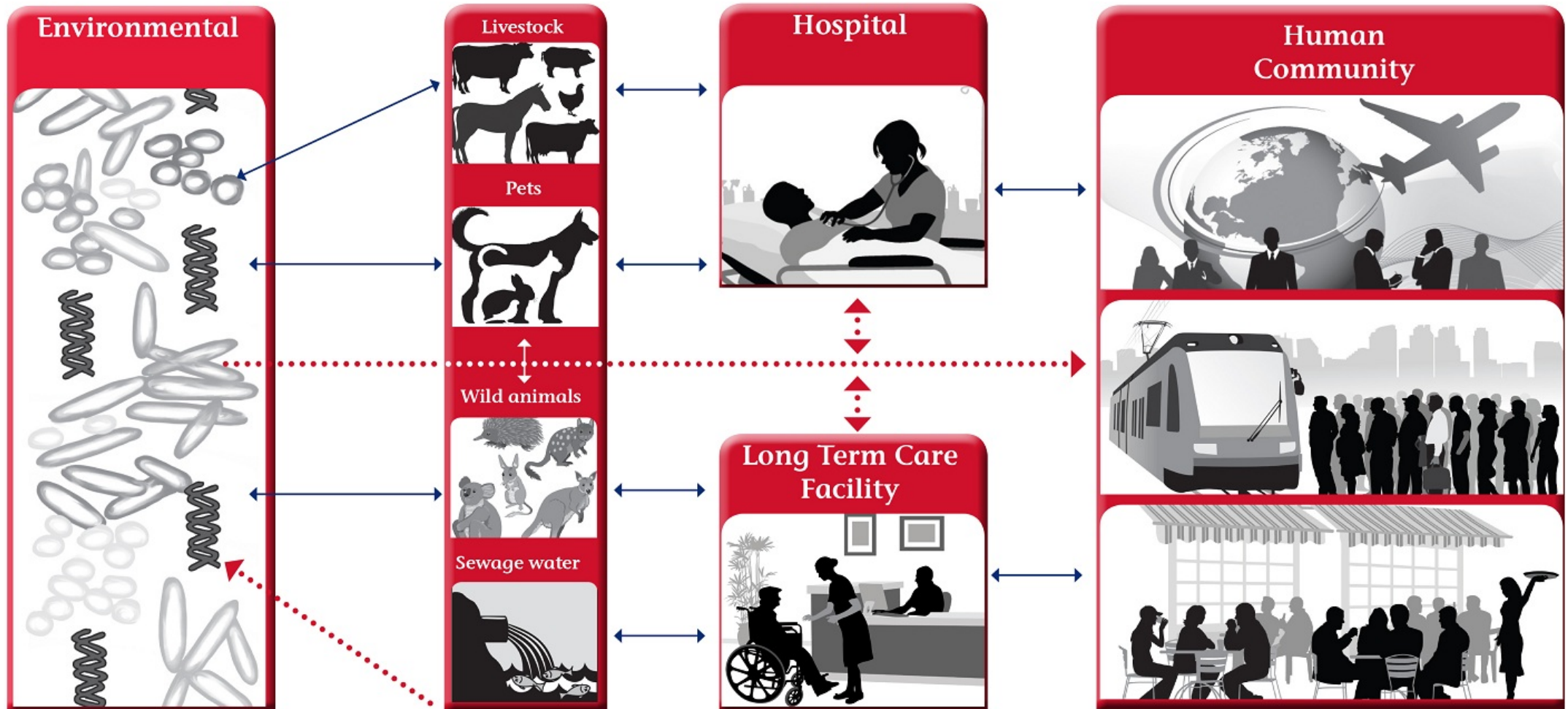


Community Antibioqram Jan - Dec 2020



Community Antibigram Jan - Dec 2020

Cumulative antibiograms from community isolates can be a useful resource to inform empirical therapy recommendations as per Therapeutic Guidelines.

