

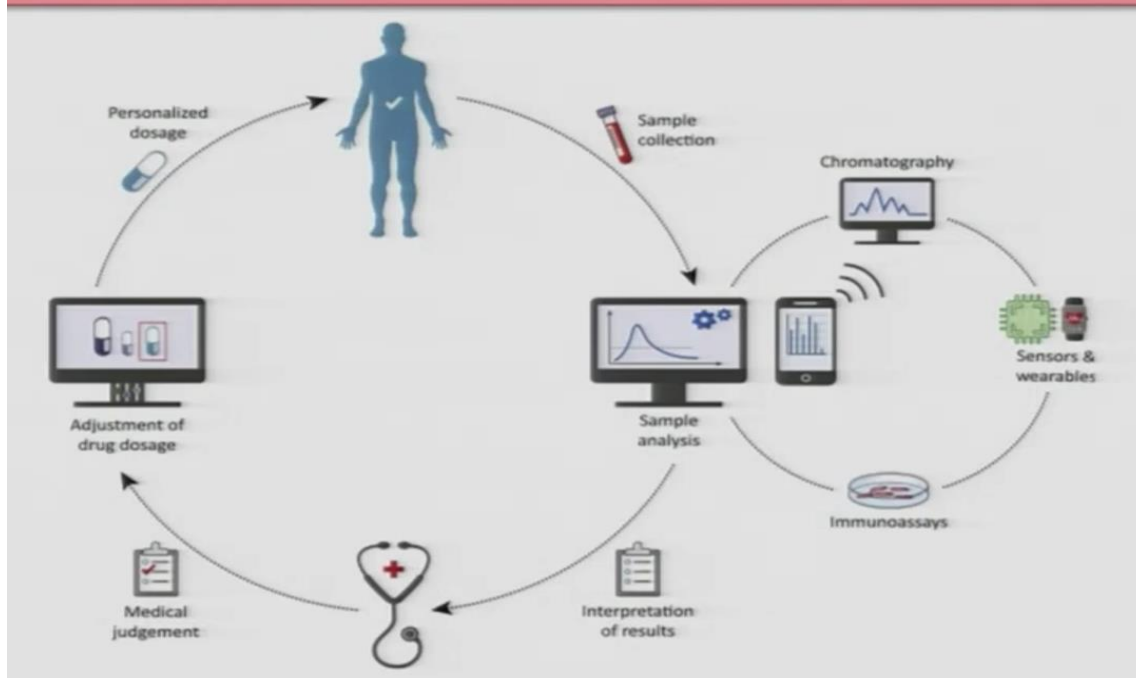
Therapeutic Drug Monitoring

- Therapeutic drug monitoring (TDM) is the clinical practice of measuring specific drugs at designated intervals to maintain a constant concentration in a patient's bloodstream, thereby optimizing individual dosage regimens.
- In other words, TDM refers to the individualization of drug dosage by maintaining plasma or blood drug concentrations within a targeted therapeutic range or window.
- Therapeutic drug monitoring involves not only measuring drug concentrations, but also the clinical interpretation of the result.
- The goal of this process is to *individualize therapeutic regimens* for optimal patient benefit.
- By combining knowledge of pharmaceuticals, pharmacokinetics and pharmacodynamics, TDM enables the assessment of the efficacy and safety of a particular medication in a variety of clinical settings.

