## Equation Sheet

$$C = C_o e^{-K_E t}$$

$$\log C = \log C_o - \frac{K_E}{2.3} t$$

$$Cl_{TB} = K_E V_d = \beta V_{d\beta} = \frac{FD}{AUC}$$

$$t_{½} = \frac{0.693}{K_E} = \frac{0.693}{Cl_{TB}} V_d$$

$$V_d = \frac{Dose}{C_o}$$

$$AUC_{0-\infty} = AUC_{0-t} + AUC_{t-\infty}$$

$$AUC_{t-\infty} = \frac{C_t}{K_E \text{ or } \beta}$$

$$AUC_{t_1-t_2} = \frac{(C_2 + C_1)(t_2 - t_1)}{2}$$

$$\log \frac{dX_u}{dt} = \log k_e X_o - \frac{K_E}{2.3} t$$

$$\Sigma X_u^{\infty} = \frac{k_e X_o}{K_E}$$

$$\log(\Sigma X_u^{\infty} - \Sigma X_u) = \log \Sigma X_u^{\infty} - \frac{K_E}{2.3} t$$

$$\frac{dX_u}{dt} = Cl_r C$$

$$Cl_r = k_e V_d$$

$$X_u\Big|_{t_1}^{t_2} = k_e V_d \int_{t_1}^{t_2} C dt$$

$$C = \frac{k_o}{V_d K_E}(1 - e^{-K_E t})$$

$$C_{ss} = \frac{k_o}{K_E V_d}$$

$$C = \frac{k_o}{K_E V_d} e^{-K_E t'}$$

$$LD = C_{ss} V_d$$

$$k_o = C_{ss} V_d K_E = C_{ss} Cl_{TB}$$

$$\log \Delta C = \log \frac{k_o}{K_E V_d} - \frac{K_E}{2.3} t$$

$$C = Ae^{-\alpha t} + Be^{-\beta t}$$

$$C_o = A + B = \frac{X_o}{V_c}$$

$$C = \frac{k_a F X_o}{V_d (k_a - K_E)}(e^{-K_E t} - e^{-k_a t})$$

$$AUMC_{0-\infty} = \int_0^t tCdt + \frac{C_t}{(\beta \text{ or } K_E)^2} + \frac{tC_t}{\beta \text{ or } K_E}$$

