Supplement 1. First-order equation used for determination of area under the curve (AUC).

1. Check the sampling times for the serum concentration (Sc): *Sc*1 and *Sc*2,

   i.e., respectively *t*1 and *t*2 (time post-dose)

2. Calculate the elimination rate constant (K_e):

$$Ke = \frac{ln\,(\frac{Sc2}{Sc1})}{t2-t1}$$

3. Calculate the elimination half-life ($T_{1/2}$):

$$T_{1/2} = \frac{0.693}{ke}$$

4. Calculate real peak (C_{max}) with time between end of infusion and *t*1 (ΔT):

$$C_{max} = \frac{Sc1}{1-(e^{-k\cdot\Delta T})}$$

5. Calculate real trough (C_{min}) with dosing interval (T):

$$C_{min} = C_{max} \cdot \ (e^{-ke\cdot(T-t)})$$

6. Calculate the volume of distribution (*V*d) with infusion time (*t*):

$$Vd = \frac{dose}{t} \cdot \frac{(1-e^{-kt})}{ke \cdot (C_{max} - (C_{min} \cdot e^{-kt}))}$$

7. Calculate daily area under the concentration-time curve for infusion (AUC_{inf}):

$$AUC_{inf} = \frac{Cmax + Sc2}{2} \cdot t$$

8. Calculate daily area under the concentration-time curve for elimination (AUC_{elim}):

$$AUC_{elim} = \frac{Cmax - Sc2}{ke}$$

9. Calculate daily area under the concentration-time curve for 24-h (AUC):

$$AUC = (AUC_{inf} + AUC_{elim}) \cdot \frac{24}{T}$$

Choice of dosing regimen with AUC

Use the pre-monitoring regimen if AUC is between 400 and 600 mg*h/L (target range). If the AUC is not in this range, follow these steps:

1. Calculate daily dose for an AUC of 500 mg*h/L

$$daily\ dose = Vd \cdot Ke \cdot 500$$

2. Choose a dosing interval that meets the following criteria:

    a. Generates a trough between 10–15 mg/L

    b. Prefer a smaller dose with a more frequent interval

3. Calculate new vancomycin unit dose (rounding to the nearest 250 mg):

$$unit\ dose = \frac{daily\ dose}{24} \cdot T$$

4. Calculate extrapolated C_{max} for new dose:

$$C_{max} = \frac{unit\ dose}{Vd \cdot (1 - e^{-k \cdot T})}$$

5. Calculate extrapolated C_{min} for new dose:

$$C_{min} = C_{max} \cdot (e^{-ke \cdot (T - t)})$$

6. Calculate extrapolated AUC with the same method as above.

Supplement 2. Vancomycin pharmacokinetic characteristics in the study population.

Variable	Mean ± SD[a] (*n* = 66)
Initial dosage	
Single dose (mg)	1109 ± 192
Daily (mg/day)	2244 ± 724
Daily (mg/kg/day)	29.94 ± 10.31
Interval (h)	13.39 ± 6.35
No. of doses before peak (median and range)	3.00 (3–12)
Peak (mg/L)	28.44 ± 5.87
Trough (mg/L)	12.34 ± 3.81
K_e (h^{-1})	0.0942 ± 0.0418
Half-life (h)	9.64 ± 9.182
Volume of distribution (L)	54.70 ± 16.63
Volume of distribution (L/kg) [b]	0.74 ± 0.26
AUC (mg*h/L)	480.26 ± 99.14

AUC = area under the curve, K_e = elimination rate constant, SD= standard deviation.

[a]Except where indicated otherwise.

[b]Divided by total body weight in kilograms.