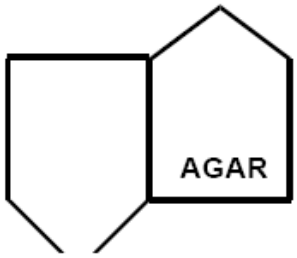

The Australian Group on Antimicrobial Resistance

2011 Antibiotic Susceptibility Survey for

Hospital-Onset *Staphylococcus aureus*

Introduction

The Australian Group for Antimicrobial Resistance (AGAR) was established in 1986, initially to monitor resistance in *Staphylococcus aureus* throughout Australia. This surveillance role has become more important with the multiple waves of methicillin-resistant *S. aureus* (MRSA) that have occurred in Australia since the 1960s. Results of previous *S aureus* surveys have been published. AGAR performs alternate hospital- and community-onset surveys.

The 2011 survey is a hospital survey.

Objectives

The objectives of this study are:

1. Determine the proportion of resistance to commonly used antibiotics in *S aureus* in Australian hospitals.
2. Characterise the epidemic and community MRSA clones isolated in Australian hospitals using a range of molecular techniques.
3. Determine the proportion of MRSA in Australian hospitals that carry the Panton-Valentine leukocidin determinants.

Important Dates

Collection period: 1st July 2011 to 30th November 2011.
Complete data forwarded to Julie Pearson by 31st December 2011.
S. aureus isolates forwarded to RPH by 31st December 2011.
Invoices forwarded to Geoff Coombs by 28th February 2012 ($5 per isolate plus GST).

Status

Compulsory study

Organisms to be Tested

100 consecutive isolates of *S. aureus* (MRSA included) from **100 different inpatients (hospital stay >48 hours at the time of collection)** will be tested by each laboratory. Hospital laboratories to collect from one institution only. Private laboratories to collect from any institution they service (name of hospital to be entered into work sheet).

Specimen Source

Each *S. aureus* (whether MRSA or not) should be an individual patient isolate judged to have come from a potentially infected site and an organism for which the laboratory would normally perform antibiotic susceptibility testing.

The following should **not** be included:

- Coagulase-negative staphylococci.
- Repeat isolates from the same patient.
- Organisms isolated from specimens received for the purpose of gathering surveillance data (eg. infection control).
- Isolates from outpatients or general practitioners
- Isolates from inpatients where hospital stay is <48 hours at time of sample collection.

Identification of Isolates

The minimum tests for identification of staphylococci include at least two of the following:

(1) Slide coagulase test (A commercial staphylococcal slide test may be substituted for the standard slide test)

(2) Tube coagulase test

(3) Demonstration of deoxyribonuclease production (DNAse agar).

(4) Appropriate growth on chromogenic agar

For identification of an organism as *S. aureus,* two tests should be positive.

Additional tests such as fermentation of mannitol on mannitol-salt agar or *nuc* gene PCR may be performed for confirmation if preferred.

Isolate Information Required

For all *S. aureus* enter information in columns B to L in the Excel SAP11 spreadsheet:

a) Your reference number or storage number

b) Date of admission

c) Date of collection

d) DPA (Days Post Admission). This field will calculate the number of days between DOA and DOC (≥48h for inclusion in a hospital survey so please check collection times for values of 2; discard isolate if figure is 0 or 1).

e) Lab ID: Laboratory number (optional)

f) Patients ID (optional) – URN or initials. Only required for tracking duplicate or repeat isolations. This information is not transferred to the SAP database

g) Source - state specimen type and site eg leg wound swab, pleural fluid

h) Hospital: Hospital where the patient was admitted (hospital laboratories to collect from one institution only, private laboratories can collect from multiple institutions)

i) Patient sex

j) Date of birth (preferred) OR age if DOB unavailable

For each MRSA record the appropriate information in column M:

- MRSA: new or old (known patient)?

