VUH and Associated Clinics Antimicrobial Susceptibility Summary: Adult Patients 2025

Clinical Microbiology
Department of Pathology, Microbiology and Immunology

Preface

This booklet contains up-to-date information to assist in decisions concerning antimicrobial therapy.

Tables summarize susceptibility data obtained for organisms isolated in the VUMC Clinical Microbiology Laboratory between January 1, 2025 – December 31, 2025

Guidelines for Interpretation of Minimum Inhibitory Concentrations (MICs)

MICs are interpreted as susceptible, intermediate, resistant, non-susceptible or susceptible dose dependent according to Clinical and Laboratory Standards Institute (CLSI) guidelines. When deciding whether the interpretation is meaningful, one should consider the antimicrobial pharmacokinetics, taking into account dosage and route of administration, the infecting organism and site of infection, and previous clinical experience.

For additional information, please call the microbiology laboratory or the Antimicrobial Stewardship team.

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Frequently called numbers:
Antibiotic Approval Pager: 615-317-GERM (4376)
On Call VU ID Fellow Pager: 615-831-8872
Microbiology Lab: 615-322-3406

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VASP Website:
https://medsites.vumc.org/antimicrobial-stewardship-program

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Table 1. Adults – Most Common Gram-negative Bacteria, Urine Isolates, % Susceptible

Data represent first isolate per patient

Organism	N	Ampicillin	Ampicillin/Sulbactam	Cefazolin*	Cefepime	Ceftazidime	Ceftriaxone	Ciprofloxacin	Ertapenem	Gentamicin	Levofloxacin	Meropenem	Nitrofurantoin	Piperacillin/Tazobactam	Trimethoprim/Sulfamethoxazole
Citrobacter braakii	57	R	72	R	100	70	70	86	98	98	88	98	98	68	97
Citrobacter freundii	148	R	R	R	97	77	R	83	98	93	85	99	92	76	85
Citrobacter koseri	156	R	99	99	99	99	99	99	99	99	99	100	90	98	100
Enterobacter cloacae	314	R	R	R	91	71	R	85	91	96	86	98	41	70	85
Escherichia coli	9025	56	80	87	92	90	90	73	100	91	75	100	97	95	77
Klebsiella aerogenes	242	R	R	R	98	82	R	93	98	100	94	100	12	82	96
Klebsiella oxytoca	250	R	86	39	96	95	89	94	99	97	96	99	89	88	92
Klebsiella pneumoniae	2166	R	83	84	90	87	87	81	99	93	82	100	16	86	83
Morganella morganii	92	R	34	R	ND	ND	84	80	99	89	79	100	R	98	84
Proteus mirabilis	679	85	97	93	96	97	94	87	100	92	87	99	R	100	81
Providencia rettgeri	45	R	78	R	98	96	93	91	98	100	73	93	R	96	82
Pseudomonas aeruginosa	582	R	R	R	90	91	R	85	R	R	78	93	R	83	R
Serratia marcescens	116	R	R	R	97	98	R	85	98	100	87	99	R	ND	97

*Cefazolin serves as the sensitivity marker for all oral cephalosporins in urine isolates. Oral cephalosporins include: cefaclor, cefdinir, cefpodoxime, cefprozil, cefuroxime, cephalexin, and loracarbef for treatment of uncomplicated urinary tract infections.

ⓘ Empiric guidance for the treatment of urinary tract infections, including pyelonephritis, can be found on the VASP website at https://www.vumc.org/vasp/52609. Antibiotics should be narrowed once susceptibilities are known.

Table 2. Adults – Gram-negative bacteria, Urine isolates, % Susceptible by Patient Location

