Discussing Driving Concerns With Older Patients

II. Vision Care Providers’ Approaches to Assessment

David C. Musch, PhD, MPH; Nancy K. Janz, PhD; Rebecca L. Leinberger, MPH; Leslie M. Niziol, MS; Brenda W. Gillespie, PhD

Objectives: To characterize situations that prompt vision care providers (VCPs) to ask about their older patients’ driving, the types of information they consider, and the factors that influence these inquiries.

Methods: A survey was conducted among a random sample of 500 VCPs who were active members of their Michigan professional organizations and had patients 65 years or older in their practice. Factors associated with the survey responses were identified using ordinal logistic regression analyses.

Results: Survey results were obtained from 404 respondents (80.8%). Common situations that prompted VCPs to ask patients about driving included poor visual function, inquiries from the patient or family, and requests from the state. Visual acuity and peripheral vision testing were frequently relied on (performed always or often by >80% of VCPs), but other ocular test results and nonocular information were infrequently obtained. Questioning about night driving, reading road signs, and experiencing glare were frequent, but inquiries about driving tasks (eg, making left turns) were infrequent. The likelihood of asking about specific driving tasks was significantly greater with more time in practice and with a higher percentage of older patients in their practice, and the likelihood was significantly less for ophthalmologist specialists vs optometrists.

Conclusions: Vision care providers are often placed in a primary role of advising older patients about their ability to drive safely or legally. The most frequent tests they use fail to capture the complexities of visual function that contribute to safe driving. The driving tasks about which they usually inquire include some, but not all, tasks commonly associated with crash risk. Educating VCPs on useful resources, tests, and questions is needed.


In most areas of the United States, driving is important if not essential to meeting the needs of daily life and maintaining independence. The ability to drive safely is affected by a complex milieu of influences, among which include motor and sensory ability, attentiveness, cognitive status, and visual function. Although this complexity is well recognized,1 an objective test that evaluates all components in a sensitive, specific, and easy-to-administer fashion is lacking. In the United States, all the states include visual acuity testing as a screening test for obtaining a driver’s license, and most states require this when applying for license renewal.2 Failure to achieve a designated threshold acuity criterion results in referral to a vision care provider (VCP), who is charged with assessing the individual’s vision and enabling the person to achieve his or her best-corrected visual acuity for license retesting. While this formal assessment is a frequent occurrence for VCPs, a visual deficit is often identified during a regular eye examination that cannot be improved by refraction or treatment. The literature is sparse on what clinical and nonclinical factors should be considered by VCPs when they assess whether a patient with a visual deficit is likely to be a safe driver.

See also page 205

We evaluated the attitudes, actions, and perspectives of VCPs who face this situation in their daily practice and, in particular, among their older patients. Our findings are described in 2 articles. The first article3 in this issue of the Archives reports the attitudes that VCPs have toward inquiring about driving and the actions that they take when dealing with older patients who should modify or ter-
of response categories was 3 (eg, if access to transportation alternatives exists and whether the patient lives alone) that may have some bearing on VCPs’ recommendations about driving.

A descriptive summary of the survey responses included frequencies and percentages for each response category. Ordinal logistic regression was used to identify significant predictors of responses to individual survey items using the following collapsed 3-category response scale: (1) always or often, (2) sometimes, and (3) rarely or never. Covariates investigated included the type of VCP (MD generalist, MD specialist, or OD), VCP characteristics (sex, age, and time in practice), and practice characteristics (community size, number of patients, percentage of patients 65 years or older, total number of VCPs in the practice, and access to a social worker or psychologist). Model selection was performed using best subset selection, with the score statistic as the selection criterion. This approach identifies the overall best model and closely competing models. Specifically, for each number of covariates (1, 2, or 3, etc), the 5 best models were selected based on the highest score statistic. The model with the most covariates in which all were significant was chosen as the final model. The proportional odds assumption was found to hold for all models. As a result, effects are interpreted as the odds of responding with greater frequency to asking about certain driving tasks rather than with less frequency, regardless of whether the outcome was dichotomized as (1) always or often vs sometimes, rarely, or never or (2) always, often, or sometimes vs rarely or never. Commercially available software (SAS version 9.2; SAS Institute, Inc) was used for all analyses.

Of 500 surveys that were mailed, 404 (80.8%) were returned with usable data. The response proportions were similar between ODs (206 of 250 [82.4%]) and MDs (196 of 250 [78.4%]), with 2 respondents not revealing their profession. A detailed description of the respondents is provided in the initial table in the first article. Briefly, 72.5% of VCPs who responded to the survey were male; 30.0% were 40 years or younger and 18.5% were older than 60 years; 51.5% were ODs, 28.8% were MD generalists, and 19.8% were MD specialists; VCPs had been practicing for a mean (SD) of 17.8 (12.2) years at the time of the survey. Almost 27% of VCPs had practices in which more than 60.0% of patients were 65 years or older.

