

The 5x5 Antimicrobial Audit

Pilot Project Evaluation

Introduction

Antimicrobial stewardship (AMS) is an ongoing and systematic effort to optimise the use of antimicrobial medicines within a health service organisation.¹ The National Safety and Quality Health Service Standards require healthcare facilities to demonstrate that an AMS program is in place and action is taken to improve its effectiveness.² Measuring the quality of antimicrobial prescribing within a healthcare facility is essential for identifying targets for improvement, however there are considerable challenges associated with the regular collection and review of data. While point prevalence surveys assessing the appropriateness of antimicrobial therapy provide a valuable snapshot, these are considerably labour-intensive and many hospitals are only able to perform these surveys once per year.

In 2012, the Clinical Excellence Commission (CEC) Quality Use of Antimicrobials in Healthcare (QUAH) program was established to support AMS initiatives in NSW public hospitals. A key goal of this program was the development of a resource to support effective and sustainable quality audits for antimicrobial prescribing. A review of recent AMS literature prompted interest in an audit tool developed by the Scottish Antimicrobial Prescribing Group (SAPG)^{3,4}, a network of clinicians and leaders responsible for improving the quality of antimicrobial prescribing in Scottish healthcare facilities. Using a specific indicator for hospital-based empirical antimicrobial prescribing, the SAPG focused on frequent, easy-to-assess process measures that support the delivery of more regular and targeted feedback to prescribers. The CEC liaised with key representatives from the SAPG, and received permission to adapt their prescribing indicator for use in NSW public hospitals. With the support of the CEC AMS Expert Advisory Committee, the QUAH program team developed a new audit tool which would go on to be piloted across a variety of hospital settings.

Project Objective

The objectives of the 5x5 Antimicrobial Audit pilot project were to:

- a) Develop a sustainable model of antimicrobial audit, intervention and feedback based on repeated small samples of antibiotic prescriptions
- b) Provide NSW public hospitals with resources and support to implement this initiative
- c) Obtain evidence that this initiative contributes to improvements in the quality of empirical antimicrobial prescribing.

In addition to the above objectives this project contributed to achieving other QUAH program goals, including raising awareness of AMS principles across NSW public hospitals and fostering supportive and collaborative relationships with health care workers responsible for AMS in their facilities.

Method

Development of the Audit Tool

The SAPG hospital-based empirical prescribing indicator used a set of yes or no questions to capture data on indication documentation and concordance with Scotland's national antimicrobial prescribing policy. This approach does not involve a direct assessment of the appropriateness of antimicrobial therapy; concordance with guidelines is measured as a surrogate marker for appropriateness and quality. In adapting this resource to a NSW setting, the following empirical antimicrobial prescribing indicators were defined as the primary audit measures:

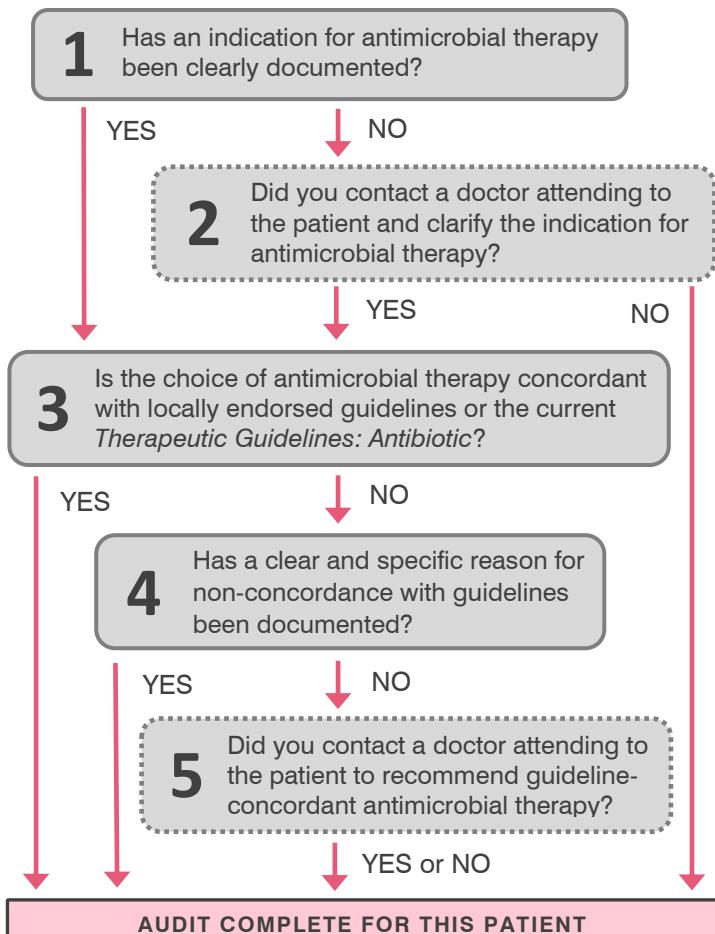
Indicator 1:	Clear documentation of an indication for antimicrobial therapy
Indicator 2:	Choice of antimicrobial agent(s) being concordant with guidelines (OR a documented reason for non-concordance with guidelines)

The goal for each indicator was greater than, or equal to, 95%, meaning at least 19 out of 20 eligible patients audited each month would have an indication for their antimicrobial therapy clearly documented in the medical record, and the choice of antimicrobials prescribed were concordant with guidelines (or a reason for diverting from guidelines had been clearly documented).

