AUSTRALIAN COMMISSION
ON SAFETY AND QUALITY IN HEALTH CARE

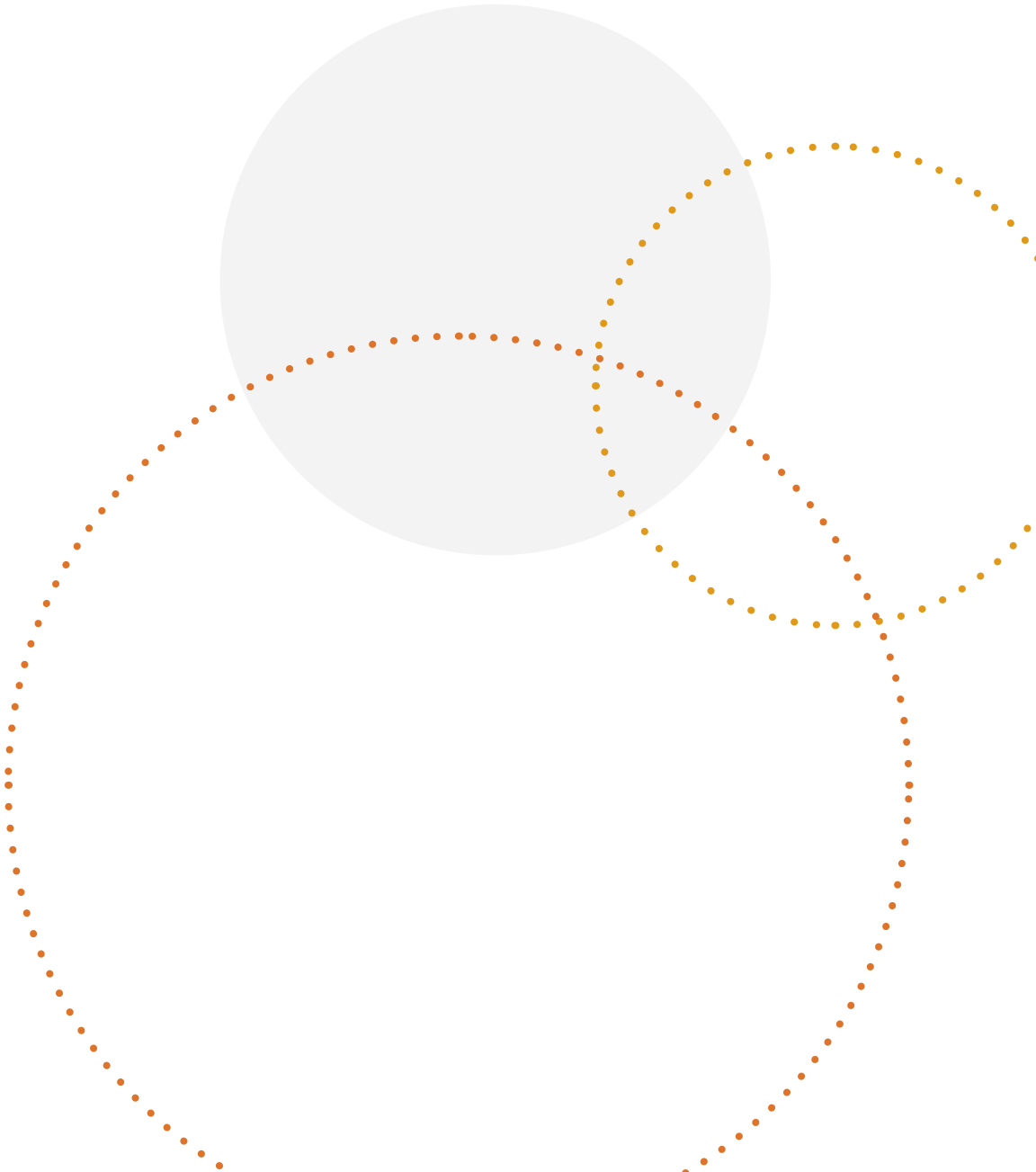
AURA 2016

Supplementary data

AURA
Antimicrobial Use and Resistance in Australia

AURA 2016

Supplementary data



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Disclaimer

This report is based on the best data and evidence available at the time of development.

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Introduction

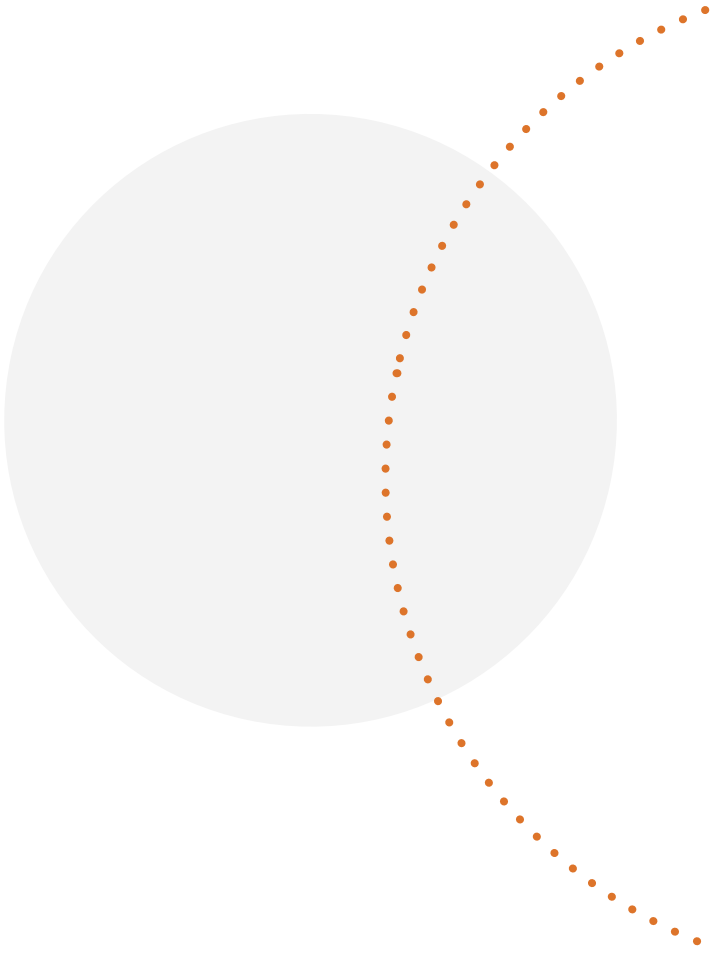
This report provides supplementary data for *AURA 2016: first Australian report on antimicrobial use and resistance in human health* (AURA 2016). It includes additional detail relating to Chapter 3: 'Antimicrobial use and appropriateness' and Chapter 4: 'Antimicrobial resistance'. Tables and figures in this supplementary data are numbered according to the relevant chapter.

Sources of data for antimicrobial use and appropriateness

Chapter 3 of AURA 2016 describes patterns and trends in use of antimicrobials, and is based on data collected by five programs:

- The National Antimicrobial Prescribing Survey (NAPS) is an audit performed by hospitals to assess antimicrobial prescribing practices and appropriateness of prescribing within the hospital. Data is reported nationally from this program every year, and hospitals are able to interrogate their own data within the audit tool.
- The Aged Care National Antimicrobial Prescribing Survey (acNAPS) is a pilot program based on the NAPS model. It is an audit of antimicrobial prescribing and appropriateness of prescribing in residential aged care facilities.
- The National Antimicrobial Utilisation Surveillance Program (NAUSP) collects, analyses and reports data on use of antimicrobials at the hospital level. Participating hospitals receive bimonthly reports of their own data, and national reports are prepared annually.
- The NPS MedicineWise MedicineInsight program collects data on antimicrobial prescribing in general practice. Data is provided to participating general practitioners, and reported elsewhere on an ad hoc basis.
- The Pharmaceutical Benefits Scheme (PBS) and the Repatriation Pharmaceutical Benefits Scheme (RPBS) collect data on antimicrobials dispensed under the PBS/RPBS, which is reported annually.

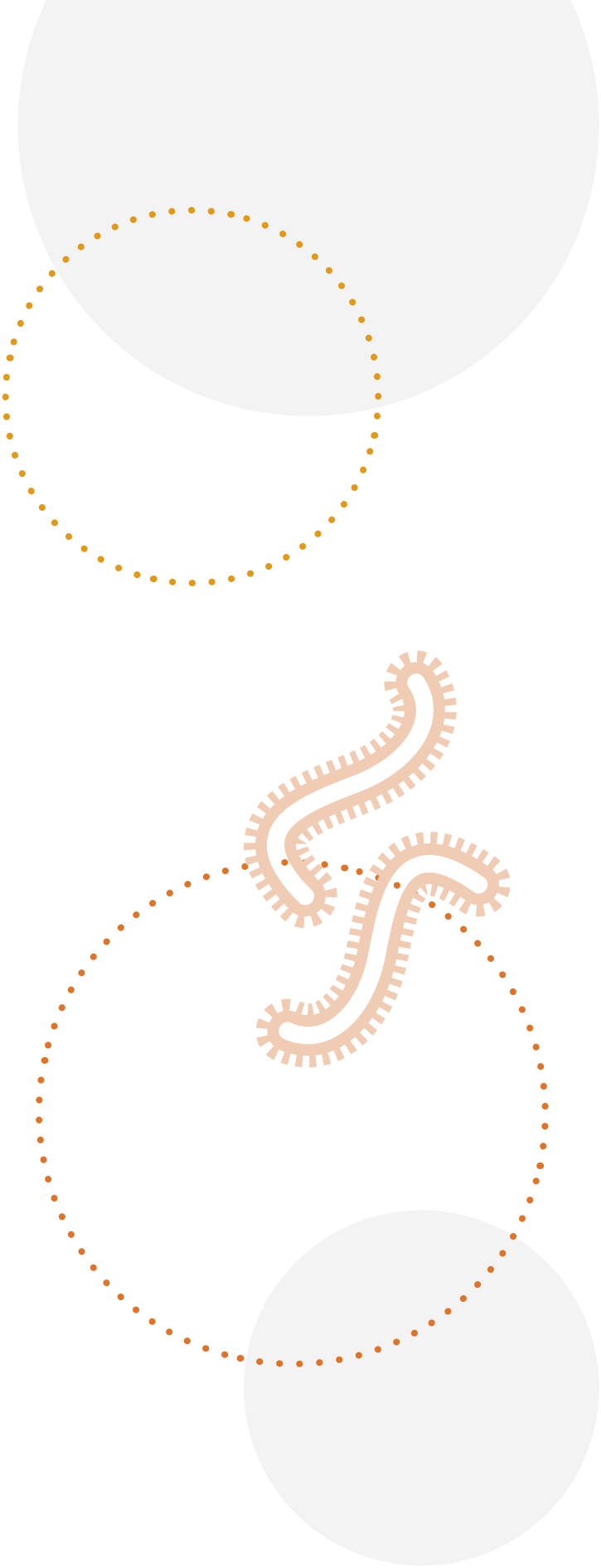
These sources of data reflect prescriptions for antimicrobials, use of antimicrobials and appropriateness of prescribing in public and private hospitals across Australia, as well as dispensing within the community.



Sources of data for antimicrobial resistance

Chapter 4 of AURA 2016 describes rates of resistance for priority organisms, and is based on data collected by five programs:

- The Australian Group on Antimicrobial Resistance (AGAR) collects, analyses and reports on data on priority organisms such as *Enterobacteriaceae* species, *Enterococcus* species and *Staphylococcus aureus*. Data is reported nationally for three AGAR programs every year.
- The Queensland Health OrgTRx system collects, analyses and reports on data on antimicrobial resistance in public hospitals across Queensland. Participants in OrgTRx can access their own data and run ad hoc reports within the system. There is currently no national reporting of OrgTRx data.
- The Australian National Neisseria Network (NNN) conducts the national laboratory surveillance programs for *Neisseria gonorrhoeae* and *N. meningitidis*. Data from the NNN programs are published quarterly and annually in the journal *Communicable Diseases Intelligence*.
- The National Notifiable Diseases Surveillance System (NNDSS) collects data on *Mycobacterium tuberculosis*, and data is published annually in *Communicable Diseases Intelligence*. The Australian Mycobacterium Reference Laboratory Network provides drug susceptibility data on *M. tuberculosis* isolates to state and territory public health units for inclusion in the NNDSS.
- Sullivan Nicolaides Pathology (SNP) collects data on antimicrobial resistance among organisms in the community, and acute and residential aged care facilities. Data on rates of resistance for SNP facilities has not previously been published nationally.



