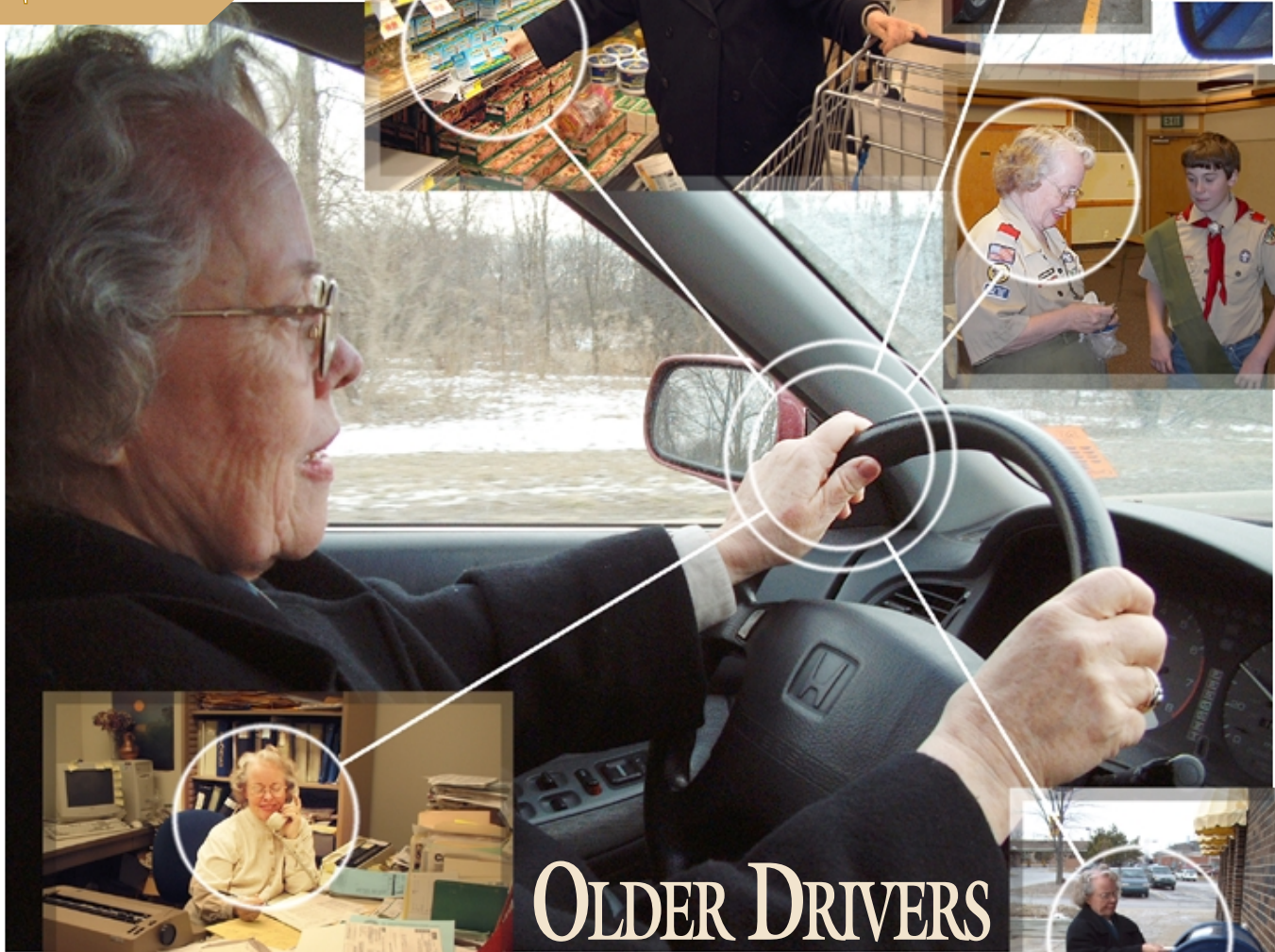


RESEARCH REVIEW

• UNIVERSITY OF MICHIGAN TRANSPORTATION RESEARCH INSTITUTE • OCTOBER–DECEMBER 2001 • VOLUME 32, NUMBER 4 •

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OLDER DRIVERS Making Decisions They Can Live With

on page 1

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Transportation Tidbits

• In 1999, 85,000 pedestrians were injured and 4,906 were killed in traffic crashes in the United States, representing 3 percent of all the people injured in traffic crashes and 12 percent of all traffic fatalities.[†]

• On average, a pedestrian is killed in a motor vehicle crash every 107 minutes, and one is injured every six minutes.[†]

• In 1900, the National Auto Show debuted at Madison Square Garden in New York.[§]

• On July 4, 1909, the first public road paved with Portland cement opened in Wayne County, Michigan.[°]