Antibiogram summary:

This document provides a cumulative antibiogram of isolates collected from patients in the community. Sullivan Nicolaides pathology services patients from all over Queensland as well as Northern New South Wales. The data is divided into three parts

1. Urinary Antibiogram
 - Note: only a subset of *S.saprophyticus* isolates have had routine susceptibility performed.
2. Non Urinary Antibiogram
3. Blood Culture Antibiogram
 - Organisms are listed in descending order of frequency.
 - Organisms are colour coded according to whether they are Gram Positive or Gram Negative bacteria.
 - Only the first isolate of a given species per patient per year per subtype (e.g urine, non urine, blood cultures) is included.
 - Screening isolates collected for infection control purposes have been removed.
 - Since 2012, susceptibility testing to produce these antibiograms is performed using EUCAST microbroth dilution and disc diffusion methods.²
 - Expert EUCAST rules in Antimicrobial Susceptibility testing have been applied.³
 - Where the total number of isolates tested is < 30, results are considered statistically invalid in accordance with CLSI M39-A4. ⁴
 - Where only a subset (< 95%) of isolates from a particular organism group have been tested, reported susceptibilities are usually not indicative of the true susceptibility because of the selective nature of testing only more resistant isolates. These occasions are marked with an * and susceptibility results should be interpreted with caution.
 - For cefazolin, the EUCAST-approved Australian National Antimicrobial Susceptibility Testing Committee guidelines were used.
 - For amoxicillin–clavulanic acid, CLSI breakpoints were used, because the CLSI formulation for this agent was used in the Vitek® susceptibility cards.

Signal resistances:

Some important antibiotic resistances have their origin or circulate in the community. At the end of each antibiogram, signal resistances are summarised

These organisms include

- *Enterobacterales* resistant to third or fourth generation cephalosporins due to the presence of Extended Spectrum Beta Lactamases (ESBLs)
- *Enterobacterales* resistant to third or fourth generation cephalosporins due to the presence of Plasmid Mediated AMPC production (PAMPs)
- *Enterobacterales* resistant to carbapenems due to the presence of a plasmid mediated carbapenamase (CPE)
- Non *Enterobacterales* (e.g *Acinetobacter* spp; *Pseudomonas aeruginosa*) resistant to carbapenems due to the presence of a plasmid mediated carbapenamase (CPNE)
- Vancomycin resistant Enterococci (VRE)
- Methicillin resistant *Staphylococcus aureus* (MRSA)
- Vancomycin heteroresistant, intermediate and resistant *Staphylococcus aureus* (hVISA, VISA, VRSA)
- Penicillin intermediate and resistant *Streptococcus pneumoniae* noting that breakpoints differ according to clinical condition (meningitis, pneumonia, other) and mode of administration
- Penicillin intermediate and resistant viridans *Streptococci*

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Changes in 2019:

- Organisms tested with the EUCAST antimicrobial susceptibility method from 2019 are considered susceptible if the organism tests either "susceptible, standard dosing regimen (S)" or "susceptible, increased exposure (I)". Previous iterations of these antibiograms only included "susceptible, standard dosing regimen" (S).²
- Most positive blood cultures are collected in hospitals. As these are usually significant, all blood culture isolates have been included even where n = <30.












The current EUCAST interpretations are:

- S - Susceptible, standard dosing regimen: A microorganism is categorised as "Susceptible, standard dosing regimen", when there is a high likelihood of therapeutic success using a standard dosing regimen of the agent.
- I – Susceptible, increased exposure*: A microorganism is categorised as "Susceptible, Increased exposure*" when there is a high likelihood of therapeutic success because exposure to the agent is increased by adjusting the dosing regimen or by its concentration at the site of infection.
- R - Resistant: A microorganism is categorised as "Resistant" when there is a high likelihood of therapeutic failure even when there is increased exposure.
- Dosing and modes of administration related to S, I and R of agents are available in the last TAB of the EUCAST breakpoint table.²

References:

