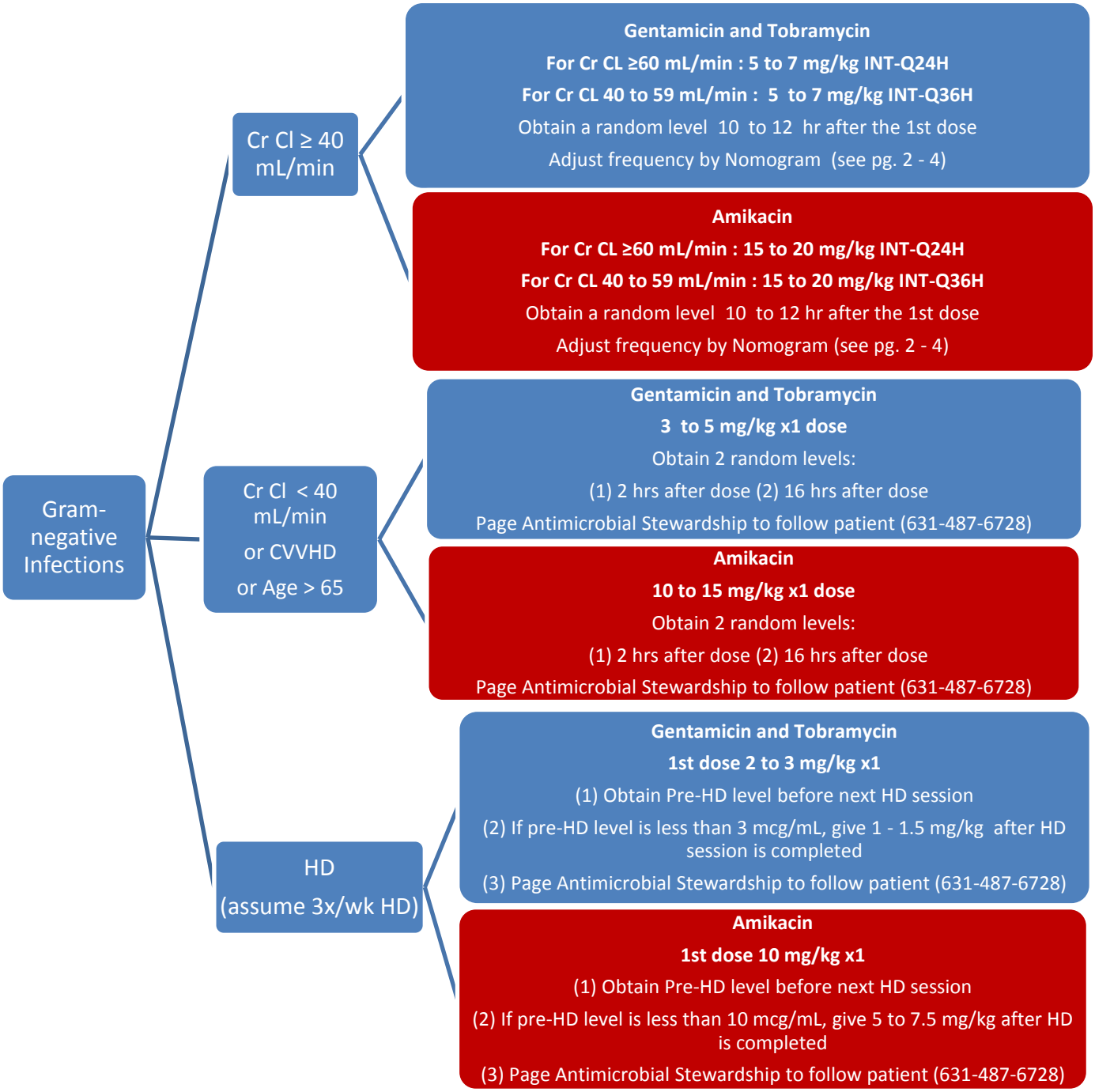
Stony Brook Medicine
Antimicrobial Stewardship Program

SBUH Aminoglycoside Dosing Protocol

Adult Aminoglycoside Dosing for Gram-negative infections prior to available serum levels
(Excludes patients with cystic fibrosis, OB-GYN patients and surgical prophylaxis)



