

Supplementary Table 1. Contributory drug concentration table used to interpret forensic toxicological analyses and reports

Class of drugs	Drug name	Toxic/lethal range	Range to impact decision/ Drowning	Reference
Cannabinoids	Cannabis/THC		0.0021 mg/L (often report in ng/mL or ug/L: 2.1 ng/mL 2.1 ug/L)	[1, 2]
Benzodiazepines			Therapeutic or above	[2-4]
	Alprazolam	0.1 – 0.4 mg/L	0.005 – 0.05 mg/L	[3]
	Bromazepam + OH-	0.3 – 0.4 mg/L	0.08 – 0.2 mg/L	[4]
	Chlordiazepoxide	3.5 – 10 mg/L	0.4 – 3 mg/L	[4]
	Norchlordiazepoxide		0.3 – 2 mg/L	[3]
	Demoxepam		0.5 – 0.74 mg/L	[3]
	Clobazam	0.5	0.03 – 0.3 mg/L	[4]
	Norclobazam		2.0 – 4.0 mg/L	[3]
	Clonazepam	0.1 mg/L	0.02 – 0.08 mg/L	[4]
	Aminoclonazepam		0.02 – 0.07 mg/L	[3]
	Desalkylflurazepam		0.01 – 0.15 mg/L	[3]
	OH-ethylflurazepam		0.01 – 0.07 mg/L	[3]
	Lorazepam	0.3-0.5 mg/L	0.02 – 0.25 mg/L	[4]
	Lormetazepam		0.00-0.02	[4]
	Midazolam + OH-midazolam	1 – 1.5 mg/L	0.04 – 0.1 mg/L	[4]
	Nitrazepam	0.2-3 mg/L	0.03 – 0.1 mg/L	[4]
	Oxazepam		0.2 -1.5 mg/L	[4]
	Temazepam	> 1 mg/L	0.02 – 0.15mg/L	[4]
	Diazepam	3-5 mg/L	0.1-2 mg/L	[4]
	Nordiazepam	1.5 – 2 mg/L	0.2-0.8 mg/L	[4]
	Estazolam		0.055-0.2	[4]
Hypnotics	Zolpidem	0.5 mg/L	0.08 – 0.15 mg/L	[4]
	Zopiclone	0.15 mg/L	0.01 – 0.05 mg/L	[4]
Antidepressants	Fluoxetine	1-5.9 mg/L		[4]
	Norfluoxetine	1.0 – 5.6 mg/L		[5]

	Sertraline	0.29 mg/L		[5]
	Venlafaxine	1-1.5 mg/L		[4]
	O-desmethyvelafaxine	1 mg/L		[6]
	Citalopram	0.22 mg/L		[4]
	Mirtazipine	1 mg/L		[4]
	Amitriptyline	0.5-0.6 mg/L		[4]
	Nortriptyline	0.3-0.5 mg/L		[4]
	Paroxetine	0.35 – 0.4 mg/L		[4]
	Duloxetine	0.24 mg/L		[4]
	Dothiepin	0.3 – 0.8 mg/L		[4]
	Fluvoxamine	0.5 – 0.97 mg/L		[4]
Opioids	Codeine	0.5 - 1 mg/L	0.03-0.25	[4, 7, 8]
	Morphine	0.1 mg/L	0.01-0.1 mg/L	[4]
	Propoxyphene	0.6-1 mg/L	0.05 – 0.3 mg/L	[4]
	Methadone	> 0.2 mg/L	0.25-0.35 mg/L	[4, 9, 10]
	Oxycodone	0.2 mg/L	0.005-0.1 mg/L	[4]
	Fentanyl	0.003 – 0.3 mg/L	0.003 – 0.3 mg/L	[4]
	Tramadol	> 1 mg/L	0.1-1 mg/L	[4]
Analgesics/anti inflammatory	Paracetamol	100 – 150 mg/L		[11]
	O-desmethyl tramadol	> 0.1 mg/L		[6, 12]
Antipsychotic	Pericyazine	0.1 mg/L		[13]
	Clozapine	0.6 – 1 mg/L mg/L	0.1-0.6 mg/L	[4]
	Olanzapine	0.15 – 0.2 mg/L	0.02-0.08 mg/L	[4]
	Quetiapine	1-1.8 mg/L		[4]
Anti-convulsants	Carbamazepine	10 mg/L	2 – 9 mg/L	[4, 14] > 8 mg/L causes poor cognitive performance
	Phenobarbitone	30 – 40 mg/L		[9]