AURA 2016 Chapter 3: antimicrobial use and appropriateness tables

Table S3.1 Number of hospitals contributing to the National Antimicrobial Utilisation Surveillance Program, by peer group, 2005–14

Year	Principal referral	Large public acute	Medium public acute
2005	13	8	4
2006	15	9	4
2007	16	9	5
2008	18	12	7
2009	18	16	9
2010	18	18	9
2011	20	22	10
2012	25	32	13
2013	28	42	24
2014	28	51	26

Note: Data from small public hospital and specialist women's hospital peer groups is excluded because the number of contributors was small.
Source: NAUSP, 2014

Table S3.2 Number of hospitals contributing to the National Antimicrobial Utilisation Surveillance Program, by peer group and jurisdiction, 2014

Jurisdiction	Principal referral	Specialist women's	Large public acute	Medium public acute	Small public acute	Private (nonpeered)	Total
New South Wales and Australian Capital Territory	12	0	21	10	0	0	43
Queensland	5	1	12	5	0	6	29
South Australia	2	0	4	4	3	6	19
Tasmania	1	0	2	1	0	1	5
Victoria	6	0	8	5	0	4	23
Western Australia	2	1	4	1	1	1	10
Australia	28	2	51	26	4	18	129

Note: Northern Territory data has not been included because of issues with the scope of the data supplied.
Source: NAUSP, 2014

Table S3.3 Total-hospital antimicrobial usage rates (defined daily doses per 1000 occupied-bed days) by antimicrobial class, 2010–14

Antimicrobial class	2010 (*n* = 53)	2011 (*n* = 61)	2012 (*n* = 79)	2013 (*n* = 114)	2014 (*n* = 129)
Aminoglycosides	50.87	46.50	44.49	41.52	38.45
Amphenicols	0.01	0.00	0.00	0.00	0.00
ß-lactamase inhibitor combinations	185.15	186.99	187.57	186.82	180.70
ß-lactamase-resistant penicillins	87.35	84.27	85.30	91.29	91.03
ß-lactamase-sensitive penicillins	27.78	23.68	25.58	26.74	28.66
Carbapenems	19.02	18.27	18.88	19.49	17.79
Extended-spectrum penicillins	117.04	112.10	107.52	104.83	103.39
First-generation cephalosporins	139.04	142.48	132.39	133.66	130.90
Fluoroquinolones	53.37	51.06	43.53	42.90	39.21
Fourth-generation cephalosporins	6.03	5.49	5.21	5.24	5.50
Glycopeptides	31.34	32.05	29.65	28.95	26.01
Lincosamides	12.96	13.93	14.06	15.59	14.93
Macrolides	86.17	85.38	80.49	71.81	67.13
Monobactams	0.20	0.18	0.36	0.42	0.45
Nitrofurans	1.23	1.11	0.87	0.88	0.81
Nitroimidazoles	51.65	52.77	47.71	44.76	40.80
Other antibacterials (daptomycin + linezolid)	1.56	1.16	2.18	2.40	2.38
Other cephalosporins and penems (ceftaroline)	0.00	0.00	0.00	0.04	0.05
Polymyxins	0.43	0.58	0.63	0.81	0.77
Second-generation cephalosporins	5.39	5.83	5.41	5.55	5.75
Steroids	2.42	2.33	1.93	1.61	1.34
Streptogramins	0.13	0.42	0.54	0.51	0.51
Streptomycins	0.03	0.05	0.01	0.01	0.00
Sulfonamide–trimethoprim combinations	13.90	13.56	14.95	16.62	16.18
Tetracyclines	31.28	37.35	43.08	47.96	54.34
Third-generation cephalosporins	50.17	51.47	49.50	48.99	46.17
Trimethoprim	23.44	21.53	20.57	19.75	18.00
Total	1005.70	998.38	968.79	965.14	936.31

n = number of participating hospitals
Source: NAUSP, 2014

Table S3.4 Key indicators for appropriateness of antimicrobial prescribing in hospitals, by jurisdiction, peer group, remoteness and funding type, 2014

Jurisdiction, peer group, remoteness or funding type	Category	Number of hospitals	Number of prescriptions	Indication documented (%)	Surgical prophylaxis >24 hours (%)[a]	Compliant with guidelines (%)	Noncompliant with guidelines (%)	Directed therapy (%)	Compliance with guidelines not available (%)	Not assessable for compliance with guidelines (%)	Appropriate (%)	Inappropriate (%)	Not assessable for appropriateness (%)
State or territory	ACT	2	185	57.3	54.2[b]	57.8	31.4	7.0	2.7	1.1	66.5	33.0	0.5
	NSW	79	6 609	76.3	49.9	52.5	26.7	11.3	5.1	4.5	70.2	25.5	4.3
	NT	2	287	92.3	60b	54.6	21.6	19.2	3.1	1.7	78.4	20.6	1.1
	Qld	36	2 363	75.6	39.8	58.8	23.5	9.6	2.2	5.9	73.6	21.6	4.8
	SA	15	1 733	76.2	20.8	63.3	24.4	6.6	2.7	3.1	71.2	25.3	3.6
	Vic	80	6 250	73.6	33.2	56.9	22.7	10.7	4.9	4.8	74.1	19.9	6.1
	WA	34	2 517	65.2	31.1	56.9	22.1	10.4	6.5	4.3	72.5	23.2	4.3
Peer group (public hospitals only)	A	69	10 955	75.9	45.8	55.2	21.8	13.3	5.7	4.0	74.4	21.7	3.9
	B	29	2 087	78.4	39.9	54.8	29.3	8.6	4.1	3.3	71.9	24.2	3.9
	C	39	2 133	79.4	17.0	56.4	28.5	6.5	2.3	6.3	73.0	21.1	6.0
	D	42	1 650	77.6	22.0	62.7	25.0	5.5	2.6	4.4	69.6	26.2	4.2
	E	10	144	86.8	na	52.8	28.5	4.2	4.9	9.7	68.8	21.5	9.7
	F	1	11	54.5	100[b]	36.4[b]	45.5[b]	18.2[b]	0	0	63.6[b]	36.4[b]	0
	G	7	129	75.2	na	63.6	10.9	8.5	10.9	6.2	69.8	14.7	15.5
Remoteness (public hospitals only)	Major cities	83	11 325	76.9	42.5	54.8	22.4	13.2	5.8	3.9	74.3	21.6	4.1
	Inner regional	60	3 248	73.3	31.4	58.1	27.0	6.1	3.3	5.6	70.9	23.5	5.6
	Outer regional	33	1 600	84.8	27.7	57.7	24.3	9.5	2.8	5.8	73.4	21.4	5.2
	Remote	10	785	73.8	19.6	62.8	28.3	4.5	2.0	2.4	71.3	27.0	1.7
	Very remote	4	151	88.1	0[b]	47.7	39.7	6.0	3.3	3.3	60.3	35.8	4.0
Funding type	Public	197	17 075	77.0	37.7	56.0	23.9	11.1	4.8	4.3	73.4	22.3	4.4
	Private	51	2 869	55.8	34.1	57.1	26.7	6.9	3.5	5.9	65.7	27.3	7.0
Combined national result	na	248	19 944	74.0	35.9	56.2	24.3	10.4	4.6	4.5	72.3	23.0	4.7

ACT = Australian Capital Territory; na = not applicable; NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Vic = Victoria; WA = Western Australia

a Where surgical prophylaxis was selected as the indication (2785 prescriptions)

b Low numbers of surgical prophylaxis prescriptions (<30)

Note: No Tasmanian facilities participated in the National Antimicrobial Prescribing Survey in 2014.

Source: NAPS, 2014

Table S3.5 Appropriateness of antimicrobial prescribing in hospitals for the 20 most common indications, 2014

Rank of inappropriate prescribing	Rank of indication[a]	Indication	Number of prescriptions	Appropriate (%)	Inappropriate (%)	Not assessable (%)
1	1	Surgical prophylaxis	2246	56.9	40.2	2.9
2	7	COPD: infective exacerbation	552	62.3	36.8	0.9
3	16	Cholecystitis	209	72.2	27.8	0.0
4	2	Community-acquired pneumonia	1936	73.9	25.0	1.1
5	4	Urinary tract infection	1156	73.1	25.0	1.9
6	5	Cellulitis/erysipelas	759	74.7	24.8	0.5
7	20	Appendicitis	159	76.7	22.6	0.6
8	9	Wound infection: surgical	369	74.5	21.4	4.1
9	10	Pneumonia: aspiration	362	77.1	21.3	1.7
10	8	Hospital-acquired pneumonia	401	77.8	21.2	1.0
11	17	Abscess	190	77.9	19.5	2.6
12	6	Sepsis: empiric therapy	563	80.8	17.1	2.1
13	15	Diverticulitis	219	85.8	14.2	0.0
14	14	Osteomyelitis	249	81.9	13.3	4.8
15	18	Sepsis: gram-negative bacteraemia	188	87.2	12.8	0.0
16	19	Diabetic infection (including foot)	169	88.2	11.2	0.6
17	12	Sepsis: gram-positive bacteraemia	261	89.7	10.0	0.4
18	13	Febrile neutropenia	258	92.6	6.6	0.8
19	3	Medical prophylaxis (bacterial, viral and fungal)	1320	89.9	6.4	3.6
20	11	Oral candidiasis	332	89.8	5.7	4.5

COPD = chronic obstructive pulmonary disease

a Rank in the 20 most common indications, where 1 is the most common indication

Source: NAPS, 2014

Table S3.6 Region of residence and socioeconomic status for patients prescribed systemic antibiotics in the community, 2014

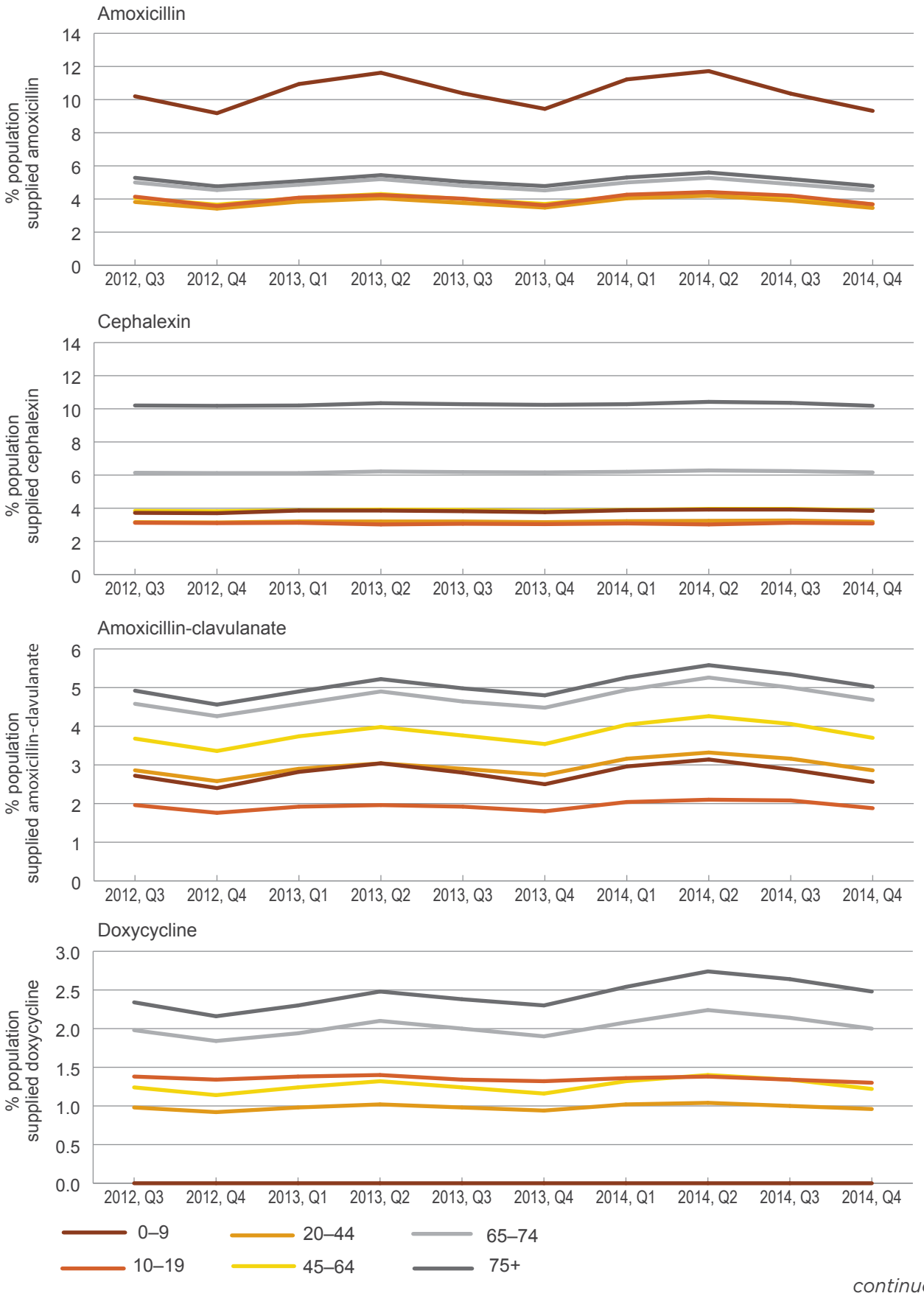
Measure	Category	Percentage of patients prescribed systemic antibiotics[a]
Jurisdiction	New South Wales	33.8
	Queensland	30.1
	Tasmania	30.4
	Victoria	29.0
	Australian Capital Territory, Northern Territory and Western Australia	26.3
Remoteness	Major cities	31.1
	Inner regional	28.2
	Outer regional, remote and very remote	29.3
Socioeconomic status (SEIFA quintile)	1–2 (most disadvantaged)	31.3
	3–4	28.7
	5–6	30.5
	7–8	30.7
	9–10 (most advantaged)	30.5

SEIFA = Socio-Economic Indexes for Areas

a Percentage of patients visiting a general practitioner at a clinically representative practice who had one or more prescriptions for systemic antibiotics ordered in 2014

Source: NPS MedicineWise, MedicineInsight Post Market Surveillance Report 3, February 2015.

