2017 UAH Antibiograms

University of Alberta Hospital

Cross Cancer Institute

Stollery Children's Hospital

Department of Laboratory Medicine and Pathology

Introduction

The antibiograms presented herein represent cumulative annual antimicrobial susceptibility rates of the most common microbial pathogens isolated from clinical specimens submitted to the University of Alberta Hospital (UAH) Clinical Microbiology Laboratory. This report represents the 2017 local susceptibility rates at the University of Alberta Hospital, Stollery Children's Hospital, and the Cross Cancer Institute, and is to be used as a resource to direct empiric antimicrobial therapy.

Antibiograms are generated by compiling susceptibility results from all first clinical isolates of a specific pathogen recovered from an individual patient per calendar year. That is, only the first isolate, regardless of specimen type or body site, is selected for analysis. Susceptibility rates for organisms represented by less than 30 isolates are not included due to the limited statistical significance.

The susceptibility testing methods used by the UAH Clinical Microbiology Laboratory include VITEK-2, gradient diffusion, microbroth dilution and disk diffusion. Interpretation of susceptibility testing results is based on Clinical and Laboratory Standards Institute (CLSI) guidelines.

The data presented herein is also available at the following website: www.antibiogram.ca.

We would like to acknowledge the effort of the entire clinical microbiology technologist staff generating the data presented herein and UAH antimicrobial stewardship for helping review this document. We would also like to acknowledge Dr. Darren Hudson, UAH, for his assistance with synthesizing antibiogram data.

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UNIVERSITY OF ALBERTA HOSPITAL ANTIBIOGRAM
2017 ADULT CUMULATIVE GRAM-NEGATIVE ISOLATES (PERCENT SUSCEPTIBLE ISOLATES)

ADULT GRAM-NEGATIVE (≥17 years old)	*n*	β-Lactams										Aminoglycosides			Other Mechanisms of Action			
		Ampicillin	Amoxicillin/ Clavulanate	Piperacillin/ tazobactam	Ertapenem	Meropenem	Imipenem	Cephalexin[a]	Cefixime	Ceftazidime	Ceftriaxone	Amikacin	Gentamicin	Tobramycin	Ciprofloxacin	Doxycycline	Trimethoprim/ sulfamethoxazole	Nitrofurantoin[a]
Acinetobacter baumannii	37					97							97	97	97		86	
Citrobacter freundii	68			[d]	98	98			[d]	[d]	[d]	98	91	91	91		82	98
Enterobacter aerogenes	52			[d]	96	96			[d]	[d]	[d]	100	100	100	96		96	11
Enterobacter cloacae	273			[d]	92	93			[d]	[d]	[d]	99	95	94	98		90	63
Escherichia coli (ALL)	1876	49	77	83	99	99		86	83		86	99	90	88	73		73	97
Escherichia coli (ESBL only)	221				99	100	100					97	69	56	18		48	96
Klebsiella pneumoniae (ALL)	512		90	90	99	99		93	93		94	100	96	94	92		88	38
Klebsiella pneumoniae (ESBL only)	38				94	97	100					97	<u>50</u>	36	36		<u>34</u>	15
Morganella morganii	54			88	100	100			67		88	100	85	90	92		74	
Proteus mirabilis	190	77	93	98	100	100		93	93		97	98	94	95	83		79	
Pseudomonas aeruginosa (CF)	76			86[b]		88	75			96		59	65	88	82			
Pseudomonas aeruginosa (non-CF)	630			79[b]		86	82			85		90	85	93	84			
Serratia marcescens	82			[d]	98	98			[d]		[d]	100	98	81	95		98	
Stenotrophomonas maltophilia	206									45						85[c]	96	

Underlined values represent a ≥10% decrease from the previous year.

[a]Urinary tract isolates only.

[b]Represents activity of piperacillin only. [c]Using minocycline breakpoints.

[d] This organism may develop resistance to third generation cephalosporins and beta-lactam/beta-lactamase inhibitor combination during prolonged therapy.