An audit tool was developed with the purpose of capturing relevant data and prompting point-of-care interventions where a prescribing indicator had not been met (see *Figure 1*). All efforts were made to streamline the data collection requirements so that trained auditors (doctors, pharmacists or experienced nursing staff) were able to integrate this process into their regular workflow and/or clinical duties. The audit tool was named 'The 5x5 Antimicrobial Audit' as a reference to the fact that auditors would be required to answer up to five yes or no questions in five patients per week, aiming for a minimum sample size of twenty patients per month.

Pre-pilot testing of the audit tool was undertaken at two separate facilities, with comparative auditing performed by a CEC staff member, a local pharmacist with experience in AMS and a local pharmacist without any experience in AMS. Insights into data collection logistics and inter-rater variability were then used to adjust and perfect the contents of the audit resource package prior to launching the pilot.

Figure 1: The 5x5 Antimicrobial Audit tool



Audit Resources

A 5x5 Antimicrobial Audit resource package was constructed to provide all pilot sites with essential implementation guidance and other items to support data collection and analysis (*Figure 2*).

Audit User Guide

Detailed instructions for conducting the 5x5 Antimicrobial Audit, with appendices containing the List of Audit Definitions, Data Collection Form, Eligibility Flowchart, Collated Monthly Data Form and Audit Coordinator Checklist.

Frequently Asked Questions

A series of questions and answers designed to provide further clarification and guidance to audit coordinators and auditors, often with reference to specific issues or scenarios.

Challenging Cases Tutorial

An interactive MS PowerPoint designed to complement the auditor training process by asking the user to audit a series of complex cases and indicate where they would make interventions.

CAP Cheat Sheet

A simple guide for determining guideline-concordant prescribing for one of the most commonly-audited antibiotic indications, community acquired pneumonia (CAP).

Data Entry & Review System (and Guide)

An MS Excel database designed for collating and analysing audit data, with automated calculation of indicator results and built in graphing functions. This is accompanied by a guide providing instructions for use and screenshots.

Pilot Site Selection and Training

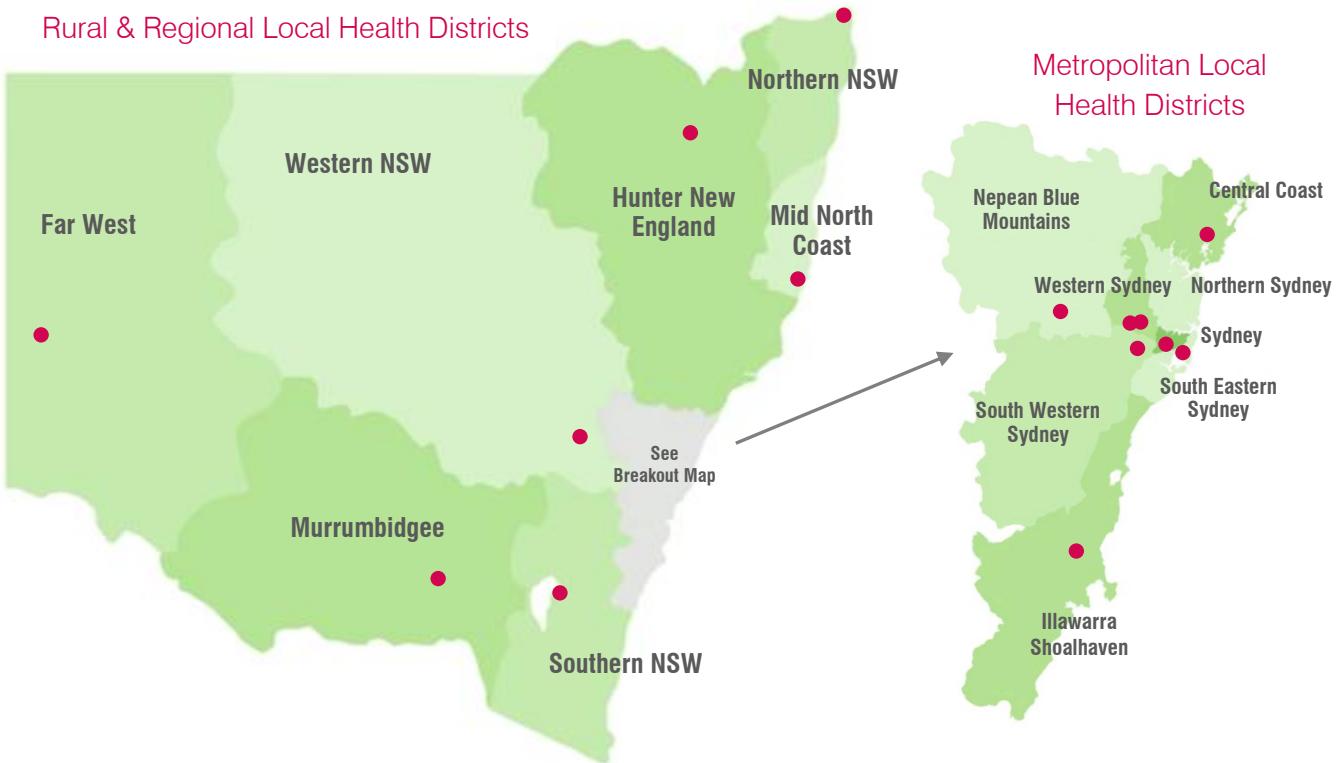
In January 2014, NSW local health districts and networks were invited to nominate one facility for participation in the 5x5 Antimicrobial Audit pilot project. Sixteen facilities of varying size and location were selected (see *Figure 3*) and in March 2014 pilot site delegates received face-to-face audit coordinator training from the CEC. Training sessions provided a complete induction to the audit project including a discussion of the evidence base, familiarisation with the audit resources and role-playing of data collection and intervention scenarios. Training attendees also received education around basic quality improvement principles and assistance with developing their plan for local implementation. Audit coordinators were advised to select specific clinical units or specialties which would be suitable for the audit, so that regular feedback could be delivered to the target prescribing teams.