Figure S3.1 Most commonly dispensed antibiotics in the community, by age group (3-point moving average), quarter 3, 2012 – quarter 4, 2014



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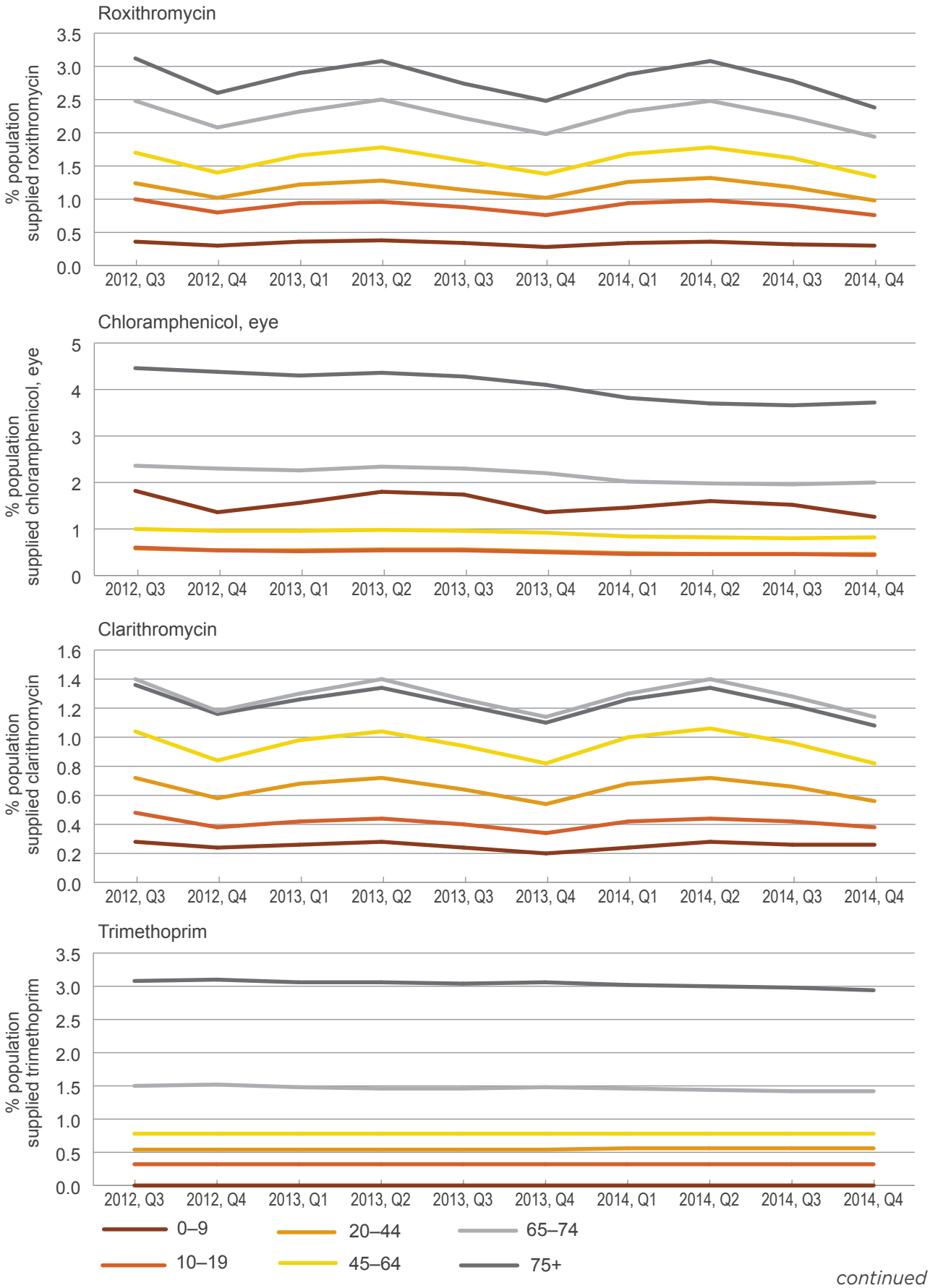

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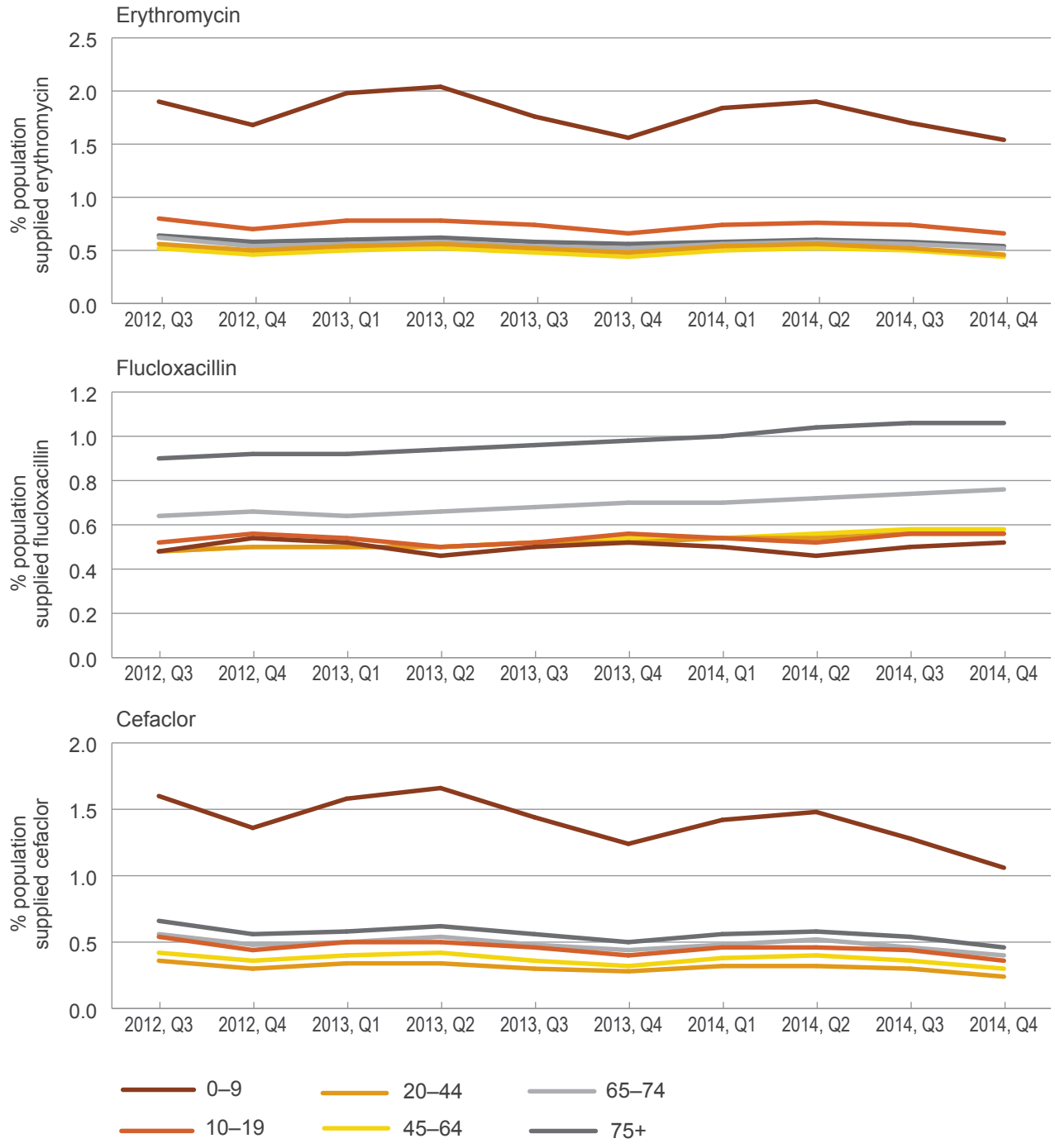

Sources: Drug Utilisation Sub Committee; PBS

Table S3.7 Residential aged care facilities participating in the Aged Care National Antimicrobial Prescribing Survey pilot, by jurisdiction, remoteness and provider type, 2015

Measure	Category	Number (%)
State	New South Wales	17 (9.1)
	Queensland	7 (3.8)
	South Australia	8 (4.3)
	Tasmania	6 (3.2)
	Victoria	130 (69.9)
	Western Australia	18 (9.7)
Remoteness	Major cities	51 (27.4)
	Inner regional	81 (43.5)
	Outer regional	45 (24.2)
	Remote	8 (4.3)
	Very remote	1 (0.5)
Provider type	Not for profit	37 (19.9)
	• *charitable*	*9*
	• *religious*	*20*
	• *community based*	*8*
	Government owned	141 (75.8)
	• *state government*	*140*
	• *local government*	*1*
	Private	8 (4.3)
Total	na	186 (100.0)

na = not applicable
Source: acNAPS, 2015

Table S3.8 Prevalence of antimicrobial use and infection in residential aged care facilities, by jurisdiction, remoteness and provider type, 2015

Measure	Category	Number of facilities	Number of beds audited	Prevalence of antimicrobial use, *n* (%)	Prevalence of infection, *n* (%)
State	New South Wales	17	545	66 (12.1)	32 (5.9)
	Queensland	7	481	31 (6.4)	17 (3.5)
	South Australia	8	559	99 (17.7)	53 (9.5)
	Tasmania	6	147	19 (12.9)	9 (6.1)
	Victoria	130	4704	334 (7.1)	172 (3.7)
	Western Australia	18	1153	310 (26.9)	61 (5.3)
Remoteness	Major cities	51	2881	397 (13.8)	127 (4.4)
	Inner regional	81	3323	312 (9.4)	148 (4.5)
	Outer regional	45	1245	123 (9.9)	50 (4.0)
	Remote	8	128	25 (20.0)	17 (13.6)
	Very remote	1	12	2 (16.7)	2 (16.7)
Provider type	Not for profit	37	2181	426 (19.5)	120 (5.5)
	Government	141	4963	395 (8.0)	207 (4.2)
	Private	8	445	38 (8.5)	17 (3.8)
National aggregate	na	186	7589	859 (11.3)	344 (4.5)

na = not applicable
Source: acNAPS, 2015

Table S3.9 World Health Organization defined daily doses for antibacterial agents included in the National Antimicrobial Utilisation Surveillance Program annual report

ATC code – pharmacological subgroup	ATC code – chemical subgroup	ATC code	Generic name	Defined daily dose (grams)	Route
J01A Tetracyclines	J01AA Tetracyclines	J01AA02	Doxycycline	0.1	O, P
		J01AA08	Minocycline	0.2	O, P
		J01AA12	Tigecycline	0.1	P
J01B Amphenicols	J01BA Amphenicols	J01BA01	Chloramphenicol	3	O, P
J01C ß-lactam antibacterials, penicillins	J01CA Penicillins with extended spectrum	J01CA01	Ampicillin[a]	2	O, P
		J01CA04	Amoxicillin[a]	1	O, P
	J01CE ß-lactamase-sensitive penicillins	J01CE01	Benzylpenicillin[a]	3.6	P
		J01CE02	Phenoxymethylpenicillin[a]	2	O
		J01CE08	Benzathine benzylpenicillin[a]	3.6	P
		J01CE09	Procaine penicillin[a]	0.6	P
	J01CF ß-lactamase-resistant penicillins	J01CF01	Dicloxacillin	2	O, P
		J01CF05	Flucloxacillin	2	O, P
	J01CR Combinations of penicillins, including ß-lactamase inhibitors	J01CR02	Amoxycillin and enzyme inhibitor[a]	1	O
		J01CR03	Ticarcillin and enzyme inhibitor[b]	15	P
		J01CR05	Piperacillin and enzyme inhibitor[b]	14	P
J01D Other ß-lactam antibacterials	J01DB First-generation cephalosporins	J01DB01	Cefalexin	2	O
		J01DB03	Cefalotin	4	P
		J01DB04	Cefazolin	3	P
	J01DC Second-generation cephalosporins	J01DC01	Cefoxitin	6	P
		J01DC02	Cefuroxime	0.5	O
		J01DC04	Cefaclor	1	O
	J01DD Third-generation cephalosporins	J01DD01	Cefotaxime	4	P
		J01DD02	Ceftazidime	4	P
		J01DD04	Ceftriaxone	2	P
	J01DE Fourth-generation cephalosporins	J01DE01	Cefepime	2	P
	J01DH Carbapenems	J01DH02	Meropenem	2	P
		J01DH51	Imipenem and enzyme inhibitor	2	P
		J01DH03	Ertapenem	1	P
		J01DH04	Doripenem	1.5	P
	J01DF Monobactams	J01DF01	Aztreonam	4	P
	J01DI Other cephalosporins	J01DI02	Ceftaroline	1.2	P
J01E Sulfonamides and trimethoprim	J01EA Trimethoprim and derivatives	J01EA01	Trimethoprim	0.4	O, P
	J01EE Sulfonamides and trimethoprim	J01EE01	Sulfamethoxazole and trimethoprim	1.92	O, P

