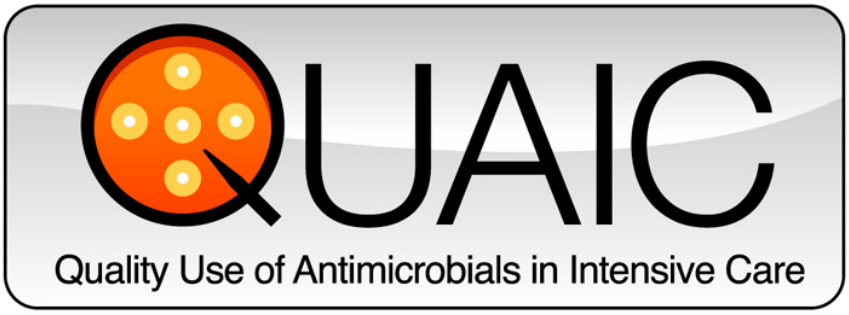


Structures and Processes to Support the Quality Use of Antimicrobials in NSW Intensive Care Units

Status Report October 2010

This page is intentionally blank

Structures and Processes to Support the Quality Use of Antimicrobials in NSW Intensive Care Units

Status Report October 2010

CLINICAL EXCELLENCE COMMISSION
GPO Box 1614
Sydney NSW 2001
Tel. (02) 9382 7600
www.cec.health.nsw.gov.au

Board Chair
Prof Carol Pollack

Chief Executive Officer
Prof Clifford F Hughes, AO

This publication is part of the CEC Publication Series.
A complete list of CEC publications is available from the Director,
Corporate Services (address above) or at
www.cec.health.nsw.gov.au

Any enquiries about this publication, or comments, should be directed to:

Dr Tony Burrell
Director, Patient Safety
Clinical Excellence Commission
GPO Box 1614
Sydney NSW 2001
Tel. (02) 9382 7613
Email tony.burrell@cec.health.nsw.gov.au

Content within this publication was accurate at the time of publication. October 2010

Contents

Executive Summary

The Clinical Excellence Commission (CEC) and the Intensive Care Coordination and Monitoring Unit (ICCMU) have established a project team and expert advisory group to investigate the potential to improve Quality Use of Antimicrobials in Intensive Care units (QUAIC) in NSW.

The expert advisory group has developed a position statement containing 6 key recommendations outlining support structures and processes and to facilitate the quality use of antimicrobials in intensive care. To determine whether these structures and processes are currently in place in NSW intensive care units (ICU), a 46 question survey was generated. The survey included aspects of a safety attitude questionnaire.

The position statement and survey were separately emailed to the directors of 38 ICUs in NSW and one in the ACT. Two thirds of the units responded (26/38) to the survey. The response rate was considered a fair representation of NSW intensive care units with 8/11 tertiary, 9/12 metropolitan, 7/14 rural and 2/2 paediatric units completing the survey.

The results indicate that most units have some organisational process to facilitate antimicrobial prescription but not all the structures considered appropriate to maintain supportive internal processes. There are opportunities for improvement in relation to all 6 recommendations in the ICCMU position statement. Most notably variability exists in relation to support by infectious diseases specialists and microbiology and laboratory services across the metro and rural units. The general attitude represented by the survey responses indicated that there is a positive attitude towards principles of quality use of antimicrobials.

The QUAIC project aims to facilitate improvement processes in ICUs to implement and test the recommendations in the ICCMU position statement. To achieve this aim, a number of resources are under development by the expert advisory group. These include:

- A generic ICU empiric guideline for antibiotic prescription which allows for local adaptation by ICUs to incorporate local antibiogram data;
- Tools to audit and report on antimicrobial usage from pharmacy data and unit specific prescribing practices from chart audits;
- An educational resource.

The next phase of the QUAIC project is to work with 3 pilot ICUs to test the viability of implementing changes at a unit level to increase compliance with the position statement. Further it is recommended that NSW Health

- Investigate and support service provision to ICUs to ensure access to Infectious diseases specialists and microbiologists is available.

Background

The presence and continuing development of multi-resistant organisms cause a considerable burden on the health care system. This burden comes in the form of increased patient morbidity and mortality, increased costs associated with treating infection and declining development of new agents. Considerable evidence exists linking non-judicious use of antibiotics to the development of multi-resistant organisms (MROs)[1-3].

Antimicrobials are used extensively for the treatment of known and suspected infection in Australian hospitals. The National Antimicrobial Utilisation Surveillance Program (NAUSP), collects data from 26 tertiary hospitals throughout Australia and estimates the rate of antimicrobial use in Australian hospitals to be around 960 defined daily doses per 1000 occupied bed days[4]. This rate is significantly higher than rates reported in several European countries. In the analysed Australian data, intensive care units (ICUs) contributed significantly to the overall use of antimicrobials with the rate of antimicrobial use in ICU being approximately double that of the rest of the hospital. This is unsurprising, given the acuity and severity of disease treated in the ICU.

ICUs have been sensationally described as factories for the production and amplification of multi-resistant organisms[5]. Whilst this depiction may be overly dramatic, characteristics of treatment in the ICU, such as the widespread empiric use of broad-spectrum antimicrobial agents and the cross infection of patients are seen as key factors in the generation of MROs[6].

Antimicrobial stewardship programs have been implemented in a variety of clinical settings in an attempt to ensure the judicious use of antimicrobials. These programs are designed to provide oversight and support to antibiotic use, helping clinicians to choose antibiotics in such a way as to obtain the best possible results for individual patients while limiting the risk of further development of multi-resistant organisms through excessive or unnecessary use of broad-spectrum antibiotics[1, 7-10].

The Clinical Excellence Commission (CEC) and the Intensive Care Coordination and Monitoring Unit (ICCMU) acknowledge that reducing the rate of health care associated infections (HAI), especially those associated with multi-resistant organisms (MROs), is a priority for patient safety in NSW. As part of an overarching strategy to reduce HAI, the CEC and ICCMU are working with a group of expert clinicians including clinical microbiologists, infectious disease physicians, intensivists and pharmacists to improve the quality of antimicrobial use in the intensive care setting.

Aims of the QUAIC Project

The broad aims of the Quality Use of Antimicrobials in Intensive Care project (QUAIC) are to:

- Analyse the existing structures and processes that are in place to support the quality use of antimicrobials in intensive care; and
- Define the structures and process that should be in place to support the quality use of antimicrobials in intensive care; and
- Develop or obtain tools and resources that can be used by intensive care units to implement structures and processes to support the quality use of antimicrobials in intensive care.

