The 5x5 Antimicrobial Audit
Implementation of a successful audit and feedback activity in NSW hospitals

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Antimicrobial Stewardship Project Officer
Clinical Excellence Commission, NSW, Australia
The QUAH Program

- Established in 2012 to support AMS principles and AMS programs within NSW public hospitals
- Develops resources, provides advice and site visits, offers a statewide perspective
- Antimicrobial Stewardship Expert Advisory Committee provides direction
- No control over what stewardship resources are actually available in each local health district or network
In 2013, AMS became a standalone criterion within National Safety & Quality Health Service Standards. Require every Australian hospital to provide evidence that an stewardship program is in place and action is taken to monitor and improve its effectiveness.
Meeting the needs of our NSW hospitals

• NAUSP, NAPS, targeted QUM indicators etc.

• Local health districts and networks wanted an audit methodology which:
  
  o Required minimal extra resources
  
  o Was suitable for facilities of any size, including those with little or no infectious diseases expertise
  
  o Could be sustained long term
  
  o Provided useful data
Searching for the Perfect Antimicrobial Audit

- Waste of my precious young life
- Data Rich, Infrequent
- Excellent
- Pure Gold!

RESOURCES REQUIRED
- e.g. time, personnel, expertise

USEFULNESS / EFFECTIVENESS

AVOID

New Audit Method?
Hospital-based empirical prescribing indicator: Antibiotic prescriptions are compliant with local antimicrobial policy and the rationale for treatment is recorded in the clinical case note in ≥ 95% of sampled cases
Discussions with SAPG

• Engaged with SAPG (via Peter Davey and Dilip Nathwani)

• The Scottish experience:
  – Strong focus on feedback process
  – Executive level reporting within each NHS
  – National data formed the benchmark
  – Recorded details of non-compliance for discussion
  – Results were optimal when auditing performed by doctors

• Audit and feedback is most effective when:
  – combined with explicit targets and an action plan
  – feedback given by a supervisor or colleague
  – it was provided more than once
  – it was delivered in both verbal and written formats

Davey P, 2013; Ivers N et al., 2012
Adapting the SAPG tool to NSW

Measures 2 indicators for empirical prescribing:

1. Clear documentation of antimicrobial indication
2. Choice of antimicrobial(s) concordant with guidelines (OR a documented reason for non-concordance)
Adapting the SAPG tool to NSW

- Developed as an audit and intervention tool

- “5x5 Antimicrobial Audit” (5 questions in 5 pts/wk per target audit population)

- Potential to integrate data collection into everyday workflow
‘5x5 Antimicrobial Audit Package’

- Audit User Guide
- Frequently Asked Questions
- CAP Cheat Sheet
- Challenging Cases Tutorial
- Data Entry & Review System (+ Guide)
12 month pilot in NSW public hospitals
Pilot site support

• Face-to-face training

• Regular support teleconferences

• Provision of monthly reports: local + ‘statewide average’ results

• Site visit to each facility:
  o Discuss issues and challenges with audit, including unintended consequences
  o Discuss feedback strategy
  o Perform audits together on participating ward

• Email and phone support throughout
Pilot Project Results

• All 15 pilot sites continued for full 12 months (+ ongoing external interest)

• Over 4600 audit records

• Audits performed by:
  o Pharmacists
  o Nurses
  o Interns/RMOs
  o Infectious Diseases/AMS team

• Either part of routine work or on audit-specific rounds

• Interventions:
  o Generally occurred at the point of care
  o Great stories!

• Feedback: meetings, posters, emails
  o Some sites had strong feedback process, others somewhat patchy
  o Often linked to quality governance structure
Documentation of Antimicrobial Indication

For the period of 01-May-14 to 30-Apr-15

“When all audit locations were reviewed in terms of the degree of improvement from Quarter 1 to Quarter 4, the median improvement for Indicator 1 was +8%, noting that 4 audit locations had reached the improvement ceiling (indicator result of 100%) by Quarter 4. The maximum level of improvement exhibited by a single unit was 31%.”
“When all audit locations were reviewed in terms of the degree of improvement from Quarter 1 to Quarter 4, the median improvement for Indicator 2 was +12%, noting that 2 audit locations had reached the improvement ceiling (indicator result of 100%) by Quarter 4. The maximum level of improvement exhibited by a single unit was 38%.”
Most of the improvement in indicator 2 has been due to an increase in **guideline concordance** (vs. reason documented for non-concordance).
Over 1000 interventions made during pilot project!

