Testing biological specimens for drugs

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Uses For Drug Screens

- **Clinical:**
  - Acute:
    - Overdose
    - Paediatric
    - Psychiatric
  - Drug Treatment:
    - Detoxification
    - Methadone Maintenance
    - Other Drug Interventions
    - “Drug Free” Programs

- **Medico-legal:**
  - P & P
  - Prisons
  - Employment
  - Medical
  - Insurance
  - Family Court
  - FACS

- **Forensic:**
  - Cause of death
  - “Drug Busts”

- **Mixed:**
  - DFSA

What Did They Take?

- Believe the patient
- Observe the patient
- Point of care testing
- Laboratory analysis
  - AS4308 and beyond
AS/NZS 4308:2008

Procedures for specimen collection and the detection and quantitation of drugs of abuse in urine

Collection/Transport

- Identify patient and sample
- Integrity checking
- Security of sample and transport
- Referee sample

Classes covered

- Amphetamine types
- Benzodiazepines
- Cannabis
- Cocaine
- Opiates (Heroin types only)

Detection Times (urine)

- Cocaine: 1-2 days
- MDMA: 1-2 days
- Methylamphet.: 1-6 days
- Morphine: 1-3 days*
- Benzodiazepines: days-weeks
- Cannabis: days-weeks

Detection

- Initial test by immunoassay
- Confirmation by GC/MS
- Referee sample essential

- (Auto-retests if not prescribed)

What does it mean?

- If result is negative?
- If a drug is found?
- If something odd has occurred?
- WAS IT WORTH TESTING???
Scenario 1
• Three times weekly screening
• Must show negative
• AS4308 & Peth/Oxycod/Tram
• What are we proving?

Practicalities
• A negative screen may be available in a few hours
• Confirmation may take several days.
• May be positive multiple times.

Possibility
• Patient is tested Friday a.m.
• Uses very short acting drug
• Public holiday on Monday
• Can we find it Tuesday p.m?

Why Urine?
• Drugs concentrate in urine
• Non-invasive
• Easy to collect a reasonable amount

Other Matrices
• Blood
• Hair
• Sweat
• Saliva
• Finger/Toe nails
• Other

Hair testing
• Detection times
• Do you have any to test?
• Racial bias
• Live vs dead cells
• Sensitivity levels
Alcohol Usage

- Blood & Breath Ethanol
- Urine Ethanol
- CDT
- Ethylglucuronide
- Hair

What Gets Tested

- AS 4308 Classes
- Pethidine
- Tramadol
- Oxycodone
- & others (optional)

Common Optional Tests

- Propofol
- Ketamine
- Zolpidem
- Fentanyl

Scenario 2

- Morphine is reported
- What was taken?
  - Heroin (→ 6-Acetylmorphine)
  - Morphine
  - Codeine
  - Poppyseed

Opiate Metabolism

Heroin (di-AM)
  ↓
  6-AM
  ↓
  Morphine
  ↓
  Codeine
  Poppy seed

Scenario 3

- Oxazepam is reported
- What was taken?
  - Serepax
  - Normison
  - Valium
Benzodiazepines

- Diazepam
- Nordiazepam
- Temazepam
- Oxazepam

Common Tricks
- Hydration
- Substitution
- Additives

Dilution
- Add water if not supervised
- Drink large amounts
- Take a diuretic

Overhydration
- Creatinine < 200 mg/L: dilute
- Creatinine < 50 mg/L: unphysiological
- Creatinine = 0
- Specific gravity & other tests

Lab Errors
- Mixups
- Transcriptions
- Contaminations
- Misinterpretation
- “B” sample