Dosing weight for aminoglycoside weight-based dosing methods:

- **Use Ideal body weight unless Actual body weight is less than Ideal body weight (IBW)**
- **If Actual Body Weight is greater than 120% of Ideal body weight, use Adjusted Dosing Weight**
  Adjusted Dosing Weight = Ideal body weight + [0.4 x (Actual body weight – Ideal body weight)]

Editors: Melinda Monteforte, PharmD., Roderick Go, DO.
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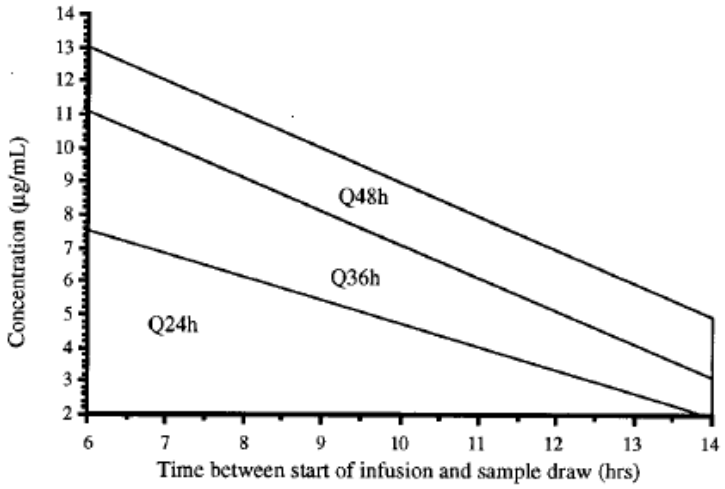
Monitoring for High-Dose Extended Interval Dosing Method

For gentamicin or tobramycin dosing at 7mg per kg, use Hartford Hospital Dosing Nomogram to determine dosing frequency



How to use Hartford Hospital Nomogram when gentamicin or tobramycin is dosed at 7mg/kg:

- **Obtain a random level 10 - 12 hours after the 1st dose**
- **Plot the measured gentamicin or tobramycin levels on the Hartford Nomogram corresponding to the number of hours from when the infusion was started**
- **If the level falls within "Q24h" area, the dosing frequency is INT-Q24h.**
- **If the level falls within "Q36h" area, the dosing frequency is INT-Q36h. Start new regimen 36 hours from the last dose and repeat a 10 - 12 hours post-dose random level.**
- **If the level falls within "Q48h" area, the dosing frequency is INT-Q48h. Start new regimen 48 hours from the last dose and repeat a 10-12 hours post-dose random level.**
- **If the plotted level falls on or close to a division line, use the dosing frequency with the longer dosing interval**
- **If the plotted level falls on or above the upper line of q48h, discontinue current regimen and order for a random level 24 hours from the last level. Page Antimicrobial Stewardship to follow patient (631-487-6728)**

Monitoring after dosing frequency is confirmed:

- ***Monitor renal function***
- ***If renal function is unchanged, recheck a random level 10-12 hours after dose every 5-7 days***
- ***More frequent monitoring may be warranted in patients with higher risk for nephrotoxicity or unstable renal function***
- ***When decline in renal function is detected, reassess dosing frequency by a random level 10-12 hours after the dose***

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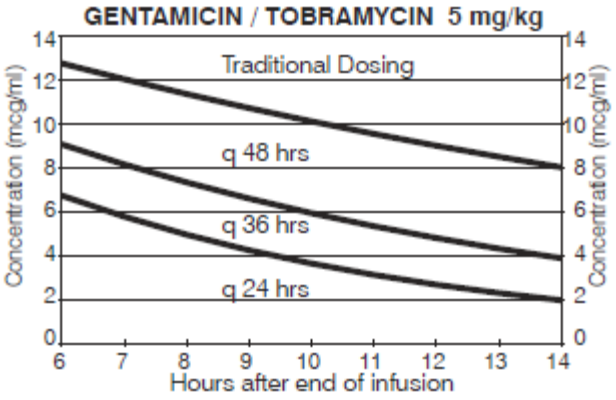
Monitoring for High-Dose Extended Interval Dosing Method