UNIVERSITY OF ALBERTA HOSPITAL ANTIBIOGRAM
2017 ADULT CUMULATIVE GRAM-POSITIVE ISOLATES (PERCENT SUSCEPTIBLE ISOLATES)

ADULT GRAM-POSITIVE (≥17 years old)	*n*	β-Lactams					Other Mechanisms of Action								Aminoglycosides	
		Ampicillin	Amoxicillin	Penicillin	Ceftriaxone	Cloxacillin[a]	Clindamycin	Erythromycin	Levofloxacin	Nitrofurantoin[b]	Tetracycline	Trimethoprim/ sulfamethoxazole	Vancomycin	Linezolid	Gentamicin[c]	Streptomycin[c]
Staphylococcus aureus (ALL)	1954					79	77	67	82	99	96	97	100	100	*99*	
Staphylococcus aureus (MRSA)	402						62	25	32	99	94	95	100	100	*98*	
Staphylococcus aureus (MSSA)	1552					100	81	77	95	99	96	97	100	100	*99*	
Coagulase-negative Staphylococcus species	237					35	54	39	52	98	89	62	100	100	*82*	
Staphylococcus lugdunensis	74					98	85	83	100	100	95	100	100	100	*100*	
Enterococcus faecalis	947	99							77	99	17		100	98	*76*	*84*
Enterococcus faecium	305	13							10	36	57		79	100	*86*	*54*
Viridans group streptococci	82			67	98								100			
Streptococcus anginosus group	43			100	100								100			
Streptococcus pyogenes	62			100			77	77								
Streptococcus pneumoniae (meningitis BPs)[d]	169			79	80								100			
Streptococcus pneumoniae (non-meningitis BPs)[d]	169		90	96	92		74	69	100			87	100			

[a]Cephalosporin (e.g., cefazolin) activity inferred by activity of cloxacillin for *Staphylococcus* spp.

[b]Urinary tract isolates only.

[c]Used for synergistic purposes only.

[d]Breakpoints (BPs) are defined differently for CSF and non-CSF isolates. Numbers do not reflect meningitis rates.

UNIVERSITY OF ALBERTA HOSPITAL ANTIBIOGRAM
2017 PEDIATRIC CUMULATIVE GRAM-NEGATIVE ISOLATES (PERCENT SUSCEPTIBLE ISOLATES)

		β-Lactams						Cephalosporins				Aminoglycosides			Other Mechanisms of Action			
PEDIATRIC GRAM-NEGATIVE (<17 years old)	*n*	Ampicillin	Amoxicillin/ Clavulanate	Piperacillin/ tazobactam	Ertapenem	Meropenem	Imipenem	Cephalexin[a]	Cefixime	Ceftazidime	Ceftriaxone	Amikacin	Gentamicin	Tobramycin	Ciprofloxacin	Doxycycline	Trimethoprim/ sulfamethoxazole	Nitrofurantoin[a]
Enterobacter cloacae	52			[d]	94	96			[d]	[d]	[d]	100	98	96	98		90	61
Escherichia coli (ALL)	501	43	76	85	100	99		89	90	93	92	99	88	87	88		67	97
Escherichia coli (ESBL only)	38				100	97	100					92	60	55	42		26	92
Klebsiella pneumoniae (ALL)	79		85	89	100	99		91	92	92	92	100	97	92	95		86	43
Proteus mirabilis	31	77	93	100	100	100		96	96	100	100	100	90	93	96		70	
Pseudomonas aeruginosa (non-CF)	83			91[b]		96	95			92		86	85	95	93			
Stenotrophomonas maltophilia	54									35						90[c]	92	

Underlined values represent a ≥10% decrease from the previous year.

[a]Urinary tract isolates only.

[b]Represents activity of piperacillin only.

[c]Using minocycline breakpoints.

[d]This organism may develop resistance to third generation cephalosporins and beta-lactam/beta-lactamase inhibitor combination during prolonged therapy.

UNIVERSITY OF ALBERTA HOSPITAL ANTIBIOGRAM
2017 PEDIATRIC CUMULATIVE GRAM-POSITIVE ISOLATES (PERCENT SUSCEPTIBLE ISOLATES)

		β-Lactams					Other Mechanisms of Action								Aminoglycosides	
PEDIATRIC GRAM-POSITIVE (<17 years old)	*n*	**Ampicillin**	**Amoxicillin**	**Penicillin**	**Ceftriaxone**	**Cloxacillin[a]**	**Clindamycin**	**Erythromycin**	**Levofloxacin**	**Nitrofurantoin[b]**	**Tetracycline**	**Trimethoprim/ sulfamethoxazole**	**Vancomycin**	**Linezolid**	**Gentamicin[c]**	**Streptomycin[c]**
Staphylococcus aureus (ALL)	546					79	82	70	86	100	97	92	100	100	*98*	
Staphylococcus aureus (MRSA)	114						79	36	55	100	97	92	100	100	*95*	
Staphylococcus aureus (MSSA)	432					100	83	78	93	100	96	92	100	93	*98*	
Coagulase-negative Staphylococcus species	34					29	35	20	55	100	91	67	100	100	*61*	
Enterococcus faecalis	208	100							97	100	17		100	99	*86*	*92*
Streptococcus pneumoniae (meningitis BPs)[d]	32			90	96								100			
Streptococcus pneumoniae (non-meningitis BPs)[d]	32		100	100	100		100	75	100			91	100			

Underlined values represent a ≥10% decrease from the previous year.