As shown in Figure 1, the situation that most frequently prompted VCPs to inquire about driving was based on the results of visual function testing, with 86.8% (347 of 400) responding that they always or often asked about driving if they noted poor visual function on clinical examination. As expected, the receipt of a request from the licensing agency (the Michigan secretary of state office) was also a commonly reported reason (79.5% [315 of 396]) to always or often inquire about a patient’s driving. Similarly, inquiries from the patient or a family member of the patient were frequent reasons to always or often inquire about driving (69.0% and 70.0% for patient and family member inquires, respectively). Observing that a patient had nonvisual functional limitations was not a common reason to ask about his or her driving (29.6% [118 of 398]).

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**METHODS**

Our study population included all VCPs (772 OD optometrists and 372 MD ophthalmologists) in Michigan who were in practice (ie, not in training or retired) and who were members of their respective professional societies (the Michigan Ophthalmic Association or the Michigan Society of Eye Physicians and Surgeons). A random sample, stratified by region of the state, was selected that included 500 VCPs (250 ODs and 250 MDs). These VCPs were sent a Vision Care Providers’ survey (eAppendix, http://www.jamaophth.com) that had been developed to address the objectives of the study. The underlying framework of the survey, its pretesting, and the methods used to secure its completion are described in the first article. The present article addresses responses to survey questions pertaining to situations that prompted VCPs to ask about a patient’s driving, as well as the information that VCPs consider when determining visual adequacy for safe driving.

Situations that prompt VCPs to inquire about their patients’ driving (5 items, with the option to write in a response) were assessed on a 5-point Likert-type scale, with responses ranging from “always” to “never.” Examples of prompts included a question from the patient, a request from a family member of the patient, or a request from the Michigan licensing agency. Information considered when determining if a patient’s vision is adequate for safe driving (29 items total) was assessed on a 5-point Likert-type scale, with responses ranging from “always” to “never.” Among these items, the survey included 7 questions about visual functioning (eg, visual acuity and contrast sensitivity), 2 items about nonocular medical conditions and medications, 5 items examining driving situations and conditions (eg, difficulty driving at night), 6 items concerning driving skills and tasks (eg, reading street signs and merging), 1 item that addressed the patient’s recent driving history (accidents or close calls), and 8 items assessing patient-related factors (eg, if access to transportation alternatives exists and whether the patient lives alone) that may have some bearing on VCPs’ recommendations about driving.

A descriptive summary of the survey responses included frequencies and percentages for each response category. Ordinal logistic regression was used to identify significant predictors of responses to individual survey items using the following collapsed 3-category response scale: (1) always or often, (2) sometimes, and (3) rarely or never. Covariates investigated included the type of VCP (MD generalist, MD specialist, or OD), VCP characteristics (sex, age, and time in practice), and practice characteristics (community size, number of patients, percentage of patients 65 years or older, total number of VCPs in the practice, and access to a social worker or psychologist). Model selection was performed using best subset selection, with the score statistic as the selection criterion. This approach identifies the overall best model and closely competing models. Specifically, for each number of covariates (1, 2, or 3, etc), the 5 best models were selected based on the highest score statistic. The model with the most covariates in which all were significant was chosen as the final model. The proportional odds assumption was found to hold for all models. As a result, effects are interpreted as the odds of responding with greater frequency to asking about certain driving tasks rather than with less frequency, regardless of whether the outcome was dichotomized as (1) always or often vs sometimes, rarely, or never or (2) always, often, or sometimes vs rarely or never. Commercially available software (SAS version 9.2; SAS Institute, Inc) was used for all analyses.

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**RESULTS**

Of 500 surveys that were mailed, 404 (80.8%) were returned with usable data. The response proportions were similar between ODs (206 of 250 [82.4%]) and MDs (196 of 250 [78.4%]), with 2 respondents not revealing their profession. A detailed description of the respondents is provided in the initial table in the first article. Briefly, 72.5% of VCPs who responded to the survey were male; 30.0% were 40 years or younger and 18.5% were older than 60 years; 51.5% were ODs, 28.8% were MD generalists, and 19.8% were MD specialists; VCPs had been practicing for a mean (SD) of 17.8 (12.2) years at the time of the survey. Almost 27% of VCPs had practices in which more than 60.0% of patients were 65 years or older.

