

Therapeutic Drug Monitoring (TDM) Sample Collection

Time of Collection (TOC)

The TOC of a TDM sample is important if the physician has a specific therapeutic goal in mind, such as checking for toxicity (peak) or determining if trough levels are still in the therapeutic range. Precisely drawn samples might also be important if looking for abnormal drug metabolism leading to unusual ratios of parent drug and metabolite(s). The physician should order a “PEAK” or “TROUGH” level in these circumstances. The trough should be drawn just before the next dose. The true trough actually occurs a bit after the next dose is orally administered, because of delayed absorption.

Often, a randomly drawn level is adequate, especially for drugs with long half-lives (e.g. phenobarbital) and for those where there is no well-defined therapeutic range and compliance is the issue.

Serum from gel Separator Tubes

This is a sticky issue. A few drugs show a decreased serum concentration if drawn in certain gel tubes. The effect is not constant from brand-to-brand, and has not been studied for many drugs. In general, the effect is made worse if the serum is not removed from the gel tube promptly. The effect seems to be worst for highly lipophilic drugs such as phenytoin and tricyclic antidepressants, and many other such drugs have not been tested. Lidocaine and quinidine have also demonstrated the effect. It does not cause extremely large errors, especially if the serum is removed quickly.^{1,2}

Since it is so tedious to deal with this on an individual basis, we recommend using plain red top vacutainers for TDM sample collection. This would be true for the above drugs and any of the unusual drugs such as propafenone, amiodarone, etc. The common drugs have been studied and those with a problem are listed here.

Plasma versus Serum

We recommend serum as the usual specimen, instead of plasma, because it is universally applicable. We will accept heparin, EDTA, and sodium fluoride/potassium oxalate anticoagulants for all TDM's done at Warde Medical Laboratory. They do not interfere with the chromatographic and fluorescence polarization methods we use. We do not recommend the use of plasma for free drug testing. Plasma may be more likely to plug the filters used to remove protein bound-drug.

¹Orsulak, et al, Blood collection tubes for tricyclic antidepressants. A reevaluation,. Ther. Drug Monitoring, 1984,6:444-8.

²Koch and Platoff, Suitability of collection tubes with separator gels for therapeutic drug monitoring, Ther. Drug Monitoring, 1990; 12:277-80.