

VISION AND ROAD SAFETY: PUTTING THE BRAKES ON A GLOBAL PUBLIC HEALTH THREAT

Uncorrected vision continues to endanger the lives of drivers, passengers, and pedestrians around the world. Compounded by external factors such as nighttime driving, inclement weather, and adverse road conditions, uncorrected vision contributes to more than **1.25 million road accident deaths each year**.¹ Until recently, the intersection of vision and road safety has not received adequate attention. Consequently, there is a lack of awareness around the need to address the impact of vision problems on driver and road safety. While governments and policymakers can play a significant role in raising greater awareness of this public health threat, eye care professionals are also part of the solution as they are a competent authority in promoting effective assessment of vision and correcting drivers' visual functions.



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The problematic relationship between uncorrected vision and road safety is a deadly, global phenomenon, and is growing more dangerous. The World Health Organization (WHO) has reported that road traffic crashes are a leading cause of road deaths globally and the main cause of deaths among those aged 15 to 29 years-old.² What is perhaps most disturbing is how traffic accidents disproportionately affect low- or middle-income countries, which are home to more than 80 percent of the world's population. Though these countries account for only 54 percent of the world's vehicles, they see 90 percent of all road traffic deaths. **These road accidents also come with an adverse economic impact, estimated at US\$500 billion a year –another burden on low- or middle-income countries.**²

There are hopeful signs, yet much work remains. Globally, the number of traffic deaths plateaued between 2007 and 2015 despite a four percent increase in the world's population – and an increase in motorization even four times higher than that – suggesting that intervention efforts can and do save lives.² However, disparity remains. Among the 68 countries that saw a rise in the number of road traffic deaths between 2010 and 2013, 84 percent were low- or middle-income.²

Recognizing the severity and disparity of both the human toll and economic burden that traffic accidents place on national economies and individual households alike, the United Nations, in its Sustainability Goals, included an ambitious goal of halving traffic-related deaths and injuries by the year 2020.

This new imperative to address road safety brings with it a greater urgency to understand the underlying causes of traffic accidents. Much attention has been given to the effects of drunk driving and, more recently, the use of wireless devices while driving. But in addition to the important issues of inebriated and inattentive driving, vision impairment also warrants attention.

The assumption of good vision, necessary to safely operate a vehicle, has long caused uncorrected vision to be overlooked as a factor in road safety. Drs. Cynthia Owsley and Gerald McGwin note in their analysis, "Vision and Driving," that "the visual demands of driving are intricate."³ By cataloging the many and varied visual tasks involved in driving, including the simultaneous use of central and peripheral vision to monitor primary and secondary tasks, they reinforce how visually intensive driving under normal conditions is. These findings have led researchers to conclude that many visual tests for drivers are inadequate, often failing to simulate the distractions and wide ranging contrast and luminance levels experienced in real-world road conditions.³ This is compounded by the fact that many drivers avoid seeking evaluation and treatment for vision issues; in Europe, 19 percent of drivers reported delaying visits to an optician until they notice problems with their vision.⁵ The contributions of Owsley, McGwin, Chakrabarty and others to

the growing dialogue around driving and vision are indicative of the increased attention and analysis that this issue requires. **However, though the link between vision and road safety should be a global concern, the disparity between high-income and low- or medium-income countries illustrates that it remains very much a local issue, which demands a greater understanding of local factors.**

Road Safety Around the World

As the correlation between vision and road safety has come to the forefront, more data is becoming available from both high-income and low- or medium-income countries.

In India, for example, the dual forces of population growth and economic development have resulted in a higher number of vehicles on the road and, consequently, a greater number of traffic accidents. One study of vision and drivers in India calculated the road crash involvement rate of drivers with unacceptable vision test results at 81 percent, which was 30 percent higher than that of drivers with good vision.⁶ **While many factors, including poor vehicle and road conditions and traffic violations, have been found to affect driver safety, researchers have pointed to vision problems, worsened by night driving, as significant causes of driver safety challenges.**



IN EUROPE, 19% OF DRIVERS REPORT **DELAYING** VISITS TO AN OPTICIAN UNTIL THEY NOTICE PROBLEMS WITH THEIR VISION.



Source: 1 European Council of Optometry and Optics, Visual Standards for Driving in Europe, January 2017; 2 BRAKE, Driver Eyesight Survey, 2014.

