Adult attention deficit hyperactivity disorder and driving – risk, medication and fitness to drive

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The publication of the initial Sláinte agus Tiomáint: Medical Fitness to Drive Guidelines in 2013 focussed the attention of Irish doctors on traffic medicine and the challenges of balancing mobility and safety with acute chronic medical conditions. One condition receiving increasing attention is attention deficit hyperactivity disorder (ADHD) and attendant risk when driving. This assumes greater relevance in the light of increasing numbers of those whose symptoms persist into adult life. It used to be assumed that ADHD was a childhood disorder whose symptoms and prevalence would mitigate exponentially with chronological age. However, the persistence rate of full diagnosis up to an age of 25 is found to be about 15%, rising up to 65% if including partial remission. The adult prevalence of ADHD lies within the range of 2.5-4.2%. A complex interplay of cognitive, motor and emotional changes underlie the increased crash risk of drivers with ADHD estimated at relative risk of traffic crashes of 1.36.6 Co-morbidities, including oppositional defiant disorder (ODD) and conduct disorder (CD), are common with ADHD and previous higher estimates of risk may have arisen from the presence of co-morbid ODD and/or CD.

Of particular interest to traffic medicine is the increasing number of studies suggesting that treatment of ADHD is associated with reduced crash risk. Methylphenidate in particular shows beneficial effects on driving behaviours of ADHD drivers, including better driving performances in simulators, less speed variability, less incidence of speeding and less inappropriate use of brakes in simulated driving fewer inattentive errors, less speed variability and smaller collision rate in real traffic. In response to the prevalence of adult ADHD and the risk for driving of ADHD drivers, better diagnosis and treatment for adult ADHD is needed. The conventional diagnosis was based on the text revision of the 4th edition of Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) published by American Psychiatric Association, where ADHD was defined as “a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequent and severe than is typically observed in individuals at a comparable level of development” causing impairment in “occupational, social, and academic” aspects to the patient. However, the DSM-IV-TR diagnostic criteria had unclear validity as it targeted at children in school or playground setting. Moreover, presentation of ADHD symptoms could change according to age, including decline of hyperactivity, worsening or...
persistence of inattention, slowing of reaction and arise of irritability and depression\textsuperscript{3,4}. These could lead to premature discontinuation of treatment when affected children enter adulthood and an underestimation of adult prevalence\textsuperscript{12}. The diagnostic criteria of ADHD in the 5th edition of the classification (DSM-5) in 2013 were revised to more accurately incorporate the characteristics of adult ADHD through recognising the difficulty of precise recall of childhood, adopting a lower cut-off point for number of symptoms and providing additional examples\textsuperscript{10,13}. An increase by 27\% in adult ADHD prevalence is expected upon the change from DSM-IV-TR to DSM-5 diagnostic criteria which is appropriate for adults\textsuperscript{14}.

Adult ADHD medications are not licensed for use in adults in Ireland, the United Kingdom (UK) and most European countries and need to be prescribed off-licence: the greater medico-legal responsibility may deter practitioners from prescribing medication of ADHD for adults. The guidelines on medical treatment of ADHD provided by UK National Institute for Health and Clinical Excellence (NICE) updated in 2008 have removed the previous recommendation of stopping medication on ADHD during adolescence\textsuperscript{12}. Guidelines of treatment for adults are lacking and the need for licensing medication for adults is increasing with the greater proportion of the young adult population falling into the diagnostic criteria of ADHD. The evaluation of the fitness of ADHD patients to drive in Sláinte agus Tiomáint: Medical Fitness to Drive Guidelines is that the disorder itself does not mean a restriction to acquire a license to drive a car or a motorcycle, with the recognition of that impulsivity and lack of awareness need to be considered\textsuperscript{1}. The future update of the guidelines may need to address issues on the previously underestimated prevalence in adults, the possibility of complex co-morbidities and the effect of medication. The guidelines recommend observance of the finding that compliance with medication is associated with reduced crash risk, in effect a recommendation which will be strengthened if the drugs are licensed for adults in the future and is particularly relevant if drivers are diagnosed with other co-existing psychiatric conditions.

As the continuity of care is essential in patient management, regular follow-up is needed to keep track of the driver’s condition, and change the dosage or medication if indicated. Doctors need to be supportive with these young adults if they fail in assessments of driving ability to drive, bearing in mind the greater propensity of ADHD to depression\textsuperscript{4}. Loss of the means of travelling by driving may affect their social health, because social engagement is curtailed\textsuperscript{7}. Co-operation with counselling psychologists and social workers may be needed.

In order to facilitate the licensing of ADHD medications and further refinement of guidelines for assessing medical fitness to drive, researchers need to consider several lines of enquiry. The cause or causes of ADHD and mechanism by which medications work to improve ADHD symptoms are still not clearly known, so further research into ADHD pathogenesis, etiology and drug mechanisms could project an insight into the measures to improve treatment efficacy and safety\textsuperscript{15}. Future studies are recommended to adopt a longitudinal perspective, increase the sample size, diversify sample composition, lengthen the duration, and impose better control on confounding factors and co-morbidities\textsuperscript{6,15}. Researchers also need to investigate non-pharmacological interventions, such as cognitive-behavioural therapy, which may potentially improve driving performance but which has been under-explored in existing research\textsuperscript{15}. A particular ethical issue of concern is the stigmatisation of ADHD patients. Physicians and researchers could presume an exaggerated risk and severity of ADHD, and underestimate the patients’ potential ability to drive or response to therapy and extended training. Conversely, the high social value of a driving licence and attendant
pressure from those with ADHD and their families to engage with driving may prove to be a potent agent of change in promoting research and understanding of the syndrome in adulthood.

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All authors declare no competing interests.

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**References**
1. Road Safety Authority. Sláinte agus Tiomáint: Medical Fitness to Drive Guidelines. Ireland: Road Safety Authority; 2015.

