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Palm Beach County Sheriff's Office
Introduction

- Quality of Forensic Analysis can be impacted by workplace stress
- Causes of workplace stress\(^1\)\(^-\)\(^4\):
  - Workload
  - Tight deadlines
  - Changing priorities
  - Unrealistic job expectations

1. A.M. Jeanguenat, et al. (2017) JFS
Introduction

- Increased Requirements
  - ISO/IEC 17025
  - SWGTOX Standards

- Recommendations
  - 2013 National Safety Council – Alcohol, Drug, and Impairment Division
    - Perform drug screen on all DUI cases

5. B.K. Logan, et al. (2013) JAT
Introduction

- Many DUI labs use a case management protocol limiting blood drug screens (BDS) performed based on ethanol concentration (BAC).
- By employing such a protocol the number of drugs involved in DUI cases is under reported\(^{5-9}\)

5. B.K. Logan, et al. (2013) JAT
PBSO Protocol

- Every blood sample is tested for BAC / Volatiles
- Case involves fatality
  - BDS is performed
- Case does not involve fatality
  - BAC > 0.1 g/dL
    - BDS is not performed
  - BAC < 0.1 g/dL
    - BDS is performed
Introduction

- Is using a BDS case management protocol valid?
- Are meaningful drug results not being reported?
- Most studies were only qualitative\(^5-9\)
- One quantitative study concluded that alcohol was the main factor in fatal accidents\(^10\)

5. B.K. Logan, et al. (2013) JAT
Cost

- Cost of performing BDS on every DUI blood case\(^{11}\)
  - Would require materials budget and staffing to be at least doubled
  - BDS materials cost 30 times the cost of BAC
  - BDS analyst time 6 times the time to complete BAC

\(^{11}\) N.B. Tiscione, et al. (2017) JAT
Benefit of Drug Screen

- Studies conducted to evaluate the benefit of performing a drug screen on every DUI case\textsuperscript{11-12}
- Drug results were determined to be meaningful if:
  - The BAC was less than 0.15 g/dl
    - Ethanol impairment at this level is very significant
  - The drug results were at therapeutic levels or significant levels for illicit compounds

\textsuperscript{11} N.B. Tiscione, et al. (2017) JAT
\textsuperscript{12} N.B. Tiscione, et al. (2014) JAT
Benefit of Drug Screen

- Misdemeanor Cases\textsuperscript{11-12}

\begin{itemize}
  \item All: 28\%
  \item BAC < 0.08 g/dl: 70\%
  \item BAC \geq 0.08 g/dl: 93\%
  \item BAC \geq 0.10 g/dl: 3\%
\end{itemize}

\textit{n} = 54

Benefit of Drug Screen

- Felony Cases

Priorities

- Improving Quality
  - Accreditation
  - Certification
  - SWG/OSAC Standards

- Expanding Scope
  - Novel Psychoactive Substances (NPS)
  - Pharmaceuticals
Necessity of Expanding Scope

- Cases submitted with the following history and no results after our testing that explained the behavior:
  - History of ‘Heroin’
  - Driver found unconscious and responded to naloxone
  - Severe CNS Depression

- Some cases sent to a private lab – carfentanil detected

- Carfentanil is the most commonly observed fentanyl analog that our Drug Chemistry Unit is encountering
  - Furanyl fentanyl is second

- Developed and Validated Toxicology method
Necessity of Expanding Scope

- Blood DUI Casework: January 1 to June 6

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cases</td>
<td>108</td>
<td>101</td>
</tr>
<tr>
<td>BAC &gt; 0.02 g/dL</td>
<td>62</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>57%</td>
<td>73%</td>
</tr>
<tr>
<td>BAC &gt; 0.08 g/dL</td>
<td>55</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>51%</td>
<td>66%</td>
</tr>
<tr>
<td>Total Drug Screen</td>
<td>69</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>64%</td>
<td>48%</td>
</tr>
</tbody>
</table>

- Drug Screen Results

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Drug Screen</td>
<td>69</td>
<td>48</td>
</tr>
<tr>
<td>Carfentanil</td>
<td>23</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>33%</td>
<td>?</td>
</tr>
<tr>
<td>Alprazolam</td>
<td>22</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>32%</td>
<td>21%</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>21</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>30%</td>
<td>23%</td>
</tr>
<tr>
<td>Morphine</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>29%</td>
<td>29%</td>
</tr>
<tr>
<td>Delta-9-THC</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>25%</td>
<td>35%</td>
</tr>
</tbody>
</table>
Blood DUI/DFSA Casework

- Drugs Identified with Carfentanil since 8/2016:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carfentanil</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Fentanyl</td>
<td>17</td>
<td>57%</td>
</tr>
<tr>
<td>Morphine</td>
<td>13</td>
<td>43%</td>
</tr>
<tr>
<td>Alprazolam</td>
<td>9</td>
<td>30%</td>
</tr>
<tr>
<td>Cocaine</td>
<td>5</td>
<td>17%</td>
</tr>
<tr>
<td>Codeine</td>
<td>5</td>
<td>17%</td>
</tr>
<tr>
<td>Sum</td>
<td>4</td>
<td>13%</td>
</tr>
</tbody>
</table>

- Diazepam (4), Oxycodone (4), 6-MAM (3), Amphetamine (3), Ethanol (3), Mitragynine (3), Diphenhydramine (2), Hydromorphone (2), Acetyl fentanyl (1), Buprenorphine (1), Lorazepam (1), Methadone (1), Methamphetamine (1), N-ethylpentylone (1), Tramadol (1), U-47700 (1)
Conclusions

- Protocol for limiting drug testing in toxicology
  - Efficient method to manage caseload and limit errors
  - Supported by:
    - Known impairment of ethanol at higher concentrations
    - Difficulty assigning a level of contributing impairment from drugs in the presence of high ethanol levels
    - Likelihood that drug results may be suppressed at trial
  - Does lead to under reporting of drugs in DUI cases.

- In majority of cases studied, drug results were not significant in light of the ethanol levels and do not warrant the substantial increase in analysis.
Conclusions

- Use of case management policies should be based on appropriate, sound research.
- Priorities should be determined to minimize workplace stress factors:
  - Performing drug screens simply to gather statistics is not worth the cost.
  - Resources are better spent improving quality and expanding services:
    - Scope of testing in toxicology.
Conclusions

- By setting appropriate priorities
  - Errors in cases can be mitigated
  - Service can be improved to the criminal justice system
    - Higher quality analysis
    - Expanded scope of testing
    - Reduced turnaround times
Acknowledgements

- Russell Miller, Xiaoqin Shan and Tate Yeatman
- Palm Beach County Sheriff’s Office
References


References


References