For gentamicin or tobramycin dosing at 5 mg per kg, use Barnes-Jewish Hospital Dosing Nomogram to determine dosing frequency



How to use Barnes-Jewish Nomogram when gentamicin or tobramycin is dosed at 5 mg/kg

- **Obtain a random level 10 - 12 hours after the first dosing**
- **Plot the measured gentamicin or tobramycin level on the Barnes-Jewish Hospital Nomogram corresponding to the number of hours from the end of the infusion**
- **If the level falls within "Q24h" area, the dosing frequency is INT-Q24h.**
- **If the level falls within "Q36h" area, the dosing frequency is INT-Q36h. Start new regimen 36 hours from the last dose and repeat a 10-12 hours post-dose random level.**
- **If the level falls within "Q48h" area, the dosing frequency is INT-Q48h. Start new regimen 48 hours from the last dose and repeat a 10-12 hours post-dose random level.**
- **If the plotted level falls on or close to a division line, use the dosing frequency with the longer dosing interval**
- **If the plotted level falls on or above the upper line of q48h, discontinue current regimen and order for a random level 24 hours from the last level. Page Antimicrobial Stewardship to follow patient (631-487-6728)**

Monitoring after dosing frequency is confirmed:

- ***Monitor renal function***
- ***If renal function is unchanged, recheck a random level 10-12 hours after dose every 5-7 days***
- ***More frequent monitoring may be warranted in patients with higher risk for nephrotoxicity or unstable renal function***
- ***Whenever decline in renal function is detected, reassess dosing frequency by a random level 10-12 hours after the dose***

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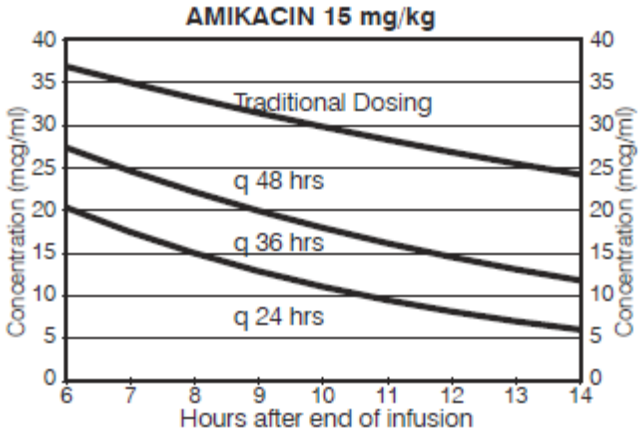
Monitoring for High-Dose Extended Interval Dosing Method

For amikacin dosing at 15 mg/kg, use Barnes-Jewish Hospital Dosing Nomogram to determine dosing frequency



How to use Barnes-Jewish Nomogram when amikacin is dosed at 15 mg/kg

- **Obtain a random level 10 - 12 hours after the first dosing**
- **Plot the measured amikacin level on the Barnes-Jewish Hospital Nomogram corresponding to the number of hours from the end of the infusion**
- **If the level falls within "Q24h" area, the dosing frequency is INT-Q24h.**
- **If the level falls within "Q36h" area, the dosing frequency is INT-Q36h. Start new regimen 36 hours from the last dose and repeat a 10-12 hours post-dose random level.**
- **If the level falls within "Q48h" area, the dosing frequency is INT-Q48h. Start new regimen 48 hours from the last dose and repeat a 10-12 hours post-dose random level.**
- **If the plotted level falls on or close to a division line, use the dosing frequency with the longer dosing interval**
- **If the plotted level falls on or above the upper line of q48h, discontinue current regimen and order for a random level 24 hours from the last level. Page Antimicrobial Stewardship to follow patient (631-487-6728)**

Monitoring after dosing frequency is confirmed:

- ***Monitor renal function***
- ***If renal function is unchanged, recheck a random level 10-12 hours after dose every 5-7 days***
- ***More frequent monitoring may be warranted in patients with higher risk for nephrotoxicity or unstable renal function***
- ***Whenever decline in renal function is detected, reassess dosing frequency by a random level 10-12 hours after the dose***