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Essentially all the VCPs reported always or often measuring visual acuity for use in assessing their older patients’ visual capabilities relative to driving, and periph-
eral vision testing or a visual field test was performed always or often by 81.6% (315 of 386) and 65.7% (253 of 385) of respondents, respectively. Other visual function tests, such as stereopsis and contrast sensitivity testing, were obtained infrequently (always or often by 14.8% [57 of 385] and 10.2% [39 of 381], respectively). The most infrequent tests performed were visual processing speed and visual search (both performed always or often by <10% of respondents).

When a VCP asked an older patient about driving, the most common query was night driving (94.0% [363 of 386] asked always or often) (Figure 2). This query was closely followed in likelihood by questions about difficulty with glare and reading signs while driving (87.1% and 86.8% asked always or often, respectively). While VCPs could have asked about many other potential problematic driving situations, most of these driving situations were not specifically raised with patients (Figure 2). Common situations in which driving safety could be compromised by poor vision (such as merging, backing up, making left turns, or driving in heavy traffic) were not usually discussed by VCPs (<10% asked always or often).

Because a patient’s driving may be influenced by his or her social support network, driving needs, and available transportation alternatives, we asked VCPs to indicate how frequently they inquired about such factors. As shown in Figure 3, VCPs did not often ask about such factors. Inquiring about nearby access to family or friends who might require or provide rides was the most likely query raised (asked by 39.4% always or often), whereas inquiries about the use of driving aids, such as larger gauges (asked by 10.1%) and reliance on driving with a “copilot” (asked by 17.6%), were not usually discussed by VCPs (always asked by <10%).

Factors that influenced the likelihood of a VCP’s asking his or her patients about driving were evaluated by means of multivariable ordinal logistic regression (Table). Two characteristics of the providers (their time in practice and whether they were MD specialists) and 1 characteristic of their practices (the percentage of patients older than 65 years) were most frequently associated with the probability of asking about particular driving situations. More years in practice was most often associated with increased odds of more frequently asking about difficulty with certain driving situations (odds ratio [OR] range, 1.22-1.33 for a 10-year increase). When the type of VCP (MD specialist or generalist vs OD) was significantly associated with the respondents’ rating of how often they asked a question about driving, the MD specialist was much less likely to ask such a question (OR range, 0.15-0.18), except in the instance of noticing cars to the left or right, which was more likely to be asked by the MD specialist (OR, 1.96). The VCPs whose practices were weighted more toward patients who were 65 years or older were more likely to ask about difficulty with 6 specific driving tasks (OR range, 1.55-2.79). Finally, compared with VCPs whose practices were in smaller communities, VCPs whose practices were in larger communities (>100 000 residents) were less likely to ask their patients about difficulty merging (OR, 0.57), backing up (OR, 0.58), or making left turns (OR, 0.60).

The tests most frequently relied on by VCPs to determine poor visual function were those that are commonly included in licensing evaluations, namely, visual acuity and 2 measures of peripheral vision (a confrontational field test and a visual field test by perimetry). Visual acuity is uniformly tested, and its relevance is understood by patients, but a strong evidence base does not exist for its use in determining safe driving. While past studies have endorsed visual field loss as a concern to address in safe driving, other visual function tests that have been promoted as helpful in assessing the ability to drive safely (such as contrast sensitivity, visual attention, and visual processing speed) were rarely or never used by most VCPs. The importance of such tests is underscored in work by Owsley et al, who reported that older drivers with a history of crash involvement were almost 8 times more likely than those who were crash free to have a serious contrast sensitivity deficit in the worse eye (defined as a Pelli-Robson score of ≤1.25). Although visual attention and processing speed are more often evaluated by...
neurologists than by VCPs, such assessments should be embraced in some form by VCPs. The Useful Field of View test, which incorporates aspects of visual attention and processing speed, has been promoted in this regard but has yet to become a common test that is used in legal or safe driving assessments.

Older adults experience a unique set of driving concerns and difficulties, as evidenced by their involvement in types of crashes that differ from those of younger drivers. For example, older drivers are more likely to be involved in intersection crashes, multiple-vehicle crashes, and at-fault crashes. Many specific driving tasks challenge older drivers and may affect safe driving. Among them, night driving, encountering glare, and having the ability to read road signs are common driving challenges that were reported to be frequently raised in conversations with older patients about driving by VCPs in our survey. Night driving problems are often reported by individuals with glaucoma, one of the more common eye diseases among older adults, and are a common reason for avoiding night driving in older adults. Problems with glare have been related to increased intracocular light scattering, glare sensitivity, and photostress recovery time in older drivers, and glare sensitivity was a significant predictor of crash involvement. While these problems deserve questioning, asking about other difficult driving tasks (such as making left turns, which is a focus of research in the traffic safety literature) occurred less frequently, although such questions may be more indicative of a patient’s declining ability to drive. The low frequency at which several important driving-related inquiries were made when VCPs discussed driving with their patients should be addressed by the professional societies and in continuing medical education.

