# OSAC RESEARCH NEEDS ASSESSMENT FORM

**Title of research need:** Prevalence of Characteristic and Consistent Particles

**Keyword(s):** Gunshot residue, Primer residue, prevalence

**Submitting subcommittee(s):** Gunshot Residue **Date Approved:** Sept 2020

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

**Background Information:**

1. Description of research need:

There has long been a need for a large scale study on the prevalence of particles characteristic of, or consistent with, GSR on persons in the United States. Many studies have been performed in various countries, but the difference in gun laws and usage around the world limit the application of studies from country to country. Data is needed both from people with no known association to firearms, and people with known associations to firearms (through employment or personal use). A study (or studies) are needed which allow the evaluation of the probability of finding characteristic or consistent GSR particles on the hands of an individual not associated with a shooting event. The applicant must have experience and access to instrumentation using automated GSR software followed by manual confirmation of GSR particles by Scanning Electron Microscopy and Energy Dispersive X-Ray analysis.

2. Key bibliographic references relating to this research need:


[1] L. Ali, K. Brown, H. Castellano, and S. Wetzel. A Study of the Presence of Gunshot Residue in Pittsburg Police Stations using SEM/EDS and LC-MS/MS. J. Forensic Sci. **2016**, 61, 928.

[2] R. Berk, S. Rochowicz, M. Wong, and M. Kopina. GSR in Chicago Police Vehicles and Facilities: An Emperical Study. J. Forensic Sci. **2007**, 52, 838.

[3] Z. Brozek-Mucha. On the prevalence of gunshot residue in selected populations - An empirical study performed with SEM-EDX analysis. For. Sci. Int. **2014**, 237, 46.

[4] S. Charles and N. Geusens. A study of the potential risk of gunshot residue transfer from special units of the police to arrested suspects. For. Sci. Int. **2012**, 216, 78.

[5] R. Gerard, E. Lindsay, M. McVicar, D. Randall, and A. Gapinska. Observations of Gunshot Residue Associated with Police Officers, Their Equipment, and Their Vehicles. J. Can. Soc. Forensic Sci. **2012**, 45, 57.

[6] D. Gialamas, E. Rhodes, and L. Sugarman. Officers, Their Weapons and Their Hands: An Empirical Study of GSR on the Hands of Non-Shooting Police Officers. J. For. Sci. **1995**, 40, 1086.

[7] N. Lucas, H. Brown, M. Cook, K. Redman, T. Condon, H. Wrobel, K. Kirkbride, and H. Kobus. A study into the distribution of gunshot residue particles in the random population. For. Sci. Int. **2016**, 262, 150.

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

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| This research would improve the ability of laboratories to provide meaningful interpretation of gunshot residue examination results. |

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

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| The research results would improve understanding of how commonly one could expect to find gunshot residue particles on a person in the U.S. population. This will improve understanding of the probative value of gunshot residue analysis. |

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

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| The research results would allow for more meaningful interpretation of gunshot residue test results in reports and in courts of law. This will have the potential to increase the amount of information an investigator or court can gain from gunshot residue test results. |

4. 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.*

**Approvals:**

| Subcommittee | Approval date: 31Aug2020 |
|---|---|
| *(Approval is by majority vote of subcommittee. Once approved, forward to SAC.)* | |

| SAC | | | | |
|---|---|---|---|---|
| 1. Does the SAC agree with the research need? | Yes | X | No | |
| 2. Does the SAC agree with the status assessment? | Yes | X | No | |
| If no, what is the status assessment of the SAC: | | | | |

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|---|---|
| Approval date: | 13Sep2020 |

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