



INSTITUTE FOR CIVIL JUSTICE

- THE ARTS
- CHILD POLICY
- CIVIL JUSTICE
- EDUCATION
- ENERGY AND ENVIRONMENT
- HEALTH AND HEALTH CARE
- INTERNATIONAL AFFAIRS
- NATIONAL SECURITY
- POPULATION AND AGING
- PUBLIC SAFETY
- SCIENCE AND TECHNOLOGY
- SUBSTANCE ABUSE
- TERRORISM AND HOMELAND SECURITY
- TRANSPORTATION AND INFRASTRUCTURE
- WORKFORCE AND WORKPLACE

This PDF document was made available from www.rand.org as a public service of the RAND Corporation.

[Jump down to document](#) ▼

The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world.

Support RAND

[Purchase this document](#)

[Browse Books & Publications](#)

[Make a charitable contribution](#)

For More Information

Visit RAND at www.rand.org

Explore [RAND Institute for Civil Justice](#)

View [document details](#)

Limited Electronic Distribution Rights

This document and trademark(s) contained herein are protected by law as indicated in a notice appearing later in this work. This electronic representation of RAND intellectual property is provided for non-commercial use only. Permission is required from RAND to reproduce, or reuse in another form, any of our research documents for commercial use.

This product is part of the RAND Corporation technical report series. Reports may include research findings on a specific topic that is limited in scope; present discussions of the methodology employed in research; provide literature reviews, survey instruments, modeling exercises, guidelines for practitioners and research professionals, and supporting documentation; or deliver preliminary findings. All RAND reports undergo rigorous peer review to ensure that they meet high standards for research quality and objectivity.

TECHNICAL
R E P O R T



Estimating the Accident Risk of Older Drivers

David S. Loughran, Seth A. Seabury



RAND INSTITUTE FOR CIVIL JUSTICE

The research described in this report was conducted by the RAND Institute for Civil Justice.

Library of Congress Cataloging-in-Publication Data

Loughran, David S., 1969-
Estimating the accident risk of older drivers / David S. Loughran, Seth A. Seabury.
p. cm.
Includes bibliographical references.
ISBN 978-0-8330-4139-5 (pbk. : alk. paper)
1. Older automobile drivers—United States. 2. Traffic safety—Study and teaching—United States—
Evaluation. 3. Risk assessment. I. Seabury, Seth A. II. Rand Corporation. III. Title.

HE5620.A24L68 2007
363.12'52—dc22

2007002568

The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

RAND® is a registered trademark.

© Copyright 2007 RAND Corporation

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from RAND.

Published 2007 by the RAND Corporation
1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
1200 South Hayes Street, Arlington, VA 22202-5050
4570 Fifth Avenue, Suite 600, Pittsburgh, PA 15213-2665
RAND URL: <http://www.rand.org/>
To order RAND documents or to obtain additional information, contact
Distribution Services: Telephone: (310) 451-7002;
Fax: (310) 451-6915; Email: order@rand.org

Summary

As the U.S. population ages, so will the population of licensed drivers. Policymakers are concerned that this aging of the driving population will lead to increases in traffic accidents and, consequently, injury to property and person. Although it is uncontroversial that the capacity to safely operate a motor vehicle decreases at older ages, we should expect at least some older individuals to voluntarily limit their driving when they perceive that their ability to drive has diminished. From a policy perspective, the question is whether the elderly self-regulate to the extent that their overall negative impact on traffic safety is no more than that of drivers of other ages.

The research reported here applies an innovative statistical procedure attributable to Levitt and Porter (2001) to estimate how the probability of causing an automobile accident varies with age.¹ At first glance, it might seem that computing this probability by age would be quite simple. All that is needed is to divide the number of automobile accidents caused by drivers of particular ages by a measure of their prevalence on the road (for example, vehicle miles traveled).