Figure 2: The 5x5 Antimicrobial Audit Resource Package

In the weeks following training, modifiable clinician engagement materials were made available to support the pre-audit phase at each pilot site. These items included a template letter to be sent to prescribers from a member of the hospital executive, an ‘information for prescribers’ flyer and a template MS PowerPoint presentation to facilitate introduction of the audit activity at clinician meetings.

Figure 3: Distribution of pilot sites for the 5x5 Antimicrobial Audit



Data Collection Period (May 2014 – April 2015)

As of May 2014, the majority of pilot sites had launched the 5x5 Antimicrobial Audit and the 12 month data collection period was commenced. One pilot site was forced to withdraw from the project prior to commencing the audit due to critical staff shortages on the implementation team.

Audit coordinators submitted de-identified, collated audit data to the CEC on a monthly basis. This data was combined to calculate a ‘statewide average’ result for each of the indicators, which was included in monthly reports generated by the CEC for each pilot site. Throughout the data collection period pilot sites received ongoing support from the CEC via frequent support teleconferences and email updates, as well as phone advice where requested. A site visit from CEC staff was also provided, to discuss the progress and challenges of the project at a local level and observe auditing in practice.

Results

The following results reflect data collected across 15 pilot sites from **1 May 2014 to 30 April 2015**.

Table 1: Indicator results for the 5x5 Antimicrobial Audit pilot project

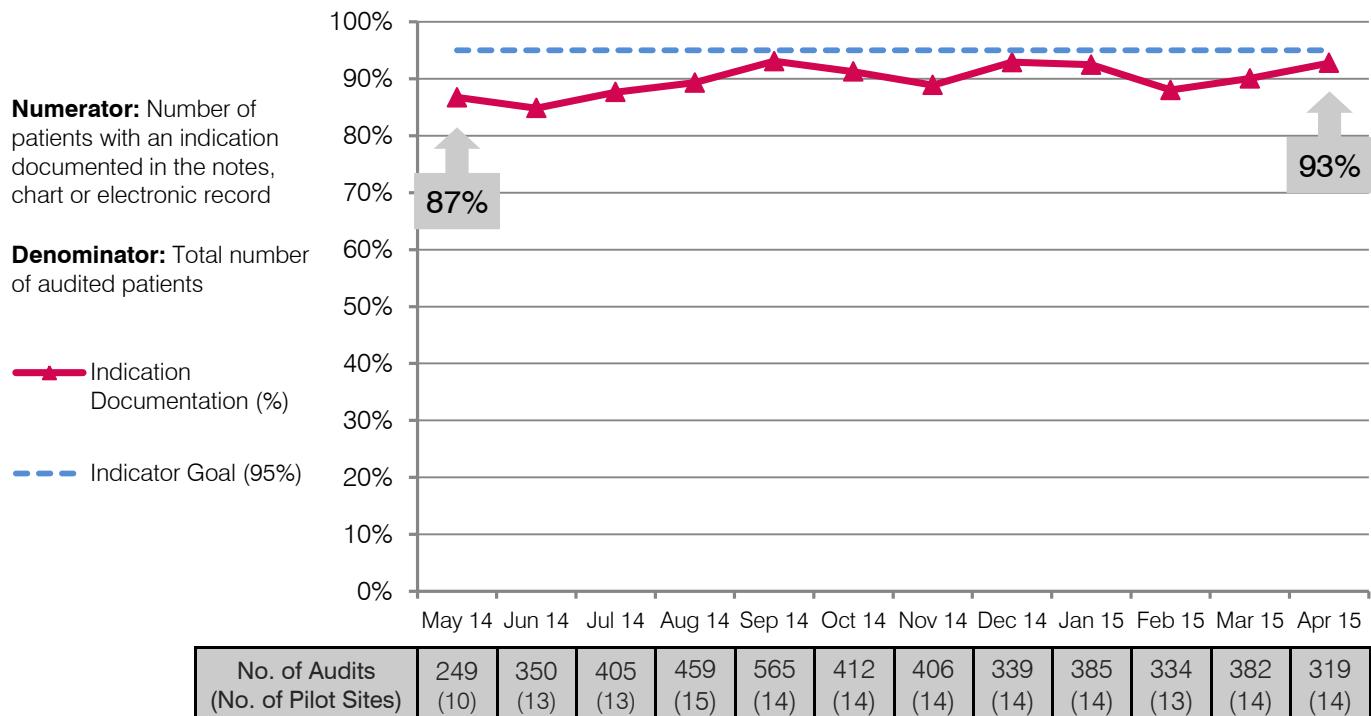
Average of NSW Pilot Sites					
Measure	Quarter 1 (May-Jul)	Quarter 2 (Aug-Oct)	Quarter 3 (Nov-Jan)	Quarter 4 (Feb-Apr)	Mean (12 months)
Indicator 1 (Indication Documentation)	86% (868/1004)	91% (1312/1436)	91% (1032/1130)	90% (934/1035)	90% (4146/4605)
Indicator 2 (Guideline Concordance / Non-Concordance with Documented Reason)	76% (756/995)	78% (1111/1427)	80% (878/1101)	82% (821/1002)	79% (3566/4525)
Indicators 1 & 2	69% (691/1004)	74% (1063/1436)	75% (850/1130)	76% (783/1035)	74% (3387/4605)

