OSAC RESEARCH NEEDS ASSESSMENT FORM

Title of research need: Fiber Population Studies

Describe the need: Research on the variability of fiber types and colors present within different regions of the US and seasons for the purpose of better understanding background fiber types and colors, the potential for similar fibers to be found, and differences across the US

Keyword(s): Fibers, population study, random match

Submitting subcommittee(s): Trace Materials **Date Approved:** August 22, 2022

Background Information:

1. Does this research need address a gap(s) in a current or planned standard? (ex.: Field identification system for on scene opioid detection and confirmation)

Yes, we need better information on fiber populations within and across the U.S. to aid examiner understanding of the distribution of fiber types when evaluating evidence. Research on this topic has been conducted in Europe, and these studies would be helpful to understand random match probabilities for fibers, as well as offer the potential for statistical analyses to complement a comparison of fiber evidence of possible source analysis to better interpret the evidence within its relevant background population (with focus on different geographical and temperate climes). Population studies provide information about the rarity of key features such as fiber type and color that are observed during comparative examinations within a population of interest. Such research may also lead to additional research on target fibers and discriminating power but knowledge of background fiber populations are lacking in the US.

2. Are you aware of any ongoing research that may address this research need that has not yet been published (e.g., research presented in conference proceedings, studies that you or a colleague have participated in but have yet to be published)?

Not in the U.S.

3. Key bibliographic references relating to this research need: (ex.: Toll, L., Standifer, K. M., Massotte, D., eds. (2019). Current Topics in Opioid Research. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88963-180-3)

Trejos, T., Koch, S., & Mehltretter, A. (2020). Scientific foundations and current state of trace evidence—A review. *Forensic Chemistry*, *18*, 100223.

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Grieve, M. C., Biermann, T. W., & Schaub, K. (2005). The individuality of fibres used to provide forensic evidence--not all blue polyesters are the same. *Sci.& Justice*, *45*(1), 13-28.

T.W. Biermann, Blocks of colour IV: the evidential value of blue and red cotton fibres, *Sci. Justice* 47 (2007) 68–87.

M.C. Grieve, J. Dunlop, P. Haddock, An assessment of the value of blue, red, and black cotton fibers as target fibers in forensic-science investigations, *J. Forensic Sci*. 33 (1988) 1332–1344.
M.M. Houck, Inter-comparison of unrelated fiber evidence, *Forensic Sci. Int.* 135 (2003) 146–149.
R. Palmer, V. Chinherende, A target fiber study using cinema and car seats as recipient items, *J. Forensic Sci.* 41 (1996) 802–803.
M.C. Grieve, T.W. Biermann, M. Davignon, The evidential value of black cotton fibres, *Sci. Justice* 41 (2001) 245–260.
W. Fong, S.H. Inami, Results of a study to determine the probability of chance match occurrences between fibers known to be from different sources, *J. Forensic Sci.* 31 (1986) 11859J.
C. Roux, P. Margot, An attempt to assess the relevance of textile fibres recovered from car seats, *Sci. Justice* 37 (1997) 225–230.
M.C. Grieve, T. Biermann, M. Davignon, The occurrence and individuality of orange and green cotton fibres, *Sci. Justice* 43 (2003) 5–22
K. Wiggins, P. Drummond, T. Hicks Champod, A study in relation to the random distribution of four fibre types on clothing (incorporating a review of previous target fibre studies), *Sci. Justice*. 44 (2004) 141–148.

4. Review the annual operational/research needs published by the National Institute of Justice (NIJ) at https://nij.ojp.gov/topics/articles/forensic-science-research-and-development-technology-working-group-operational#latest? Is your research need identified by NIJ?

Determination of accuracy and reliability of forensic analyses and conclusions, including potential sources of error.

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

These studies would aid interpretation of fiber associations and understanding of potential random matches from the background fiber populations. The assignment of a level of association also depends on the rarity of the observed features in a relevant population so this study would help with more objective assignment of association levels.

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

This research would improve fiber examiners' understanding of how common or rare various fiber types and colors may be within a given geographical/temperate region.

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

This research would be useful to fiber examiners writing reports and testifying in court so as to not overstate or understate potential rarity of a fiber.

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

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

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