Project Progress

A position statement, outlining six recommended structures and processes that support the quality use of antimicrobials in intensive care has been developed and circulated for consultation. This draft position statement was developed in reference to the relevant literature and in consultation with the expert advisory group overseeing the project. The draft position statement can be considered and commented on at (http://intensivecare.hsnet.nsw.gov.au/quaic). The six recommendations are:

1. That intensive care units have appropriate policies for first line treatment of sepsis, including policies for empiric antimicrobial management of suspected bacterial infection;
2. That intensive care units are provided with regular data on the prevalence of microorganisms and their susceptibility and local guidelines for empiric treatment are assessed against this information;
3. That intensive care units are provided with timely reports of laboratory results which may be used to guide antimicrobial therapy;
4. That intensive care units are provided with antimicrobial usage data on a monthly basis;
5. That intensive care units have access to standard materials for training medical officers in the quality use of antimicrobials;
6. That intensive care units have mechanisms to audit the quality use of antibiotics and to provide feedback on audit results to individual prescribers.

Survey of Current Practice

A survey designed to elicit information related to current antimicrobial practices and attitude in ICU was generated by the expert advisory group (appendix 1). The survey was distributed to all NSW ICUs to determine the gaps that exist between current practice and recommended practice outlined in the ICCMU position statement.

Method

Ethics approval to administer the survey was granted through the Human Research and Ethics Committee of Royal Prince Alfred Hospital. Site specific approval to conduct the survey was required from individual facilities or Area Health Services as appropriate and was obtained for 39 general intensive care units across NSW (38) and the ACT (1). This included a number of units that have intensive care and high dependency beds as well as 2 specialist paediatric ICUs (See appendix 2).

A letter introducing the survey was mailed to the 39 ICU directors in NSW. The survey link was then emailed and the completed electronically via the internet. Where the survey was not completed within 4-6 weeks, a reminder email was sent. The survey was open for 6 months. It was requested that the director of the ICU or the most appropriate delegate complete the survey.

Results

Demographics

There were 26 (66%) responders to the survey (see table 1 and 2 for demographics). The lowest response rate was from rural units (50%). From the 26 responding units, 73% (n= 19) of the respondents were the ICU director. Others responders included a senior staff/ICU specialists (n= 4), a registrar (n=1), the NUM (n=1) or a CMO (n=1). In one case there were 2 responders from the same ICU. These responses were reconciled and the extra response deleted.

Table 1: PERCENTAGE OF UNITS RESPONDING TO THE SURVEY BY TYPE OF ICU

Type of ICU	Tertiary	Metro	Rural	Paediatric	Total
% Responded (n)	73% (8/11)	75% (9/12)	50% (7/14)	100% (2/2)	66% (26/39)

Table 2: PERCENTAGE OF UNITS RESPONDING TO THE SURVEY BY AREA HEALTH SERVICE

AHS	ACT	GSAHS	GWAHS	HNEAHS	NCAHS
% (n) responders	0% (0/1)	25% (1/4)	33% (1/3)	60% (3/5)	50% (2/4)
AHS	NSCCAHS	Paediatric	SESIAHS	SSWAHS	SWAHS
% (n) responders	75% (3/4)	100% (2/2)	83% (5/6)	67% (4/6)	75% (3/4)

Current activity related to position statement recommendations

Position Statement Recommendation 1

That intensive care units have appropriate policies for first line treatment of sepsis, including policies for empiric antimicrobial management of suspected bacterial infection

Survey Response

Eighty percent (21) of responding ICUs have a policy or guidelines for the empiric management of suspected infection. 76% (16) of these units use the Therapeutic Guidelines: Antibiotic. Both paediatric units and 3 tertiary units reported use of internal protocols. Five ICUs including 2 metro and 3 rural reported using no guideline to determine empiric treatment (see figure 1). Also of note, 46% (12) of units that do use clinical policies/guidelines indicated that they are not assessed against local resistance patterns (figure 2, table 3).

Figure 1: GUIDELINE OR PROTOCOL USED TO DETERMINE EMPIRIC TREATMENT

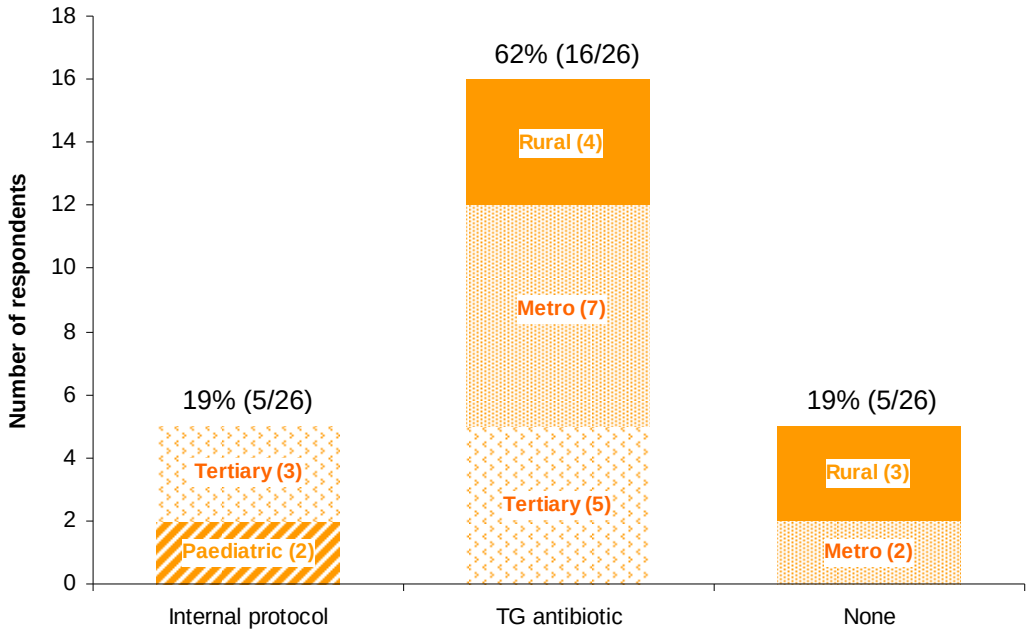


Figure 2: POLICIES ASSESSED AGAINST LOCAL RESISTANCE PATTERNS

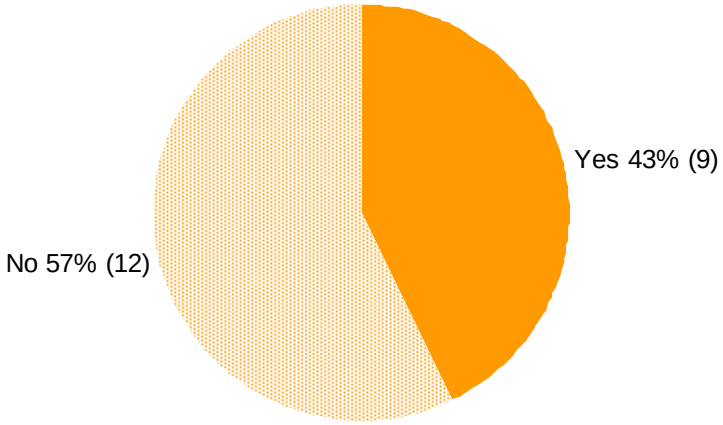


Table 3: POLICIES ARE ASSESSED AGAINST RESISTANCE BY ICU TYPE

Tertiary	Metro	Rural	Paediatric
50% (4/8)	22% (2/9)	14% (1/7)	100% (2/2)