	Valproic Acid	150 - 200 mg/L		[4]
Amphetamines	Methylamphetamine	> 0.15 mg/L	0.1 mg/L	[4]
	3,4-Methylenedioxymethamphetamine (MDMA)	0.35-0.5 mg/L	0.1-0.35 mg/L	[4]
	Dexamphetamine		> 10 ng/L > 0.01 mg/L	[15] Drug effects felt after plasma concentration > 10 ng/L
	Amphetamine	0.2 mg/L	7.5 ng/mL 0.01 mg/L	[4, 16] Amphetamine group showed intoxication greater than control for more than 7 hours after administration, approximately 45 ng/mL
	Methylphenidate	0.1-0.5		[4]
Other	Amlodipine	0.088 mg/L		[4]
	Irbesartan	> 5.3 mg/L (therapeutic conc.)		[12]
	Flecainide	1-2		[4]
Cocaine	Cocaine	0.25-1 mg/L	50 ng/mL 50 ug/L 0.05 mg/L	[4, 17] Euphoric/behavioral/physiological effects returned to baseline 60 min after administration, approx. 50 ng/mL)
	Benzoylcegonine		0.1 mg/L	[4]

SUPPLEMENTARY TABLE REFERENCES

- 1 Skopp G, Pötsch L. Cannabinoid concentrations in spot serum samples 24–48 hours after discontinuation of cannabis smoking. *J Anal Toxicol* 2008;**32**:160-4.
- 2 Longo MC, Hunter CE, Lokan RJ, *et al.* The prevalence of alcohol, cannabinoids, benzodiazepines and stimulants amongst injured drivers and their role in driver culpability: part ii: the relationship between drug prevalence and drug concentration, and driver culpability. *Accid Anal Prev* 2000;**32**:623-32.
- 3 Smink BE, Lusthof KJ, De Gier JJ, *et al.* The relation between the blood benzodiazepine concentration and performance in suspected impaired drivers. *Journal of forensic and legal medicine* 2008;**15**:483-8.
- 4 Schulz M, Iwersen-Bergmann S, Andresen H, *et al.* Therapeutic and toxic blood concentrations of nearly 1,000 drugs and other xenobiotics. *Critical care* 2012;**16**:1-4.
- 5 Baselt RC. *Disposition of toxic drugs and chemicals in man, 11th Edition*: Chemical Toxicology Institute 2017.
- 6 Baselt RC. *Disposition of toxic drugs and chemicals in man, 8th Edition*: Chemical Toxicology Institute 2008.
- 7 Chen A, Ashburn MA. Cardiac effects of opioid therapy. *Pain Med* 2015;**16**:S27-S31.
- 8 Gilljam T, Eriksson B, Sixt R. Cardiac output and pulmonary gas exchange at maximal exercise after atrial redirection for complete transposition. *European heart journal* 1998;**19**:1856-64.
- 9 Baselt RC. *Disposition of toxic drugs and chemicals in man, 9th Edition*: Chemical Toxicology Institute 2011.
- 10 Dyer KR, White JM, Foster DJ, *et al.* The relationship between mood state and plasma methadone concentration in maintenance patients. *Journal of clinical psychopharmacology* 2001;**21**:78-84.
- 11 Hansson RC. Paracetamol Detections in WA Coronial Casework. Forensic Science Laboratory Chemistry Centre (WA), July 1992 to March 2007.
- 12 Moffat AC, Osselton MD, Widdop B, *et al.* *Clarke's analysis of drugs and poisons*: Pharmaceutical press London 2011.
- 13 Regenthal R, Krueger M, Koepfel C, *et al.* Drug levels: therapeutic and toxic serum/plasma concentrations of common drugs. *Journal of clinical monitoring and computing* 1999;**15**:529-44.
- 14 O'Dougherty M, Wright FS, Cox S, *et al.* Carbamazepine plasma concentration: relationship to cognitive impairment. *Arch Neurol* 1987;**44**:863-7.
- 15 Brauer LH, Ambre J, de Wit H. Acute tolerance to subjective but not cardiovascular effects of d-amphetamine in normal, healthy men. *Journal of clinical psychopharmacology* 1996;**16**:72-6.
- 16 Mendelson J, Jones RT, Upton R, *et al.* Methamphetamine and ethanol interactions in humans. *Clinical Pharmacology & Therapeutics* 1995;**57**:559-68.
- 17 Cone EJ, Kumor K, Thompson LK, *et al.* Correlation of saliva cocaine levels with plasma levels and with pharmacologic effects after intravenous cocaine administration in human subjects. *J Anal Toxicol* 1988;**12**:200-6.