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WINTER 2017

OREGON STATE POLICE

Forensic Services Division Newsletter

IMPRESSION EVIDENCE: from Scene to Lab

FACT: MANY CRIMINALS WEAR SHOES DURING CRIMINAL ACTIVITY!

Despite the many advances in DNA and other areas of forensic analysis, sometimes old-fashioned clues still prove useful in criminal investigation. The OSP Crime Lab offers several levels of analysis of foot wear and tire impressions. **As with most types of Trace Evidence, the lab currently accepts Impressions evidence from property crimes.** Impressions left at a crime scene can be directly compared to items of footwear or to individual tires. However, if you don't have a suspect's shoes (or tires) yet, the lab can work with photographs of scene impressions and the SICAR system to develop a list of which types of shoes could have left that impression.

Impressions may be left in soft soil, snow or sand, but also may be deposited from the shoe or tire onto a hard surface in mud, dust, blood or moisture. Clear photographs make impressions evidence much more useful. Impressions photographs should include a scale (ruler) and be taken at a 90-degree angle from the surface. Side-lighting is useful for highlighting detail and dimension. The impression should also fill the frame of the image. For more tips for the best Impressions Photography, see Section 28 of the [OSP Forensics Services Division Physical Evidence Manual](#).

What is SICAR?

SICAR (Shoeprint Image Capture and Retrieval) is a footwear database that contains manufacturer information including outsole (tread) patterns to aid in identifying potential makes/models of footwear impressions recovered from scenes of crimes. Although SICAR only has a reference database for footwear, the Oregon State Police Forensic Laboratory also performs make/model searches for tire impressions using other methods.

Footwear impressions that are left at a scene may be challenging to collect or appear to have limited distinguishing information. As a result, limited emphasis is given to the collection or submission of this evidence, leaving valuable information underutilized. With the use of SICAR, images of footwear impressions can provide very valuable information. Even images that are taken at an angle, with poor resolution, or with a point-and-shoot camera can produce results from SICAR searches. Limited detail in design elements, shapes, or logos can offer enough information to provide a make/model of a potential shoe.

How do I submit evidence for a SICAR search or tire search?

Evidence can be submitted in two ways: electronically via email or through traditional physical evidence submission (e.g. disc, dental stone cast, gel lift). Obviously, only digital images may be submitted via email. Digital images may be taken directly of the impression at the scene or may be of the method used for recovery (e.g. images of the gel lift or cast). Once a suspect shoe/tire is developed, the actual shoes/tires must be submitted for direct comparison to the scene impression(s).

Continue to page 2 for detailed submission instructions.





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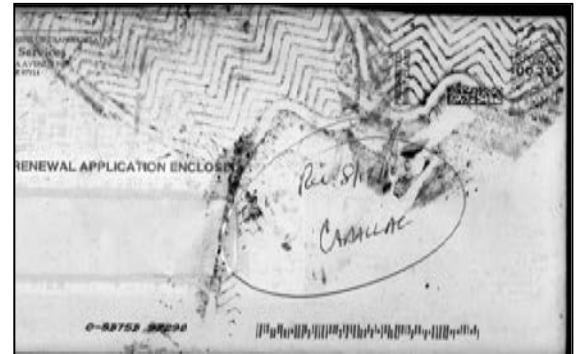
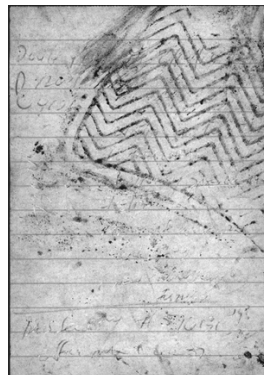
HOW TO... SICAR SEARCHES

SICAR submission instructions for emailed digital images of footwear impressions and tire tracks:

- 3) Fill out a Form 49. You can find the electronic version here:
<http://www.oregon.gov/osp/FORENSICS/docs/ospform49sept201.pdf>
Fill in Agency Case #, Offense, Offense Date, Investigating Officer and their contact information, and information regarding individuals (if known). For both footwear and tire tracks, select "Footwear (SICAR)" as the Requested Service. Save the Form 49 in the following format: Casenumber-SICAR.pdf (ex. 14-000546-SICAR.pdf).
- 4) Prepare your images: Select one or two images that best depicts a particular outsole (tread) design. Given enough detail in the impression, we can narrow the search down to a make/model of footwear. If there are multiple outsole designs (indicating more than one pair of shoes), please send them all under one case number. Check the file sizes of the images. If they are near or larger than 20 MB, the OSP email system may strip them from our email. You may need to compress the image to reduce the file size. If you do this, please check before sending to make sure it hasn't become too pixelated. If you are having difficulties with a particular image please contact the laboratory. In the example below, different portions of a specific outsole design (left) are seen in the impressions at right.



The outsole design as it appears in the SICAR database. This is a Jordan 12 Retro model.



