Using Healthcare Associated Infection Data for Action

Submitted by: Australasian College for Infection Prevention and Control
Using Healthcare Associated Infection data for action

Professor Marilyn Cruickshank
Objectives

- Why collect HAI data
- Approaches to prioritising data collection
- Identify sources of data for use in IP&C
- Examine different ways to present data
- Role of regulation (hospital accreditation) in practice improvement
- Examples from local and domestic perspectives
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APEC Health Working Group & APEC Life Sciences Innovation Forum
APEC Policy Toolkit for Building Capacity to Prevent and Control Healthcare-Associated Infections
4 July 2013 │ Medan, Indonesia
APEC Policy Toolkit advises

- establishing governance and management systems
- establishing multi-stakeholder advisory councils
- implementation of domestic infection control guidelines
- promoting hand hygiene
- building clinician capacity
- enhancing antimicrobial stewardship
- monitoring and public reporting
- developing regulatory oversight
HAI data for patient safety

It has been suggested that HAI is special in terms of patient safety measurement:

*Perhaps the only valid outcome measures of harm are the rates of health care-acquired infections.*

Strategies to mitigate HAI

- HAI Surveillance - measuring the problem
- Hand hygiene - single most effective strategy infection
- Infection control guidelines - evidence based practice
- Antimicrobial stewardship - single most effective strategy AMR
- Regulation and accreditation
- Clinical capacity - education and information
Why collect HAI data?

- Reliable data underpin all quality improvement and patient safety processes.
- Collection, analysis and reporting of surveillance data on HAI is associated with a reduction in infection rates, morbidity and mortality.

All health facilities require HAI surveillance systems because these are proven to reduce infection rates when local data collection results in timely feedback. (p29 Cruickshank & Ferguson, 2008)
Why collect domestic-level data

Only from large data sets can decisions be made on some HAI measures.

- local surveillance data bases do not contain sufficient data to reliably plot trends eg antimicrobial usage
- to inform and update infection control guidelines, domestic programs
- guide domestic policy and priorities
- monitor domestic trends
Objectives

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Prioritisation

"Not everything that can be counted counts, and not everything that counts can be counted"

Albert Einstein
What are we actually trying to achieve?

- Is it to show effective our program is?
- Is it to benchmark?
- Is it to show where variations exist?
- Is it to demonstrate improvement?
- Is it to assess the current situation
- Is it all of the above?
Collecting data - what