• The first automobile headlight flashers appeared on the Fiat 1500 model in Italy in 1935.[°]

• In 1938, General Motors' Oldsmobiles were the first line of cars to offer automatic transmission. The "Hydra-Matic drive" was based on technology developed in the early 1900s by German manufacturers of marine engines.[‡]

• In 1953, America's first sports car, the Chevrolet Corvette, was introduced. Only 300 were built that year.[°]

• The first compulsory automobile exhaust emission controls were introduced in California in 1965. By 1968, every state had some sort of emission control standard.[°] **RR**

Sources:

[‡] Ask Yahoo!,

<http://ask.yahoo.com/ask/20011022.html>

[§] Chicago Tribune,

<http://cgi.chicago.tribune.com/autos/diversio/100years/chronbtm.htm> (no longer online)

[†] Fatality Analysis Reporting System (FARS) Web-Based Encyclopedia, <http://www-fars.nhtsa.dot.gov/>

[°] *On the Move: A Chronology of Advances in Transportation* by Leonard C. Bruno

Safe and efficient mobility for older drivers has become a complex issue for society. Several factors contribute to this complexity, including the increased representation of older drivers in the population, their elevated crash rate, their greater likelihood of injury in a crash, and the linkage between driver licensure and emotional well-being.

People age 65 and up account for an increasingly greater proportion of the U.S. population. In 1950, less than 10 percent of the population was over 65 years of age. Today about 13 percent, or 35 million people, are over 65, and by 2050, seniors will account for 21 percent of the population, or 70 million people. Evidence suggests that after age 65 to 69, the crash involvement rate by miles driven begins to show a steep increase with increasing age. Although older drivers restrict their driving to times and situations in which they feel safest, they have a higher crash rate, per mile driven, than drivers in other age groups. At the same time, when crash involvement rates are calculated per number of licensed drivers, the rate of

Older Drivers on the Go

Making Decisions They Can Live With



PHOTOS THROUGHOUT FEATURE ARTICLE: UMTRI / DAVID W. EBY

seatbelts, they don't drink and drive, and they don't speed or drive aggressively. But due to declining abilities, it is harder for them to drive. As drivers age, they compensate for driving situations that make them

uncomfortable, like freeway driving, making left turns, driving at night, and driving in unfamiliar situations."

The Need for Mobility

Older people want to remain mobile to participate in leisure and daily-life activities. Michael Sivak, head of the UMTRI Human Factors Division, and a team of researchers report that more than half of all older adults take their cars on a driving vacation at least once a year and over 30 percent enjoy driving for pleasure. They also found a significant correlation between self-reported life satisfaction and the ability to engage in personal travel.

and a team of researchers report that more than half of all older adults take their cars on a driving vacation at least once a year and over 30 percent enjoy

An older driver said, "Driving enables me to live. Not driving would be crippling."

higher probability of being seriously injured or killed in a crash.

However, David W. Eby, an associate research scientist in UMTRI's Social and Behavioral Analysis (SBA) Division, says, "Older drivers are generally safe drivers—they wear their

Indeed, there is growing evidence that the ability to drive is an essential component of an older person's well-being. In a 1988 study for the Transportation Safety Board, Frances M. Carp found that an important component of well-being is

continued...

As the driving population matures, there will be increasing focus on older drivers.

In recognition of the statistical and practical importance of age differences on driver performance, almost every UMTRI study over the last decade has included both older and younger drivers.



a person's ability to participate in activities that give life an "acceptable and positive quality." This sense is achieved through social interaction, recreation, spirituality, and feeling useful, and generally cannot be achieved within the older person's home. Reduced mobility can lead to a potential decline in emotional well-being and quality of life. In a multiyear research project on reduction and cessation of driving by older people, Lidia Kostyniuk, an associate research scientist in the SBA Division, and Jean Shope, SBA division head, found that respondents consistently felt that driving was of central importance in their lives. They identified driving as most important in terms of contributing to feelings of freedom and independence, as well as a necessity for shopping, errands, and appointments. One respondent said, "Driving enables me to live. Not driving would be crippling." Overall, though, older drivers had not given much thought to the time when they might not be able to drive, or how they would meet their mobility needs. Another respondent admitted, "I don't even want to face [thinking about] it." Another felt, "I couldn't conceive of not being able to drive. I've never thought about it, and yet I know logically that's a ridiculous way to look at it."

Older people are driving as long as they can. Many may find it impractical or impossible to rely on family members, walking, or public transportation to get around, so driving remains their primary mode of transportation. About 90 percent of older drivers drive their own cars as their main form of transportation, and nearly all former drivers ride as passengers in cars belonging to friends or family for most of their trips.

