



## Monographs for Commonly Administered Intravenous Medications in Home and Community Care

### Piperacillin/Tazobactam

<b>Drug Class<sup>1</sup></b>	Antibiotic – penicillin with $\beta$ -lactamase inhibitor	
<b>Spectrum<sup>1</sup></b>	<b>Refer to product monograph for complete spectrum</b> For $\beta$ -lactamase producing bacteria strains (e.g., <i>Haemophilus influenza</i> , <i>Escherichia coli</i> , and <i>Staphylococcus aureus</i> ). Also to susceptible <i>Acinetobacter</i> species, <i>Klebsiella pneumonia</i> , <i>Pseudomonas aeruginosa</i> often combined with aminoglycoside).	
<b>Cross Sensitivities / Allergies<sup>1</sup></b>	Cross sensitivities with penicillin and possibly cephalosporin and/or beta-lactam inhibitors	
<b>Indications<sup>1,2</sup></b>	<ul style="list-style-type: none"> <li>• Intra-abdominal</li> <li>• Skin and skin structure</li> <li>• Gynecological</li> </ul>	<ul style="list-style-type: none"> <li>• Respiratory tract</li> <li>• Septicemia</li> <li>• Urinary tract</li> <li>• Other conditions based on culture and sensitivity results</li> </ul>
<b>Outpatient Considerations<sup>1</sup></b>	<ul style="list-style-type: none"> <li>• For patients with a documented allergy to penicillin, cephalosporin or beta-lactam inhibitor, the first dose should be administered in a hospital or clinic setting.</li> <li>• Must be able to access laboratory monitoring (either at outpatient laboratory or by arranging in-home lab) if using an interacting oral medication (see Potential Drug Interactions section)</li> </ul>	
<b>Prescribing Considerations and Dosage in Adults<sup>1,2</sup></b>	<p><b>At time of ordering please provide the following to the pharmacist:</b></p> <ul style="list-style-type: none"> <li>• <b>Height, weight</b></li> <li>• <b>Most recent serum creatinine with date obtained</b></li> <li>• <b>Indication (infection being treated)</b></li> </ul> <p>Usually dosed every 6 to 8 hours. Available as 2 g/0.25 g, 3 g/0.375 g, 4 g/0.5 g piperacillin/tazobactam (dose selected based on indication)            Maximum 18 g/ 2.25 g piperacillin/tazobactam daily</p> <p><b><i>Dose and administration interval require adjustment for renal impairment</i></b></p> <p>Errors have occurred due to unusual ordering as combined dose of piperacillin and tazobactam. Order may be expressed only as piperacillin component or as a total of piperacillin + tazobactam (8:1 ratio). <i>Clarify unclear orders with prescriber prior to medication administration.</i></p>	
<b>Administration</b>	<ul style="list-style-type: none"> <li>• Dispensed in an ambulatory cassette/multi-dose bag intended for an infusion pump, programmed to deliver total daily dose via preprogrammed boluses over 24 hours.</li> </ul>	



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	<ul style="list-style-type: none"> <li>Prior to connecting the patient to therapy, double check pump programming against the order. Recheck after each order change.</li> <li>Contact pharmacy infusion provider for specific questions pertaining to administration.</li> </ul>	
<b>Stability / Compatibilities<sup>1,2</sup></b>	<p><i>Compatible in:</i></p> <ul style="list-style-type: none"> <li>0.9% Sodium Chloride (NS)</li> <li>Dextrose 5% in Water (D5W)</li> <li>Ringer’s Lactate (RL); for certain brands of antibiotic – check product monograph</li> </ul> <p><i>Incompatible with:</i></p> <ul style="list-style-type: none"> <li>Tobramycin</li> <li>Check with the pharmacy infusion provider if administering with gentamicin or amikacin as some concentrations may create a precipitate.</li> </ul>	<p>Follow the stability as specified by the infusion provider (as it is based on the dilution). Ensure appropriate storage conditions as specified are being met.</p>
<b>Monitoring Parameters<sup>1,2,3</sup></b>	<p><b>Laboratory:</b></p> <ul style="list-style-type: none"> <li>Complete blood count weekly (prolonged use can cause hematological toxicity)</li> <li>See Potential Drug Interactions section below for additional monitoring as needed</li> </ul>	<p><b>Clinical by Nursing</b></p> <ul style="list-style-type: none"> <li>Clarify any unclear orders prior to administration (e.g., piperacillin component only or as total grams of piperacillin + tazobactam)</li> <li>Validate that patient does not have a penicillin or cephalosporin allergy</li> <li>Ask about any onset of diarrhea daily – if present, doctor should be contacted to reassess therapy, possibly order stool cultures to rule out <i>C. difficile</i> and implement treatment if required</li> <li>Any bleeding manifestations should be communicated to the prescriber to obtain orders – rarely, piperacillin / tazobactam causes acute onset thrombocytopenia</li> <li>Observe for any new onset skin rashes – and if they appear to be progressing, notify prescriber to obtain orders</li> <li>Daily doses deliver between 650-850 mg of sodium – monitor for exacerbation of</li> </ul>



