OSAC RESEARCH NEEDS ASSESSMENT FORM

Title of research need: Alternative Matrices

Keyword(s): Alternative matrix, oral fluid, hair, neonatal, breath

Submitting subcommittee(s): Toxicology

Date Approved: 5/22/20

(If SAC review identifies additional subcommittees, add them to the box above.)

Background Information:

1. Description of research need:

Alternative matrices such as oral fluid, hair, neonatal specimens, and breath are increasingly being used for toxicological testing of drugs, and results are receiving scrutiny in court and other arenas. Both the analytical and interpretive aspects of these matrices should be set forth as areas of needed research.

2. Key bibliographic references relating to this research need:

**Multiple:**

**Neonatal:**


**Oral Fluid:**
3a. In what ways would the research results improve current laboratory capabilities?

Research surrounding oral fluid will result in correlations or lack thereof with blood concentrations and/or impairment, streamlined workflows, development of comprehensive mass spectrometry based screening, and investigation of alternative techniques and instrumentation. All aspects of oral fluid for roadside testing of driving under the influence of drugs are needed. For hair testing, research should focus on optimization of decontamination steps, improving ease of sample preparation, and providing more sensitive methodology to identify unique markers of drug metabolism that document drug intake and not
environmental contamination. For neonatal matrices, research will result in optimized sample preparation, identification of alternative matrices to meconium for capturing in utero or peri/postnatal drug exposure (amniotic fluid, placenta, cord blood or tissue, infant hair, breast milk), best practices for specimen collection, and guidance for analytical scope and sensitivity. Research for breath should focus on evaluation of roadside devices, development of additional roadside screening techniques for a wide range of drugs other than alcohol, and ways to identify or eliminate oral fluid contribution. For all alternative matrices, it is imperative to evaluate or develop suitable reference materials and proficiency testing programs.

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

Results of research will help us understand the interpretive value and timeline for exposure (oral fluid, neonatal, and breath), interpret drug incorporation vs environmental contamination (hair), and understand drug pharmacokinetics (breath).

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

Oral fluid research will provide a non-invasive sample collection for the roadside while eliminating the need for a phlebotomist or delayed collection (DUID, workplace). Hair research will provide more standardized testing and reliable interpretation (child custody cases, workplace, DFC, PM). Neonatal matrix research will provide more standardized testing and reliable interpretation. Breath research will provide an understanding for use of breath as a “for probable cause” matrix as well as evidentiary value in the realm of public safety.

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

<table>
<thead>
<tr>
<th>Oral fluid: I</th>
<th>Major gap in current knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hair: II</td>
<td>Minor gap in current knowledge</td>
</tr>
<tr>
<td>Neonatal: II</td>
<td></td>
</tr>
<tr>
<td>Breath: I</td>
<td></td>
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</tbody>
</table>

No or limited current research is being conducted

Existing current research is being conducted

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

Approvals:

Version 1.1 / Date of Issue: 2.09.16 / Issuing Authority: Forensic Science Standards Board (FSSB)
### Subcommittee Approval date: **04/30/2020**

*(Approval is by majority vote of subcommittee. Once approved, forward to SAC.)*

<table>
<thead>
<tr>
<th>SAC</th>
<th>Approval date: <strong>5/22/20</strong></th>
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</thead>
<tbody>
<tr>
<td>1. Does the SAC agree with the research need?</td>
<td>Yes [x] No [ ]</td>
</tr>
<tr>
<td>2. Does the SAC agree with the status assessment?</td>
<td>Yes [x] No [ ]</td>
</tr>
</tbody>
</table>

If no, what is the status assessment of the SAC: [ ]

*(Approval is by majority vote of SAC. Once approved, forward to NIST for posting.)*