Position Statement Recommendation 2

That intensive care units are provided with regular data on the prevalence of microorganisms and their susceptibility and local guidelines for empiric treatment are assessed against this information

Survey Response

54% (14) of responding units (figure 3, table 4) do not have access to a cumulative antibiogram that reports the prevalence and susceptibility of microorganisms in the unit. Of the 11 ICUs that have access to a cumulative antibiogram, only 2 tertiary units reported that it was easily accessible in the ICU. Only 1 unit indicated antibiogram data was nearly always reported to the ICU (figure 4).

Figure 3: CUMULATIVE ANTIBIOGRAM AVAILABLE

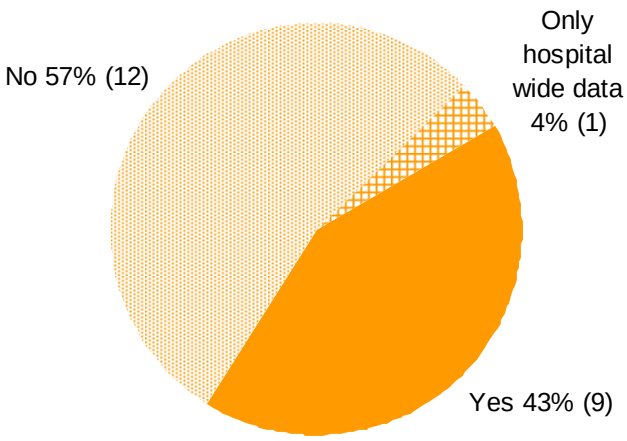
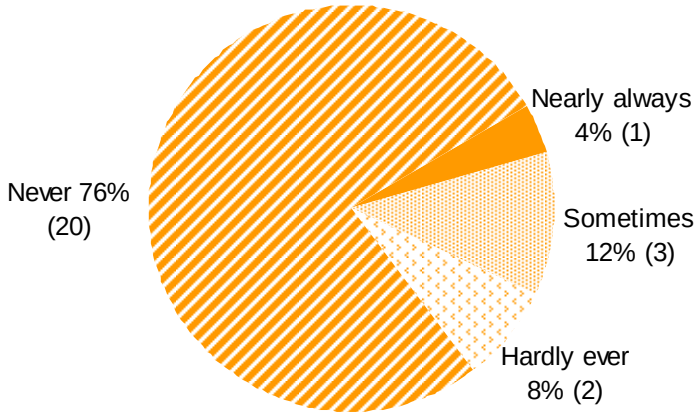


Table 4: ACCESS TO CUMULATIVE ANTIBIOGRAM BY ICU TYPE

Tertiary	Metro	Rural	Paediatric
63% (5/8)	33% (3/9)	29% (2/7)	50% (1/2)

Figure 4: CUMULATIVE ANTIBIOGRAMS ARE FORMALLY COMMUNICATED BACK TO THE ICU



Position Statement Recommendation 3

That intensive care units are provided with timely reports of laboratory results which may be used to guide antimicrobial therapy

Survey Response

Nearly all units (96%, 25/26) reported that results from susceptibility testing are routinely available to guide and de-escalate antimicrobial therapy. 53% (14) of respondents reported that these results were provided in a timely or extremely timely fashion (figure 5, table 5).

Figure 5: IDENTITY AND SUSCEPTIBILITY OF ISOLATED ORGANISMS DATA

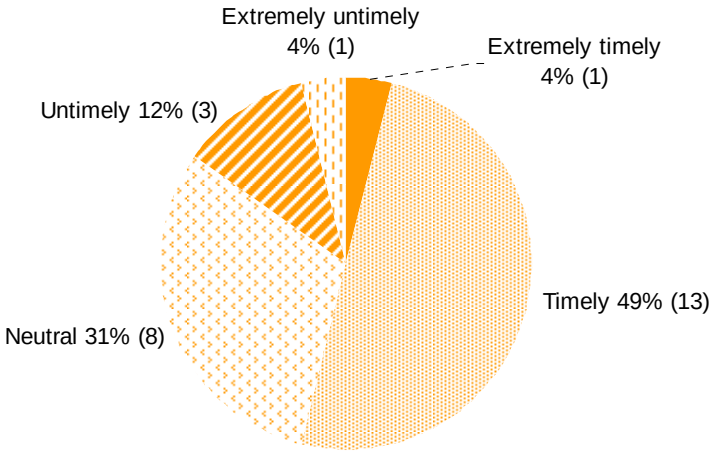


Table 5: AVAILABILITY OF DATA REGARDING IDENTITY AND SUSCEPTIBILITY BY ICU TYPE

	Extremely timely	Timely	Neutral	Untimely	Extremely untimely
Tertiary (8)	0% (0)	62% (5)	13% (1)	25% (2)	0% (0)
Metro (9)	0% (0)	55% (5)	33% (3)	11% (1)	0% (0)
Rural (7)	0% (0)	29% (2)	57% (4)	0% (0)	14% (1)
Paediatric (2)	50% (1)	50% (1)	0% (0)	0% (0)	0% (0)

Position Statement Recommendation 4

That intensive care units are provided with antimicrobial usage data on a monthly basis

Survey Response

Only 23% (6/26) of responding ICUs calculate antimicrobial usage and12% (3) reported submitting data to NAUSP. Only 12% (3) of units provide feedback on antibiotic consumption data to prescribers.

Position Statement Recommendation 5

That intensive care units have access to standard materials for training medical officers in the quality use of antimicrobials

Survey Response

Only 19% (5/26) of units reported having standard training materials related to the use of antimicrobials (figure 6, table 6). No metropolitan or rural units had training. When asked whether education would improve prescribing in the ICU, all but one respondent either agreed or strongly agreed (figure 7).