continued

Table S3.9 *continued*

ATC code – pharmacological subgroup	ATC code – chemical subgroup	ATC code	Generic name	Defined daily dose (grams)	Route
J01F Macrolides, lincosamides and streptogramins	J01FA Macrolides	J01FA01	Erythromycin	1	O, P
		J01FA01	Erythromycin ethylsuccinate	2	O
		J01FA06	Roxithromycin	0.3	O
		J01FA09	Clarithromycin	0.5	O
		J01FA10	Azithromycin	0.3	O
		J01FA10	Azithromycin	0.5	P
	J01FF Lincosamides	J01FF01	Clindamycin	1.2	O
		J01FF01	Clindamycin	1.8	P
		J01FF02	Lincomycin	1.8	O, P
	J01FG Streptogramins	J01FG01	Pristinamycin	2	O
		J01FG02	Quinupristin/dalfopristin	1.5	P
J01G Aminoglycoside antibacterials	J01GB Other aminoglycosides	J01GB01	Tobramycin	0.24	P
		J01GB01	Tobramycin	0.3	Inh solution
		J01GB01	Tobramycin	0.112	Inh powder
		J01GB03	Gentamicin	0.24	P
		J01GB05	Neomycin	1	O
		J01GB06	Amikacin	1	P
J01M Quinolone antibacterials	J01MA Fluoroquinolones	J01MA01	Ofloxacin (oral product not marketed in Australia but available through Special Access Scheme)	0.4	O
		J01MA02	Ciprofloxacin	1	O
		J01MA02	Ciprofloxacin	0.5	P
		J01MA06	Norfloxacin	0.8	O
		J01MA14	Moxifloxacin	0.4	O, P
J01X Other antibacterials	J01XA Glycopeptide antibacterials	J01XA01	Vancomycin	2	O, P
		J01XA02	Teicoplanin	0.4	P
	J01XB Polymyxins	J01XB01	Colistin	3 MU	P, Inh
	J01XC Steroid antibacterials	J01XC01	Fusidic acid	1.5	O, P
	J01XD Imidazole derivatives	J01XD01	Metronidazole	1.5	P
		J01XD01	Metronidazole	2	O, R
		J01XD02	Tinidazole	2	O
	J01XX Other antibacterials	J01XX08	Linezolid	1.2	O, P
		J01XX09	Daptomycin	0.28	P
J04 Antimycobacterials	J04AB Antibiotics	J04AB02	Rifampicin	0.6	O, P

ATC = Anatomical Therapeutic Chemical; Inh = inhalation; MU = million units; O = oral; P = parenteral; R = rectal

a Without antipseudomonal activity

b With antipseudomonal activity

Source: World Health Organization Collaborating Centre for Drug Statistics Methodology

Table S3.10 Antimicrobials included in analyses of Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme data

ATC code	Description
J01	Antibacterials for systemic use
A02BD	Combinations for eradication of *Helicobacter pylori*
A07AA09	Vancomycin (intestinal anti-infectives)
A07AA11	Rifaximin (intestinal anti-infectives)
D06AX09	Mupirocin (cream/ointment, RPBS only)
D06BA01	Sulfadiazine silver (cream)
D07CB01	Triamcinolone + neomycin sulfate + gramicidin + nystatin
S01AA01, S01AA11, S01AA12, S01AA26	Opthalmological antibiotics: gentamicin, chloramphenicol, azithromycin, tobramycin
S01AE01, S01AE03	Opthalmological fluoroquinolones: ofloxacin, ciprofloxacin
S02AA01, S02AA15	Otological anti-infectives: chloramphenicol, ciprofloxacin
S02CA	Corticosteroids and anti-infectives in combination
S03AA	Framycetin

RPBS = Repatriation Pharmaceutical Benefits Scheme

AURA 2016 Chapter 4: antimicrobial resistance tables

Table S4.1 ***Acinetobacter baumannii*** **resistance (all specimen sources), 2014**

Antimicrobial	No. isolates tested	% resistant
Ampicillin	234	100.0
Ceftriaxone	776	83.9
Ciprofloxacin	562	4.1
Gentamicin	799	2.4
Trimethoprim–sulfamethoxazole	43	7.0
Meropenem	609	3.6

Sources: OrgTRx (Queensland); SNP (Queensland and northern New South Wales)

Table S4.2 ***Acinetobacter baumannii*** **resistance, by clinical setting, 2014**

Antimicrobial	Public hospitals and health services, % resistant (*n*)	Private hospitals, % resistant (*n*)	Community, % resistant (*n*)	Residential aged care facilities, % resistant (*n*)
Ampicillin	na	100.0 (54)	100.0 (165)	100.0 (15)
Ceftriaxone	80.1 (557)	100.0 (51)	92.2 (153)	86.7 (15)
Ciprofloxacin	4.2 (520)	2.4 (42)	na	na
Gentamicin	2.8 (567)	1.9 (54)	1.2 (163)	0.0 (15)
Trimethoprim–sulfamethoxazole	na	7.0 (43)	na	na
Meropenem	3.5 (564)	4.4 (45)	na	na

na = not available (either not tested or tested against an inadequate number of isolates)
Sources: OrgTRx; SNP (Queensland and northern New South Wales)

Table S4.3 *Escherichia coli* resistance, by specimen source, 2014

Antimicrobial	Blood, % resistant (*n*)	Urine, % resistant (*n*)	Other, % resistant (*n*)	Total, % resistant (*n*)
Ampicillin	51.3 (5 907)	42.3 (82 118)	49.8 (2 666)	43.1 (90 691)
Amoxicillin–clavulanate	20.9 (5 495)	11.1 (82 370)	21.1 (1 810)	11.9 (89 675)
Ticarcillin–clavulanate	18.9 (3 855)	33.7 (3 200)	na	25.6 (7 055)
Piperacillin–tazobactam	6.3 (5 902)	5.3 (25 457)	9.4 (2 167)	5.7 (33 526)
Cefazolin	19.4 (4 661)	15.2 (26 690)	25.0 (2 680)	16.6 (34 031)
Cefoxitin	na	5.5 (54 676)	na	5.5 (54 676)
Ceftriaxone	7.5 (5 903)	5.1 (29 176)	12.4 (2 243)	5.9 (37 322)
Ceftazidime	4.4 (3 485)	na	na	4.4 (3 485)
Cefepime	2.8 (3 888)	na	na	2.8 (3 888)
Trimethoprim	29.4 (3 485)	21.0 (82 109)	na	21.3 (85 594)
Trimethoprim–sulfamethoxazole	26.8 (5 902)	19.9 (26 369)	18.9 (2 677)	21.0 (34 948)
Gentamicin	7.0 (5 908)	4.5 (30 427)	6.0 (2 665)	5.0 (39 000)
Tobramycin	8.1 (3 886)	6.3 (3 212)	10.3 (436)	7.4 (7 534)
Amikacin	0.1 (3 485)	na	na	0.1 (3 485)
Ciprofloxacin	8.7 (5 898)	6.2 (25 684)	9.7 (2 144)	6.8 (33 726)
Norfloxacin	16.5 (3 485)	6.6 (79 916)	na	7.1 (83 401)
Nitrofurantoin	1.5 (3 462)	0.8 (54 605)	na	0.9 (58 067)
Meropenem	0.1 (5 886)	0.0 (25 548)	0.0 (2 183)	0.0 (33 617)

na = not available (either not tested or tested against an inadequate number of isolates)
Sources: OrgTRx (Queensland); AGAR (national); SNP (Queensland and northern New South Wales)

Table S4.4 *Klebsiella pneumoniae* resistance, by specimen source, 2014

Antimicrobial	Blood, % resistant (*n*)	Urine, % resistant (*n*)	Other, % resistant (*n*)	Total, % resistant (*n*)
Ampicillin	96.7 (1 449)	98.7 (10 587)	98.5 (1 088)	98.5 (13 124)
Amoxicillin–clavulanate	9.4 (1 358)	4.7 (10 647)	6.6 (908)	5.3 (12 913)
Ticarcillin–clavulanate	11.3 (959)	28.1 (608)	23.1 (104)	18.1 (1 671)
Piperacillin–tazobactam	7.6 (1 454)	8.9 (4 145)	8.9 (973)	8.6 (6 572)
Cefazolin	10.6 (1 144)	6.6 (4 298)	9.2 (1 099)	7.7 (6 541)
Cefoxitin	na	3.4 (6 171)	na	3.4 (6 171)
Ceftriaxone	6.6 (1 445)	4.3 (4 811)	6.1 (990)	5.0 (7 246)
Ceftazidime	5.8 (875)	na	na	5.8 (875)
Cefepime	3.1 (970)	na	na	3.1 (870)
Trimethoprim	16.6 (875)	12.3 (10 582)	na	12.7 (11 457)
Trimethoprim–sulfamethoxazole	14.0 (1 447)	8.2 (4 285)	8.0 (1 089)	9.4 (6 821)
Gentamicin	4.6 (1 448)	3.1 (4 961)	4.9 (1 088)	3.6 (7 497)
Tobramycin	6.4 (970)	6.4 (610)	19.4 (103)	7.2 (1 683)
Amikacin	0.9 (875)	na	na	0.9 (875)
Ciprofloxacin	4.5 (1 449)	4.5 (4 145)	6.2 (964)	4.7 (6 558)
Norfloxacin	12.6 (875)	5.6 (10 422)	na	6.2 (11 297)
Nitrofurantoin	34.6 (875)	21.0 (6 209)	na	22.7 (7 084)
Meropenem	0.5 (1 443)	0.1 (4 136)	0.0 (972)	0.2 (6 551)

na = not available (either not tested or tested against an inadequate number of isolates)
Sources: OrgTRx (Queensland); AGAR (national); SNP (Queensland and northern New South Wales)

Table S4.5 *Enterobacter cloacae* resistance, by specimen source, 2014

Antimicrobial	Blood, % resistant (*n*)	Other, % resistant (*n*)	Total, % resistant (*n*)
Ampicillin	89.4 (405)	99.9 (1920)	98.1 (2325)
Amoxicillin–clavulanate	90.9 (340)	99.7 (1543)	98.1 (1883)
Ticarcillin–clavulanate	28.5 (404)	50.3 (596)	41.5 (1000)
Piperacillin–tazobactam	24.3 (382)	32.2 (199)	27.0 (581)
Cefazolin	97.6 (292)	100.0 (380)	99.0 (672)
Cefoxitin	na	99.5 (1541)	99.5 (1541)
Ceftriaxone	24.2 (567)	26.3 (2625)	25.9 (3192)
Ceftazidime	24.4 (340)	na	24.4 (340)
Cefepime	3.2 (403)	na	3.0 (403)
Trimethoprim	18.3 (338)	21.3 (2773)	21.0 (3111)
Trimethoprim–sulfamethoxazole	19.9 (569)	17.6 (2467)	18.0 (3036)
Gentamicin	7.2 (568)	7.6 (2843)	7.6 (3411)
Tobramycin	7.2 (405)	11.1 (692)	9.7 (1097)
Amikacin	0.0 (340)	na	0.0 (340)
Ciprofloxacin	4.7 (571)	4.4 (2361)	4.5 (2932)
Norfloxacin	11.5 (340)	6.4 (2731)	6.9 (3071)
Nitrofurantoin	21.8 (339)	35.1 (1548)	32.8 (1887)
Meropenem	2.6 (571)	1.3 (2399)	1.5 (2970)

na = not available (either not tested or tested against an inadequate number of isolates)
Sources: OrgTRx (Queensland); AGAR (national); SNP (Queensland and northern New South Wales)

Table S4.6 *Enterococcus faecium* resistance, by jurisdiction (blood culture isolates), 2014

Antimicrobial	ACT, % resistant (*n*)	NSW, % resistant (*n*)	NT, % resistant (*n*)	Qld, % resistant (*n*)	SA, % resistant (*n*)	Tas, % resistant (*n*)	Vic, % resistant (*n*)	WA, % resistant (*n*)	Australia, % resistant (*n*)
Ampicillin	87.8 (41)	89.3 (103)	0.0 (1)	81.1 (37)	89.1 (46)	71.4 (7)	94.6 (93)	94.0 (50)	89.7 (378)
Ciprofloxacin	90.2 (41)	64.1 (103)	0.0 (1)	71.4 (28)	na	na	93.5 (93)	94.0 (50)	81.3 (316)
Trimethoprim–sulfamethoxazole	75.6 (41)	46.6 (103)	0.0 (1)	64.9 (37)	27.9 (43)	na	na	82.0 (50)	56.7 (275)
Linezolid	0.0 (41)	1.9 (103)	0.0 (1)	0.0 (37)	0.0 (45)	0.0 (7)	0.0 (93)	0.0 (50)	0.5 (377)
Vancomycin	24.4 (41)	50.5 (103)	0.0 (1)	40.5 (37)	56.5 (46)	14.3 (7)	66.7 (93)	18.0 (50)	46.3 (378)

ACT = Australian Capital Territory; na = not available (either not tested or tested against an inadequate number of isolates); NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia
Source: AGAR

Table S4.7 *Enterococcus faecalis* resistance, by jurisdiction (blood culture isolates), 2014

