Variation in healthcare associated infection surveillance practices in Australia

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Conflicting interests:

Philip Russo is a member of the Australian Commission for Safety and Quality in Health Care, Healthcare Associated Infection Advisory Committee, and previously Operations Director at the VICNISS Coordinating Centre.

Allen Cheng - none declared

Mike Richards is the Director of the VICNISS Coordinating Centre, which established and runs the State healthcare infection surveillance Program in Victoria. He is Chair of the Australian Commission for Safety and Quality in Health Care, Healthcare Associated Infection Advisory Committee

Nicholas Graves provides advice to the Centre for Healthcare Related Infection Surveillance and Prevention (CHRISP), QLD Health, and is a member of the Australian Commission for Safety and Quality in Health Care, Healthcare Associated Infection Advisory Committee.

Lisa Hall was previously the Manager of Epidemiology and Research at CHRISP, and is a member of the Australian Commission for Safety and Quality in Health Care, Healthcare Associated Infection Technical Working Group.

ABSTRACT

In the absence of a national healthcare associated infection (HAI) surveillance program, differences between existing state-based programs were explored using an online survey. Only 51% of respondents who undertake surveillance have been trained, less than half perform surgical site infection surveillance (SSI) prospectively, and only 41% indicated they risk adjust SSI data. Widespread variation of surveillance methods highlights future challenges when considering the development and implementation of a national program in Australia.

Key words

HAI

Surveillance

Variation

Method

Introduction

Although many countries have well established coordinated national healthcare associated infection (HAI) surveillance programs, Australia does not. In the absence of clear national direction, the separate evolution of Australia's eight States and Territories individual surveillance programs, which were gradually implemented during the 1990's and 2000's, (1) has resulted in methodology differences that have not been well understood. (1-3) Recently HAI surveillance has been mandated in the National Safety and Quality Health Service Standards for Australian Hospitals.(4)

Historically surveillance data has primarily been used for internal purposes, but the advent of reporting to external agencies at a State, Territory and national level has underlined issues relating to variation in processes, resources and training between hospitals. Inevitably, comparisons will be made between hospitals, the validity of which depends on robust and valid data that has been subject to appropriate analysis.

Whilst there have been few HAI surveillance statewide validation studies in Australia which demonstrated only moderate sensitivity, (5-7) there have been no studies exploring the variation of programs nationally. It has been suggested that 175,000 HAIs occur annually, (8) but variation in surveillance inhibits our understanding of the true epidemiology of HAIs in Australia, limiting our ability to measure the impact of any infection prevention interventions nationally.

The purpose of this study was to identify variation between HAI surveillance practices in Australian hospitals across the eight States and Territories.

Method

An online survey was administered to infection prevention staff from both public (government funded) and private acute care facilities with more than 50 beds who undertake HAI surveillance. The survey sought information on; infection prevention staff and team demographics, surveillance training, definitions, data sources, collection processes, analysis and reporting. Four current and two former infection prevention staff piloted the survey.

Recruitment of participants was through an open invitation email distributed through the list server of the Australasian College of Infection Prevention and Control (ACIPC). Recipients of the email were also encouraged to pass it on to others. Coordinators of State and Territory surveillance programs, where they existed, were contacted and requested to encourage those in their region to complete the survey. Members of the Australian Commission on Safety and Quality in Health Care HAI Advisory Committee were requested to overtly support completion of the survey to their peers and colleagues.

No identifying details of participants or their facilities were requested. Ethics permission was granted by the University Human Research Ethics Committee, Queensland University of Technology (1400000339).

Data was analysed using Stata, version 13 (StataCorp). The chi square test was performed to compare proportions between groups, and Kruskal-Wallis to test for influence of State and Territory.

Results

A total of 104 completed responses were received over a five week period. Due to the logical design of the survey, respondents were not required to answer every question, therefore the number of responses varied for different questions. Characteristics of the respondents and their surveillance practices are listed in Table 1.

