



AOTA Critically Appraised Topics and Papers Series

**Driving and Community Mobility
for Older Adults**

**A product of the American Occupational Therapy Association's
Evidence-Based Literature Review Project*

CRITICALLY APPRAISED PAPER (CAP)

Focused Question

What is the evidence for the effect of policy and community mobility programs (e.g., alternative transportation, walkable communities, education, and pedestrian programs) on the participation of the older adult?

Marshall, S. C., Spasoff, R., Nair, R., & Walraven, C. (2002). Restricted driver licensing for medical impairments: Does it work? *Canadian Medical Association Journal*, 167, 747–751.

PROBLEM STATEMENT (JUSTIFICATION OF THE NEED FOR THE STUDY)

State the problem the authors are investigating in this study.

Drivers with medical conditions related to visual, cardiac, arthritis, cognitive, and neurological systems are associated with increased risk of motor vehicle crashes. In some jurisdictions, individuals with these conditions are restricted from driving. In other jurisdictions, individuals with these conditions are offered restricted or conditional licenses. The effectiveness of these restricted licensing programs is unknown. It is important for physicians identifying medically unfit drivers, government policy-makers, and society to understand the impact of these restricted licensing programs to make sound judgments regarding establishment and use of the programs.

RESEARCH OBJECTIVE(S)

List study objectives.

Evaluate the rates of crashes and traffic violations among drivers with restricted licenses compared with the rates in the general driving population, and compare the crash and traffic violation rates before and after driver restrictions were imposed.

DESIGN TYPE:

Cohort

Level of Evidence:

II

Limitations (appropriateness of study design):

Was the study design type appropriate for the knowledge level about this topic? *If no, explain.*

Yes

No

SAMPLE SELECTION

How were subjects selected to participate? Please describe.

No sampling, population study inclusive of the dates when accurate records were kept.

Inclusion Criteria

Drivers who held a valid license between 1/1/92 and 4/19/99.

Exclusion Criteria

- Drivers with a license class higher than 5 because these tended to be commercial drivers with more experience and training
- Drivers born before 1/1/00 because birth date was unreliable
- Drivers with restrictions solely for alcohol or substance abuse

Sample Selection Biases: *If yes, explain.*

Volunteers/Referrals

Yes

No

Attention

Yes

No

Others (list and explain):

SAMPLE CHARACTERISTICS

N = 703,758

% Dropouts	<input type="text" value="0"/>		
#/(%) Male	<input type="text" value="345,071"/>	#/(%) Female	<input type="text" value="358,687"/>
Ethnicity	<input type="text" value="NR"/>		
Disease/disability diagnosis	<input type="text" value="23,185 of the drivers had some type of medically related condition resulting in a restricted driving or licensure status. The medical conditions of this group were not specifically identified."/>		

NR = Not reported.

Check appropriate group:

<20/study group	20–50/study group	51–100/study group	101–149/study group	150–200/study group <input checked="" type="checkbox"/>
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Sample Characteristics Bias: If no, explain.

If there is more than one study group, was there a similarity between the groups?

Yes	<input type="text"/>
No	<input type="text"/>
N/A	<input checked="" type="text"/>

Were the reasons for the dropouts reported?

Yes	<input type="text"/>
No	<input type="text"/>
N/A	<input checked="" type="text"/>

INTERVENTION(S)—Included are only those interventions relevant to answering the evidence-based question.

- Driving restrictions; allow for driving under specific conditions, such as only during daylight hours or within a certain radius of a person's home.
- Licensing restrictions; physical examination or periodic eye examinations are required.
- Restrictions were imposed on an individual basis and dictated by the individual driver's needs and impairments.

Add groups if necessary.

Group 1

Brief Description	Drivers with an imposed restriction on driving and licensure
Setting	Driving on public roadways in Saskatchewan
Who Delivered?	Government-imposed restrictions carried out by driver
Frequency?	100% of driving following imposed restriction
Duration?	Duration of driving years, but tracked for 4 years following imposition

Intervention Biases: Explain, if needed.

Contamination

Yes

No

Co-intervention

Yes

No

Timing

Yes

No

Site

Yes

No

Use of different therapists to provide intervention

Yes Drivers carried out their own restrictions and may not have been consistent or accurate with the imposed restrictions

No

MEASURES AND OUTCOMES—Included are measures relevant to answering the focused question.

Name of measure:

Crash and traffic violation statistics

Outcome(s) measured (what was measured?):

Number of crashes resulting in an insurance claim and all traffic violations were collected from the database of licensed drivers through Saskatchewan Government Insurance.

Is the measure reliable (as reported in article)?

Yes

No

NR

Is the measure valid (as reported in article)?

Yes

No Only crashes resulting in an insurance claim were included in the study, therefore this measure is not indicative of all crashes. Those crashes that are not severe enough to be reported and those that are handled personally may be related to medically related conditions yet were not included in the study.

