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SUMMER 2019

## OREGON STATE POLICE

Forensic Services Division Newsletter

### TRACE EVIDENCE CORNER

# TRACE EVIDENCE COLLECTION KITS: SUPPLIES AT YOUR FINGERTIPS

Over the past two years, the Trace Unit of the Forensic Services Division has been conducting trainings for members of law enforcement personnel around Oregon. Topics have included workshops on overall Trace Evidence and lab capabilities in Trace Evidence Analysis, Collection of Evidence and Standards, Trace Evidence related to Crash Investigations, and Photography of Impressions Evidence. During interactions between lab staff and our customer agencies, two messages have come through loud and clear:

1. Many local agencies are unaware of the services the OSP FSD can provide in the analysis of glass, fibers, paint, impressions (tire and footwear), miscellaneous chemicals and poisons, and hair.
2. The lack of appropriate tools at the crime scene is a significant barrier in the collection of trace evidence. As a result, trace evidence can be overlooked and may not be effectively utilized in crime scene investigations, particularly in situations where biological evidence is not present or relevant.

To address #1, lab staff members will continue to provide training on Trace Evidence in the coming months. If your agency is interested in training of this type, please contact Trace Unit Supervisor Liz Flannery at 971-673-8325.

And on topic #2, although we cannot provide the actual tools for evidence collection to agencies throughout the state, we can offer an idea that may help: Trace Evidence Collection Kits.

The premise behind Trace Evidence Collection Kits is to create an all-in-one pack that can be kept in a patrol vehicle until it is needed. As items are used, they can be easily replaced; the supplies are available from online vendors such as Amazon or office supply stores. Another goal is to keep the cost low. When made in bulk (~30 kits at a time), the cost per kit is less than \$20. Check out the next few pages for a description of the contents of the kit and a list of suppliers for the various components you will need to assemble your kits.

With a Trace Evidence Collection Kit at the ready, trace evidence can be a valuable part of your investigation. And the OSP FSD Trace Unit is ready to help.



