Journal of Hospital Infection 88 (2014) 141–148

Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevierhealth.com/journals/jhin

Costing the Australian National Hand Hygiene Initiative

K. Page [a,*], A.G. Barnett [a], M. Campbell [a], D. Brain [a], E. Martin [a], N. Fulop [b], N. Graves [a,c]

[a] *Institute of Health and Biomedical Innovation, Queensland University of Technology, School of Public Health and Social Work, Queensland University of Technology, Kelvin Grove, Queensland, Australia*
[b] *King's College, London, UK*
[c] *Centre for Healthcare Related Infection Surveillance and Prevention, Queensland Health, Herston, Queensland, Australia*

ARTICLE INFO

Article history:
Received 19 January 2014
Accepted 17 June 2014
Available online 9 July 2014

Keywords:
Costs
Economics
Hand hygiene
Infection control

SUMMARY

Background: The Australian National Hand Hygiene Initiative (NHHI) is a major patient safety programme co-ordinated by Hand Hygiene Australia (HHA) and funded by the Australian Commission for Safety and Quality in Health Care. The annual costs of running this programme need to be understood to know the cost-effectiveness of a decision to sustain it as part of health services.

Aim: To estimate the annual health services cost of running the NHHI; the set-up costs are excluded.

Methods: A health services perspective was adopted for the costing and collected data from the 50 largest public hospitals in Australia that implemented the initiative, covering all states and territories. The costs of HHA, the costs to the state-level infection-prevention groups, the costs incurred by each acute hospital, and the costs for additional alcohol-based hand rub are all included.

Findings: The programme cost AU$5.56 million each year (US$5.76, £3.63 million). Most of the cost is incurred at the hospital level (65%) and arose from the extra time taken for auditing hand hygiene compliance and doing education and training. On average, each infection control practitioner spent 5 h per week on the NHHI, and the running cost per annum to their hospital was approximately AU$120,000 in 2012 (US$124,000, £78,000).

Conclusion: Good estimates of the total costs of this programme are fundamental to understanding the cost-effectiveness of implementing the NHHI. This paper reports transparent costing methods, and the results include their uncertainty.

Introduction

The economics of new infection control programmes depend on their effectiveness and the health benefits, the costs saved from fewer infections and the costs of implementation.[1,2] The published evidence is weakest around the costs of implementation. The published literature favours accurate and transparent effectiveness data, and excellent reviews of the methods have been published.[3,4] Numerous studies estimate the costs imposed by healthcare-associated infections, and so inform the cost savings from effective interventions, and there is good discussion of sources of bias in these methods.[5–7] Few studies consider the extra costs of implementing infection control programmes, and useful papers on costing methods have been published.[8–10] A review by Stone

* Corresponding author. Address: Institute of Health and Biomedical Innovation, Queensland University of Technology, 60 Musk Avenue, Kelvin Grove, QLD 4059, Australia. Tel.: +61 434 433 033.
E-mail address: katie.page@qut.edu.au (K. Page).

http://dx.doi.org/10.1016/j.jhin.2014.06.005

et al. found that research estimating the cost attributable to an infection was seven times more likely to be judged as higher quality than studies of the cost of interventions.[8]

The topic for this paper is the cost of implementing hand hygiene programmes. With worldwide uptake of hand hygiene improvement programmes, scarce health resources will be used up. An important and overlooked first step for the economic appraisal of these programmes is to understand the costs arising from their implementation. Huis *et al*. and Chen *et al*. did perform a cost-effectiveness evaluation of an evidence-based hand hygiene programme and specified implementation costs.[11,12] Five others studies relied on existing cost information to build economic arguments for hand hygiene interventions.[13–17] A previous study of an Australian hand hygiene intervention estimated the cost per patient of 'roughly two-thirds the cost of a Big Mac', and the authors acknowledged that they did not perform a detailed cost analysis.[18] The current knowledge about the cost of hand hygiene programmes could be improved.