In-vehicle telematics—such as global positioning systems, head-up displays, etc.—may help seniors to drive more confidently, but only if the devices are designed with older drivers' needs in mind. Paul Green, a senior research scientist in UMTRI's Human Factors Division, found that the visual demand of older drivers (as measured by visual occlusion) was 15 to 50 percent greater than that of younger drivers. He says, "Older drivers felt they needed to see the road more frequently, and therefore had much less time to look away from the road at telematics. [Older drivers] experience considerably more difficulty in completing telematics tasks, and it is therefore essential

that safety and usability evaluations focus on them. If older drivers are able to complete a task safely and

easily, other drivers will be able to as well." Likewise, Paul Olson, an UMTRI emeritus research scientist, found that any changes that make things easier for older drivers—such as improved visibility and legibility of highway signs and truck markings—would also make things easier for drivers as a whole.

Kåre Rumar, a visiting scholar in the Human Factors Division, agrees. He says, "We should not be content with improved safety at the cost of a reduced quality of life. Ideally, safety should be improved or maintained without limiting the mobility of seniors."

Making Informed Driving Decisions

So, what's the answer? Eby says, "Giving up driving is not realistic for all older drivers and may have other adverse consequences for both older drivers and society as a whole. While studies focused on solving the problem of maintaining safe and efficient mobility for older drivers continue, there is

general agreement among traffic-safety professionals that both clinical and self-assessment of older drivers are important components of the solution.”

Recent research sought to determine the extent to which decisions about planned driving-related behaviors (such as driving compensation, driver retraining, and clinical evaluation) were related to actual on-the-road driving experience. The project was funded by General Motors pursuant to an agreement with NHTSA, and conducted by Eby, Shope, Lisa Molnar, senior research associate, Jonathon Vivoda, research associate, and Tiffani Fordyce, research assistant.

“The science of driving assessment is in its infancy,” Eby says. “We have tests for vision or cognitive problems, but we don’t know how these directly affect a person’s ability to drive. One approach to assessment is to keep people informed about their driving abilities so that they can make better decisions about where and when to drive. Doctors, who are not driving experts, may not have all the answers on exactly how a specific condition affects a person’s driving ability. Early detection and evaluation can help, as a first step. Self-evaluation can provide feedback and help people figure out how to continue driving safely.”

To this end, the idea of a tool to help older drivers make informed driving decisions was born. The *Driving Decisions Workbook* was created to

increase safety in the older driver population by providing a self-evaluation tool, intended for drivers who may be starting to experience declines in

Decisions Workbook can give feedback for making good driving decisions by increasing self-awareness and general knowledge, and by suggesting appropriate driving restrictions and further clinical assessment.”

The workbook is also useful in generating discussions within families and with peers about age-related declines. In a focus group study, Kostyniuk, Eby, and Shope found that adult children of older drivers found it difficult to talk to their parents about their driving. Only a few adult children reported comfortable conversations in which both sides discussed issues and concerns and came to a mutual solution. Eby says, “Most of us have older people in our families and we may have concerns about their driving. Self-evaluation can help families with that process because it’s a nonthreatening tool to use in their own home.”

The workbook was developed in three stages: collecting background information and creating a framework, determining what questions to ask and how to offer feedback (including pilot testing), and validating the workbook to make sure the instrument measured what it was supposed to measure and to determine whether self-awareness was increased.

The framework for the workbook was developed by first considering factors that affect all drivers, such as

health, driving abilities, driving skills, driving experiences, and appraisal of driving. The framework is shown in *continued...*

Trends for Older and Former Drivers

In a study on reduction and cessation of driving among older drivers in Michigan, UMTRI researchers Lidia Kostyniuk, Jean Shope, and Lisa Molnar found the following trends:

Older Drivers in General

- Participated in out-of-home activities much more frequently than did former drivers
- Were much more satisfied than former drivers with their ability to get places
- Said they would rely on others (spouse, children, family, and friends) for rides if they had to stop driving

Older Drivers Anticipating Problems

- Were more likely to ride as passengers and therefore drove fewer miles
- Were more likely to have started thinking about what they might do if they could no longer drive, and to make arrangements for rides
- Seemed to accept the possibility of having to stop driving more than others

Former Drivers

- Were in poorer health than drivers
- Made fewer long distance trips (as passengers) than drivers
- Stopped driving mainly due to health reasons, such as vision problems or a sudden illness or injury
- Did not anticipate stopping driving five years prior to actually stopping
- Reached the decision to stop driving on their own

driving abilities or loss of confidence in certain driving situations. Eby says, “For those willing and able to assess their own driving abilities, the *Driving*