INDICATOR 1: Indication Documentation

Documentation of an indication required a reason or rationale for antimicrobial therapy to be specified in the patient's notes, chart or electronic medical record, with enough precision and clarity that it may be matched to a diagnosis or diagnostic related group in the antimicrobial guidelines.

The Indicator 1 average for NSW pilot sites was quite consistent across the data collection period. Despite a relatively high baseline, results for this indicator demonstrated a small but important trend towards improvement (Graph 1).

Graph 1: Documentation of Antimicrobial Indication



Variation between pilot sites

The vast majority of pilot sites demonstrated an improvement in Indicator 1 (or maintenance of a high baseline result). Almost all pilot sites exhibited a ‘dip’ in this result during February 2015, which may have been due to the commencement of new junior medical officers in most pilot sites during that time.

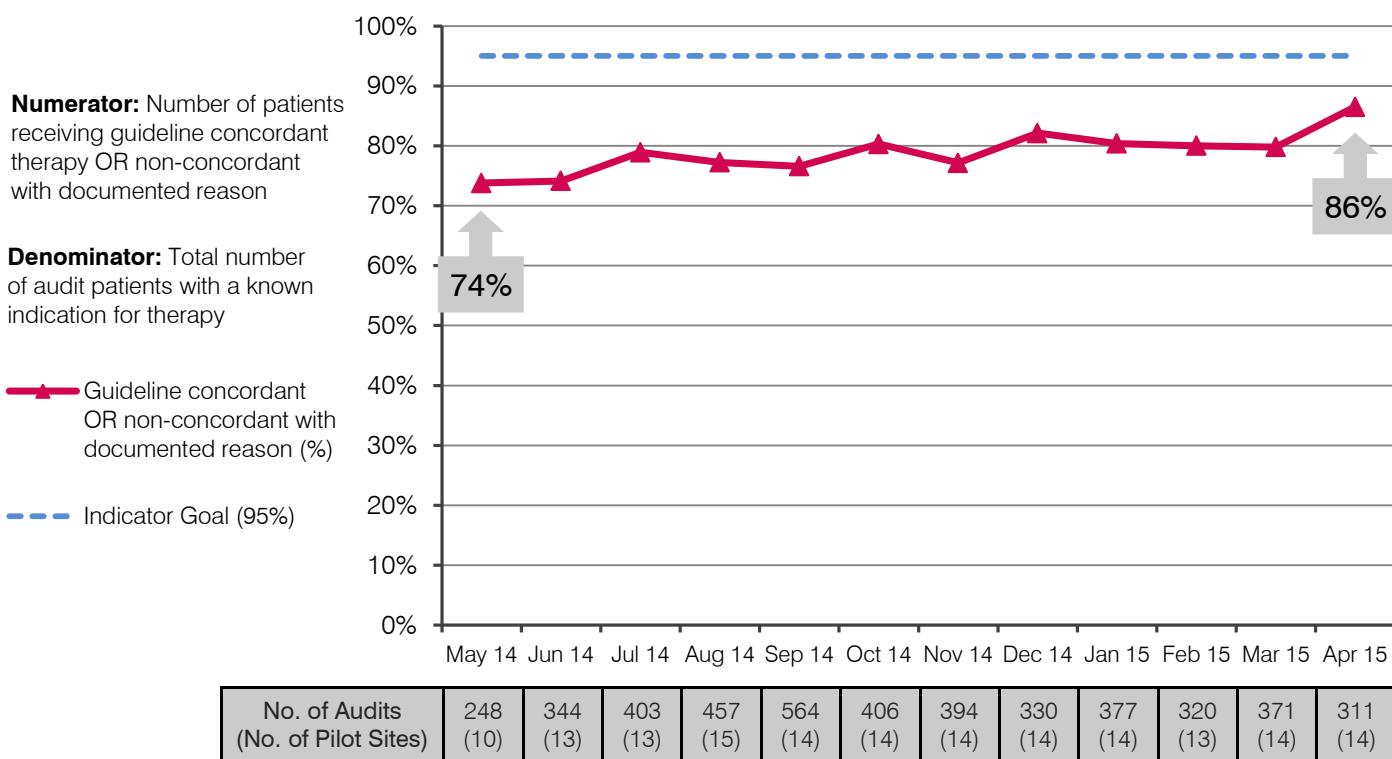
When all audit locations were reviewed in terms of the degree of improvement from Quarter 1 to Quarter 4, the median improvement for Indicator 1 was +8%, noting that 4 audit locations had reached the improvement ceiling (indicator result of 100%) by Quarter 4. The maximum level of improvement exhibited by a single unit was 31%.