- 1) Attach the images and Form 49 to an email and send to OSP_SICAR@state.or.us. Indicate in the body of the email how many images you are sending for a particular case. The email subject line should be in the form of full agency name and case number. Describe whether there is other evidence that represents these impressions. Sometimes casts and lifts show better detail than an image. It may be necessary for the lab to request these items before completing work on a case. Below is an example where the cast (center) clearly shows the lettering that is present in the outsole design. The lighting used in the image (left) of the impression in soil does not highlight the lettering sufficiently.
- 2) You will receive an email reply with the OSP case number. When the case is complete a report will be available in LOIS. A hard copy will also be mailed to you with images of potential make/models of the source of your impression, if any were found.





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HOW TO... LIMIT DRUG EXPOSURE RISK

DANGERS FROM FENTANYL AND FENTANYL-DERIVATIVES REQUIRE INCREASED PRECAUTIONS

Fentanyl and fentanyl derivatives are continuing to affect people across the State of Oregon. Currently, these fentanyl derivatives are most commonly seen as counterfeit tablets. These tablets are marketed to look like legitimate pharmaceuticals containing oxycodone (OxyContin) or alprazolam (XANAX).

The Oregon Board of Pharmacy classified fentanyl derivatives as Schedule I Controlled Substances on August 22, 2016; however, for much of the nation, most fentanyl derivatives are not yet controlled. This allows people to purchase fentanyl derivatives online and have them shipped through the mail.

In the lab, the safe handling of fentanyl cases is a top priority. Any evidence suspected to contain a fentanyl – related drug should be properly packaged: sealed tightly and labeled to alert anyone who comes in contact with the evidence of the possible danger. Extra layers of packaging, transparent if possible, are strongly encouraged. Forensic Scientists working in the lab wear lab coats, nitrile gloves, and eye protection on a regular basis, but the added threat with fentanyl evidence has them donning respirator masks. Each forensic laboratory has doses of naloxone available for any accidental exposure and lab staff has been trained in its use. If analysis confirms the presence of fentanyl or any fentanyl derivative, the evidence may be repackaged in additional layers and a sticker, such as the one seen below, may be on the evidence to alert the person handling the evidence to be cautious.



Forensic Scientist Erin Ward examines evidence suspected to contain fentanyl. She is wearing proper personal protective equipment (PPE) and working inside a ventilation hood for added protection.

NALOXONE EXPLAINED:

Naloxone, commonly sold under the trade name **Narcan**, is a medication used to help reverse the effects of an opioid overdose. Naloxone is available as a nasal spray or as a liquid to be injected. The effects of the naloxone start to work immediately after administering and last about thirty to sixty minutes. If no response is seen in the patient after 2-3 minutes, another dose of naloxone is given. Multiple doses may be required, as the duration of opioids is much longer than that of naloxone. Seek medical help after any overdose situation.



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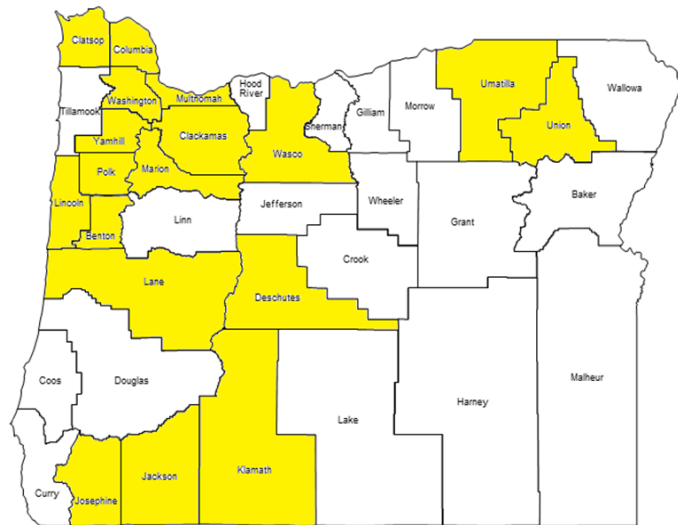
POSTMORTEM TREND: FENTANYLS

FENTANYL DERIVATIVES: DEADLY DANGERS

Fentanyl itself is a Schedule II controlled substance typically used for end-of-life pain management. Fentanyl and its derivatives, drugs based on slight changes or additions to the original fentanyl molecule, may be 50-100 times more potent than morphine. Therefore, even at low doses, overdose can happen quickly and death occurs due to respiratory depression.