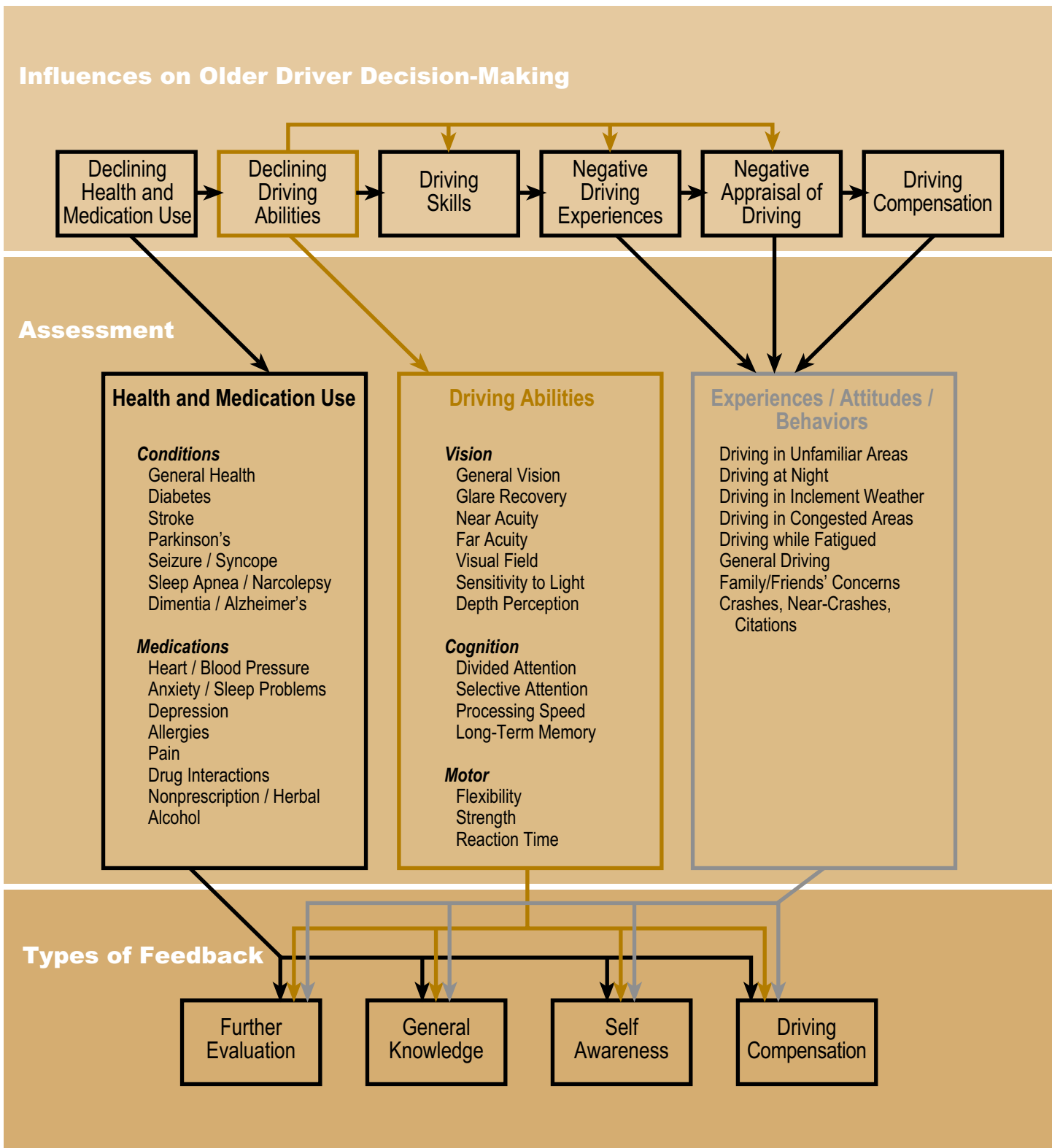


FIGURE 1. The framework of the *Driving Decisions Workbook*. The driver model includes three assessment domains: health and medication use, driving abilities, and experiences. The workbook provides feedback for each assessment area.

Figure 1. All of these lead to decisions a person makes about how they drive. For older drivers, health and driving ability may be declining, and their driving experience may be negative due to being honked or gestured at, or

being involved in crashes or near crashes. Older people may then feel less confident, and begin to use driving compensation strategies.

Based on the framework, the researchers determined which ques-

tions to include. In general, four kinds of feedback are available for each topic: general knowledge about how the problem is related to driving, self-awareness, driving compensation tips, and recommendations for further



