

Response to the National Institute of Justice (NIJ) “National Best Practices for Sexual Assault Kits: A Multidisciplinary Approach” from OSAC Materials (Trace) Subcommittee Hair Task Group

The Organization of Scientific Area Committee’s (OSAC) Materials (Trace) Subcommittee Hair Task Group has reviewed the NIJ “National Best Practices for Sexual Assault Kits: A Multidisciplinary Approach.” While we applaud the development of best practices, as well as the emphasis on a victim’s individual needs during the evidence collection process, we feel that calling this a multidisciplinary approach is misleading. This document is primarily focused on the collection and processing of DNA evidence in sexual assault cases and it does not fully reflect the probative value of other forms of evidence, such as hairs or other trace evidence. The recommendations outlined in this document regarding collecting and processing evidence for sexual assault kits actually limit the types of forensic examinations that can be performed and therefore decrease the probative value of the sexual assault kit. We have the following specific concerns about the types of evidence collected and the evidence collection methods promoted.

Types of Hairs Collected

When referring to the collection of hair samples (page 20), the document exclusively mentions pubic hairs. Except from the deceased, this document does not mention the collection of head hair combings and standards, which may be probative, particularly in cases where the assailant is unknown or multiple assailants are involved.

Recommendation: In order to maximize the probative value of a hair analysis, we strongly suggest the routine collection of both head hair and pubic hair combings and standards as part of a sexual assault kit. Collecting a reference standard contemporaneous to when potential unknown hairs may have been deposited maximizes the potential value of a microscopical hair comparison (e.g., the known hairs would not be altered by time, growth, artificial treatment, etc.). Furthermore, failure to collect reference material at the onset of the investigation represents a lost opportunity as it may be difficult or impossible to obtain standards at a later date. Finally, the collection of combings (both head and pubic) preserves not only possible hair transfer evidence, but also other types of transfer evidence, such as fibers, that may be important to an investigation.

Cutting versus Plucking/Pulling Hairs

The document also directs that hair reference samples (i.e., standards) “should only be collected by cutting” (page 20), further stating (page 23) that plucking or pulling hairs causes unnecessary pain and that research does not support their probative value. Although the OSAC Hair Task Group acknowledges that the plucking/pulling of pubic hair samples may cause discomfort, microscopical hair comparison protocols involve examining all of the microscopic characteristics of a questioned hair from root to tip and comparing these characteristics to the microscopic features present within a reference sample (i.e., root to root, tip to tip). If reference hair samples are cut, potential corresponding features found in the root portions that could be of great importance would be absent, especially when hairs have been forcibly removed in an assault. If a microscopical hair comparison is performed with a cut hair standard, results would be limited because of the missing root portions in the reference samples. Topical anesthetics have been suggested as a method to reduce discomfort while still collecting the complete evidence sample. Pain can also be reduced by gently tugging at large tufts of hair to remove those hairs that are loosely attached. As DNA analysts rely on microscopical hair examinations to limit unnecessary testing of recovered hairs by subsequent DNA analysis, and to ensure only probative hairs are moved

forward for further exams, we feel that it is inappropriate to promote partial evidence collection that only serves to limit forensic analyses. Microscopical hair comparisons can be performed efficiently and quickly in time-sensitive cases, and provide investigative leads in cases where a suspect is not in a database or no DNA was found.

To suggest that research does not exist to support the routine collection of plucked/pulled hair samples is unjustified and inappropriate. Microscopy has been a standard method of scientific investigation for hundreds of years and has been used in legal investigations for over a hundred years. Numerous scientific publications in peer-reviewed journals support the validity and reliability of microscopical characterization and comparison of entire hairs (roots included) for forensic purposes, including:

- Exline DL, Smith FP and SG Drexler. "Frequency of pubic hair transfer during sexual intercourse (1998)," *J. Forensic Sci.* 43: 505-508.
- Mann, M. "Hair transfers in sexual assault: A six year case study (1990)," *J. Forensic Sci.* 35: 951-955.
- Oien, C. T. (2009). Forensic hair comparison: background information for interpretation. *Forensic Science Communications—FBI*, 1(2).
- Robertson, James. "Forensic and microscopic examination of human hair." *Forensic examination of hair* (1999): 79-154.
- Strauss (1983)--Mary Ann T. Strauss, "Forensic Characterization of Human Hair I," *The Microscope*, Vol. 31, p. 15, 1983.
- Wickenheiser (1990)--R. A. Wickenheiser and D. G. Hepworth, "Further Evaluation of Probabilities in Human Scalp Hair Comparisons," *Journal of Forensic Sciences*, Vol. 35, p. 1323, 1990.
- Additional publications can be found within the SWGMAT hair bibliography:
https://drive.google.com/file/d/0B1RLIs_mYm7edmQyX1ZxZmlkVIE/viewSWGMAT_hair_bibliography

