



The Usefulness of SFSTs in Detecting Drugs Other than Alcohol

2024 Texas Impaired Driving Forum

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THE USEFULNESS OF SFSTS IN DETECTING DRUGS OTHER THAN ALCOHOL

Final Report
By

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JUNE 20, 2020

The Usefulness of SFSTs in Detecting Drugs Other than Alcohol

▶ Study Authors

- ▶ **Wes Evans**, DRE Instructor, Grand Blanc, MI Twp PD
 - ▶ Study Creator, Coordinator, and Funder
- ▶ **Dary Fiorentino, Ph.D**
 - ▶ Psychologist; colleague of Dr. Marcelline Burns and Dr. Herb Moskowitz at Southern California Research Institute (SCRI)
 - ▶ Statistical analysis
- ▶ **Thomas E. Page**, retired LAPD, DRE Emeritus



The Usefulness of SFSTs in Detecting Drugs Other than Alcohol

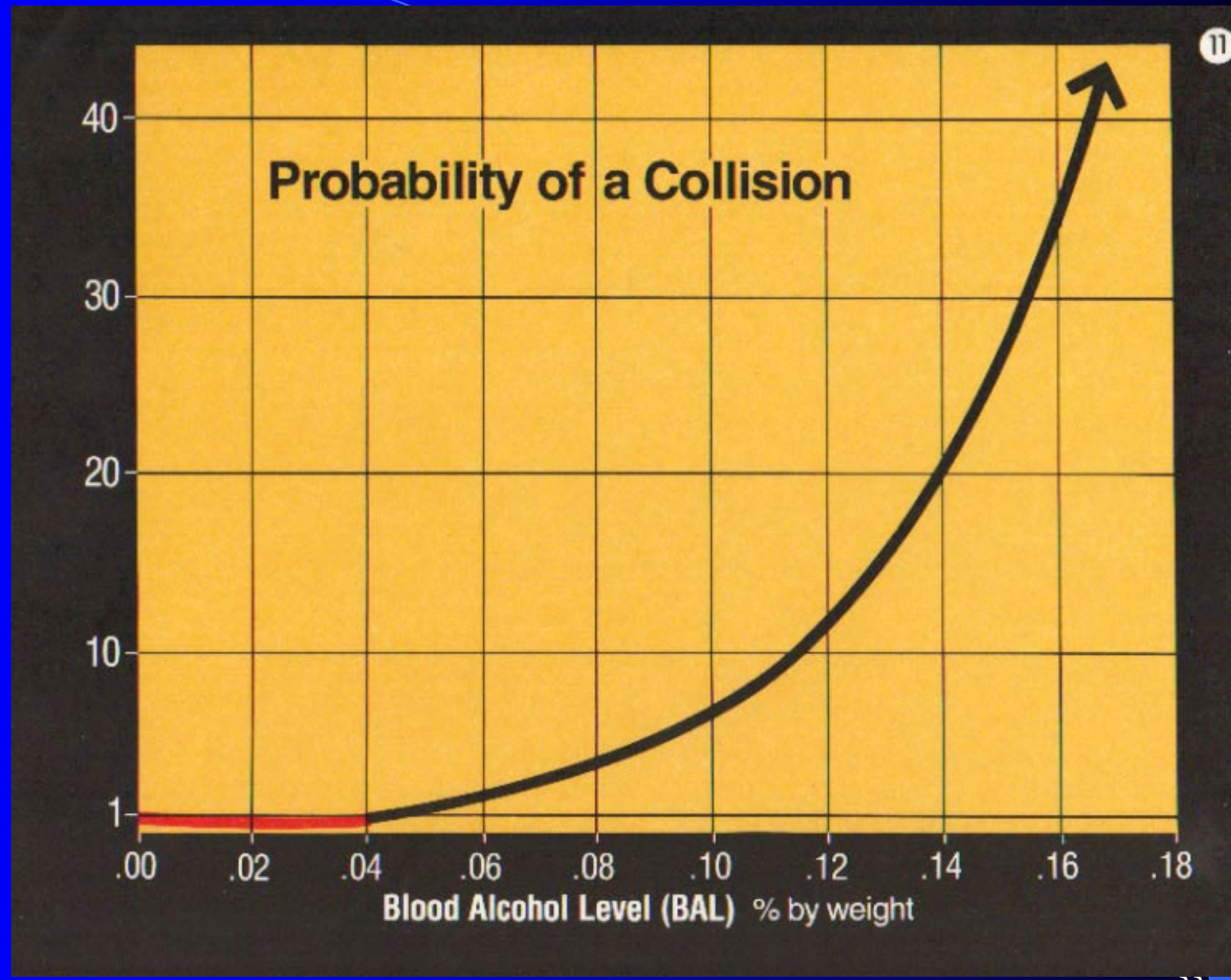
- ▶ Bridges the gap between SFSTs and non-alcohol drugs
- ▶ The Standardized Field Sobriety Test battery
 - ▶ 3 Test battery (HGN, WAT, OLS); using “Validated” clues
 - ▶ SFSTs developed to detect the presence of **alcohol at impairing levels**
 - ▶ Drs. Marcelline Burns and Herb Moskowitz and the Southern California Research Institute (SCRI)
 - ▶ .10 BAC initially; .08 later; .05 (1995 Colorado study by Ellen Anderson and Burns)
 - ▶ **Note: Not the Standardized Field ALCOHOL test battery!!**