- Why are you collecting data?
- What will you collect?
- How will you collect and record data?
- Who will be involved?
- What will be the sample size?
- How often will the data be collected?
- How will results be communicated?
- How will the information be used?
AAA Infections Audit Annually
Additonal Isolation Precautions, Additonal Precautions Audit
Aged care infection control practice audits, air sampling in theatre all clinical areas, Antibiotic prophylaxis
BBSE cause & effect, Blood and Body Fluid Exposures
Blood, Care of patient equipment central devices central IV access compliance, central line
Care of patient equipment central devices central IV access compliance, central line
CJD questionnaire annually Clinical Audits
Clinical waste & sharps disposal. Clinical waste management, Cold chain,
Correct waste disposal customer focus survey Decibuls Ulcers
Decibuls, Drinking water
Education Attendance
Engineering and Building services, engineering, Environment,
Environmental & environmental all Units, Environmental Audit
Environmental Hygiene, Environmental swabs; environmental/house keeping audit equipment e.g. IV pumps,
Equipment Reprocessing Annually Eye infections and
flash steriliser use in theatres; flash steriliser,
food handing, Food safe
food safe program food services, Food storage,
Food temperature, Fridge temp record immunisations
Frigde temperatures monitored Gastroscopies (GESA guidelines), general infection control audit glutaraldehyde management
GOR/CSD/ hand hygiene
hand hygiene compliance competency
Hand hygiene solution audit by
hand hygiene compliance competency
Hand hygiene station audit, hand washing audit
Hand washing knowledge audit;
Hazard inspections I.V. Cannulation Audits annually IC practice compliance audits, clinical and organisational.
ICHH learning package completion audits. ice machine audits.
Ice Machine compliance with policy Indwelling Catheter audit
Indwelling Urinary Catheter (annually) infection control environmental hazards audit
Infection Control Program audit, Infection Control Risk Assessment
Infection prevention & control target surveillance -adhoc, Infectious waste
Infection control in the health care setting 2004 influenza immunisation audit
Isolation precautions
Isolation requirements (every isolation room, every ward) Isolation signage audits. isolation.
IV Audits
IV cannula audit
IV Cannulation site monthly, IV site 6 monthly audits IV Site Infection Prevalence; IV sites
Kitchen Audits (Storage and Handling EMB, & Ice) kitchen audits,
Legionella Testing Compliance Legionella Testing Compliance, Legionella water testing of patient/staff use areas legionaire H20 testing 3 monthly linen
maintenance
mask fit testing annually Medical imaging port insertion related infections micro samples scopes
mortality audit; motor vehicle audit, MRO compliance audits MRO documentation audits
MRO, MRSA audits
MRSA documentation N95/P2 fly checking competency needle stick body fluid, Needle stick injuries Neonatal infections < 48 hours (ACHS indicator 4.1) nosocomial infections Nosocomial UTI-Annually, Notifiable disease.
Occupational exposure occupational exposure management Occupational exposure monitored Occupational exposure process audit
Occupational exposure regional reporting occupational exposures monitored OPA audit
Operating theatre environmental audit,
opportunistic immunisation audit report,
OR. OT, environmental services, cooling towers outbreak management audit peripheral cannula audit Peripheral Cannula Survey peripheral cannula, peripheral IV access compliance; Peripheral IV Audits 3 monthly, Peripheral IV Cannula: compliance with policy peripheral IVC personal hygiene audit PIVD
Placement of HH products pneumococcal audit point prevalence survey of aged care facility Point prevalence survey twice year, policy compliance Post Body Fluids Audit annually PPE audit
PPE Availability Audits 3 monthly, PPE compliance audits PPE Compliance.
PPE information & accessibility in clinical areas annually PPE knowledge/donning & doffing assessment, processing of equipment, proper disposal of waste RADIOLOGY,
Rain water (Dialysis), Rain water (drinking). Recycling
respiratory preparedness audit review of policy and procedures RICPRAC auditing.
Nosocomial Audits RICPRAC Audits
RICPRAC audits suite covers multiple areas of IC RICPRAC audits which look at practices.
RICPRAC Clinical & organisational audits
RICPRAC Clinical risk audits group; RICPRAC point prevalence for infections in aged care; RICPRAC compliance audits RICPRAC Point Prevalence Rural Infection Control Practitioners Audits
Safe handling of contaminated waste Safe Handling of sharps Safe use / disposal of sharps SAMP (choice, timing, duration) Sanitiser bowel washer temperature Satisfaction surveys scope cleaning Sharp disposal sharps
Sharps and clinical waste management sharps and sharps containers. Sharps Audit sharps bins audits. sharps compliance, Sharps container audit Sharps containers: audit disposal practices and safety sharps control Sharps disposal Sharps information audit sharps management, sharps safety & biohazard injuries sharps safety, Signage throughout the organisation laminated.
36% (range 17%-61%) of all contracted infection control professionals time is spent on surveillance activities

Objectives

Why collect HAI data
Approaches to prioritising data collection

White box: Identify sources of data for use in IP&C
Examine different ways to present data
Role of regulation (hospital accreditation) in practice improvement
Examples from local and domestic perspectives
It is not feasible to conduct hospital-wide surveillance for all events.

Recommend targeted (priority-directed) surveillance that focuses on:

- specific events
- processes
- organisms
- medical devices or
- high-risk patient populations

(p29 Cruickshank & Ferguson, 2008)
Data for improvement
Hand hygiene: department type
Hand Hygiene: Profession

- Healthcare workers
  - Nurse/Midwife: 99.8% (886/890)
  - Medical Practitioner: 90% (711/790)
  - Allied Health Care Worker: 98.2% (559/569)
  - Invasive Technician: 97.9% (319/326)
  - Personal Care Staff: 95.2% (537/564)
  - Administrative and Clerical Staff: 97.1% (337/347)
  - Domestic: 91.4% (562/615)
- Healthcare students
  - Student Nurse/Midwife: 99.2% (523/527)
  - Student Doctor: 98.7% (223/226)
  - Student Personal Care Staff: 100% (61/61)
  - Student Allied Health: 98.9% (182/184)
  - Other: 95% (343/361)
Public facilities
Nursing and Medical compliance rates by Period

