



Drug Testing Trends

Presented by:
R. H. Barry Sample, Ph.D.
Director of Science and Technology

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National Survey of Drug Use and Health (NSDUH)

National analysis of workplace drug testing data from our forensic toxicology labs

- Annual survey of the civilian, non-institutionalized population of the U.S. aged 12 years old or older
- Presents national estimates of rates of use, numbers of users, and other measures related to illicit drugs, alcohol and tobacco products
- Self-reported use
- Approximately 67,500 persons are interviewed in NSDUH annually




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Today's session

Drug Testing Trends presented by R. H. Barry Sample, Ph.D.

- About the Quest Diagnostics Drug Testing Index™ (DTI)
- Key findings
- Trends and insights from DTI data
- Analysis by drug category
- Summary
- Testing for Synthetic Cannabinoids
- Questions




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Common matrices in drugs of abuse testing

Detection windows vary by drug test type

Urine drug testing	Oral fluid drug testing	Hair drug testing
		
Detects recent use (previous 24-72 hours)	Detects recent use (previous 24-48 hours)	Detects a pattern of repetitive use (up to 90 days, based on testing proximal 1.5" head hair)



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Quest Diagnostics Drug Testing Index™

National analysis of workplace drug testing data from our forensic toxicology labs

Routine urine specimens submitted for workplace drugs of abuse testing

- Workplace
- Rehabilitation and criminal justice excluded
- Point of collection (POCT) confirmations excluded (excludes high positivity)

Laboratory positive data (prior to MRO review)

- Does not indicate whether there is an "alternative medical explanation"
- Includes employer/Medical Review Officer (MRO) blinds

Two major groups

- Federally-Mandated, Safety-Sensitive Workforce
- General U.S. Workforce




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Key findings



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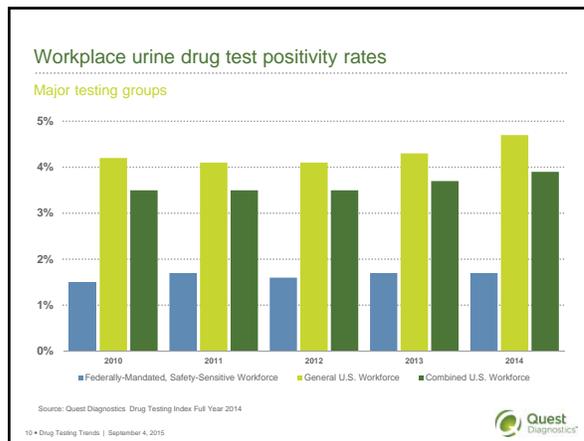
Key findings

Quest Diagnostics Drug Testing Index full year 2014 report

- Percentage of North American workers testing positive for illicit drugs increased for the second consecutive year in the general U.S. workforce
- Marijuana positivity increased nationally for the second consecutive year
 - Marijuana positivity increased at about the same rate in the two states with recreational marijuana-use laws as the rest of the U.S. in 2014
- Increases in workplace positivity for cocaine in the general U.S. workforce over the past two years, reversing a prolonged period of decline
- Amphetamines use, specifically the use of methamphetamine, showed an increase across both urine and oral fluid drug tests
- Positivity doubled for 6-AM, a specific marker for heroin, in the general U.S. workforce between 2011 and 2014

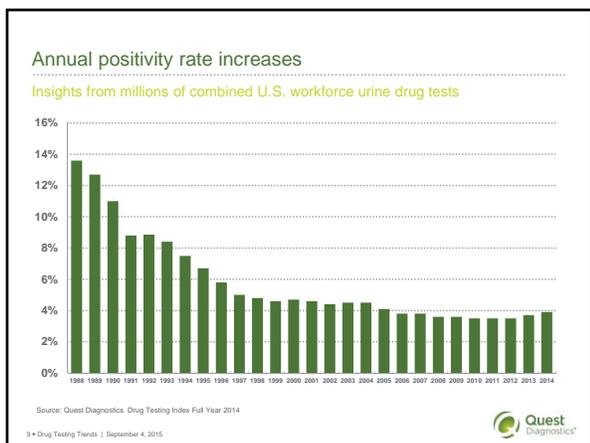
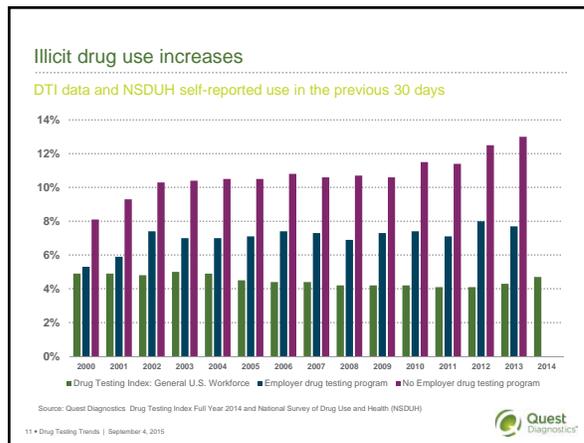