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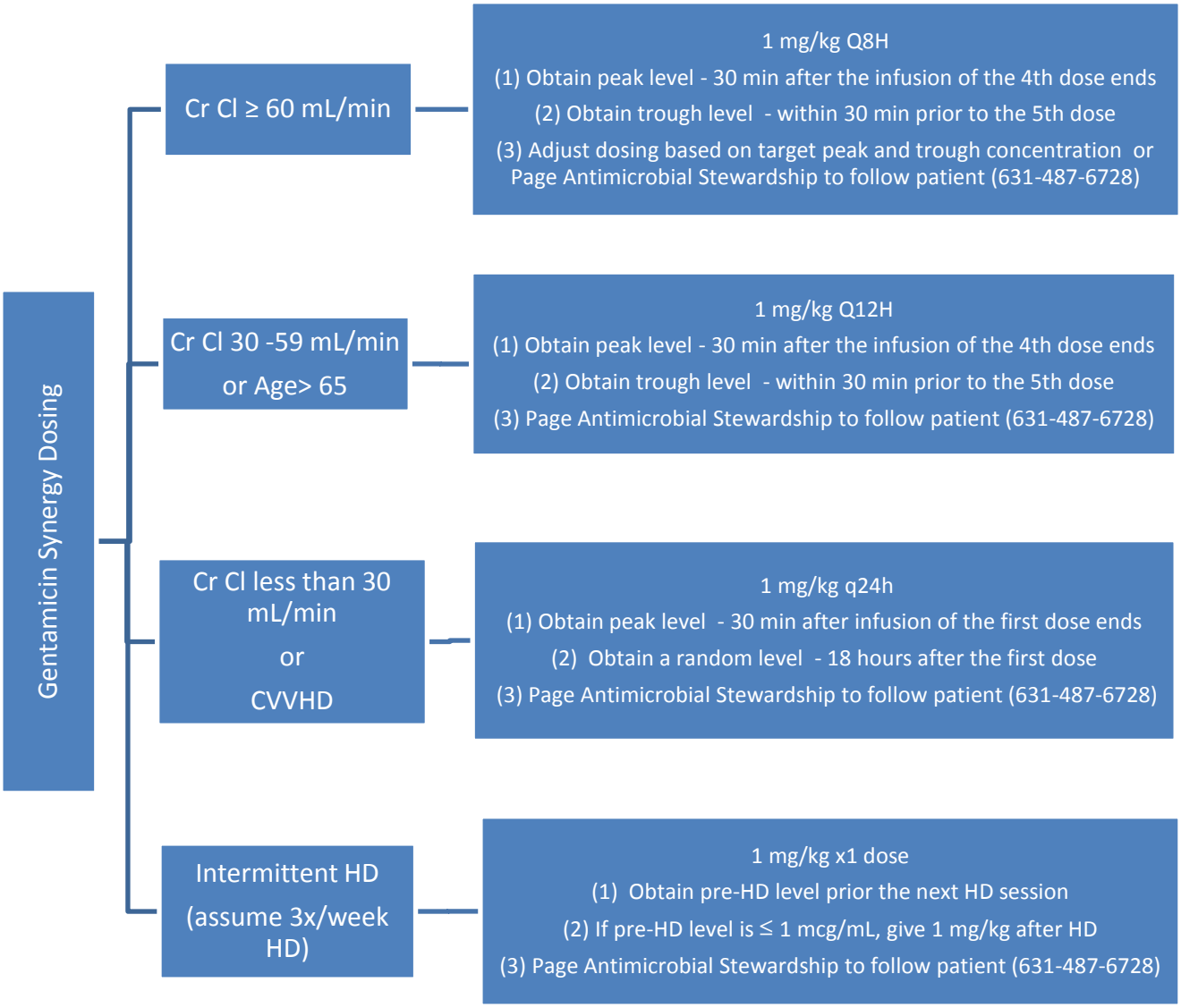
Gentamicin Gram-positive Synergy Dosing