Organism	Location	N	Ampicillin	Ampicillin/Sulbactam	Cefazolin*	Cefepime	Ceftazidime	Ceftriaxone	Ciprofloxacin	Ertapenem	Gentamicin	Levofloxacin	Meropenem	Nitrofurantoin	Piperacillin/Tazobactam	Trimethoprim/Sulfamethoxazole
Citrobacter braakii	ICU	2**	R	R	R	100	ND	ND	100	100	100	100	100	100	ND	100
	IN	8**	R	R	R	100	75	75	63	100	100	75	100	100	63	100
	OP	45	R	R	R	100	71	71	89	98	98	89	98	98	71	96
Citrobacter freundii	ICU	8**	R	R	R	100	75	63	88	100	100	88	100	100	75	100
	IN	24**	R	R	R	92	63	63	88	96	92	92	96	88	63	92
	OP	102	R	R	R	98	80	73	83	98	94	83	100	91	78	83
Citrobacter koseri	ICU	1**	R	100	100	100	100	100	100	100	100	100	100	100	100	100
	IN	14**	R	100	100	100	100	100	100	100	100	100	100	79	93	100
	OP	125	R	99	99	100	100	100	99	100	99	100	100	91	100	100
Enterobacter cloacae	ICU	19**	R	R	R	79	47	37	79	68	95	79	95	37	47	84
	IN	70	R	R	R	87	65	57	81	90	93	86	97	42	58	78
	OP	205	R	R	R	94	77	70	87	94	96	87	99	40	76	89
Escherichia coli	ICU	159	47	72	79	85	83	82	63	100	92	64	99	95	86	67
	IN	680	45	75	77	85	83	80	61	100	88	63	100	96	91	67
	OP	7384	57	81	88	93	91	90	73	100	91	75	100	97	96	78
Klebsiella aerogenes	ICU	9**	R	R	R	100	44	44	89	100	100	89	100	ND	44	100
	IN	26**	R	R	R	96	69	69	96	100	100	96	100	8	65	96

	OP	183	R	R	R	97	86	86	92	98	100	94	100	14	86	97
Klebsiella oxytoca	ICU	10**	R	70	30	90	90	70	90	100	90	100	100	100	70	90
	IN	43	R	81	26	93	95	79	95	100	98	95	100	95	81	93
	OP	185	R	85	41	96	95	91	94	99	97	95	98	87	89	92
Klebsiella pneumoniae	ICU	95	R	68	57	73	62	60	57	98	80	58	98	16	74	62
	IN	341	R	70	69	78	72	73	68	98	85	70	99	17	74	71
	OP	1579	R	86	88	93	90	90	85	100	95	85	100	15	89	86
Morganella morganii	ICU	3**	R	67	R	ND	ND	67	67	100	100	67	100	R	100	67
	IN	25**	R	36	R	ND	ND	84	60	100	76	64	100	R	96	72
	OP	59	R	34	R	ND	ND	83	88	98	93	85	100	R	98	88
Proteus mirabilis	ICU	23**	91	96	96	96	100	96	87	100	100	87	100	R	100	87
	IN	109	73	95	81	86	94	83	71	100	88	71	100	R	99	67
	OP	480	89	97	95	98	98	96	90	100	93	91	99	R	100	85
Pseudomonas aeruginosa	ICU	56	R	R	R	84	82	R	78	R	R	69	87	R	76	R
	IN	169	R	R	R	92	88	R	84	R	R	79	93	R	80	R
	OP	343	R	R	R	91	93	R	83	R	R	75	93	R	83	R
Serratia marcescens	ICU	8**	R	R	R	88	100	88	100	100	100	100	100	R	ND	100
	IN	27**	R	R	R	100	93	96	78	96	100	85	96	R	ND	96
	OP	69	R	R	R	97	100	88	83	99	100	84	100	R	ND	99

Data represent first isolate per patient.

ICU, intensive care unit; IN, inpatient; OP, outpatient (includes emergency department); R, intrinsic resistance; ND, not tested.

*Cefazolin serves as the sensitivity marker for all oral cephalosporins in urine isolates. Oral cephalosporins include: cefaclor, cefdinir, cefpodoxime, cefprozil, cefuroxime, cephalexin, and loracarbef for treatment of uncomplicated urinary tract infections.

**Calculated with <30 isolates, interpret data with caution.

Table 3. Adults – Most Common Gram-negative Bacteria, Non-Urine Isolates, % Susceptible

Data represent first isolate per patient.

