## GENERAL INFORMATION
## CHEMISTRY/TOXICOLOGY SECTION - CLINICAL LABORATORY

### Recommended Instructions for Fasting Patients

1) Patients should have **no alcohol for 24-hours** and be fasting prior to specimen collection.
2) If the patient is diabetic, the patient should continue with his/her medication.
3) It is acceptable and encouraged for the patient to have adequate amounts of water during the fasting period.

| Assay | Fasting Requirement |
|---|---|
| Lipid Panel | 12-14 hours |
| Fasting Glucose | 8 hours |
| Glucose Tolerance Testing | 8 hours |

Glucose Tolerance Testing

Glucose Tolerance Testing is no longer recommended as a screening test for diagnosing diabetes. Fasting glucose and glycohemoglobin results generally provide conclusive data for substantiating diagnosis. However if a tolerance is desired, it may be requested as 2 hour tolerance. For outpatients, the physician should instruct the patient as to the length of time the patient will remain in the laboratory for the glucose tolerance testing.

The patient will be drawn for a fasting glucose specimen. A fasting glucose of ≥126 mg/dl will result in automatic callback to the physician's office or floor notifying them that the test will be canceled.. **If the physician wants to continue the glucose tolerance testing after being notified of the >126 mg/dl fasting glucose result, the laboratory medical director must be consulted first.** 75 grams of glucola will be administered to the patient's. The patient will then have a specimen drawn 2 hours after drinking the glucola.

Gestational Diabetes Screen

The patient does **not** need to be fasting. A baseline glucose will be drawn. A baseline glucose of ≥126 mg/dl will result in automatic callback to the physician's office or floor notifying them that the test will be canceled. **If the physician wants to continue the gestational glucose tolerance testing after being notified of the >126 mg/dl fasting glucose result, the laboratory medical director must be consulted first.** 50 grams of oral glucola will be administered and a one-hour specimen will be drawn.

Gestational Glucose Tolerance:

The patient needs to be fasting. A fasting glucose will be drawn. A fasting glucose of ≥126 mg/dl will result in automatic callback to the physician's office or floor notifying them that the test will be canceled. **If the physician wants to continue the gestational glucose tolerance testing after being notified of the >126 mg/dl fasting glucose result, the laboratory medical director must be consulted first.** 100 grams of oral glucola will be administered and a one-hour, two hour and three hour specimen will be drawn.

Cardiac Monitoring: It is recommended that a patient exhibiting symptoms of cardiac injury be tested for an early marker and a definitive marker. Testing needs to be done immediately on presentation in ER or onset of symptoms, and sequentially thereafter. Troponin I is the definitive marker of choice, and CK can be used as an early marker. CK-MB is not necessary in addition to Troponin I, but can be used to monitor for reinfarct due to the fact that Troponin I stays elevated for 72 hours following initial injury, and CK-MB usually returns to normal within 48 hours.

Pregnancy Monitoring
It is recommended that **prior** to requesting a *quantitative* HCG for pregnancy monitoring that there be a previously documented positive *qualitative* HCG for the patient.

Serum/Blood Alcohol (Ethanol) Analysis
Quantitative serum/blood alcohol (ethanol) is available in-house and is **done for medical purposes only.**

## Urines Submitted For Analysis

It is recommended that prior to submitting or requesting a timed urine specimen to contact the laboratory. Many timed urine assays require special additives added to the collection container prior to the start of the timed urine collection.

In some cases it is not possible to submit one timed urine specimen for all assays desired due to the additive requirement. In that case the patient will need to collect two separate timed urine collections to submit for analysis. Timed urine collection containers are available from the laboratory on request.

Urine Collection Guidelines
The normal composition of urine varies considerably during a 24-hour period; most random urine reference values are based on analysis of the first urine voided in the morning. This specimen is preferred because it has a more uniform volume and concentration, and its lower pH helps preserve the formed elements.

Random Urine Procedure
1. Submit a first morning specimen whenever possible.
2. Specimens for routine urinalysis should be collected, properly labeled and transported to the laboratory. Refrigeration of the specimen is recommended if it is not being transported to the laboratory ASAP.

Timed Urine Collection Procedure
Because accurate test results depend on proper collection of timed urine specimens, patients should be carefully instructed in the correct procedure. Printed instructions are available from the laboratory. The collection starts **after** the patient empties his bladder. This initial voiding is **not** included in the timed collection. Note the time and date of voiding on the label of specimen container. Collect all urine voided during the collection period **including** the

specimen voided at the end of the collection period. The specimen should be collected in the clean container provided by the laboratory. The specimen should be refrigerated or kept on ice during the collection period. Each voiding should be added to the container as soon as possible.

## Therapeutic Drug Monitoring Guidelines

In general serum drug concentrations should be determined only after a patient has reached steady-state (that is the drug is no longer accumulating in the body and the rate of drug administration approximates the rate of elimination). Another variable is whether a peak, trough, or random measurement is needed.