NR

How frequently was the measure used for each group in the study?

Data were gathered from a database including information from a 7-year, 3-month period

Measurement Biases

Were the evaluators blinded to treatment status? *If no, explain.*

Yes

No

Recall or memory bias? *If yes, explain.*

Yes

No

Others (list and explain):

Limitations (appropriateness of outcomes and measures) If no, explain.

Did the measures adequately measure the outcome(s)?

Yes

No Measuring crash data and violation records are not sufficient in capturing all of the motor vehicle events that occur, particularly in a population that may attempt to hide incidents to preserve license privilege.

RESULTS

List results of outcomes relevant to answering the focused question.

Include statistical significance where appropriate ($p < 0.05$).

Include effect size if reported.

- Restricted license holders were less likely than drivers with unrestricted licenses to have been involved in crashes (83%) versus (75%); $p < 0.001$.
- Drivers with license restrictions had fewer traffic violations than unrestricted license holders (82%) versus 62%; $p < 0.001$.
- Poisson regression analysis, after adjustment for age, gender, and residence—drivers with any restriction (incidence rate ratio [IRR] 1.14, 95% CI (Confidence Interval) 1.11–1.17), drivers with driving restrictions (IRR 1.18, 95% CI 1.10–1.27), and drivers with licensing restrictions (IRR 1.15, 95% CI 1.12–1.18)—has significantly higher crash rates than drivers without restrictions. (These increases were significantly lower than those associated with being male [IRR 2.01, 95% CI 1.99–2.02] or living in an urban area [IRR 1.38, 95% CI 1.3–1.39]).
- Restricted license holders had significantly lower traffic violation rates than drivers without restrictions (IRR 0.93, 95% CI 0.91–0.95).
- With both driving and licensing restrictions imposed, there was a significant decrease of 0.2 (95% CI 0.04–0.39) crashes per 1000 drivers per week after the restrictions were imposed ($p < 0.001$). This is a relative rate reduction of 12.8% (95% CI 2.4%–23.2%).
- Driving restrictions alone were associated with a significant decrease of 0.7 (95% CI 0.38–1.04) crashes per 1000 drivers per week ($p < 0.001$).
- Analysis of weekly traffic violation rates 4 years before and after imposition of restrictions revealed that a combination of driving and license restrictions significantly decreased traffic violations 0.2 (95% CI 4.4%–15.7%) per 1000 drivers after the restrictions were imposed ($p < 0.001$).

Was this study adequately powered (large enough to show a difference)? *If no, explain.*

Yes

No

Were appropriate analytic methods used? *If no, explain.*

Yes

No

Were statistics appropriately reported (in written or table format)? *If no, explain.*

Yes

No

CONCLUSIONS

State the authors' conclusions that are applicable to answering the evidence-based question.

Compared to the general driving population, drivers with restricted licenses had a lower adjusted risk of traffic violations but a higher adjusted risk of at-fault crashes. However, this increased risk of crashes attributable to restricted licenses is significantly smaller than that attributable to male gender or urban residence. Imposition of license restriction was associated with significantly decreased rates of crashes and traffic violations.

License restrictions may decrease crash and traffic violation rates for drivers with medical impairments in several ways, for example by limiting the driving environment thus reducing exposure, increasing drivers' insight into their limitations, and changing driver behavior by self-restriction.

Were the conclusions appropriate for the Study Design (Level of Evidence)? *If no, explain.*

Yes

No

Were the conclusions appropriate for the statistical results? *If no, explain.*

Yes

No

Were the conclusions appropriate given the study limitation and biases? *If no, explain.*

Yes

No

IMPLICATIONS FOR OCCUPATIONAL THERAPY

This section provides guidance about clinical practice, program development, and other implications of the study findings as they relate to the focused question.

Licensing restrictions indicated the greatest impact on decreased crashed and traffic violations. Licensing restrictions are related to the driver's license and may call for periodic physical examination, road testing, and cognitive testing or vision assessment. For jurisdictions that impose licensing restrictions, more professionals will be needed to provide these services. This increased need will increase the demand for occupational therapists to provide driver rehab services so the most appropriate restrictions can be imposed.

Additional research called for by the authors included:

- Assessment of driving exposure with a time-based estimate of crashes and violation risk
- Evaluation of specific driving and licensing restrictions
- Evaluation of the impact of specific medical diagnoses or impairments on crash and traffic violation rates
- Evaluation of the appropriate timing and methods of identifying who would benefit from a restricted license

This work is based on the evidence-based literature review completed by Wendy B. Stav, PhD, OTR/L, SCDCM.

CAP Worksheet adapted from: Critical Review Form – Quantitative Studies ©Law, M., Stewart, D., Pollack, N., Letts, L., Bosch, J., & Westmorland, M., 1998, McMaster University. Used with permission.

For more information about the Evidence-Based Literature Review Project, contact the American Occupational Therapy Association, 301-652-6611, x 2052.



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