INDICATOR 2: (Guideline Concordance and Reason Documentation)

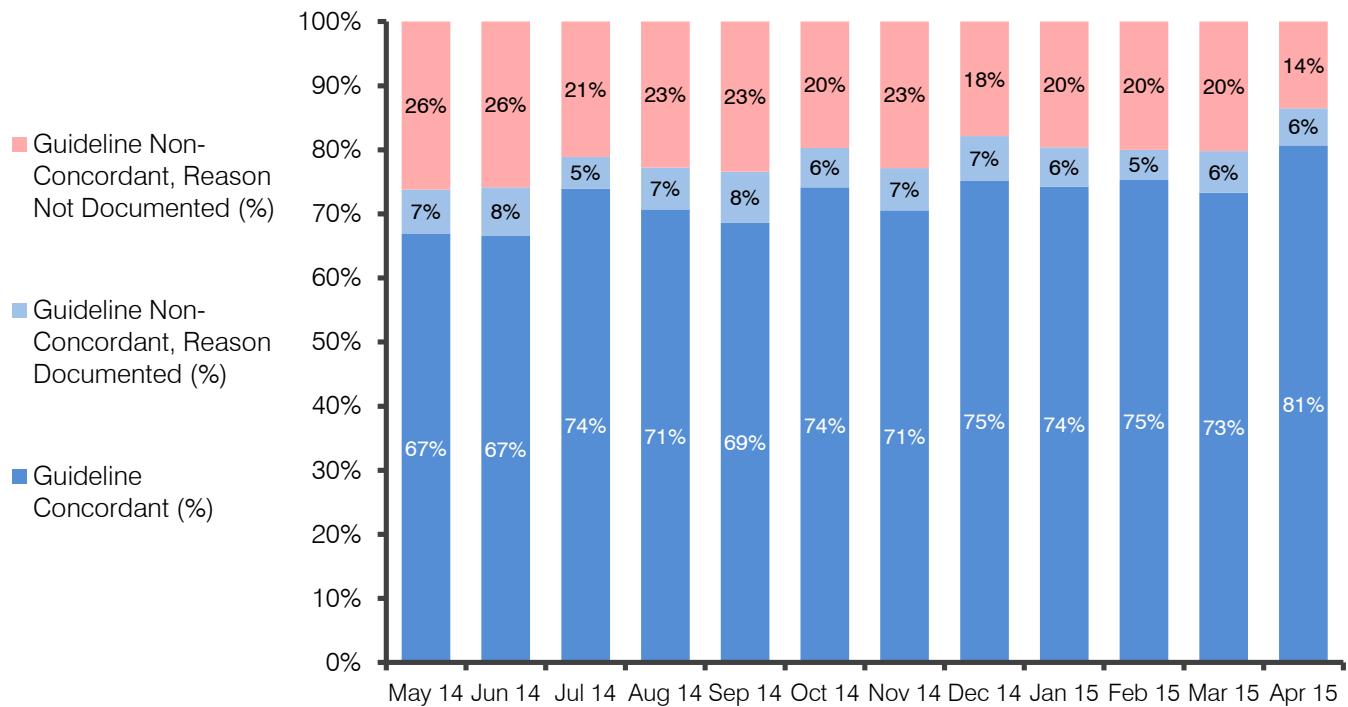
Therapy was considered concordant with guidelines when the choice of antimicrobial(s) matched what was recommended in locally-endorsed guidelines or the *Therapeutic Guidelines: Antibiotic* (note this did not include reviewing dose, route, frequency, etc.). Where choice of therapy was deemed non-concordant, auditors looked for a clinical reason for diverging from guidelines documented in the patient’s notes, chart or electronic medical record.

The Indicator 2 average for NSW pilot sites was quite consistent across the data collection period. Although the indicator goal of 95% was not reached, results for this indicator demonstrate incremental and sustained improvement over time (Graph 2). A review of positive Indicator 2 results by proportion of ‘guideline concordant’ versus ‘non-concordant with documented reason’ demonstrates increasing guideline concordance overall (Graph 3).

Graph 2: Guideline Concordance & Documented Reason for Non-Concordance



Graph 3: Profile of Guideline Concordance Vs Non-Concordance



Variation between pilot sites

Indicator 2 results within individual audit locations were found to exhibit greater month-to-month variability than was exhibited with Indicator 1 results, however long-term improvement tended to be more significant.

