MATATIKI
CHILD & YOUTH HEALTH
CANTERBURY DHB
NEONATAL SERVICES

Neonatal Gentamicin Monitoring

NHI .... WARD ....

SURNAME ....

FIRST NAME ....

GENDER .... DOB .... AGE ....

(or affix patient label)

Working weight: .... Indication: .... Prescriber's pager number: ....

Use a new sheet for each gentamicin course and keep in the notes   **Accurate entry of drug infusion times is imperative for dose predictions**

	PRESCRIBER/NURSE TO COMPLETE							PHARMACIST TO COMPLETE OR ADVISE BY PHONE AND NICU STAFF CAN COMPLETE					
	DOSING			**SAMPLING**				**PHARMACOKINETICS** *see page 2 for calculations*				**NEW DOSE**	
Dose date	Dose and Interval	Gentamicin Infusion Start Time	Gentamicin Infusion Stop Time	Time of Peak Level	Peak Level (mg/L)	Time of Mid-interval Level	Mid-Interval Level (mg/L)	$t_{1/2}$ (hr)	C_{max} (mg/L)	C_{min} (mg/L)	AUC (mg/L.hr)	Recommendations *Dose and Interval*	Pharmacist Signature /Pager
	60 mg hrly First dose												
	mg hrly												
	mg hrly												
	mg hrly												

Work hours
- The Neonatal Unit pharmacist (pager 5009) will provide help with gentamicin monitoring and dose predictions between 8.00am-4.30pm Mon-Fri
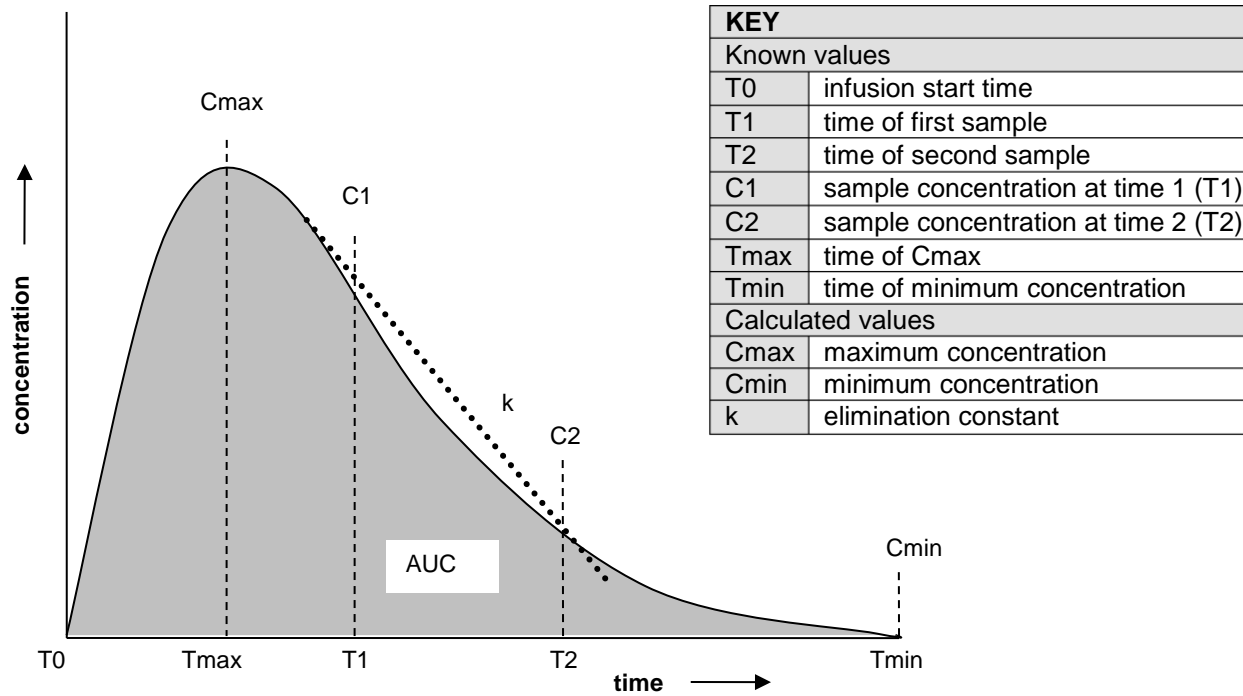
After hours
- Contact the on-call pharmacist via the Christchurch Hospital operator. Verbal predictions need to be "witnessed" by two staff members, if possible ask for photo or scanned copy of the monitoring form.

Notes:
- This dosing strategy aims to maximise the effectiveness of gentamicin via concentration rather than time-dependent bacterial kill and to minimise toxicity and resistance
- $t_{1/2}$ (half-life) – neonates with very long gentamicin half-lives, ie. > 12 hr should not be given subsequent doses (D/W the Consultant as alternative antibiotics may not be available)
- C_{max} (true peak concentration) – needs to be **> 12 mg/L. (ideal range 12 - 25 mg/L) ; Gentamicin works best with a high Cmax and a very low Cmin**
- C_{min} (true trough concentration – at the end of the dosing interval) – needs to be as low as possible and ideally should be **< 0.5 mg/L**
- AUC (area under the concentration-time curve) – should be no greater than **250 mg/L.hr** for a 60hr dosing interval **(usual range 175 – 250 mg/L.hr)**

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KEY	
Known values	
T0	infusion start time
T1	time of first sample
T2	time of second sample
C1	sample concentration at time 1 (T1)
C2	sample concentration at time 2 (T2)
Tmax	time of Cmax
Tmin	time of minimum concentration
Calculated values	
Cmax	maximum concentration
Cmin	minimum concentration
k	elimination constant

$$k = \frac{\ln C1 - \ln C2}{T2 - T1}$$

$$t\tfrac{1}{2} = \frac{0.693}{k}$$

$$Cmax = C1 \times e^{k(T1 - Tmax)}$$

$$Cmin = C2 \times e^{-k(Tmin - T2)}$$

$$AUC = \frac{Cmax - Cmin}{k}$$