2020 Kansas Antibiogram

Gram Positives

Percent Susceptible 2018-2019 Isolates	Number of Isolates	Aminoglycosides	Rifamycins	β-Lactams			Cephalosporins	Folate pathway inhibitor	Flouro-quinolones		Glycopeptides	Lincosamides	Lippeptides	Macrolides	Nitrofurans	Oxazo lidin one	Tetracyclines
		Gentamicin	Rifampin [1]	Ampicillin [2]	Oxacillin [3]	Penicillin	Ceftriaxone	Trimethoprim/ sulfamethoxazole	Ciprofloxacin	Levofloxacin	Vancomycin	Clindamycin	Daptomycin	Erythromycin [4]	Nitrofurantoin [5]	Linezolid	Doxycycline
Enterococcus facieum	676	93 [6]		25					18	25	49		83		31	92	
VRE (E.facieum isolates only)	83			4							0				50	99	
Enterococcus faecalis	4,644			99					81	83	98		100		99	93	
NORTHWEST	606			99					62	63	99				99	98	
NORTHCENTRAL	254			100					74	74	100		100		100	99	
NORTHEAST [7]	1,136			100					83	85	100		99		100	97	
KC-METRO	1,187			99							96		100		98	75 [8]	
SOUTHEAST	327			99					70	75	99		99		100	100	
SOUTHCENTRAL	259			99					84	84	98				99	100	
WICHITA-METRO	624			99							98				100	97	
SOUTHWEST	251			100					91	91	100				98		
Staphylococcus aureus (MSSA)	5,913		100		100			98	86	85	100	79	99	65		100	94
NORTHWEST	409		100		100			99	74	76	100	80		71		100	93
NORTHCENTRAL	121		100		100			99	82	83	100	86		64		100	95
NORTHEAST [7]	1,690		100		100			98	88	87	100	80	99	65		99	93
KC-METRO	2,262		100		100			97			100	79		61		100	95
SOUTHEAST	339		100		100			97	97	91	100	81	100	72		100	95
SOUTHCENTRAL	97				100			98			100	79		77			89
WICHITA	946				100			99			100	76		65			95
SOUTHWEST	49		100		100			100	76	77	100	72		55		100	94
Staphylococcus aureus (MRSA)	4,761		100		0			94	42	43	100	65	99	12		100	91
NORTHWEST	267		99		0			99	26	26	100	42		8		98	92
NORTHCENTRAL	261		98		0			95	45	45	100	71		18		100	92
NORTHEAST [7]	1095		100		0			98	52	53	100	72		12		100	90
KC-METRO	1422		100		0			93	33	36	100	68		16		100	90
SOUTHEAST	665		100		0			89	33	35	100	59	100	10		100	92
SOUTHCENTRAL	97				0			98	58	58	100	72		7		100	82
WICHITA	772				0			97			100	56		11			94
SOUTHWEST	182		100		0			96	42	43	100	73		12		100	94
Coagulase negative staphylococcus	3,494		99		44			66	69	68	100	63	97	34	98	99	82
Staph. epidermidis	1,419		98		43			63	61	60	100	60	97	33	97	97	80
Staph. hominis	16 [11]		100		38			77	90	90	100	36		57	100	100	66
Staph. lugdenesis	168		100		94			96	99	99	100	83	100	84	100	100	96
Staph. saprophyticus	121		100		45			96	99	100	100	72	93		100	100	93
Strep agalactiae (GBS)	598					100	99			100	100	46		28		100	15
Strep anginosus group [12]	122					85	96			97	100	90		75			38
Streptococcus pneumoniae	1,109					71/91 [9]	91/94 [9]	82		98	100	82		56		100	
Streptococcus pyogenes (GAS)	27 [11]					100	100			96		89		74			
Streptococcus viridans group [13]	207					67	96			95	100	72		76			78
Corynebacterium striatum [10]	66							13	100		100		100 [10]			100	15

