Older drivers with reduced ability to process rapidly presented visual stimuli were more likely to have motor-vehicle crashes

Owsley C, Ball K, McGwin G Jr, et al. **Visual processing impairment and risk of motor vehicle crash among older adults.** JAMA. 1998 Apr 8;279: 1083-8.

Question
In older drivers, what are the visual risk factors for having a crash?

Design
3-year prospective cohort study.

Setting
Jefferson County, Alabama, United States.

Participants
294 participants were randomly selected from all licensed drivers in the county who were ≥ 55 years of age (n = 118 553). The sample was stratified by age and crash frequencies. 33% of the participants had no crashes, 49% had 1 to 3 crashes, and 18% had ≥ 4 crashes on record in the previous 5 years.

Assessment of risk factors
During a single visit, drivers were assessed for vision, visual attention and processing speed (measured by the Useful Field of View test, which assesses the visual field area over which rapidly presented visual information can be used), cognitive function (measured by the Mattis Organic Mental Syndrome Screening Examination), self-reported driving exposure, self-reported chronic medical conditions, and demographic characteristics.

Main outcome measure
Motor vehicle crashes that were on record.

Main results
56 participants had ≥ 1 crash, and 11 had ≥ 2 crashes. Involvement in a crash in the previous 5 years was associated with an increased risk for having a crash during follow-up (relative risk [RR] 2.0, 95% CI 1.1 to 3.8). Participants whose Useful Field of View test scores were above a preselected cut-point (≥ 40% reduction) were more likely to have a crash (RR 2.1, CI 1.2 to 3.4); this association remained in multivariate analyses (P = 0.01) (Table). Multivariate analyses showed a trend toward an association between driving < 7 days/wk and a decreased risk of having a crash (P = 0.08) (Table).

Conclusion
In drivers ≥ 55 years of age, a reduced ability to process rapidly presented multiple visual stimuli was associated with a greater risk for having a crash

Sources of funding: National Institute on Aging; Research to Prevent Blindness, Inc.; Rich Research Foundation; Alabama Eye Institute.

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Risk factors for motor-vehicle crashes in older drivers

Risk factor	Adjusted relative risk (95% CI)*
Abnormal Useful Field of View test score	2.21 (1.20 to 4.09)
Driving < 7 d/wk	0.55 (0.28 to 1.08)†

*Adjusted for age, sex, race, chronic medical conditions, and mental status.
†Not significant.

Commentary

The methodologically sound study by Owsley and colleagues has good generalisability and shows that abnormal Useful Field of View test scores in older drivers are associated with an increased crash risk. The Useful Field of View test assesses both vision and visual processing, which requires selective and divided attention and rapid responses to visual stimuli. Rapid processing of multiple visual stimuli rather than just being able to see adequately is critical for safe driving.

For diagnostic purposes, the Useful Field of View test may be unsuitable if used alone because it has a low specificity for crash risk. Over one half of older drivers would have been categorised as being at increased crash risk, but, in a 3-year period, only one fifth had a crash. By using the Useful Field of View test alone, many older drivers would have had their driving restricted unnecessarily.

For management purposes, physicians could consider the following on the basis of this study: Involvement in a previous crash is associated with an increased risk for further crashes, and older drivers who drive < 7 days/wk are involved in fewer crashes. Those who drive daily may not be self-regulating their driving to avoid high crash-risk periods (bad weather, low light, and heavy traffic). Patients could be counselled accordingly.

Valid assessments of drivers' ability to av crashes are needed. So too are effective str egies that reduce crash risks of drivers w are found to be at increased risk.

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Evid Based Med: first published as 10.1136/ebm.3.1.28 on 1 February 1998. Downloaded from http://ebm.bmj.com/ on 19 July 2018 by guest. Protected by copyright.