



Sex, Drugs & Alcohol – A Day in the Life of a Forensic Pharmacologist

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Forensic Pharmacology

- ◆ The application of pharmacology to the law.
- ◆ The Forensic Pharmacologist is an Expert Witness (“Skilled Person” in Scotland)

The Expert Witness is an essential component of the Court in the UK. You must be credible in your capacity to inform the Judge/Jury of complete, accurate and unbiased information within your area of expertise.

Regardless of your instructing party- your duty resides with the Court.



The Glasgow Expert Witness Service Ltd.

- ◆ Dr. Paul Skett – alcohol cases
- ◆ Dr. Stephanie Sharp – drug cases
- ◆ Cover everything from simple drink-drive cases (and, drug-drive cases) to complex murder, rape, medical negligence cases and inquests.



Alcohol



- ◆ Ethanol
- ◆ Colourless, volatile liquid
- ◆ Found in alcoholic drinks (1-80% alcohol)
- ◆ Also found in many other products
- mouthwash, perfume, household products.



Effects of Alcohol

- ◆ **20mg/100mL of blood**
 - disinhibition - euphoria, emotional instability and release of social and sexual inhibitions
- ◆ **50mg/100mL of blood**
 - above effects become pronounced and motor coordination becomes affected and there is a marked effect on judgement



Effects of Alcohol

- ◆ 200mg/100mL of blood
 - motor coordination is progressively lost and speech becomes slurred
- ◆ 300mg/100mL of blood
 - Unconsciousness
- ◆ 400mg/100mL of blood
 - death from respiratory failure



Pharmacokinetics of Alcohol

- ◆ **Rapidly absorbed from mouth, lungs, stomach and small intestine – if drinking about 20% absorbed from stomach and rest from small intestine (peak blood concentration in 30-60 minutes)**
- ◆ **Cleared from body predominantly by metabolism (liver)**



Pharmacokinetics of Alcohol

♦ Alcohol dehydrogenase (ADH)



- ♦ Clearance is zero order with respect to ethanol
 - i.e. ethanol cleared at a constant rate regardless of concentration.
 - easy to calculate



Detection of Alcohol in Breath and Blood

- ◆ **Breath – Intoximeter – IR/EC detection of alcohol in expired air.
Detects “mouth alcohol” and “interfering substances”**
- ◆ **Blood – usually gas chromatography of extracted blood sample with IR/EC detector.**
- ◆ **Use of IR and EC detection eliminates cross-detection of other substances.**



Alcohol and Driving

- ◆ **Road Traffic Act 1988**
- ◆ **Section 4(1)**
 - **driving a motor vehicle whilst unfit through drink or drugs**
- ◆ **Section 4(2)**
 - **being in charge of a motor vehicle whilst unfit through drink or drugs**



New legislation – October 2018

- ◆ Defined levels for drugs:
 - illicit drugs at virtually zero tolerance (cocaine, cannabis, MDMA, heroin)
 - prescription drugs (set levels)
- ◆ NO relationship to impairment



Alcohol and Driving

- ◆ Road Traffic Act 1988 Section 5(1)(a)
 - driving a motor vehicle after consuming so much alcohol that the proportion in breath, blood or urine was >22 microgrammes per 100mL of breath, >50 milligrammes per 100mL of blood or >67 milligrammes of alcohol in 100mL of urine.



Alcohol and Driving

- ◆ **Road Traffic Act 1988 Section 5(1)(b)**
 - being in charge of a motor vehicle after consuming so much alcohol that the proportion in breath or blood was >22 microgrammes per 100mL of breath, >50 milligrammes per 100mL of blood or > 67 milligrammes of alcohol in 100mL of urine.



Procedure - alcohol

- ◆ Police stop suspect – accident or other road traffic offence
- ◆ Detect alcohol (smell) or drug (test strip)
- ◆ Roadside breath test
- ◆ If positive, arrest and take to Police Office
- ◆ Intoximeter procedure (alcohol) or blood sample (drugs or alcohol)



Lines of Defence

- ◆ Section 5 (Alcohol)
 - **statutory defence** – no intention to drive
 - need calculation of when subject would fall below the statutory limit
 - **post-incident drinking**
 - need calculation to verify consistency of evidence



Lines of Defence

- ◆ **Section 5 (Alcohol) cont.**
 - **spiked drinks**
 - **calculations required to verify evidence**
- ◆ **How are these calculations done?**



Forward and Back Calculation of Alcohol Concentrations

◆ NEED:

- height and weight of subject
- amount of alcohol consumed (type and volume)
- when alcohol consumed (important is **START TIME**)
- Intoximeter and/or blood sample readings
- what times values needed for



Example 1

- ◆ The subject is accused that on the 17th May 2025 she did drive a motor vehicle after consuming so much alcohol that the proportion in her breath was 36 microgrammes of alcohol in 100 millilitres of breath which exceeded the prescribed limit of 22 microgrammes of alcohol in 100 millilitres of breath; CONTRARY to the Road Traffic Act 1988, Section 5(1)(a).