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%.

Prompted Interventions

As part of the data collection process, auditors were prompted to consider making an intervention in clinically appropriate scenarios. This included making contact with a doctor for the purpose of either:

- Clarifying the indication for antimicrobial therapy (where an indication was not clearly documented in the notes, chart or electronic medical record), OR
- Discussing a patient's antimicrobial therapy with a view to recommending guideline-concordant therapy (where therapy was non-concordant with guidelines with no documented reason)

In designing this audit activity, it was recognised that actioning a prompted intervention may not always be ideal or appropriate for all scenarios. Auditors were encouraged to use their discretion

when deciding how and when to make interventions, and as such intervention rates were expected to vary based on perceived appropriateness of off-guideline antibiotic use, nature of existing relationships

and rapport with prescribing teams, an auditor's level of confidence in making recommendations and the amount of time available for making interventions.

Table 1: Intervention rates for the 5x5 Antimicrobial Audit pilot project

Intervention Rates for NSW Pilot Sites					
(Number of interventions made / Number of interventions prompted by audit tool)					
Measure	Quarter 1 (May-Jul)	Quarter 2 (Aug-Oct)	Quarter 3 (Nov-Jan)	Quarter 4 (Feb-Apr)	Mean (12 months)
Intervention for Indicator 1 (Contacting a doctor to clarify the indication for therapy)	93% (127/136)	93% (115/124)	71% (70/98)	69% (68/101)	83% (380/459)
Intervention for Indicator 2 (Contacting a doctor to discuss choice of antibiotic, with a view to recommending guideline-concordant therapy)	62% (148/239)	63% (200/316)	67% (150/223)	70% (127/181)	65% (627/963)

Other Statistics of Interest

Across the 12 months of data collection:

- 72% of audited patients with a known indication* received antimicrobial therapy that was deemed concordant with guidelines.
- 23% of audited patients who did NOT receive guideline-concordant therapy had a reason clearly documented in the notes, chart or electronic medical record.
- 4.5% of audited patients with a known indication* did NOT have the indication documented, did NOT receive antimicrobial therapy that was concordant with guidelines, and did NOT have a documented reason for diverging from guidelines. The proportion of audited patients in this category reduced significantly over the 12 month audit period, from 8.5% of audit records in Month 1 to 2.6% of audit records in Month 12.
- There appears to be a positive correlation between *indication documentation* and *guideline concordance* (*or documented reason for non-concordance*). Eighty-two percent (82%) of cases with a documented indication were found to have guideline-concordant therapy or a documented reason for non-concordance, compared to only 47% of cases where the indication was not documented.

* Patients for which an auditor was able to establish an indication (either documented or via clarification from the prescribing team), to direct their review of guideline concordance.

Results of the Pilot Site Feedback Survey

Invitations to complete an anonymous feedback survey were sent to all audit coordinators and pilot site contacts in May 2015.

Profile of Survey Responders

Of the 21 survey responders, most (71%) were personally involved with the pilot project across all 12 months, and almost all (95%) had been involved with the project for at least 6 months. The majority of responders were pharmacists (67%), followed by doctors (24%), with single responses from a nurse (5%) and an infection prevention specialist (5%). Many responders indicated that their day-to-day work involves a mixture of clinical duties and management or quality improvement duties (62%).

Audit Resources

All items in the audit resource package (*Audit User Guide*, *Frequently Asked Questions*, *CAP Cheat Sheet*, *Challenging Cases Tutorial*, *Data Entry & Review System* and the *Guide to the Data Entry & Review System*) received positive results regarding their perceived usefulness. For those responders who were familiar with each resource, the proportion of either 'quite useful' or 'very useful' ratings was >85% for all items (min: 88.2%, max: 100%). For the additional resources developed to support clinician engagement, the *Ward Posters* and *Template Letter to Prescribers* were considered most useful (>70% of responders considered these 'quite useful' or 'very useful').

Responders were invited to make suggestions regarding the development of additional resources (or the improvement of existing resources). Many comments noted that the current audit package is well-constructed and easy to understand, and that no additional resources are required. Some comments proposed enhancements or ideas for new resources, however the majority of these suggestions were very specific to the needs of individual facilities or were out of scope for the focus of this audit and feedback activity. The addition of extra cases and examples of audit scenarios was identified as a need which could be met within further audit package updates.

The Audit and Intervention Process

Of the 20 survey responders who indicated that they themselves had performed audits, 70% received full training for the role (delivered by the CEC, an audit coordinator or another auditor). A further 15% indicated that they did not receive specific training but were instructed to read through the audit package items, while the remaining 15% received no specific training or instruction.

Responders were asked to estimate the average time required to complete the audit for 5 patients, including all components of patient identification, data collection and interventions. The majority of responders estimated that the average time taken was ≤60 minutes (70%), however comments suggested that this could vary significantly depending on factors outside the auditor's control (e.g. availability of patient records, difficulty contacting prescribers, patient turnover).

Responders were also asked to rate their confidence regarding various aspects of the auditing process. The proportion of responders who felt 'quite confident' or 'very confident' was 85% for *patient identification and data collection*, and 80% for *contacting doctors and making interventions*. Some responders felt there was scope to develop further training or tools to improve communication with prescribers, particularly when dealing with clinicians who are resistant to change.