Organism	N	Ampicillin	Ampicillin/Sulbactam	Cefazolin	Cefepime	Ceftazidime	Ceftriaxone	Cefuroxime axetil	Ciprofloxacin	Ertapenem	Gentamicin	Levofloxacin	Meropenem	Piperacillin/Tazobactam	Trimethoprim/Sulfamethoxazole
Citrobacter koseri	48	R	98	94	98	98	96	79	96	98	100	96	100	94	98
Citrobacter freundii	45	R	R	R	96	R	R	R	82	93	91	84	93	80	78
Enterobacter cloacae	391	R	R	R	94	R	R	R	92	93	99	93	99	83	90
Escherichia coli	806	45	74	76	83	80	79	72	61	99	86	63	100	90	67
Klebsiella aerogenes	109	R	R	R	96	R	R	R	95	97	100	94	100	71	100
Klebsiella oxytoca	166	R	84	50	93	92	87	83	91	100	93	93	100	85	90
Klebsiella pneumoniae	616	R	78	78	86	80	81	73	75	99	91	75	99	78	78
Morganella morganii	85	R	32	R	ND	ND	85	R	85	100	93	84	100	100	88
Proteus mirabilis	269	84	97	90	96	97	92	91	83	99	94	83	98	99	82
Pseudomonas aeruginosa	977	R	R	R	92	92	R	R	86	R	R	82	94	84	R
Serratia marcescens	239	R	R	R	98	R	R	R	89	98	98	90	98	ND	98

R, intrinsic resistance; ND, not tested.

Table 4. Adults – Gram-negative Bacteria, Non-Urine Isolates, by Patient Location

Data represent first isolate per patient.

Organism	Location	N	Ampicillin	Ampicillin/Sulbactam	Cefazolin	Cefepime	Ceftazidime	Ceftriaxone	Cefuroxime axetil	Ciprofloxacin	Ertapenem	Gentamicin	Levofloxacin	Meropenem	Piperacillin/Tazobactam	Trimethoprim/Sulfamethoxazole
Enterobacter cloacae	ICU	77	R	R	R	87	R	R	R	96	88	99	96	99	66	93
	IN	202	R	R	R	93	R	R	R	89	93	97	90	98	80	85
	OP	91	R	R	R	98	R	85	R	95	97	100	95	100	97	95
Escherichia coli	ICU	188	41	68	67	75	73	71	60	52	100	87	54	100	85	63
	IN	353	42	70	74	82	78	78	70	59	99	84	62	99	88	64
	OP	200	49	79	79	87	83	83	78	65	100	86	68	100	95	68
Klebsiella aerogenes	ICU	23**	R	R	R	100	R	R	R	100	91	100	96	100	61	100
	IN	41	R	R	R	95	R	R	R	88	100	100	88	100	61	100
	OP	33	R	R	R	97	R	R	R	97	97	100	97	100	82	100
Klebsiella oxytoca	ICU	33	R	76	36	91	91	76	76	94	100	94	97	100	76	94
	IN	63	R	81	38	89	84	84	79	84	100	86	87	100	79	84
	OP	60	R	85	57	97	97	88	83	95	100	98	97	100	88	93
Klebsiella pneumoniae	ICU	188	R	73	74	81	75	77	69	69	97	90	70	98	71	75
	IN	280	R	77	76	85	79	79	71	74	99	90	74	99	80	77
	OP	118	R	81	83	89	84	83	76	81	99	90	81	99	82	80
Morganella morganii	ICU	15**	R	40	R	ND	ND	R	R	93	100	93	93	100	100	87
	IN	30	R	23	R	ND	ND	R	R	77	100	97	77	100	100	97
	OP	31	R	36	R	ND	ND	R	R	87	100	90	84	100	100	81
Proteus mirabilis	ICU	39	82	95	95	100	97	95	95	80	100	90	77	97	97	69
	IN	96	77	97	81	94	97	85	85	76	100	93	77	98	100	80

	OP	119	90	98	94	96	98	95	94	87	98	94	87	98	99	87
Pseudomonas aeruginosa	ICU	193	R	R	R	86	84	R	R	83	R	R	78	90	70	R
	IN	383	R	R	R	90	88	R	R	85	R	R	81	92	80	R
	OP	370	R	R	R	95	96	R	R	85	R	R	81	97	90	R
Serratia marcescens	ICU	44	R	R	R	98	R	R	R	91	98	100	93	98	ND	100
	IN	108	R	R	R	95	R	R	R	84	96	95	86	96	ND	95
	OP	66	R	R	R	100	R	R	R	89	100	100	89	100	ND	100

ICU, intensive care unit; IN, inpatient; OP, outpatient (includes emergency department) R, intrinsic resistance; ND, not tested.