- Australian Commission on Safety and Quality in Health Care: Specification for a Hospital Cumulative Antibigram: Sydney: ACSQHC; 2019
- The European Committee on Antimicrobial Susceptibility Testing. [Breakpoint tables for interpretation of MICs and zone diameters, version 9.0 2019.](#)
- The European Committee on Antimicrobial Susceptibility Testing (EUCAST). Intrinsic Resistance and Exceptional Phenotypes Tables: EUCAST; 2011 [Available from: http://www.eucast.org/fileadmin/src/media/PDFs/EUCAST_files/Expert_Rules/Expert_rules_intrinsic_exceptional_V3.1.pdf].
- Clinical and Laboratory Standards Institute (CLSI). Guideline for Analysis and Presentation of Cumulative Antimicrobial Susceptibility (M39-A4). Pennsylvania: CLSI; 2014.

Colour coding for all antibiograms tables is shown below.

	Gram Positive Organism		≥90% of isolates susceptible (S) or susceptible increased exposure (I)		≥90% of isolates susceptible (S) or susceptible increased exposure (I) (where sample size <95% of total isolates tested)
	Gram Negative Organism		70-89% of isolates susceptible (S) or susceptible increased exposure (I)		70-89% of isolates susceptible (S) or susceptible increased exposure (I) (where sample size <95% of total isolates tested)
	Antibiotic Not recommended to be used in children without specialist advice		<70% of isolates susceptible (S) or susceptible increased exposure (I)		<70% of isolates susceptible (S) or susceptible increased exposure (I) (where sample size <95% of total isolates tested)
	Restricted or 2nd Line Antibiotics	R	Intrinsic Resistance is present with this organism-antibiotic combination	*	Sample size <95% of the total isolates tested
	Restricted or 2nd Line Antibiotics and Antibiotic Not recommended to be used in children without specialist advice	%	Percentage of isolates sensitive to this particular antibiotic	n	Number of isolates tested with this antibiotic

Community Antibrogram Jan - Dec 2020

Urine Antibigram			All SNP Community																		
Organism Group	No. Organisms	%Total		Amoxicillin	Amoxicillin-clavulanate	Piperacillin-tazobactam	Cefalexin	Ceftriaxone	Ceftazidime	Meropenem	Gentamicin	Amikacin	Trimethoprim	Nitrofurantoin	Norfloxacin	Ciprofloxacin	Fusidic acid	Rifampicin	Fosfomycin	Vancomycin	
All isolates	41132	100																			
Escherichia spp	27197	66.1	%	60	95	95	92	91		100	94	100	77	99	91					99	
			n	27188	27191	13622	27184	13676		13234	13695	13238	27193	27178	27194						1051
Klebsiella spp	3788	9.2	%	R	98	92	96	96		100	98	100	90	86	96						
			n		3788	1619	3788	1624		1483	1626	1485	3788	3784	3788						
Enterococcus spp	3660	8.9	%	99				R	R				R	99	96		R	25		90	
			n	3656											3656	3658			55		82
Proteus mirabilis	984	2.4	%	90	99	100	97	99		100	98	100	83	R	99						
			n	984	983	476	984	479		446	479	446	984		984						
Staphylococcus saprophyticus	892	2.2	%	20	94		R		R				91	100	100		R		R		
			n	258	284								892	890	891						
Pseudomonas aeruginosa	878	2.1	%	R	R	93	R	R	95	99	97	99	R	R	96	92					
			n			876			877		744	878	748			821	878				
Enterobacter cloacae complex†	744	1.8	%	R	R	81	R	80		100	99	100	90	86	97						
			n			587		589		554	590	554	744	743	744						
Citrobacter koseri, amalonaticus group	573	1.4	%	R	99	98	97	98		100	100	100	99	97	100		R				
			n		573	285	573	285		273	285	274	573	572	573						
β haemolytic Streptococci Group B	423	1.0	%	100									87	99	63						
			n	423									423	422	182						