Collating and Reviewing Data

Over half of survey responders (62%) indicated that they had used the *Data Entry & Review System* (an MS Excel database designed to collate and analyse raw audit data). Of these responders, some used this resource only to collate their data (31%), and did not utilise the built-in statistical or graphing functionality. Others used the statistics and graphs to ‘keep an eye on’ their results (38%), while a third group collated raw data and generated statistics and graphs to inform and support their feedback processes (31%). Many responders indicated that they had no specific suggestions to improve this tool, however one comment suggested that it would be useful to add capacity for optional extra information such as the diagnosis and antibiotic(s) prescribed.

Feedback to Prescribing Teams and Other Stakeholders

Where applicable, survey respondents provided information about the modes and frequency of feedback delivered to prescribing teams (regarding overall audit results and prescribing practices). The most commonly cited modes of feedback appear to be *presentation of results at relevant clinical meetings*, and *other discussion of audit results with prescribers on an ad-hoc or by-request basis*. The *circulation of either CEC or locally-generated reports via email or print* was also quite frequently reported. While some responders indicated that the posting of audit results in areas seen by target prescribers was used, one comment indicated that the local executive was concerned about the potential for resentment amongst prescribers and subsequent disengagement with the project. When asked which feedback methods were perceived to be most effective, responses overwhelmingly favoured the presentation or discussion of results in a face-to-face capacity, particularly when combined with educational reviews of scenarios where indicators were missed.

With regards to feedback delivered to other stakeholders (e.g. hospital executive, managers, committees and pharmacy or nursing staff), the most common modes of feedback mirrored those used for prescribing teams. The presentation of results at committee meetings and circulation of reports to managers were frequently cited as effective methods of feeding back to these groups.

Perception of Project Management and Support

In terms of project implementation duties, 62% of survey responders indicated that they were involved in *audit preparation and set-up*, and 38% played an active role in *training other auditors*. No suggestions were received as to how support for these duties could be improved, with many comments indicating that responders felt well supported by the CEC and their local project team.

Where applicable, responders were asked to rate the value of various modes of CEC support offered to pilot sites. 100% of responders rated the *CEC 5x5 Training Day in Sydney* and the *CEC-generated monthly reports* as either ‘quite valuable’ or ‘very valuable’. Less value was attributed to the *5x5 Support Teleconferences* (43% rated this activity as ‘quite valuable’), however *email updates* which included minutes of teleconferences were well-received (72% rated as ‘quite valuable’ or ‘very valuable’). *Site visits from CEC staff* had the most variation in perceived value, however the majority of responders (69%) still rated this support as ‘quite valuable’ or ‘very valuable’.

Comments regarding the overall project were encouraging and positive, citing that implementation and maintenance was well-organised with excellent support from CEC staff. Many responders indicated their appreciation for being involved in the pilot and their belief that the 5x5 Antimicrobial Audit is an achievable and valuable addition to a hospital antimicrobial stewardship program.

Discussion

Pilot Site Retention

One enrolled pilot site was forced to withdraw from the pilot prior to data collection, due to unexpected personnel absences. The remaining fifteen pilot sites were able to commence data collection and maintained strong engagement with the project until its completion.

Targeted Locations and Prescriber Groups

There was considerable variation in the way pilot sites targeted their audit to specific prescriber groups. Many pilot sites elected to audit in specialised wards (e.g. respiratory ward) or general wards (e.g. medical ward), while other sites audited according to admitting teams, specialties, or more general clinical divisions (e.g. all surgical patients). Some small facilities based in rural areas elected to audit all acute care inpatients from one or more wards, as a broad scope was considered necessary to meet the quota of 20 audit records per month.

Project Limitations and Lessons Learned

The 5x5 Antimicrobial Audit pilot project was conducted to test the usability, sustainability and effectiveness of an SAPG prescribing indicator in NSW hospitals. It was not designed with the degree of academic rigour required to conclusively prove a statistically significant effect. In order to keep the audit project adaptable and sustainable to facilities with highly variable resources, pilot sites were able to select their own target locations and prescriber groups, as well as their own methods and frequency of intervention and feedback. The impact of an individual facility's wider antimicrobial stewardship program and concurrent interventions also cannot be disregarded. Conclusions drawn about the impact of the 5x5 Antimicrobial Audit are thus based on both quantitative and qualitative data, from the perspective of the project's potential contribution to improving the quality of empirical antimicrobial prescribing in targeted areas.

Although the following points were made clear in the audit resource package and audit coordinator training, even greater emphasis may be needed regarding the importance of the following methodological qualifications:

- Specificity of prescriber groups - the audit, intervention and feedback cycle is designed for auditing specifically engaged prescribers and teams, rather than for use as a whole of hospital audit
- Regular, targeted feedback - the effectiveness of the audit in improving the quality of prescribing is largely dependent on prescribers receiving frequent and detailed feedback on their performance.

The majority of pilot site visits were undertaken in the latter half of the 12 month data collection period. In future quality improvement projects, these site visits would ideally be placed in the first few months of implementation in order to maximise their value.

