

Adult Antibigram – Milton S. Hershey Medical Center – 2022 Data

(includes the adult wards in the Children's Hospital building)

A joint effort of the Clinical Microbiology Laboratory and the Antimicrobial Stewardship Program

To access in Cerner PowerChart: Click "Resources" and choose "Infectious Diseases Resources"

Purpose: To report susceptibilities of common bacteria and yeast isolates from January to December of 2022

Contents: Inpatient and outpatient data for Gram-positive and Gram-negative bacteria, and data for *Candida* species.

What data are included: As per national recommendations, the data reflect the first isolate for any patient, at any site, during the time period of this antibiogram, and 30 isolates are needed for results to be considered statistically reliable.

How to use: Percent susceptibility is shown for selected bug–drug combinations ("R" indicates that the drug should not be used due to intrinsic resistance, and a blank box indicates that there are no data for this bug-drug combination).

Please note: Although antibiograms can guide empiric therapy before microbiological data are available, quality care and good stewardship require considering additional clinical information and may require an Infectious Diseases consult.

Selected Recent Data (by year):

Methicillin (Oxacillin)-Resistant *Staph aureus* (MRSA)

2021: 31% of inpatient isolates and 28% of outpatient isolates

2022: 30% of inpatient isolates and 27% of outpatient isolates

Methicillin (Oxacillin)-Resistant Coagulase-Negative Staphylococci (MRCNS)

2021: 49% of inpatient isolates and 51% of outpatient isolates

2022: 59% of inpatient isolates and 45% of outpatient isolates

Vancomycin-Resistant *Enterococcus* (VRE)

2021: 19% of inpatient isolates and 8% of outpatient isolates; 2% of *E. faecalis* but 61% of *E. faecium*

2022: 18% of inpatient isolates and 5% of outpatient isolates; 2% of *E. faecalis* but 50% of *E. faecium*

For questions, please contact:

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Hershey Medical Center <u>Adult</u> Antibigram for Gram-Positives, Jan – Dec 2022 (Inpatient at top and Outpatient at bottom)																				
Gram-Positives January – December, 2022	# Isolates Tested (not all tested for each drug)	% Susceptible ("R" indicates the drug should not be used due to intrinsic resistance; a blank box indicates no data for this bug-drug combination.)																		
		Penicillins and Cephalosporins					Macro- lides	Fluoroquinolones			Amino- glycosides		Others (in alphabetical order)							
		Penicillin	Ampicillin	Amoxicillin / Clavulanate	Oxacillin	Ceftriaxone	Erythromycin	Ciprofloxacin	Levofloxacin	Moxifloxacin	Gentamicin (Do not use alone)	Gentamicin Synergy	Clindamycin	Daptomycin	Linezolid	Nitrofurantoin (for urine infections)	Rifampin (Do not use alone)	Tetracycline	Trimethoprim / Sulfamethoxazole	Vancomycin

INPATIENT																				
<i>Staph aureus</i> (total)	521			70	70	70	49	68	71	84	99		73	100	100	100*	99	91	97	100
<i>Staph aureus</i> (MRSA only)	157			0	0	0	16	24	27	55	99		66	100	100	*	97	81	91	100
<i>Staph aureus</i> (MSSA only)	364			100	100	100	63	87	90	96	99		76	100	100	*	99	96	99	100
<i>Staph coag. neg.</i>	157			41	41	41	48	56	58	70	78		63	100	100	*	99	82	59	100
<i>Streptococcus pneumoniae</i>	13*	54**		*		100*	69*		100*				92*					82*	92*	100*
Viridans Strep group	30	90	84*			100	43		80				80					63*		100
<i>Enterococcus faecalis</i>	167	100	100		R	R		76	83		R	80		100	99	100		33	R	96
<i>Enterococcus faecium</i>	58	12	14		R	R		10	12		R	95		93	100	48*		22	R	40

OUTPATIENT ***																				
<i>Staph aureus</i> (total)	981			73	73	73	49	74	76	88	98		73	>99	100	100	99	93	98	100
<i>Staph aureus</i> (MRSA only)	260			0	0	0	16	32	34	68	97		72	>99	100	100*	98	85	95	100
<i>Staph aureus</i> (MSSA only)	721			100	100	100	61	88	92	96	99		73	>99	100	100	99	95	99	100
<i>Staph coag. neg.</i>	188			55	55	55	47	69	69	76	84		66	100	100	100*	98	85	69	100
<i>Streptococcus pneumoniae</i>	42	67**		86*		95**	61		98				90					92	76	100
Viridans Strep group	37	95	94			97	64		86				100					68		100
<i>Enterococcus faecalis</i>	457	100	100		R	R		84	89		R	84		100	>99	>99		26	R	98
<i>Enterococcus faecium</i>	53	19	21		R	R		11	17		R	100		98	100	55		21	R	60

Footnotes:

* Fewer than 30 isolates tested, so results are not considered statistically reliable.