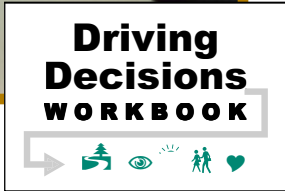
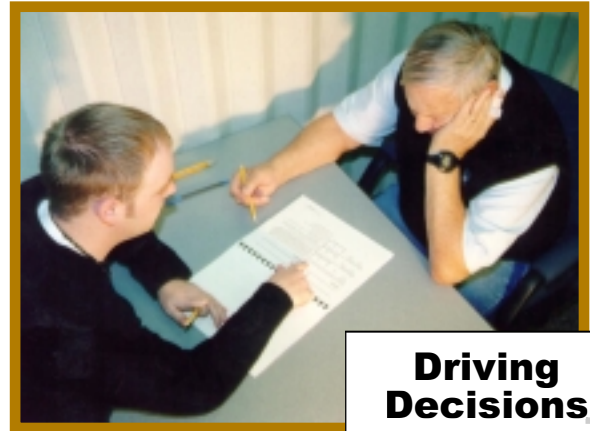
evaluation (like going to the doctor, etc.). A general question and answer section at the end of the workbook covers additional topics. It provides how-to information such as using the information learned from the workbook when visiting the doctor, planning for future driving needs, understanding general traffic safety, and approaching friends who may have a problem.

In the pilot testing stage, the workbook was completed by 99 licensed Michigan drivers age 65 and over. The drivers also completed a standardized on-the-road driving course scored by a trained evaluator.

In the validation phase, the drivers were asked several follow-up questions on driving-related decisions. A score for the driving course was derived for each subject, based on the number of driving problems associated with specific driving performance, such as visual search and proper use of signals. Some of the key questions and driving correlations are shown in Figure 2.

Research showed that self-reported decisions about planned driving-related behaviors are related to actual on-the-road driving experience. Older drivers in the study had

insight about their difficulties with driving and appropriately adjusted their driving to compensate. Also, the high correlation between driving performance and how often subjects reported passing up opportunities because of concerns about driving suggests that this question might serve as a useful one-item screen for potential driving problems for clinicians and health care practitioners.



Finally, the finding that drivers who were either planning to make changes in the way they drive or were more likely to think about taking driver retraining after completing the workbook suggests the workbook may be a valuable tool for older driver self-assessment. The validation phase also focused on correlations among workbook responses, driving performance, and various clinical tests of driving-related abilities.

The workbook, currently in beta format, is available at <http://www.umtri.umich.edu/library/pdf/2000-14.pdf>. Future plans include securing a sponsor to redesign and print the workbook as a full-color, glossy brochure and to distribute it in partnership with, for example, an organization with older members or through doctors' offices. Eby would also like to develop a web-based version of the workbook, where people get automatic feedback based on their input, links to more information than available in a printed version, and possibly certain physical tests, such as a vision test, that can be completed online.

RR

For a related story, see "Older Drivers and Advanced Traveler Information Systems" in the July–September 1999 issue of *UMTRI Research Review*.

Follow-Up Questions for Drivers Who Completed the Workbook	Correlation to Actual Driving
• Now that you have completed the workbook, are you planning to make any changes in the way you drive?	.39 ^Δ
• Did completing the workbook make you think more about the possibility of taking a driver refresher course or how such a course might benefit you?	.34 ^Δ
• Now that you have completed the workbook, do you think you will be more likely to have a doctor check your seeing, thinking, or movement abilities?	.17
• How often do you avoid driving at night?	.26 [†]
• How often do you avoid making left turns across oncoming traffic?	.30 [*]
• How often do you avoid driving in bad weather (rain, snow, fog, etc.)?	.27 [*]
• How often do you avoid driving on high-traffic roads?	.21 [†]
• How often do you avoid driving in unfamiliar areas?	.29 [*]
• How often do you pass up opportunities to go shopping, visit friends, etc., because of concerns about driving?	.42 ^Δ
key: * p < .05 Δ p < .01 † p < .001	

FIGURE 2. Correlations between self-reported driving decisions and actual driving.

On a Roll with the

CNTS

Center for National Truck Statistics



PHOTOS AT LEFT: UMTRI / SHEKHAR ERRINGTON



CNTS interviewers gather detailed physical descriptions, from people across the country, for over 5,000 trucks involved in fatal crashes each year. Pictured left to right are Bob Pichler, Robert Allen, Rob Flowers (also inset), and Amy Marcinkowski.

The previous issue (volume 32, number 3) of UMTRI Research Review highlighted Ken Campbell's career and touched on the Center for National Truck Statistics (CNTS). This article provides a more in-depth look at CNTS.

UMTRI researchers have been conducting annual national surveys on fatal accidents involving medium and heavy trucks since 1980. From 1985 to 1987, they conducted a major national survey of truck travel, the National Truck Trip Information Survey. In 1988, this program was formalized as the Center for National Truck Statistics (CNTS).