### Interventions Rate for Indication Documentation
(Contacting a doctor to clarify the indication for therapy)

<table>
<thead>
<tr>
<th>Ward/Location</th>
<th>Quarter 1 (May-Jul)</th>
<th>Quarter 2 (Aug-Oct)</th>
<th>Quarter 3 (Nov-Jan)</th>
<th>Quarter 4 (Feb-Apr)</th>
<th>Mean (12 months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of NSW Pilot Sites</td>
<td>93% (127/136)</td>
<td>93% (115/124)</td>
<td>71% (70/98)</td>
<td>67% (68/101)</td>
<td>82.8% (380/459)</td>
</tr>
</tbody>
</table>

### Interventions Rate for Guideline Concordance
(Contacting a doctor to discuss choice of antibiotic, with a view to recommending guideline-concordant therapy)

<table>
<thead>
<tr>
<th>Ward/Location</th>
<th>Quarter 1 (May-Jul)</th>
<th>Quarter 2 (Aug-Oct)</th>
<th>Quarter 3 (Nov-Jan)</th>
<th>Quarter 4 (Feb-Apr)</th>
<th>Mean (12 months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of NSW Pilot Sites</td>
<td><strong>62% (148/239)</strong></td>
<td><strong>63% (200/316)</strong></td>
<td><strong>67% (150/223)</strong></td>
<td><strong>70% (127/181)</strong></td>
<td><strong>65.1% (627/963)</strong></td>
</tr>
</tbody>
</table>
Evaluation

• Pilot project has been evaluated
  o Implementation process
  o Quantitative results
  o Qualitative results (survey + observations/other feedback)

• Overall opinion and experience of the audit has been positive

“The most powerful thing about the audit is the conversation it starts”
Evaluation

• Pilot project has been evaluated
  o Implementation process
  o Quantitative results
  o Qualitative results (survey + observations/other feedback)

• Overall opinion and experience of the audit has been positive

“It was a very valuable audit that we will continue as quality assessment, and roll out to surgical units via our AMS pharmacist”
Evaluation

• Pilot project has been evaluated
  o Implementation process
  o Quantitative results
  o Qualitative results (survey + observations/other feedback)

• Overall opinion and experience of the audit has been positive

  “Excellent audit. Good for capturing all antimicrobial use… useful for capturing what is happening with 'non-restricted' antimicrobials in the hospital.”
Evaluation

• Pilot project has been evaluated
  o Implementation process
  o Quantitative results
  o Qualitative results (survey + observations/other feedback)

• Overall opinion and experience of the audit has been positive

  “It was an excellent program and tool which was achievable even with the stretched capacity at rural health services. It also gave traction to the overall LHD AMS program because the results provoked discussion and identified some current gaps.”
Determinants of Success

It was observed that pilot sites were more likely to show improvement if:

• Audit population had relatively low baseline results
• Prescribers were positively engaged with the audit
• Feedback could be easily targeted to prescriber groups
• Feedback to prescribers was delivered regularly, in at least one forum which allowed for discussion
• High rates of follow-through on intervention prompts
• Data collection consistently met quota of ≥ 20 patients per month
Audit Package Updates

Audit User Guide and FAQ

• Small amount of additional content and removal of references to pilot project
Audit Package Updates

Challenging Cases Tutorial and CAP Cheat Sheet

• Updated to align with latest version of Therapeutic Guidelines: Antibiotic
Audit Package Updates

Clinician Engagement Tools

- Template letter, Information Flyer, Presentation Slides and Ward Posters

THE 5x5 ANTIMICROBIAL AUDIT

A brief introduction for <Your Facility> clinicians

ATTENTION DOCTORS

This ward supports best practice antimicrobial prescribing!

