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The prevalence and nature of stopped on-the-road driving tests and the relationship with objective performance impairment

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ABSTRACT

Introduction and objectives: The on-the-road driving test in normal traffic is applied to examine the impact of drugs on driving performance. Although participants are accompanied by a licensed driving instructor, under Dutch law, the driver is primarily responsible for safe driving and is not permitted to continue driving when it is judged that the drug compromises safety. This review examined the prevalence and nature of stopped driving tests, and the relationship with Standard Deviation of Lateral Position (SDLP), i.e. the "weaving of the car".
Materials and methods: A literature search was conducted to gather all publications on clinical trials that applied the on-the-road driving test, examining the effects of Central Nervous System (CNS)-drugs such as anxiolytics, antidepressants, antihistamines, analgesics, and hypnotics.
Results: 47 papers reported on 50 Dutch clinical trials in which 1059 subjects participated (903 healthy volunteers and 156 patients). A total of 7232 driving tests were performed; 5050 after drug treatment and 2042 after placebo. 3.1% of all driving tests were terminated before completion: 4.1% after drug treatment, and 0.7% after placebo. The decision to stop a driving test was 3–4 times more often made by the driving instructor than the subject. The most common reasons for stopping were the driver feeling tired or sleepy, or the driving instructor noticing signs of drowsiness and performance impairment. Although SDLP values of stopped driving tests are sometimes high, there is no clear relationship between SDLP (changes from placebo) and the decision to stop a driving test. Based on 8 studies that reported exact data, 39.6% of stopped drivers had a lower and 60.4% had a higher SDLP than 35 cm, i.e. the cut-off point of safe driving. This confirms that perception of the driver as well as judgment by the instructor of driving to be 'unsafe' differs between individuals.
Conclusion: Driving tests are sometimes stopped after drug treatment or placebo. The decision to stop driving is not a good correlate of objective performance.

1. Introduction

In the Netherlands an on road driving test is used to examine the effects of Central Nervous System (CNS) drugs on driving safety. The on-the-road driving test is a standardized 100-km test performed on a primary highway during normal traffic (O'Hanlon et al., 1982; Verster and Roth, 2011a). Participants are instructed to drive with a steady lateral position within the right traffic lane while maintaining a constant speed of 95 km/h (60 mph). A camera, mounted on the roof of the test vehicle, measures the vehicle's lateral position relative to the road delineation. The amount of weaving of the car, measured by the standard deviation of the lateral position (SDLP, cm), is the primary outcome parameter. As is evident from Fig. 1, with increased weaving (side-to-side motion of the car), higher SDLP values are obtained.

The test has been shown to be sensitive to drug-induced dose-dependent impairment for both illicit drugs (Penning et al., 2010) and CNS-drugs such as hypnotics, antidepressants, antihistamines and anxiolytics (Verster et al., 2009). Research showed that the magnitude of driving impairment (i.e. SDLP increment relative to placebo) differs both between drugs and individuals within a given drug who participate in these clinical trials. The normal range of SDLP values after placebo treatment ranges from 9 to 34 cm (Verster and Roth, 2011a). Performance impairment due to CNS drug side effects further increases SDLP values.

To safety reasons, a licensed driving instructor who has access to dual controls sits in the right front seat. If necessary, the driving instructor can intervene and correct the driver. In addition, tests can be terminated if the driving instructor or the subject feels it is *unsafe* to continue. Participants of the on-the-road driving test

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