Antimicrobial	ACT, % resistant (*n*)	NSW, % resistant (*n*)	NT, % resistant (*n*)	Qld, % resistant (*n*)	SA, % resistant (*n*)	Tas, % resistant (*n*)	Vic, % resistant (*n*)	WA, % resistant (*n*)	Australia, % resistant (*n*)
Ampicillin	0.0 (33)	0.0 (133)	0.0 (6)	2.0 (102)	2.0 (51)	0.0 (13)	0.0 (110)	0.0 (63)	0.6 (511)
Ciprofloxacin	42.4 (33)	17.2 (134)	50.0 (6)	15.7 (89)	na	na	22.0 (109)	11.1 (63)	19.6 (434)
Trimethoprim–sulfamethoxazole	36.4 (33)	21.6 (134)	50.0 (6)	21.6 (102)	26.0 (50)	na	na	12.7 (63)	22.4 (388)
Linezolid	0.0 (33)	0.7 (134)	0.0 (6)	0.0 (102)	0.0 (51)	0.0 (13)	0.0 (109)	0.0 (63)	0.2 (511)
Vancomycin	0.0 (33)	0.0 (134)	0.0 (6)	1.0 (102)	0.0 (51)	0.0 (13)	0.0 (110)	0.0 (63)	0.2 (512)

ACT = Australian Capital Territory; na = not available (either not tested or tested against an inadequate number of isolates); NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia
Source: AGAR

Table S4.8 *Mycobacterium tuberculosis* resistance to first-line antimycobacterial agents, 2005–14

Isolates and resistance patterns	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total TB cases notified to NNDSS[a]	1075	1208	1130	1220	1307	1364	1389	1316	1263	1339
Total number of laboratory isolates[b]	706	775	782	913	966	1023	1059	984	936	1027
Fully susceptible	638	660	685	801	823	903	941	852	814	898
Resistant to isoniazid only[c]	42	74	59	57	94	67	65	73	67	65
Resistant to rifampicin only[c]	2	1	3	2	6	3	1	3	3	7
• Resistant to isoniazid and rifampicin (susceptible to ethambutol and pyrazinamide)	6	11	11	12	15	13	18	14	10	7
• Resistant to isoniazid, rifampicin and ethambutol (susceptible to pyrazinamide)	4	2	1	6	1	1	2	2	4	1
• Resistant to isoniazid, rifampicin and pyrazinamide (susceptible to ethambutol)	1	0	7	3	8	16	2	1	2	3
• Resistant to isoniazid, rifampicin, ethambutol and pyrazinamide	1	3	0	1	0	1	5	3	7	6
Total MDR strains (resistant to at least isoniazid and rifampicin; sum of above 4 rows)	12	16	19	22	24	31	27	20	23	17
Percentage of all laboratory isolates that are MDR-TB	1.7	2.1	2.4	2.4	2.5	3.0	2.5	2.0	2.5	1.7
XDR-TB (resistant to at least isoniazid and rifampicin, plus fluoroquinolone and an injectable agent)	0	0	0	0	0	2	0	0	0	1

MDR-TB = multidrug-resistant tuberculosis; NNDSS = National Notifiable Diseases Surveillance System; TB = tuberculosis; XDR-TB = extremely drug-resistant tuberculosis

a Clinically diagnosed cases of tuberculosis are reported to NNDSS.

b Some laboratory isolates may have been tested against agents other than first-line agents.

c Notified cases may have reported resistance to antimicrobials other than first-line agents.

Note: Drug susceptibility test data was not provided by Western Australia for 2005, 2006 and 2007; or the Australian Capital Territory for 2005.

Source: NNDSS snapshot (23 June 2015) 373 and 374

Table S4.9 *Mycobacterium tuberculosis* notifications and resistance, by jurisdiction, 2014

Jurisdiction	Total TB cases notified to NNDSS	Total isolates tested	Isoniazid,[a] % resistant (*n*)	Rifampicin,[a] % resistant (*n*)	Ethambutol,[a] % resistant (*n*)	Pyrazinamide,[a] % resistant (*n*)	Fluoroquinolones,[bc] % resistant (*n*)	Kanamycin,[b] % resistant (*n*)	Capreomycin,[b] % resistant (*n*)	Amikacin,[b] % resistant (*n*)	Ethionamide/ prothionamide,[b] % resistant (*n*)
ACT	30	22	13.6 (22)	4.5 (22)	0.0 (22)	0.0 (22)	0.0 (1)	0.0 (9)	0.0 (1)	0.0 (1)	0.0 (1)
NSW	472	340	9.7 (340)	1.5 (340)	2.1 (338)	2.4 (336)	20.0 (10)	0.0 (0)	0.0 (7)	0.0 (7)	12.5 (8)
NT	28	22	4.5 (22)	0.0 (22)	0.0 (22)	0.0 (21)	0.0 (1)	0.0 (1)	0.0 (1)	0.0 (1)	0.0 (1)
Qld	165	142	11.4 (140)	4.9 (142)	1.4 (142)	4.2 (142)	11.1 (9)	0.0 (9)	0.0 (8)	0.0 (9)	75.0 (8)
SA	48	40	5.4 (37)	5.0 (40)	0.0 (39)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (2)	0.0 (0)	0.0 (0)
Tas	9	8	0.0 (8)	0.0 (8)	0.0 (8)	12.5 (8)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Vic	448	347	6.7 (329)	2.0 (347)	0.6 (337)	0.3 (336)	6.1 (33)	11.8 (34)	2.9 (34)	2.9 (34)	35.3 (34)
WA	139	106	7.5 (106)	2.8 (106)	0.9 (106)	3.8 (106)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (1)
Australia	1339	1027	8.5 (1004)	2.4 (1027)	1.2 (1014)	2.1 (971)	9.3 (54)	9.1 (44)	1.9 (53)	1.9 (52)	35.8 (53)

ACT = Australian Capital Territory; NNDSS = National Notifiable Diseases Surveillance System; NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; TB = tuberculosis; Vic = Victoria; WA = Western Australia

a Routinely tested agents

b Selectively tested agents

c Fluoroquinolones include ciprofloxacin, ofloxacin, moxifloxacin and levofloxacin.

Source: NNDSS snapshot (23 June 2015) 373 and 374

Table S4.10 *Neisseria gonorrhoeae* decreased susceptibility and resistance, 2000–14

Year	Number of isolates tested	Ceftriaxone decreased susceptibility, % (*n*)	Ciprofloxacin resistance, % (*n*)	Azithromycin resistance, % (*n*)	Penicillin resistance, % (*n*)
2000	3468	na	18.0 (619)	na	20.0 (679)
2001	3641	na	17.0 (638)	na	23.0 (832)
2002	3861	0.5 (21)	10.0 (389)	na	18.0 (695)
2003	3677	0.3 (10)	13.0 (452)	na	17.0 (639)
2004	3542	0.7 (24)	21.0 (757)	na	22.0 (770)
2005	3886	1.2 (48)	29.0 (1113)	na	30.0 (1148)
2006	3850	0.6 (23)	30.0 (1413)	na	34.0 (1306)
2007	3042	0.8 (25)	48.0 (1456)	na	38.0 (1163)
2008	3109	0.8 (25)	53.0 (1651)	na	44.0 (1367)
2009	3157	2.0 (64)	43.0 (1346)	1.1 (25)[a]	36.0 (1142)
2010	3997	4.8 (192)	34.0 (1348)	1.1 (35)[a]	29.0 (1161)
2011	4133	3.2 (134)	27.0 (1099)	1.5 (49)[a]	26.0 (1053)
2012	4718	4.4 (207)	30.0 (1428)	1.3 (63)	32.0 (1513)
2013	4897	8.8 (429)[b]	34.0 (1669)	2.1 (104)	35.0 (1700)
2014	4804	5.4 (258)	36.0 (1750)	2.5 (119)	29.0 (1370)

na = not available

a Excluding Victoria, as azithromycin data is not available

b An additional isolate from the Northern Territory had a minimum inhibitory concentration (MIC) of 0.5 mg/L to ceftriaxone, the highest recorded in Australia.

Note:

1. Decreased susceptibility to ceftriaxone: MIC 0.06–0.125 mg/L
2. Resistance to ciprofloxacin: MIC ≥1 mg/L
3. Resistance to azithromycin: MIC ≥1 mg/L

Source: NNN (www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-gonoanrep.htm)

Table S4.11 *Neisseria gonorrhoeae* decreased susceptibility and resistance, by jurisdiction, 2014

Jurisdiction	Number of isolates tested	Ceftriaxone decreased susceptibility, % (*n*)	Ciprofloxacin resistance, % (*n*)	Azithromycin resistance, % (*n*)	Penicillin resistance, % (*n*)
ACT	75	2.7 (2)	44.0 (33)	9.3 (7)	12.0 (9)
NSW	1672	7.1 (119)	43.0 (726)	2.0 (33)	43.0 (725)
NT: urban and rural	99	3.0 (3)	27.0 (27)	0.0 (0)	21.0 (21)
NT: remote	130	0.8 (1)	3.1 (4)	0.0 (0)	1.5 (2)
Qld	650	3.2 (21)	28.0 (184)	3.5 (23)	24.0 (153)
SA	207	1.0 (2)	42.0 (86)	0.5 (1)	11.0 (22)
Tas	30	0.0 (0)	27.0 (8)	3.3 (1)	23.0 (7)
Vic	1440	6.6 (95)	39.0 (559)	2.3 (33)	22.0 (322)
WA: urban and rural	393	3.6 (14)	30.0 (117)	5.3 (21)	26.0 (104)
WA: remote	108	0.9 (1)	5.6 (6)	0.0 (0)	4.6 (5)
Australia	4804	5.4 (258)	36.0 (1750)	2.5 (119)	29.0 (1370)

ACT = Australian Capital Territory; NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

Note:

1. Decreased susceptibility to ceftriaxone: MIC 0.06–0.125 mg/L
2. Resistance to ciprofloxacin: MIC ≥1 mg/L
3. Resistance to azithromycin: MIC ≥1 mg/L

Source: NNN (www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-gonoanrep.htm)

Table S4.12 *Neisseria gonorrhoeae* decreased susceptibility to ceftriaxone (MIC 0.06–0.125 mg/L), by jurisdiction, 2009–14

Jurisdiction	2009, % of all isolates (*n*)	2010, % of all isolates (*n*)	2011, % of all isolates (*n*)	2012, % of all isolates (*n*)	2013, % of all isolates (*n*)	2014, % of all isolates (*n*)
ACT	5.3 (2)	6.7 (2)	3.1 (2)	3.6 (2)	0.0 (0)	2.7 (2)
NSW	1.7 (16)	5.6 (74)	4.4 (58)	4.5 (76)	11.8 (183)	7.1 (119)
NT: total	0.2 (1)	0.2 (1)	0.4 (2)	0.0 (0)	–	–
urban and rural	na	na	na	na	1.9 (2)	3.0 (3)
remote	na	na	na	na	0.8 (2)	0.8 (1)
Qld	1.8 (10)	3.2 (26)	2.3 (18)	2.4 (17)	4.9 (33)	3.2 (21)
SA	5.3 (9)	11.6 (19)	0.7 (1)	0.7 (1)	1.9 (4)	1.0 (2)
Tas	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	24.4 (11)	0.0 (0)
Vic	2.2 (17)	5.7 (52)	5.3 (50)	8.4 (105)	11.8 (181)	6.6 (95)
WA: total	3.1 (9)	5.2 (17)	0.7 (3)	1.2 (6)	2.7 (13)	–
urban and rural	na	na	na	na	na	3.6 (14)
remote	na	na	na	na	na	0.9 (1)
Australia	2.0 (64)	4.8 (191)	3.2 (134)	4.4 (207)	8.8 (429)	5.4 (258)

– = total for state or territory separated into urban and rural, and remote; ACT = Australian Capital Territory; MIC = minimum inhibitory concentration; na = not available; NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

Note: An additional isolate from the Northern Territory had a MIC of 0.5 mg/L to ceftriaxone, the highest recorded in Australia (see www.nejm.org/doi/full/10.1056/NEJMc1408109).

Source: NNN (www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-gonoanrep.htm)

Table S4.13 Percentage of *Neisseria gonorrhoeae* isolates with decreased susceptibility to ceftriaxone (MIC 0.06–0.125 mg/L), 2010–14

Ceftriaxone MIC (mg/L)	2010	2011	2012	2013	2014
0.06	4.6	3.2	4.1	8.2	4.8
0.125	0.1	0.1	0.3	0.6	0.6

MIC = minimum inhibitory concentration

Note: An additional isolate from the Northern Territory in 2013 had a MIC of 0.5 mg/L to ceftriaxone, the highest recorded in Australia (see www.nejm.org/doi/full/10.1056/NEJMc1408109).