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Trends and insights from DTI data

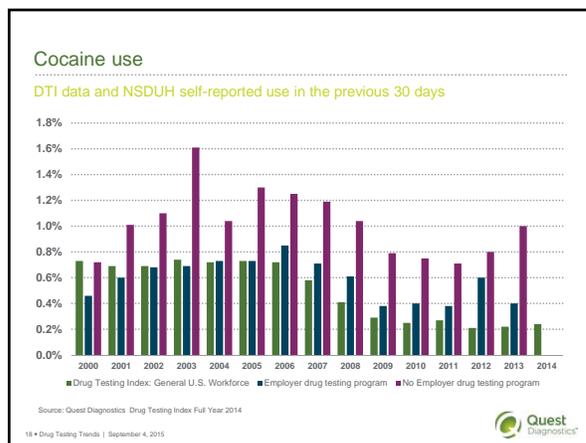
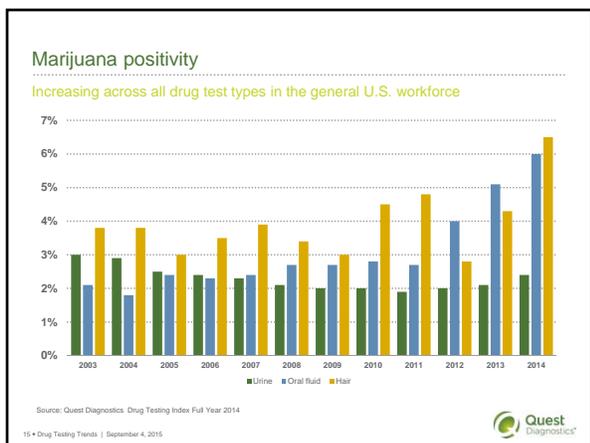
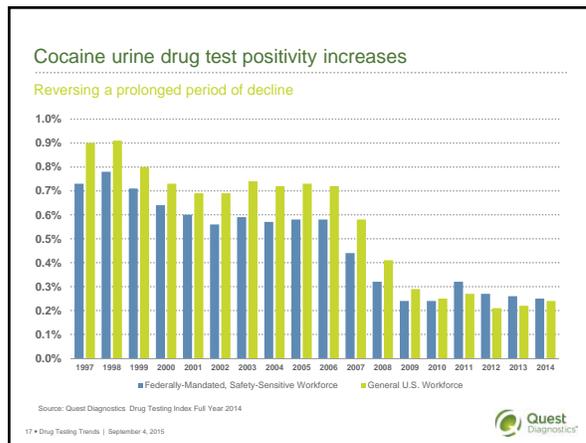
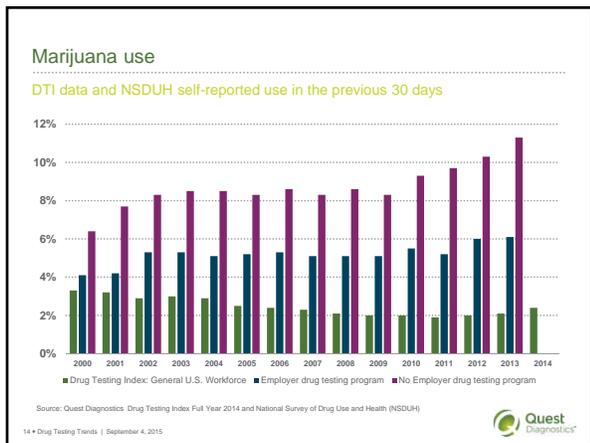
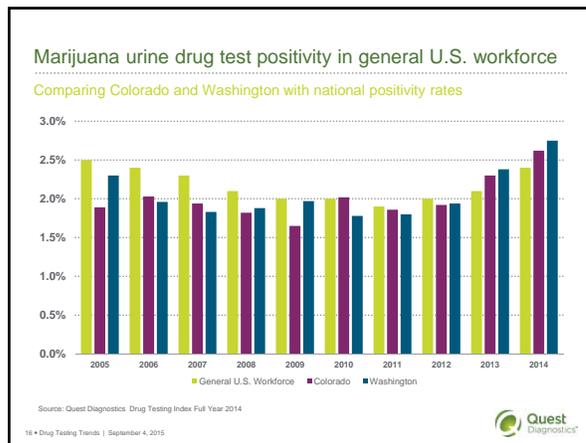
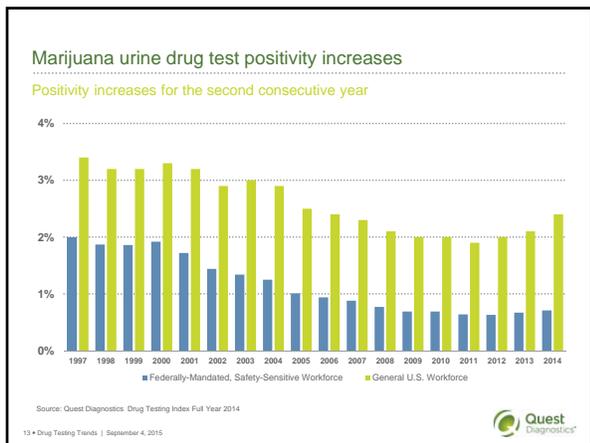
