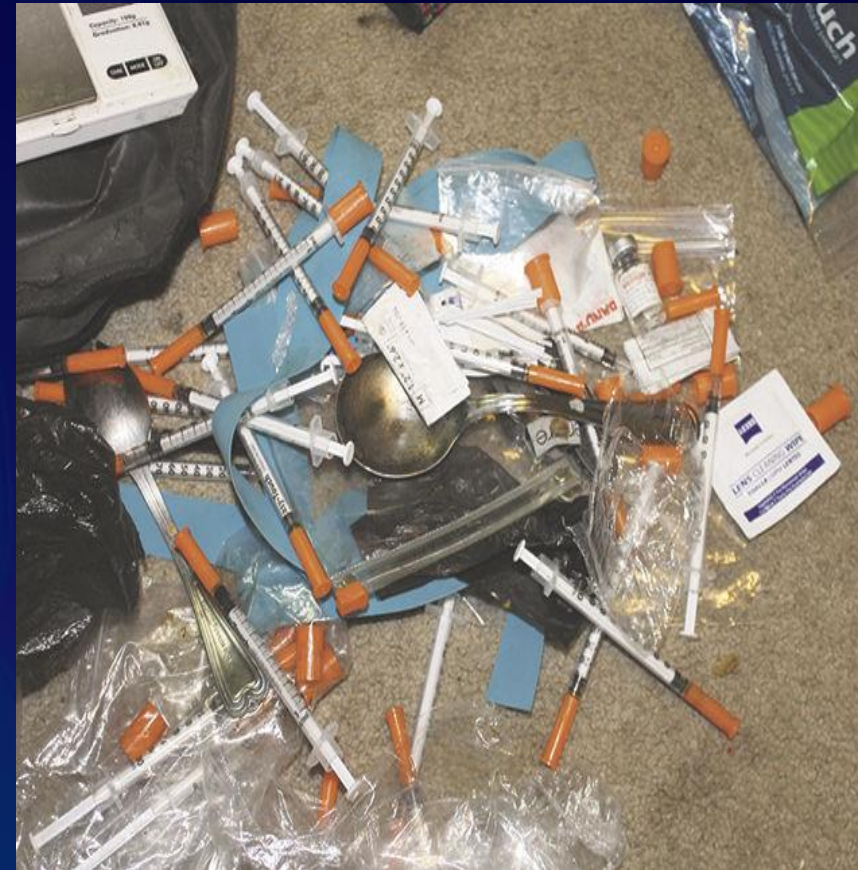


Poisonings and ingestions; Accident or abuse?



Dr Jo Tully
VFPMS Seminar 2018

Why is toxicology important to forensic paediatricians?

- The intentional covert administration of prescription or illicit substances to a child = **child abuse**
 - Factitious illness by proxy (medical child abuse)
 - Malicious administration/ 'poisoning'
 - corrupting behaviours (emotional maltreatment)
 - to facilitate 'parenting'
- The accidental ingestion of substances by a child
 - Typically toddlers, up to 8% PICU admissions, exploratory behaviour, accident or **supervisory neglect**
- Unintentional exposure to drugs from environment, ante-natal exposure = **Child abuse? physical neglect? Corrupting behaviours?**
- Drug-facilitated sexual assault = **crime**



Children living with drug abuse

- Methamphetamine – crystal meth, ice, speed
 - Up to 5% of pregnancies in USA
 - Clandestine home labs
 - Burns, ingestions, neglect, exposure to sexual exploitation/pornography, weapons, violence
- Marijuana – pot, weed, hash
 - Rarely fatal, may increase child's later use during adolescence
- Cocaine
 - Harmful to fetus
- Opiates – heroin, morphine, methadone
 - Often fatal in OD
- Direct physical effects of exposure, effects on care of child, emotional effects

How can toxicology help us?



- Appropriate and timely specimen testing might give us helpful information in relation to:
 - Drugs ingested/exposed to
 - Amount ingested
 - Time ingested
 - Mechanism – abuse or accident
- Need a meticulous Hx, physical examination, knowledge of drug effect, specimen and testing method in order to interpret toxicology findings
- Need to understand limitations of toxicology testing
 - Cut-offs
 - Quantification and ‘read-backs’
 - Hair analysis
 - Pharmacokinetics in vivo and in vitro
- Used for criminal and/or protective purposes

What specimens might we use and when?