Gram Negatives

Percent Susceptible 2018-2019 Isolates	Number of Isolates	Aminoglycoside			β-Lactams	β-Lactam/ inhibitor combo			Cephalosporin						Carbapenem		Folate path inhibitor	Quinolones		Monobactam	Nitrofurans
									1st	2nd		3rd		4th							
		Amikacin	Gentamicin	Tobramycin	Ampicillin [1]	Amoxicillin/clavulante	Ampicillin/sulbactam	Pipercillin-tazobactam	Cefazolin	Cefoxitin	Cefuroxime	Ceftazidime	Ceftriaxone	Cefepime	Ertapenem	Meropenem	Trimethoprim/ sulfamethoxazole	Ciprofloxacin	Levofloxacin	Aztreonam	Nitrofurantoin [3]
Acinetobacter baumannii	176	83	88	94			94	66				80		79		86	84	89	81		
Citrobacter freundii complex	629	100	92	96				90				83	84	99	99	99	88	95	95	88	93
Enterobacter cloacae	1,534	100	98	98				83				86	80	94	95	99	92	94	95	86	34
Escherichia coli	31,872	100	93	93	56	85	63	97	86	92	91	95	94	95	100	100	77	81	82	96	96
NORTHWEST	1,805	99	94	95	59	85	65	98	93	98	94	91	97	98	100	100	80	86	84	95	96
NORTHCENTRAL	1,462	99	91	93	61	90	66	98	92			95	96	99	100	100	79	79	81	94	96
NORTHEAST [4]	11,436	100	94	94	58	87	64	97	90	93	91	96	96	97	100	100	80	84	85	97	96
KC-METRO	7,491	100	91	92	54	82	61	96	79		93	96	93	94	100	100	75	86	81	96	98
SOUTHEAST	3,719	100	91	92	55	87	66	97	85		93	94	94	95	100	100	76	78	79	94	92
SOUTHCENTRAL	1,336	100	92	93	57		65	96	90	89		93	92	94	100	100	76	79	76		94
WICHITA-METRO	2,865		89	90	48		55	94	84				86	92		100	73	71			95
SOUTHWEST	1,758		93	92	55	82	60	96	85				94	95	100	100	73	79	82	91	97
Klebsiella aerogenes (former Enterobac	576	99	99	100				85				86	86	97	97	100	98	98	98	89	22
Klebsiella oxytoca	792	100	98	97		94	63	91				95	95	97	100	100	94	98	98	95	87
Klebsiella pneumoniae	5,942	100	98	97		95	86	95				97	96	97	99	100	92	96	97	97	48
Morganella morganii	240	100	87	93				98				79	92	97	100	100	74	83	82	96	
Proteus mirabilis	3,385	100	87	87		96	85	98				98	97	97	100	100	74	67	70		
Pseudomonas aeruginosa	5,017	97	93	98				92				91		91		94		86	80	91	
NORTHWEST	250	96	93	94				91				90		88		90		81	71	90	
NORTHCENTRAL	174	97	89	99				98				97		91		95		89	86	97	
NORTHEAST [4]	1,205	100	92	99				97				92		95		96		90	86	92	
KC-METRO	1,586	95	92	97				90				91		89		90		89	78	91	
SOUTHEAST	344	100	92	98				90				87		89		93		76	73	87	
SOUTHCENTRAL	385		94	99				99				95		93		98		82	82	95	
WICHITA-METRO	1,002		93	98				84						93		96		85		95	
SOUTHWEST	71	100	98	95				91				95		95		92		83	82	95	
Serratia marcescens	491	99	100	95				97				96	94	97	99	99	98	95	96	97	
Stenotrophomonas maltophilia	292											45					93		85		

Yeasts

Percent Susceptible	Number of Isolates	Azoles		Echino candin
		Fluconazole	Voriconazole	Micafungin
Candida albicans	186	97	95	99
Candida glabrata [5]	97	80	83	100
Candida parapsilosis	69	96	94	97
Candida tropicalis	28 [6]	82	75	100

Kansas Healthcare-Associated Infections & Antimicrobial Resistance Advisory Group