Older patients may be taking medications prescribed by other care providers that influence driving ability and have been associated with an increased crash risk, but only 33.0% of VCPs herein indicated that they always or often inquire about medication use in relation to driving ability. While some medications may directly influ-

| Table. Ordinal Logistic Regression Model of Provider and Practice Characteristics Predicting the Frequency of Inquiring About Specific Driving Situations Among 404 VCPs

<table>
<thead>
<tr>
<th>Regression Outcome</th>
<th>Provider Characteristic</th>
<th>Practice Characteristic</th>
<th>Interpretation of Subgroup Most Likely to Endorse Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night driving</td>
<td>0.15 (0.06-0.42)</td>
<td>...</td>
<td>OD VCPs with more years in practice</td>
</tr>
<tr>
<td>Heavy traffic</td>
<td>...</td>
<td>1.28 (1.10-1.50)</td>
<td>... Pracites with &gt;60.0% of patients 65 y old</td>
</tr>
<tr>
<td>Bad weather</td>
<td>...</td>
<td>1.86 (1.17-2.95)</td>
<td>OD VCPs with fewer years in practice, practices with &gt;60.0% of patients 65 y old</td>
</tr>
<tr>
<td>Reading signs</td>
<td>0.18 (0.08-0.41)</td>
<td>0.76 (0.59-0.98)</td>
<td>OD VCPs with fewer years in practice, practices with &gt;60.0% of patients 65 y old</td>
</tr>
<tr>
<td>Glare</td>
<td>0.16 (0.07-0.35)</td>
<td>0.75 (0.58-0.98)</td>
<td>OD VCPs with fewer years in practice, practices with &gt;60.0% of patients 65 y old</td>
</tr>
<tr>
<td>Highway driving</td>
<td>...</td>
<td>1.22 (1.04-1.42)</td>
<td>VCPs with more years in practice, practices with &gt;60.0% of patients 65 y old</td>
</tr>
<tr>
<td>Noticing cars to the left or right</td>
<td>1.96 (1.18-3.23)</td>
<td>...</td>
<td>MD specialist</td>
</tr>
<tr>
<td>Reading gauges</td>
<td>0.29 (0.18-0.46)</td>
<td>0.16 (0.09-0.26)</td>
<td>VCPs with more years in practice, practices with &gt;60.0% of patients 65 y old, smaller communities</td>
</tr>
<tr>
<td>Making left turns</td>
<td>...</td>
<td>1.30 (1.08-1.57)</td>
<td>VCPs with more years in practice, practices with &gt;60.0% of patients 65 y old, smaller communities</td>
</tr>
<tr>
<td>Merging</td>
<td>...</td>
<td>1.33 (1.09-1.61)</td>
<td>VCPs with more years in practice, practices with &gt;60.0% of patients 65 y old, smaller communities</td>
</tr>
<tr>
<td>Backing up</td>
<td>...</td>
<td>1.31 (1.09-1.57)</td>
<td>VCPs with more years in practice, practices with &gt;60.0% of patients 65 y old, smaller communities</td>
</tr>
</tbody>
</table>

Abbreviations: Ellipses, not applicable; MD, ophthalmologist; OD, optometrist; VCPs, vision care providers.

a All table entries are significant at P < .05. Ordinal logistic regressions model the probability of more frequently inquiring about certain driving tasks and situations (with the odds of more vs less frequency being the same for any dichotomy of the scale).

b Per 10-year increase (approximately 1-SD increase).
ence driving ability via adverse effects (such as vertigo and dizziness from angiotensin-converting enzyme inhibitor use), the use of other medications may simply be an indication of a chronic disability (eg, arthritis, which may impair movement and response time). In evaluating a patient’s ability to drive safely, VCPs need to consider not only visual function but also complexities of the patient’s medical history, cognitive and physical status, and medication use. Such considerations may necessitate referral of the patient to a primary care provider to obtain a comprehensive evaluation.

