

Supplemental Table 1. Summary of Evidence on Low Vision Interventions to Promote Driving and Community Mobility for Older Adults With Low Vision

Author	Study Objectives	Level/Design/Participants	Intervention and Outcome Measures		Results	Study Limitations
			Driving Simulation	Outcome Measures		
Akinwuntan et al. (2005)	To determine the effectiveness of simulator-based training on driving performance and safety poststroke	Level I RCT <i>N</i> = 73 participants with first stroke age <75 yr who were able to legally drive before the stroke (~25% had visual field loss)	<p><i>Intervention</i></p> <p>Regular hospital rehabilitation programming and driver simulator training, 15 hr over 5 wk</p> <p><i>Control Group</i></p> <p>Driving-related cognitive tasks</p> <p><i>Outcome Measures</i></p> <ul style="list-style-type: none"> • Fitness-to-drive evaluation classification (unfit to drive, temporarily unfit to drive, fit to drive) • On-road test performance 	<p>73% of intervention participants who completed the follow-up assessment passed and could legally resume driving compared with only 42% of control participants (<i>p</i> = .03).</p> <p>Simulator outcomes showed significant reductions in collisions, pedestrian hits, and total faults (all <i>ps</i> < .001) for the intervention group.</p>	<p>The authors provided limited description of the simulator protocol and of the measure for determining fitness to drive, limiting reproducibility.</p> <p>Only about 25% of participants were reported to have visual field loss; their outcomes were not differentiated from those of participants with no visual field loss.</p> <p>No significant difference was found between the intervention and control groups regarding visual field loss.</p> <p>Simulated outcomes were not compared with on-road measures, so the study lacks ecological validity.</p>	
Multidisciplinary Low Vision Rehabilitation						
Lamoureux et al. (2007)	To evaluate the effectiveness of a multidisciplinary low vision rehabilitation program on quality of life	Level III Before-and-after design <i>N</i> = 192 participants with AMD <i>M</i> age = 80.3 ± 13.1 yr	<p><i>Intervention</i></p> <p>Multidisciplinary low vision services to help participants use their remaining vision, improve participation in daily living, and improve quality of life after an initial assessment at a low-vision clinic with a member of the multidisciplinary team usually made up of occupational therapy, orientation and mobility, orthoptics, and welfare specialists</p> <p>Devices and rehabilitation program provided for up to 6 mo</p> <p><i>Outcome Measures</i></p> <p>Impact of Visual Impairment (IVI): self-reported restriction of participation in daily living activities on the basis of ability to read and access information and emotional well-being, and level of mobility and independence</p>	<p>Participants showed significant improvements on all IVI subscales except the Mobility and Independence subscale.</p> <p>The highest effect size was obtained for the Emotional Well-Being subscale.</p>	<p>A limited number of participants took advantage of occupational therapy or O&M services (<i>n</i> = 48 participants).</p> <p>Comorbidities may have led to decreased O&M scores.</p> <p>No control group was used.</p> <p>The discussion of the IVI instrument and Independence subscale lacks detail on how the items contribute to the construct of community mobility.</p>	

(Continued)

Supplemental Table 1. Summary of Evidence on Low Vision Interventions to Promote Driving and Community Mobility for Older Adults With Low Vision (cont.)