A poorly addressed issue with respect to costing complex interventions is the role and nature of uncertainties in estimates. A systematic review of economic evaluations showed that most studies either completely neglected to deal with uncertainty or did so in an inadequate manner.[19] Improvements in how uncertainties are included in economic models have been made in recent years.[20–24] Finkler *et al*. suggested that, unless uncertainty can be adequately expressed within individual studies, the potential for realizing efficiency improvements by subsequent cost-effectiveness analyses will be reduced.[25]

The aims of this paper are to describe the methods used to cost the Australian National Hand Hygiene Initiative (NHHI) and to present the results. The findings will be used to address the policy-relevant question of whether the NHHI was cost-effective.

The NHHI was a national and sustained effort to improve compliance in every hospital in Australia. The Australian Commission on Quality and Safety in Health Care funded Hand Hygiene Australia (HHA) to implement the NHHI. HHA is managed from The Austin Hospital in Melbourne, Victoria, but local HHA coordinators were appointed in Tasmania, South Australia, Western Australia, New South Wales, and the Australian Capital Territory. HHA collaborated with public and private hospitals, developed educational materials and compliance recording tools. Overall responsibility of managing participation in the programme lies with each state and territory. The national programme started in 2009 with three goals: to achieve widespread uptake of the World Health Organization's 'five moments' programme, replacing state-initiated programmes; to apply a single training programme that allows healthcare workers responsible for hand hygiene to teach and measure compliance in a standardized way; to make reliable counts of healthcare-associated *Staphylococcus aureus* bacteraemia infections with a standard definition.[26]

Methods

The study followed recently published guidelines for costing infection control programmes with six stages: (1) identify the aim of the costing study; (2) choose the perspective of the decision-maker; (3) make an inventory of all resources to be included; (4) data collection; (5) partition jointly used resources; (6) value resources attributed to the programme.[10]

Identify the aim of the costing study

This study aimed to identify incremental changes to all relevant costs from adopting the NHHI as compared to the existing hand hygiene activities in each state and territory of Australia. We did not create a national estimate because each state and territory operates independently with distinct infection control governance. The sample was the 50 largest public hospitals in Australia. In the initial phase of the programme the focus was on acute-care public hospitals, and hence most resources were dedicated to this. Further roll-out of the NHHI occurred to private and other healthcare facilities. All cost data are presented at a state level to ensure the anonymity of individual hospitals, except the Australian Capital Territory that only has one hospital. It is a retrospective analysis because the programme had already been widely adopted by the time the evaluation was funded.

Perspective

The perspective for the costing study is the health service. The majority of intervention costs were incurred at a hospital level, hence it was the natural unit for analysis. If the programme had incurred large costs in community-based health services or had impacted private individuals, then a wider perspective would have been appropriate. We judged that the effort required to measure costs falling outside of health services would not be justified.

Resource inventory

The resources to be included for costing were determined after semi-structured interviews with infection control professionals from three large south-east Queensland hospitals. To be eligible, we identified that they had been responsible for implementing the NHHI in their hospital. The aim of the interview was to identify resources used for the NHHI, which fell naturally into five activities/items: (i) auditing hand hygiene compliance; (ii) education and training of healthcare workers; (iii) marketing and promotion activities to support NHHI; (iv) extra equipment and supplies; (v) attending meetings. These informed the development of questions for an online survey.

Data collection/measurement

The sample of 50 hospitals represented the eight states and territories of Australia. The five largest hospitals in New South Wales, Victoria, Western Australia, Queensland and South Australia were recruited, followed by the three largest hospitals in Tasmania (TAS), the single main hospitals in the Northern Territory, and Australian Capital Territory, and the next 20 largest hospitals Australia-wide. These hospitals were selected with the aim of capturing the largest proportion of Australian hospital beds for the lowest data collection costs (as each additional hospital sampled incurs additional research costs). The 50 hospitals cover 48% of public hospital beds in Australia.

The costs were estimated using an online survey of the senior infection control practitioners at the hospitals. These people were chosen because they had good knowledge of the programme and how it was implemented in their hospital.