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## Introduction to Oral Fluids

New York Stop DWI Symposium  
October 19, 2023

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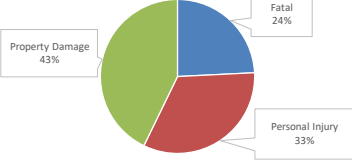


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## Drug Impaired Driving - 2022

Drug-Related Crashes 2022 (n=1629)



Category	Percentage
Property Damage	43%
Personal Injury	33%
Fatal	24%

Institute for Traffic Safety Management & Research (ITSMR)  
New York State's Traffic Safety Statistical Repository (TSSR)  
<https://www.itsmr.org/traffic-safety-statistical-repository/>



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## New York Oral Fluid Workgroup

- NYS Impaired Driving Advisory Council – created a sub-group to educate and help implement oral fluid testing options in NYS
- Members include toxicologists, law enforcement/DREs, attorneys, other traffic safety partners
- Activities include research, outreach and training, implementation strategies, guidance




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## Oral Fluid Session

- Introduction – oral fluid as a testing specimen
- Roadside screening programs – Chris Kirby
- Roadside screening in New York – Sgt Jonathan Cook
- Evidential Oral Fluid Testing – Jen Limoges
- Legal Considerations – Amanda Nissen
- Q&A



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## Specimens for Drug Impaired Driving Testing




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## Specimen Type



Occupational Health & Safety [ohsonline.com](http://ohsonline.com)




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## Blood

<p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>Recent use</li> <li>Detect parent/active compounds</li> <li>Concentration may assist in interpretation (e.g. therapeutic)</li> </ul>	<p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>Requires medically trained personnel to collect</li> <li>Collection delays may result in active compounds being undetected</li> <li>Legal challenges to it being too invasive</li> </ul>
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## Urine

<p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>Ease of collection</li> </ul>	<p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>Limited interpretation – detection simply means a history of use</li> <li>Easily adulterated</li> </ul>
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## Oral Fluid

<p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>Recent use, similar detection time to blood</li> <li>Detect parent/active compounds</li> <li>Ease of collection</li> </ul>	<p><b>Disadvantages</b></p> <ul style="list-style-type: none"> <li>Limited interpretation of levels - oral cavity coating and limited research</li> <li>Sensitivity for some drugs (e.g. benzodiazepines)</li> </ul>
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## Why Oral Fluid ?

- Most accessible biological fluid
- Easy, rapid collection
- Minimally invasive
- Observed; gender neutral
- No need for medical personnel
- Can be taken proximate to the traffic stop
- Difficult to adulterate



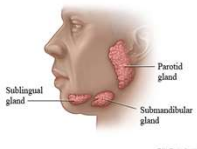

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## Oral Fluid

Mixture of saliva, oral mucosal transudates, and residues of ingested products

- Saliva
  - liquid from the salivary glands
  - 99% water and 1% protein and salts
- Production
  - 500-1500 mL/day (~2-6 cups)
  - rate ~0.3-0.4 mL/min
- Oral mucosal transudates
  - Fluids from the capillaries beneath the lining of the cheeks and lips

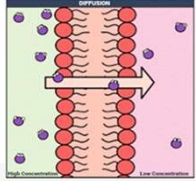

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## How do drugs get into oral fluid?

Simple passive diffusion from the blood

- Once blood gets to the salivary glands, drugs rapidly transfer to the oral fluid
- Parent drug and some metabolites
- Basic drugs transfer well to OF (e.g. cocaine, amphetamines, pain meds)
- Acidic protein bound drugs do not transfer well to OF (e.g. benzodiazepines)

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## How do drugs get into oral fluid?

Oral cavity deposition

- Smoked, vaped, snorted, chewed, sublingual, etc
- Typically cleared within a few hours





NBC News      Chemistry World      

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## Oral Fluid SCREENING Devices

- Easy to use
- Portable
- Preliminary screening results
- Cover the most common drugs
  - Not standardized on drugs tested or cutoffs
- Need additional sample collected for evidential testing (blood or oral fluid)



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## AAA Oral Fluid Pocket Card

AAA  
Oral Fluid  
Pocket  
Card



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## Abbott SoToxa

Screens for 6 drugs/drug classes

- Cocaine
- Opiates
- Methamphetamine
- Amphetamine
- THC
- Benzodiazepines





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## Draeger DrugTest 5000

Screens for 8 drugs/drug classes

- Cocaine
- Opiates
- Methamphetamine
- Amphetamine
- THC
- Benzodiazepines
- Methadone
- Ketamine






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## Reliability of OF Roadside Screening Devices




Evaluation of Draeger DrugTest 5000 in a Naturalistic Setting  
Hilward Gjerdv, Grethe Bremhorst Clausen, Espen Andreassen, Eskild Furuhaugen  
Journal of Analytical Toxicology, Volume 42, Issue 4, May 2018, Pages 248-254.  
https://doi.org/10.1093/jat/bky003  
Published: 02 February 2018    Article history

Suitability of SoToxa® Oral Fluid Screening Over Time: Re-Examination of Drugged Driving in Wisconsin

Theodore Savage<sup>1</sup>, Therese Sanders<sup>2</sup>, Ryan Pieters<sup>3</sup>, Amy Miles<sup>3</sup>, Heather Barkholz<sup>1,3</sup>





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### Evidential Oral Fluid Testing

Collected onsite, no medical personnel

Sent to a forensic laboratory for testing






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### Challenges of OF Testing in DUID Case

- Salivation decreases after stimulant, opioid, MJ use, potentially extending time required for obtaining adequate specimen volume
- Some drugs do not partition well into OF, creating detection challenges, e.g. Benzodiazepines (Xanax, Valium)
- Total OF-elution buffer volume (2-4 mL) – requires sensitive and comprehensive methods




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### Challenges of OF Testing in DUID Case

- Roadside devices do not allow confirmation testing of the same specimen that is screened
  - Roadside screening and evidential sample (OF or blood) are independent processes
- OF testing is not currently common to most forensic labs
  - Proper instrumentation, time for method development and validation
- Not recommended to estimate drug concentrations in whole blood from OF drug concentrations or vice versa




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### References

<https://newsroom.aaa.com/2022/10/use-of-oral-fluid-to-detect-drugged-drivers/>

- Use of Oral Fluid to Detect Drugged Drivers: A Toolkit
  - detailed guidance document
- Quick Reference Handout
  - 2-page executive summary
- Law Enforcement Pocket Guide




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### Contact Information

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