Community Antibiogram Jan - Dec 2020

Urine Antibiogram			All SNP Community																		
Organism Group	No. Organisms	%Total		Amoxicillin	Amoxicillin-clavulanate	Piperacillin-tazobactam	Cefalexin	Ceftriaxone	Ceftazidime	Meropenem	Gentamicin	Amikacin	Trimethoprim	Nitrofurantoin	Norfloxacin	Ciprofloxacin	Fusidic acid	Rifampicin	Fosfomycin	Vancomycin	
All isolates	41132	100																			
Klebsiella aerogenes	420	1.0	%	R	R	81	R	83		100	100	100	98	72	97						
			n			*	*	*	*	*	*	*	*	420	419	420					
Staphylococcus aureus (ALL)†	275	0.7	%	16	89								95	100	95		97	100		100	
			n	275	275									274	270	274		*	*	*	*
Morganella spp	256	0.6	%	R	R	96	R	99		100	98	100	91	R	94						
			n			253		254		245	254	245	256		256						
Coagulase negative Staphylococci (other)†	197	0.5	%	21	78								63	100	90		64	86		100	
			n	193	197								197	195	197		*	*	*	*	
Citrobacter freundii complex†	177	0.4	%	R	R	72	R	70		99	96	99	89	98	94						
			n			*	*	*	*	*	*	*	177	177	177						
Serratia spp	145	0.4	%	R	R	96	R	96		100	99	100	97	R	93						
			n			139		139		*	139	*	145		145						
viridans Streptococci†	91	0.2	%	100									62	98			R				
			n	91									91	91							
Staphylococcus epidermidis	66	0.2	%	10	73				R				55	100	88		50	90		100	
			n	*	66								66	64	66		*	*	*	*	
Proteus spp other	53	0.1	%	R	92	100	R	84		100	100	100	87	R	100						
			n		53	*	*	*	*	*	*	*	53		53						
Aerococcus spp	47	0.1	%	100										100	98						
			n	47										47	47						

Community Antibiogram Jan - Dec 2020

Urine Antibiogram			All SNP Community																			
Organism Group	No. Organisms	%Total		Amoxicillin	Amoxicillin-clavulanate	Piperacillin-tazobactam	Cefalexin	Ceftriaxone	Ceftazidime	Meropenem	Gentamicin	Amikacin	Trimethoprim	Nitrofurantoin	Norfloxacin	Ciprofloxacin	Fusidic acid	Rifampicin	Fosfomycin	Vancomycin		
All isolates	41132	100																				
Providencia spp	39	0.1	%	R	R	100	R	100		100	97	100	90	R	97							
			n			39		39		*	32	39	*	32	39		39					
Acinetobacter baumannii complex	32	0.1	%	R	R	97	R	R		R	100	100	R							R		
			n			32						32	31									

Community Antibiogram Jan - Dec 2020

Signal Resistances: Where the tables below contain no data no multiresistant organisms have been detected.

Urine: Extended spectrum beta lactamase producing Enterobacterales (ESBL)

Organism Group	Organism Name	No. Positive	% of Strain
Citrobacter freundii complex† n = 177	Citrobacter freundii	4	2.3
Citrobacter koseri, amalonaticus group n = 573	Citrobacter koseri	1	0.2
Enterobacter cloacae complex† n = 744	Enterobacter cloacae	8	1.1
Escherichia spp n = 27197	Escherichia coli	1062	3.9
Klebsiella spp n = 3788	Klebsiella oxytoca	1	0.0
	Klebsiella pneumoniae	48	1.3
Proteus mirabilis n = 984	Proteus mirabilis	4	0.4
Proteus spp other n = 53	Proteus penneri	1	1.9

Urine: Plasmid mediated AMPC producing Enterobacterales (PAMP)

Organism Group	Organism Name	No. Positive	% of Strain
Citrobacter koseri, amalonaticus group n = 573	Citrobacter koseri	3	0.5
Escherichia spp n = 27197	Escherichia coli	569	2.1
Klebsiella spp n = 3788	Klebsiella oxytoca	1	0.0
	Klebsiella pneumoniae	33	0.9
Proteus mirabilis n = 984	Proteus mirabilis	1	0.1