Gentamicin should not be used as monotherapy for Gram-positive infections. A low dose of gentamicin is used in combination with a cell wall active antimicrobial agent (e.g., beta-lactam antibiotics or vancomycin) for synergy in the treatment of Gram-positive infections (e.g., endovascular infection with Enterococcus, Staphylococcus, Penicillin-resistant Streptococcus, and Listeria)

Target steady state peak concentration: 3 – 4 mcg/mL

Target steady state trough concentration: Less than 1 mcg/mL



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Target Levels

I. Aminoglycoside High Dose Extended Interval Method (Also known as Once-Daily Dosing)

Gentamicin and Tobramycin

When dosed at 5 to 7 mg per kg with extended dosing interval (e.g., Q24H, Q36H, or Q48H), the usual peak concentration is in the range of 15 to 25 mcg/mL. The goal for the trough concentration is less than 0.3 mcg/mL.

Amikacin

When dosed at 15 to 20 mg per kg with extended dosing interval (e.g., Q24H, Q36H, or Q48H), the usual peak concentration is in the range of 35 to 50 mcg/mL. The goal for the trough concentration is less than 4 mcg/mL

II. Conventional Dosing

This dosing method uses patient's estimated pharmacokinetic parameters derived from measured serum concentrations to determine dose and frequency to achieve target peak and trough concentrations. This dosing method is used when High Dose Extended Interval Dosing Method cannot be used for patients who have decreased renal function.

Conventional dosing interval of q24h should not be confused with patients receiving High Dose Extended Interval Method (Once-daily). The dose used in Conventional Dosing Method is reduced in order to attain the optimal PK/PD target in patients with decreased renal function

Target Peak and Trough at steady state for Conventional dosing

Gentamicin and Tobramycin		
Indications	**Target Peak at steady state (mcg/ml)**	**Target Trough at steady state (mcg/ml)**
Gram-negative Pneumonia	**8-10**	**< 2**
Severe Gram negative Infections	**6-8**	**< 2**
Urinary Tract Infections	**4-6**	**<1**

Amikacin		
Indications	**Target Peak at steady state (mcg/ml)**	**Target Trough at steady state (mcg/ml)**
Gram-negative infections	**25 - 35**	**< 8**

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References

1. Nicolau DP., Freeman CD., Belliveau PP., et al. Experience with a One-Daily Aminoglycoside Program administered to 2,184 adult patients. AAC 1995;39:650-655
2. Editors Casabar E, Ritchie D, Bain B, Bailey T. Aminoglycosides. Barnes Jewish Hospital Tool Book 2014
3. Freeman CD., Nicolau DP., Belliveau PP., et al. Once-daily dosing of Aminoglycosides: review and recommendations for clinical practice. JAC 1997;36:677-686
4. Begg EJ., Barclay ML., Duffull SB. A suggested approach to once-daily aminoglycoside dosing. Br J Clin Pharmac 1995;39:605-609
5. Heintz BH., Matzke GR., Dager WE. Antimicrobial Dosing Concepts and recommendations for critically ill adult patients receiving continuous renal replacement therapy or intermittent hemodialysis. Pharmacotherapy 2009;29:562-577
6. Dager WE., King JH. Aminoglycosides intermittent hemodialysis: Pharmacokinetics with individual dosing. Ann Pharmacother 2006;40:9-14
7. Trotman RL., Williamson JC., Shoemaker DM, et al. Antibiotic dosing in critically ill adult patients receiving continuous renal replacement therapy. CID 2005;41:1159-66
8. Beringer, P. and Winter, M. (2004) Aminoglycoside Antibiotics. In: Troy DB. ed. Basic Clinical Pharmacokinetics. Philadelphia: Lippincott Williams and Wilkins. pp 130-182
9. Leggett, James. Aminoglycosides. Principles and Practice of Infectious Diseases. Ed. Bennett JE, Dolin R, Blaser M. Publisher. Saunders. Eighth Edition 2015. Pg. 310-321
10. Baddour LM, Wilson WR, Bayer AS., et al. Infective Endocarditis in Adults: Diagnosis, Antimicrobial Therapy, and Management of Complications. Circulation. 2015;132:1-53

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