Author	Study Objectives	Level/Design/Participants	Intervention and Outcome Measures		Results	Study Limitations	
			Driver Education Programs	Low Vision Devices (Bioptics and Prisms)			
Owsley, McGwin, Phillips, McNeal, & Stalvey (2004)	To evaluate the efficacy of a program that teaches older drivers at high risk for crash involvement and motivated to remain behind the wheel the effects of their functional deficits on driving skills and compensatory strategies such as self-regulation	Level I RCT $N = 403$ licensed drivers with visual impairment ages ≥ 60 yr in the Birmingham, Alabama, area who had been the driver in a crash in the prior yr and had a Mini-Mental State Examination score of ≥ 23	<p><i>Intervention</i></p> <p>Usual care (comprehensive examination by an optometrist; discussion with an eye care specialist of the impact of diagnosed visual impairment on activities of daily living, including driving) plus 2 educational sessions that included an initial 2-hr visit followed by a booster session 1 mo later</p> <p><i>Control Group</i></p> <p>Usual care alone</p> <p><i>Outcome Measures</i></p> <ul style="list-style-type: none"> Crash involvement during 2-yr follow-up Average weekly mileage and average days, trips, and places driven per wk measured at 6-, 12-, 18-, and 24-mo interviews 	At 2-yr follow-up, no difference was found in crash rates between the two groups. Both groups reported decreases in mileage driven, with a more significant decrease ($p = .02$) occurring in the intervention group.	Outcomes for the 2-yr follow-up were self-reported.	Two intervention sessions may not have been enough to change behaviors for the long term.	The education provided may have made participants overconfident in their ability to continue driving.
Stalvey & Owsley (2003)	To evaluate the efficacy of a theory-based intervention for high-risk older drivers	Level I RCT $N = 365$ participants ages ≥ 60 yr who were legally licensed to drive in Alabama, who had visual acuity of 20/30 to 20/60 and/or visual processing deficits and who had a high level of driving exposure and a history of crash involvement M age = 74 yr	<p><i>Intervention</i></p> <p>Usual care plus 2 educational sessions that included an initial 2-hr visit followed by a booster session 1 mo later</p> <p><i>Control Group</i></p> <p>Usual care</p> <p><i>Outcome Measure</i></p> <p>Driver Perceptions and Practices Questionnaire before and after interventions</p>	Participants in the educational program reported a significantly greater level of perceived vision impairment and understanding about its impact on driving and a significantly higher number of perceived benefits of self-regulation.	Outcomes for the 2-yr follow-up were self-reported.	Two intervention sessions may not have been enough to change behaviors for the long term.	The education provided may have made participants overconfident in their ability to continue driving.
Bowers, Apfelbaum, & Peli (2005)	To determine participants' perceived ability to continue driving safely after receiving bioptic telescope training	Level III Cross-sectional survey study design $N = 58$ drivers with visual impairments who had recent experience in driving with a bioptic telescope and who used or were trained to use bioptics during driving within the past 3 yr Age range = 17–86 yr	<p><i>Intervention</i></p> <p>No intervention; previous participation in driver training with the use of bioptics</p> <p><i>Outcome Measures</i></p> <p>Driving Habits Questionnaire (DHQ), supplemented with questions specific to driving with bioptic telescopes</p>	83% of participants reported driving themselves. 72% rated their driving as above average. 84% reported driving with the general flow of traffic. 88% were moderately or very confident using bioptics while driving.	Several participants were referred to physicians to assist in answering questions on the DHQ.	Participants' age range of 17–86 limits generalizability to the older population. Outcomes were not differentiated by age.	No details were provided on dosage of driver training with bioptics (time, intensity, duration).

(Continued)

Supplemental Table 1. Summary of Evidence on Low Vision Interventions to Promote Driving and Community Mobility for Older Adults With Low Vision (cont.)

Author	Study Objectives	Level/Design/Participants	Intervention and Outcome Measures	Results	Study Limitations
Szlyk, Seiple, Laderman, Kelsch, Ho, & McMahon (1998)	To test the effectiveness of a bioptic, peripheral vision-enhancement lens in participants with retinitis pigmentosa, choroidemia, and Usher's syndrome Type II	Level II Crossover design N = 15 M age = 45.2 yr; range = 27–67 yr	<i>Intervention</i> O&M training, 4 weekly 3-hr sessions; driving training, 8 weekly 2-hr sessions <i>Outcome Measures</i> • <i>O&M assessment:</i> Visual skill tasks in the domains of recognition, peripheral detection, scanning, tracking, and mobility (outdoor activities; e.g., crossing intersections) • <i>Driving assessment:</i> Visual skill tasks in the domains of recognition, peripheral detection, scanning, tracking, visual memory, and mobility (simulator and on-road skills; e.g., number of accidents, brake response time)	90% were employed, and 85% drove to work. 12% reported 1 crash in the previous 12 mo. No statistically significant differences were found between groups when comparing distribution of scores for improvement. Overall improvement for both groups averaged 37.3%. Mobility scores improved 46.4%. 86% of participants were satisfied or extremely satisfied with bioptics.	The small sample size limits power and generalizability. Only 1 of the 15 participants was >65 yr old. No breakdown was reported for skills specific to O&M or driving, making it difficult to attribute change to outdoor mobility or driving training. No reference was made to crash or on-road performance outcomes (pass vs. fail). Psychometric characteristics of the outcome measures were not reported.
Szlyk et al. (2000)	To evaluate a vision rehabilitation program aimed at training people with visual field loss to use a bioptic telescope to improve life skills, including driving	Level I RCT N = 25 participants (13 male and 12 female) with central vision loss Age range = 16–78 yr	<i>Intervention</i> • <i>Training groups:</i> O&M training, 4 weekly 3-hr sessions, and driving training, 8 weekly 2-hr sessions • <i>Control groups:</i> (1) Delayed training and (2) no training <i>Outcome Measures</i> • <i>O&M assessment:</i> Visual skill tasks in the domains of recognition, peripheral detection, scanning, tracking, and mobility (outdoor activities; e.g., crossing intersections) • <i>Driving assessment:</i> Visual skill tasks in the domains of recognition, peripheral detection, scanning, tracking, visual memory, and mobility (simulator and on-road skills; e.g., number of accidents, brake response time)	Training groups demonstrated improved visual skills in the domains of recognition, peripheral detection, and scanning. No significant improvement was found in the domains of mobility, tracking, and visual memory. However, when driving skills were compared separately, a significant difference was found between the trained and untrained groups ($p = .02$). 82% of participants were very satisfied or extremely satisfied with bioptics.	The small sample size limits power and generalizability. The low proportion (25%) of participants >65 yr old limits generalizability to the older population. Driving-related skill improvement was noted, but no reference was made to crash or on-road performance outcomes (pass vs. fail). Limited detail was provided on how driving items and skills were quantified (possibly mixed domains). Psychometric characteristics of the outcome measures were not reported.