Urine: Plasmid mediated Carbapenemase producing Enterobacterales (CPE)

Organism Group	Organism Name	Subtype	No. Positive	% of Strain
Escherichia spp n = 27197	Escherichia coli	IMP	1	0.0
	Escherichia coli	NDM	1	0.0

Urine: Plasmid mediated Carbapenemase producing Non Enterobacterales (CPNE)

Community Antibigram Jan - Dec 2020

Organism Group	Organism Name	No. Positive	% of Strain
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Urine: Vancomycin Resistant Enterococci (VRE)

Organism Group	Organism Name	No. Positive	% of Strain
Enterococcus spp n = 3660	Enterococcus faecium (VRE) - VAN-A	1	0.0
	Enterococcus faecium (VRE) - VAN-B	5	0.1

Urine: Methicillin Resistant Staphylococcus aureus (MRSA)

Organism Group	Organism Name	No. Positive	% of Strain
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Community Antibigram Jan - Dec 2020

Non-urine Antibigram			All SNP Community																										
Organism Group	No. Organisms	% Total		Clarithromycin	Penicillin	Amoxicillin	Flucloxacillin	Amoxicillin-clavulanate	Piperacillin-tazobactam	Cefalotin	Cefazolin	Ceftriaxone	Ceftazidime	Cefepime	Meropenem	Gentamicin	Amikacin	Sulpha-trimethoprim	Norfloracin	Ciprofloxacin	Fusidic acid	Rifampicin	Erythromycin/Clarithromycin	Azithromycin	Clindamycin	Tetracyclines	Quinupristin-dalfopristin	Vancomycin	
				%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
All isolates	29018	100																											
Staphylococcus aureus (ALL)†	16919	58.3	%		20		89	89		89			R					98		97	92	100	82		83	97		100	
			n	16912		16910	16911		16916									16917	*	15759	*	15763	*	15755	16916	16910	16915	*	15747
Pseudomonas aeruginosa	4033	13.9	%			R		R	97		R	R	98	98	100	96	99	R		95							R		
			n				4026		4026			4027	3879	4027	4031	*	3234			4029									
β haemolytic Streptococci Group A	1857	6.4	%		100					100		100						99				100	88		91	79		100	
			n	1857					1845		*	1136						1856				*	1171	1857	1856	1857	*	1178	
Haemophilus influenzae	1136	3.9	%			61		77													R					99			
			n		1136		1136											1135								1136			
Campylobacter spp	846	2.9	%																	84	R		98	98		89	R		
			n															846					846	846	845				
Salmonella spp	779	2.7	%			96		99				100			100			99	98	99									
			n		779		771				771			770			779	778	771										
β haemolytic Streptococci Other (nonA nonB)	731	2.5	%		100					100		100						99				100	80		81	75		100	
			n	730					722		*	371					731					*	388	731	731	731	*	388	
Aeromonas spp	554	1.9	%			R		1	88		R	99		100	70	100	100	98	99	99									
			n				*	164	*	478		*	515	*	484	*	493	*	519	*	446	554	*	481	*	515			
Streptococcus pneumoniae	338	1.2	%	71	100							97						77				100	70		76	74		100	
			n	* 270	337						*	258					335					*	253	338	323	337	*	259	