QUAH

CLINICAL EXCELLENCE COMMISSION
NEW Data Entry & Review System

• Pre-formatted MS Excel spreadsheet
• Supports audit sites collating and analysing their audit results
• Pilot version – data stratified by date range and ward
• Updated version – data stratified by date range and up to 3 parameters chosen by the user
  o E.g. Large metro hospital with multiple audit foci Ward, Specialty, Team
  o E.g. Group of small rural facilities, general audit foci Hospital, Acute/Non-Acute, Doctor
## Data Entry & Review System

### STATISTICS

<table>
<thead>
<tr>
<th>Date from</th>
<th>1/03/2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date to</td>
<td>31/03/2015</td>
</tr>
</tbody>
</table>

I would like to specify data by: Date Range, Hospital, Location and Specialty

<table>
<thead>
<tr>
<th>Hospital</th>
<th>St. Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Medical A</td>
</tr>
<tr>
<td>Specialty</td>
<td>Gen Med</td>
</tr>
</tbody>
</table>

No. of Audit Records | 32
(01/03/15 to 31/03/15, St. Hospital, Medical A, Gen Med)

### INDICATOR 1
78.1% of audited patients had an indication for antimicrobial therapy clearly documented in the notes, chart or electronic medical record.

25 out of 32 audited patients had an indication for antimicrobial therapy clearly documented in the notes, chart or electronic medical record.

### INDICATOR 2
66.7% of patients* received antimicrobial therapy that was either guideline concordant or guideline non-concordant with a documented reason.

20 out of 30 patients* received antimicrobial therapy that was either guideline concordant or guideline non-concordant with a documented reason.
**Data Entry & Review System**

**Guideline Concordance & Documented Reason for Non-Concordance**

Results for 01-Mar-15 to 30-Apr-15, St. Hospital, Medical A, Gen Med

- **Numerator**: Number of patients receiving guideline concordant therapy OR non-concordant therapy with a documented reason
- **Denominator**: Number of audited patients

The line graph shows the percentage of guideline concordant or non-concordant therapy with documented reasons from 01-Mar-15 to 26-Apr-15. The graph indicates fluctuations in the percentage, with a peak on 19/04/15 and a low on 15/03/15. The indicator goal is set at 95%.
Data Entry & Review System

Guideline Concordance Vs Non-Concordance (by Percentage)

Results for 01-Mar-15 to 30-Apr-15, St. Hospital, Medical A, Gen Med

- Guideline Non-Concordant, No Reason Documented (%)
- Guideline Non-Concordant, Reason Documented (%)
- Guideline Concordant

<table>
<thead>
<tr>
<th>Date</th>
<th>Guideline Non-Concordant, No Reason Documented (%)</th>
<th>Guideline Non-Concordant, Reason Documented (%)</th>
<th>Guideline Concordant</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/03-07/03</td>
<td>30%</td>
<td>40%</td>
<td>30%</td>
</tr>
<tr>
<td>08/03-14/03</td>
<td>25%</td>
<td>38%</td>
<td>38%</td>
</tr>
<tr>
<td>15/03-21/03</td>
<td>33%</td>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>22/03-28/03</td>
<td>17%</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>29/03-04/04</td>
<td>14%</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>05/04-11/04</td>
<td>14%</td>
<td>71%</td>
<td>71%</td>
</tr>
<tr>
<td>12/04-18/04</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>19/04-25/04</td>
<td>33%</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td>26/04-02/05</td>
<td>13%</td>
<td>25%</td>
<td>25%</td>
</tr>
</tbody>
</table>
Data Entry & Review System

Documentation of Antimicrobial Indication
Results for 01-Mar-15 to 30-Apr-15

Numerator: Number of patients with an indication clearly documented in the notes, chart or electronic medical record

Denominator: Total number of audited patients

Indicator Goal (95%)
All Records (%)
Royal Hospital, Surgical 2 (%)
Gen Med (%)
Medical A (%)

01/03 - 07/03  08/03 - 14/03  15/03 - 21/03  22/03 - 28/03  29/03 - 04/04  05/04 - 11/04  12/04 - 18/04  19/04 - 25/04
Data Entry & Review System

- Provides more than enough information to construct a thorough report
Data Entry & Review System

- Provides more than enough information to construct a thorough report

5x5 Antimicrobial Audit
<ABC Hospital, Month YYYYY>

Introduction
The 5x5 Antimicrobial Audit is based on prescribing indicators developed by the Scottish Antimicrobial Prescribing Group and adapted for use in NSW hospitals by the Clinical Excellence Commission. Audit indicators specifically focus on indication documentation and concordance with prescribing guidelines in patients receiving empirical antimicrobial therapy.

