

VUMC
Antimicrobial
Susceptibility Summary:
Adult Patients
2024

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

Data represent first isolate per patient.

| Organism | N | Amikacin | Amoxicillin-clavulanate | Ampicillin | Ampicillin-sulbactam | Aztreonam | Oral Cephalosporins* | Cefepime | Ceftazidime | Ceftriaxone | Ciprofloxacin | Ertapenem | Gentamicin | Levofloxacin | Meropenem | Nitrofurantoin | Piperacillin-tazobactam | Tobramycin | Trimethoprim sulfamethoxazole |
|-------------------------------------|------|----------|-------------------------|------------|----------------------|-----------|----------------------|----------|-------------|-------------|---------------|-----------|------------|--------------|-----------|----------------|-------------------------|------------|-------------------------------|
| <i>Citrobacter freundii</i> | 172 | 99 | R | R | R | 80 | R | 97 | 78 | 77 | 85 | 98 | 96 | 91 | 100 | 92 | 84 | 97 | 88 |
| <i>Citrobacter koseri</i> | 130 | 100 | 99 | R | 99 | 99 | 99 | 99 | 99 | 99 | 98 | 100 | 100 | 99 | 100 | 42 | 99 | 99 | 99 |
| <i>Enterobacter cloacae</i> | 237 | 100 | R | R | R | 79 | R | 94 | 78 | 74 | 89 | 83 | 98 | 94 | 99 | 23 | 81 | 97 | 90 |
| <i>Escherichia coli</i> | 7031 | 100 | 89 | 59 | 82 | 93 | 88 | 93 | 94 | 91 | 73 | 100 | 92 | 80 | 100 | 98 | 98 | 91 | 78 |
| <i>Klebsiella aerogenes</i> | 204 | 100 | R | R | R | 84 | R | 97 | 84 | 83 | 93 | 96 | 99 | 95 | 100 | 18 | 85 | 99 | 98 |
| <i>Klebsiella oxytoca</i> | 222 | 100 | 91 | R | 84 | 91 | 73 | 96 | 94 | 89 | 88 | 100 | 96 | 92 | 100 | 90 | 94 | 95 | 87 |
| <i>Klebsiella pneumoniae</i> | 1487 | 100 | 92 | R | 83 | 89 | 87 | 90 | 89 | 89 | 83 | 99 | 93 | 86 | 100 | 31 | 93 | 92 | 83 |
| <i>Morganella morganii</i> | 67 | 100 | R | R | 54 | 98 | R | 100 | 79 | 91 | 81 | 97 | 92 | 81 | 100 | R | 98 | 91 | 79 |
| <i>Proteus mirabilis</i> | 614 | 100 | 98 | 86 | 97 | 99 | 92 | 96 | 99 | 96 | 85 | 100 | 94 | 87 | ND | R | 100 | 93 | 87 |
| <i>Proteus vulgaris</i> | 35 | 100 | 89 | R | R | 100 | R | 100 | 100 | 49 | 91 | 100 | 100 | 100 | 97 | R | 100 | 100 | 97 |
| <i>Providencia rettgeri</i> | 40 | 100 | R | R | 85 | 97 | R | 97 | 100 | 100 | 85 | 100 | 95 | 85 | 100 | R | 97 | 97 | 87 |
| <i>Pseudomonas aeruginosa</i> | 367 | 100 | R | R | R | 84 | R | 95 | 94 | R | 81 | R | R | 81 | 93 | R | 88 | ND | R |
| <i>Stenotrophomonas maltophilia</i> | 30 | R | R | R | R | R | R | R | R | R | ND | R | R | 67.9 | R | R | R | R | 92.3 |

*Oral cephalosporins include: cefaclor, cefdinir, cefpodoxime, cefprozil, cefuroxime, cephalexin, and loracarbef for treatment of uncomplicated urinary tract infections. R indicates intrinsic resistance, ND, no data.

***Enterobacter cloacae*, *Klebsiella aerogenes*, and *Citrobacter freundii* may develop resistance during therapy with 3rd-generation cephalosporins due to derepression of AmpC β -lactamase.



Empiric guidance for the treatment of urinary tract infections, including pyelonephritis, can be found on the [VASP website](#). Antibiotics should be narrowed once susceptibilities are known.