- Blood

- Excellent, needs preservative in tube
- Information about RECENT drug ingestion – 24-48 hours
- Depends on pharmacokinetics
- Can allow quantification – dose and timing



- Urine

- Information about ingestion over LAST FEW DAYS
- Drug/metabolite may be present for prolonged period eg marijuana
- Cannot quantify and cannot perform 'read-back' calculations re dose or timing



- Hair

- For long-term exposure – grows approximately 1cm per month
- Cannot discriminate between ingestion and environmental exposure well
- Cannot quantify
- May be excellent for one-off exposure at defined time eg DFSA, intentional administration

- Meconium

- Exposure during trimester 2 and 3
- Overcomes fact that mother may desist from use in days preceding birth



- Sweat/saliva/post mortem

Timing of specimen collection



- If exposure reported to have occurred within 48-72 hours take BLOOD and URINE
- If exposure reported to have occurred within 5 days take URINE
- If exposure is historical take HAIR
- If antenatal exposure suspected take BLOOD, URINE and consider MECONIUM and HAIR from baby as well as BLOOD, URINE and possible HAIR from mother

- Remember that presence of metabolites are also important
- Take forensic specimens as soon as is feasible – interpretation is easier

How do we collect forensic toxicology specimens, where do we send them and why?

- Hospital labs
 - limited range of substances
 - cut-offs
 - no chain of custody
 - Good for clinical care
- Forensic labs
 - Wider range of substance including novel psychoactives, GHB
 - No cut-offs or very low
 - Chain of custody documented
- In Victoria use VIFM kit
- Police to transport – needs refrigeration
- Give complete information to allow targeted testing
- Discussions good – Tox@vifm.org
- Hair
 - Cut NOT pulled
 - Close to scalp as possible, nape of neck
 - Wrap in silver foil
 - Label ends clearly



CASE EXAMPLES – FORENSIC TOXICOLOGY IN PRACTICE

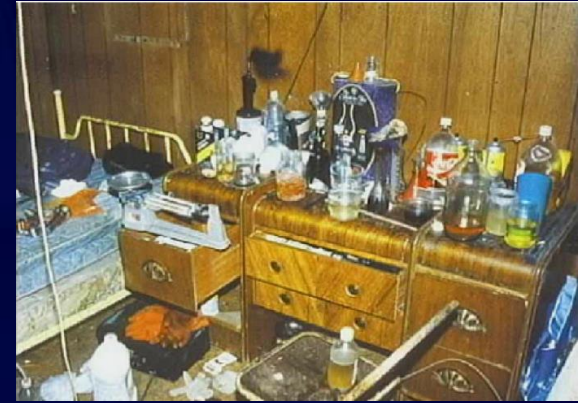


- Intentional administration uncommon (about 45 per year USA)
- High fatality rates – 30X that of accidental ingestion
- Motivation
 - Sedation – over the counter meds, alcohol, opiates
 - Direct injury/pain
 - Punishment
 - Psychological gain – factitious illness by proxy
 - Homicide
- Red flags
 - Young child with large amounts
 - Conflicting or confusing stories
 - Repeated exposures, siblings also affected
 - Poisoning with unusual substance to which a child would not usually have access
 - “Accidental” poisoning in older child/teenager
 - Unexplained death in family

Malicious use of non-pharmaceuticals in children Yin et al 2011 Child Abuse & Neglect

Case 3 -Environmental exposure

- Meth labs
- Parental drug use
- Ante-natal exposure



- Neglect?
- Physical harm?
- Victorian legislation – caring for a child while under the influence of alcohol or other drugs constitutes child abuse and may necessitate protective measures

DFSA – “date rape”



- DFSA –subject to non-consensual acts while incapacitated or unconscious due to effects of alcohol or drugs
- You cannot consent to sex if you are asleep, unconscious, drug affected or drunk
- Mainly voluntary ingestion – alcohol
- Tasteless, colourless, odourless, rapid onset
- Drugs that render victim;
 - Unconscious, passive, powerless to resist
 - Incapable of rational thinking with little or no memory of event
 - Still able to participate in sex/to act without inhibition “helpless slave to desire”

Summary & learning points – forensic toxicology

- May help inform clinical care, protective risk and criminal matters
- Needs the right samples at the right time in the right manner
- Needs accurate interpretation in context and with understanding of the limitations
- Toxicologists at VIFM and VFPMS always willing to assist with questions