Alcohol v. Other Drugs



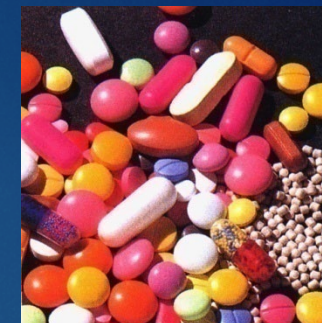
- Blessing and Curse of Alcohol!
- Alcohol has simple pharmacokinetics
 - The “ins, arounds, changes, and outs”
- Easy to study & measure
- All are familiar with alcohol
- The numbers relate (imperfectly) to impairment



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Alcohol v. Other Drugs...

- *Some* of the problems with drugs...
 - Complex pharmacokinetics
 - Complex pharmacology
 - Eg: Metabolites may be active
 - Difficulty studying some drugs – on humans
 - Relationship between levels and impairment more complex
 - Cannabis levels close to meaningless



The Usefulness of SFSTs in Detecting Drugs Other than Alcohol

- ▶ Challenges to use of SFSTs for non-alcohol drugs
 - ▶ Growing over past two plus decades
 - ▶ In Defense challenges to SFSTs and DRE
 - ▶ Within the Enforcement community (SFST practitioners; DREs)
 - ▶ Within the Research community



The Usefulness of SFSTs in Detecting Drugs Other than Alcohol

- ▶ Some have suggested...
 - ▶ Study the SFSTs for drugs
 - ▶ Develop **new** SFSTs depending on the drug
 - ▶ Marijuana the primary reason
 - ▶ Increase in trend to full recreational legalization
 - ▶ Very different impairment profile from alcohol
 - ▶ The never-ending search for **meaningful levels!**
 - ▶ Adding new components to the current SFSTs
 - ▶ Breathalyzer for drugs



The Usefulness of SFSTs in Detecting Drugs Other than Alcohol

- ▶ The impetus
 - ▶ Growing prevalence of drugs compared to alcohol
 - ▶ Drugs equal to or surpassing alcohol in serious/fatal crashes
 - ▶ Challenges with Marijuana
 - ▶ E.G.: No HGN with Cannabis
 - ▶ Growing discussions about changing SFSTs in the Enforcement Community, including us!



