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Review

Dose related risk of motor vehicle crashes after cannabis use

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Abstract

The role of Î”[9]-tetrahydrocannabinol (THC) in driver impairment and motor vehicle crashes has traditionally been established in experimental and epidemiological studies. Experimental studies have repeatedly shown that THC impairs cognition, psychomotor function and actual driving performance in a dose related manner. The degree of performance impairment observed in experimental studies after doses up to 300Â Î¼g/kg THC were equivalent to the impairing effect of an alcohol dose producing a blood alcohol concentration (BAC) â‰¥0.05Â g/dl, the legal limit for driving under the influence in most European countries. Higher doses of THC, i.e. >300Â Î¼g/kg THC have not been systematically studied but can be predicted to produce even larger impairment. Detrimental effects of THC were more prominent in certain driving tasks than others. Highly automated behaviors, such as road tracking control, were more affected by THC as compared to more complex driving tasks requiring conscious control. Epidemiological findings on the role of THC in vehicle crashes have sometimes

control. Epidemiological findings on the role of THC in vehicle crashes have sometimes contrasted findings from experimental research. Case-control studies generally confirmed experimental data, but culpability surveys showed little evidence that crashed drivers who only used cannabis are more likely to cause accidents than drug free drivers. However, most culpability surveys have established cannabis use among crashed drivers by determining the presence of an inactive metabolite of THC in blood or urine that can be detected for days after smoking and can only be taken as evidence for past use of cannabis. Surveys that established recent use of cannabis by directly measuring THC in blood showed that THC positives, particularly at higher doses, are about three to seven times more likely to be responsible for their crash as compared to drivers that had not used drugs or alcohol. Together these epidemiological data suggests that recent use of cannabis may increase crash risk, whereas past use of cannabis does not. Experimental and epidemiological research provided similar findings concerning the combined use of THC and alcohol in traffic. Combined use of THC and alcohol produced severe impairment of cognitive, psychomotor, and actual driving performance in experimental studies and sharply increased the crash risk in epidemiological analyses.

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Keywords

Cannabis; Driving; Crash risk; Experimental; Epidemiology

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