GLASS



FIBERS



PAINT



IMPRESSIONS



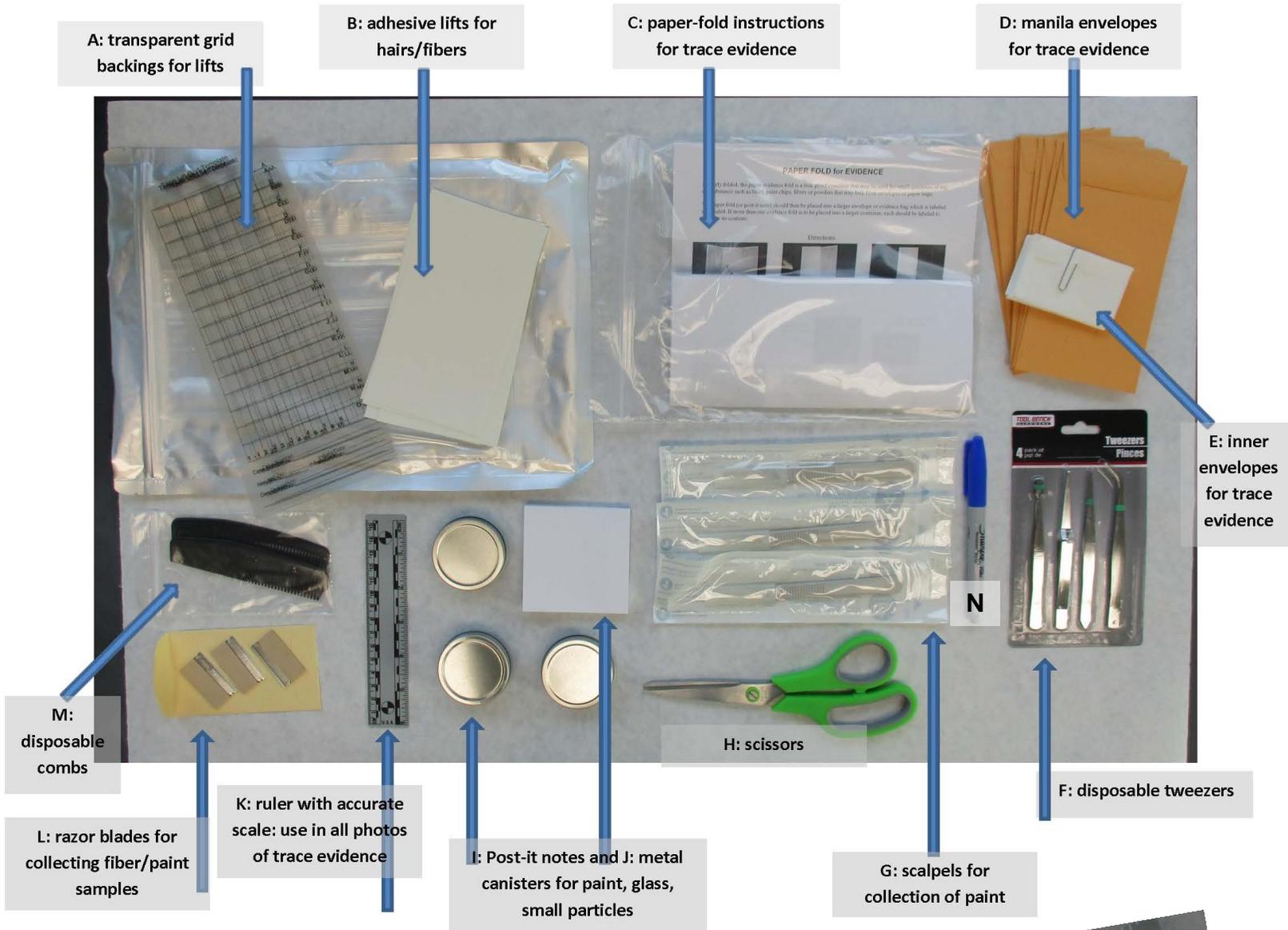
HAIR



# OREGON STATE POLICE

## Forensic Services Division Newsletter

### TRACE EVIDENCE COLLECTION KITS



Refer to the table on the next page for a description of each component of the kit. All the supplies shown above fit inside a Mylar bag with a ziplock closure, ensuring they stay clean until they are needed at your crime scene.

We suggest adding disposable gloves in your size to the kit as well.

Replace items as needed so your kit is always ready.