The Usefulness of SFSTs in Detecting Drugs Other than Alcohol

- ▶ Back to Basics approach!
- ▶ Successful for me overall in Court
- ▶ Alcohol IS a Drug!
- ▶ SFSTs were developed for a Specific Drug – Alcohol
- ▶ Suggestion to develop different SFSTs for non-Alcohol drugs....
 - ▶ In my opinion, suggestion doesn't meet "Spock logic"
 - ▶ Requires determining the drug, then changing the SFSTs



The Usefulness of SFSTs in Detecting Drugs Other than Alcohol

- ▶ This Study a response
- ▶ Studying the ***Null*** Hypothesis:

“The current SFSTs do NOT enable the SFST practitioner to accurately identify drug-impairment.”

- ▶ If the Null hypothesis is disproved,
- ▶ the SFSTs work for drugs



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The SFST “Bridge Study”



- Made in Michigan!
- Collaborative effort between Dary Fiorentino, PhD (DF Consulting, Van Nuys, CA),
- Thomas E. Page, M.A. (retired LAPD, Detroit MI), and many others.
- Work started mid-2018, Final Report out mid-2020.

- Supported by Genesee County Prosecutors Office, Genesee Co. Chiefs of Police Assn., Genesee Co. Sheriff's Office and Michigan State Police - Flint Post Commander.

The SFST “Bridge Study”



- Overall Goal: to determine whether the SFSTs, using the “validated clues” (.08 BAC) were Useful in Detecting Impairment from non-alcohol drugs
- The Goal Was Not to “Validate” these tests for specific drugs
- Goal not to develop validated clues like we have with alcohol



Validity

A test (or battery of tests) is considered to be valid if it does what it's designed to do

Reliability

Dependable; giving the same results; consistent; may be "reliably bad"

The SFST “Bridge Study”

- Study conducted in the Genesee County (Flint) MI Jail.
- 527 recent arrestees volunteered to participate.
 - All had been in custody for 8 hours or less
- Volunteers were anonymous and randomly recruited.
- 12 Genesee County police agencies participated.
- 62 police officers from these agencies served as Testers.
 - Only criteria was SFST trained at some point in career
- Volunteers were not asked about drug use (if any) prior to testing



The Study and Report

- ▶ Participants selected at random while awaiting processing
- ▶ PBT given (for alcohol)
- ▶ One step multi drug urine screen (Drugs Tests in Bulk.com)
- ▶ Amphetamine, Barbiturates, Benzodiazepines, Buprenorphine, Cocaine, MDMA, Marijuana, Methadone, Methamphetamine, Morphine, Oxycodone, Phencyclidine
- ▶ 5/7 DRE categories; inhalants not included, and no PCP was found
- ▶ If urine pos for THC, oral fluid screening test given
 - ▶ Oral fluid test determined to be defective (no positives found)

The SFST “Bridge Study”



- 13 different drugs from six of the seven DRE Categories were tested for.
- Drugs from five of the seven DRE categories were detected.
- Chemical testing was done only after the SFSTs.









Participant height 168 Participant weight 5-2 End time 2056

Gaze Nystagmus (HGN)

I am going to check your eyes. (Please remove your glasses).
Keep your head still and follow the stimulus with your eyes only.
Do not move your head.
Do you understand the instructions?

	Left Eye	Right Eye	Total
Smooth pursuit	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Nystagmus at maximum deviation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Onset prior to 45 degrees	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Walk and Turn (WAT)

- Put your left foot on the line and put your right foot in front of it with your right heel touching your left toe. Keep your hands at your side. (Demonstrate.)
- Do not start until I tell you to.
- Do you understand the directions?
- When I tell you to begin, take nine heel to toe steps on the line, turn around keeping one foot on the line, and return nine heel to toe steps. (Demonstrate heel to toe; three steps are sufficient.)
- On the ninth step, keep the front foot on the line and turn by making several small steps with the other foot. (Demonstrate turn.)
- While walking, watch your feet all the times, keep arms at side, count steps out loud. Once you begin, do not stop until test is completed.
- Do you understand the instructions?
- You may begin the test.