<table>
<thead>
<tr>
<th>Period</th>
<th>Nursing</th>
<th>Medical</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>68.2%</td>
<td>71.7%</td>
</tr>
<tr>
<td>2011</td>
<td>68.3%</td>
<td>19.2%</td>
</tr>
<tr>
<td>2012</td>
<td>88.1%</td>
<td>40.4%</td>
</tr>
<tr>
<td>2013</td>
<td>95.0%</td>
<td>49.4%</td>
</tr>
<tr>
<td>2014</td>
<td>75.9%</td>
<td>50.4%</td>
</tr>
<tr>
<td>2015</td>
<td>72.2%</td>
<td>50.4%</td>
</tr>
<tr>
<td>2016</td>
<td>77.0%</td>
<td>55.0%</td>
</tr>
</tbody>
</table>

Hand Hygiene Australia
www.hha.org.au
Confidential must not be distributed, copied, quoted or forwarded to any other person
Making change easy - Collection by HHApp

- Central HH database
- New direct-entry HH compliance App
  - i-Phones
- Benefits:
  - Reduces data management time by 50%
  - No duplicate data entry and errors
- Potential - WHO, NZ, Singapore
- Platform and database - potentially huge uses
AMS in different settings

Table 2: Options for Implementation of Antimicrobial Stewardship in Different Facilities

<table>
<thead>
<tr>
<th>Program Element</th>
<th>Health Service Organization</th>
<th>Large Urban Hospital or Tertiary Care Facility</th>
<th>Other or rural/district facility</th>
<th>Small Hospital or Service Clinic</th>
<th>Long-Term Care Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Executive Leadership</strong></td>
<td>Network/district/management group executive sponsorship and support for AMS program</td>
<td>Local executive sponsorship and support for AMS program</td>
<td>Local executive sponsorship and support for AMS program</td>
<td>Local executive sponsorship and support for AMS program</td>
<td>Local executive sponsorship and support for AMS program</td>
</tr>
<tr>
<td><strong>Governance Arrangements, Structure and Lines of Communication</strong></td>
<td>Director of AMS program and multidisciplinary AMS committee, comprising staff representation on: - a member of executive - a pharmacist - an infectious diseases physician</td>
<td>Director of AMS program – pharmacist, infectious diseases physician or medical microbiologist with Multidisciplinary AMS team (e.g., pharmacy, infectious diseases, hospital epidemiology, medical microbiology)</td>
<td>Pharmacist (where possible)</td>
<td>Facility manager coordinates with input from local or network pharmacist, infectious diseases physician and medical microbiologist</td>
<td>Facility manager coordinates, with support from specialist visiting clinicians and/or pharmacist where available</td>
</tr>
<tr>
<td><strong>AMS Team</strong></td>
<td>- AMS pharmacist, antimicrobial pharmacist, or antimicrobial clinical pharmacist</td>
<td>- Infectious diseases physician and medical microbiologist (These services may be available externally or on an agreed external consultancy)</td>
<td>- External support from an infectious diseases physician and medical microbiologist (At an agreed external consultancy)</td>
<td>- Probably determined by a district-wide approach to outline scope of program</td>
<td>- Probably determined by a district-wide approach to outline scope of program</td>
</tr>
<tr>
<td><strong>Antimicrobial Policy and Defined Components</strong></td>
<td>- Outlines scope of program, endorsed by network/district/management group executive and roles and responsibilities defined</td>
<td>- Outlines scope of program, endorsed by senior executive and management group; roles and responsibilities defined</td>
<td>- May be developed and implemented locally or as part of higher level process</td>
<td>- Probabilty determined/developed/initially developed and overseen by broader organizational management</td>
<td>- Policy confirmed by local approach to surgical prophylaxis</td>
</tr>
</tbody>
</table>

Table continued next page

One size does not fit all

Table of options pp36-7, SQIG
The Clinical Care Standard for AMS

- Supporting documents
- Fact sheets for consumers and clinicians
- Indicator specifications

Implementation happens at the bedside.....so data needed here
Objectives

Why collect HAI data
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Identify sources of data for use in IP&C

▶ Effect of public reporting on HAI
Role of regulation (hospital accreditation) in practice improvement
Examples from local and domestic perspectives
Data for improvement?

http://www.ask.com/web?qsrc=1&o=0&l=dir&q=low+hanging+fruit+cartoon
Public reporting of SAB by hospital
## Public reporting of SAB by state

### Table 2.2: Cases of *Staphylococcus aureus* (including MRSA) bacteraemia (SAB) in public hospitals, MRSA and MSSA, by state/territory, 2010–11<sup>a,b</sup>