Source: NNN (www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-gonoanrep.htm)

Table S4.14 ***Neisseria gonorrhoeae*** **resistance to ciprofloxacin (MIC ≥1 mg/L), by jurisdiction, 2009–14**

Jurisdiction	2009, % of all isolates (*n*)	2010, % of all isolates (*n*)	2011, % of all isolates (*n*)	2012, % of all isolates (*n*)	2013, % of all isolates (*n*)	2014, % of all isolates (*n*)
ACT	5.30 (20)	57.0 (17)	14.0 (9)	34.0 (19)	20.0 (9)	44.0 (33)
NSW	55.0 (525)	40.0 (522)	33.0 (431)	32.0 (539)	35.0 (553)	43.0 (726)
NT: total	2.2 (8)	3.6 (15)	3.5 (16)	2.8 (9)	–	–
urban and rural	na	na	na	na	23.0 (24)	27.0 (27)
remote	na	na	na	na	2.1 (5)	3.1 (4)
Qld	29.0 (163)	27.0 (223)	15.0 (114)	17.0 (120)	29.0 (194)	28.0 (184)
SA	41.0 (70)	59.0 (59)	23.0 (35)	33.0 (49)	26.0 (56)	42.0 (86)
Tas	45.0 (5)	64.0 (7)	40.0 (2)	36.0 (5)	49.0 (22)	27.0 (8)
Vic	59.0 (457)	42.0 (377)	40.0 (374)	46.0 (572)	44.0 (683)	39.0 (559)
WA: total	33.0 (98)	39.0 (128)	21.0 (88)	24.0 (123)	25.0 (123)	–
urban and rural	na	na	na	na	na	30.0 (117)
remote	na	na	na	na	na	5.6 (6)
Australia	43.0 (1346)	34.0 (1348)	26.0 (1069)	30.0 (1436)	34.0 (1669)	36.0 (1750)

– = total for state or territory separated into urban and rural, and remote; ACT = Australian Capital Territory; MIC = minimum inhibitory concentration; na = not available; NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

Source: NNN (www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-gonoanrep.htm)

Table S4.15 ***Neisseria gonorrhoeae*** **resistance to azithromycin (MIC ≥1 mg/L), by jurisdiction, 2009–14**

Jurisdiction	2009, % of all isolates (*n*)	2010, % of all isolates (*n*)	2011, % of all isolates (*n*)	2012, % of all isolates (*n*)	2013, % of all isolates (*n*)	2014, % of all isolates (*n*)
ACT	0.0 (0)	0.0 (0)	6.3 (4)	0.0 (0)	2.2 (1)	9.3 (7)
NSW	0.6 (6)	0.7 (9)	0.3 (4)	0.5 (9)	0.9 (14)	2.0 (33)
NT: total	0.0 (0)	0.0 (0)	0.2 (1)	0.3 (1)	–	–
urban and rural	na	na	na	na	1.0 (1)	0.0 (0)
remote	na	na	na	na	0.0 (0)	0.0 (0)
Qld	2.0 (11)	1.5 (12)	2.7 (21)	2.1 (15)	5.7 (38)	3.5 (23)
SA	4.7 (8)	7.3 (12)	11.0 (16)	0.7 (1)	2.8 (6)	0.5 (1)
Tas	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	3.3 (1)
Vic	na	na	na	2.7 (34)	2.3 (35)	2.3 (33)
WA: total	0.0 (0)	0.6 (2)	0.7 (3)	0.6 (3)	1.9 (9)	–
urban and rural	na	na	na	na	na	5.3 (21)
remote	na	na	na	na	na	0.0 (0)
Australia	1.1 (25)	1.1 (35)	1.5 (49)	1.3 (63)	2.1 (104)	2.5 (119)

– = total for state or territory separated into urban and rural, and remote; ACT = Australian Capital Territory; MIC = minimum inhibitory concentration; na = not available; NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

Source: NNN (www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-gonoanrep.htm)

Table S4.16 *Neisseria gonorrhoeae* resistance to penicillin (MIC ≥1 mg/L or penicillinase-producing *N. gonorrhoeae*), by jurisdiction, 2009–14

Jurisdiction	2009, % of all isolates (*n*)	2010, % of all isolates (*n*)	2011, % of all isolates (*n*)	2012, % of all isolates (*n*)	2013, % of all isolates (*n*)	2014, % of all isolates (*n*)
ACT	29.0 (11)	23.0 (7)	11.0 (7)	14.0 (8)	2.2 (7)	12.0 (9)
NSW	47.0 (447)	31.0 (408)	28.0 (371)	28.0 (482)	38.0 (593)	43.0 (725)
NT: total	3.6 (13)	3.6 (15)	4.1 (19)	3.1 (10)	–	–
urban and rural	na	na	na	na	20.0 (21)	21.0 (21)
remote	na	na	na	na	1.3 (3)	1.5 (2)
Qld	19.0 (105)	23.0 (185)	19.0 (144)	26.0 (183)	31.0 (209)	24.0 (153)
SA	43.0 (73)	34.0 (56)	17.0 (26)	35.0 (53)	18.0 (39)	11.0 (22)
Tas	45.0 (5)	36.0 (4)	60.0 (3)	36.0 (5)	38.0 (17)	23.0 (7)
Vic	52.0 (403)	42.0 (382)	44.0 (410)	53.0 (666)	44.0 (678)	22.0 (322)
WA: total	29.0 (85)	32.0 (104)	18.0 (73)	21.0 (106)	27.0 (133)	–
urban and rural	na	na	na	na	na	26.0 (104)
remote	na	na	na	na	na	4.6 (5)
Australia	36.0 (1142)	29.0 (1161)	26.0 (1053)	32.0 (1513)	35.0 (1700)	29.0 (1370)

– = total for state or territory separated into urban and rural, and remote; ACT = Australian Capital Territory; MIC = minimum inhibitory concentration; na = not available; NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

Source: NNN (www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-gonoanrep.htm)

Table S4.17 *Neisseria meningitidis* resistance and decreased susceptibility, 2000–14

Year	Number of isolates tested	Penicillin decreased susceptibility, % (*n*)	Penicillin resistance, % (*n*)	Ceftriaxone resistance, % (*n*)	Ciprofloxacin resistance, % (*n*)	Rifampicin resistance, % (*n*)
2000	369	68.0 (251)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
2001	338	67.0 (226)	0.0 (0)	0.0 (0)	0.0 (0)	1.2 (4)
2002	391	67.0 (262)	0.5 (2)	0.0 (0)	0.0 (0)	0.0 (0)
2003	300	67.0 (200)	0.3 (1)	0.0 (0)	0.0 (0)	1.0 (3)
2004	238	62.0 (147)	0.4 (1)	0.0 (0)	0.0 (0)	0.0 (0)
2005	206	68.0 (140)	0.5 (1)	0.0 (0)	0.0 (0)	0.5 (1)
2006	164	67.0 (109)	0.0 (0)	0.0 (0)	0.0 (0)	0.6 (1)
2007	151	77.0 (116)	0.0 (0)	0.0 (0)	0.0 (0)	2.0 (3)
2008	150	73.0 (109)	0.0 (0)	0.0 (0)	0.0 (0)	0.7 (1)
2009	137	72.0 (98)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
2010	122	83.0 (101)	0.8 (1)	0.0 (0)	0.0 (0)	0.0 (0)
2011	125	86.0 (108)	0.8 (1)	0.0 (0)	0.0 (0)	0.0 (0)
2012	115	83.0 (95)	0.9 (1)	0.0 (0)	0.0 (0)	0.0 (0)
2013	93	79.0 (73)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
2014	95	88.0 (84)	0.0 (0)	0.0 (0)	0.0 (0)	2.1 (2)

Note: Penicillin decreased susceptibility is defined as a minimum inhibitory concentration of >0.03 mg/L.
Source: NNN (www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-menganrep.htm)

Table S4.18 Number of *Neisseria meningitidis* isolates at each penicillin MIC value, 2006–14

Year	Total isolates tested	≤0.008 mg/L	0.016 mg/L	0.03 mg/L	0.06 mg/L	0.125 mg/L	0.25 mg/L	0.5 mg/L	1.0 mg/L	≥2.0 mg/L
2006	164	2	8	45	57	25	21	6	0	0
2007	151	0	2	33	63	18	25	10	0	0
2008	150	0	2	39	58	24	20	7	0	0
2009	137	0	8	31	41	23	25	9	0	0
2010	122	3	1	16	40	20	26	15	1	0
2011	125	0	3	13	33	22	40	13	1	0
2012	115	0	1	18	36	17	22	20	1	0
2013	93	1	2	17	30	14	21	8	0	0
2014	95	0	1	10	28	15	26	15	0	0

MIC = minimum inhibitory concentration
Source: NNN (www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-menganrep.htm)

Table S4.19 *Neisseria meningitidis* decreased susceptibility to penicillin (MIC 0.06–0.50 mg/L), by jurisdiction, 2009–14

Jurisdiction	2009, % (*n*)	2010, % (*n*)	2011, % (*n*)	2012, % (*n*)	2013, % (*n*)	2014, % (*n*)
ACT	100 (3)	100 (1)	100 (3)	0 (0)	100 (2)	0 (0)
NSW	77 (37)	93 (40)	93 (25)	86 (30)	49 (24)	89 (23)
NT	100 (2)	100 (3)	0 (0)	100 (2)	100 (2)	50 (1)
Qld	69 (20)	68 (17)	88 (30)	79 (22)	85 (17)	91 (21)
SA	29 (4)	57 (4)	85 (11)	75 (9)	67 (6)	100 (6)
Tas	0 (0)	0 (0)	67 (4)	75 (3)	50 (1)	100 (2)
Vic	87 (20)	93 (26)	89 (25)	96 (21)	86 (12)	100 (21)
WA	71 (12)	71 (10)	77 (10)	67 (8)	82 (9)	67 (10)
Australia	72 (98)	83 (101)	86 (108)	83 (95)	79 (73)	88 (84)

ACT = Australian Capital Territory; MIC = minimum inhibitory concentration; NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia
Source: NNN (www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-menganrep.htm)

Table S4.20 ***Neisseria meningitidis*** **resistance to penicillin (MIC ≥1 mg/L), by jurisdiction, 2002–12**

Year	Number of isolates	State or territory of isolation
2002	2	NSW and NT
2003	1	ACT
2004	1	NT
2005	1	NSW
2006	0	na
2007	0	na
2008	0	na
2009	0	na
2010	1	Vic
2011	1	Vic
2012	1	NSW

ACT = Australian Capital Territory; MIC = minimum inhibitory concentration; na = not applicable; NSW = New South Wales; NT = Northern Territory; Vic = Victoria

Note: All isolates had MIC = 1 mg/L.

Source: NNN (www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-menganrep.htm)

Table S4.21 ***Neisseria meningitidis*** **resistance to rifampicin (MIC ≥1 mg/L), by jurisdiction, 2001–14**

Year	Number of isolates	State or territory of isolation
2001	4	Qld (3 with MIC = 1 mg/L;1 with MIC = 128 mg/L)
2002	0	na
2003	3	SA (MIC = 32 mg/L), Qld (MIC = 1 mg/L), WA (MIC = 100 mg/L)
2004	0	na
2005	1	Qld (MIC = 1 mg/L)
2006	1	Qld (MIC = 1 mg/L)
2007	3	Qld (MIC = 1 mg/L)
2008	1	Qld (MIC = 1 mg/L)
2009	0	na
2010	0	na
2011	0	na
2012	0	na
2013	0	na
2014	2	WA (1 with MIC = 4 mg/L; 1 with MIC = 16 mg/L)

MIC = minimum inhibitory concentration; na = not applicable; Qld = Queensland; SA = South Australia; WA = Western Australia

Source: NNN (www.health.gov.au/internet/main/publishing.nsf/content/cda-pubs-annlrpt-menganrep.htm)

Table S4.22 ***Pseudomonas aeruginosa*** **resistance (all specimen sources), 2014**

Antimicrobial	% resistant	No. isolates tested
Ampicillin	100.0	12 207
Piperacillin–tazobactam	10.3	9 101
Cefazolin	100.0	6 692
Ceftazidime	4.5	21 387
Gentamicin	5.3	21 498
Ciprofloxacin	6.7	15 694
Meropenem	4.0	15 845
Trimethoprim–sulfamethoxazole	99.6	6 683

Sources: OrgTRx (Queensland); SNP (Queensland and northern New South Wales)

Table S4.23 ***Pseudomonas aeruginosa*** **resistance, by clinical setting, 2014**

Antimicrobial	Public hospitals and health services, % resistance (*n*)	Private hospitals, % resistance (*n*)	Community, % resistance (*n*)	Residential aged care facilities, % resistance (*n*)
Ampicillin	na	100.0 (2552)	100.0 (8444)	100.0 (1211)
Piperacillin–tazobactam	10.3 (9101)	na	na	na
Cefazolin	na	na	100.0 (6692)	na
Ceftazidime	7.1 (9194)	4.6 (2551)	1.8 (8430)	2.5 (1212)
Gentamicin	8.9 (9250)	2.5 (2569)	2.6 (8463)	2.5 (1216)
Ciprofloxacin	9.4 (9258)	na	2.8 (6436)	na
Meropenem	6.4 (9194)	na	0.6 (6651)	na
Trimethoprim–sulfamethoxazole	na	na	99.6 (6683)	na

na = not available (either not tested or tested against an inadequate number of isolates)

Sources: OrgTRx, Queensland (public hospitals and health services); SNP (private hospitals, community and residential aged care facilities)

Table S4.24 *Salmonella* species (nontyphoidal) resistance, by specimen source, 2014

