Providencia spp (LTR62261)

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Organism

Providencia spp.

- *P. alcalifaciens*
- *P. rettgeri*
- *P. rustigianii*
- *P. stuartii*

Clinical

These organisms are found in a variety of environmental sources and may be part of the normal flora of the gastrointestinal tract. They cause urinary tract infections in chronically catheterized patients. *Providencia* spp. are difficult to eradicate due to a property for enhanced adherence. They also cause nosocomial infections especially of the urinary tract, usually in debilitated patients who have received prior antibiotic therapy. These organisms may rarely cause pneumonia, wound infections, or bacteremia.

Note: Other species include *P. heimbachae, P. alcalifaciens, P. rustigianni.* These species are very rare and have been associated with diarrheal illnesses. If isolated from clinical specimens, consult microbiologist.

Usual susceptibility pattern

These organisms produce a chromosomally mediated inducible beta-lactamase (AmpC) and are resistant to ampicillin and first generation cephalosporins. Although most strains test susceptible to second and third generation cephalosporins, use of these agents may result in selection of resistant strains. The beta-lactamase produced by these organisms is not inhibited by beta-lactamase inhibitors and as such, beta-lactam/beta-lactamase inhibitor combinations should not be reported. Although extended spectrum beta-lactamase (ESBL) may be found in these organisms, conventional ESBL testing is not reliable due to interference by the chromosomal cephalosporinase. Cefepime +/- clavulanic acid may detect an ESBL enzyme. *Providencia* spp. are usually susceptible to carbapenems. (Exception: May exhibit decreased susceptibility to imipenem (decreased affinity to PBP2) that does not affect other carbapenems.)

Susceptibility to TMP-SMX, and quinolones is variable. As a general rule, *P. stuartii* is more resistant than *P. rettgeri.* *Providencia* spp. are resistant to gentamicin and tobramycin (but still susceptible to amikacin) secondary to a chromosomally mediated enzyme which is difficult to detect in vitro. *Providencia* spp. are resistant to nitrofurantoin, tetracycline and colistin.

Providencia spp., Continued

Susceptibility method

VITEK2. Additional tests (Disc diffusion or Etest method) are performed using Mueller-Hinton agar incubated in ambient air at 35°C for 16-20 hours.

Note: For Etest use 0.5 McFarland suspension in saline.
For mucoid strains use 1.0 McFarland.

Susceptibility reporting

	CSF/ Brain	Blood/ Sterile Body Site/ Endovascular Catheter	Urine	Other	Comments
Amikacin		✓	✓	✓	Disc diffusion
Ampicillin	R	R	R	R	
Cefazolin		R	R	R	
Cefixime			R		
Ceftriaxone	R	R			
Ciprofloxacin		✓	✓	✓	Do not report in patients < 18 y
Ertapenem		✓	2	2	2nd line if cipro or TMP-SMX I/R If S do not report in patients < 3 months **See Special Considerations**
Gentamicin		R	R	R	
Meropenem	✓	✓	2*	2*	2nd line if cipro or TMP-SMX I/R * Report 1st line in neonates (< 1 month) **See Special Considerations**
Nitrofurantoin			R		Add comment: For uncomplicated lower UTI only #f1
TMP-SMX	*	✓	✓	✓	*Report only at physician request
Tobramycin		R	R	R	

Note	Providencia spp **other than** P. stuartii and P. rettgeri are very rare causes of human infection. If isolated, consult Microbiologist regarding clinical significance and susceptibility reporting.

Special considerations

Ertapenem / Meropenem:	If reporting ertapenem and meropenem add comment: "Imipenem has intrinsically low activity against this organism." #A375

Interpretation

For Etest, report actual MIC result. For interpretation (S, I, and R) report according to nearest higher doubling dilution **(Appendix 1)**.

Use **CLSI** interpretive document for **Enterobacterales**

For Beta-lactam drugs – Refer to Beta-lactam Resistance Detection Charts