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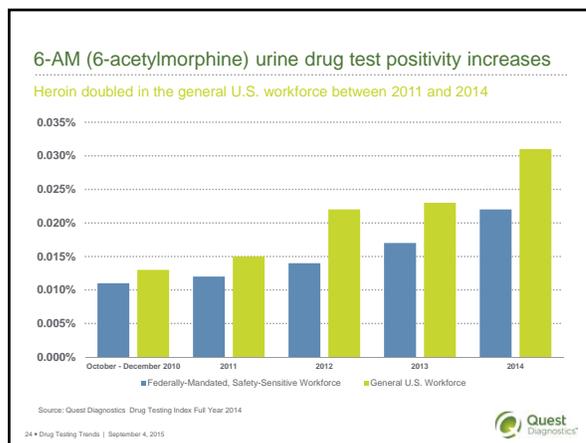
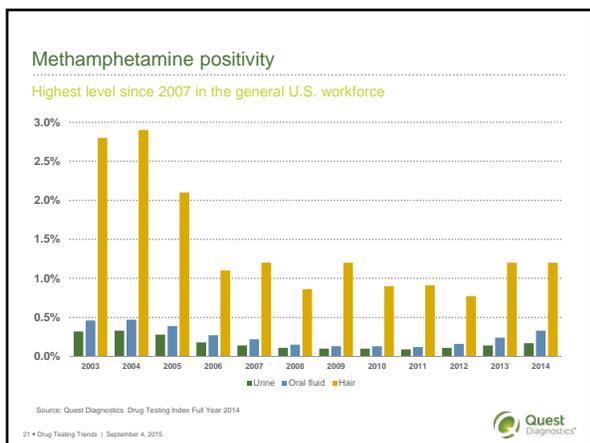
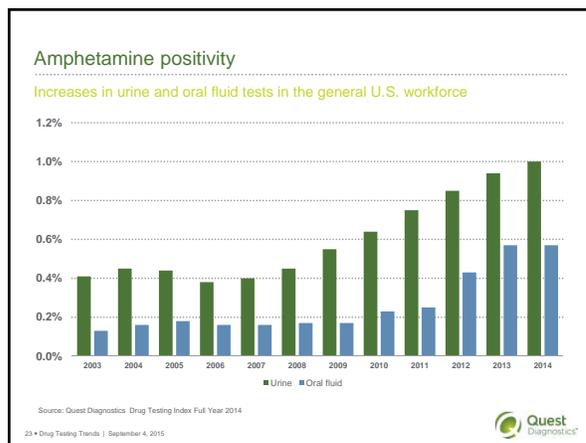
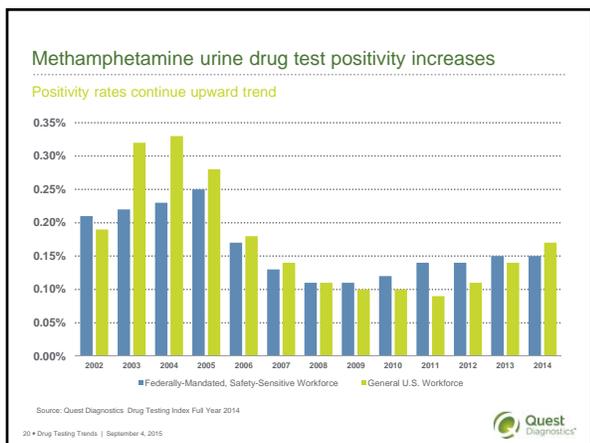
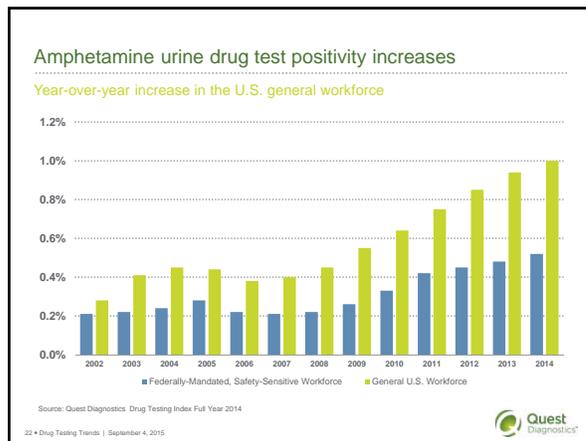
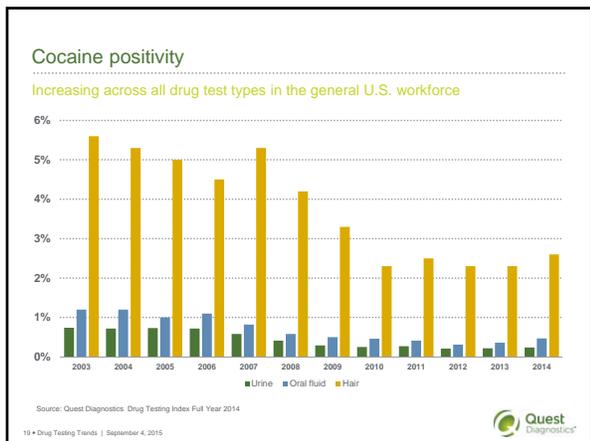