Antimicrobial	Blood, % resistance (*n*)	Faeces, % resistance (*n*)	Other, % resistance (*n*)	Total, % resistance (*n*)
Ampicillin	6.7 (180)	7.7 (2421)	7.7 (115)	7.6 (2716)
Amoxicillin–clavulanate	0.0 (91)	na	1.8 (56)	0.7 (147)
Ticarcillin–clavulanate	5.4 (92)	na	na	5.4 (92)
Piperacillin–tazobactam	0.0 (93)	na	na	0.0 (93)
Ceftriaxone	0.6 (181)	0.8 (946)	1.9 (53)	0.8 (1180)
Ceftazidime	1.1 (93)	na	na	1.1 (93)
Cefepime	1.1 (93)	na	na	1.1 (93)
Trimethoprim	5.4 (93)	na	3.6 (56)	4.7 (149)
Trimethoprim–sulfamethoxazole	4.9 (103)	4.2 (1443)	na	4.3 (1546)
Gentamicin	0.0 (93)	na	na	0.0 (93)
Tobramycin	0.0 (93)	na	na	0.0 (93)
Amikacin	0.0 (93)	na	na	0.0 (93)
Ciprofloxacin	1.1 (179)	0.2 (936)	0.0 (46)	0.3 (1161)
Norfloxacin	10.8 (93)	1.4 (1087)	0.9 (109)	2.0 (1289)
Nitrofurantoin	8.6 (93)	na	na	8.6 (93)
Meropenem	0.0 (93)	na	na	0.0 (93)

na = not available (either not tested or tested against an inadequate number of isolates)
Sources: OrgTRx (Queensland); AGAR (national); SNP (Queensland and northern New South Wales)

Table S4.25 *Salmonella* species (typhoidal) resistance (blood culture isolates), 2014

Antimicrobial	Blood, % resistance (*n*)
Ampicillin	2.3 (43)
Amoxicillin–clavulanate	0.0 (25)
Ticarcillin–clavulanate	0.0 (26)
Piperacillin–tazobactam	0.0 (21)
Cefazolin	0.0 (22)
Ceftriaxone	0.0 (44)
Ceftazidime	0.0 (26)
Cefepime	0.0 (26)
Trimethoprim	0.0 (25)
Trimethoprim–sulfamethoxazole	3.3 (30)
Gentamicin	0.0 (26)
Tobramycin	0.0 (26)
Amikacin	0.0 (26)
Ciprofloxacin	14.6 (41)
Norfloxacin	65.4 (26)
Nitrofurantoin	0.0 (26)
Meropenem	0.0 (26)

Sources: OrgTRx (Queensland); AGAR (national); SNP (Queensland and northern New South Wales)

Table S4.26 *Salmonella* species (nontyphoidal) resistance, by clinical setting, 2014

Antimicrobial	Public hospitals, % resistance (*n*)	Public hospitals and health services, % resistance (*n*)	Private hospitals, % resistance (*n*)	Community, % resistance (*n*)	Residential aged care facilities, % resistance (*n*)
Ampicillin	8.9 (90)	5.0 (1111)	15.1 (146)	8.8 (1358)	0.0 (11)
Amoxicillin–clavulanate	0.0 (88)	na	na	1.9 (52)	na
Ticarcillin–clavulanate	5.6 (89)	na	na	na	na
Piperacillin–tazobactam	0.0 (90)	na	na	na	na
Cefazolin	2.0 (49)	na	na	na	na
Ceftriaxone	1.1 (90)	0.8 (1077)	0.0 (11)	na	na
Ceftazidime	1.1 (90)	na	na	na	na
Cefepime	1.1 (90)	na	na	na	na
Trimethoprim	5.6 (90)	na	na	3.8 (52)	0.0 (4)
Trimethoprim–sulfamethoxazole	5.6 (90)	na	2.9 (139)	4.4 (1310)	0.0 (7)
Gentamicin	0.0 (90)	na	na	na	na
Tobramycin	0.0 (90)	na	na	na	na
Amikacin	0.0 (90)	na	na	na	na
Ciprofloxacin	0.0 (90)	0.4 (1059)	0.0 (10)	na	na
Norfloxacin	11.1 (90)	1.4 (1016)	1.7 (120)	0.0 (52)	0.0 (11)
Nitrofurantoin	8.9 (90)	na	na	na	na
Meropenem	0.0 (90)	na	na	na	na

na = not available (either not tested or tested against an inadequate number of isolates)

Sources: AGAR (public and private hospitals); OrgTRx, Queensland (public hospitals and health services); SNP (private hospitals, community and residential aged care facilities)

Table S4.27 *Shigella* species resistance (faecal isolates), 2014

Antimicrobial	*S. sonnei*, % resistance (*n*)	*S. flexneri*, % resistance (*n*)
Ampicillin	10.6 (66)	57.1 (21)
Ceftriaxone	3.1 (32)	0.0 (13)
Ciprofloxacin	9.4 (32)	0.0 (12)
Norfloxacin	53.1 (32)	0.0 (7)
Trimethoprim–sulfamethoxazole	75.8 (33)	44.4 (9)

Sources: OrgTRx (Queensland); AGAR (national); SNP (Queensland and northern New South Wales)

Table S4.28 *Shigella* species resistance, by clinical setting, 2014

Antimicrobial	Public hospitals and health services, % resistance (*n*)	Community, % resistance (*n*)
Ampicillin	21.3 (47)	23.7 (38)
Ceftriaxone	2.2 (46)	na
Ciprofloxacin	6.7 (45)	na
Norfloxacin	na	43.6 (39)
Trimethoprim–sulfamethoxazole	na	69.0 (42)

na = not available (either not tested or tested against an inadequate number of isolates)

Sources: OrgTRx, Queensland (public hospitals and health services); SNP (community)

Table S4.29 *Staphylococcus aureus* resistance, by specimen source, 2014

Antimicrobial	Blood, % resistance (*n*)	Other, % resistance (*n*)	Total, % resistance (*n*)
Penicillin	83.1 (3 758)	88.7 (30 835)	88.1 (34 593)
Oxacillin	17.1 (3 757)	15.8 (67 402)	15.8 (71 159)
Erythromycin	16.9 (3 759)	16.5 (67 431)	16.5 (71 190)
Clindamycin	7.7 (3 764)	13.9 (67 710)	13.6 (71 474)
Tetracycline	5.0 (3 749)	3.4 (62 334)	3.5 (66 083)
Gentamicin	3.3 (3 514)	1.4 (27 898)	1.6 (31 412)
Ciprofloxacin	9.5 (3 514)	4.1 (26 905)	4.7 (30 419)
Trimethoprim–sulfamethoxazole	3.5 (3 759)	2.2 (67 194)	2.3 (70 953)
Fusidic acid	5.4 (3 509)	11.3 (26 821)	10.6 (30 330)
Rifampicin	0.3 (3 458)	0.2 (26 846)	0.2 (30 304)
Nitrofurantoin	0.0 (2 109)	na	0.0 (2 109)
Daptomycin	0.3 (3 664)	0.3 (60 370)	0.3 (64 034)
Linezolid	0.1 (3 657)	0.1 (60 229)	0.1 (63 886)
Vancomycin	0.0 (3 764)	0.0 (26 642)	0.0 (30 406)

na = not available (either not tested or tested against an inadequate number of isolates)
Sources: OrgTRx (Queensland); AGAR (national); SNP (Queensland and northern New South Wales)

Table S4.30 *Staphylococcus aureus* resistance, by clinical setting, 2014

Antimicrobial	Public hospitals, % resistance (*n*)	Public hospitals and health services, % resistance (*n*)	Private hospitals, % resistance (*n*)	Community, % resistance (*n*)	Residential aged care facilities, % resistance (*n*)
Penicillin	82.7 (2 144)	88.9 (29 575)	84.4 (2 861)	84.6 (13)	na
Oxacillin	19.2 (2 144)	20.7 (29 504)	15.6 (3 493)	10.8 (34 117)	27.7 (1 901)
Erythromycin	17.2 (2 144)	14.7 (29 532)	19.6 (3 494)	17.3 (34 120)	22.2 (1 900)
Clindamycin	4.4 (2 144)	10.1 (29 834)	17.5 (3 492)	16.5 (34 105)	20.6 (1 899)
Tetracycline	6.1 (2 144)	3.3 (28 232)	4.5 (3 425)	3.2 (30 386)	5.0 (1 896)
Gentamicin	4.3 (2 146)	1.4 (29 206)	0.0 (60)	na	na
Ciprofloxacin	12.3 (2 146)	4.1 (28 213)	3.3 (60)	na	na
Trimethoprim–sulfamethoxazole	4.2 (2 144)	2.7 (29 294)	3.1 (3 494)	1.7 (34 120)	3.5 (1 901)
Fusidic acid	4.1 (2 145)	11.1 (28 125)	3.3 (60)	na	na
Rifampicin	0.4 (2 094)	0.2 (28 150)	0.0 (60)	na	na
Nitrofurantoin	0.0 (2 092)	na	0.0 (17)	na	na
Daptomycin	0.5 (2 142)	0.3 (26 344)	0.5 (3 047)	0.3 (30 852)	0.7 (1 649)
Linezolid	0.2 (2 146)	0.0 (26 180)	0.0 (3 048)	0.1 (30 863)	0.1 (1 649)
Vancomycin	0.0 (2 146)	0.0 (27 959)	0.0 (287)	0.0 (14)	na

na = not available (either not tested or tested against an inadequate number of isolates)
Sources: AGAR (public and private hospitals); OrgTRx, Queensland (public hospitals and health services); SNP (private hospitals, community and residential aged care facilities)

Table S4.31 *Staphylococcus aureus* resistance, by jurisdiction (blood culture isolates), 2014

Antimicrobial	ACT, % resistance (*n*)	NSW, % resistance (*n*)	NT, % resistance (*n*)	Qld, % resistance (*n*)	SA, % resistance (*n*)	Tas, % resistance (*n*)	Vic, % resistance (*n*)	WA, % resistance (*n*)	Australia, % resistance (*n*)
Penicillin	84.6 (78)	85.1 (516)	92.2 (64)	80.7 (550)	93.9 (196)	67.3 (52)	78.6 (426)	80.4 (322)	82.6 (2204)
Oxacillin	14.1 (78)	24.9 (515)	37.5 (64)	17.8 (550)	21.4 (196)	5.8 (52)	15.5 (426)	14.2 (323)	19.0 (2204)
Erythromycin	20.5 (78)	22.1 (516)	26.6 (64)	14.9 (550)	18.4 (196)	11.5 (52)	16.9 (425)	11.8 (323)	17.3 (2204)
Clindamycin	2.6 (78)	5.6 (516)	7.8 (64)	4.5 (550)	3.6 (196)	1.9 (52)	5.4 (425)	1.9 (323)	4.4 (2204)
Tetracycline	7.6 (79)	10.1 (516)	10.9 (64)	5.1 (550)	4.6 (194)	0.0 (52)	5.9 (426)	2.2 (323)	6.1 (2204)
Gentamicin	5.1 (79)	6.8 (516)	7.8 (64)	3.6 (550)	5.1 (196)	0.0 (52)	3.8 (426)	0.6 (323)	4.2 (2206)
Ciprofloxacin	13.9 (79)	19.6 (516)	9.4 (64)	8.4 (550)	13.3 (196)	1.9 (52)	12.9 (426)	6.2 (323)	12.1 (2206)
Trimethoprim–sulfamethoxazole	3.8 (79)	4.9 (515)	10.9 (64)	3.6 (550)	5.1 (195)	0.0 (52)	4.5 (426)	1.5 (323)	4.0 (2204)
Fusidic acid	0.0 (78)	4.3 (516)	3.1 (64)	6.9 (550)	4.1 (196)	0.0 (52)	2.6 (426)	3.1 (323)	4.2 (2205)
Rifampicin	0.0 (79)	0.6 (516)	0.0 (64)	0.0 (550)	1.0 (196)	na	0.7 (426)	0.3 (323)	0.4 (2154)
Nitrofurantoin	0.0 (79)	0.0 (516)	0.0 (64)	0.0 (505)	0.0 (196)	na	0.0 (426)	0.0 (323)	0.0 (2109)
Daptomycin	0.0 (77)	1.2 (515)	0.0 (64)	0.0 (549)	0.5 (196)	0.0 (52)	0.5 (426)	0.3 (323)	0.5 (2202)
Linezolid	0.0 (79)	0.4 (516)	0.0 (64)	0.0 (550)	0.0 (196)	0.0 (52)	0.2 (426)	0.3 (323)	0.2 (2206)
Vancomycin	0.0 (79)	0.0 (516)	0.0 (64)	0.0 (550)	0.0 (196)	0.0 (52)	0.0 (426)	0.0 (323)	0.0 (2206)

ACT = Australian Capital Territory; na = not available (either not tested or tested against an inadequate number of isolates); NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

Source: AGAR

Table S4.32 Methicillin-resistant *Staphylococcus aureus* resistance, by specimen source, 2014

