile phones. Healthcare-associated infections (HAIs) can be caused by a range of pathogens and pose a serious risk to patients, healthcare practitioners (HCPs) and visitors. Regular audits with feedback are an important part of the WHO's hand hygiene guidelines and have been shown to improve the conception of many hand hygiene interventions. Because of the minimal published evidence on the association between HAIs and hand hygiene, the effect of improving hand hygiene is hard to quantify.

GOAL

This modelling study was created to calculate the potential clinical and economic impact of reducing the incidence of HAIs by improving hand hygiene compliance with an electronic audit and feedback system in a hypothetical general hospital in England.

DESIGN AND METHODS

The study was designed as a modelling study. Patients and members of the public were not directly involved. The model assumed there would be 76,053 adult admissions, 510 adult inpatient beds and 4,473 frontline HCPs in an average year in an average hospital in England. The model outputs were:

- HAIs avoided per year
- HAI-related patient deaths avoided per year
- HAI-related days of avoided absence by HCPs per year
- HAI-related occupied bed days per year
- total hospital cost attributable to HAIs per year (including cost of patient management per year, HCP management, agency staff and the electronic audit and feedback system)

RESULTS

HAIs avoided per year per hospital	552
Number of deaths due to HAIs avoided per year	19
Probability of affording a cost-effective intervention	≥ 0.75
Reduction of total hospital costs per year attributable to HAIs	13 %
Net benefit for the hospital	£1,221,852

Table 1: Modified from Guest *et al.* (2019)

The base case model estimated 3,683 HAIs per year and 126 HAI-related patient deaths per year in the assumed hypothetical average hospital (with 76,053 adult admissions per year, 510 adult inpatient beds and 4,473 front-line HCPs). See in table 1 the expected HAI-related outcome, if the use of the electronic audit and feedback system led to a 15 % reduction in the incidence of HAIs:

**Expected outcomes
in case of a 15 %
reduction in HAIs**

CONCLUSION

The model has shown that the introduction of an electronic audit and feedback system to improve hand hygiene compliance in a hypothetical general hospital in England could afford a cost-effective intervention. Prerequisite for this is that it yields a reduction of HAI by 15 %.