When stratified by bed numbers, several significant differences were identified and are listed in Table 2. Other findings included: respondents working in public hospitals were more likely to be part of a team (79% v 50%; $p=0.010$) and be trained in surveillance (58% v 20%; $p=0.002$). Those from private hospitals with less than 200 acute beds were more likely to be working as sole practitioners (90% v 54%; $p=0.040$) and work part time (80% v 39%; $p=0.027$).

Respondents who had received surveillance training were significantly more likely to undertake prospective SSI surveillance (69% v 29%; $p<0.001$) and risk adjust their SSI data (61% v 24%; $p=0.001$). These factors were also significantly influenced by State and Territory, $p=0.007$ and $p<0.001$ respectively (Kruskal-Wallis test).

When questioned how confident they were that their HAI data was accurate, 60% ($n=78$) believed their SSI data was accurate and 79% ($n=57$) believed their CLABSI data was accurate.

Discussion

Widespread variation in HAI surveillance practices is evident between different States and Territories, public and private, and different sized facilities. Fundamental disparities between States and Territories, such as definitions (1) and other differences identified in our study,

mean that until the adoption of national uniform protocol, any attempt to compare State and Territory level data or aggregate for use at a national level will be flawed.

This study identified that just over half of the respondents who undertake HAI surveillance have been trained. This is an important finding given that many of the criteria in the National Health and Safety Network based HAI definitions require interpretation. We also found that those who have been trained were more likely to undertake prospective surveillance and risk adjust SSI data. This indicates a poor understanding of basic HAI surveillance principles and the dangers of not risk adjusting data. (9) This finding suggests that the benefits of training extend beyond the application of definition criteria, but also assist in appropriate methods and analysis. The lack of training in Australia places uncertainty about the validity of data currently collected by the various programs.

We found that reporting to those who have the ability to implement change, such as the hospital executive, was inconsistent. Feeding back data is an important component of quality improvement activities and reinforce that surveillance should form part of an overall infection prevention program. (10)

There are limitations in this study. A true response rate was unable to be calculated as the number of infection prevention staff involved in HAI surveillance is unknown. (11)

Approximately 500 ACIPC members subscribe to the list server, (personal communication, ACIPC secretary June 2014), but not all would undertake HAI surveillance, nor are all infection prevention staff members of ACIPC. It is estimated there are approximately 215 acute public hospitals with more than 50 beds in Australia, (12) and our respondents were from all States and Territories with a broad range of experience working in different sized

hospitals, and so we are confident this is representative of those undertaking HAI surveillance. It is possible that there may have been a respondent bias in that those that responded to the survey may be systematically different to those that did not.

The findings from this study highlight the future challenges when considering the purpose and usefulness of any potential national HAI surveillance program in Australia. This work supports previous recommendations for further training and standardization to allow external comparisons to be made in a national surveillance system. (13)

The effect of this widespread variation has on data quality, and appropriate identification of HAIs has not been described. To quantify the significance of this variation, we intend to evaluate the assessment of a series of clinical vignettes by infection prevention staff.

