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PIPERACILLIN DRUG MEASUREMENT INFORMATION SHEET

Piperacillin (available in combination with tazobactam)	Extended spectrum penicillin combined with β-lactamase inhibitor (tazobactam). **Active against:** Gram positive bacteria including MSSA, *Streptococcus spp. and Enterococcus spp.;* Gram negative bacteria including *Enterobacteriales, Pseudomonas* and many anaerobes (*B. fragilis* may be resistant).
When to consider TDM	Consider for **all patients receiving therapy for more than 24 hours**, but particularly in critically unwell patients (including **bacteraemia** and **deep-seated infections**), **renal failure**, **obesity**, and **infections with susceptible organisms but elevated MIC** for piperacillin-tazobactam (reported by Microbiology as SIE – sensitive, increased exposure).
Pharmacokinetics (may be altered in critical illness and organ dysfunction)	Absorption: N/A (IV) Protein binding: 20-30% Clearance: As metabolites: 31% | Unchanged in urine: 69% Elimination t½: 0.7-1.2 hours
Sample Collection Time	**Trough sample (<1 hour prior to the next dose), minimum 24h after** initiation or dose change.
Requesting and Collection	Collect 4 mL in a purple top (EDTA) tube (no gel separator). **Important information required on request form**: 1. Time of blood sample collection 2. Dosing regimen (dose and frequency) 3. Date and time of commencement 4. Date and time of last dose
Handling and Transport	Sample must be delivered to laboratory within 1 hour of collection. If not delivered to the lab within this time, centrifuge, separate plasma and freeze within 3 hours of collection.
Availability	Test performed Mondays to Fridays. Results available after 4 pm. For tests outside these hours, see handling & transport instructions above. Add-on tests are generally not available as sample integrity cannot be guaranteed.
Reference Intervals	***NB**: Only piperacillin concentrations have correlated with treatment endpoints; tazobactam concentrations are not measured or reported.* **TARGET FOR EMPIRICAL THERAPY**: EUCAST PK-PD non-species related sensitivity breakpoint for piperacillin is ≤ 8 and for *P. aeruginosa* 16mg/L.[1] Appropriate target trough concentrations are 32 mg/L (most species) or 64 mg/L (*P. aeruginosa*). **TARGET FOR DIRECTED THERAPY:** Trough concentration > 4 times the pathogen's MIC. Contact the Microbiology registrar for assistance with MICs: (02) 8382 9194. **TOXIC RANGE:** Significant neurotoxicity expected with trough concentrations > 360 mg/L. Features of neurotoxicity include delirium, decreased level of consciousness and seizures. [2]
Contact	Clinical Pharmacology Laboratory: (02) 8382 9184. Patient Results: (02) 8382 9100 Further information: www.sydpath.com.au - Test Database
Instructions for Referring Laboratories	Centrifuge, separate plasma within 3 hours of collection, store and transport plasma frozen.
Document Approval	TDM Matters committee, March 16th 20223. Signed Ric Day, director CPT Dept
References	1. EUCAST Clinical Breakpoint Tables v. 12.0, 2022 (link) 2. Imani et al. 2017 DOI: 10.1093/jac/dkx209