<table>
<thead>
<tr>
<th></th>
<th>NSW</th>
<th>Vic</th>
<th>Qld&lt;sup&gt;c&lt;/sup&gt;</th>
<th>WA</th>
<th>SA</th>
<th>Tas</th>
<th>ACT</th>
<th>NT</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rate per 10,000 patient days</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methicillin-resistant <em>Staphylococcus aureus</em></td>
<td>0.4</td>
<td>0.2</td>
<td>0.3</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.5</td>
<td>0.3</td>
</tr>
<tr>
<td>Methicillin-sensitive <em>Staphylococcus aureus</em></td>
<td>0.9</td>
<td>0.7</td>
<td>0.9</td>
<td>0.6</td>
<td>0.7</td>
<td>1.1</td>
<td>0.7</td>
<td>0.9</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1.3</td>
<td>0.9</td>
<td>1.2</td>
<td>1.0</td>
<td>0.9</td>
<td>1.2</td>
<td>0.9</td>
<td>1.6</td>
<td>1.1</td>
</tr>
<tr>
<td><strong>Number of cases</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methicillin-resistant <em>Staphylococcus aureus</em></td>
<td>223</td>
<td>110</td>
<td>72</td>
<td>23</td>
<td>31</td>
<td>5</td>
<td>6</td>
<td>16</td>
<td>509</td>
</tr>
<tr>
<td>Methicillin-sensitive <em>Staphylococcus aureus</em></td>
<td>536</td>
<td>322</td>
<td>210</td>
<td>117</td>
<td>91</td>
<td>35</td>
<td>23</td>
<td>27</td>
<td>1,379</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>769</td>
<td>440</td>
<td>282</td>
<td>140</td>
<td>122</td>
<td>42</td>
<td>29</td>
<td>43</td>
<td>1,875</td>
</tr>
<tr>
<td><strong>Patient days under SAB surveillance (000)</strong></td>
<td>5,061</td>
<td>4,721</td>
<td>2,453</td>
<td>1,377</td>
<td>1,331</td>
<td>342</td>
<td>310</td>
<td>266</td>
<td>16,862</td>
</tr>
<tr>
<td><strong>Coverage (per cent)</strong></td>
<td>94</td>
<td>99</td>
<td>77</td>
<td>84</td>
<td>81</td>
<td>91</td>
<td>98</td>
<td>100</td>
<td>93</td>
</tr>
</tbody>
</table>

<sup>a</sup> The SAB cases were associated with both admitted patient care and with non-admitted patient care (including emergency departments and outpatient clinics). The comparability of the SAB rates among jurisdictions is limited because of coverage differences and because the count of patient days reflects the amount of admitted patient activity, but does not necessarily reflect the amount of non-admitted patient activity.

<sup>b</sup> Note that these data have been updated since the publication of Australian hospital statistics 2010–2011: *Staphylococcus aureus* bacteraemia in Australian public hospitals (AIHW 2011).

<sup>c</sup> Only includes patients aged 14 and over.

<sup>d</sup> Total may not equal sum of components due to rounding.
Rate of domestic SAB rates 2009-14

Number of HA-SAB cases
Figure 1: Healthcare-associated S. aureus bloodstream infections in public hospitals, by major and large hospitals, 2013–14

- **Major hospitals, more vulnerable patients**
- **Major hospitals, fewer vulnerable patients**
- **Large hospitals, more vulnerable patients**
- **Large hospitals, fewer vulnerable patients**

**Performance:**
- Best hospitals were in the highest or lowest 10% of results for major hospitals.
- Major hospitals accounted for 81% of all reported cases.

**Number of cases:**
- Each dot represents a hospital.
- The size of the dot represents the number of S. aureus cases at that hospital.

The government-agreed target calls for a rate of no more than 2.0 healthcare-associated S. aureus bloodstream infections per 10,000 patient bed days for each state and territory.

*Minority of vulnerable patients where in hospitals deemed to be in the top quartile of S. aureus cases across all states and territories, the Federation of Australian Hospital Unions/Associations contributed to data collection efforts. For more information on measures and peer groups, see the Federation’s website: www.fauhas.com.au.

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The NSQHS Standards

- Standard 1: Governance for Safety and Quality in Health Service Organisations
- Standard 2: Partnering with Consumers
- Standard 3: Healthcare Associated Infections
- Standard 4: Medication Safety
- Standard 5: Patient Identification and Procedure Matching
- Standard 6: Clinical Handover
- Standard 7: Blood and Blood Products
- Standard 8: Preventing and Managing Pressure Injuries
- Standard 9: Recognising and Responding to Clinical Deterioration in Acute Health Care
- Standard 10: Preventing Falls and Harm from Falls
Mandatory accreditation Jan 2013
Six criterion - mandatory for hospitals, day procedure units and dentists