Antimicrobial Susceptibility Testing

All isolates will be tested using the Vitek 2 AST-P612 card

Antibiotic	Code	MIC Range
Benzylpenicillin	P	0.03 – 0.5
Oxacillin	OX1	0.25 – 4
Cefoxitin screen	OXSF	+/-
Vancomycin	VA1	0.5 - 32
Rifampicin	RA	0.5 - 32
Fusidic acid	FA	0.5 - 32
Gentamicin	GM	0.5 - 16
Erythromycin	E	0.25 - 8
Clindamycin	CM	0.25 - 8
Inducible clindamycin resistance	ICR	+/-
Tetracycline	TE	1 - 16
Trimethoprim/Sulphamethoxazole	SXT	10 - 320
Ciprofloxacin	CIP	0.5 - 8
Teicoplanin	TEC	0.5 – 32
Linezolid	LNZ	0.5 – 8
Nitrofurantoin	FT	16 – 512
Mupirocin	MUP	2 – 8
Daptomycin	DAP	0.12 – 8

The Vitek 2 Advanced Expert System (AES) interprets the MICs according to current CLSI guidelines. **Please note that raw data, not interpreted data is required.**

To minimise data entry errors, the Vitek 2 raw MIC data is extracted via the logbook report to a txt file format that can be readily converted into the current AGAR Data Entry Excel File. Refer to the *Vitek Data Conversion* section of the AGAR website (www.antimicrobial-resistance.com) for instructions.

Additional Susceptibility Tests

BETA-LACTAMASE TEST

All isolates that have a penicillin MIC ≤0.125mg/L should be tested for the production of ß-lactamase. Use growth around a cefoxitin disc to perform the test.

The ß -lactamase test is to be performed by using the nitrocefin method. Use Cefinase Discs (BBL Cat No. 31650). Follow the manufacturer's instructions.

D-TEST

All erythromycin resistant and clindamycin susceptible or intermediate isolates are to be tested for inducible clindamycin resistance.

Place a 15 µg erythromycin disc and 2 µg clindamycin disc 15-26mm apart (ie adjacent to each other if using a dispenser) on either a Mueller Hinton Agar plate inoculated with a 0.5 McFarland suspension of the test organism , or the blood agar purity plate used with the MIC test (placing discs on the initial inoculum). Incubate the plate at 35 ±2˚C in ambient air for 16 to 18 hours. A flattening of the zone of inhibition adjacent to the erythromycin disc (D-zone) indicates inducible clindamycin resistance and will be recorded as D-test positive.

Storage of Isolates

Participating laboratories will collect isolates and store isolates immediately after they are first isolated. They are to be tested, using methods as described.

The participating laboratories should retain all cultures in glycerol broth or a suitable preservative and stored at -70˚C until determined otherwise at AGAR meetings.

Referral of Isolates

Forward all 100 (plus extras) *S. aureus* to RPH for storage and typing as soon as possible. Isolates can be transported on agar slopes in O-ring sealed containers (e.g. cryotubes) or on swabs in transport medium. Please label isolates with lab name (eg RPH), isolate number (i.e. 1-100 according to column A in your SAP08 worksheet) and your reference or Lab ID number (column B or F of your SAP11 worksheet).

SAP11 RPH 89 9658475H

Forward isolates to:
Geoff Coombs
Dept of Microbiology and Infectious Diseases
PathWest Laboratory Medicine
Royal Perth Hospital
Level 6, A block
Wellington St
Perth, WA, 6000

Data analysis

Julie Pearson will provide the updated data entry programme (SAP11.xls).

Please: ***Read the instructions on the software***

1. All **raw** MIC results are to be transferred to the Excel Data Entry file AGAR SAP11.xls as indicated in Appendix 1 or 2. All other information must be completed as indicated
2. Include QC results performed during the survey period
3. Check the file for transcription errors

Forward final data to Julie Pearson (julie.pearson@health.wa.gov.au) by 31st December 2011.

Checklist

	Read Protocol
	Collect 100 consecutive isolates from inpatients (>48h) – from July1, 2011
	Freeze cultures promptly - some resistance may be lost
	Store cultures till determined otherwise at AGAR meetings
	Vitek 2 AST-P612 susceptibility card to be used for primary susceptibility testing
	Test all penicillin-susceptible (MIC≤0.125mg/L) strains for β-lactamase
	Proof read worksheet. ***Confirm rare resistances ie vancomycin, linezolid and quinupristin/dalfopristin.***
	Forward all isolates to Royal Perth Hospital