Clue

Clue	Instruction phase	Walking phase
Cannot keep balance	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Starts too soon	<input type="checkbox"/>	<input type="checkbox"/>
Stops while walking	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Misses heel to toe	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Steps off line	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Uses arms to balance	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Improper turn	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wrong number of steps	<input type="checkbox"/>	<input type="checkbox"/>

TOTAL

Leg Stand (OLS)

Stand with your heels together and your arms at your side. (Demonstrate.)
Do not begin until I tell you to.
Do you understand?
When I tell you, I want you to raise your leg, either leg, approximately six inches off the ground, feet pointed out. Keep both legs straight and keep your eyes on the elevated foot.
While holding that position, count out loud; one thousand and one, one thousand and two, one thousand and three, and so forth until I tell you to stop. (Demonstrate the raised leg and count.)
Do you understand the instructions?
You may begin the test.

Clue

Swaying	<input checked="" type="checkbox"/>
Uses arms to balance	<input checked="" type="checkbox"/>
Hopping	<input type="checkbox"/>
Walking Puts foot down	<input checked="" type="checkbox"/>

TOTAL

Urine Screen

Administration	g/210L	Drug Class	Result (Circle 1)
BrAC 1	<u>.600</u>	AMP	+ <input checked="" type="checkbox"/>
		BAR	+ <input checked="" type="checkbox"/>
		BUP	+ <input checked="" type="checkbox"/>
		BZO	+ <input checked="" type="checkbox"/>
		COC	+ <input checked="" type="checkbox"/>
		mAMP	+ <input checked="" type="checkbox"/>
		MDMA	+ <input checked="" type="checkbox"/>
		MTD	+ <input checked="" type="checkbox"/>
		MOP	+ <input checked="" type="checkbox"/>
		OXY	+ <input checked="" type="checkbox"/>
		PCP	+ <input checked="" type="checkbox"/>
		THC	+ <input checked="" type="checkbox"/>

Saliva Screen

Drug Class	Result (Circle 1)
AMP	+ <input checked="" type="checkbox"/>
COC	+ <input checked="" type="checkbox"/>
mAMP	+ <input checked="" type="checkbox"/>
OPI	+ <input checked="" type="checkbox"/>
THC	+ <input checked="" type="checkbox"/>

Participant race/ethnicity W
Participant height 5-2 Participant weight 125 End time 2051

Horizontal Gaze Nystagmus (HGN)

I am going to check your eyes. (Please remove your glasses).
Keep your head still and follow the stimulus with your eyes only.
Do not move your head.
Do you understand the instructions?

	Left Eye	Right Eye	Total
Smooth pursuit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nystagmus at maximum deviation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Onset prior to 45 degrees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TOTAL

Walk and Turn (WAT)

- Put your left foot on the line and put your right foot in front of it with your right heel touching your left toe. Keep your hands at your side. (Demonstrate.)
- Do not start until I tell you to.
- Do you understand the directions?
- When I tell you to begin, take nine heel to toe steps on the line, turn around keeping one foot on the line, and return nine heel to toe steps. (Demonstrate heel to toe; three steps are sufficient.)
- On the ninth step, keep the front foot on the line and turn by making several small steps with the other foot. (Demonstrate turn.)
- While walking, watch your feet all the times, keep arms at side, count steps out loud. Once you begin, do not stop until test is completed.
- Do you understand the instructions?
- You may begin the test.

Clue

Clue	Instruction phase	Walking phase
Cannot keep balance	<input type="checkbox"/>	<input type="checkbox"/>
Starts too soon	<input type="checkbox"/>	<input type="checkbox"/>
Stops while walking	<input type="checkbox"/>	<input type="checkbox"/>
Misses heel to toe	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Steps off line	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Uses arms to balance	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Improper turn	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wrong number of steps	<input type="checkbox"/>	<input type="checkbox"/>

TOTAL

Leg Stand (OLS)

Stand with your heels together and your arms at your side. (Demonstrate.)
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When I tell you, I want you to raise your leg, either leg, approximately six inches off the ground, feet pointed out. Keep both legs straight and keep your eyes on the elevated foot.
While holding that position, count out loud; one thousand and one, one thousand and two, one thousand and three, and so forth until I tell you to stop. (Demonstrate the raised leg and count.)
Do you understand the instructions?
You may begin the test.