** The Penicillin-Resistant *Streptococcus pneumoniae* (PRSP) rates shown (46% non-susceptible for inpatients and 33% for outpatients) used the "meningitis" breakpoints, which are very conservative. However, most *S. pneumoniae* outside the central nervous system (such as in the respiratory tract) are treatable with penicillins. If the higher "non-meningitis" breakpoints are used, 0% of our *S. pneumoniae* would be non-susceptible to penicillin and 0% would be non-susceptible to ceftriaxone (as combined inpatient and outpatient data).

*** Outpatient numbers and data include Pediatric isolates.

Comments:

- The Methicillin (Oxacillin)-Resistant *Staphylococcus aureus* (MRSA) rate was 30% for inpatients and 27% for outpatients.
- The Methicillin (Oxacillin)-Resistant Coagulase-Negative Staphylococci (MRCNS) rate was 59% for inpatients and 45% for outpatients.
- The Vancomycin-Resistant *Enterococcus* (VRE) rate was 18% for inpatients (4% of *E. faecalis*, 60% of *E. faecium*) and 5% for outpatients (2% of *E. faecalis*, 40% of *E. faecium*).

Hershey Medical Center <u>Adult</u> AntibioGram for Gram-Negatives, Jan – Dec 2022 (Inpatient at top and Outpatient at bottom)																						
Gram-Negatives January – December, 2022	# Isolates Tested (not all tested for each drug)	% Susceptible ("R" indicates the drug should not be used due to intrinsic resistance; a blank box indicates no data for this bug-drug combination.)																				
		Penicillins and Cephalosporins					β-lactam/β-lactamase Inhibitor Combinations					Mono- bactam	Carbapenems		Fluoroquinolones			Aminoglycosides		Others		
		Ampicillin	Cefazolin	Ceftriaxone	Ceftazidime	Cefepime	Amoxicillin / Clavulanate	Ampicillin / Sulbactam	Piperacillin / Tazobactam	Ceftolozane / Tazobactam	Ceftazidime / Avibactam		Meropenem	Ertapenem	Ciprofloxacin	Levofloxacin	Moxifloxacin	Gentamicin	Tobramycin	Nitrofurantoin (for urine infections)	Tetracycline	Trimethoprim / Sulfamethoxazole

INPATIENT																						
<i>Citrobacter freundii</i>	15*	R	R	67*	67*	100*	R	R	87*		100*	80*	100*	100*	87*	87*	*	100*	93*	100*	80*	93*
<i>Enterobacter cloacae</i>	75	R	R	55	60	87	R	R	73	*	*	64	100	80	92	97	98	96	96	29*	87	91
<i>Escherichia coli</i>	395	57	70	87	88	89	86	65	96	98	99	87	>99	99	76	81	81	93	93	97	76	83
<i>Klebsiella (Enterobacter) aerogenes</i>	25*	R	R	76*	80*	100*	R	R	88*		100*	84*	100*	100*	100*	100*	100*	100*	100*	50*	92*	100*
<i>Klebsiella oxytoca</i>	40	R	20	93	100	100	90	75	95	100	100	93	98	98	95	98	100	100	100	94*	98	98
<i>Klebsiella pneumoniae</i>	158	R	74	86	88	87	88	69	96	99	100	87	100	100	79	89	93	89	92	45	72	81
<i>Morganella morganii</i>	14*	R	R	77*	77*	100*	R	8*	92*	77*	100*	92*	100*	100*	85*	85*	80*	85*	92*	R	62*	92*
<i>Proteus mirabilis</i>	54	89	77	98	100	98	100	96	100	100	100	98	100	100	89	89	89*	92	94	R	R	83
<i>Pseudomonas aeruginosa</i>	191	R	R	R	92	91	R	R	90	99	99	83	94	R	85	80	R	**	99	R	R	R
<i>Serratia marcescens</i>	58	R	R	93	98	100	R	R	98	100	100	98	98	97	86	93	94	100	95	R	12	98
<i>Stenotrophomonas maltophilia</i>	18*	R	R	R	R		R	R	R			R	R	R		94*		R	R	R	R	100*

