

Pharmacokinetic Calculations

Ideal Body Weight (IBW) Calculation:

Male: 50 kg + [2.3 kg for each inch over 5 feet]

Female: 45 kg + [2.3 kg for each inch over 5 feet]

Creatinine Clearance (CrCl) using Cockcroft-Gault Equation:

Creatinine is expressed in mL/min

$$\text{CrCl (mL/min)} = \frac{(140 - \text{age}) (\text{IBW in kg})^*}{72 (\text{SCr in mg/dL})^\ddagger}$$

NOTE: For Females multiply by 0.85

CrCl for elderly patients or when no height is available:

$$\text{CrCl (mL/min)} = \frac{(114 - (0.8 * \text{age}))}{\text{SCr in mg/dL}^\ddagger}$$

NOTE: For females multiply by 0.9

*If patients actual body weight is less than IBW, use actual body weight to calculate CrCl

‡If patient is underweight/cachectic, may consider rounding SCr up to 1 mg/dL.^{1,2}
Do not round to 1 mg/dL for all patients > 60 years of age.³⁻⁵

Adjusted Body Weight (aminoglycoside dosing)

Use adjusted body weight (AdjBW) when actual body weight (ABW) is ≥ 30% of ideal body weight (IBW)

$$\text{AdjBW} = 0.4 (\text{ABW} - \text{IBW}) + \text{IBW}$$

IBW= Ideal Body Weight (in kg); AdjBW= Adjusted Body Weight; ABW= Actual Body Weight; CrCl= Creatinine clearance; SCr= serum creatinine

References:

1. Robert S, Zarowitz BJ, Peterson EL, Dumler F. Predictability of creatinine clearance estimates in critically ill patients. *Crit Care Med.* 1993;21(10):1487-1495.
2. Khuu T, Bagdasarian G, Leung J, et al. Estimating aminoglycoside clearance and creatinine clearance in underweight patients. *Am J Health-Sys Pharm.* 2010;67(4):274-279.
3. Bertino JS. Measured versus estimated creatinine clearance in patients with low serum creatinine values. *Ann Pharmacother.* 1993;27(12):1439-1442.
4. Smythe M, Hoffman J, Kizy K, Dmuchowski C. Estimating creatinine clearance in elderly patients with low serum creatinine concentrations. *Am J Hosp Pharm.* 1994;51(2):198-204.
5. Dowling TC, Wang E-S, Ferrucci L, Sorkin JD. Glomerular Filtration Rate Equations Overestimate Creatinine Clearance in Older Individuals Enrolled in the Baltimore Longitudinal Study on Aging: Impact on Renal Drug Dosing. *Pharmacotherapy.* 2013;33(9):912-921.