Kansas Department of Health and Environment

2020 Kansas Antibiogram

Methodology

Collection Process and State Representation: Antibiotic susceptibility data was collected amongst 66 Kansas healthcare facilities. One hundred and twenty-three healthcare facilities were contacted regarding institutional antibiograms, of which 66 responded with results. Of the 82 critical access hospitals contacted, 47 provided results, 14 had no antibiogram, 1 had an antibiogram in process not provided, and 20 did not report back to which a second attempt was made. Amongst 51 acute care hospitals, 30 provided antibiograms and 21 did not provide even with re-requests sent out. Of these 77 received, 13 were redundant (i.e., the critical access hospital used the nearby acute care hospital's antibiogram). Two clinics also were able to provide data. The state was well represented, with facilities in each region: 10 northwest, 7 northcentral, 11 northeast (excluding Kansas City metro hospitals), 6 Kansas City metro facilities, 9 southeast, 11 southcentral, 4 Wichita metro, and 8 southwest facilities. Given a relative lack of antibiograms in many critical access and rural clinics compared to their urban peers, we attempted as much as possible to provide regional antibiotic susceptibility patterns.

Antibiogram development: The CLSI guidelines were followed in the aggregation of data from all reported hospital antibiograms. Antibiotic and organism combinations intrinsically resistant or clinically irrelevant were censored or grayed in the antibiogram.

Limitations: The majority of data provided was from reference labs in alignment with Clinical and Laboratory Standards Institute (CLSI) guidelines. However, 31 facilities reported back institutional antibiogram forms. Of these, 15 were from tertiary and large acute care hospitals whose labs were confirmed to be in alignment with CLSI. Sixteen forms were from critical access hospitals, of which the reference lab to which this data was acquired were unable to be confirmed was CLSI guidelines. An internal assessment of outliers or implausible data was conducted. Attempts were made to confirm outlying data. As confirmation could not be acquired, this data was excluded. This was a rare event, occurring no more than 4 or 5 times out of the thousands of susceptibility profiles.

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The KDHE HAI/AR Program is a resource for developing and strengthening Kansas healthcare facilities stewardship activities. Visit https://www.kdheks.gov/epi/hai.htm for more information.

Gram positive table key

Gray = Insufficient data to compile total susceptibility, not tested, or inappropriate for clinical use because of intrinsic use	
1	Rifampin to be used in combination only (rapid resistance emergence on single-agent therapy)
2	Ampicillin predicts amoxicillin susceptibility
3	Oxacillin predicts nafcillin, cefazolin, cephalexin susceptibility
4	Erythromycin predicts azithromycin susceptibility
5	Nitrofurantoin only for urinary infections
6	Gentamicin for synergy
7	Northeast region excluding KC metro
8	E. faecalis KC-metro linezolid susceptibility is lower likely as a reflection of greater VRE-faecalis only isolates linezolid susceptibilities reported at 1 over-represented institution
9	S. pneumoniae meningeal / non-meningeal breakpoint rates
10	C.striatum develops rapid daptomycin resistance while on treatment
11	Low numbers of S.hominis and S.pyogenes, numbers <30 may be statistically unreliable
12	Strep anginosus group (anginosus, constellatus, intermedius)
13	Strep mitis group (mitis, oralis, mutans, bovis, sanginis)

Gram negative / yeast table key

Gray = Insufficient data to compile total susceptibility, or not tested, or inappropriate in clinical use because of intrinsic use	
1	Ampicillin predicts amoxicillin susceptibility
2	Ampicillin/sulb. generally predicts amoxicillin/clav. susceptibility (except for A.baumannii which is intrinsically resistant)
3	Nitrofurantoin only for urinary infections
4	Northeast region excluding KC metro
5	C.glabrata has no established voriconazole breakpoint (i.e. current data are insufficient to demonstrate a correlation between in vitro susceptibility and clinical outcome for C.glabrata and voriconazole)
6	Isolate numbers of C.tropicalis <30, and may be statistically unreliable
7	For yeasts, data are susceptible-dose dependent; in vivo susceptibility is dependent upon achieving the maximal possible blood level for mucosal and invasive infections