**Drugs and Driving Committee Literature (Based on ASB Standard 120)**

**Cannabinoids**

* Arkell, T.R. et al. [Cannabidiol (CBD) content in vaporized cannabis does not prevent tetrahydrocannabinol (THC)-induced impairment of driving and cognition.](https://www.ncbi.nlm.nih.gov/pubmed/31044290) *Psychopharmacology (Berl)* 236:2713-2724 (2019)
* Bidwell, L.C. et al. [Association of naturalistic administration of cannabis flower and concentrates with intoxication and impairment.](https://pubmed.ncbi.nlm.nih.gov/32520316) *JAMA Psychiatry* 77:787-796 (2020)
* Bondallaz, P. et al. [Cannabis and its effects on driving skills.](https://www.ncbi.nlm.nih.gov/pubmed/27701009) *Forensic Sci Int* 268:92-102 (2016)
* Dubois, S. et al. [The combined effects of alcohol and cannabis on driving: Impact on crash risk.](https://www.ncbi.nlm.nih.gov/pubmed/25612879) *Forensic Sci Int* 248:94-100 (2015)
* Hartley, S. et al. [Effect of smoked cannabis on vigilance and accident risk using simulated driving in occasional and chronic users and the pharmacokinetic-pharmacodynamic relationship.](https://pubmed.ncbi.nlm.nih.gov/30872375) *Clin Chem* 65:684-693 (2019)
* Hartman, R.L. et al. [Cannabis effects on driving skills.](http://www.ncbi.nlm.nih.gov/pubmed/23220273) *Clin Chem* 59:478-492 (2013)
* Hartman, R.L. et al. [Cannabis effects on driving lateral control with and without alcohol.](https://www.ncbi.nlm.nih.gov/pubmed/26144593) *Drug Alcohol Depend* 154:25-37 (2015)
* Hartman, R.L. et al. [Cannabis effects on driving longitudinal control with and without alcohol.](https://www.ncbi.nlm.nih.gov/pubmed/26889769) *J Appl Toxicol* 36:1418-1429 (2016)
* Hartman, R.L. et al. [Effect of blood collection time on measured Δ9-tetrahydrocannabinol concentrations: implications for driving interpretation and drug policy.](https://www.ncbi.nlm.nih.gov/pubmed/26823611) *Clin Chem* 62:367-377 (2016)
* **[NEW]** Høiseth, G. [Impairment due to alcohol, tetrahydrocannabinol, and benzodiazepines in impaired drivers compared to experimental studies.](https://pubmed.ncbi.nlm.nih.gov/27327554/) *Traffic Inj Prev* 18:244-250 (2019)
* Huestis, M.A. et al. [Blood cannabinoids. I. Absorption of THC and formation of 11-OH-THC and THCCOOH during and after smoking marijuana.](http://www.ncbi.nlm.nih.gov/pubmed/1338215) *J Anal Toxicol*16: 276-282 (1992)
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* Neavyn, M.J. et al. [Medical marijuana and driving: a review.](https://www.ncbi.nlm.nih.gov/pubmed/24648180) *J Med Toxicol* 10:269-279 (2014)
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* Ramaekers, J.G. et al. [Marijuana, alcohol and actual driving performance.](http://www.ncbi.nlm.nih.gov/pubmed/12404625) *Hum Psychopharmacol* 15:551-558 (2000)
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**CNS Stimulants (Completed Re-Review in 2022)**

