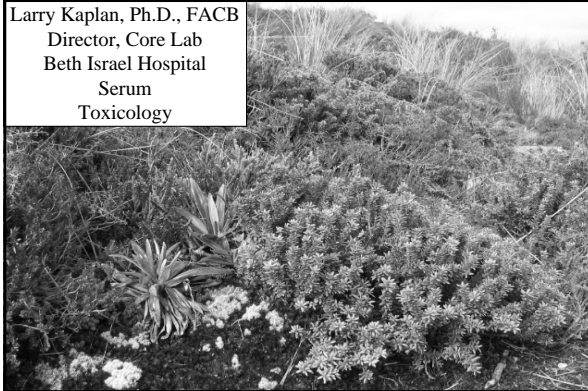


Larry Kaplan, Ph.D., FACB
 Director, Core Lab
 Beth Israel Hospital
 Serum
 Toxicology



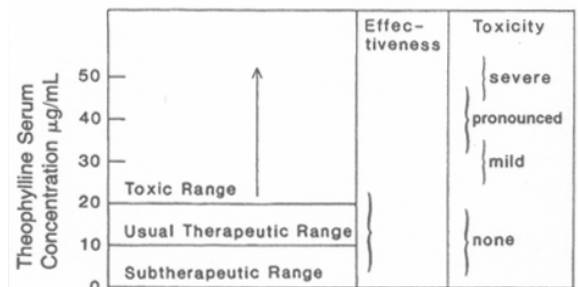
Therapeutic or Toxic Range

- Often obtained as a result of clinical trials
- Must be taken in clinical context: is patient getting better?

Reasons for Serum Drug Measurement

1. Monitoring therapeutic levels of a drug
2. Possible toxicity of a therapeutic drug
 - Requires quantitative levels
3. Presence of a toxic substance
 - Typically requires only a qualitative result

Theophylline Effectiveness vs Toxicity



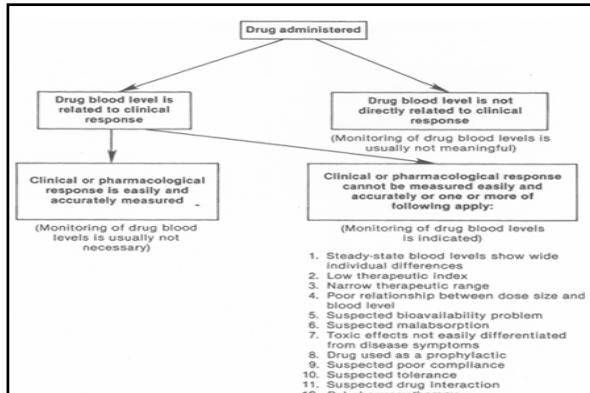
CONCEPT OF THERAPEUTIC vs TOXIC RESPONSE: POPULATION DEFINITION

LD₅₀ OF A TOXIN IS DEFINED AS A POPULATION-BASED CONCEPT THAT WILL VARY WITH

- GENDER, AGE,
- RACE,
- GENERAL HEALTH, AND
- GENETIC FACTORS

WHEN IS MEASUREMENT OF SERUM DRUG APPROPRIATE?

TDM Past Present Future: AJPesce



Optimal Sampling Time

- For dosage at half life, usually oral medications
- Optimal sampling is after 5 half lives
- Intravenous infusion at constant rate the same e.g. after 5 half lives

Clinical Settings for TDM (1)

- Suspected overdose
- Lack of therapeutic effect
- Compliance
- Possible toxicity
- Drug interaction
- Prophylactic drug
- Dose prediction: use current level to adjust next dose

Critical Values

- Unusually high or toxic values
- High trough values
- Low values (near 0)
 - Non compliance
 - Wrong patient
 - Incorrect order, patient not on drug

Clinical Settings for TDM (2)

- Disease state that alters pharmacokinetics
- Optimization in critically ill patient
- Unknown medication level
- Leucovorin rescue

TOXINS ENCOUNTERED IN CLINICAL SITUATIONS

- SUICIDE
- MURDER
- ACCIDENTAL OVERDOSES OF A SUBSTANCE or THERAPEUTIC DRUG (legal drug)
- ABUSED DRUGS, LEGAL AND ILLEGAL

Laboratory Support
Serum
Toxicology



Request for Quest send-out; questions

- What is the drug?
- Why is serum level needed:
 - compliance?
 - Toxicity?
 - Therapeutic levels?
- Does Quest have toxic or therapeutic ranges?
- Pain management often requires levels for toxicity issues

USE OF SPECIFIC DRUG ANALYSES
FOR TOXINS IN BLOOD/SERUM

- SERUM SALICYLATE, ETHANOL, ACETAMINOPHEN; correlation between [blood] and status
- Certain, limited, therapeutic drugs
- THE RESULTS OF THESE ANALYSES WILL OFTEN AFFECT TREATMENT
- BLOOD ANALYSES NEVER REQUIRE CONFIRMATION, VERY RAPID TURN-AROUND
- In-lab TAT <30 min.

For qualitative results, compliance, a urine sample is sufficient to indicate presence:

OPIATES:	NEGATIVE
METHADONE:	POSITIVE
BENZODIAZEPINES:	NEGATIVE
COCAINE:	NEGATIVE
BARBITURATES:	NEGATIVE
ALCOHOL	NEGATIVE
CREATININE:	<10 MG/DL

SAMPLES FOR DRUG SCREENING

- SERUM- usually overdose situations for which there is good correlation between concentration and clinical status
- URINE- usually for drugs of abuse; only POS/NEG.-serum analyses is NOT necessary

Laboratory Support
For Serum
Toxicology

