

Aging America *and* Transportation

PERSONAL CHOICES AND PUBLIC POLICY

Joseph F. Coughlin • Lisa A. D'Ambrosio

EDITORS



Aging America and Transportation: Personal Choices and Public Policy

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Aging America and Transportation: Personal Choices and Public Policy

*The National Older Driver Safety
Advisory Council*

Edited by
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and
LISA A. D'AMBROSIO, PhD


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Contents

<i>National Older Driver Safety Advisory Council Members</i>	vii
<i>Contributors</i>	ix
<i>Preface</i>	xi
<i>List of Abbreviations</i>	xiii
<i>Acknowledgments</i>	xvii

SECTION I: SETTING THE CONTEXT

1. Purpose of This Volume 3
The National Older Driver Safety Advisory Council
2. The Continuing and Growing Importance of Mobility 11
Lisa A. D’Ambrosio, Joseph F. Coughlin, Michelle R. Pratt, and Maureen Mohyde
3. Describing the Older Adult Population 27
Ann Dellinger
4. The Travel and Mobility Needs of Older People Now and in the Future 39
Sandra Rosenbloom

SECTION II: THE CHANGING TRANSPORTATION SYSTEM

5. The Changing Car: New Vehicle Technologies 57
Scott McCormick, Steve Underwood, and Shiwei Wang
6. The Future Highway Infrastructure—How It Can Help Older Drivers and Pedestrians Retain Their Mobility 77
Larry Tibbits and Kim Lariviere
7. Innovative Mobility Services and Technologies: A Pathway Toward Transit Flexibility, Convenience, and Choice 95
Susan A. Shaheen

SECTION III: THE NEW OLDER DRIVER

8. The New Older Driver in the United States and Canada:
Changes and Challenges 119
Bonnie M. Dobbs
9. Reducing Older Road-User Deaths 137
Leonard Evans
10. Beyond the Car 163
Jane Hardin and Rose Sheridan
11. Older Driver Education 175
*Lisa A. D'Ambrosio, Michelle R. Pratt, Joseph F. Coughlin,
and Maureen Mohyde*
12. Older Driver Education Today and the Possibilities for
Tomorrow 197
*Richard Israels, Joseph F. Coughlin, Michelle R. Pratt,
Lisa A. D'Ambrosio, and Bryan Reimer*

SECTION IV: INNOVATIONS FOR FUTURE MOBILITY OF THE BABY BOOMERS

13. Outside the Box: New Models for Transportation
Partnerships 217
Jon E. Burkhardt
 14. If Demographics Is Destiny, Are We Preparing for It? Aging
Baby Boomers, Transportation Planning, and Investing
in Mobility Tomorrow 233
Joseph F. Coughlin and Steven Proulx
 15. National Older Driver Safety Advisory Council Recommendations
for Policy Makers 247
- Index* 257

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Preface

The National Older Driver Safety Advisory Council reflects a collaboration between the Massachusetts Institute of Technology AgeLab, the USDOT-sponsored New England University Transportation Center, and the AARP's Driver Safety Program to bring together some of the leading thinkers and practitioners around issues of mobility for older adults. Although much attention has been given to noting the aging of the world's population, less has been devoted to addressing some of the challenges that this aging population presents. Older adult mobility, in particular, is one area where more research has been done regarding the challenges for older adults to keeping mobile as they age, whether they be older drivers, older transit users, or older pedestrians. Relatively less ink has been devoted to thinking about the opportunities and solutions that older transportation system users might present and need, respectively.

One of the specific objectives of the Advisory Council is to serve as an independent voice on current developments and research in mobility, safety, and aging. As part of this mission, the Council felt that there was a gap in existing research that identified some of the issues, problems, and solutions that the coming generation of older adults will face as they age. In less than decade years, the baby boomers, one of the largest and most influential generations, begin to turn 75 in 2021. This Council recognized that aging for this generation—how they live and how they get around—will be different than for previous generations of older adults. The book the Council outlined is designed to capture and convey some of these key differences around living, social and commercial activities, and transportation patterns.

Yet, simply noting problems or challenges is not enough; with the first baby boomers turning 65 in 2011, and with a new administration and Congress coming into power, it is a time too for thinking about opportunities and solutions. It is hoped that this volume will serve as a venue to place some of the issues and problems in maintaining older adults' mobility as they age on the public agenda, as well as to put forward solutions and recommendations to stakeholders—transportation providers, policy makers, and researchers alike.