This report has been generated for <ABC Hospital> by <Name, Title>. For more information about the 5x5 Antimicrobial Audit at this facility, please contact:
<Name> <Preferred Contact Details>

<Month> Results Summary
Data Collection Date Range: dd mmm to dd mmm yyyy (# days)

<table>
<thead>
<tr>
<th>Indicator 1: Percentage of patients receiving empirical antimicrobial therapy had an indication clearly documented in the notes, chart or electronic medical record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit Population</td>
</tr>
<tr>
<td>&lt;E.g. Medical Ward A&gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicator 2: Percentage of patients receiving empirical antimicrobial therapy that was either guideline concordant or guideline non-concordant with a documented reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit Population</td>
</tr>
<tr>
<td>&lt;E.g. Medical Ward A&gt;</td>
</tr>
</tbody>
</table>

IF NEEDED: Data collection for <ABC Hospital> during <Month YYYY> did not reach the target of at least 30 patients per sample population, per month. Please keep the small sample size in mind when interpreting results.

Emerging Trends
“This report covers only the initial period of data collection therefore analysis of trends is not applicable at this time.”

OR
For the <month> to <month> audit period:
- Results for Indicator 1 (Indication Documentation)...
- Results for Indicator 2 (Guideline Concordance and Reason Documentation)...
- Other trends worth noting...

Other Results of Interest
- ##% of audit records for <Audit Population> achieved both indicators, (i.e., patient had a documented indication and received antimicrobial therapy that was either concordant with guidelines or non-concordant with a documented reason.)
- ##% of audit records for <Audit Population> did not achieve either indicator, (i.e., patient did not have the indication documented, did NOT receive antimicrobial therapy that was concordant with guidelines and did NOT have a documented reason for diversion from the guidelines.)
- ##% of audit records for <Audit Population> received antimicrobial therapy that was NOT concordant with guidelines. A reason for non-concordance was documented in ##% of these cases.
- Other statistics... e.g., intervention rates

Report template available on QUAH website

Report prepared <dd mmm YYYY>.

For general enquiries regarding NSW antimicrobial stewardship initiatives, please contact the Clinical Excellence Commission [Email: CEC-HA@health.nsw.gov.au]
So what’s next for 5x5?

• Updated resource package officially launched
• Plans to record webinars to support training
• Further opportunities to attend training at CEC
• Explore options for streamlining data collection and reporting
  ○ Benchmarking (statewide averages)
  ○ QARS (Quality Audit Reporting System)
Using 5x5? Please keep in touch!

- Ongoing support for the 5x5 Antimicrobial Audit is available from the QUAH team at the CEC:
  
  **Evette Buono**  
  *Program Leader, Antimicrobial Stewardship*

  **Kate Callaghan**  
  *Project Officer, Antimicrobial Stewardship*

- Email: [CEC-HAI@health.nsw.gov.au](mailto:CEC-HAI@health.nsw.gov.au)

Acknowledgements and thanks:

• Scottish Antimicrobial Prescribing Group (Prof Peter Davey, Prof Dilip Nathwani, Dr Jacqueline Sneddon, Andrea Patton)
• Members of the CEC Antimicrobial Stewardship Expert Advisory Committee
• Nepean Blue Mountains LHD (Eleanor Allison, Greg Gillespie)
• Murrumbidgee LHD (Cindy Patterson, Ann Mathew)
• Northern NSW LHD (Dr Alison Winning and team registrars)
• Mid-North Coast LHD (Rachel Taylor)
• Hunter New England LHD (Linden Hobday)
• Central Coast LHD (Amy Murray, Deborah Tong, Sarah Bowen)
• Far West LHD (John Carroll, Adeleye Erinle, Cyd Soriano, Ruth Martin, Claire Blackwell)
• Western NSW LHD (Derek Kay, Suzy Macrae)
• Illawarra Shoalhaven LHD (Prof William Pratt, Megan Orr and medical teams)
• Southern NSW LHD (Margaret Taylor, Pauline Murtagh)
• South Eastern Sydney LHD (Cathy Vlouhos, Joe-Anne Bendall, Dr Jon Penm)
• South Western Sydney LHD (Dr Lisa Noonan, Gianluca Parisi)
• Sydney LHD (Dr John Sammut and team registrars, Jocelyn Ong, Geoff Manners)
• Sydney Children’s Hospitals Network (Tony Lai, Reva Sharma, Irfan Azeem)
• Western Sydney LHD (Lucy Nair, Lolita Tu, Tony Lai)

Contact:
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