Figure 6: STANDARD EDUCATION FOR MEDICAL OFFICERS AVAILABLE

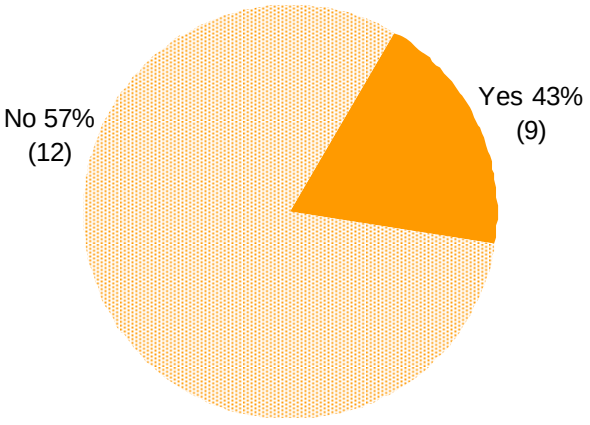
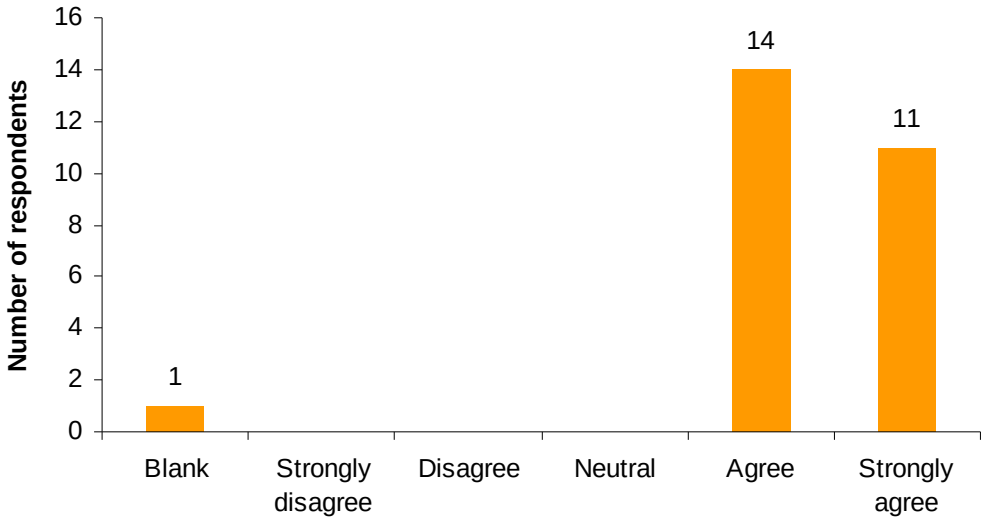


Table 6: ICUs THAT HAVE STANDARD EDUCATION MATERIALS AVAILABLE

Tertiary	Metro	Rural	Paediatric
50% (4/8)	0% (0/9)	0% (0/7)	50% (1/2)

Figure 7: EDUCATION WOULD IMPROVE ANTIMICROBIAL PRESCRIBING IN THE ICU



Position Statement Recommendation 6

That intensive care units have mechanisms to audit the quality use of antibiotics and to provide feedback on audit results to individual prescribers.

Survey Response

There were no specific questions in the survey related to mechanisms to audit quality use of antimicrobials in ICU. However, there was a question relating to presentation of antimicrobial use data to prescribers where only 8% (2) tertiary ICUs reported gathering data for this use.

Analysis of the attitude responses

There were 17 safety attitude questions included in the survey using a 5 point likert scale to gauge agreement. Nine of the questions were considered to be most indicative of a supportive attitude towards quality use of antimicrobials in the ICU (**bold** text table 7). A score out of 9 was allocated to respondents, where each of the 9 attitude statements indicated was allocated 1 point when the response was strongly agree or agree to statement 1-8 and strongly disagree or disagree to statement 9.

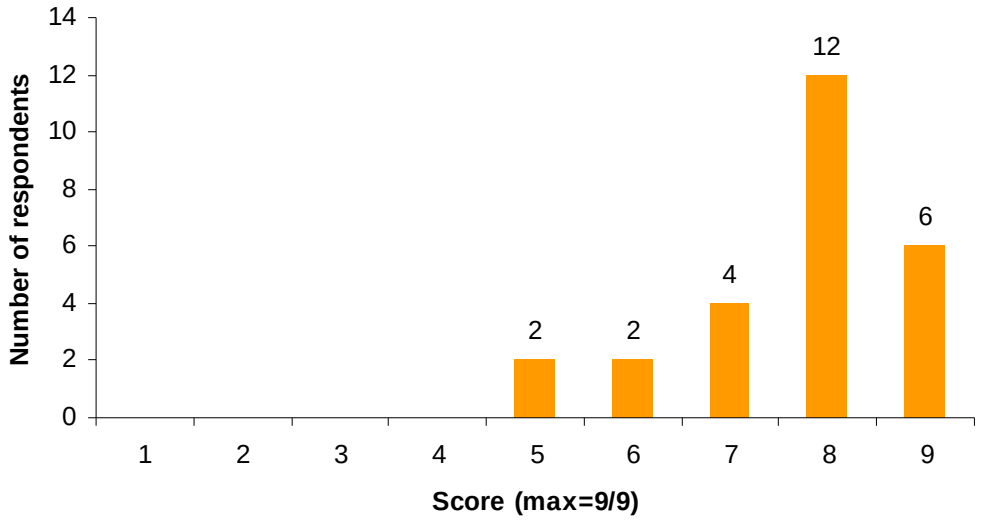
Of the 9 considered to be important to demonstrate a positive attitude, 25% of responders scored 9/9 (figure 8), however 85% of respondents scored 7/9 or above. This indicates that the ICUs represented in this survey have a supportive attitude towards quality use of antimicrobials in the ICU.