Family medicine and geriatric physicians are often the primary care providers who are faced with assessing safe driving of older patients. Surveys of and commentaries by these physicians have revealed their sensitivity to raising the issue of driving safety with their patients, both in terms of a recognized responsibility to report unsafe drivers and a desire to maintain physician-patient confidentiality. Given the frequent reliance placed by state licensing agencies on vision criteria, VCPs are also at the forefront in dealing with older drivers whose vision may compromise safe driving. In Michigan, VCPs often receive formal requests for driver evaluation from the secretary of state, and a person whose best-corrected visual acuity is less than 20/70 (<20/60 with progressive abnormalities or diseases of the eye) is not eligible for licensing. Our survey of Michigan VCPs revealed that a referral from the state was a common reason for VCPs to inquire about driving, as was poor visual function results from an examination. It is important to distinguish between visual criteria used to determine legal driving vs visual criteria that pertain to safe driving. The disparity in such criteria and the lack of an evidence base for such criteria have been previously described and deserve attention.

The role that health care providers have in assessing risk and intervening if necessary in their older patients’ driving is challenging to carry out effectively. Issues described by Eby and Molnar include the lack of valid and reliable screening and assessment tools, reluctance or inability of older drivers (especially those with cognitive impairment or dementia) to acknowledge or recognize problems they have with driving, and an increasing trend for older adults to be in single households, which makes it less likely that family members may ask health care providers to intercede. In addition to these issues, variability exists across the country in reporting requirements, in access to referral sources such as a driving rehabilitation specialist, and in cost coverage by insurance carriers for such services and in the effectiveness of those services.

Position statements and guidance documents on assessing driving have been published by many health care professional associations. One of the more comprehensive guidance documents is the American Medical Association’s Physician’s Guide to Assessing and Counseling Older Drivers, in which advice is given on identifying when to intervene, how to assess medical fitness to drive, which resources are available to care providers and patients, and what means are suggested to avoid compromising the physician-patient relationship when the sensitive issue of driving needs to be discussed. Within the 2 primary national VCP associations, the American Optometric Association and the American Academy of Ophthalmology have issued policy statements. The American Optometric Association statement recommends a required comprehensive eye examination for individuals at risk for functionally impaired vision as a condition for holding a driver’s license. At-risk groups include persons who have been involved in a traffic accident or moving violation and anyone 60 years or older. The American Academy of Ophthalmology statement is less prescriptive and recognizes the need to evaluate patients for driving based on visual parameters, describes several tests to assess visual sensory ability, and because of the complexity of factors that influence safe driving recommends that evidence-based driver assessment and training programs should be established to address deficiencies in driving performance.

The differences between recommendations contained in the American Optometric Association and American Academy of Ophthalmology statements (such as the American Optometric Association’s identification of all drivers 60 years or older as being an at-risk group) may enter into the variations that we observed between VCPs who were ODs vs MDs (particular specialists). The ODs were significantly more likely than MD specialists to ask their older patients about several common driving tasks. The VCPs who had been in practice longer were also more likely to inquire about driving with their older patients. This may reflect a heightened awareness among VCPs with more years in practice of driving difficulties associated with aging or an increased openness to entering into dialogue about more sensitive issues with their patients.

Our results must be considered within the context in which they were obtained. We based our findings on self-reports from VCPs, who may have exaggerated the frequency with which they reported asking their patients about driving. We attempted to reduce this possibility by assuring VCPs that their individual responses would be held confidential. Our findings can be generalized only to those VCPs who are members of their respective professional organizations in Michigan. We relied on membership lists of 2 professional state associations, so VCPs who do not belong to these organizations were not contacted. The Michigan Society of Eye Physicians and Surgeons estimates that 72% of ophthalmologists in Michigan are members, and the Michigan Optometric Association estimates that 60% of optometrists belong to their organization. By randomly sampling the resource population and by obtaining a substantial response rate, we have a sound basis to accurately estimate the responses of members of these 2 organizations.

In conclusion, VCPs who were members of 2 professional organizations in Michigan frequently encounter the need to consider their patients’ visual capabilities in relation to safe driving and to counsel their patients accordingly. They make use of common visual function tests to do so but rarely perform vision tests that may be more closely associated with driving difficulties such as visual attention and processing speed testing. Likewise, the questions that they usually ask about driving cover some but not all common tasks associated with crash risk. The
use of such tests and queries would provide for a more complete assessment of visual aspects associated with safe driving.

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Correspondence: David C. Musch, PhD, MPH, Department of Ophthalmology and Visual Sciences, University of Michigan, 1000 Wall St, Ann Arbor, MI 48105 (dmusch@umich.edu).

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Additional Contributions: The Michigan Optometric Association and the Michigan Society of Eye Physicians and Surgeons endorsed this research and granted access to their membership rolls for participant recruitment purposes.

REFERENCES