The book is organized in four parts. The first part, Setting the Context, explores the demands for transportation among the current and future generations of older adults, including the importance of mobility, the impact of changing demographics on the transportation system, and how individuals' lifestyles and activities contribute to the demands this and future

generations of older adults will have for transportation. The second section, *The Changing Transportation System*, examines some of the changes on the transportation supply side: How will individual vehicles and alternative transportation options evolve to meet the demands of aging baby boomers and their parents? The third part of the book, *The New Older Driver*, looks at how the next generation of older drivers themselves may differ from previous generations, looking at the personal health and safety trends among baby boomers, and how this generation will get around beyond the car. The last section, *Innovations for Future Mobility of the Baby Boomers*, goes beyond these to look at how education and other models and alternatives for transportation may affect how the next generation of older adults live, drive, and get around.

The book concludes with a series of recommendations for policy makers, practitioners, advocates, researchers, and others to address some of the challenges that our society faces in maintaining a high quality of life and mobility as we age. The challenges are great, and the resources often all too limited, but the need for change and innovation and the benefits that improved mobility will generate to society will be well worth it.

List of Abbreviations

3G	3rd Generation International Mobile Telecommunications—2000
AAA	American Automobile Association
AAMVA	American Association of Motor Vehicle Administrators
AASHTO	American Association of State Highway and Transportation Officials
ABS	Antilock Braking System
ADA	Americans with Disabilities Act
ADED	Association for Driver Rehabilitation Specialists
ADLs	Activities of Daily Living
AOTA	American Occupational Therapy Association
ATIS	Advanced Traveler Information Systems
AVL	Automatic Vehicle Location
BMI	Body Mass Index
BRT	Bus Rapid Transit
CAD	Computer-Aided Dispatch
CAMP	Collision Avoidance Metrics Program
CAR	Center for Automotive Research
CCAM	Interagency Transportation Coordinating Council on Access and Mobility
CD-ROM	Compact Disc Read-Only Memory
CDRS	Certified Driving Rehabilitation Specialists
COA	Council on Aging
COPD	Chronic Obstructive Pulmonary Disease
CPU	Central Processing Unit
D1	Digital
DMV	Department of Motor Vehicles
DOT	Department of Transportation
DSP	Digital Signal Processor
DSP	Driver Safety Program
DSRC/WAVE	Dedicated or Digital Short-Range Communication
DVD	Digital Video Disc
EC	European Community
FARS	Fatality Analysis Reporting System
FCC	Federal Communications Commission
FHWA	Federal Highway Administration

FTA	Federal Transit Administration
GAO	Government Accountability Office
GDP	Gross Domestic Product
GHz	Gigahertz
GIS	Geographic Information System
GPS	Global Positioning System
GSM	Global System for Mobile communications
HMI	Human Machine Interface
HMO	Health Maintenance Organization
IADLs	Instrumental Activities of Daily Living
IEEE	Institute of Electrical and Electronics Engineers
ITE	Institute of Transportation Engineers
ITN	Independent Transportation Network America
ITS	Intelligent Transportation Systems
KAT	Knoxville Area Transit
LED	Light-Emitting Diode
Lidar	Light Detection and Ranging
MDD	Mature Driver Database
MDOT	Michigan Department of Transportation
MDT	Mobile Data Terminals
MP3	MPEG-1 Audio Layer 3
MRC	Maryland Research Consortium
MSA	Metropolitan Statistical Area
MSAA	Mobility Services for All Americans
MTC	Metropolitan Transportation Commission
MVA	Motor Vehicle Administration
MUTCD	Manual on Uniform Traffic Control Devices for Streets and Highways
NCHRP	National Cooperative Highway Research Program
NHTS	National Household Travel Survey
NHTSA	National Highway Traffic Safety Administration
NPTS	National Personal Transportation Survey
NSC	National Safety Council
OBU	On-board Unit
OECD	Organization for Economic Cooperation and Development
OLED	Organic Light-Emitting Diode
PATH	California Partners for Advanced Transit and Highways
PDA	Personal Digital Assistant
PTI	Pennsylvania Transportation Institute
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

SEMCOG	Southeast Michigan Council of Governments
SDARS	Satellite Digital Radio Systems
SMART	Suburban Mobility Authority for Regional Transportation
STPP	Surface Transportation Policy Project
TCRP	Transit Cooperative Research Program
TMCC	Travel Management Coordination Centers
TOD	Transit Oriented Development
TRB	Transportation Review Board
TRIP	Transportation Reimbursement and Information Project
TTI	Texas Transportation Institute
UFOV	Useful Field of View
UMTRI	University of Michigan Transportation Research Institute
USDOT	United States Department of Transportation
UWR	United We Ride
V2I	Vehicle-to-Infrastructure
V2P	Vehicle-to-Person
V2V	Vehicle-to-Vehicle
VGA	Video Graphics Array
VII	Vehicle Infrastructure Integration
VIIC	Vehicle Infrastructure Integration Consortium
VMS	Variable Message Signs
VMT	Vehicle Miles Traveled
WLAN	Wireless Local Area Network
WiMax	Worldwide Interoperability for Microwave Access