Table 7: LIKERT SCALE ATTITUDE QUESTIONS: QUESTION 40

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Appropriate selection, dosing, route, and duration of antimicrobial therapy is important in the ICU	77% (20/26)	23% (6/26)	0%	0%	0%
Inappropriate antimicrobial use drives microbial resistance	65% (17/26)	35% (9/26)	0%	0%	0%
Inappropriate antimicrobial use can lead to poorer patient outcomes	62% (16/26)	38% (10/26)	0%	0%	0%
Appropriate use of antibiotics is necessary for patient safety	65% (17/26)	31% (8/26)	4% (1/26)	0%	0%
I am aware of the Infectious Diseases Society of American and the Society for Healthcare Epidemiology of American (IDSA_SHEA)Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship	4% (1/26)	23% (6/26)	19% (5/26)	42% (11/26)	13% (3/26)
I can outline the contents of the IDSA_SHEA antimicrobial Stewardship Guidelines	4% (1/26)	4% (1/26)	19% (5/26)	54% (14/26)	19% (5/26)
I am aware that the Intensive Care Coordination and Monitoring Unit has circulated a draft position statement regarding Quality Use of Antibiotics in Intensive Care	8% (2/26)	54% (14/26)	13% (3/26)	15% (4/26)	12% (3/26)
A multidisciplinary approach to antibiotic prescribing would improve quality of care in my ICU	27% (7/26)	35% (9/26)	27% (7/26)	12% (3/26)	0%
It is important to liaise with infectious diseases and pharmacy to ensure good antimicrobial prescribing in the ICU	38% (10/26)	46% (12/26)	4% (1/26)	8% (2/26)	4% (1/26)
There are enough support services to ensure judicious prescribing of antimicrobials in ICU	4% (1/26)	50% (13/26)	19% (5/26)	19% (5/26)	8% (2/26)
I believe antimicrobial prescribing should be restricted	31% (8/26)	46% (12/26)	12% (3/26)	12% (3/26)	0%
Empiric guidelines should always be followed when prescribing broad	19% (5/26)	35% (9/26)	23% (6/26)	23% (6/26)	0%

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
spectrum antibiotics in my ICU					
Receiving antimicrobial consumption data from the pharmacy is important to inform antimicrobial prescribing practice in the ICU	12% (3/26)	62% (16/26)	19% (5/26)	8% (2/26)	0%
Local resistance data would help inform prescribing choices in the ICU	31% (8/26)	62% (16/26)	8% (2/26)	0%	0%
Education for all medical officers would improve antimicrobial prescribing practices in the ICU	42% (11/26)	54% (14/26)	0%	0%	0%
My hospital/institution has the capacity to facilitate an ICU antimicrobial stewardship programme	4% (1/26)	27% (7/26)	42% (11/26)	12% (3/26)	15% (4/26)
Intensive Care does not require guidelines to support prescription of antimicrobials	0%	0%	15% (4/26)	62% (16/26)	19% (5/26)

Figure 8: DISTRIBUTION OF COMPOSITE ATTITUDE SCORES



Additional Data

In addition to questions about structures and processes recommended in the ICCMU position statement, additional information regarding principles of antimicrobial stewardship was collected. Data reported relates to pharmacy, microbiological and infectious diseases services available to the ICU to support antimicrobial prescribing.

Only one paediatric ICU reported daily access to a ward round with infectious diseases specialists or a clinical microbiologist and 38% (10) of ICUs reported having no antimicrobial ward rounds (figure 9, table 8). In relation to access for specialty consultation, 24% (6) of ICUs were only able to access a consult in business hours and 1 ICU had no access to microbiology or infectious diseases advice (figure 10 and table 9). The number of units with a dedicated pharmacist is illustrated in figure 11 and table 10 and indicated that 42% of units, including 5 metro, 4 rural, 1 tertiary and 1 paediatric ICU, do not have a clinical pharmacist.

The use of empiric agents was reportedly most often based on the Therapeutic Guidelines: Antibiotic. Results indicate variable cessation, review and de-escalation of therapy depending on the availability and review of laboratory results. Only 1 ICU reported automatic cessation of empiric agents. Broad spectrum agents are reviewed within a defined time period in 42% (11) of ICUs and there were 10 separate time periods defined by respondents. 42% (11) ICUs reported operating in a system where there is a list of restricted agents. Where prescription was restricted monitoring was variable and usually completed by the pharmacist.

Where sites had a defined period after which treatment is reviewed, this period varied between one day and one week, with 6 sites stating that they required a review before 5 days of therapy. Other sites based their review around the availability of sensitivity data or on the advice of microbiology / infectious diseases.

Figure 9: INFECTIOUS DISEASES SPECIALISTS/CLINICAL MICROBIOLOGISTS AVAILABLE FOR WARD ROUNDS

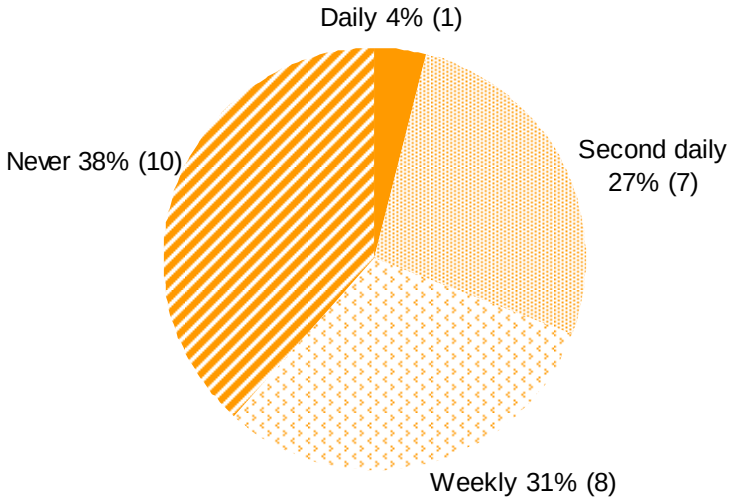


Table 8: FREQUENCY OF ANTIMICROBIAL WARD ROUNDS BY ICU TYPE

	Daily	2nd Daily	Weekly	Never
Tertiary (8)	0% (0)	38% (3)	38% (3)	25% (2)
Metro (9)	0% (0)	22% (2)	33% (3)	44% (4)
Rural (7)	0% (0)	14% (1)	28% (2)	57% (4)
Paediatric (2)	50% (1)	50% (1)	0% (0)	0% (0)

Figure 10: MICROBIOLOGISTS AND/OR INFECTIOUS DISEASES SPECIALISTS AVAILABLE FOR CONSULTATION

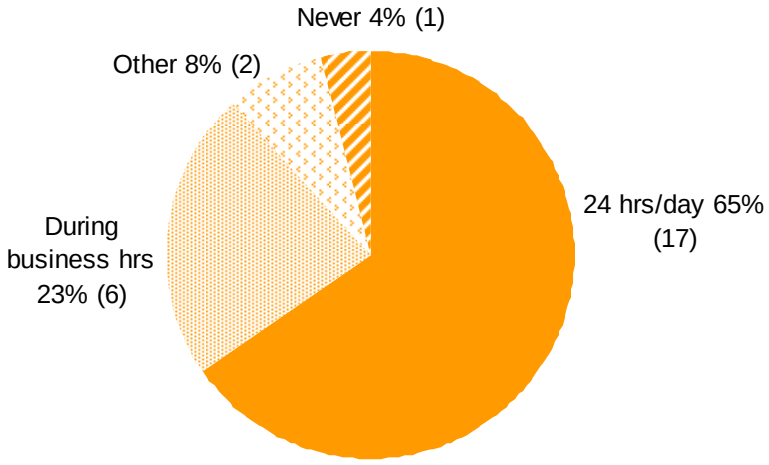


Table 9: ACCESS TO ID/MICRO CONSULTATION BY ICU LEVEL

	24hr/day	During business hours	Never	Other	Total
Tertiary (8)	32% (8)	0% (0)	0% (0)	0% (0)	32% (8)
Metro (9)	26% (7)	8% (2)	0% (0)	0% (0)	34% (9)
Rural (7)	0% (0)	16% (4)	4% (1)	8% (2)	28% (7)
Paediatric (2)	8% (2)	0% (0)	0% (0)	0% (0)	8% (2)