Dan Blower, director of CNTS and assistant research scientist in UMTRI's Survey and Analysis Division, says, "Our goal is to provide high-quality, reliable, complete statistics on medium and heavy truck involvements in accidents and to advance understanding of heavy truck safety." CNTS provides that data, known as the Trucks Involved in Fatal Accidents (TIFA) file, to the Bureau of Transportation and Statistics' Intermodal Transportation Data Base (<http://www.itdb.bts.gov/>), NHTSA, FMCSA,

and other researchers and research institutions. The data comes in a comma-delimited file for easy import into most database and analytical programs. A comprehensive set of statistics from the TIFA database is also available, as a set of tables based on the data, in the *Trucks Involved in Fatal Accidents Factbook*. "We want our data to be used as widely as possible to promote other research," Blower says.



The Team Behind the Data

Starting with data from NHTSA's Fatality Analysis Reporting System (FARS), the CNTS team researches each incident, adds detailed data to each case, and then disseminates the more comprehensive data as the TIFA file. Blower says, "There is a mismatch of about 10 percent in what FARS and UMTRI classify as a truck. For example, 5 to 6 percent of heavy trucks classified in FARS as light vehicles, and 2 to 3 percent of vehicles categorized by FARS as heavy trucks are non-trucks."

(UMTRI defines a truck as a nonpassenger vehicle, used primarily for hauling cargo, with a gross vehicle weight rating of at least 10,000 pounds.)

The FARS file provides data about vehicles involved in fatal accidents from which UMTRI selects trucks and other vehicles that may be trucks. UMTRI's CNTS staff obtains police reports for each of the cases, checks them against the FARS file, and notes additional information. An extensively-trained interviewer then contacts the truck driver, owner-operator, dispatcher, safety director, police officer, or witnesses to get a detailed physical description of the truck. Interviewers collect information to determine whether the vehicle is a truck, and if it is, they obtain an extensive description

of the physical configuration of the truck at the time of the accident. Details collected for each unit in the combination include weight, length, number of axles, cargo body type, cargo type and weight, and whether the cargo was hazardous. Cab style, type of fuel, and whether the truck had a sleeper is determined for the power unit, and the truck operator's company type is also determined. Editors compare details about the truck and cargo with

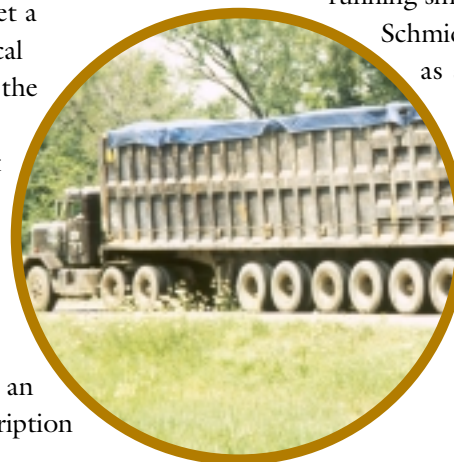
manufacturers' specifications that the CNTS staff has been collecting for the past twenty years.

Blower is quick to point out that he works with an exceptional team. The survey is run by Raymond Masters, a long-time UMTRI employee. Cases are edited by Leslie Pettis, who has been working on the project since the first survey in 1980. Research associates Anne Matteson and Devi Putcha perform much of the analytical and data quality work, while administrative assistant Betty Brenay keeps things running smoothly. Christine

Schmidt serves as staff

interviewer and mentors and helps train the interviewer team. Blower says, "Our telephone interviewers have to be very knowledgeable about trucks because they deal with people who have this knowledge. They have to understand all the ways in which trucks are described in different parts of the country and ask the right questions to get the data we need. The quality of our data depends on our interviewers' painstaking attention and care."

He continues, "We handle 5,500 cases (individual incidents of trucks involved in fatal accidents) per year. It's an organizational feat to get the police reports, make calls to gather detailed information about each case, ensure all cases are accounted for, and scrutinize each case at many stages along the way. Each case is checked at least three times by hand, as well as by computer at two major stages of completion."
continued...



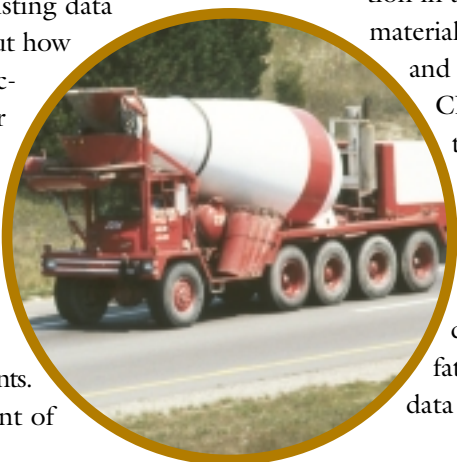
Interdisciplinary Projects

CNTS also contributes data analysis to UMTRI research projects. Blower says, “Our analysis of the real-world safety experience, especially truck operations, complements the laboratory- and clinical-based research of other UMTRI divisions.”

