

Laboratory Perspective on Additional Drug Testing and Associated Costs

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This presentation was modified from its original format for 508
compliance.

Laboratory Background

- CRL is privately held Category 5 laboratory
- Testing capabilities include:
 - Urine
 - Oral Fluids
 - Sweat Patches
 - Broad based Medical/Professional Panels
- Screening by automated chemistry, ELISA, and LC/MS/MS
- Confirmation testing by GC/MS and LC/MS/MS

Drug Test Panel Selection

- **Drug panel selections are based on the needs of the company**
 - **Add drugs of concern (e.g. expanded narcotics, stimulants, alcohol, nicotine)**
- **Laboratory efficiency of the screening and confirmation methods are the cost drivers for the price of a testing panel**
 - **Costs for mass spectrometry screens are much more expensive than immunoassays (pennies vs. dollars) and requires hours instead of seconds)**
 - **Laboratories typically offer limited number of panels to minimize testing complexity – potentially hundreds of panels can be created**
 - **Broad panels include standard urine tests with automated analyzers, ELISA testing, GC/MS or LC/MS/MS screens**
 - **Often little financial gain is achieved through the elimination of one or two compounds since multiple drugs can be screened or confirmed in the same method (ie. GC/MS screen or LC/MS/MS screen)**
- **Data review and reporting is more labor intensive and complicated**

Panel Selection

- Standard is the SAMHSA/DOT 5 panel
- Common variations are a 7, 9 or 10 panel
 - Also includes Barbiturates, Benzodiazepines, Methadone, Propoxyphene, Methaqualone or Alcohol
 - Possible synthetic opiates (hydrocodone, oxycodone, hydromorphone, and oxymorphone)
- New trend for the addition of nicotine for pre-employment decisions
- Larger panels for medical personnel with access to narcotics, etc.
 - Pharmacists, nurses, and physicians
 - These personnel are tested when there is missing drugs in the pharmacy or hospital floor, reasonable cause, or pre-employment

Drugs Typically Monitored in a Professional Panel

- **Narcotics/Opiates**
 - Buprenorphine
 - Butorphanol
 - Codeine/Morphine
 - Dihydrocodeine
 - Fentanyl
 - Hydrocodone
 - Hydromorphone
 - Meperidine
 - Methadone
 - Nalbuphine
 - Oxycodone
 - Oxymorphone
 - Pentazocine
 - Propoxyphene
 - Tramadol
- **Cocaine**
- **Marijuana**
- **PCP**
- **Amphetamines**
- **Ambien**
- **Meprobamate**
- **Benzodiazepines**
 - Alprazolam
 - Clonazepam
 - Diazepam
 - Estazolam
 - Flurazepam
 - Flunitrazepam
 - Halazepam
 - Lorazepam
 - Midazolam
 - Nitrazepam
 - Oxazepam
 - Temazepam
 - Triazolam
- **Barbiturates**
- **Stimulants**
 - Diethylpropion
 - Ritalin
 - Phendimetrazine
 - Phentermine
 - Ketamine
- **Alcohol (EtG and EtS)**
- **Nicotine**

Medical and Pain Management Panels

- The biggest category to add are the narcotics
 - Oxycodone, hydrocodone, oxymorphone and hydromorphone
 - Addition of tramadol, fentanyl, nalbuphine, butorphanol, pentazocine, and buprenorphine
- Expanded benzodiazepines
 - Clonazepam, flunitrazepam, midazolam, and nitrazepam
- Stimulants
 - Diethylpropion, ritalin, phendimetrazine, phentermine and ketamine

Alcohol Testing

- Old standard was testing for urine alcohol
 - Problems with alcohol production by bacteria in certain samples leading to interpretation problems
- Breath alcohol is preferred as it accepted as indicative of impairment with elevated levels
- Alcohol metabolites of EtG and EtS
 - Best for determination alcohol consumption within the last 48-72 hours
 - Urine levels can be found with exposure to OTC products (e.g. Mouthwash)
 - Not appropriate for monitoring unless the donor is enrolled in an abstinence program
 - Should have a review by a MRO

Nicotine

- Employers are beginning to add nicotine detection to the list of substances monitoring as a condition for pre-employment
- Smoking has been linked with increased health care costs and eliminating the smoking worker has the potential for decreased corporate premiums
- Monitor in urine and oral fluids
 - Primary metabolites are cotinine and hydroxycotinine

Onsite Testing

- More companies are including onsite testing as a mechanism to provide fast decisions on hiring
- Many products are available – some include up to ten drugs
- Still need to confirm for screen positives
- Sensitivity and selectivity are of concern with GC/MS confirmation
- Monitoring for SVT can be problematic

Oral Fluids

- Promoted for ease of collection and avoiding dilute urine issues
- Up to a 7-drug panel is available (includes barbiturates and benzodiazepines)
- Automated chemistry tests are limited: only ELISA at this point for all assays
- Confirmation using GC/MS, two-dimensional GC/MS, LC/MS, or LC/MS/MS

Summary

- The trend is to larger panels with people in safety/sensitive positions
- Target medical staff for theft of pharmacy drugs for impairment in judgment/medical malpractice
- Addition of nicotine for controlling health care costs
- Minimizing professional liability and Workmen's Compensation by more carefully selecting staff
- More expensive equipment (LC/MS/MS) to perform testing and to achieve ultra low detection levels
- Highly trained technical staff are required due to the complexity of the equipment
- Bigger panels translates into higher costs and additional time to complete testing and data review