[a]Cephalosporin (e.g., cefazolin) activity inferred by activity of cloxacillin for *Staphylococcus* spp.

[b]Urinary tract isolates only.

[c]Used for synergistic purposes only.

[d]Breakpoints (BPs) are defined differently for CSF and non-CSF isolates. Numbers do not reflect meningitis rates.

UNIVERSITY OF ALBERTA HOSPITAL ANTIBIOGRAM
2017 GSICU CUMULATIVE GRAM-NEGATIVE and GRAM POSITIVE ISOLATES (PERCENT SUSCEPTIBLE ISOLATES)

GSICU GRAM-NEGATIVE	*n*	β-Lactams										Aminoglycosides			Other Mechanisms of Action		
		Ampicillin	Amoxicillin/ Clavulanate	Piperacillin/ tazobactam	Ertapenem	Meropenem	Imipenem	Cephalexin[a]	Cefixime	Ceftazidime	Ceftriaxone	Amikacin	Gentamicin	Tobramycin	Ciprofloxacin	Trimethoprim/ sulfamethoxazole	Nitrofurantoin[a]
Escherichia coli	53	49	64	79	98	98		83	77		81	98	92	91	87	83	100
Pseudomonas aeruginosa (non-CF)	39			79[b]		82	82			84		89	84	94	76		

Underlined values represent a ≥10% decrease from the previous year.

[a]Urinary tract isolates only.

[b]Represents activity of piperacillin only.

GSICU GRAM-POSITIVE	*n*	β-Lactams		Other Mechanisms of Action								Aminoglycosides	
		Ampicillin	Cloxacillin[a]	Clindamycin	Erythromycin	Levofloxacin	Nitrofurantoin[b]	Tetracycline	Trimethoprim/ sulfamethoxazole	Vancomycin	Linezolid	Gentamicin[c]	Streptomycin[c]
Staphylococcus aureus	149		81	81	72	86	99	97	97	100	100	*99*	
Enterococcus faecium	35	3				9	37	59		77	100	*86*	*43*

[a]Cephalosporin (e.g., cefazolin) activity inferred by activity of cloxacillin for *Staphylococcus* spp.

[b]Urinary tract isolates only.

[c]Used for synergistic purposes only.

UNIVERSITY OF ALBERTA HOSPITAL ANTIBIOGRAM
2017 CROSS CANCER INSTITUTE CUMULATIVE GRAM-NEGATIVE and GRAM POSITIVE ISOLATES (PERCENT SUSCEPTIBLE ISOLATES)

CROSS CANCER INSTITUTE GRAM-NEGATIVE	*n*	β-Lactams									Aminoglycosides			Other Mechanisms of Action		
		Ampicillin	Amoxicillin/ Clavulanate	Piperacillin/ tazobactam	Ertapenem	Meropenem	Imipenem	Cephalexin[a]	Cefixime	Ceftriaxone	Amikacin	Gentamicin	Tobramycin	Ciprofloxacin	Trimethoprim/ sulfamethoxazole	Nitrofurantoin[a]
Escherichia coli	92	58	78	83	98	98		91	85	88	100	96	92	78	73	93

Underlined values represent a ≥10% decrease from the previous year.
[a]Urinary tract isolates only.

CROSS CANCER INSTITUTE GRAM-POSITIVE	*n*	β-Lactams		Other Mechanisms of Action								Aminoglycosides	
		Ampicillin	Cloxacillin[a]	Clindamycin	Erythromycin	Levofloxacin	Nitrofurantoin[b]	Tetracycline	Trimethoprim/ sulfamethoxazole	Vancomycin	Linezolid	Gentamicin[c]	Streptomycin[c]
Staphylococcus aureus	49		84	76	65	80	100	100	100	100	100	*100*	
Enterococcus faecalis	46	100				86	100	11		100	100	*69*	*77*

Underlined values represent a ≥10% decrease from the previous year.
[a]Cephalosporin (e.g., cefazolin) activity inferred by activity of cloxacillin for *Staphylococcus* spp.
[b]Urinary tract isolates only.
[c]Used for synergistic purposes only.