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  + **[NEW]** Høiseth, G. [Impairment due to amphetamines and benzodiazepines, alone and in combination.](https://pubmed.ncbi.nlm.nih.gov/25456327/) *Drug Alcohol Depend* 145:174-9 (2014)
  + Logan, B.K. et al. [Methamphetamine and Driving Impairment.](http://www.ncbi.nlm.nih.gov/pubmed/8656187)Journal of Forensic Sciences 41:457-464 (1996)
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  + **[NEW]** Musshoff, F. and Madea, B. [Driving Under the Influence of Amphetamine-Like Drugs.](https://pubmed.ncbi.nlm.nih.gov/22335607/) *J Forensic Sci* 57:413-419 (2012)
* MDMA
  + **[NEW]** Bosker, W.M. et al. [MDMA (ecstasy) effects on actual driving performance before and after sleep deprivation, as a function of dose and concentration in blood and oral fluid.](https://pubmed.ncbi.nlm.nih.gov/21952668/) Psychopharmacology (Berl) 222:367-376 (2012)
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  + Kuypers, K.P. et al. [MDMA and alcohol effects, combined and alone, on objective and subjective measures of actual driving performance and psychomotor function.](http://www.ncbi.nlm.nih.gov/pubmed/?term=MDMA+and+alcohol+effects%2C+combined+and+alone%2C+on+objective+and+subjective+measures+of+actual+driving+performance+and+psychomotor+function.)Psychopharmacology (Berl) 187:467-475 (2006)
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  + Isenschmid, D.S. [Cocaine: effects on human performance and behavior.](https://pubmed.ncbi.nlm.nih.gov/26256487/) Forensic Sci Rev 14:61-100 (2002)
  + **[NEW]** Jenkins A. J. et al. [Correlation Between Pharmacological Effects and Plasma Cocaine Concentrations after Smoked Administration.](https://pubmed.ncbi.nlm.nih.gov/12422990/) J Anal Toxicol 26:382-392 (2002)
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**CNS Depressants**

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  + Logan, B.K, et al. [Carisoprodol, meprobamate and driving impairment.](http://www.ncbi.nlm.nih.gov/pubmed/10855968) *J Forens Sci* 45:619-623 (2000)
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* **Zolpidem (Completed Re-Review in 2022)**
  + Hindmarch, I. et al. [Residual effects of zaleplon and zolpidem following middle of the night administration five hours to one hour before awakening.](http://www.ncbi.nlm.nih.gov/pubmed/?term=Residual+effects+of+zaleplon+and+zolpidem+following+middle+of+the+night+administration+five+hours+to+one+hour+before+awakening.) *Hum Psychopharmacol* 16:159-167 (2001)
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    - **[NEW]** Høiseth, G. [Impairment due to amphetamines and benzodiazepines, alone and in combination.](https://pubmed.ncbi.nlm.nih.gov/25456327/) *Drug Alcohol Depend* 145:174-9 (2014)
    - **[NEW]** Høiseth, G. [Impairment due to alcohol, tetrahydrocannabinol, and benzodiazepines in impaired drivers compared to experimental studies.](https://pubmed.ncbi.nlm.nih.gov/27327554/) *Traffic Inj Prev* 18:244-250 (2019)
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    - Verster, J.C. et al. [Blood drug concentrations of benzodiazepines correlate poorly with actual driving impairment.](https://www.ncbi.nlm.nih.gov/pubmed/22884949) *Sleep Med Rev* 17:153-159 (2013)
  + **Alprazolam** **(Completed Re-Review in 2024)**
    - Leufkens, T.R., et al. [Cognitive, psychomotor and actual driving performance in healthy volunteers after immediate and extended release formulations of alprazolam 1 mg.](http://www.ncbi.nlm.nih.gov/pubmed/?term=.++Cognitive%2C+psychomotor+and+actual+driving+performance+in+healthy+volunteers+++++++++after+immediate+and+extended+release+formulations+of+alprazolam+1+mg.) *Psychopharmacology*191:951-959 (2007)
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  + **Lorazepam** **(Completed Re-Review in 2024)**
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    - Daurat, A. et al. [Lorazepam impairs highway driving performance more than heavy alcohol consumption.](https://www.ncbi.nlm.nih.gov/pubmed/24007754) *Accid Anal Prev* 60:31-34 (2013)

**Narcotic Analgesics**

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