However, data needed to compute these statistics have a number of significant limitations. Data on automobile accidents are not collected consistently on a national basis and there is good reason to believe that a large fraction of accidents is never reported to either insurers or public authorities. Moreover, accident fault is not reliably recorded in accident data. Data on vehicle miles traveled are self-reported and error in those self-reports could increase with respondent age.

With appropriate modifications, the approach of Levitt and Porter (2001) allows us to compute the likelihood that an older individual will cause an automobile accident relative to the likelihood that a younger individual will cause an automobile accident employing only high-quality data on counts of two-car fatal accidents involving drivers of different ages. Fatal accidents are reliably reported in FARS. With this approach, we circumvent the problems inherent in using data on all accidents (fatal and nonfatal) and vehicle miles traveled.

Our estimates of what we call the *relative riskiness* of older drivers emerge from a model of the probability of observing fatal crashes between drivers of different types.² The derivation

¹ Levitt and Porter (2001) apply the statistical procedure to the problem of estimating how much likelier drunk drivers are to cause an accident than are sober drivers.

² We cannot distinguish between riskiness due to drivers taking greater risks and that due to declining driving ability or other factors, so *riskiness* throughout this report refers to both types of risk. In general, though, we assume that the increased

of these estimates is technical in nature, but the assumptions needed to formulate the model are transparent and reasonable. Most important, the model assumes that older and younger drivers are “equally mixed” on the road (i.e., older drivers are not disproportionately clustered temporally or geographically) and that older drivers are at least as likely to cause an accident as are younger drivers, where “younger” drivers are defined to be 25–64 years old and “older” drivers are defined to be 65 and older. The former assumption is supported by examining relative riskiness in specific locations and at specific points in time and the latter assumption is supported by studies of the physiology of driving.

Applying our model to FARS data from between 1975 and 2003, we find that drivers 65 and older are 16 percent likelier than drivers 25–64 years old to cause an accident. Given the reasonable assumption that driving ability should worsen as mental and physical conditions deteriorate, it might come as a surprise to some readers that our estimate of the relative riskiness of older drivers is not higher. It is important to recognize, however, that our estimates reflect the riskiness of older drivers who continue to drive. We suspect that the riskiest older drivers significantly limit how much they drive or choose not to drive at all so as to lower the risk that they might cause property damage or injure themselves or others. In other words, older drivers do, in fact, self-regulate.

This conjecture regarding self-regulation is supported by a number of additional findings. Conditional on being in an accident, we estimate that individuals riding in cars driven by older drivers are nearly seven times likelier to die in an auto accident than are individuals riding in cars driven by middle-aged drivers. Since the ages of passengers and drivers are highly positively correlated, this finding suggests that older individuals are much likelier to die in a car accident than are middle-aged individuals. Consequently, self-preservation provides considerable incentive for older individuals to curtail their driving (and perhaps car travel in general). And, in fact, our estimates imply just that: By our estimates, older licensed drivers drive only 60 percent as many miles as do middle-aged individuals.

Finally, we find that our estimate of relative riskiness actually falls between 55 and 70 years old. An explanation for the decline in relative riskiness between these ages is that self-regulation becomes increasingly effective with age. Only the healthiest and safest drivers continue to drive at more advanced ages.

An alternative to the self-regulation hypothesis is that state licensing regulations have succeeded in identifying the riskiest older drivers and discouraging them from driving. That is, in the absence of state licensing regulations targeted at older drivers, such as mandatory vision and road tests, accelerated and in-person renewal policies, and mandatory physician reporting of medical conditions to state licensing authorities, older drivers would be much riskier than we estimate them to be. However, this hypothesis is not supported by existing empirical evidence. Most studies find little or no correlation between measures of the riskiness of older drivers and the existence of specific state licensing policies. We also note that our estimates indicate that the relative riskiness of older drivers changed little between the early 1970s and the last period of our data, 1998–2003, a time during which many states adopted more stringent licensing requirements for older drivers.

riskiness of older drivers is due to their declining ability rather than an increased likelihood of taking chances.