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A RECENT STUDY SHOWS DRIVERS IN INDIA WITH UNACCEPTABLE VISION TEST RESULTS WERE FOUND TO HAVE AN **81%** ROAD CRASH INVOLVEMENT RATE - THIS IS **30%** HIGHER THAN IN DRIVERS WITH GOOD VISION.



Current Science, Assessment of Driver Vision Functions in Relation to Their Crash Involvement in India, Volume 110, Number 6, 2016.

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Despite the disproportionate impact of uncorrected vision on road safety in low- or medium-income countries, high-income countries are not immune to this threat. A 2003 European analysis of health-related risk factors in traffic accidents found that **the risk of car crash increased by nine percent when there was a visual impairment.**⁷ Research also reveals how even a relatively small percentage of drivers with uncorrected vision can cause a significant economic impact. In the U.K., for example, only seven percent of the population suffers from uncorrected vision, yet the economic impact of road accidents in relation to vision amounted to US\$55 million in 2012.^{9,13}

Vision Solution Efforts

Though uncorrected vision remains a danger to road safety, recent research is helping to make the case for policies and resources that can put the brakes on this global public health threat. With more stakeholders undertaking efforts to understand the intersection of vision and road safety, researchers, governments, organizations and eye care professionals around the world are beginning to identify promising solutions. In Italy, researchers evidenced that the use of an appropriate ophthalmic compensation with corrective lenses is able to improve drivers' visual abilities.¹⁰

In India, for instance, as the result of early efforts to prevent traffic accidents, drivers are now required to undergo vision screenings and be granted access to driving aids such as anti-glare glasses.⁴ Based on their research, Drs. Owsley and McGwin recommend **additional screening measures to augment current visual acuity tests, which would examine drivers' contrast sensitivity, visual field, processing speed, and divided attention. But most importantly, they call for more research methodology on vision and driving to expand upon the current database of knowledge.**³

However, more research, more testing and even more rigorous testing will not reduce the threat of uncorrected vision on road safety if drivers do not seek evaluation and treatment from eye care professionals. The WHO released a report, "Universal Eye Health: A Global Action Problem 2014-2019," which focuses on finding solutions to visual impairments. According to the report, if vision care – such as refractive services and surgeries – were provided, more than two-thirds of people affected by uncorrected vision could improve their eyesight.¹¹ For this reason, organizations like Essilor and the Fédération Internationale de l'Automobile (FIA) have pledged to address the correlation between poor vision and driver and road safety. Essilor's role in the partnership is to advocate for road safety and



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reinforce FIA's messages about the vital role of adequate vision along with corresponding efforts to lobby against road accidents and deaths. The collaboration between these two organizations rests on the "New Golden Rule, 'Check your vision,'" which aims to raise awareness on vision as a public health challenge by updating FIA's ten "Golden Rules" on road safety. This partnership received the distinct endorsement of the World Council of Optometry and the Vision Impact Institute at the 2nd World Congress of Optometry in Sept. 2017.¹²

Conclusion

It is imperative that we address vision problems and their impact on the safety of drivers, passengers, and pedestrians. Vision standards for driving must be a priority, and the development and implementation of these standards should not fall solely on local, state and national governments, but also on eye care professionals around the world. As we work towards our goal of expanding access to proper vision care around the world, our success will hinge on the collaboration between stakeholders to identify solutions that will improve driver vision, equip medical professionals with the information and resources they need and, ultimately, ensure road safety for drivers everywhere.

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KEY TAKEAWAYS

- The link between vision and road safety is a global concern and the disparity between high-income and low-or medium-income countries illustrate that it demands a greater understanding of local factors
- While many factors, including poor vehicle and road conditions and traffic violations, have been found to affect driver safety, researchers have pointed to vision problems, worsened by night driving, as significant causes of driver safety challenges.
- The link between vision impairment and road safety has not been prioritized in the public health space; hence, policymakers, together with other stakeholders, should explore how to raise public awareness on visual standards for driving
- Eye care professionals have a crucial role to play in correcting visual functions and advising drivers on the importance of their visual performance for safe driving.
- Clinicians and researchers recommend additional measures on top of current visual acuity tests to evaluate drivers' contrast sensitivity, visual field, processing speed, and divided attention. They also call for further research on vision and driving.
- It is imperative to address vision problems and their impact on the road safety of all road users, not only drivers, but also passengers and pedestrians.