

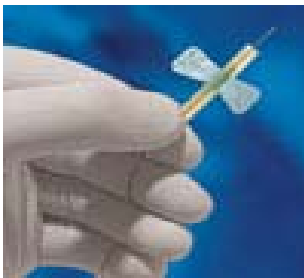
# **Therapeutic Drug Monitoring: A Nursing Perspective**

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# Therapeutic Drug Monitoring

- Pharmacokinetics (PK) and Pharmacodynamics (PD).
- What is TDM?
- Why request TDM?
- What is the nurses role in the process?



# Pharmacokinetics (PK) and Pharmacodynamics (PD):

- *Pharmacokinetics* is the study of what the body does to the drugs.
  - *Drug Absorption, Distribution, Metabolism, and Elimination.*
- *Pharmacodynamics* is the study of what the drugs do to the body.
  - *Drug Efficacy, Toxicity and/or possible side effects.*

# What is TDM?

- TDM stands for *Therapeutic Drug Monitoring*
- Measures Drug Absorption, Distribution, and Metabolism (PK).
- Uses the blood levels to customize ARV Therapy or adjust doses for complete viral suppression with fewer side effects.
- Routinely used in most areas of medicine to achieve maximal benefit with minimal or (hopefully) no toxicity with drug therapy.

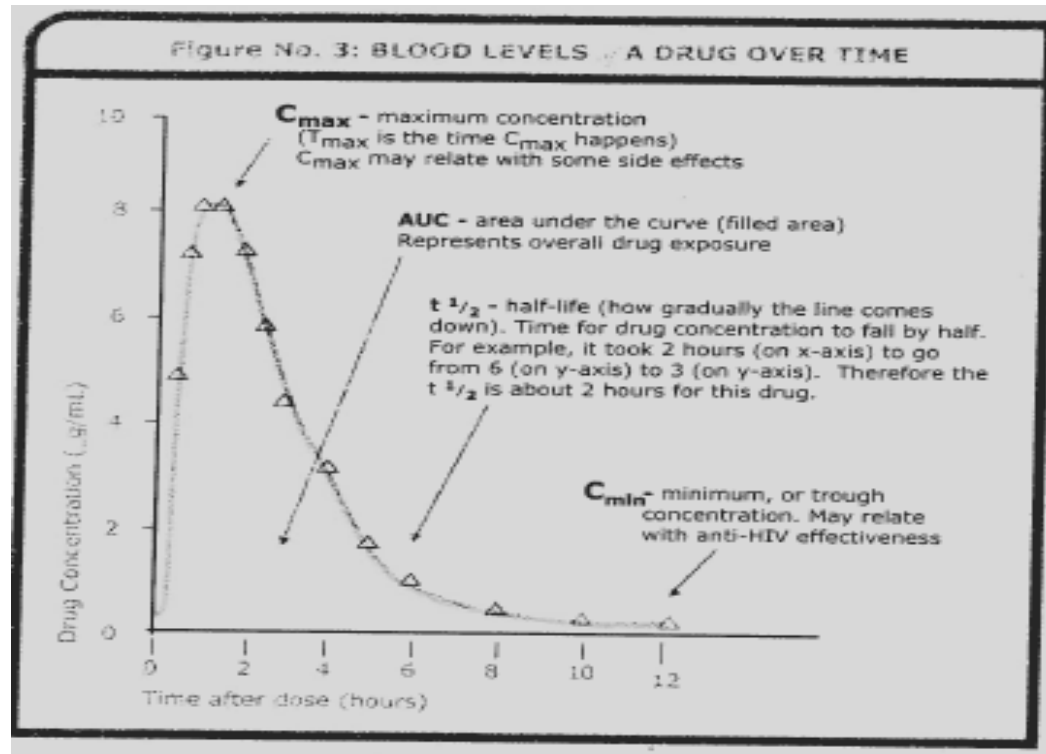
## Therapeutic Range for Drug Concentration

- **Sub-Optimal Levels** are associated with low therapeutic effects with possible future resistance.
- **Therapeutic Effect** is the reduction in HIV RNA (VL), the increase of CD4 Cells and consequent decrease in Opportunistic Infections.
- **Therapeutic Range** is the Level of Drug that causes a therapeutic effect versus a toxic effect.
- **Toxic Effect** speaks for itself...