**O: Exterior packaging: Gallon-sized Mylar Ziploc Bag**



# TRACE EVIDENCE COLLECTION KIT LIST



	Item	# in kit	Cost/ kit (2019)	Possible vendor's link	Helpful Hints
A	Copier transparency sheets for grids*	3 sheets (6 grids)	\$0.75	<a href="https://www.amazon.com/Apollo-Transparency-Copier-without-VPP100CE/dp/B001E67VP6/ref=pd_sim_229_1/163-9712125-4755544">https://www.amazon.com/Apollo-Transparency-Copier-without-VPP100CE/dp/B001E67VP6/ref=pd_sim_229_1/163-9712125-4755544</a>	<b>LIFTS for HAIRS/FIBERS. DO NOT USE STICKY LIFTS FOR PAINT EVIDENCE; USE POST-IT NOTES INSTEAD.</b>
B	Clear adhesive Lift Sheets 8x8"	3: cut into 6 parts	\$0.30	<a href="http://www.csiforensic.com/m7/%232-6003--lift-sheets-clear-adhesive-9-1-2-x-13-1-2.html">http://www.csiforensic.com/m7/%232-6003--lift-sheets-clear-adhesive-9-1-2-x-13-1-2.html</a>	
*Helpful tips for using adhesive lifts for Trace Evidence and the template for the grid backings can be found in this FSD newsletter: <a href="https://www.oregon.gov/osp/Docs/FSD-Newsletter-2-SPRING-2017.pdf">https://www.oregon.gov/osp/Docs/FSD-Newsletter-2-SPRING-2017.pdf</a>					
for A/B	Ziploc bags for storing lift set pairs, 5x12"	3	\$0.19	<a href="https://www.uline.com/Product/Detail/S-1901/Poly-Bags-Reclosable/5-x-12-2-Mil-Reclosable-Bags">https://www.uline.com/Product/Detail/S-1901/Poly-Bags-Reclosable/5-x-12-2-Mil-Reclosable-Bags</a>	lifts are for collecting hairs/fibers off surfaces
C	paper printed w/ fold instructions	5	0	look on page 4 of this newsletter for the paperfold template; print out 5 for each kit	good for enclosing small items
D	small manila envelopes, 2.5"x4.25"	10	\$0.30	<a href="https://www.amazon.com/ValBox-Envelopes-Envelope-Gummed-Garden/dp/B07DWT5PN/ref=sr_1_2_sspa">https://www.amazon.com/ValBox-Envelopes-Envelope-Gummed-Garden/dp/B07DWT5PN/ref=sr_1_2_sspa</a>	outer package for very small items
E	glassine envelopes, 2-7/8" x 1-3/4"	10	\$0.70	<a href="http://www.bagsunlimited.com/category/75/glassine-sleeves">http://www.bagsunlimited.com/category/75/glassine-sleeves</a>	inner package for very small items
F	disposable tweezers	2	\$1.60	<a href="https://www.amazon.com/uxcell-Plastic-Anti-static-Tweezers-Length/dp/B07DGCWLGG/ref=sr_1_26_sspa">https://www.amazon.com/uxcell-Plastic-Anti-static-Tweezers-Length/dp/B07DGCWLGG/ref=sr_1_26_sspa</a>	If re-used, clean between use
G	disposable scalpels, rounded, #10	3	\$2.30	<a href="https://www.amazon.com/dp/B0096BZPAO/ref=biss_dp_t_asn">https://www.amazon.com/dp/B0096BZPAO/ref=biss_dp_t_asn</a>	use to cut fiber standards, scrape paint
H	scissors	1	\$1.07	<a href="https://www.amazon.com/Scissors-VERONES-Comfort-Grip-Handles-Stainless/dp/B07C95XD9H/ref=sr_1_8">https://www.amazon.com/Scissors-VERONES-Comfort-Grip-Handles-Stainless/dp/B07C95XD9H/ref=sr_1_8</a>	clean between use
I	pale 3x3" post-it notes	1 pad	\$0.84	<a href="https://www.amazon.com/dp/B00006JNNE/ref=psdc_1297017011_t1_B001DKHHV6">https://www.amazon.com/dp/B00006JNNE/ref=psdc_1297017011_t1_B001DKHHV6</a>	for paint, fibers, short hairs, small glass fragments
J	metal canisters	3	\$2.25	<a href="https://www.amazon.com/Mighty-Gadget-Screw-Round-Steel/dp/B01M0IBZQ/ref=sr_1_1">https://www.amazon.com/Mighty-Gadget-Screw-Round-Steel/dp/B01M0IBZQ/ref=sr_1_1</a>	good for glass & paint evidence
K	Small scale for photographs	1	\$2.51	<a href="https://www.amazon.com/Forensic-Photo-Scales-Rulers-Gray/dp/B00FA5NF2U">https://www.amazon.com/Forensic-Photo-Scales-Rulers-Gray/dp/B00FA5NF2U</a>	always use a scale in scene photos that show trace evidence; shoot photos at 90°
L	razor blades	3	\$0.27	<a href="https://www.amazon.com/Allway-0-009-Inch-Industrial-Quality-100-Pack/dp/B002J9CPTO/ref=sr_1_4?">https://www.amazon.com/Allway-0-009-Inch-Industrial-Quality-100-Pack/dp/B002J9CPTO/ref=sr_1_4?</a>	use to cut fiber standards, scrape paint
M	disposable combs	3	\$0.11	<a href="https://www.amazon.com/dp/B0722Y8XBF?psc=1">https://www.amazon.com/dp/B0722Y8XBF?psc=1</a>	To <a href="#">aid in hair standard collection</a> or to collect trace evidence such as glass <a href="#">and</a> fibers; from hair
N	Sharpie pen, Fine Point	1	\$0.58	<a href="https://www.amazon.com/Sharpie-Permanent-Markers-Point-Black/dp/B00006IFHD/ref=pd_sim_229_1">https://www.amazon.com/Sharpie-Permanent-Markers-Point-Black/dp/B00006IFHD/ref=pd_sim_229_1</a>	label everything!
O	mylar ziploc bag for kit, 10x14"	1	\$0.85	<a href="https://www.amazon.com/AwePackage-Gallon-Aluminum-Zipper-Storage/dp/B01IWR3VWQ/ref=sr_1_6">https://www.amazon.com/AwePackage-Gallon-Aluminum-Zipper-Storage/dp/B01IWR3VWQ/ref=sr_1_6</a>	always keep the kit sealed so it doesn't get contaminated
	Large "L" scale (optional-- not pictured)	1	\$5.25	<a href="http://www.safariland.com/products/forensics/crime-scene-documentation/rulers-and-scales/bureau-scales-set-of-2-1005953.html">http://www.safariland.com/products/forensics/crime-scene-documentation/rulers-and-scales/bureau-scales-set-of-2-1005953.html</a>	recommended for impressions photography
	gloves	~6	varies	always wear disposable gloves to protect the evidence & yourself	
2019	<b>ESTIMATED COST PER KIT</b>		<b>\$19.87</b>	<b>Questions? OSP Trace Evidence Unit Supervisor Liz Flannery: 971-673-8325</b>	