Figure 11: DOES THE UNIT HAVE A CLINICAL PHARMACIST

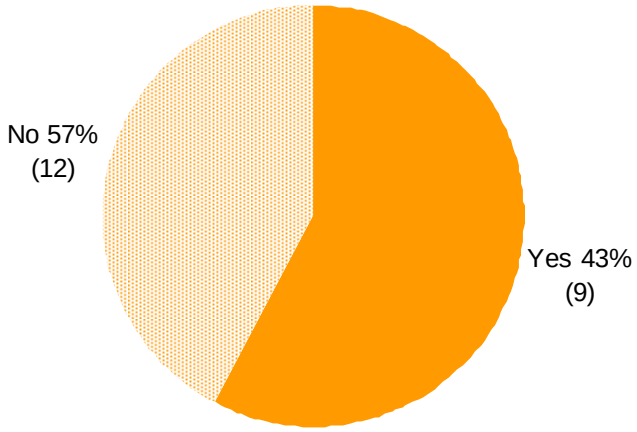


Table 10: PERCENTAGE OF UNITS THAT HAVE A CLINICAL PHARMACIST, BY ICU TYPE

Tertiary	Metro	Rural	Paediatric
88% (7/8)	44% (4/9)	43% (3/7)	50% (1/2)

Discussion

The principles outlined in the ICCMU position statement were considered by the expert advisory group to formulate ideal support structures to facilitate appropriate antimicrobial stewardship in NSW ICUs. Generally, results indicate that services to promote quality use of antimicrobials provided to the tertiary ICUs are more supportive than metropolitan or rural units. There are multiple reasons for this variability including but not limited to service availability. At this stage it is unclear as to the feasibility of applying this statement to all NSW ICUs as it is yet to be tested within the current environment. However, the results of this survey indicate that there are opportunities for system improvement.

Empiric prescribing

Antimicrobial prescribing practice in NSW ICUs is variable and empiric treatment with broad spectrum antibiotics may be a key area for improvement. Although most units reported using empiric guidelines, 19% used none and only 9 adapt guidelines to local resistance data. Only 1 unit reported automatic cessation of empiric therapy, 42% (11) reported that prescriptions were reviewed after a defined time period and the time period is not standardised as there were 10 separate time periods defined. A recent publication of Australian and New Zealand ICU antibiotic prescribing practice describes a survey of intensivists in which 4 cases were depicted and clinicians were asked to identify antibiotic choices and doses. Compliance was evaluated by comparing choices with those outlined in the therapeutic guidelines. Evaluation was based on 7 assessments as each case could have been evaluated to have more than one condition.[11] According to one of the authors, in the majority of situations in which only non-compliant antibiotics were selected, the chosen antibiotics were broader than those recommended in the guidelines. Although the likelihood that patients would have received ineffective agents is low there was room to improve use of broad spectrum empiric antibiotics.[12] The QUAIC expert advisory group are currently finalising an ICU empiric guideline adapted from the therapeutic guidelines which will be used in the QUAIC pilot program. The empiric guideline is a summary of relevant portions of the therapeutic guideline and makes recommendations about antimicrobial prescribing practice to promote appropriate agent selection, cessation, review and de-escalation.

Audit and reporting

Most units didn't measure antimicrobial use (77% 20/26). Of the units that did monitor use, there were inconsistencies in relation to reporting of this data to the national program (NAUSP). The annual report from NAUSP lists 7 of the responding ICUs as submitting data [4] which means 4 units were unaware data was submitted from their hospitals. Receiving antimicrobial consumption data from the pharmacy was considered important to 73% of survey respondents to inform antimicrobial prescribing practice in the ICU. Given that this information is relatively easy to extract from pharmacy databases this is a realistic interim output of the QUAIC project.

Antimicrobial restriction

The expert advisory group considered restriction in the ICU was not necessarily appropriate given the nature of ICU patients, however 77% (20) of respondents believe that antimicrobial prescribing should be restricted (see table 8). Most units didn't operate within an environment where antibiotic prescription is restricted and only 7 of the 11 units that indicated that restrictions were in place had an enforcing mechanism.

Service provision

Further investigation is required in relation to the microbiology network and laboratory services. Currently these networks operate independently to Area Health Services which contributes to variability in service provision to ICUs within each Area. This imbalance will continue in the changing structure to the NSW Health system to local

health networks. Service provision within the laboratory clusters in NSW could be adapted to ensure all ICUs have reasonable access. The change to electronic record keeping creates the need to investigate computerised decision support tools and these could be considered in forward IT planning. Currently no units utilise this kind of technology however a proportion of ICUs in NSW already use clinical information systems for record keeping.

Infectious diseases specialists, microbiologists and pharmacists have been accessed for support to ensure quality antimicrobial prescribing. Actual or virtual ward rounds are considered one of the most important mechanisms to improve prescribing. This support service does not apply uniformly to all NSW ICUs. Whilst physical access to all these specialties may not be necessary at all sites the ICCMU position statement advocates a need for data to be provided by the laboratory and pharmacy to optimise prescribing. Supported multidisciplinary antibiotic rounds in the ICU have been suggested for inclusion in the position statement. In the current environment this would be unachievable as infectious diseases specialists/microbiologist are not available to perform ward rounds in 38% of sites and 1 site indicted not having access to any service for consultation. Many units also did not have a clinical pharmacist.

Pilot program

Sixteen respondents (62%) indicated a willingness to participate in a pilot program to improve antimicrobial use. With a good overall survey response rate and 85% of respondents with a “positive attitude” to principles of quality use of antimicrobials, it is evident that NSW ICUs are ready to consider practice changes. There is a general acceptance of the role of other specialties to support change and is there an acceptance that quality use of antimicrobials is important. To translate this into a successful pilot project close consideration of local services and application of tools is vital. At this stage, 3 of the 16 self nominated sites have been selected to participate in the pilot including a tertiary, metro and rural ICU. The QUAIC project plan includes testing a number of tools in the 3 ICUs to assess the viability of the ICCMU position statement. Evaluation of the pilot will serve to inform future initiatives in the ICU.