Example 1

- ◆ The subject is stated to be a 10.5 stone, 5 foot 7” tall, 19 year old female.
- ◆ It is stated that the subject consumed the following:
- ◆ 17th May 2025:
- ◆ 04:00 hours – $\frac{1}{4}$ of a bottle (187.5mL) of Barefoot® pinot grigio wine (12% v/v alcohol) and 3 mouthful (taken to be a standard 50mL each) of Smirnoff® vodka (37.5% v/v alcohol)



Example 1

- ◆ Given the physical characteristics of the subject and the intake of alcohol as described above and the known and published rates of uptake and clearance of alcohol in the general population (Jones, 2010; UKIAFT, 2024; Watson, 1981), it can be calculated that the breath alcohol concentration in the subject at 06:19 hours on the 17th May 2025, the time of the Intoximeter reading, would be 59 (within a range of 47 and 72) microgrammes of alcohol in 100 millilitres of breath.
- ◆ This is not consistent with the Intoximeter reading of 36 microgrammes of alcohol in 100 millilitres of breath at 06:19 hours on the 17th May 2025.



Example 2

- ◆ The subject is accused that on the 4th May 2025 he was in charge of a motor vehicle after consuming so much alcohol that the proportion in his breath was 75 microgrammes of alcohol in 100 millilitres of breath which exceeded the prescribed limit of 22 microgrammes of alcohol in 100 millilitres of breath; CONTRARY to the Road Traffic Act 1988, Section 5(1)(b).



- ◆ Given the Intoximeter reading of 75 microgrammes of alcohol in 100 millilitres of breath at 03:47 hours on the 4th May 2025 and the known and published rates of clearance of alcohol in the general population of 8.3 (within a range of 3.9 and 12.6) microgrammes of alcohol in 100 millilitres of breath per hour (Jones, 2010; UKIAFT, 2024; Watson, 1981), it can be calculated that the breath alcohol concentration in the subject would have fallen below the prescribed limit of 22 microgrammes of alcohol in 100 millilitres of breath at 10:10 hours on the 4th May 2025 (within a range of 08:00 hours and 17:25 hours on the 4th May 2025).



Alcohol in other crimes

- ◆ **Clear that effects of alcohol may influence other aspects of legal process and be a factor in other criminal activities:**

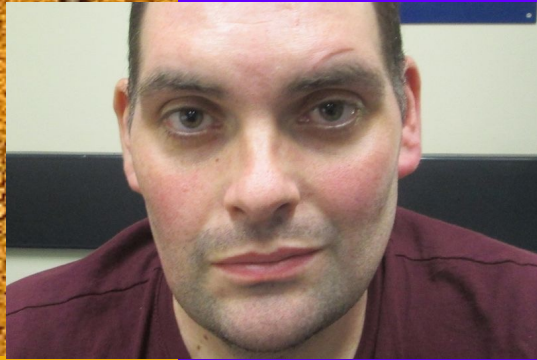


Summary

- ◆ Alcohol – clear relevant effects on body
- ◆ Cleared at constant rate – easy to calculate
- ◆ Alcohol and driving – legal limits
- ◆ Statutory defences
- ◆ Calculations – forward and back calculations



R -v- APPLETON



Daniel Appleton (pictured top) beat his wife, Amy and local woman Sandy Seagrave (pictured bottom) to death with Seagrave's walking stick outside his and Amy's house in Crawley Down, in December 2019.

Police found him naked and writhing in a pool of blood in the kitchen with severe, life altering self-inflicted knife injuries to his legs, chest and neck.

Charged with 2 counts of murder.



Police found search history regarding mushrooms- "bad mushroom trips" on phone. Alleged out of curiosity regarding the death of 'Juice Wrld'.

Involvement: Blood negative for psilocin. Transient psychotic episode?
Instruct Psych...

I Suggested NBOMe and Mephedrone. Tested Positive. 26.5 years.



R -v- BRIZZI



Allegedly Inspired by Walter White in 'Breaking Bad'

Met PC Semple over a dating app.

Both partook of methamphetamine. Highly addictive and capable of producing psychotic symptoms.

PC Semple died during a sex act.

Brizzi plead not guilty of murder, but admitted 'obstructing the Coroner'.

The body was dismembered and placed into various containers, including a bath tub, and evidence suggested Brizzi attempted to eat parts of the Deceased.



Involvement: addressing the possibility of amphetamine-induced psychosis and intent. Brizzi was jailed for life, but committed suicide 3 months into his sentence.



Thank you for your attention!

◆ Any questions?