Acknowledgments

Any discussion about the future sparks conflict, and transportation is no different. What might the travel patterns of today's middle-aged boomers mean for tomorrow's older Americans? What is adequate access, mobility, or even how safe is safe? How much to spend—and on what? How will technology affect future transportation systems and behaviors? We do not seek to resolve these conflicts in this volume. Instead we hope that identifying and providing insight into these and related issues will place aging and transportation high on local, regional, and state transportation policy agendas. Moreover, the book's contributors hope to inform Congress's deliberations around the nation's surface transportation policy. The next iteration of national policy, guiding near-term highway and transit priorities, will have long-term implications for the capacity of the nation's aging baby boomers to remain independent, engaged and safely on the move.

This book is the product of many people. As the editors we must acknowledge and thank the members of the National Older Driver Safety Advisory Council for their time, contributions and patience. We are also indebted to the authors, many of whom were not members of the Council, but who gave generously of their insights and creativity to discuss factors that should be considered in crafting transportation policy for an aging nation.

Our colleagues at MIT's Center for Transportation & Logistics and Engineering Systems Division provided a fertile environment to consider the convergence of disruptive demographics, mobility and public policy and their combined impacts on the transportation system. We are particularly grateful to Professor Yossi Sheffi, Director of the Center for Transportation & Logistics, who continues to provide enthusiastic support for the work of the MIT AgeLab, always urging the blending of thoughtful academic enterprise with the practical considerations of making a difference; and to Professor Joseph Sussman, Interim Director, Engineering Systems Division, who remains a rich source of inspired guidance on transportation systems thinking.

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Joseph Coughlin & Lisa D'Ambrosio
Cambridge, Massachusetts

Section I

Setting the Context

1

Purpose of This Volume

The National Older Driver Safety Advisory Council

In 1952, when Dinah Shore urged Americans to “see the USA in their Chevrolet,” the oldest members of what would one day be called the baby boom generation were just 6 years old. Three years later, the Federal-Aid Highway Act of 1956 authorized construction of a national network of interstate highways, in part because it would make national defense more practical during the Cold War years. Yet these highways would also make long-distance automobile travel possible for all Americans. State and local governments followed suit by investing in roadways and infrastructure over public transportation.

At the same time, after World War II families were moving away from urban and rural areas and into new suburban homes designed with larger layouts than urban apartments, along with spacious private yards and a garage for an automobile. A private home, in the suburbs, became the standard of successful living and the icon of the American dream.

The baby boom generation was born during these sweeping changes in living arrangements and private travel. Even leisure activities were changing rapidly. The oldest baby boomers remember when the television was a curiosity. By the time these same adults left high school and took a job or went to war, the television was a primary conduit of news and entertainment. As much as this generation has been credited with challenging and changing the economic, political, and social environment it has faced at every juncture over the past 60 years, it is important to remember that these adults were also shaped by social and economic changes in the 1950s and 1960s, the decades of their early childhood, a time when a private home and a personal car represented the pinnacle of personal success and autonomy.

In 2011, the oldest members of this generation turned 65, traditionally considered the age of retirement, when researchers have typically expected

mobility and activity patterns to change for older adults. And yet, many of the older adults in this generation will not retire at age 65. They will continue to work and to play aggressively, and to drive everywhere, as they have all their lives. In 2021, the oldest of this baby boom generation will turn 75, an age at which agility issues will begin to affect them in larger and larger numbers. Many will still demand a high degree of mobility, however—most likely higher than their parents demanded at the same age. Mobility—the ability to go where they want, when they want to—will be prized among this generation so that they can continue to engage in their active work and social lives and maintain the activities that give their lives meaning. The transportation system, the highways, transit systems, and sidewalks, makes this possible. But this system was designed for and by younger users; to have a generation this old and this mobile is unprecedented. What does the advent of the aging baby boom generation mean for the transportation system, and for the mobility of the baby boomers? What happens to those who continue to drive as driver performance decreases? What happens to those who can no longer drive and are suddenly left at home, cut off from friends and social activities? What if transit does not exist in their area as an alternative mode to driving? What happens to those who can no longer use public transportation? What happens when older adults run out of transportation options?

This volume is a kind of crystal ball, an attempt to identify and examine many of the issues faced by policy makers, transportation officials, vehicle manufacturers, health and human services professionals, and aging adults themselves as this, the largest generation, prepares to drive into late adulthood. Policy makers should be preparing for them now. Rather than being reactive, there is an opportunity to be proactive in preparing transportation system solutions to problems that we know will emerge as this generation ages.