Conclusions

The QUAIC survey identified gaps in regards to processes that support quality use of antimicrobials across NSW. ICUs display a positive attitude towards the principles of antimicrobial stewardship as outlined in the ICCMU position statement, however, lack the necessary resources to provide a comprehensive supportive structure for prescribers. The current plan to pilot tools in target ICUs will serve to test the viability of the ICCMU position statement within the clinical environment.

Recommendations

Based on the results of the survey the recommendations for the *QUAIC project* include piloting:

- An empiric guideline modified using local resistance patterns
- An educational tool
- Audit of prescribing against the empiric guideline including prescriber feedback
- Encouraging multidisciplinary ICU rounds to assess antimicrobial use and ensure appropriate de-escalation (where available including infectious diseases, microbiologists, pharmacists, infection control).
- Reporting of both antimicrobial dispensing data and antibiograms using computerised programs.

Based on the results of the survey the recommendations for *NSW Health* include:

- Investigation and support of service provision to ICUs to ensure access to Infectious diseases specialists and microbiologists is available.

References

1. Fishman N. Antimicrobial stewardship. American journal of infection control 2006; 34 (5 Suppl 1):S55-63.
2. Manzur A, Tubau F, Pujol M, et al. Nosocomial outbreak due to extended-spectrum-beta-lactamase- producing Enterobacter cloacae in a cardiothoracic intensive care unit. Journal of clinical microbiology 2007; 45 (8):2365-9. Epub: 007 Jun 20.
3. Fridkin SK, Edwards JR, Courval JM, et al. The effect of vancomycin and third-generation cephalosporins on prevalence of vancomycin-resistant enterococci in 126 U.S. adult intensive care units. Annals of internal medicine 2001; 135 (3):175-83.
4. National Antimicrobial Utilisation Surveillance Program. Annual Report 2008-2009. Adelaide
5. Carlet J, Alib A, Chalfine A. Epidemiology and control of antibiotic resistance in the intensive care unit. Current Opinion in Infectious Diseases 2004;17:309-16.
6. Owens R. Antimicrobial Stewardship: Application in the Intensive Care Unit. Infectious Disease Clinics of North America 2009;23:683-702.
7. Gould IM. Antibiotic policies to control hospital-acquired infection. The Journal of antimicrobial chemotherapy 2008;61(4):763-5. Epub: 2008 Feb 14.
8. Fiona JC, Bryony Dean F, Wendy L, Ann J, Alison H. Multidisciplinary hospital antibiotic stwardship: a West London model. Clinical Governance 2004;9(4):237.
9. Dellit TH, Owens RC, McGowan JE, et al. Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship. Clinical infectious diseases: an official publication of the Infectious Diseases Society of America 2007;44(2):159-77. Epub: 2006 Dec 13.
10. Metjian TA, Prasad PA, Kogon A, Coffin SE, Zaoutis TE. Evaluation of an antimicrobial stewardship program at a pediatric teaching hospital. The Pediatric infectious disease journal 2008; 27(2):106-11.
11. Dulhunty J, Webb S, Paterson D, et al. A survey of antibiotic prescribing practices in Australian and New Zealand intensive care units. Critical Care & Resuscitation 2010;12(3):162-70.
12. Webb S. Query regarding antibiotic prescribing practice in AUS/NZ in ICUs paper. email correspondence to Burrell T, 2010.

Appendix 1: Survey Questions

Which Intensive Care Unit are you from?	Drop down list of 38 NSW units + TCH				
What is your designation?	Drop down list including “other specify” option				
Is there active involvement by microbiology and/or infectious diseases specialists in the management of intensive care patients	Always	Nearly always	Sometimes	Hardly ever	Never
Do clinical microbiologists and/or infectious diseases specialists perform antibiotic ward rounds in the intensive care unit?	Always	Nearly always	Sometimes	Hardly ever	Never
What is the frequency of this round?					
Daily? 2nd Daily? Weekly Never Other, please specify _____					
Are clinical microbiologists and/or infectious diseases specialists available to provide clinical advice:					
24 hours a day? During business hours? Never Other, please specify _____					
Data are available to treating clinicians to show the identity and susceptibility of organisms isolated from clinical specimens?	Extremely timely	Timely	Neutral	Untimely	Extremely untimely
Are data available to show the prevalence of colonisation/infection with multi-resistant organisms (MROs) isolated within the unit and their susceptibility patterns (Cumulative antibiogram)?	Yes	No	No- hospital wide data only available	If no skip to 13	

Is the cumulative antibiogram easily accessible in the intensive care unit?	Yes		No		If yes skip to 12
What factors limit the accessibility of the antibiogram data?	Large text box				
Is the cumulative antibiogram used by the intensive care unit in making treatment decisions?	Always	Nearly always	Sometimes	Hardly ever	Never
When was the last cumulative antibiogram issued?	Text box				
How frequently is it re-issued?	Text box				
What barriers prevent this from being updated more frequently?	Large text box				
Is the cumulative antibiogram formally/regularly communicated back to the intensive care unit?	Always	Nearly always	Sometimes	Hardly ever	Never
What is the mechanism and frequency of this communication? (e.g. electronic report, paper based report, pocket card guide, monthly, quarterly, annually etc)	Large text box				
Are clinical policies and protocols available to guide staff in deciding on empiric antibiotic treatment for common infections?	Yes		No		If no skip to 23
What guidelines/protocols are followed?					
TG Antibiotic Other external guideline, please specify _____ Internal protocol					
Please indicate if an electronic decision support system for antimicrobial therapy is being used					
None IDEA3S Guidance-DS Other, please specify _____					

Are these clinical policies and protocols assessed against local resistance patterns to ensure that recommended treatment is appropriate in light of these resistance patterns?	Yes		No		
Does the unit have a dedicated clinical pharmacist?	Yes		No		If no skip to 24
How often does the pharmacist perform ward rounds in the intensive care unit?					
Daily Twice weekly Weekly Never Other, please specify _____					
Is the clinical pharmacist involved in the management of antimicrobial therapy?	Always	Nearly always	Sometimes	Hardly ever	Never
Does the unit calculate its use of antimicrobials?	Yes		No		If no skip to 29
How is antimicrobial use measured e.g. defined daily doses?	Text box				
Is antimicrobial usage reported to the National Antimicrobial Utilisation Surveillance Program (NAUSP)?	Yes		No		
Are data collected on antibiotic use presented to prescribers regularly so that they can review trends in antibiotic use?	Yes		No		
Is there a defined list of antimicrobial agents whose use is restricted?	Yes	No	Don't know		If no skip to 33
What is the mechanism of restriction used (e.g. pre-approval from micro/ID)?	Large text box				