Clue

Swaying	<input checked="" type="checkbox"/>
Uses arms to balance	<input type="checkbox"/>
Hopping	<input type="checkbox"/>
Walking Puts foot down	<input checked="" type="checkbox"/>

TOTAL

Urine Screen

Administration	g/210L	Drug Class	Result (Circle 1)
BrAC 1	<u>.020</u>	AMP	+ <input checked="" type="checkbox"/>
		BAR	+ <input checked="" type="checkbox"/>
		BUP	+ <input checked="" type="checkbox"/>
		BZO	+ <input checked="" type="checkbox"/>
		COC	+ <input checked="" type="checkbox"/>
		mAMP	+ <input checked="" type="checkbox"/>
		MDMA	+ <input checked="" type="checkbox"/>
		MTD	+ <input checked="" type="checkbox"/>
		MOP	+ <input checked="" type="checkbox"/>
		OXY	+ <input checked="" type="checkbox"/>
		PCP	+ <input checked="" type="checkbox"/>
		THC	+ <input checked="" type="checkbox"/>

Saliva Screen

Drug Class	Result (Circle 1)
AMP	+ <input checked="" type="checkbox"/>
COC	+ <input checked="" type="checkbox"/>
mAMP	+ <input checked="" type="checkbox"/>
OPI	+ <input checked="" type="checkbox"/>
THC	+ <input checked="" type="checkbox"/>

The SFST “Bridge Study”



- Chemical testing was done only after the SFSTs.
- Drug positives were very high, even with randomization.
- 84% tested positive for at least one drug.
- Any positive BrAC (.001 or more) was 12.9%.
- Of the 12.9%, only 7% had a BAC \geq .08.
- THC was the most common drug detected at 69%.

The Study and Report

- ▶ Saliva test for active THC metabolite
 - ▶ Results determined to be inaccurate
 - ▶ Not included in the report
- ▶ 624 requests to participate; 527 agreed to participate
- ▶ Urine tests for 524



The Study and Report

- ▶ Results: Alcohol
 - ▶ 87.1% had .00 BrAC
 - ▶ 7% had .08 and higher
- ▶ Results: 82% positive for Drugs
 - ▶ 3 had 7 drugs
 - ▶ 4 had 6
 - ▶ 11 for 5
 - ▶ 25 for 4
 - ▶ 37 for 3
 - ▶ 131 for 2



The Study and Report

- ▶ 219 for 1
- ▶ Thus, about half were poly-drugs
- ▶ 94 negative for all drugs
 - ▶ 10 of these had BrAC of .08 or more
- ▶ **Large** correlation between CNS Depressants & HGN
- ▶ Each of the SFSTs looked at alone, and then in combination
- ▶ Optimal “cut-point” was found to be 2 positive SFSTs
- ▶ Two or more positive tests **.94** probability the person had one or more drugs in the system



The Study and Report



- ▶ Correct classification (don't confuse with DRE!) based on SFSTs...
 - ▶ No drug, because no impairment seen on SFSTs
 - ▶ One or more drugs
 - ▶ If less than two positive SFSTs, .30 probability the person did NOT have drugs in their system
 - ▶ False positives (pos SFSTs with neg tox) - .23 probability
 - ▶ False negatives (neg SFSTs with pos tox) - .36 probability
 - ▶ Thus, false negatives more likely (a good thing!)