Community Antibigram Jan - Dec 2020

Non-urine Antibigram All SNP Community

Organism Group	No. Organisms	% Total	Antibiotics																								
			Clarithromycin	Penicillin	Amoxicillin	Flucloxacillin	Amoxicillin-clavulanate	Piperacillin-tazobactam	Cefalotin	Cefazolin	Ceftriaxone	Ceftazidime	Cefepime	Meropenem	Gentamicin	Amikacin	Sulpha-trimethoprim	Norfloracin	Ciprofloxacin	Fusidic acid	Rifampicin	Erythromycin/Clarithromycin	Azithromycin	Clindamycin	Tetracyclines	Quinupristin-dalfopristin	Vancomycin
All isolates	29018	100																									
Moraxella catarrhalis	229	0.8	% 100	2	100										96					100			100				
Staphylococcus lugdunensis	206	0.7	%	65	98	98	98		R						100	99	100	100	96		96	96	96			100	
viridans Streptococci†	158	0.5	%	100			100	94							89		R		75		87	71			100		
Neisseria gonorrhoeae	115	0.4	%	85				100								76				100							
Escherichia spp	95	0.3	%	52	83	93	77	80	94	100	94	100	80	87													
Pasteurella spp	75	0.3	%	99	99	100		100					40		100								99				
Stenotrophomonas maltophilia	74	0.3	%	R	R	R	R	R	R		R	R	R	100									R				
Staphylococcus epidermidis	70	0.2	%	20	60	60	60		R						81	90	86	99	50		80	76			100		
Non fermenting GNB†	68	0.2	%	6	56	92	0	39	53	90	33	19	90	59									92				

Community Antibrogram Jan - Dec 2020

Non-urine Antibigram All SNP Community

Organism Group	No. Organisms	% Total		Clarithromycin	Penicillin	Amoxicillin	Flucloxacillin	Amoxicillin-clavulanate	Piperacillin-tazobactam	Cefalotin	Cefazolin	Ceftriaxone	Ceftazidime	Cefepime	Meropenem	Gentamicin	Amikacin	Sulpha-trimethoprim	Norfloracin	Ciprofloxacin	Fusidic acid	Rifampicin	Erythromycin/Clarithromycin	Azithromycin	Clindamycin	Tetracyclines	Quinupristin-dalfopristin	Vancomycin
All isolates	29018	100																										
Klebsiella spp	61	0.2	%			R		97	98		85	97		100	100	98	100	92		95								
			n					61	60		61	61		61	61	61	61	*	56	61		61						
Serratia spp	50	0.2	%			R		R	100		R	100		100	100	100	100	98		94								
			n					50		50		50	50	50	50	50	50	50	50	50		50						
β haemolytic Streptococci Group B	49	0.2	%		100					100	100							100				100	63		69	26		100
			n		49				*	36	*	30							48			*	30	48	48	48	*	46
Enterobacter cloacae complex†	48	0.2	%			R		R	89	R	R	87		96	100	96	100	88		96								
			n					47		47		47	47	47	47	47	*	45	48		47							
Corynebacterium spp	47	0.2	%		81													57					45		36	93		100
			n		*	43													28					*	29	44	43	*
Corynebacterium diphtheriae	44	0.2	%		43																		93		95	100		
			n		44																			44		*	37	*
Yersinia spp	32	0.1	%			R		R	95	R	R	100		97	100	97	97	97	97	100	100							
			n					*	21		*	30		31	*	29	*	29	*	30	32	32	*	30				

Community Antibiogram Jan - Dec 2020

Signal Resistances: Where the tables below contain no data no multiresistant organisms have been detected.

NonUrine: Extended spectrum beta lactamase producing Enterobacterales (ESBL)			
Organism Group	Organism Name	No. Positive	% of Strain
Enterobacter cloacae complex† n = 48	Enterobacter cloacae	3	6.3
Escherichia spp n = 95	Escherichia coli	14	14.7
Klebsiella spp n = 61	Klebsiella pneumoniae	3	4.9
Proteus mirabilis n = 25	Proteus mirabilis	1	4.0
Salmonella spp n = 779	Salmonella enterica ssp enterica	1	0.1
Shigella spp n = 26	Shigella sonnei	2	7.7

NonUrine: Plasmid mediated AMPC producing Enterobacterales (PAMP)			
Organism Group	Organism Name	No. Positive	% of Strain
Escherichia spp n = 95	Escherichia coli	6	6.3
Salmonella spp n = 779	Salmonella enterica ssp enterica	1	0.1

