Editorial

David Kerr
Editor-in-Chief

Disrupted driving and diabetes

"It is amazing to me that we let humans drive cars... It's a bug that cars were invented before computers."

Eric Schmidt, Co-founder of Google

The European Commission has recently changed its mind on the thorny topic of driving and diabetes. No longer will individual drivers face a driving ban after one episode of nocturnal hypoglycaemia whilst asleep. This change of heart has been welcomed by Diabetes UK, who said, "we are delighted this is happening, having campaigned for five years now to get this ban lifted and put a stop to some people with diabetes losing their driving licence unfairly" (Diabetes UK, 2016). This change is likely to be implemented in 2018.

Meanwhile, a fleet of six convoys of driverless trucks set off recently from Sweden, Germany and Denmark to drive to Rotterdam. The vehicles were driving themselves by coordinating their routes with Wi-Fi (Murgia, 2016). Apparently, when such trucks autonomously follow one another with only a 1 second gap between vehicles (platooning), they lower fuel consumption by around 15%, as well as reducing their carbon emissions. It has also been claimed that "autonomous truck platooning" will cause fewer road traffic accidents (Janssen et al, 2015).

The internal combustion engine is a ubiquitous feature of modern life, and there appears to be a strong link between economic growth, quality of life, and the use of motorised vehicles. In the UK, the time spent travelling by car averages 383 hours per person per year, or around 38 minutes a day (Kerr and Olateju, 2010). The difference between autonomous truck and car driving is that the latter, by design, will continue to have passengers with the expectation that the vehicle will be able to switch between autonomous and human control.

Driving a motor vehicle safely requires coordination of a highly complex set of physiological, anatomical and behavioural systems. It is generally recognised that human factors, as opposed to vehicle and environmental factors, are the predominant contributor in the vast majority of motor vehicle collisions. As no machine is truly infallible, in some circumstances it will be anticipated that the "passenger" in an autonomous vehicle will decide to take back control to become the driver once more. The challenge for the autonomous vehicle manufacturer is to create an environment where such a switch will be seamless and without incident. In turn, the new challenge for the medical profession will be to make an assessment as to whether the passenger will be in an ideal physical and cognitive state to be able to take back control and perform driving in a manner that is safe and timely, as well as appropriate. For drivers at risk of hypoglycaemia, this could mean embedding some form of glucose sensor within the vehicle to determine the prevailing level of blood glucose.

In the US, public road testing of driverless cars is only legal in eight states at present. In the UK, however, the enthusiasm for autonomous driving is especially keen (Department for Transport, 2015). At this early stage, the UK authorities make no suggestion that the rules for holding a driving licence for an autonomous car will be the same as for holding a regular licence in people with diabetes. It is already accepted that the actual process for transition between automated and manual modes is an important area for safety. Therefore, it makes sense for diabetes professionals and people living with the condition to have a voice at this early stage as to the future requirements to hold an autonomous driving licence. This is likely to be especially relevant to older drivers, in whom impairments in cognitive performance and reaction time may have different implications for safe driving in these futuristic vehicles – at least in the short term, when other road users will be a mixture of traditional, hybrid and fully autonomous vehicles! We would like to hear our readers' thoughts on this. ■

Department for Transport (2015) *The Pathway to Driverless Cars: A Code of Practice for Testing.* DfT, London. Available at: http://bit.ly/1Ie9IHT (accessed 16.09.16)

Diabetes UK (2016) *EU changes night-time hypos driving rules for people with diabetes.* DUK, London. Available at: http://bit.ly/1ZW7elE (accessed 16.09.16)

Janssen R, Zwijnenberg H, Blankers I, de Kruiff J (2015) *Truck Platooning: Driving the Future of Transportation.* TNO, Delft, the Netherlands. Available at: http://bit.ly/1WzW9sX (accessed 16.09.16)

Kerr D, Olateju T (2010) Driving with diabetes in the future: in-vehicle medical monitoring. *J Diabetes Sci Technol* **4**: 464–9

Murgia M (2016) Britain leads the world in putting driverless vehicles on the roads. *The Telegraph*, London. Available at: http://bit.ly/1VKx3Fu (accessed 16.09.16)

David Kerr
Director of Research and Innovation at the William Sansum Diabetes Center in Santa Barbara, California (www.sansum.org) and Founder of www.DiabetesTravel.org and www.Excarbs.com