## PAPER FOLD for EVIDENCE

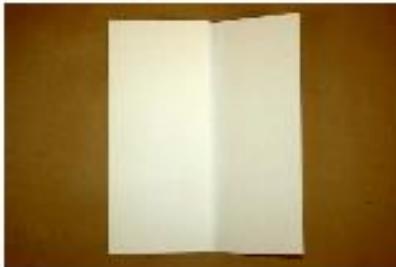
Properly folded, the paper evidence fold is a leak proof container that may be used for small quantities of any dry substance such as hairs, paint chips, fibers or powders that may leak from envelopes or paper bags.

The paper fold (or post-it note) should then be placed into a larger envelope or evidence bag which is labeled and sealed. If more than one evidence fold is to be placed into a larger container, each should be labeled to describe its contents.

### Directions



1. Fold a clean, unused sheet of paper into thirds and place evidence in middle section



2. Fold one third over middle section



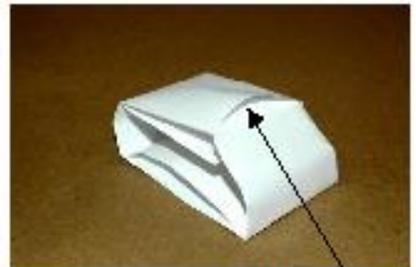
3. Fold the other third over middle section



4. Fold in half in the same direction as the thirds were folded. **THIS IS THE CRITICAL STEP IN MAKING THE PACKAGE LEAK PROOF**



5. Fold the ends up, making one into a point for easier insertion into the other



6. Insert the pointed end into the **OUTERMOST** opening of the straight end



7. If it appears the final fold may not stay closed, use **ONE** small piece of tape to secure the closure. Only tape if necessary.

In lieu of paper folds, small fragments of glass, paint, fibers or other trace evidence can be attached to the sticky portion of a post-it note. If practical, circle the evidence of interest.

