# Frequently Asked Questions

## Primer Gunshot Residue (pGSR)

- Do pGSR kits expire?
  - pGSR kits do not expire
- Can they be stored in patrol vehicle?
  - Yes
  - Make sure at room temp when using, frozen adhesive won't be sticky enough to collect
- How long is too long from time of incident to time of collection?
  - Do not collect a pGSR kit on hands after 8 hours have passed.
- Why should kits not be collected from hands after 8 hours?
  - From the moment a firearm is discharged, pGSR particles can be lost due to activity and movement. After 6-8 hours, analysts would not expect to detect pGSR on an active person.
- How can particles be lost?
  - Movement of the subject such as washing of the hands, putting hands in pockets, touching other objects. Environmental conditions including wind and rain.
- Why are victim kits not tested?
  - Shooting victims are known to have been in the environment of a discharged firearm. Analysis cannot determine if a shooting victim discharged a firearm themselves or if they were shot by someone else.
- What other sources produce particles similar to pGSR?
  - Brake pads, airbags, and a certain type of firework can produce particles of lead, barium, and antimony. However, brake pads, airbags, and the firework also produce elements not consistent with pGSR. For this reason, entire populations of particles are taken into consideration when analyzing for pGSR.
- Are you able to tell what firearm/ammunition the particles came from?
  - No, individual firearms/ammunition will not produce unique particles types.
- Are you able to tell how long particles have been present on an inanimate object/surface?
  - No, a particle will remain on a surface until it is removed.
  - Particles will not breakdown over time
- If the subject admits to moving the firearm after a shooting, can pGSR analysis determine whether they discharged the firearm or moved it?
  - No, pGSR analysis cannot tell the difference between discharging a firearm or simply handling a firearm.
- Can an interpretation be made comparing the number of particles on the right vs. left hand or between kits of various subjects?
  - No, this cannot be done due to factors including the variability of transfer and movement after discharge.

- How could someone get pGSR particles on their hands?
  - Discharging a firearm, being in the environment of a discharged firearm, touching a firearm, or touching an object with pGSR could cause someone to have particles of pGSR on their hands.
- What is the difference between primer residue and powder residue?
  - Primer residue is the mixture of lead, barium, and antimony that originates from the primer of a cartridge.
    - Primer residue (pGSR) are microscopic particles which have to be sampled using SEM stubs
    - pGSR is analyzed by Trace Evidence using SEM/EDS
  - Powder residue refers to the particulate produced by the ammunition.
    - Analysis includes testing for components in ammunition (e.g. smokeless gunpowder, lead, copper, bullet fragments, and shotshell components)
    - Typically used for distance determination
    - Analyzed by Firearms Section
- What type of evidence goes to trace for pGSR?
  - pGSR kits from hands or objects (vehicles)
  - Clothing from the shooting suspect
  - Kits are tested to determine if a subject has discharged a firearm or been in the environment of a discharged firearm.
  - Clothing from suspects is tested to determine if it has been in the environment of a discharged firearm or in contact with a firearm.
  - Trace will not test shooting victim clothing or pGSR kits.
- What type of GSR evidence goes to firearms?
  - Distance determination
    - Victim clothing
    - Inanimate object/surface
  - Is this a bullet hole?
  - Are there visible residue patterns on clothing/objects that can be tested/explained as being adjacent to a firearm during discharge
- When is pGSR analysis the most helpful?
  - Refuting a statement, such as: Suspect claims they did not shoot a gun and/or was not near a shooting; suspect does not have a gun on person at the time of arrest
  - Support a statement, such as: Witness claims they saw suspect shoot a gun but suspect has not provided any additional information; suspect does not have gun on person at time of arrest
- When does pGSR analysis have limited value?
  - Suspect admits to discharging a firearm, being in the proximity of a firearm when it was discharged, or handling a firearm or other object with pGSR on it
  - The subject washed their hands before sampling
  - A vehicle/object is known to have exposures to pGSR other than this incident
- If someone has pGSR on them, does this mean they discharged a firearm?
  - The presence of pGSR can mean:
    - The person discharged a firearm

        - The person was in close proximity to a discharged firearm
        - The person came into contact with a surface that contained pGSR
- Does the lack of pGSR mean they did not discharge a firearm?
    - The absence of pGSR can mean:
        - The person did not discharge a firearm
        - The person discharged a firearm but pGSR was not deposited in detectable amounts or was not deposited in the area sampled
        - The person discharged a firearm but pGSR was removed by wiping or washing prior to collection of the pGSR kit
- If I am sampling a vehicle, how many stubs should I use?
    - Use as few stubs as possible for sampling
        - The maximum number of stubs that will be tested is 4
        - Most areas (window area, dashboard, steering wheel, etc.) 1 stub can be used
        - Conclusions will not be drawn between the number of particles throughout a vehicle to determine where the shooter was sitting
- What should I do if I don't have a kit on hand?
    - Can contact NSP troop area or lab to see if they have a kit
        - Must be collected in 8 hours, sooner the better
    - Can collect clothing (if know what they were wearing at the time of the shooting)
    - Do not use a cotton swab for collection
- If I am sampling from a vehicle, where should I sample?
    - Depends on your case
        - If driver is suspected to have discharged firearm – steering wheel, dash, headliner, inner door panel, window frame
        - If passenger – headliner above seat, inner door panel, seat, window frame
    - Will not make correlations between areas sampled to determine placement of shooter
    - If an area is wet, allow to dry before sampling
- If need to sample a steering wheel (or other object) for touch DNA and pGSR, which should be done first?
    - Swabbing for DNA may remove pGSR particles and stubbing for pGSR particles may remove touch DNA.
    - Typically, DNA should be sampled first as it may be more probative to your case.
- Should I cover the hands with paper bags if transporting a subject to another location to samples?
    - Yes, protects against possible contamination in transport
    - Always best to sample in field when feasible
    - Bags will not be tested to determine if particles have come off inside of paper bag