Antimicrobial	Blood, % resistance (*n*)	Other, % resistance (*n*)	Total, % resistance (*n*)
Penicillin	100.0 (634)	100.0 (5 826)	100.0 (6 460)
Oxacillin	98.1 (635)	99.9 (10 439)	99.8 (11 074)
Ciprofloxacin	42.9 (611)	12.6 (5 813)	15.5 (6 424)
Erythromycin	45.4 (636)	23.7 (10 445)	25.0 (11 081)
Clindamycin	20.6 (637)	19.0 (10 547)	19.1 (11 184)
Trimethoprim–sulfamethoxazole	11.8 (636)	5.2 (10 530)	5.5 (11 166)
Gentamicin	15.0 (612)	4.1 (5 818)	5.1 (6 430)
Rifampicin	0.8 (628)	0.9 (10 333)	0.9 (10 961)
Fusidic acid	4.6 (633)	5.9 (10 462)	5.8 (11 095)
Linezolid	0.3 (600)	0.1 (9 557)	0.1 (10 157)
Daptomycin	1.0 (599)	0.6 (9 587)	0.6 (10 186)
Tetracycline	15.8 (631)	7.2 (10 062)	7.7 (10 693)
Nitrofurantoin	0.0 (409)	na	0.0 (409)
Vancomycin	0.0 (643)	0.0 (10 477)	0.0 (11 120)

na = not available (either not tested or tested against an inadequate number of isolates)

Sources: AGAR (public and private hospitals); OrgTRx, Queensland (public hospitals and health services); SNP (private hospitals, community and residential aged care facilities)

Table S4.33 Methicillin-resistant *Staphylococcus aureus* resistance, by clinical setting, 2014

Antimicrobial	Public hospitals, % resistance (*n*)	Public hospitals and health services, % resistance (*n*)	Private hospitals, % resistance (*n*)	Community, % resistance (*n*)	Residential aged care facilities, % resistance (*n*)
Penicillin	100.0 (408)	100.0 (6023)	100.0 (28)	na	na
Oxacillin	97.3 (409)	100.0 (6024)	99.3 (534)	99.9 (3591)	99.6 (516)
Ciprofloxacin	51.6 (409)	13.0 (6008)	na	na	na
Erythromycin	49.1 (409)	20.6 (6029)	46.2 (535)	24.1 (3592)	41.3 (516)
Clindamycin	16.4 (409)	14.6 (6135)	41.5 (533)	20.8 (3591)	39.3 (516)
Trimethoprim–sulfamethoxazole	12.7 (408)	5.3 (6116)	10.5 (535)	4.5 (3591)	5.2 (516)
Gentamicin	18.1 (409)	4.2 (6014)	na	na	na
Rifampicin	1.2 (407)	0.7 (6017)	1.6 (514)	1.0 (3484)	1.3 (539)
Fusidic acid	4.2 (409)	4.6 (6015)	9.6 (551)	6.7 (3571)	11.1 (549)
Linezolid	0.5 (409)	0.1 (5391)	0.0 (461)	0.1 (3425)	0.2 (471)
Daptomycin	1.5 (407)	0.5 (5422)	0.7 (461	0.7 (3425)	0.8 (471)
Tetracycline	19.1 (409)	6.4 (5991)	13.0 (530)	7.1 (3249)	11.1 (514)
Nitrofurantoin	0.0 (406)	na	na	na	na
Vancomycin	0.0 (409)	0.0 (6014)	0.0 (555)	0.1 (3589)	0.2 (553)

na = not available (either not tested or tested against an inadequate number of isolates)

Sources: AGAR (public and private hospitals); OrgTRx, Queensland (public hospitals and health services); SNP (private hospitals, community and residential aged care facilities)

Table S4.34 Methicillin-resistant *Staphylococcus aureus* resistance, by jurisdiction (blood culture isolates), 2014

Antimicrobial	ACT, % resistant (*n*)	NSW, % resistant (*n*)	NT, % resistant (*n*)	Qld, % resistant (*n*)	SA, % resistant (*n*)	Tas, % resistant (*n*)	Vic, % resistant (*n*)	WA, % resistant (*n*)	Australia, % resistant (*n*)
Penicillin	100.0 (10)	100.0 (128)	100.0 (27)	100.0 (98)	100.0 (41)	100.0 (2)	100.0 (65)	100.0 (44)	100.0 (415)
Oxacillin	100.0 (10)	96.9 (128)	88.9 (27)	96.9 (98)	100.0 (41)	100.0 (2)	100.0 (65)	95.6 (45)	97.1 (416)
Erythromycin	90.0 (10)	56.3 (128)	37.0 (27)	37.8 (98)	56.1 (41)	50.0 (2)	58.5 (65)	33.3 (45)	49.3 (416)
Clindamycin	20.0 (10)	14.8 (128)	18.5 (27)	18.4 (98)	14.6 (41)	0.0 (2)	23.1 (65)	6.7 (45)	16.3 (416)
Tetracycline	30.0 (10)	25.0 (128)	22.2 (27)	17.3 (98)	14.6 (41)	0.0 (2)	20.0 (65)	2.2 (45)	18.8 (416)
Gentamicin	30.0 (10)	24.2 (128)	18.5 (27)	14.3 (98)	14.6 (41)	0.0 (2)	21.5 (65)	2.2 (45)	17.8 (416)
Ciprofloxacin	80.0 (10)	66.4 (128)	22.2 (27)	33.7 (98)	53.7 (41)	50.0 (2)	67.7 (65)	28.9 (45)	51.0 (416)
Trimethoprim–sulfamethoxazole	10.0 (10)	13.4 (127)	25.9 (27)	11.2 (98)	17.1 (41)	0.0 (2)	13.8 (65)	0.0 (45)	12.5 (415)
Fusidic acid	0.0 (10)	3.9 (128)	0.0 (27)	5.1 (98)	4.9 (41)	0.0 (2)	4.6 (65)	4.4 (45)	4.1 (416)
Rifampicin	0.0 (10)	1.6 (128)	0.0 (27)	0.0 (98)	4.9 (41)	na	1.5 (65)	0.0 (45)	1.2 (414)
Nitrofurantoin	0.0 (10)	0.0 (128)	0.0 (27)	0.0 (93)	0.0 (41)	na	0.0 (65)	0.0 (45)	0.0 (409)
Daptomycin	0.0 (9)	3.9 (128)	0.0 (27)	0.0 (97)	0.0 (41)	0.0 (2)	0.0 (65)	2.2 (45)	1.4 (414)
Linezolid	0.0 (10)	0.0 (128)	0.0 (27)	0.0 (98)	0.0 (41)	0.0 (2)	1.5 (65)	2.2 (45)	0.5 (416)
Vancomycin	0.0 (10)	0.0 (128)	0.0 (27)	0.0 (98)	0.0 (41)	0.0 (2)	0.0 (65)	0.0 (45)	0.0 (416)

ACT = Australian Capital Territory; na = not available (either not tested or tested against an inadequate number of isolates); NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

Source: AGAR

Table S4.35 Methicillin-resistant *Staphylococcus aureus* resistance, by healthcare-associated and community-associated clones (blood culture isolates), 2014

Antimicrobial	Healthcare associated, % resistant (*n*)	Community associated, % resistant (*n*)	Total, % resistant (*n*)
Penicillin	100.0 (163)	100.0 (239)	100.0 (402)
Oxacillin	99.4 (163)	95.4 (240)	97.0 (403)
Ciprofloxacin	98.2 (163)	19.6 (240)	51.4 (403)
Erythromycin	71.2 (163)	33.3 (240)	48.6 (403)
Clindamycin	29.4 (163)	7.1 (240)	16.1 (403)
Trimethoprim–sulfamethoxazole	22.1 (163)	5.9 (239)	12.4 (402)
Gentamicin	28.8 (163)	9.6 (240)	17.4 (403)
Rifampicin	1.2 (162)	0.8 (239)	1.0 (401)
Fusidic acid	2.5 (163)	5.4 (240)	4.2 (403)
Linezolid	0.0 (163)	0.8 (240)	0.5 (403)
Daptomycin	3.1 (161)	0.4 (240)	1.5 (401)
Tetracycline	29.4 (163)	11.3 (240)	18.6 (403)
Nitrofurantoin	0.0 (161)	0.0 (235)	0.0 (396)
Vancomycin	0.0 (163)	0.0 (240)	0.0 (403)

Source: AGAR

Table S4.36 Methicillin-resistant *Staphylococcus aureus* healthcare-associated and community-associated clones, by jurisdiction (blood culture isolates), 2014

Jurisdiction	Total isolates	% MRSA	No. typed	Community associated, % of total (*n*)	Healthcare associated, % of total (*n*)
ACT	79	12.7	10	1.3 (1)	11.4 (9)
NSW	516	24.8	125	11.0 (57)	13.2 (68)
NT	64	42.2	27	34.4 (22)	7.8 (5)
Qld	550	17.8	96	12.0 (66)	5.5 (30)
SA	196	20.9	37	11.2 (22)	7.7 (15)
Tas	52	3.8	2	1.9 (1)	1.9 (1)
Vic	426	15.3	61	8.0 (34)	6.3 (27)
WA	323	13.9	45	11.5 (37)	2.5 (8)
Australia	2206	18.9	403	10.9 (240)	7.4 (163)

ACT = Australian Capital Territory; MRSA = methicillin-resistant *Staphylococcus aureus*; NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia

Note: 97% of MRSA were available for typing to determine sequence type. Based on sequence type, MRSA were classified as either healthcare-associated or community-associated clones.

Source: AGAR (national)

Table S4.37 *Streptococcus agalactiae* resistance (all specimen sources), 2014

Antimicrobial	% resistant	No. of isolates tested
Penicillin	0.0	769
Ampicillin	0.0	1221
Erythromycin	22.7	772
Clindamycin	17.1	672
Norfloxacin	39.9	1216
Trimethoprim	17.2	1221

Sources: OrgTRx (Queensland); SNP (Queensland and northern New South Wales)

Table S4.38 *Streptococcus agalactiae* resistance, by clinical setting, 2014

Antimicrobial	Public hospitals and health services, % resistant (*n*)	Community, % resistant (*n*)	Residential aged care facilities, % resistant (*n*)
Penicillin	0.0 (769)	na	na
Ampicillin	na	0.0 (1126)	0.0 (95)
Erythromycin	22.7 (772)	na	na
Clindamycin	17.1 (672)	na	na
Trimethoprim	na	17.7 (1126)	11.6 (95)
Norfloxacin	na	40.1 (1121)	36.8 (95)

na = not available (either not tested or tested against an inadequate number of isolates)
Sources: OrgTRx, Queensland (public hospitals and health services); SNP (community and residential aged care facilities)

Table S4.39 *Streptococcus pneumoniae* resistance, by specimen source, 2014

Antimicrobial	Blood, % resistant (*n*)	Cerebrospinal fluid, % resistant (*n*)	Other, % resistant (*n*)	All sources, % resistant (*n*)
Penicillin	2.3 (175)	14.3 (7)	2.0 (2257)	2.1 (2439)
Erythromycin	21.1 (19)	na	25.9 (2283)	25.8 (2302)
Tetracycline	21.1 (19)	na	25.6 (121)	25.0 (140)
Trimethoprim–sulfamethoxazole	21.1 (19)	na	29.9 (1117)	29.8 (1136)

na = not available (either not tested or tested against an inadequate number of isolates)
Sources: OrgTRx (Queensland); SNP (Queensland and northern New South Wales)

Table S4.40 *Streptococcus pneumoniae* resistance, by clinical setting, 2014

Antimicrobial	Public hospitals and health services, % resistant (*n*)	Private hospitals, % resistant (*n*)	Community, % resistant (*n*)	Residential aged care facilities, % resistant (*n*)
Penicillin	2.6 (1312)	3.1 (131)	1.3 (989)	0.0 (7)
Erythromycin	22.1 (1170)	30.0 (130)	29.6 (995)	42.9 (7)
Tetracycline	na	26.6 (128)	0.0 (5)	14.3 (7)
Trimethoprim–sulfamethoxazole	na	27.5 (131)	30.0 (997)	37.5 (8)

na = not available (either not tested or tested against an inadequate number of isolates)

Sources: OrgTRx, Queensland (public hospitals and health services); SNP (private hospitals, community and residential aged care facilities)

Table S4.41 *Streptococcus pyogenes* resistance (all specimen sources), 2014

Antimicrobial	% resistant	No. of isolates tested
Penicillin	0.0	9934
Erythromycin	3.4	9880
Tetracycline	13.9	122
Trimethoprim–sulfamethoxazole	1.2	4782

Sources: OrgTRx (Queensland); SNP (Queensland and northern New South Wales)

Table S4.42 *Streptococcus pyogenes* resistance, by clinical setting, 2014

Antimicrobial	Public hospitals and health services, % resistant (*n*)	Private hospitals, % resistant (*n*)	Community, % resistant (*n*)	Residential aged care facilities, % resistant (*n*)
Penicillin	0.0 (5155)	0.0 (100)	0.0 (4 186)	0.0 (28)
Erythromycin	2.3 (5095)	7.0 (100)	4.4 (4657)	7.1 (28)
Tetracycline	na	14.9 (94)	na	10.7 (28)
Trimethoprim–sulfamethoxazole	na	4.1 (98)	1.1 (4656)	0.0 (28)

na = not available (either not tested or tested against an inadequate number of isolates)

Sources: OrgTRx, Queensland (public hospitals and health services); SNP (private hospitals, community and residential aged care facilities)

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