NonUrine: Plasmid mediated Carbapenemase producing Enterobacterales (CPE)				
Organism Group	Organism Name	Subtype	No. Positive	% of Strain

NonUrine: Plasmid mediated Carbapenemase producing Non Enterobacterales (CPNE)			
Organism Group	Organism Name	No. Positive	% of Strain

Community Antibigram Jan - Dec 2020

NonUrine: Vancomycin Resistant Enterococci (VRE)

NonUrine: Methicillin Resistant Staphylococcus aureus (MRSA)

Organism Group	Organism Name	No. Positive	% of Strain
Staphylococcus aureus (ALL)† n = 16911	S.aureus (non-multiresistant MRSA)	1723	10.2
	Staphylococcus aureus (MRSA)	45	0.3
	Staphylococcus aureus (UK EMRSA-15)	92	0.5

NonUrine: Streptococcus pneumoniae Penicillin Susceptibility (Non-meningitis breakpoints)

Organism Group	MIC category	No.	% of Strain
Streptococcus pneumoniae n = 337	Sensitive ≤ 0.06 mg/L	200	59.3
	Intermediate 0.12 - 2 mg/L	136	40.4
	Resistant > 2 mg/L	1	0.3

NonUrine: Streptococcus pneumoniae Ceftriaxone Susceptibility

Organism Group	MIC category	No.	% of Strain
Streptococcus pneumoniae n = 337	Intermediate 1 - 2 mg/L	1	0.3

NonUrine: Streptococcus alpha haem (viridans Streptococci) Penicillin Susceptibility

Organism Group	MIC category	No.	% of Strain
viridans Streptococci† n = 158	Sensitive ≤ 0.25 mg/L	151	95.6
	Intermediate 0.5 - 2 mg/L	7	4.4

Community Antibigram Jan - Dec 2020

Blood Culture Antibigram		All SNP Community													
Organism Group	No. Organisms	% Total		Penicillin	Flucloxacillin	Amoxicillin-clavulanate	Cefalotin	Sulpha-trimethoprim	Ciprofloxacin	Fusidic Acid	Rifampicin	Erythromycin/Clarithromycin	Clindamycin	Tetracyclines	Vancomycin
All isolates	56	100.0													
Staphylococcus epidermidis	11	19.6	%	18	55	55	55	60	80	80	100	45	64	64	100
			n	11	11	11	11	10	10	10	10	11	11	11	11

Signal Resistances: Where the tables below contain no data no multiresistant organisms have been detected.

Blood Culture: Extended spectrum beta lactamase producing Enterobacterales (ESBL)

Organism Group	Organism Name	No. Positive	% of Strain
Escherichia spp n = 8	Escherichia coli	1	12.5

Blood Culture: Plasmid mediated AMPC producing Enterobacterales (PAMP)

Organism Group	Organism Name	No. Positive	% of Strain
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Blood Culture: Plasmid mediated Carbapenemase producing Enterobacterales (CPE)

Organism Group	Organism Name	Subtype	No. Positive	% of Strain
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Blood Culture: Plasmid mediated Carbapenemase producing Non Enterobacterales (CPNE)

Community Antibigram Jan - Dec 2020

Organism Group	Organism Name	No. Positive	% of Strain
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Blood Culture: Vancomycin Resistant Enterococci (VRE)

Organism Group	Organism Name	No. Positive	% of Strain
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Blood Culture: Methicillin Resistant Staphylococcus aureus (MRSA)

Organism Group	Organism Name	No. Positive	% of Strain
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Community Antibigram Jan - Dec 2020

Blood Culture: Streptococcus pneumoniae Penicillin Susceptibility (Non-meningitis breakpoints)

Blood Culture: Streptococcus pneumoniae Ceftriaxone Susceptibility

Blood Culture: Streptococcus alpha haem (viridans Streptococci) Penicillin Susceptibility

Organism Group	MIC category	No.	% of Strain
viridans Streptococci† n = 5	Sensitive ≤ 0.25 mg/L	5	100.0

† Miscellaneous organism groupings detail [report](#).