$$MRT = \frac{AUMC}{AUC} = \frac{1}{K}$$

$$V_{dss} = MRT \,.\, Cl_{TB} = \frac{AUMC \;\; Dose}{AUC^2}$$

$$\frac{F_A}{F_B} = \frac{D_B \, AUC_A}{D_A \, AUC_B}$$

$$C_{ss} = \frac{F D}{Cl_{TB} \;\; \tau}$$

$$Cl_H = Q E$$

$$F = F_g F_\ell F_{lung}$$

$$F_l = 1 - E$$

$$Cl_i = f \;\; Cl_i^{'}$$

$$E = \frac{Cl_i}{Q + Cl_i} = \frac{C_{in} - C_{out}}{C_{in}}$$

$$V = 5.6 + \frac{f_B}{f_T}(35)$$

$$V^{'} = 2.8 + \frac{f_p}{f_T^{'}}(37.8)$$

$$\frac{dC}{dt} = \frac{V_m \;\; C}{K_m + \;\; C}$$

$$LBW\,(male) = 50\ kg + 2.3\ kg\ /\ in\ \ over\ \ 5'$$

$$LBW\,(\ female) = 45.5\ kg + 2.3\ kg\ /\ in\ \ over\ \ 5'$$

$$Cl_r\ \ (male) = \frac{(140 - age)\ \ LBW}{72\ C_{cr}}$$

$$Cl_r\ \ (\ female) = \frac{(140 - age)\ \ LBW}{85\ C_{cr}}$$

$$D_u = D_N\ \ \frac{K_u}{K_N}$$

$$\tau_u = \tau_N\ \ \frac{K_N}{K_u}$$

$$K_u = K_r + K_{nr} = a\,Cl_{cr} + K_{nr}$$

$$K\% = a + b\ Cl_{cr}$$

$$G = \frac{K_u}{K_N} = 1 - f\ (1 - \frac{Cl_{cr}^{u}}{Cl_{cr}^{N}})$$

$$Child\ D_M = \left[\frac{SA\ (m^2)}{1.8}\right] x\ adult\ D_M$$

$$Child\ D_M = \left[\frac{BW\ (kg)}{70}\right]^{0.7}\ \ x\ adult\ D_M$$

$$D_M = \left[\frac{(140 - age)(SA)}{153}\right] usual\ adult\ D_M$$

$$D_M = \left[\frac{(140 - age)(BW)^{0.7}}{1660}\right] usual\ adult\ \ D_M$$

Theophylline:

$$Cl_{TB} = \frac{2K_o}{C_1 + C_2} + \frac{2V_d(C_1 - C_2)}{(C_1 + C_2)(t_2 - t_1)}$$

Aminoglycosides:

$$DW = \left[(TBW - IBW)\ \ 0.4\right] + IBW$$

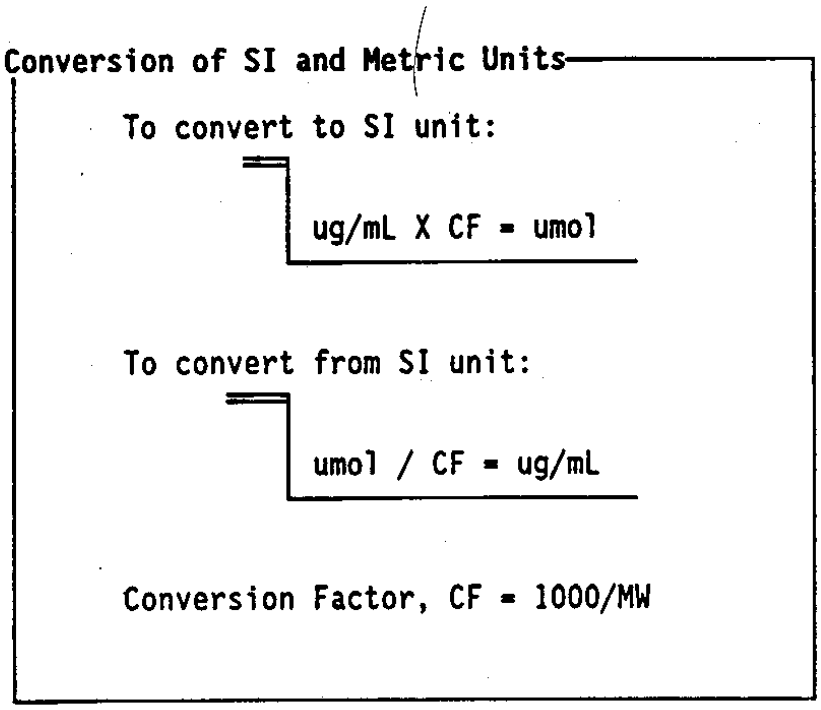
$$K_E\ \ (Gent) = 0.015 + (0.00285\ \ Cl_{cr})$$

$$K_E\ \ (Tobr) = 0.010 + (0.00310\ \ Cl_{cr})$$

$$\tau = \frac{-1}{K_E}\ \ \ln\frac{C_{\min}}{C_{\max}} + t$$

$$M_d = t\left[C_{\max}\ V_d\ K_E\ \frac{(1 - e^{-K_E\tau})}{(1 - e^{-K_E t})}\right]$$

$$C_{\min} = C_{\max}\left[e^{-K_E(\tau - t)}\right]$$




Example: What is equivalent of 12 ug/mL of phenytoin in SI unit?

Solution:

CF = 1000/252.3 = 3.96

12 (ug/mL) = X umol / 3.96 = 47.5 umol

See Assignment 12 for more relevant examples.