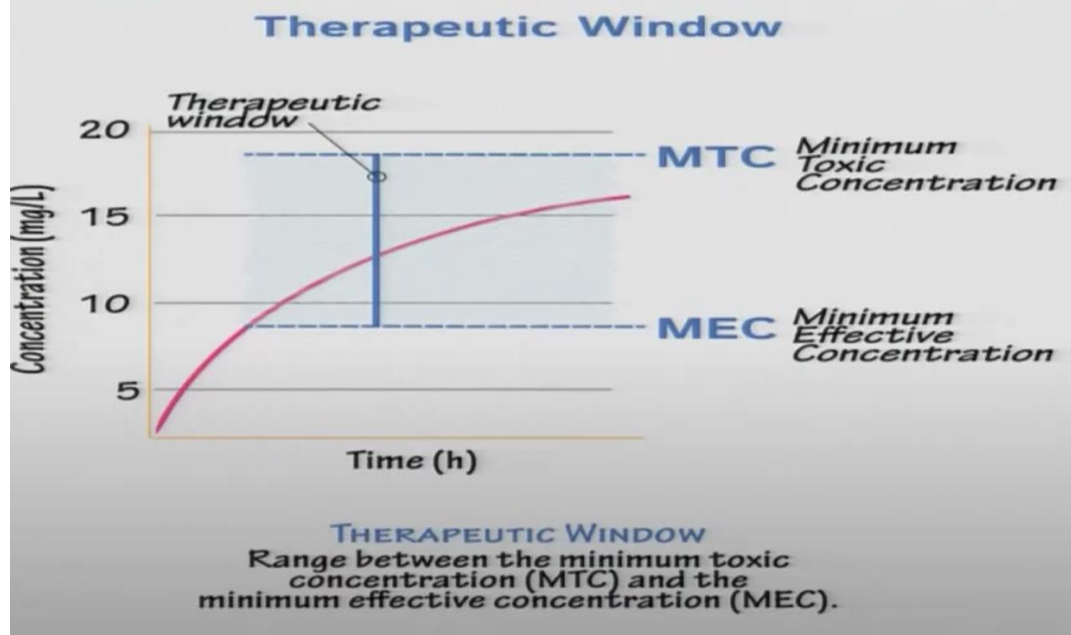
- TDM is based on the principle that for some drugs there is a close relationship between the plasma level of the drug and its clinical effect.
- Another assumption is that drug metabolism varies from patient to patient.
- When a precise therapeutic end point is difficult to define, monitoring of drug levels may be of considerable therapeutic assistance.
- Routine monitoring is however not advocated for most drugs.
- Only clinically meaningful tests should be performed.

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Therapeutic Drug Monitoring



Therapeutic Drug Monitoring



Need for Therapeutic Drug Monitoring

- Patient with an inadequate clinical response
- Patient with signs or symptoms which may indicate drug toxicity
- To minimize the risk of drug toxicity
- To individualise dosing for some drugs with an unpredictable dose response curve
- To help predict a patient's dose requirements
- To assess medication compliance
- To identify poisons and to assess the severity of poisoning in a poisoning emergency

Need for Therapeutic Drug Monitoring

Classes of drugs commonly monitored to ensure correct blood concentration include:

- Antiepileptics (Phenytoin, Valproic acid)
- Antiarrhythmics (Digitalis, Lignocaine)
- Antibiotics (Gentamycin, Amikacin, Tobramycin)
- Antineoplastics (Methotrexate)
- Antimanics (Lithium)
- Bronchodilators (Theophylline)
- Immunosuppressives (Cyclosporine)

Need for

Factors for Therapeutic Drug Monitoring

- Patient data
- Dosage regimen
- Sampling time
- Indication for therapy
- Patient adherence
- Reduced protein binding
- Drug interactions
- Pathological factors affecting pharmacokinetic profile

- Tobacco use
- Alcohol use
- Medication or sampling errors
- Laboratory errors

Indian Scenario for Therapeutic Drug Monitoring

In India, TDM started in mid 1980s and the last three decades have seen tremendous growth in its scale of popularity.

Currently, TDM exists in mainly two settings in India:

- Firstly under the aegis of clinical pharmacology departments in large scale teaching hospitals (e.g. King Edward Memorial Hospital, Mumbai)

- Secondly in private sector where it is either done in clinical biochemistry laboratories or in a dedicated clinical pharmacological unit of a corporate hospital (e.g. Apollo Hospital, New Delhi)

- Therapeutic Drug Monitoring (TDM) for imatinib, current gold standard for treatment of chronic myeloid leukemia may provide useful added information on efficacy, safety and compliance than clinical assessment alone and help in clinical decision making.

- The monitoring of therapeutic drugs is especially for personalizing medicine in ageing population and to optimize the efficacy of drugs in children

- Significant barriers to TDM use were availability, cost and time lag for results. If these barriers were removed, almost all the clinicians would use TDM atleast reactively.