Nebraska Medicine Combination Antibiogram 2016-2017

	Acinetobacter baumannii (N=40)	Pseudomonas aeruginosa (N=698)	Enterobacter aerogenes (N=123)	Enterobacter cloacae (N=317)	Escherichia coli (N=2221)	Klebsiella oxytoca (N=195)	Klebsiella pneumoniae (N=660)	Serratia marcescens (N=120)
Amikacin	98	91	99	100	100	100	100	100
Aztreonam	NA	79	81	74	93	88	93	68
Cefepime	78	89	99	93	93	91	94	98
Ceftriaxone	NA	NA	79	66	92	87	94	64
Ertapenem	NA	NA	94	85	100	100	100	98
Gentamicin	75	84	100	97	90	98	96	100
Levofloxacin	73	73	98	99	79	94	97	99
Meropenem	73	84	100	100	100	100	100	98
Piperacillin/Tazobactam	NA	90	87	80	89	86	92	75
Aztreo+Ami	NA	97	99	100	100	100	100	100
Aztreon+Gent	NA	94	100	98	97	98	97	100
Aztreon+Tobra	NA	97	99	99	97	97	95	96
Aztreon+Levo	NA	88	100	99	95	94	98	99
Cefe+Ami	98	96	100	100	100	100	100	100
Cefe+Gent	85	94	100	99	97	98	97	100
Cefe+Tobra	90	98	100	99	97	97	95	99
Cefe+Levo	85	92	100	100	95	94	98	100
Ceftriax+Ami	NA	NA	100	100	100	100	100	100
Ceftriax+Gent	NA	NA	100	98	97	98	96	100
Ceftriax+Tobra	NA	NA	100	98	96	97	95	96
Ceftriax+Levo	NA	NA	100	99	94	94	98	100
Erta+Ami	NA	NA	100	100	100	100	100	100
Erta+Gent	NA	NA	100	99	100	100	100	100
Erta+Tobra	NA	NA	100	99	100	100	100	99
Erta+Levo	NA	NA	99	99	100	100	100	100
Mero+Ami	98	97	100	100	100	100	100	100
Mero+Gent	80	94	100	100	100	100	100	100
Mero+Tobra	83	97	100	100	100	100	100	99
Mero+Levo	78	89	100	100	100	100	100	100
Pip/Tazo+Ami	NA	98	100	100	100	100	100	100
Pip/Tazo+Gent	NA	97	100	98	96	98	96	100
Pip/Tazo+Tobra	NA	99	100	98	96	97	95	97
Pip/Tazo+Levo	NA	94	100	99	93	94	98	99
Recommended Combo	Cefepime + Amikacin	P/T + Tobra	Cefepime	Levo OR Cefepime + Levo OR Mero	Erta or CTX+GENT	Erta or CTX+GENT	Erta or CTX+GENT	Erta or Cefepime

Antibiogram Generated using following criteria:

- All sites, first isolate per patient every 90 days over 2016-2017
- Individual agents and combinations of agents reported as % susceptible to either that agent of the combination of the two agents

Key Findings:

- The addition of a second agent is reasonable in severe Pseudomonas and Acinetobacter infections until susceptibility data are available

- Aminoglycosides are the most active second agent in most cases, and especially in Pseudomonas and Acinetobacter
    - Amikacin is most active against Acinetobacter and Tobramycin against Pseudomonas

- Levofloxacin has poor activity against *E. coli* but maintains good activity against other *Enterobacteriaceae*, in particular *Enterobacter* and *Serratia*

- The combination of Ceftriaxone + Gentamicin or Ertapenem alone are very active against *E. coli* and *Klebsiella* species
    - Gentamicin and amikacin are the most active aminoglycosides against *Enterobacteriaceae*

- Most patients do not require empiric combination Gram-negative therapy. The decision to use combination therapy to expand the empiric coverage for resistant Gram-negative pathogens should be based on patient severity of illness, the likelihood of isolating resistant Gram-negative pathogens, and potential for additional drug toxicity.
    - Aminoglycosides are associated with reversible nephrotoxicity that is rare in courses of therapy lasting < 5 days. The extended-interval dosing scheme should be used to minimize the risk of this toxicity while maximizing clinical efficacy. Fluoroquinolones, while less both less toxic and less likely to be active, have been strongly associated with *C. difficile* colitis.

- Combination Gram-negative coverage should be routinely deescalated to a single active agent once microbiology/susceptibility results are known.

Single agent antimicrobial susceptibility profiles can be found on the annual antibiograms located at
https://www.nebraskamed.com/for-providers/asp/antibiograms

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