OUTPATIENT ***																						
<i>Citrobacter freundii</i>	76	R	R	78	80	100	R	R	97		100	83	100	100	88	93	*	97	96	90	87	89
<i>Enterobacter cloacae</i>	138	R	R	67	76	96	R	R	83	*	*	76	100	83	91	92	95	99	99	31	88	87
<i>Escherichia coli</i>	2611	62	78	94	95	95	89	68	99	>99	>99	94	100	>99	82	86	79	92	93	98	79	80
<i>Klebsiella (Enterobacter) aerogenes</i>	70	R	R	80	83	100	R	R	91		100	90	100	100	97	97	100*	100	100	22	94	99
<i>Klebsiella oxytoca</i>	115	R	23	91	99	98	88	72	90	100	100	93	100	100	97	99	100*	98	97	91	91	90
<i>Klebsiella pneumoniae</i>	619	R	84	88	89	90	91	77	95	98	100	89	99	99	84	92	82	95	94	47	80	83
<i>Morganella morganii</i>	42	R	R	69	69	93	R	2	98	88	100	86	100	100	67	69	70*	81	88	R	43	71
<i>Proteus mirabilis</i>	238	90	76	99	100	>99	98	95	100	100	100	>99	100	100	84	85	71	99	100	R	R	88
<i>Pseudomonas aeruginosa</i>	392	R	R	R	93	92	R	R	93	99	98	85	84	R	85	81	**	97	R	R	R	R
<i>Serratia marcescens</i>	88	R	R	92	94	99	R	R	94	100	99	95	100	100	90	95	100	99	94	R	13	98
<i>Stenotrophomonas maltophilia</i>	39	R	R	R	R		R	R	R			R	R	R		95		R	R	R	R	100

Footnotes:

* Fewer than 30 isolates tested, so results are not considered statistically reliable.

** Gentamicin is no longer recommended for *Pseudomonas* infections.

*** Outpatient data include Pediatric isolates.

Combination Adult Antibigram for Selected Inpatient Gram-Negatives, Jan - Dec 2022														
Gram-Negatives January – December, 2022	# Isolates Tested	% Susceptible <i>(In vitro</i> susceptibility to each drug alone or to at least one of the indicated combination of drugs)												
		Ceftazidime			Cefepime			Piperacillin/tazobactam			Meropenem			
		(Alone)	PLUS		(Alone)	PLUS		(Alone)	PLUS		(Alone)	PLUS		
Common Gram-Negative Organisms			Ciprofloxacin	Gentamicin	Tobramycin		Ciprofloxacin	Gentamicin	Tobramycin		Ciprofloxacin	Gentamicin	Tobramycin	

<i>Enterobacter cloacae</i>	75	60	92	96	96	87	96	96	96	73	96	99	99	100	100	100	100
<i>Escherichia coli</i>	395	88	91	97	97	89	91	97	97	96	98	99	99	>99	>99	100	100
<i>Klebsiella (Enterobacter) aerogenes</i>	25*	80*	100*	100*	100*	100*	100*	100*	100*	88*	100*	100*	100*	100*	100*	100*	100*
<i>Klebsiella pneumoniae</i>	158	88	89	92	94	87	88	92	94	96	98	99	99	100	100	100	100
<i>Pseudomonas aeruginosa</i>	191	92	98	**	100	91	96	**	100	90	97	**	100	94	97	**	100
<i>Serratia marcescens</i>	58	98	100	100	100	100	100	100	100	98	100	100	100	98	98	100	98

Footnotes:

* Fewer than 30 isolates tested, so results are not considered statistically reliable.

** Gentamicin is no longer recommended for *Pseudomonas* infections.

HMC Antibigram (Adult + Pediatric) for <i>Candida</i> species, Jan 2021 – Dec 2022 (2 years)				
Yeast January 2021 – December, 2022	# Isolates Tested	% Susceptible		
		Azoles		Echino-candin
<i>Candida</i> Species		Fluconazole	Voriconazole	Micafungin***

<i>C. albicans</i>	84	93	95	99
<i>C. glabrata</i>	78	77**		100
<i>C. krusei</i>	6*	R	83*	100*
<i>C. parapsilosis</i>	37	97	100	89
<i>C. tropicalis</i>	12*	92*	92*	92*

Footnotes: (The decision was made not to show itraconazole and flucytosine data because of a lack of accepted breakpoints.)

* Fewer than 30 isolates tested, so results are not considered statistically reliable.

** *C. glabrata* susceptibility to fluconazole is dose-dependent, and a daily dose of at least 50x the MIC is suggested: empiric dosing of 800 mg daily would be sufficient for only 56% of isolates, and 400 mg daily would be sufficient for only 23% of isolates.

*** Caspofungin is the formulary echinocandin at HMC.