Is compliance with restriction measured?	Yes		No		If no skip to 35
How often is compliance measured (e.g. scheduled DUE program)?	Monthly	Quarterly	Biannually	Annually	Never
Is cost of non-compliance measured?	Yes		No		
Is the empiric use of broad spectrum antibiotics limited to a defined length of time after which treatment is to be reviewed?	Yes		No		If no skip to 37
What is the defined time period?	Text box				
Is treatment automatically ceased if not reviewed?	Yes		No		If no skip to 37
Who has authority to cease? (Select all that apply)					
Doctor- Consultant of patient Doctor- Intensivist Doctor- registrar Nurse Practitioner Pharmacist Registered Nurse Other, please specify _____					
Are results from susceptibility testing routinely available to guide decisions about de-escalation of antimicrobials?	Yes		No		
Are details of antimicrobial treatment, including indication for treatment, length of course and expected cease date communicated in ICU discharge summaries?	Yes		No		

Is there a standardised orientation or training package for medical officers commencing work in the intensive care unit which introduces the principles of quality antibiotic prescribing in intensive care?	Yes		No		
Please rate the following statements based on how strongly you agree or disagree with them					
Appropriate selection, dosing, route, and duration of antimicrobial therapy is important in the ICU	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Inappropriate antimicrobial use drives microbial resistance	SA	A	N	D	SD
Inappropriate antimicrobial use can lead to poorer patient outcomes	SA	A	N	D	SD
Appropriate use of antibiotics is necessary for patient safety	SA	A	N	D	SD
I am aware of the Infectious Diseases Society of American and the Society for Healthcare Epidemiology of American (IDSA_SHEA)Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship	SA	A	N	D	SD
I can outline the contents of the IDSA_SHEA antimicrobial Stewardship Guidelines	SA	A	N	D	SD
I am aware that the Intensive Care Coordination and Monitoring Unit has circulated a draft position statement regarding Quality Use of Antibiotics in Intensive Care	SA	A	N	D	SD
A multidisciplinary approach to antibiotic prescribing would improve quality of care in my ICU	SA	A	N	D	SD
It is important to liaise with infectious diseases and pharmacy to ensure good antimicrobial prescribing in the ICU	SA	A	N	D	SD

There are enough support services to ensure judicious prescribing of antimicrobials in ICU	SA	A	N	D	SD
I believe antimicrobial prescribing should be restricted	SA	A	N	D	SD
Empiric guidelines should always be followed when prescribing broad spectrum antibiotics in my ICU	SA	A	N	D	SD
Receiving antimicrobial consumption data from the pharmacy is important to inform antimicrobial prescribing practice in the ICU	SA	A	N	D	SD
Local resistance data would help inform prescribing choices in the ICU	SA	A	N	D	SD
Education for all medical officers would improve antimicrobial prescribing practices in the ICU	SA	A	N	D	SD
My hospital/institution has the capacity to facilitate an ICU antimicrobial stewardship programme	SA	A	N	D	SD
Intensive Care does not require guidelines to support prescription of antimicrobials	SA	A	N	D	SD
Are you interested in participating in a pilot program to support quality use of antimicrobials in intensive care?	Yes		No		If no skip to 43
Please provide your preferred contact details here	Email or telephone options				
Microbiology laboratories					
What system for antimicrobial susceptibility testing does your lab use?					
CLSI CDS EUCAST Other, please specify _____					

Are raw susceptibility data able to be extracted from the laboratory system?	Yes with ease	Yes with difficulty	No	N/A
Is it possible to access this data regularly?	Yes	No	N/A	
Is an automated program used by the lab to create the cumulative antibiogram?	None used WHONET Other, please specify _____			

Appendix 2: Participation by site

NSW role delineation is indicated according to the December 2006 ICCMU Area Health Services and Critical Care Resources Report.

ICU/HDU	NSW Level/Type/AHS	Responded
Armidale & New England	4 Rural HNEAHS	✓
Auburn	3 Metro SWAHS	✓
Bankstown	5 Metro SSWAHS	×
Bathurst	4 Rural GWAHS	✓
Blacktown	5 Metro SWAHS	×
Campbelltown	4/5 Metro SSWAHS	✓
Canterbury	3 Metro SSWAHS	✓
Coffs Harbour	4 Rural NCAHS	×
Concord	6 Tertiary SSWAHS	✓
Dubbo	4 Rural GWAHS	×
Gosford	5/6 Metro NSCCAHS	✓
Goulburn	4 Rural GSAHS	×
Griffith	4 Rural GSAHS	×
Hornsby	5 Metro NSCCAHS	✓
John Hunter	6 Tertiary HNEAHS	N
Lismore Base	4/5 Rural NCAHS	✓
Liverpool	6 Tertiary SSWAHS	✓
Manly	4/5 Metro NSCCAHS	✓
Manning River Base	4 Rural HNEAHS	✓
Mona Vale	4 Metro NSCCAHS	×
Nepean	6 Tertiary SWAHS	✓
Newcastle Calvary	5 Metro HNEAHS	✓
Orange	4/5 Rural GWAHS	×
Port Macquarie	5 Rural NCAHS	✓
Prince of Wales	6 Tertiary SESIAHS	✓
Royal North Shore	6 Tertiary NSCCAHS	✓
Royal Prince Alfred	6 Tertiary SSWAHS	✓
Shoalhaven and District	4/5 Rural SESIAHS	✓
St George	6 Tertiary SESIAHS	✓
St Vincents	6 Tertiary SESIAHS	×
Sutherland	5 Metro SESIAHS	✓
Sydney Children's	5/6 Paediatric	✓
Tamworth	5 Rural HNEAHS	×
The Canberra Hospital	Tertiary ACT	×
The Childrens Hospital Westmead	6/5 Paediatric	✓
The Tweed	5 Rural NCAHS	×
Wagga Wagga Base	5 Rural GSAHS	✓
Westmead	6 Tertiary SWAHS	✓
Wollongong	5/6 Metro SESIAHS	✓

Offices
Level 3, 65 Martin Place
Sydney NSW 2000
1st Floor
Administration Building
Sydney Hospital
8 Macquarie Street
Sydney NSW 2000

Correspondence
GPO Box 1614
Sydney NSW 2000
Tel 61 2 9382 7600
Fax 61 2 9382 7615
www.cec.health.nsw.gov.au