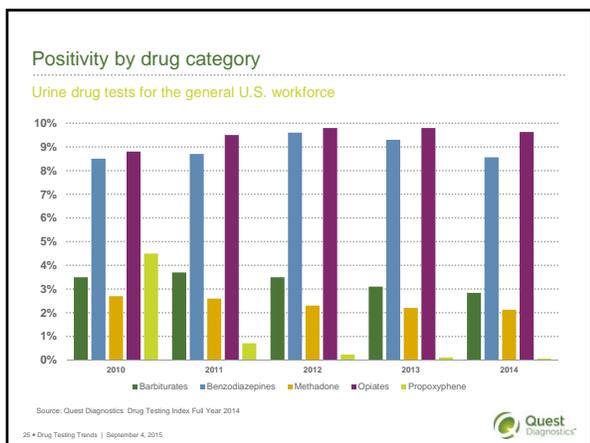
Analysis by drug category

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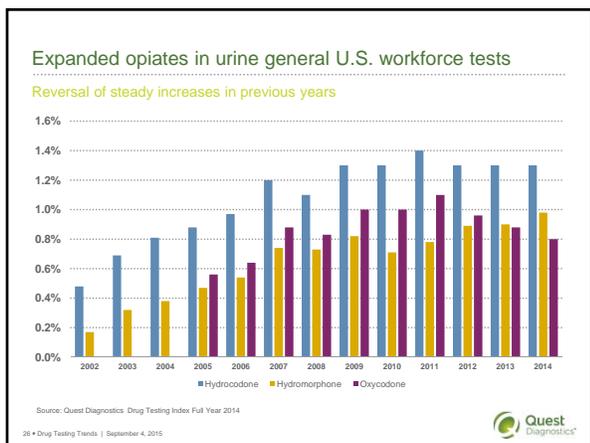


Summary

Drug Testing Trends presented by R. H. Barry Sample, Ph.D.

- North American workers are increasingly testing positive for illicit drug use across almost all workforce categories and drug test specimen types
 - Marijuana increased for the second consecutive year in the general U.S. workforce
 - Marijuana positivity increased at about the same rate in Colorado and Washington as the rest of the U.S. in 2014
 - Marijuana positivity in oral fluid is twice that in urine and comparable to that in hair
 - Steady increases in workplace positivity for cocaine in the general U.S. workforce over the past two years, reversing a prolonged period of decline
 - Cocaine positivity is up across all specimen types in 2014
 - Methamphetamine and heroin positivity rates continue upward trend
- Increases in prescription opiate positivity has stalled
 - Oxycodone positivity is down dramatically from 2011 peak
 - Hydrocodone positivity is flat and lower than 2011 peak
 - Hydromorphone positivity continues to climb slowly
- Increases in illicit drug positivity should cause employers and policymakers to take notice about the risks those drugs continue to represent for safety and compliance