CNTS is collaborating with the Human Factors and Biosciences Divisions on a study of how truck mirrors are used, ultimately to provide data on how truck mirrors should be positioned for the best view around the truck. CNTS provides accident analysis both by reviewing and analyzing current literature on the topic and by creating an accident database to advance understanding of the safety role truck mirrors can play. Factors such as type, position, and material of mirrors are being investigated. Michael Flannagan, a senior associate research scientist with Human Factors, is the project director, working with Matt Reed, an assistant research scientist in Biosciences, and Paul Green, a senior research scientist in Human Factors.

In a joint project—sponsored by the Federal Highway Administration—with Freightliner and Praxair, CNTS worked with UMTRI’s Engineering Research and Human Factors Divisions to examine whether truck rollovers could be reduced by real-time driver alerts of rollover threshold. CNTS performed accident data analysis, exhaustively reviewing existing data

to figure out how rollovers occur. Blower explains, “Rollover is a major factor associated with heavy truck accidents. Sixty percent of



truck drivers who die in an accident were involved in rollovers, and rollovers increase the likelihood of fatality thirty times. We selected a random sample of 250 rollover events to ascertain if there was a population for which warning and intervention could prevent rollovers. The analysis of accident data and the detailed review of 250 rollovers suggests that 30 to 40 percent of rollovers might be addressed by a rollover warning or intervention system.” Chris Winkler, a research scientist in Engineering Research, is the project manager, and he and John Sullivan, an assistant research scientist in Human Factors, are coprincipal investigators on the project.

Full Speed Ahead

Several new projects are also underway. “Very little is known about the types of buses involved in fatal accidents,” Blower says. He foresees CNTS expanding the data available in this area, to better determine the physical nature of the bus (type and size), as well as the type of bus operation, distinguishing schools, intercity, municipal transit, local shuttle operations, and so on. CNTS staff is working with bus data from 1999, and will continue the survey into subsequent years.

CNTS is working with the Battelle Memorial Institute in Columbus, Ohio, to examine ways to improve data collection in accidents involving hazardous materials. Current data is incomplete and not systemically collected.

CNTS is surveying stakeholders to determine what data they want, and helping to formulate a protocol to collect it.

In the future, Blower would like to improve the quality of data for trucks involved in non-fatal crashes. “There is a serious data deficit in this area,” Blower

The Center for National Truck Statistics collects, evaluates, and disseminates detailed data on medium and heavy trucks involved in fatal accidents. Its major annual offerings include:

- *The TIFA file*, a comma-delimited data file, which is documented by a detailed codebook with names, code values, and univariate frequencies for all variables in the dataset.
- *Trucks Involved in Fatal Accidents Factbook*, a hard copy document that provides descriptive statistics on fatal truck accidents, currently available for 1998 and 1999.

FOR DETAILS, STOP BY

<http://www.umtri.umich.edu/cnts/>.

says, “and a national effort to improve that is in the early stages.”

To help meet its goals, CNTS is supported by government and industry sponsors such as the Federal Motor Carrier Safety Administration, the National Highway Traffic Safety Administration, the Bureau of Transportation Statistics, Sandia National Laboratories, Freightliner, International Truck and Engine Corporation, the Owner-Operator Independent Drivers Association, the American Trucking Associations, Inc., National Seating, and the American Bus Association. **RR**

Truck Photos by UMTRI Staff (left–right)

Page 6: a. Leslie Pettis; b. & c. Cecil Lockhard.

Page 7, top: a. Monica Milla; b. & c. Raymond Masters, bottom: a. & b. Cecil Lockhard; c. Raymond Masters.

Page 8: Cecil Lockhard.

Visiting Scholar Kåre Rumar

Kåre S. Rumar has been a visiting research scientist at UMTRI for the last six years. He is retired from the Swedish Road Administration where he worked as the director of road safety in Sweden. Prior to that, Rumar worked for sixteen years at the Swedish Road and Transportation Research Institute, where he last served as the deputy director general. A native of Sweden, he spends two to three months each year at UMTRI in Ann Arbor, Michigan.

Rumar has worked on several different projects for UMTRI's Human Factors Division. He says, "I'm impressed with the open-door policy at UMTRI; you can discuss anything with the staff, who are very helpful people." He has known Michael Sivak, the division head, for about thirty years, and the visiting scholar position developed out of that professional relationship.

Suggestions for studies and investigations arise from the division's Industry Affiliation Program for Human Factors in Transportation Safety. The program consists of UMTRI staff, UM faculty, and domestic and international experts from forty-two member companies. The affiliates submit proposals for suggested research, and each year several studies are undertaken. Rumar's work has focused on these studies.



Kåre Rumar

UMTRI / KATHLEEN CROCKETT RICHARDS

in developing countries. Rumar says, "Lighting is designed for developed countries, but the biggest problems with lighting are in developing countries."

