



## OSAC Research Needs Assessment Form

**Title of research need:** Postmortem Distribution and Redistribution

**Keywords:** Drug, Postmortem, Distribution, Redistribution

**Submitting subcommittee(s):** Toxicology

**Date Approved:**

*(If SAC review identifies*

*additional*

*subcommittees, add them to the box above.)*

### Background information:

#### 1. Description of research need:

When drugs are taken into the body, they and their metabolites are distributed to biological fluids and tissues via various mechanisms such as passive diffusion and blood transport. Drug concentrations in bodily fluids and tissues are known to significantly change during the time interval between death and the collection of specimens at autopsy (a phenomenon known as *postmortem redistribution*). Forensic toxicologists are often called upon to interpret laboratory results taking into account these postmortem changes. Comprehensive research is needed to further define and characterize the distribution and redistribution of drugs found in postmortem forensic cases. The following potential research areas have been identified:

1. Comprehensive tissue distribution studies to provide data for the relationship between tissue and blood drug and/or metabolite concentrations.
2. Further characterize the chemical/biological mechanisms of postmortem redistribution of drugs and metabolites.
3. Identify potential specific chemical markers in biological fluids and/or tissues that provide evidence that redistribution has occurred.
4. Potential development of mathematical relationships between fluid and tissue drug/metabolite concentrations to evaluate the extent of postmortem redistribution.

#### 2. Key bibliographic references relating to this research need:

1. Jones GR, Pounder DJ. Site Dependence of Drug Concentrations in Postmortem Blood—A Case Study *J Anal Toxicol* (1986) 11(5):186-190.
2. Anderson WH, Prouty RW. Postmortem redistribution of drugs. In: Baselt RC, ed. *Advances in analytical toxicology*, Vol. 2. Chicago: Year Book Medical Publications, 1989:70-102.
3. Shepherd, MF, Lake KD, Kamps MA. Postmortem Changes and Pharmacokinetics: Review of the Literature and Case Report. *Ann Pharmacother* (1992) 26(4):510-514.
4. Pounder DJ. The nightmare of postmortem drug changes. In: Wecht CH, ed. *Legal medicine 1993*. Salem, New Hampshire: Butterworth Legal Publishers, 1994:163-91.
5. Pélissier-Alicot AL, Gaulier JM, Champsaur P, Marquet P. Mechanisms Underlying Postmortem Redistribution of Drugs: A Review. *J Anal Toxicol* 2003 27(8):533-544.
6. Drummer OH, Gerostamoulos, J. Postmortem Drug Analysis: Analytical and Toxicological Aspects. *The Drug Mon* 2002 24(2):199-209.

3a. In what ways would the research results improve current laboratory capabilities?

The proposed research would:

1. Enhance fluid and tissue drug/metabolite concentration databases to be drawn upon by the criminal justice system.
2. Increase the scientific community's understanding of drugs/metabolites that are more susceptible to postmortem redistribution.
3. Improve the ability of forensic toxicology laboratories to interpret drug and/or metabolite concentrations in postmortem cases for their clients and the criminal justice system.
4. Delineate differences that may exist between therapeutic and overdose cases regarding the distribution and redistribution of the offending agent(s).
5. Increase efficiency of laboratory resources by providing data for testing strategies in postmortem cases.

3b. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

The toxicology subcommittee is tasked with providing standards and guidelines for the practice of toxicology to the forensic community. The information provided by the proposed research is a critical step in gathering the comprehensive data necessary for this purpose.

3c. In what ways would the research results improve services to the criminal justice system?

By clarifying the interpretation of drug concentrations in postmortem fluids and tissues, the proposed research would increase the ability of the criminal justice system to reach a more informed decision regarding postmortem cases. Important questions such as the determination of impairment and lethality would benefit by the ability of the toxicologist to call on the data and publications from this research when describing the potential effects of drug(s) and/or metabolites.

4. Status assessment (I, II, III, or IV):

	Major gap in current knowledge	Minor gap in current knowledge
No or limited current research is being conducted	<b>I</b>	<b>III</b>
Existing current research is being conducted	<b>II</b>	<b>IV</b>

*This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.*

Subcommittee	Approval date: <input style="width: 150px; height: 20px;" type="text"/>
<i>(Approval is by majority vote of subcommittee. Once approved, forward to SAC.)</i>	
SAC	<p>1. Does the SAC agree with the research need? Yes      No <input type="radio"/></p> <p>2. Does the SAC agree with the status assessment? Yes      No <input type="radio"/></p> <p style="margin-left: 40px;"><i>If no, what is the status assessment of the SAC:</i> <input style="width: 50px; height: 20px;" type="text"/></p> <p>Approval date: <input style="width: 150px; height: 20px;" type="text"/></p> <p><i>(Approval is by majority vote of SAC. Once approved, forward to NIST for posting.)</i></p>