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Testing for Synthetic Cannabinoids

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Summary

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Synthetic cannabinoids (SCB)

- What are they?**
 - THC-like drug (bind at CB-receptors)
 - Also referred to as "K2" and "Spice"
- How are they used?**
 - Smoked (pipe, bowl, paper or electronic cigarette)
 - Snorted and taken orally

Photo: posted by LSDude, slashcannabis.com

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Evolution of SCBs

New compounds created in response to legislative bans

Structural Complexity	1st Generation (2010) • Prior to Ban • JWH-018 • JWH-073	2nd Generation (2011) • After Temp Scheduling • AM-2201 • JWH-210
	3rd Generation (2012) • After Syn Drug Abuse Prev Act • XLR-11 • UR-144 • AKB-48	4th Generation (2013) • Additional Temp Scheduling • AB-PINACA • AB-FUBINACA • PB-22 (QUIPIC)
	Scope of Compounds	

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ABCs of SCB nomenclature

- Amino $R-NH_2$
- Oxobutane

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ABCs of SCB nomenclature

AB-PINACA

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ABCs of SCB nomenclature

- Amino $R-NH_2$
- Oxobutane
- Pentyl

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ABCs of SCB nomenclature

- Amino $R-NH_2$

AB-PINACA

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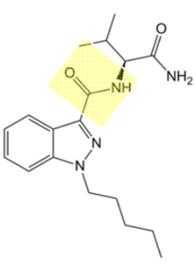
ABCs of SCB nomenclature

- Amino $R-NH_2$
- Oxobutane
- Pentyl
- Indazole

AB-PINACA

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ABCs of SCB nomenclature



- Amino** R-NH2
- Oxobutane** R-C(=O)-CH2-CH2-CH3
- Pentyl** CH3-(CH2)4-
- Indazole** C7H7N2
- CarboxAmide** R-C(=O)-NH2

AB-PINACA

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Standardization approach for SCB testing

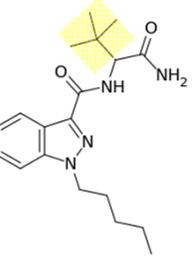
- Assessed panel needs for oil & gas industry**
 - ExxonMobil
 - Pre-employment testing required for U.S. employees and contractors
 - Policy effective November 1, 2015
- Collaborative approach**
 - Other service providers (laboratories)
 - Specific metabolites
 - Cutoffs
- Periodic data review**
 - NFLIS, DEA, scientific literature (peer-reviewed) and industry-observed trends and usage
- Panel revisions and update**
 - ~ Every 6-12 months



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ABCs of SCB nomenclature



- Amino** R-NH2
- Dimethyl** R-C(=O)-CH(CH3)2
- Oxobutane** R-C(=O)-CH2-CH2-CH3
- Pentyl** CH3-(CH2)4-
- Indazole** C7H7N2
- CarboxAmide** R-C(=O)-NH2

ADB-PINACA

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New Oil & Gas Industry SCB panel

- 12 metabolites tested**
 - Covers 15 parent drugs
 - AB CHMINACA, AB – FUBINACA, AB-PINACA/5-F-AB-PINACA, ADB- PINACA, ADBICA, AKB48 (APINACA), AM-2201, BB-22, JWH-018, JWH-073, PB-22, 5-F-PB-22, UR -144, and XLR-11
- New analytes**
 - AB CHMINACA, ADB- PINACA, ADBICA
- Updated metabolites**
 - JWH-018, JWH-073
- Lower Cutoffs**



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Confirmed SCB positives

- 2013 (1.9%)*
- 2014 (1.8%)
- 2015 (2.2%)
- 2016 (1.0%)*

Positivity (alt. service provider)

- 2014 (1.7%)
- 2015 (2.3%)*

Positivity [Jan 2016]		
	% of Total	% Last 3 mo
UR-144 pentanoic acid	17.1%	10.0%
AB-PINACA pentanoic acid	20.0%	26.0%
F-PB-22 carboxyindole	37.1%	44.0%
Overall	74.2%	80.0%

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New testing paradigm

- Continuous evaluation**
 - Changes in marketplace
 - Industry positivity
 - Usage evolution
- Panel adjustments**
 - Semi-annual to annual basis




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Drug Testing Trends

R. H. Barry Sample, Ph.D., Director of Science and Technology

Q & A



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Thank you



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