Table 2. Adults – Gram-Negative Bacteria, Urine Isolates, % Susceptible by Patient Location

Data represent first isolate per patient.

| Organism | | N | Amikacin | Amoxicillin-clavulanate | Ampicillin | Ampicillin-Sulbactam | Aztreonam | Oral cephalosporins* | Cefepime | Ceftazidime | Ceftriaxone | Ciprofloxacin | Ertapenem | Gentamicin | Levofloxacin | Meropenem | Nitrofurantoin | Piperacillin-tazobactam | Tobramycin | Trimethoprim-Sulfamethoxazole |
|---------------------------------|-----|------|----------|-------------------------|------------|----------------------|-----------|----------------------|----------|-------------|-------------|---------------|-----------|------------|--------------|-----------|----------------|-------------------------|------------|-------------------------------|
| <i>Enterobacter cloacae</i> *** | OP | 141 | 100 | R | R | R | 80 | R | 94 | 79 | ND | 93 | 88 | 99 | 97 | 99 | 27 | 82 | 97 | 90 |
| | IN | 85 | 100 | R | R | R | 82 | R | 95 | 80 | ND | 86 | 79 | 98 | 92 | 99 | 21 | 81 | 98 | 88 |
| | ICU | 13** | 100 | R | R | R | 54 | R | 77 | 54 | ND | 69 | 62 | 100 | 85 | 92 | 0 | 62 | 100 | 100 |
| <i>Escherichia coli</i> | OP | 5486 | 100 | 90 | 60 | 83 | 94 | 90 | 95 | 95 | 93 | 75 | 100 | 93 | 82 | 100 | 99 | 98 | 94 | 79 |
| | IN | 1407 | 100 | 86 | 54 | 78 | 89 | 82 | 89 | 90 | 87 | 67 | 100 | 89 | 73 | 100 | 97 | 96 | 89 | 74 |
| | ICU | 138 | 100 | 83 | 48 | 71 | 83 | 76 | 83 | 86 | 81 | 62 | 99 | 90 | 67 | 100 | 92 | 92 | 90 | 65 |
| <i>Klebsiella pneumoniae</i> | OP | 1001 | 100 | 94 | R | 86 | 93 | 91 | 93 | 92 | 93 | 87 | 99 | 95 | 90 | 100 | 33 | 94 | 95 | 86 |
| | IN | 436 | 100 | 89 | R | 78 | 82 | 80 | 84 | 82 | 81 | 75 | 98 | 89 | 79 | 100 | 28 | 91 | 88 | 77 |
| | ICU | 50 | 100 | 80 | R | 71 | 76 | 74 | 76 | 74 | 76 | 69 | 94 | 84 | 69 | 98 | 27 | 78 | 82 | 69 |
| <i>Proteus mirabilis</i> | OP | 413 | 100 | 98 | 89 | 97 | 99 | 95 | 98 | 99 | 97 | 88 | 100 | 94 | 90 | ND | R | 100 | 93 | 88 |
| | IN | 188 | 100 | 97 | 80 | 98 | 100 | 85 | 93 | 99 | 93 | 80 | 100 | 93 | 82 | ND | R | 99 | 92 | 86 |
| | ICU | 13** | 100 | 100 | 85 | 100 | 100 | 85 | 85 | 100 | 85 | 69 | 100 | 92 | 69 | ND | R | 100 | 85 | 77 |
| <i>Pseudomonas aeruginosa</i> | OP | 173 | 100 | R | R | R | 88 | R | 97 | 96 | R | 80 | R | R | 81 | 95 | R | 89 | ND | R |
| | IN | 163 | 99 | R | R | R | 80 | R | 94 | 93 | R | 82 | R | R | 82 | 91 | R | 88 | ND | R |
| | ICU | 31 | 100 | R | R | R | 77 | R | 90 | 90 | R | 77 | R | R | 77 | 94 | R | 77 | ND | R |

*Oral cephalosporins: cefaclor, cefdinir, cefpodoxime, cefprozil, cefuroxime, cephalexin, and loracarbef for treatment of uncomplicated urinary tract infections.

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

****Enterobacter cloacae*, *Klebsiella aerogenes*, and *Citrobacter freundii* may develop resistance during therapy with 3rd-generation cephalosporins due to derepression of AmpC β-lactamase.

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



For inpatient locations, and in the absence of detected or recent history of resistance or severe beta-lactam allergy, ceftriaxone or cefepime (or piperacillin-tazobactam for *E. coli*) are preferred empiric gram-negative antibiotics. Antibiotic therapy should be narrowed once susceptibilities are known.