http://clincalc.com/Kinetics/ObesityDosing.aspx

Drug Dosing in Obesity Reference Table

An evidence-based drug dosing resource

Dosing weight-based medications in obese patients can often be a tricky proposition. Most medications do not have guidelines for morbidly obesity, forcing clinicians to pursue in-depth literature searches in order to decide on a dose.

The purpose of this page is to serve as a dynamic, growing repository of evidence-based recommendations regarding medication dosing in obese patients. I would encourage you to examine each medication's cited references in order to form your own conclusions. As always, reasonable clinical judgment is required in conjunction with this information.

Lastly, if you have primary literature regarding obesity dosing for a medication that is not listed on this table, please **contact me with the drug name and citation (../About.aspx)** and I would be happy to add it to the list.

Drug	Comments
A	

Acyclovir [1]	▶ Dose using **ideal body weight (per package insert)** ▶ No information about dose adjustments in extremely obese patients exists
Amikacin [2]	▶ Dose using a 40% **adjusted body weight**
Atracurium [3]	▶ Dose using **ideal body weight** ▶ The use of ideal body weight has been shown to be associated with a more predictable muscle strength recovery within 60 minutes and a lack of need for antagonism compared to total body weight
D	
Dalteparin [4]	▶ Dose using total body weight ▶ VTE () prophylaxis: if BMI () ≥ 40 mg/m^2 increase dose by 30% ▶ VTE () treatment: once-daily dosing (200 units/kg daily) probably okay (unlike enoxaparin) ▶ Anti-Xa level monitoring probably not necessary unless weight > 190 kg
Daptomycin [5,2]	▶ Dose using total body weight
Digoxin [6]	▶ Dose using **ideal body weight**
Dobutamine [7]	▶ No kinetic data has been published -- titrate to goal MAP
Dopamine [7]	▶ No kinetic data has been published -- titrate to goal MAP

E	
Enoxaparin [4]	▶ Dose using total body weight ▶ VTE () prophylaxis: if BMI () ≥ 40 mg/m^2 increase dose by 30% ▶ VTE () treatment: avoid once-daily dosing if BMI > 27 kg/m^2 (eg, do not use 1.5 mg/kg daily) ▶ Anti-Xa level monitoring probably not necessary unless weight > 190 kg
Epinephrine [7]	▶ No kinetic data has been published -- titrate to goal MAP
F	
Fondaparinux [8]	▶ VTE () prophylaxis: use standard dosing (2.5 mg daily) ▶ In a study of patients with BMI > 40 kg/m^2, 53% of patients of patients had anti-Xa levels were within or above target range
G	
Gentamicin [2]	▶ Dose using a 40% **adjusted body weight**
H	
Heparin (unfractionated) [9,10,11]	▶ Dose using **adjusted body weight** (preferred), **ideal body weight**, or actual body weight with a dosing cap ▶ Studies have shown that using actual body weight (without a dose cap) is associated with a higher aPTT value ▶ Heparin infusions should be titrated to an aPTT goal (usually every 6-8 hours until stable)
I	

Immunoglobulin (IVIG) [12]	▶ Consider dosing using **ideal body weight** or **adjusted body weight** ▶ Overall, there is a lack of data to support using a specific body weight metric -- these recommendations are based only on expert opinion
L	
Linezolid [13]	▶ No dosing change for obesity is required ▶ In a study of 20 obese patients, linezolid exposure (AUC ()) was no different between obese and non-obese patients
Lorazepam [14]	▶ For bolus doses, use total body weight ▶ For continuous infusions, use **ideal body weight** ▶ In obese patients, lorazepam volume of distribution increases proportionally to body weight. Therefore, doses based on total body weight are required to reach the same initial serum concentration ▶ Once at goal sedation, continuous infusions should use ideal body weight because lorazepam clearance is not affected by total body weight.
M	
Methylprednisolone [15]	▶ Dose using **ideal body weight** and consider less frequent dosing ▶ In a study of 6 obese and non-obese patients, methylprednisolone volume of distribution was unaffected by body size, but clearance was significantly reduced in patients with obesity
	▶ For bolus doses, use total body weight ▶ For continuous infusions, use **ideal body weight** ▶ In obese patients, midazolam volume of distribution increases proportionally to body weight. Therefore, doses