# The 12 hour TDM!

- Trough Level at time zero, 12 hours after last BID Dose, or 24 hours after last OD Dose.
- Medication taken **after** Trough level taken.
- Blood Levels drawn every hour after for 12 hours to determine...
  - C<sub>max</sub>: Maximum Concentration (↑ in SE's).
  - AUC: Under the Curve (overall Drug Exposure).
  - C<sub>min</sub> : Minimum or Trough concentration.

# Blood levels of a Drug over time.





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## HIV-1 Pharmacokinetic Report

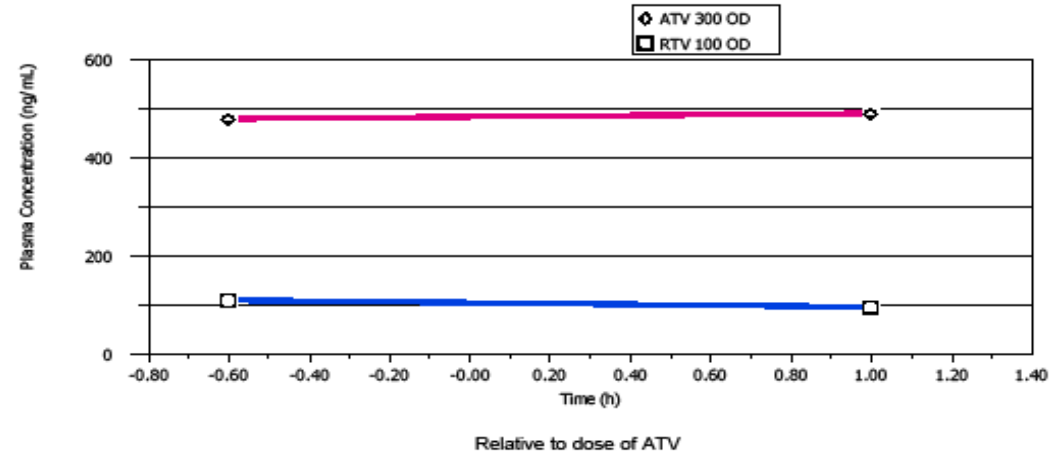
For research use only

Patient/Sample Details	Test Details	Physician Details
Name:	TDM Date:	Physician:
Patient ID:	Study Name: TDM	Contact/Copy to:
Birthdate:	Date Printed:	
Sample Comments:		

Time (h)	ATV	RTV
-0.6	480	109
1.0	491	95

### REFERENCE VALUES (SEE BELOW)

IC50 or IC95 (WT)	ATV	RTV
Cmin	862	250
Cmax	4422	784



# Why request TDM?

- The patient is experiencing Side Effects.
- Despite Adherence, the patient's VL has ↑'d
- Blood Levels of some ARV's can ↑ or ↓ due to:
  - Food Consumption (or lack of)
  - Concomitant medication (i.e.: antacids)
  - Liver and/or Renal Function/Impairment
  - Obesity or being Underweight

# What is the Nurse's Role in the TDM Process?

- Nurse as MOA
- Nurse as Phlebotomist
- Nurse as Counselor
  - Importance of Adherence
  - Side Effect Management
  - Safer Sexual Practice
  - Harm Reduction
- Nurse as EDUCATOR

## Follow up after TDM

- Results reviewed by a select few at BCCFE.
  - Dr. Julio Montaner
  - Dr. Silvia Guillemi
  - Dr. Marianne Harris
- Ordering Physician receives copy with suggestions re: ARV Therapy.
- If changes are made, 2<sup>nd</sup> TDM booked.

## References Cited and Thanks...

- Positively Aware: the Journal of Test Positive Aware Network; Winter 2005 Article: What's PK got to do with it?
- [http://www.thebody.com/treat/therapeutic\\_drugs.html](http://www.thebody.com/treat/therapeutic_drugs.html)
- <http://www.drug-monitoring.com>
- Dr. Julio Montaner M.D. RCCFP – Internal Medicine
- Dr. Silvia Guillemi M.D.
- Dr. Marianne Harris M.D.CCFD
- Junine Toy BSc(Pharm) ACPR