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References

1. Russo PL, Cheng AC, Richards M, Graves N, Hall L. Healthcare-associated infections in Australia: time for national surveillance. *Aust Health Rev.* 2014;39:37-43.
2. Cruickshank M, Ferguson J. Reducing harm to patients from health care associated infection: the role of surveillance: Australian Commission on Safety and Quality in Health Care; 2008.
3. Richards MJ, Russo PL. Surveillance of hospital-acquired infections in Australia - One Nation, Many States. *J Hosp Infect.* 2007;65:174-81.
4. Care ACfSaQiH. National Safety and Quality Health Service Standards: Commonwealth of Australia; 2011.
5. Friedman ND, Russo PL, Bull AL, Richards MJ, Kelly H. Validation of coronary artery bypass graft surgical site infection surveillance data from a statewide surveillance system in Australia. *Infect Control Hosp Epidemiol.* 2007 July;28(7):812-7. PubMed PMID: 17564983.
6. McBryde ES, Brett J, Russo PL, Worth LJ, Bull AL, Richards MJ. Validation of statewide surveillance system data on central line-associated bloodstream infection in intensive care units in Australia. *Infect Control Hosp Epidemiol.* 2009 Nov;30(11):1045-9. PubMed PMID: 19803720.
7. VanGessel H, McCann, RL., Peterson, AM., Goggin, LS. Validation of healthcare associated *Staphylococcus aureus* bloodstream infection surveillance in Western Australia. *Healthcare Infection.* 2010;15:21-5.
8. Graves N, Halton K, Paterson D, Whitby M. Economic rationale for infection control in Australian hospitals. *Healthcare Infection.* 2009;14(3):81.
9. O'Neill E, Humphreys H. Use of surveillance data for prevention of healthcare-associated infection: risk adjustment and reporting dilemmas. *Curr Opin Infect Dis.* 2009 August;22(4):359-63. PubMed PMID: 19474727. English.
10. Gaynes R, Richards C, Edwards J, Emori TG, Horan T, Alonso-Echanove J, et al. Feeding back surveillance data to prevent hospital-acquired infections. *Emerg Infect Dis.* 2001;7(2):295-8. PubMed PMID: 11294727. Pubmed Central PMCID: PMC2631724. eng.
11. Hall L, Halton K, Macbeth D, Gardner A, B M. Roles, responsibilities and scope of practice: describing the 'state of play' for infection control professionals in Australia and New Zealand. *Healthcare Infection.* 2015; <http://dx.doi.org/10.1071/HI14037>.
12. Welfare AloHa. Australian hospital statistics 2012-13. Health services series no. 54. Cat. no. HSE 145. Canberra: AIHW. 2014.
13. Murphy CL, McLaws ML. Methodologies used in surveillance of surgical wound infections and bacteremia in Australian hospitals. *Am J Infect Control.* 1999;27(6):474-81.

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Table 1 – Characteristics of survey respondents

Characteristic	Value	n
Age – mean (IQR)	48.9 (43-55)	104
Years in Infection Control – mean (IQR)	11.8 (5-17)	
Masters degree or higher	28%	
State or Territory		
<ul style="list-style-type: none"> Australian Capital Territory Northern Territory Tasmania 	9%	
<ul style="list-style-type: none"> New South Wales 	19%	
<ul style="list-style-type: none"> Queensland 	20%	
<ul style="list-style-type: none"> South Australia 	8%	
<ul style="list-style-type: none"> Victoria 	29%	
<ul style="list-style-type: none"> Western Australia 	15%	
Work in hospital > 200 beds	65%	
Work in the Public sector	80%	
Work less than 38 hours per week	35%	
Hours per week doing surveillance - mean	7.6 (range 1-40)	
Part of an infection control team	73%	
Trained in HAI surveillance	51%	

SSI surveillance		81
• Use NHSN definitions with no modifications	64%	
• Do prospective surveillance	47%	
• Risk adjust rates	41%	
• Report data to Hospital Executive	84%	63
CLABSI		66
• Use NHSN definitions with no modifications	67%	
• Do prospective surveillance	60%	
• Report data to Hospital Executive	82%	55
Report VAP data to Hospital Executive	15%	20
Report CAUTI data to Hospital Executive	30%	20

IQR – Interquartile range

SSI – surgical site infection

CLABSI – Central line associated bloodstream infection

NHSN – National Health and Safety Network

VAP – Ventilator associated pneumonia

CAUTI – Catheter associated urinary tract infection

Table 2 – Differences in characteristics of HAI surveillance practices by hospital size

Characteristic	Less than 200 beds (n)	More than 200 beds (n)	P value Chi2
Work as part of a team	36% (38)	94% (66)	< 0.001
Daily access to IDP	26% (38)	77 (65)	< 0.001
Rare or never have access to another ICP	61% (38)	32% (66)	0.004
Trained in HAI surveillance	34% (38)	61% (66)	0.010
Prospective SSI surveillance	31% (29)	56% (52)	0.032
Use surveillance software	32% (28)	65% (49)	0.005
Risk adjust SSI data	26% (29)	48% (52)	0.072

SSI – surgical site infection

IDP – Infectious Disease Physician

ICP – Infection Control Professional

HAI – healthcare associated infection