- Governance and systems for infection prevention, control and surveillance
- Infection prevention and control strategies
- Managing patients with infections or colonisation
- Antimicrobial stewardship
- Cleaning, disinfection and sterilisation
- Communicating with patients and carers
AMS Criterion - four core actions

- An AMS program is in place
- The clinical workforce prescribing antimicrobials have access to endorsed Therapeutic Guidelines on antibiotic usage
- Monitoring of antimicrobial usage and resistance is undertaken
- Action is taken to improve the effectiveness of antimicrobial stewardship
Domestic Antimicrobial Prescribing Survey

Percentage of Patients on Antimicrobials: 42.2% (144 of 341 Patients)

Number of patients on antimicrobials divided by the total number of beds surveyed

Compliance with Guidelines

<table>
<thead>
<tr>
<th>Compliance with Guidelines</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapeutic and Local Guidelines</td>
<td>64.7%</td>
</tr>
<tr>
<td>None available or Not Assessable</td>
<td>16.1%</td>
</tr>
<tr>
<td>Non-compliant</td>
<td>19.2%</td>
</tr>
</tbody>
</table>

Therapeutic Guidelines and Local Guidelines are deemed as being compliant with guidelines (displayed in green).

Appropriateness of Antimicrobial

<table>
<thead>
<tr>
<th>Appropriateness of Antimicrobial</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Optimal</td>
<td>35.7%</td>
</tr>
<tr>
<td>2-Marginal</td>
<td>21.9%</td>
</tr>
<tr>
<td>3-Dubious</td>
<td>12.9%</td>
</tr>
<tr>
<td>4-Inappropriate</td>
<td>18.3%</td>
</tr>
<tr>
<td>5-Not Assessable</td>
<td>4.9%</td>
</tr>
<tr>
<td>6-Inappropriate</td>
<td>13.6%</td>
</tr>
</tbody>
</table>

Optimal and Adequate are deemed as being appropriate (displayed in green).

Suboptimal and Inadequate are deemed as being inappropriate (displayed in red).

Documentation of Indication

<table>
<thead>
<tr>
<th>Documentation of Indication</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>The percentage of total prescriptions where an indication was documented</td>
<td>84.9%</td>
</tr>
</tbody>
</table>

Surgical Prophylaxis given for greater than 24 hours

<table>
<thead>
<tr>
<th>Surgical Prophylaxis</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>The percentage of surgical prophylaxis prescriptions where the duration of prophylaxis was for greater than 24 hours post surgery</td>
<td>40.0%</td>
</tr>
</tbody>
</table>

For best practice, this should ideally be greater than 99% (green sector).

For best practice, this should ideally be less than 9% (red sector).
Domestic antimicrobial prescribing survey

Top 20 antimicrobials in 2013

quality-based: observing the appropriateness of antimicrobial prescribing
Hospital orthopaedic unit results compared to domestic data

**My Data**
Surgical Prophylaxis given for greater than 24 hours

75.0%

**National Data (N=52)**
Surgical Prophylaxis given for greater than 24 hours

38.0%

The percentage of surgical prophylaxis prescriptions where the duration of prophylaxis was for greater than 24 hours post surgery.
For best practice this should ideally be less than 5% (green section)
Engaging stakeholders with data
Pearls of wisdom

Complexity is your enemy. Any fool can make something complicated. It is hard to make something simple.

Richard Branson
Top tips for presenting data

- Be clear about the audience and the key message
- Present data in ways that are meaningful to the intended audience
- Provide opportunities for the audience to reflect and discuss what results mean, to engage them in identifying solutions
- Consider who is best placed to present data
- Peer to peer
- Engage with team members
Antimicrobial Stewardship reduces inappropriate use of antibiotics, improves patient outcomes and can help to reduce antimicrobial resistance.

30% of antibiotics prescribed in hospitals are used inappropriately.*

Antimicrobial-resistant infections are becoming more common

22 million
Australia is one of the highest users of antibiotics in the developed world, with around 22 million prescriptions written every year in primary care. Some of this use undoubtedly drives resistance.

Since the introduction of hand hygiene initiatives, there has been a decline in MRSA rates in hospitals, however, the incidence of community-strains of MRSA has increased from 5% to 12% since 2000.

Right antibiotic, right dose, right time
Sustainability

- Standardisation via policy, procedures, pathways, guidelines
- Ongoing measurement - maintains the impetus for continuous review and improvement
- Training and Education - will vary according to type of change
- Ongoing feedback to the teams and individuals that can USE the data and EFFECT the change.