In an earlier study, Rumar examined high-beam intensity in Europe versus in the United States. U.S. high beams are much less intense than their European counterparts, while European low beams are less intense (U.S. regulations allow only half the intensity of high beams as in Europe). As a result of the study, the team proposed that NHSTA raise the limit for U.S. high-beam regulations.

Rumar enjoys the time he spends in Michigan. He says, "I have traveled a lot and Ann Arbor is one of the cities I most enjoy. I can get around easily by bicycle and have learned the city fairly well that way. I also prefer the fall climate to Sweden." Reflecting on differences between the two countries, Rumar remarks that meat is better here and less expensive than in Sweden, where seafood is more common. Also in Sweden, he says, forests are always open to public and charge no admission. Still, Rumar enjoys Ann Arbor's parks and recreation areas, and recently explored nature in Michigan's Upper Peninsula.

Rumar looks forward to his next visit and the opportunity to complete additional research. **RR**

One of the program's main focus areas is automobile lighting and night driving. Rumar says, "It's the world's most renowned night traffic research group, and I am pleased to be associated with it." His most recent research resulted in a paper entitled, *A Worldwide Perspective on Future Automobile Lighting*. Rumar's research analyzed night driving and visibility in developing versus developed countries, and recommends solutions for worldwide nighttime visibility problems related to automobile lighting.

Each year, one million people are killed in traffic fatalities worldwide, the large majority in developing countries. Rumar says, "Eighty-six percent of all traffic fatalities occur in developing countries, which have only 40 percent of the total motor vehicles." In addition, while pedestrian fatalities are decreasing in developed nations, they are both increasing and overrepresented in developing countries. The highest risk for fatality in night driving is the pedestrian. Of the 200,000 pedestrians killed at night each year, 90 percent are in developing countries. Still, vehicle lighting is not developed for conditions

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November 19–22, São Paulo, Brazil

<http://www.saebrasil.org.br/>

**Transportation Engineering and
Safety Conference**

December 5–7, State College, Pennsylvania

<http://www.cde.psu.edu/C&I/PTI/>

TRB 2002 Annual Meeting

January 13–17, Washington, D.C.

<http://www4.trb.org/trb/annual.nsf>

International Winter Road Congress

January 28–31, Sapporo, Japan

<http://www.piarc-sapporo2002.road.or.jp/>

Work Zone Traffic Control

February 21–22, Nashville, Tennessee

[http://www.asce.org/seminars/
transportation.cfm](http://www.asce.org/seminars/transportation.cfm)

I-Crash International

Crashworthiness Conference

February 25–27, Melbourne, Australia

[http://www.bolton.ac.uk/technology/
icrash2002](http://www.bolton.ac.uk/technology/icrash2002)

Road Safety Congress 2002

March 4–6, Stratford upon Avon, England

<http://www.rosipa.co.uk/cms/>

SAE World Congress

March 4–7, Detroit, Michigan

<http://www.sae.org/congress/index.htm>

**Retroreflective Materials Used
in Transportation**

March 5–6, Austin, Texas

[http://208.233.211.80/TRAIN/
retrodates.html](http://208.233.211.80/TRAIN/retrodates.html)

National Conference on Aging and Mobility

March 25–27, Scottsdale, Arizona

<http://www.mag.maricopa.gov/mobility>

SAFE Highways of the Future

March 26–28, Cologne, Germany

<http://www.ukintpress.com/safhighways/>

International Truck and

Bus Safety Symposium

April 3–5, Knoxville, Tennessee

<http://ctr.utk.edu/ts/trucksym.htm>

Child Passenger Safety Conference

April 20–24, Sacramento, California

[http://www.cipsafe.org/icpstc/2002/
default.lasso](http://www.cipsafe.org/icpstc/2002/default.lasso)

Passenger Vehicle Rollover:

Causes, Prevention, and Injury Prevalence

April 22–23, Scottsdale, Arizona

[http://www.sae.org/calendar/
topsecs2.htm#rollover](http://www.sae.org/calendar/topsecs2.htm#rollover)

Intelligent Transportation Systems

Annual Meeting

April 29–May 2, Long Beach, California

<http://www.itsa.org/annualmeeting.html>

Michigan Traffic Safety Summit

April 30–May 1, Lansing, Michigan

[http://www.ohsp.state.mi.us/summit/
summit.htm](http://www.ohsp.state.mi.us/summit/summit.htm)

SAE Automotive Dynamics and

Stability Conference

May 7–9, Detroit, Michigan

<http://www.sae.org/calendar/ads/index.htm>

**Sixth World Congress: Injury Prevention
and Control**

May 12–15, Montreal, Canada

<http://www.trauma2002.com>

Conference on Weigh-in-Motion

May 13–15, Orlando, Florida

<http://www.ctre.iastate.edu/icwim/>

National Intelligent Vehicle Initiative Meeting

May 13–15, Washington, D.C.

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