Fold the note partially over to protect the evidence and label in the area at the bottom of the note with case/evidence information.

circled evidence of interest here



label here, not on back of sticky portion



# OREGON STATE POLICE

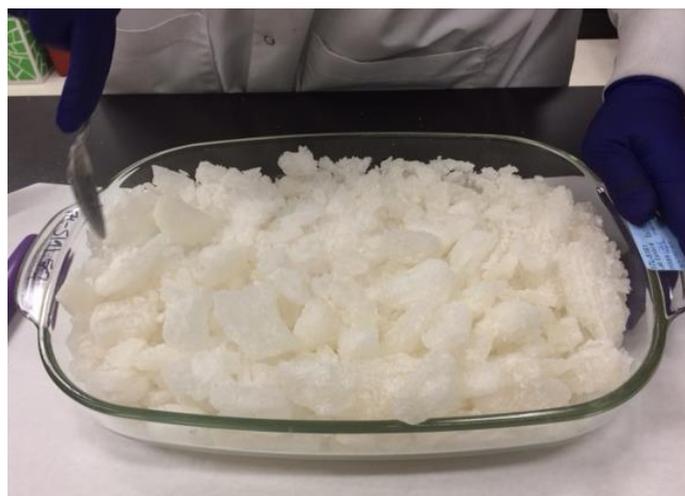
Forensic Services Division Newsletter

## METH QUANTS

# METHAMPHETAMINE PURITY TESTING FOR FEDERAL PROSECUTIONS

Have you ever seized a sample of street-level methamphetamine and wondered, “How pure *is* this stuff?” In the 1990’s and early 2000’s, it wasn’t uncommon for the methamphetamine on Oregon’s streets to be less than 50% pure. The rest of the material was “cutter”, sometimes a form of Vitamin B and other times a clear crystal known as “MSM”. In recent years, however, the purity of street-level methamphetamine in Oregon has risen dramatically. Most of the methamphetamine samples tested in the last several years have exceeded 90% purity.

The reasons for the increased purity are related to changes in Oregon laws and law enforcement. Before Oregon made pseudoephedrine a controlled substance, small-scale meth labs were common and the purity of their product was fairly low. These “clan labs” (clandestine labs) essentially disappeared when pseudoephedrine was controlled in 2006. Another factor was that some of the state’s narcotics enforcement resources were reallocated after 2001 to combat terrorism, opening the door for more large-scale drug trafficking. Today, most of the high-purity methamphetamine found in Oregon makes its way here from commercial-production labs located in Mexico and other countries in Central America.



**Above: A submission of large crystals of methamphetamine for purity testing.**

So, does every sample of methamphetamine submitted to the Forensic Services Division undergo a methamphetamine quantitation (known as a meth quant) to determine its purity? Not by a long shot. Routine drug submissions are simply weighed and tested for the presence or absence of controlled substances, not the purity. For a sample to qualify for a meth quant, it must be headed for Federal prosecution and the lab request must come from an AUSA.

The reasons for this requirement are twofold:

1. Both the physical labor and analytical time needed to prep meth quant samples are very great compared to the work needed to simply confirm whether methamphetamine is present.
2. For state-level prosecution, purity is not needed. This is due to the wording in the state’s drug control laws. For example, in [ORS 475.900 1\(a\)\(C\)](#), a commercial drug offense involving methamphetamine is defined as possession of “ten grams or more of a *mixture or substance containing a detectable amount* of methamphetamine, its salts, isomers or salts of its isomers.” (emphasis added)

So for state purposes, if someone is in possession of 20 grams of methamphetamine, it doesn’t matter whether it’s 10% pure or 90% pure. In Federal cases, on the other hand, sentencing may be affected by the amount of actual

*...continued on page 5*



**Shown at left: a Gas Chromatograph/Mass Spectrometer. Contrary to some television shows, it is not used for DNA analysis, but it *is* great for Meth Quants!**



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## METH QUANTS, CONTINUED

# METHAMPHETAMINE PURITY TESTING

methamphetamine in the sample, rather than just the total weight of the seizure. For example, on the Federal sentencing chart, Level 30 can be reached by 500 grams of a mixture containing methamphetamine, or by a sample that is pure enough to contain between 50 and 150 grams of actual methamphetamine. For a seizure (like the one shown at right) of 930 grams of crystals, testing at 97% purity means that the crystals contain 902 grams of actual methamphetamine. Meth is the ONLY controlled substance that is Federally regulated in this manner; therefore, it is the only drug for which the OSP Forensic Services Division will conduct purity testing.

