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

Common matrices in drugs of abuse testing

Detection windows vary by drug test type

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

Key findings
Key findings

- 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.
- 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.

Workplace urine drug test positivity rates

- Major testing groups

Annual positivity rate increases

Insights from millions of combined U.S. workforce urine drug tests

Analysis by drug category
Marijuana urine drug test positivity increases

Positivity increases for the second consecutive year

Source: Quest Diagnostics  Drug Testing Index Full Year 2014

Marijuana urine drug test positivity in general U.S. workforce

Comparing Colorado and Washington with national positivity rates

Source: Quest Diagnostics  Drug Testing Index Full Year 2014

Marijuana use

DTI data and NSDUH self-reported use in the previous 30 days

Source: Quest Diagnostics  Drug Testing Index Full Year 2014

Cocaine urine drug test positivity increases

Reversing a prolonged period of decline

Source: Quest Diagnostics  Drug Testing Index Full Year 2014

Marijuana positivity

Increasing across all drug test types in the general U.S. workforce

Source: Quest Diagnostics  Drug Testing Index Full Year 2014

Cocaine use

DTI data and NSDUH self-reported use in the previous 30 days

Source: Quest Diagnostics  Drug Testing Index Full Year 2014
Cocaine positivity
Increasing across all drug test types in the general U.S. workforce

Source: Quest Diagnostics  Drug Testing Index Full Year 2014

Methamphetamine urine drug test positivity increases
Positivity rates continue upward trend

Source: Quest Diagnostics  Drug Testing Index Full Year 2014

Methamphetamine positivity
Highest level since 2007 in the general U.S. workforce

Source: Quest Diagnostics  Drug Testing Index Full Year 2014

Amphetamine urine drug test positivity increases
Year-over-year increase in the U.S. general workforce

Source: Quest Diagnostics  Drug Testing Index Full Year 2014

Amphetamine positivity
Increases in urine and oral fluid tests in the general U.S. workforce

Source: Quest Diagnostics  Drug Testing Index Full Year 2014

6-AM (6-acetylmorphine) urine drug test positivity increases
Heroin doubled in the general U.S. workforce between 2011 and 2014

Source: Quest Diagnostics  Drug Testing Index Full Year 2014
Positivity by drug category

Drug Testing Trends | September 4, 2015

Expanded opiates in urine general U.S. workforce tests

Summary

Testing for Synthetic Cannabinoids

Synthetic cannabinoids (SCB)

Summary
Evolution of SCBs

New compounds created in response to legislative bans

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Prior to Ban</td>
<td>After Temp Scheduling</td>
</tr>
<tr>
<td>JWH-018</td>
<td>AM-2201</td>
</tr>
<tr>
<td>JWH-073</td>
<td>JWH-210</td>
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<tbody>
<tr>
<td>After Syn Drug Abuse Prev Act</td>
<td>Additional Temp Scheduling</td>
</tr>
<tr>
<td>JWH-182</td>
<td>AB-PINACA</td>
</tr>
<tr>
<td>JWH-183</td>
<td>AB-FUBINACA</td>
</tr>
<tr>
<td>JWH-184</td>
<td>PB-22 (QUIPIAC)</td>
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<tr>
<td>JWH-185</td>
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ABCs of SCB nomenclature

AB-PINACA

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**ABCs of SCB nomenclature**

- Amino
- Oxobutane
- Pentyl
- Indazole
- Carboxamide

**AB-PINACA**

**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
  - NFUS, DEA, scientific literature (peer-reviewed) and industry-observed trends and usage
- Panel revisions and update
  - Every 6-12 months

**Confirmed SCB positives**

<table>
<thead>
<tr>
<th>Year</th>
<th>Positivity</th>
<th>% of Total</th>
<th>% Last 3 mo</th>
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<tbody>
<tr>
<td>2013</td>
<td>1.9%*</td>
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<tr>
<td>2014</td>
<td>1.8%</td>
<td></td>
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<tr>
<td>2015</td>
<td>2.2%</td>
<td></td>
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<tr>
<td>2016</td>
<td>1.0%*</td>
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- Positivity (alt. service provider)
  - 2014 (1.7%)
  - 2015 (2.3%)*

**New Oil & Gas Industry SCB panel**

- 12 metabolites tested
  - Covers 15 parent drugs
    - AB-CHMINACA, AB-FUBINACA, AB-PINACA, F-AB-PINACA, ADB-PINACA, ADBICA, AM-2201, BB-22, JWH-018, JWH-073, PB-22, SF-PB-22, UR-144, and XLR-11
- New analytes
  - AB-CHMINACA, ADB-PINACA, ADBICA
- Updated metabolites
  - JWH-018, JWH-073
- Lower Cutoffs

**New testing paradigm**

- Continuous evaluation
  - Changes in marketplace
  - Industry positivity
  - Usage evolution
- Panel adjustments
  - Semi-annual to annual basis
Drug Testing Trends
R. H. Barry Sample, Ph.D., Director of Science and Technology


Q & A

Thank you