Midazolam [14]	based on total body weight are required to reach the same initial serum concentration ▶ Once at goal sedation, continuous infusions should use ideal body weight because midazolam clearance is not affected by total body weight.
N	
Norepinephrine [7]	▶ No kinetic data has been published -- titrate to goal MAP
O	
Oseltamivir [16,17]	▶ Use standard dosing (no adjustment for obesity)
P	
Phenytoin [18,7]	▶ For loading doses, use the following equation for dosing weight: *Dosing weight = Ideal + 1.33 * (Actual - Ideal)* ▶ Ideal body weight is calculated using the **Devine equation** ▶ Obese patients will require *more* than their actual body weight for a phenytoin loading dose
Propofol [14]	▶ Dose using total body weight ▶ For continuous infusions, titrate drip to desired sedation goal ▶ Note that the cardiovascular effects of large propofol doses (hypotension) are poorly described and may be problematic
R	
Rasburicase [19]	▶ Body weight does not strongly correlate to reduction in uric acid levels ▶ Consider fixed, single doses irrespective of body weight

Remifentanil [20,2,7]	▶ Dose using **ideal body weight** ▶ For continuous infusion, titrate to pain control
Rocuronium [21]	▶ Dose using **ideal body weight**
S	
Succinylcholine [14,22]	▶ Dose using total body weight ▶ Obese patients may have increased pseudocholinesterase activity, which metabolizes succinycholine ▶ This recommendation is only based on expert opinion -- there is nearly no compelling evidence
T	
Tigecycline [23]	▶ Dose using total body weight (based on limited pharmacokinetic data)
Tinzaparin [4]	▶ Dose using total body weight ▶ VTE () prophylaxis: if BMI () ≥ 40 mg/m^2 increase dose by 30% ▶ VTE () treatment: once-daily dosing (175 units/kg daily) probably okay (unlike enoxaparin) ▶ Anti-Xa level monitoring probably not necessary unless weight > 190 kg
Tobramycin [2]	▶ Dose using a 40% **adjusted body weight**
V	
	▶ Dose using toal body weight

Vancomycin [2,24]	▶ Vancomycin dose should be adjusted based on vancomycin trough levels once at steady state (usually 3-4 doses)
Vecuronium [14]	▶ Dose using **ideal body weight** ▶ Although volume of distribution and clearance are unchanged in obese patients, doses using actual body weight may have prolonged neuromuscular blockade.
Voriconazole [25]	▶ Dose using **lean body weight (LBW 2005 equation)** ▶ LBW2005 correlates to AUC better than total body weight, although both are poor predictors of voriconazole levels due to a high degree of interpatient variability ($R^2 < 0.50$) ▶ Voriconazole dose should be adjusted based on voriconazole trough levels once at steady state (usually 5-7 days of therapy)

❶ About This Calculator

Ideal Body Weight (Devine 1974) [26]

Although this equation lacks scientific basis, its easy of use at the bedside and extensive use for a variety of medical applications has made it the standard method for estimating lean body mass. Note that you may use the **Ideal Body Weight online calculator (IdealBW.aspx)**, or use the equations below:

$$Ideal\ BW\ (men)\ = 50 + 2.3 * (height\ over\ 60\ inches)$$
$$Ideal\ BW\ (women)\ = 45.5 + 2.3 * (height\ over\ 60\ inches)$$

Lean Body Weight (LBW2005) [27]

LBW2005 () is an accurate, validated method of measuring the lean mass of an obese patient. The equation is less commonly used than the Devine 1974 equation,[26] but is more accurate. Note that you may use the **LBW2005 online calculator (IdealBW.aspx)**, or use the equations below:

$$LBW2005\ (men) = \frac{9.27 * 10^3 * ActualBW}{6.68 * 10^3 + (216 * BMI)}$$

$$LBW2005\ (women) = \frac{9.27 * 10^3 * ActualBW}{8.78 * 10^3 + (244 * BMI)}$$

Adjusted body weight

In obese patients, the use of ideal body weight underdoses patients, but the use of actual body weight overdoses patients. With these circumstances, an adjustment factor (usually 40%) is often used to estimate the proportion of adipose tissue that distributes a given medication. Note that you may use the **adjusted body weight online calculator (IdealBW.aspx)**, or use the equations below:

$$AdjustedBW\ = IdealBW + (0.4 * (ActualBW - IdealBW))$$

References and Additional Reading

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- Acute Physiology and Chronic Health Evaluation (APACHE II) Calculator (/IcuMortality/APACHEII.aspx)
- Opioid Equianalgesic Calculator (/Opioids)
- Vancomycin Calculator (/Vancomycin)
- Visualizing the ACC/AHA ASCVD Pooled Cohort Equations (http://clincalc.com/blog/2013/12/visualizing-the-ascvd-pooled-cohort-equations/)

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