Determinants of Success

It was generally observed that pilot sites were more likely to have demonstrated sustained improvement if:

- Baseline indicator results for the selected audit location or specialty were relatively low with potential for improvement
- Prescribing teams receiving feedback were specific to the selected audit location or specialty and were easy to target for the purposes of feedback delivery
- Prescribing teams were positively engaged with the audit prior to the commencement of data collection
- Regular (at least monthly) feedback was delivered to target prescribing teams in a format and forum which allowed for discussion of results and/or reviews of audit cases
- Rates of follow-through on prompted interventions were high
- Data collection consistently met the audit quota of ≥ 20 patients per month.

Comparison with other antimicrobial audits

The pilot project of the 5x5 Antimicrobial Audit has achieved improvements in prescribing processes which are very similar to the gradual and sustained progress demonstrated when the SAPG hospital-based prescribing indicator was introduced in Scotland.³ This improvement profile, coupled with positive qualitative feedback and a high pilot site retention rate, suggests that adaptation of the hospital-based indicator to an Australian context has been highly successful.

The National Antimicrobial Prescribing Survey (NAPS) is an Australian point-prevalence survey which involves a detailed assessment of all antimicrobial prescriptions across a facility.⁵ Although the indicators measured in the 5x5 Antimicrobial Audit are also measured in NAPS, the latter provides much richer and more detailed information on antimicrobial prescribing. It should be noted that results of the NAPS are based on a more inclusive sample population (all antimicrobial prescriptions) and a different audit methodology than is used for the 5x5 Antimicrobial Audit (systemic, empirically prescribed antimicrobial prescriptions), thus any comparisons should be interpreted with care. Rather than compare results from the two audits, the NAPS may be used to identify specific wards/units where the 5x5 Antimicrobial Audit may be most useful.

Conclusion

The 5x5 Antimicrobial Audit pilot was a highly successful project which provided cumulative data from over 4600 audit records and prompted over 1000 point-of-care interventions.

All project objectives were achieved; the CEC QUAH program has developed a sustainable model of audit, intervention and feedback supported by a comprehensive resource package, with strong evidence to suggest that implementation of this initiative contributes to improvements in the quality of antimicrobial prescribing in hospital inpatient settings.

The 5x5 Antimicrobial Audit will be launched for general use by NSW public hospitals in September 2015.

Acknowledgements

The CEC wishes to thank all those who have supported the implementation of the 5x5 Antimicrobial Audit pilot project, and particularly acknowledges the hard work and perseverance of audit coordinators and auditors in the following facilities:

Bathurst Health Service, Western NSW LHD	Queanbeyan Health Service, Southern NSW LHD
Blue Mountains Hospital, Nepean Blue Mountains LHD	Shoalhaven Hospital, Illawarra Shoalhaven LHD
Broken Hill Health Service, Far West LHD	Sydney / Sydney Eye Hospital, South Eastern Sydney LHD
Canterbury Hospital, Sydney LHD	The Tweed Hospital, Northern NSW LHD
Gosford Hospital, Central Coast LHD	Wagga Base Hospital, Murrumbidgee LHD
Inverell Hospital, Hunter New England LHD	Westmead Children's Hospital, Sydney Children's Hospitals Network
Liverpool Hospital, South Western Sydney LHD	Westmead Hospital, Western Sydney LHD
Port Macquarie Base Hospital, Mid North Coast LHD	

References

1. Duguid M and Cruickshank M (eds). *Antimicrobial Stewardship in Australian Hospitals*. Sydney : Australian Commission on Safety and Quality in Health Care, 2010.
2. Australian Commission on Safety and Quality in HealthCare (2012). *Safety and Quality Improvement Guide Standard 3: Preventing and Controlling Healthcare Associated Infections*. Sydney: ACSQHC.
3. Malcolm W, Nathwani D, Davey P, Cromwell T, Patton A, Reilly J, Cairns S, Bennie M. From intermittent antibiotic point prevalence surveys to quality improvement: experience in Scottish hospitals. *Antimicrob Resist Infect Control*. 2013 Jan 15;2(1):3.
4. Nathwani D, Sneddon J, Malcolm W, Wiuff C, Patton A, Hurdling S, Eastaway A, Seaton RA, Watson E, Gillies E, Davey P, Bennie M; Scottish Antimicrobial Prescribing Group. Scottish Antimicrobial Prescribing Group (SAPG): development and impact of the Scottish National Antimicrobial Stewardship Programme. *Int J Antimicrob Agents*. 2011 Jul;38(1):16-26 Epub 2011 Apr 22.
5. Australian Commission on Safety and Quality in Health Care (2015). *Antimicrobial prescribing practice in Australian hospitals: results of the 2014 National Antimicrobial Prescribing Survey*, ACSQHC, Sydney.



Summative Evaluation prepared by the Clinical Excellence Commission, July 2015.
© Clinical Excellence Commission 2015 SHPN (CEC) 150478 ISBN 978-1-76000-277-0



For more information on the 5x5 Antimicrobial Audit and other initiatives of the Quality Use of Antimicrobials in Healthcare program, visit www.cec.health.nsw.gov.au/programs/quah.