(Continued)

Supplemental Table 1. Summary of Evidence on Low Vision Interventions to Promote Driving and Community Mobility for Older Adults With Low Vision (cont.)

Author	Study Objectives	Level/Design/Participants	Intervention and Outcome Measures		Results	Study Limitations
			Intervention	Outcome Measures		
Szlyk, Seiple, Stelmack, & McMahon (2005)	To compare the outcomes of orientation and mobility and driver training with Fresnel prisms and the Gottlieb Visual Field Awareness System (VFAS) for participants with homonymous hemianopsia	Level II Crossover, cohort design N = 10 men with hemianopsia M age = 52.3 yr; range = 16–74 yr	Lab and outdoor training with Fresnel or Gottlieb VFAS prisms, four 2- to 3-hr sessions; on-road training, eight 2-hr sessions	Participants improved in all skill categories with both of the prism systems, ranging from 36% for mobility (Fresnel prisms) to 13% for recognition (Gottlieb VFAS). No statistically significant differences were found between types of prisms. 100% of the participants were at least satisfied with the prisms. At 2-yr follow-up, 3 of the 7 participants contacted were driving (43%); 2 (29%) were driving with the lenses.	Only 3 of the 10 participants were >65 yr old, limiting generalization to the older population. Sample size was small. The description of the O&M training protocol lacks detail to facilitate reproducibility. Psychometric characteristics of the outcome measures were not reported. No breakdown was reported for items specific to outdoor mobility or driving in each skills domain, making it difficult to attribute change to outdoor mobility or driving training.	
	To determine whether the participants continued to use the optical enhancement devices at 2-yr follow-up		<p><i>Outcome Measures</i> <i>Outdoor functional assessment:</i> Visual skill tasks in the domains of recognition, peripheral detection, scanning, tracking, and mobility (outdoor activities; e.g., crossing intersections) scored by a certified O&M specialist</p> <p><i>Driving skills assessment:</i> Visual skill tasks in the domains of recognition, peripheral detection, scanning, tracking, visual memory, and mobility (simulator and on-road skills; e.g., number of accidents, brake response time)</p>			

Note. AMD = age-related macular degeneration, M = mean; O&M = orientation and mobility, RCT = randomized controlled trial.

This table is a product of AOTA's Evidence-Based Practice Project and the *American Journal of Occupational Therapy*. Copyright © 2013 by the American Occupational Therapy Association. It may be freely reproduced for personal use in clinical or educational settings as long as the source is cited. All other uses require written permission from the American Occupational Therapy Association. To apply, visit www.copyright.com.

Suggested citation: Justiss, M. D. (2013). Occupational therapy interventions to promote driving and community mobility for older adults with low vision: A systematic review (Suppl. Table 1). *American Journal of Occupational Therapy*, 67, 296–302. <http://dx.doi.org/10.5014/ajot.2013.005660>