Table 131

Percent Alcohol, 12 Drugs of Abuse, and Five DRE Categories of Drugs Detected by All Possible SFST Combinations

Drug	Test Combination							
	HGN – WAT – OLS – (N = 90)	HGN + WAT – OLS – (N = 4)	HGN – WAT + OLS - (Alcohol N = 108) (Drugs N = 107)	HGN – WAT – OLS + (N = 19)	HGN + WAT+ OLS – (N = 18)	HGN + WAT – OLS + (N = 11)	HGN – WAT + OLS + (Alcohol N = 208) (Drugs N = 207)	HGN + WAT + OLS + (Alcohol N = 65) (Drugs N = 64)
	Percent Times Drug Negative in Urine Test is Not Detected by SFSTs	Percent Times Drug Positive in Urine Test is Detected by SFSTs	Percent Times Drug Positive in Urine Test is Detected by SFSTs	Percent Times Drug Positive in Urine Test is Detected by SFSTs	Percent Times Drug Positive in Urine Test is Detected by SFSTs	Percent Times Drug Positive in Urine Test is Detected by SFSTs	Percent Times Drug Positive in Urine Test is Detected by SFSTs	Percent Times Drug Positive in Urine Test is Detected by SFSTs
Alcohol, .08 g/210L	100.0%	25.0%	0.9%	0.0%	27.8%	27.3%	1.9%	33.8%
Amphetamine (AMP), 300 ng/ml	93.3%	0.0%	8.4%	21.1%	11.1%	9.1%	13.5%	6.3%
Barbiturates (BAR), 300 ng/ml	100.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	4.7%
Benzodiazepines (BZO), 300 ng/ml	100.0%	25.0%	3.7%	5.3%	33.3%	9.1%	5.3%	34.4%
Buprenorphine (BUP), 10 ng/ml	100.0%	0.0%	2.8%	5.3%	0.0%	0.0%	4.3%	6.3%
Cocaine (COC), 300 ng/ml	88.8%	25.0%	31.8%	42.1%	22.2%	45.5%	38.6%	37.5%
MDMA, 500 ng/ml (*)	98.9%	0.0%	4.7%	5.3%	0.0%	9.1%	9.7%	3.1%
Marijuana (THC), 50 ng/ml (*)	66.67%	100.0%	78.5%	84.2%	72.2%	90.9%	76.8%	67.2%
Methadone (MTD), 300 ng/ml	98.9%	0.0%	4.7%	0.0%	0.0%	0.0%	4.8%	1.6%
Methamphetamine (mAMP), 1000 ng/ml	95.6%	0.0%	6.5%	10.5%	5.6%	9.1%	12.6%	4.7%
Morphine (MOP), 300 ng/ml	98.9%	0.0%	3.7%	10.5%	0.0%	18.2%	9.2%	6.3%
Oxycodone, (OXY) 100 ng/ml	97.8%	25.0%	1.9%	0.0%	0.0%	9.1%	5.8%	1.6%
Phencyclidine (PCP), 25 ng/ml	-	-	-	-	-	-	-	-
Central Nervous System Depressants (*)	100.00%	50.0%	5.6%	5.3%	61.1%	36.4%	7.2%	70.3%
Central Nervous System Stimulants (*)	82.2%	25.0%	35.5%	52.6%	27.8%	45.5%	48.8%	42.2%
Narcotic Analgesics (*)	96.7%	25.0%	9.3%	10.5%	0.0%	18.2%	19.3%	12.5%
Any One Drug	57.8%	100.0%	89.7%	89.5%	100.0%	100.0%	92.3%	95.3%

Note. Breath alcohol was measured with the portable breath tester Lifeloc FC10. Drugs were detected with the HCDOAEW-6125 multi-drug urine drug screen. No cases of PCP were detected in urine, so no diagnostic characteristics were calculated. (*) = Indicates DRE Drug Category. CNS depressants include alcohol, benzodiazepines, and barbiturates. CNS stimulants include cocaine, amphetamine, and methamphetamine. Narcotic analgesics include morphine, methadone, buprenorphine, and oxycodone. Hallucinogens include MDMA. Cannabis includes THC. Under the two positive criterion rule, the first test combination (HGN-, WAT-, OLS -) and the last four test combinations can be interpreted as correct decisions. Subtracting those decisions from 100% gives the percent of incorrect decisions.