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		<p>congestive heart failure, edema or hypertension – and report to prescriber doctor if any of these occur</p> <ul style="list-style-type: none"> <li>Review home medications and compare against the selected drug interactions listed below. Report to prescriber if patient is using an interacting drug and obtain further orders. For more comprehensive drug interaction screening, contact the patient’s community pharmacist(s).</li> </ul>
<b>Selected Clinically Significant Drug interactions<sup>1</sup></b>	<p><b>Diuretics (e.g., furosemide) or cytotoxics (e.g., chemotherapy)</b>- co-administration increases the risk of hypokalemia – monitor electrolytes every 3 to 4 days.</p> <p><b>Methotrexate</b> – piperacillin/tazobactam has been reported to reduce clearance of methotrexate. Prescriber must be informed if this combination is ordered. Consideration should be given to selection of a safer antibiotic. If not possible, methotrexate levels should be monitored to avoid drug toxicity.</p> <p><b>Warfarin</b> – can increase the effect of warfarin, resulting in higher International Normalized Ratios (INRs). Additional monitoring at the beginning and ending of antibiotic therapy is recommended.</p> <p><b>Vancomycin</b> – combination therapy may increase the risk of nephrotoxicity. Monitoring of serum creatinine and vancomycin trough level within the week of combined treatment is recommended.<sup>4,5</sup></p>	
<b>Patient Education</b>	<p><i>Advise patient to report to their doctor or nurse if they have:</i></p> <ul style="list-style-type: none"> <li>New onset watery, foul smelling diarrhea and abdominal cramping. Piperacillin/tazobactam can cause <i>C. difficile</i> diarrhea.</li> <li>New onset skin rash.</li> <li>Ankle swelling or increased blood pressure, especially if they are on a sodium reduced diet. Piperacillin/tazobactam has extra sodium in it, so it may be necessary to add it in to the daily diet calculations.</li> <li>Any signs of bleeding or bruising.</li> </ul>	
<b>Other<sup>1</sup></b>	<p>For information on pregnancy and nursing please contact the Motherisk Helpline found at <a href="http://www.motherisk.org/women/contactUs.jsp">http://www.motherisk.org/women/contactUs.jsp</a></p> <p>Patients with cystic fibrosis have an increased incidence of rash and fever when receiving piperacillin/tazobactam</p>	



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### References:

1. Piperacillin/Tazobactam product monograph. Toronto (ON): Novopharm Ltd.; 2011 Jul 11 [cited 2016 Feb 3]. Obtained through Health Canada Drug Product Database; search term “piperacillin” as active ingredient, available from: <http://webprod5.hc-sc.gc.ca/dpd-bdpp/index-eng.jsp>
2. Piperacillin/Tazobactam [monograph]. In: Bedard M, Gergoure N, Massicotte A, Editors. Parenteral Drug Therapy Manual. Ottawa (ON); 2015.
3. Shaik S, Kazi HA, Ender PT. Rapid-onset piperacillin-tazobactam induced thrombocytopenia. J Pharm Pract. 2015 Apr;28(2):204-6.
4. Meaney CJ, Hynicka LM, Tsoukleris MG. Vancomycin-associated nephrotoxicity in adult medicine patients: incidence, outcomes, and risk factors. Pharmacotherapy. 2014;34(7):653-61.
5. Burgess LD, Drew RH. Comparison of the incidence of vancomycin-induced nephrotoxicity in hospitalized patients with and without concomitant piperacillin-tazobactam. Pharmacotherapy. 2014;34(7):670-6.

*Disclaimer:* This monograph is intended to be used as a reference to support healthcare professionals in the home and community setting. It supplements, but does not replace: clinical judgement, the information provided by the product manufacturers, and the need to consult with the prescriber.

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Developed with support from Health Quality Ontario