For most a trough concentration drawn just prior to the next dose is recommended to insure that a therapeutic concentration of drug is maintained. A patient on multiple-dose therapy will attain a steady state concentration after 4-5 half-lives of the drug.

Measurement of both peak and trough concentrations may be indicated for some drugs (e.g., aminoglycoside antibiotics and vancomycin). However, peak concentrations may be useful only for intravenous therapy due to the variable rates of absorption following oral dosages.

**In-House Assays Available for Therapeutic Drug Monitoring**

| Generic Name | Trade Name | Half-Life |
|---|---|---|
| Antiepileptics | | |
| Phenytoin | Dilantin | 12- 30 hours |
| Carbamazepine | Tegretol | 8- 30 hours |
| Valproic Acid | Depakene | 8- 15 hours |
| Cardiac Drugs | | |
| Digoxin | Lanoxin | 36- 51 hours |
| Antibiotics | | |
| Gentamicin | Garamycin | 1.5- 3 hours |
| Tobramycin* | Nebcin | 1.5- 3 hours |
| Vancomycin | Vancocin | 4- 6 hours |
| Miscellaneous | | |
| Acetaminophen | Tylenol | 2- 3 hours |
| Salicylate | Aspirin | 2- 5 hours |
| Theophylline | Aminophylline | 2- 12 hours |

*transported to Herrin Hospital Laboratory for assay

Recommended Times To Schedule Sample Collection for TDM

In therapeutic drug monitoring (TDM) **one of the most important considerations is the timing of sample collection.**

The following information concerning peak, trough and steady-state specimens for therapeutic drugs is intended as a reference to assist in the proper timing of sample collection for therapeutic drug monitoring. For some drugs there are multiple recommendations due to

the variations for the administration of the drug, **individual consideration must be given for each patient in scheduling TDM**.

**Acetaminophen**:

In suspected overdose, several determinations starting at least 4-hour after drug ingestion.

**Antiepileptics:**

Carbamazepine, Phenytoin (generic), Valproic Acid

Immediately **prior** to next dose

**Cardiac Drugs**:

Digoxin (PO or IV):

Immediately **prior** to next dose (usually drawn after $6^{th}$-$8^{th}$ dose) or
6-8 hours after last oral dose

**Antibiotics**

Gentamicin:

(Usually drawn after $3^{rd}$ dose)
Trough: Immediately **prior** to next dose
Peak: 30-minutes after completion of 30-minute IV infusion
With Extended Interval (High dose once daily) - Infuse over 1-hour:
drawn 8-12 hours after $1^{st}$ dose

Tobramycin:

(Usually drawn aftr $3^{rd}$ dose)
Trough: Immediately **prior** to next dose
Peak: 30-minutes after completion of 30-minute IV infusion
With Extended Interval (High dose once daily) - Infuse over 1-hour:
drawn 8-12 hours after $1^{st}$ dose

Vancomycin:

Trough: Immediately **prior** to next dose
(Draw trough no earlier than 1-hr prior to next dose)
Peak: 1-hour after completion of 60-minute IV infusion

Psychotherapeutic Agents:

Lithium:

Immediately **prior** to next oral dose or
10-12 hours after last dose (early AM specimen preferred)

**Miscellaneous**:

Salicylate:

Peak: 2-4 hours after administration

Theophylline:

IV Administration:

Before IV dose if patient had theophylline within past 24-hours.
30-minutes after completion of IV loading dose.
4-6 hours after initiation of constant rate infusion.
Repeat 12-18 hours after initiation of constant rate infusion.
Repeat at 24-hour intervals until infusion discontinued.

Oral Administration:

Peak depends on oral preparation:

2-hours after syrup and uncoated tablets.
4-12 hours after dosing preparations.
12-24 hours after dosing preparations.

## Guidelines for Requesting TDM

Nursing personnel ordering in Meditech OE must respond to the time and date prompt whenever requesting therapeutic drug monitoring.

## Drugs of Abuse Primary Screening Available In-House

Primary screening for 7-drugs of abuse in urine is available in-house. This drug screen offers only preliminary analytical results, qualitative results of positive or negative, based on a cut off level. A more specific method must be used in order to confirm preliminary results.

If a confirmation of any positive result is desired, **the physician must request the confirmation by written order** and then the specimen will be sent to a reference laboratory.

In-house preliminary drug screening is available for the following:

| **Assay** | **Lower Detection Limits Cutoff for Positive Result** |
|---|---|
| Urine Amphetamine | 500 ng/ml |
| Urine Cocaine | 300 ng/ml |
| Urine Cannabinoids | 50 ng/ml |
| Urine Opiates | 2000 ng/ml |
| Urine Benzodiazepine | 200 ng/ml |
| Urine Barbiturates | 200 ng/ml |
| Urine Phencyclidine | 25 ng/ml |