One of the Study Conclusions....



Excerpt from Section 4.2 Main Findings of the Final Report:

“In conclusion, the data support the hypothesis that the SFSTs, alone and in combination, are useful in detecting impairment from drugs other than alcohol.”

**Note: only the standardized clues validated for the .08 were considered in this study. On the road, officers consider the Totality of the Circumstances including, but not limited to, such General Indicators as we discussed earlier.

Summary....

- ▶ For Roadside OWI purposes, it is not important for the Officer to know what kind of drug is causing the impairment.
- ▶ If the test(s) show impairment higher than the PBT would suggest, the officer will need to request a blood test and should seek a DRE.
- ▶ *It is the DRE who will later classify the DRE Category(s) most likely causing the impairment.*

The Study and Report

- ▶ “False Negatives” more likely than “False Positives”
 - ▶ A Good thing!
 - ▶ False Negatives – Impairment not seen, but positive drug test
 - ▶ In DRE, is this an error?
 - ▶ SFSTs and DRE NOT drug tests!
 - ▶ False Positives – Impairment seen, but negative drug test
 - ▶ How explained?
 - ▶ Drug not tested for, time of use of drug, other explanations?
 - ▶ But, NOT proof of un-impairment or sobriety!
 - ▶ Gene Adler (RIP) calls these the “Surprises and Disappointments” of toxicology

The Usefulness of SFSTs in Detecting Drugs Other than Alcohol

- ▶ What did we learn?
 - ▶ Drug use prevalence in Flint, MI huge! (80% plus!)
 - ▶ No matter the reason for the arrest
 - ▶ Poly-drug use common (about half)
 - ▶ Drugs of abuse impair!
 - ▶ Trained Officers can recognize that impairment
 - ▶ The SFST “Validated” clues work
 - ▶ The “scoring” system works
 - ▶ Two tests with two clues seems a key
 - ▶ “Large positive correlation” between HGN and CNS Depressants



The Usefulness of SFSTs in Detecting Drugs Other than Alcohol

- ▶ HGN a special case
 - ▶ DID drugs produce HGN
 - ▶ CNS Depressants, Inhalants, Dissociative Anesthetics
 - ▶ HGN role changes with non-alcohol drugs
 - ▶ CNS Stimulants
 - ▶ Narcotic Analgesics
 - ▶ Hallucinogens
 - ▶ Cannabis / Marijuana
 - ▶ Role becomes to Determine the CAUSE of the Impairment, not the IF
 - ▶ The Drug Category (s)



The Usefulness of SFSTs in Detecting Drugs Other than Alcohol

- ▶ Suggestions for Future studies
 - ▶ Replicate in different jurisdictions
 - ▶ Different drugs, combinations, proficiency of officers, demographics of subjects
 - ▶ Different oral fluid test
 - ▶ Blood in addition to urine
 - ▶ DREs vs non-DREs
 - ▶ Time post custody
 - ▶ In the field at roadside
 - ▶ Simulators



The Usefulness of SFSTs in Detecting Drugs Other than Alcohol



- ▶ Conclusions
 - ▶ SFSTs identify non-alcohol drug impairment
 - ▶ False negatives more likely than false positives
 - ▶ A good thing!
 - ▶ ***No compelling reason to modify the current SFSTs***
 - ▶ Additional training on identifying drug influence signs and symptoms
 - ▶ Focus on the 2nd phase of DUI detection – Observations of behavior and personal contact
 - ▶ DUI arrests aren't for "Exceeding the maximum number of clues!"
 - ▶ SFST are one part of the overall investigation
 - ▶ May not always be administered
 - ▶ Refusals, Inability (due to injury, illness, etc.)











The SFST “Bridge Study”



- Receiver Operating Characteristic (ROC) analysis used.
- Analyzed individually, then by DRE Category, lastly by Any Drug.
- Studied for positive and negative predictive value.



QUESTIONS?