**Calculated with <30 isolates, interpret data with caution

Table 5. Adults – *Staphylococcus aureus*, % Susceptible

Data represent first isolate per patient.

Organism		N	Clindamycin	Daptomycin	Doxycycline	Linezolid	Oxacillin	Trimethoprim/sulfamethoxazole	Vancomycin
Staphylococcus aureus	All	3423	88	100	95	100	65	89	100
MSSA	ICU	222	95	100	99	100	100	95	100
	IN	563	95	100	99	100	100	96	100
	OP	1303	95	100	98	100	100	95	100
MRSA	ICU	168	74	100	81	100	0	77	100
	IN	424	70	100	87	100	0	75	100
	OP	568	75	100	88	100	0	81	100

ICU, intensive care unit; IN, inpatient; OP, outpatient (includes emergency department)
R, intrinsic resistance; ND, not tested.

ⓘ Isolation of *S. aureus* in the urine should be followed by a blood culture to confirm the patient is not bacteremic.
S. aureus bacteremia or suspected invasive infection should be treated in conjunction with ID consultation.

Table 6. Adults – *Staphylococcus* spp., % Susceptible

Data represent first isolate per patient. Only normally sterile site isolates included.

Organism	N	Clindamycin	Daptomycin	Doxycycline	Linezolid	Levofloxacin	Oxacillin	Trimethoprim/sulfamethoxazole	Vancomycin
Staphylococcus capitis	75	77	100	97	100	84	85	95	100
Staphylococcus epidermidis	862	62	100	82	100	69	37	51	100
Staphylococcus haemolyticus	173	65	100	83	100	66	35	75	100
Staphylococcus hominis	104	80	100	94	99	79	56	63	100
Staphylococcus lugdunensis	265	90	100	99	100	97	77	99	100
Staphylococcus pseudintermedius	32	72	100	91	100	78	78	69	100

Table 7. Adults – *Enterococcus* spp., % Susceptible

Data represent first isolate per patient.

	N	Ampicillin	Daptomycin	Doxycycline	Linezolid	Levofloxacin	Vancomycin
Enterococcus faecalis	2652	100	71	28	99	91	98
Enterococcus faecium	401	19	ND	25	97	15	48

ND, not tested

ⓘ Drug of choice for *E. faecalis* include ampicillin in the absence of severe penicillin allergy.
VRE infections often require treatment with protected antibiotics such as daptomycin, which require ID approval for use.

Table 8. Adults – Urine Nitrofurantoin %Susceptibility for Staphylococcus species and Enterococcus species

	N	Nitrofurantoin
Enterococcus faecalis	2301	100
Enterococcus faecium	264	46
MSSA	163	99
MRSA	88	99
Staphylococcus epidermidis	423	99
Staphylococcus haemolyticus	143	99
Staphylococcus hominis	41	98
Staphylococcus lugdunensis	93	100

Nitrofurantoin susceptibilities are aggregated from all culture types. Nitrofurantoin should ONLY be used to treat uncomplicated UTI.

ⓘ Isolation of MSSA or MRSA in the urine should be followed by a blood culture to confirm the patient is not bacteremic. *S. aureus* bacteremia or suspected invasive infection should be treated in conjunction with ID consultation.

Table 9. – *Streptococcus pneumoniae,* % Susceptible

Data represent first isolate per patient.

	N	Penicillin			Ceftriaxone		Levofloxacin	Linezolid	Vancomycin	Tetracycline	Erythromycin*
		Meningitis	Non-meningitis	Oral	Meningitis	Non-meningitis					
Streptococcus pneumoniae	71	54	90	54	79	95	100	100	100	72	49

*Erythromycin susceptible isolates are also susceptible to azithromycin.

Table 10. Adults – *Streptococcus* spp., % Susceptible

Data represent first isolate per patient.

Organism	N	Ampicillin	Clindamycin	Ceftriaxone	Linezolid	Levofloxacin	Penicillin	Vancomycin	Erythromycin
Streptococcus agalactiae	162	100	40	100	100	98	100	100	24
Streptococcus anginosus	142	100	68	95	100	99	94	100	48
Streptococcus constellatus	93	100	61	97	100	99	99	100	63
Streptococcus intermedius	53	100	65	98	100	100	94	100	53
Streptococcus mitis	77	100	75	78	100	81	48	100	ND