So, how are meth quants done and why do they take more time for our analysts? After weighing the sample and confirming that methamphetamine is present (if this has not previously been done), the analyst must grind the entire seizure down into a fine powder. This step is done through a combination of hand-grinding in a mortar/pestle and mechanical blending. The powder is then passed through a fine sieve to mix, or homogenize, the sample. This process ensures that the final results accurately represent the entire original sample rather than just a particularly pure or impure individual crystal.

From the ground powder, three sample aliquots are created and they are analyzed using a Gas Chromatograph/Mass Spectrometer (GC/MS). A set of meth standards at known purities of 10, 20, 40, 60, 80 and 100% are prepped and also run on the GC/MS instrument-- as well as a secondary check sample. Using this calibration curve, the purity of the three sample aliquots can be determined. The results for linearity and accuracy of the curve and the reproducibility of the triplicate samplings must meet strict quality guidelines before they are accepted by the analyst. Once everything passes the quality requirements, the results of the triplicate samplings are compiled and an uncertainty range is calculated for the final report.

If the evidence in a Federal case consists of multiple exhibits, each exhibit undergoes the sample process: grinding, homogenization, triplicate sampling, analysis using the GC/MS calibration curve and the uncertainty calculation. All OSP meth quants are performed in the Portland Metro Forensic Laboratory by three trained analysts.

If you have a seizure that you think may end up in Federal court, submit it to your local laboratory for normal controlled substance analysis first. The weight will be taken and the presence or absence of methamphetamine confirmed. Once the initial lab report is released, an AUSA can contact the laboratory to make the meth quant request and have the evidence re-submitted for testing.



Forensic Scientist Gary Gebhardt prepares to grind and homogenize a large methamphetamine submission for purity testing. Below: meth quant samples for multiple cases, prepped by Forensic Scientist Carly Sizelove, ready for the GC/MS.





# LEAN SIX SIGMA PROJECT BRINGS EFFICIENCY IMPROVEMENTS

In the spring of 2018, the Oregon State Police Forensic Services Division Biology Processing and DNA Units began a Lean Six Sigma (LSS) project in conjunction with Sorenson Forensics<sup>®</sup>. LSS is an improvement process that has been used in manufacturing for decades, but has been recently applied to other industries such as health care and forensics. The primary purpose of LSS is to increase efficiency by reducing waste, errors, and variability in work processes. We applied this methodology to reduce analytical turnaround times for DNA evidence. The project was divided into five stages: Define, Measure, Analyze, Improve, and Control.

Throughout 2018, the LSS team progressed through the stages of the project – determining the scope and the needs of our customers, assessing our status quo as it related to those customer needs, and testing and measuring the impact of potential improvements. The most effective changes were implemented statewide in January of 2019 and have resulted in some noticeable changes for our partner agencies. The four most significant changes are outlined below:

- **No Biology reports for Sexual Assault Forensic Evidence (SAFE) kits** – Information that has historically been provided in Biology Processing SAFE kit reports is now included in the DNA report. The DNA report will document the items tested and any results.
- **“Five at First” submission policy** – An important concept in LSS is ensuring that appropriately-sized portions of work flow through the system at a reliable rate. Based on data analyzed during the project, we determined that our system is optimized when no more than five DNA samples per case (excluding standards) are analyzed. If necessary, additional set of five samples items may be tested once the results from the previous batch are obtained. This new policy allows us to provide relevant, investigative DNA results to all of our customers in a timely manner.
- **Targeted DNA testing in sexual assault cases** – As of March 1<sup>st</sup>, the initial DNA submission of sexual assault evidence will be limited to SAFE kits and any relevant DNA standards. DNA testing of additional items will **only** be performed after those initial DNA results have been obtained and with mutual agreement between the FSD and the relevant agencies. Exceptions may be made in special circumstances with prior DNA Supervisor approval. Please note: If no SAFE kit was collected, other probative evidence (underwear, bedding, etc.) can be considered for laboratory submission.
- **Return of evidence if necessary DNA standards are not submitted** – Analysis often requires DNA standards before meaningful conclusions can be reached. The following table shows possible evidence types and the standards that will be necessary prior to analysis:

Evidence	Examples	Required Standards
Items collected directly from a person	<ul style="list-style-type: none"> <li>• Intimate samples like hand or body swabs</li> <li>• Non-intimate samples such as clothing</li> <li>• Items recovered directly from pockets</li> </ul>	The person from whom the swab/item was collected
Items expected to have high background DNA from regular use by a particular person	<ul style="list-style-type: none"> <li>• Steering wheel swabs</li> <li>• Personal possessions such as backpacks or personal weapons</li> </ul>	Person(s) who is/are expected to have left background DNA
Samples collected directly from a suspect (not CODIS eligible)	<ul style="list-style-type: none"> <li>• Felon in Possession gun swabs</li> <li>• Items from a suspect’s home</li> </ul>	Suspect standards as well as pertinent victim or elimination standards

*Continued from page 6...*

As of March 1<sup>st</sup>, 2019, when the FSD receives evidence without the DNA standards that are deemed necessary, the lead investigator will be contacted and the evidence will be retained for 14 days. If the DNA standards are not received within 14 days, the evidence will be returned unanalyzed. It may be resubmitted along with the required standards at a later date. For questions or assistance in determining standards necessary for DNA analysis, please contact your local State Police Forensic Laboratory. **Please note that this policy does not apply to SAFE kit evidence.**

In addition to the above changes, the Biology and DNA Units implemented numerous internal procedures that have positively impacted turn-around times. Most notably, the Biology Processing Unit has moved to a statewide technical review system while the DNA Unit has implemented a daily team meeting to ensure cases are progressing efficiently. Both units developed standard work procedures and overhauled their respective technical review processes. While these changes are invisible to our partner agencies, they have improved our ability to offer quality results in a timely manner, as seen below.

<u>Metric</u>	<u>Baseline (Pre-pilot)</u>	<u>Post-Implementation (March 2019)</u>	<u>Percent Improvement</u>
<b>Biology Overall Turn-Around Time</b>	<b>66 Days</b>	<b>28.3 Days</b>	<b>57%</b>
<b>Biology Analytical Turn-Around Time</b>	<b>8.3 Days</b>	<b>2.6 Days</b>	<b>68%</b>
<b>Turn-Around Time for Internal Technical Review of Biology Cases</b>	<b>1.7 Days</b>	<b>0.93 Days</b>	<b>45%</b>
<b>Biology Cases Completed Per Week</b>	<b>25</b>	<b>60</b>	<b>140%</b>
<b>DNA Overall Turn-Around Time*</b>	<b>166 Days</b>	<b>43 Days</b>	<b>74%</b>
<b>DNA Analytical Turn-Around Time</b>	<b>27 Days</b>	<b>9.3 Days</b>	<b>66%</b>

\*Includes time that evidence spends in other FSD disciplines prior to being sent for DNA analysis.



**Members of the FSD DNA Unit participate in a team huddle – a daily, 15 minute meeting to discuss operations. The huddle centers on the production tracking control board.**

This Lean Six Sigma project was funded via the 2016 DNA Capacity Enhancement and Backlog Reduction grant from the NIJ. With the official project completed, the LSS team continues to apply Lean principles to other aspects of the Biology and DNA Unit workflows. The DNA lab space is undergoing reorganization while the Biology Processing Unit is working to standardize electronic lab notes and analytical report format as well as further simplifying evidence exhibit itemization.

In the future, other departments within the FSD will have the opportunity to carry out LSS projects with the assistance of the current LSS team members – All of whom were successfully certified by Sorenson Forensics® following completion of this project. Lastly, the decrease in our case backlogs has allowed the DNA Unit to resume High Throughput Property Crime DNA analysis, a program that will be rolled out statewide in the coming months.