Cutting of hair standards will also destroy the ability to use them as a potential nuclear DNA reference standard and possibly limit the ability to be used as a mitochondrial DNA reference standard should other DNA standards (e.g., blood, oral) become insufficient or otherwise unavailable.

Recommendation: We strongly suggest that hair standards be collected by plucking/pulling versus cutting in order to maximize the probative value of these standards. We recommend at least 25 hairs be collected from the region of interest. For the scalp this should include hairs from the top, front, back and sides. For the pubic region it should include hairs from throughout the pubic region to serve as a representative sample. Measures can be taken to reduce patient discomfort. This collection technique is especially important in cases where:

- The suspect is an unknown assailant or multiple assailants are involved.
- Hair is collected as part of the exam (collected hairs should be submitted for examination with a known sample from both the victim and suspect).
- The assailant is an acquaintance that has not previously had close intimate contact with the victim or been in the environment where the assault(s) occurred.

Use of Lubricants to Facilitate Swab Collection

The document also recommends (page 19) that the use of water-soluble non-spermicidal lubricants to collect vaginal and/or rectal samples is acceptable and promotes patient comfort.

However, in cases where condom use is indicated and no sperm are identified, forensic laboratories may perform additional testing for lubricants that may have been involved in the assault. If a lubricant is used during the examination (particularly if no control sample of this lubricant is provided), the collection process may interfere with or even preclude this type of analysis.

Recommendation: We recommend that if a water-soluble non-spermicidal lubricant is used, this information should be documented, especially in cases where condom use is suspected. We further recommend that control samples of any lubricant used also be collected during the examination. We advocate for the continued collection of control samples. These samples do not necessarily create additional workload since these samples are tested as needed.

A Note Regarding Mitochondrial DNA

Mitochondrial DNA analysis is mentioned briefly on page 54, but is introduced as being useful only in missing persons, cold cases, and mass disasters. No mention is made of mitochondrial DNA's usefulness in sexual assault cases, homicide cases, and serial rape cases and that it should be used in conjunction with probative microscopical hair comparisons. Hairs that are ready to be shed are more easily transferred, and these hairs are usually not suitable for nuclear DNA analysis. A hair or hair fragment that is transferred from either a victim or suspect to the other individual or the crime scene, and is associated with a probative hair standard by microscopical comparison, can further be tested using mitochondrial DNA, and may thus provide additional evidence in a sexual assault case.

A Note Regarding Other Trace Evidence

We agree with the "victim-centered" approach taken in this document and feel the victim should be made aware of additional laboratory testing that may be performed that may assist in the investigation and prosecution of the sexual assault. The victim should always be made aware of all possible forensic evidence testing (e.g., hairs, fibers, fabric damage, botanical material, etc.), as the case circumstances dictate. As stated on page 13, "Ultimately, it is the victim and not the SAK that should drive the medical-forensic encounter." We agree with the statement on page 55 that other "types of items may provide valuable probative evidence of the crime and assist in identifying the suspect" but feel that as those other types of evidence are "not a primary focus of these recommendations," this document does not represent best practices. One of the types of "other evidence" that occurs in sexual assault cases is not mentioned at all: the examination of fiber transfer between a victim, suspect, and/or crime scene. Fiber transfer evidence has been successfully used many times in sexual assault cases, and to not even provide it as an example does not serve the intent of this document. If all types of evidence are not collected, additional examinations cannot be performed as needed.

While the OSAC Materials (Trace) Subcommittee and Hair Task Group appreciates the time and effort that went into preparing the National Best Practices for Sexual Assault Kits document, we hope that a more comprehensive standard can be created for sexual assault evidence collection that emphasize the collection and processing of all probative types of forensic evidence.