Since 2016, the Toxicology section at the OSP Portland Lab has identified at least one fentanyl derivative in 75 postmortem cases. When examining the demographic data for these death cases, 76% are male and the mean age of the decedents is 34 years (age range 18 -64 years). There is no pattern to the Oregon counties in which these deaths have occurred (shown in yellow in the map below), supporting the idea that deaths related to fentanyl derivatives are not limited to a particular region. This is likely due to the ability to purchase them online. The chart shows synthetic opioids (a class that includes fentanyl derivatives and U-47700) that have been observed in postmortem toxicology

Synthetic Opioid	Cases
4-ANPP (precursor to illicit fentanyl production)	44
Furanyl fentanyl	30
U-47700	28
Cyclopropyl fentanyl	23
Butyryl fentanyl	3
Acetyl fentanyl	1
para-Fluorobutyryl fentanyl	1
para-Fluorofentanyl	1
Carfentanil	1



The Toxicology section has devised a sensitive analytical technique to detect fentanyl derivatives at low concentrations. Blood samples are first analyzed by an immunoassay screen that includes a fentanyl assay that will screen positive for most fentanyl derivatives. After first observing positive fentanyl assay results without detecting fentanyl by our confirmation techniques, analysts were led to suspect the presence of fentanyl derivatives in postmortem cases. Additionally, the group developed and validated a quantitative method by LC/MS/MS to report fentanyl derivative concentrations for the State Medical Examiner’s Office. The LC/MS/MS is currently capable of quantitating 14 fentanyl derivatives down to 1 ng/mL.

The fentanyl derivative class is evolving rapidly. Since the development of the LC/MS/MS quantitative method for 14 fentanyl derivatives, 26 more have been added so that they can be easily identified when detected in casework.

Finally, an LC-TOF (liquid chromatography-time-of-flight) instrument was recently validated and brought online for postmortem casework. This instrument functions as a highly sensitive screening tool that allows for faster blood and urine sample preparation and expedited analysis times.

The Toxicology section also analyzes urine collected from drivers suspected to be under the influence of intoxicants. Surprisingly, given their potency and dangerous lethality, fentanyl derivatives such as cyclopropyl fentanyl and furanyl fentanyl have been observed in those cases as well.



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Human Identification Program

In February 2017, the Oregon State Police received some unfortunate news: the University of North Texas lost their grant funding to perform free DNA analysis on missing persons and unidentified remains cases for all 50 states. Oregon agencies, including the Medical Examiner's Office, had used UNT extensively for the last 10 years with great success; we were now faced with the challenge of picking up the ball and performing these analyses in-house. OSP made the commitment to implement our own Missing Persons/ Unidentified Persons Identification Program, and to provide all law enforcement agencies with the best service possible in these challenging cases.

The OSP Portland Metro Forensic Laboratory-DNA Unit is now receiving all appropriate submissions for Missing Persons (MP) cases [this includes family reference samples [FRS] and direct MP reference samples] as well as the unidentified remains samples (UP) for identification purposes. These are exciting developments for us as we move into the future and take ownership of Oregon cases, and begin to solve our missing person's mysteries throughout the state and the nation.

We encourage law enforcement agencies to utilize the Oregon State Police Portland Metro Forensic Lab in the submission of standards collected in Missing Persons cases. ***Treat these cases just like you would any forensic evidence you would submit to the Forensic Lab for analysis.*** The State Medical Examiner's Office is also committed to using the OSP Portland Metro Forensic Lab for all of their unidentified remains identification needs.

When utilizing OSP for DNA analysis on your Missing Persons cases, please be aware of the following:

- OSP now has standardized paperwork that *must* be filled out fully, and is *required* at the time of sample submission to the OSP Forensic Lab. The paperwork is very similar to the UNT submission paperwork, so it should look familiar and be extremely straightforward. This paperwork is *in addition* to the Form 49 you need to complete. You can find this paperwork online on OSP's Missing Children/Adults Clearinghouse website under "DNA": <http://www.oregon.gov/osp/MCC/Pages/index.aspx> Include a police report documenting the general scenario for the missing person case with your submission.
- OSP is encouraging all law enforcement agencies to enter their Missing Persons into the National Missing and Unidentified Persons System (www.NamUs.gov) before submitting samples. In fact, the new OSP paperwork specifically asks for the NamUs "MP" number for direct cross-reference to the NamUs database. When your missing person cases are entered into the NamUs system, the Oregon State Police Forensic Lab can automatically update your missing person's profile with DNA results, just like UNT did in the past. This is an important step for two reasons:



The State Medical Examiner's Office enters all of their "UP" cases into the NamUs database. *Your chances of associating your missing person (MP) with one of Oregon's unidentified cases (UP) are greatly increased if you use the NamUs database.*

The State Medical Examiner's Office no longer enters any of their "UP" cases into NCIC. *There is virtually no chance of finding an association between your MP and one of Oregon's unidentified cases using NCIC.*



Submit Missing Persons Family Reference and/or Direct Reference samples to your local forensic laboratory, or directly to:

OSP Portland Metro Forensic Laboratory
13309 SE 84th Avenue, Suite 200
Clackamas, Oregon 97015

If you'd like assistance entering your Missing Person case into the NamUs system, contact OSP Forensic Anthropologist Dr. Nici Vance. She will facilitate its entry if needed. You can contact her at Nici.vance@state.or.us