The message in this book is a positive one. It is true that changes in the demographic make up of the adult population are imminent. If communities are willing to make some changes, and if governments are willing to allocate resources to these changes, then there can be more options for people to remain more mobile as they age. Research shows that mobile adults are happier and live longer on their own. If, by contrast, we do nothing, these older adults will be more isolated and more prone to illness and depression. The system will have failed to support them in an important, if challenging, stage of their lives.

Most older drivers have driven safely as they aged. Changes in vehicle technology and in the infrastructure itself, along with changes in driver education, are the means by which greater numbers of older adults may drive safely for more years. New transportation options and new transportation alliances can give these adults options for getting around

when they can no longer drive. These changes can make a significant difference in the quality of life of the baby boomers and every generation that follows.

Although the sheer size of this generation will have a staggering impact on the transportation system, it is a mistake to deal with this generation as though it fits a single profile. In a group of this size, there is relatively little homogeneity. Baby boomers will age at different rates, with varying levels of health, and under different conditions, and as such, they will interact with the transportation system in very different ways. For example, a subset of this group will be more fit and more vigorous later in old age than any previous generation. Another subset will deal with one or more chronic conditions that will impair physical and cognitive functioning at earlier ages than previous generations, thanks in part to increased medical knowledge and improved technology. Some forms of disability likely to be significant among this group are still emerging, such as microvascular degeneration of eyesight and macrovascular degeneration that may result in heart disease, stroke, or reduced kidney function. These conditions appear earlier and at greater prevalence among baby boomers than they have among their parents and grandparents, and they have implications for the modes of transportation that the baby boomers will be able to use safely as they age.

The baby boomers are the first generation in which the number of women driving nearly equals the number of men. These women will also have demands on their time; they are more likely to be working than women in previous generations and to be active in social and volunteer opportunities. They also may be living with multiple chronic medical conditions, yet they need to remain mobile to provide care for their children, grandchildren, and for their parents.

Members of this generation are also more likely to use different forms of transportation and make different types of trips even after retirement. They are more likely to fly for short and long distances and may be interested in air travel for decades after retirement. Some will use public transportation as well as driving for getting around the community. Different forms of transit will also have the potential to help keep older adults mobile by providing door-through-door transportation for those baby boomers whose physical or cognitive conditions may require such assistance. Other non-traditional modes of transit may fill in the gap left for many who may need to stop driving where fixed-route service is neither possible nor desirable. All baby boomers, however, may be more open to public transportation if it can be made available where they live, as well as be more comfortable and welcoming. Getting this generation of older adults to use public transportation earlier in their lives, before many

have to stop driving, will be important. These baby boomers will need practice using public transportation before it becomes a primary means for getting around.

To address these issues, the book has been divided into four sections: setting the context for the significance of mobility; the changing transportation system; the new older driver; and innovations that will have an impact on the future mobility of the baby boomers.

SECTION 1: SETTING THE CONTEXT

To understand the impact this generation of baby boomers will have on society and on the transportation system, it will be crucial to understand how this generation differs from previous generations of older adults. The first section of this book sets the context in which baby boomers will age. It outlines their demographics, their specific needs for transportation, and their environment.

D'Ambrosio et al. in Chapter 2 show that the baby boom generation is more active and is projected to stay active much later in life than previous generations. The mobility needs of this generation will be greater and more enduring than those of the current generation of older adults. Research on older adults, however, shows that a loss of mobility is associated with great personal and societal costs. Older adults who are isolated at home contribute less to the economy and are more likely to be depressed than adults who remain mobile and active members of a community.

Dellinger breaks down the demographics of this huge generation in Chapter 3 in terms of who they are and where these adults will live after retirement and how they affect local and state services. The important thing to understand about the baby boom generation, aside from its sheer size, is that no single profile can adequately describe it. This generation will be divided by income, with some having many more financial resources than others. It will be largely female, as past generations have been, but these women will have had varied experiences in the workplace and expect to take a more active role in political causes, in volunteer work, or in helping friends and neighbors.

Rosenbloom in Chapter 4 discusses the lifestyle choices this generation has made that will affect its need for mobility. Stereotypical descriptions of retirement would have us believe that leaving the workforce signals a reduced need for travel. Actually, the reverse may be true. Once baby boomers leave the workforce—and many will stay long past their 65th birthday—their travel needs might actually increase. This chapter examines the forces that drive travel patterns among baby boomers, including the impact of living arrangements and land use on their demand for travel.

SECTION 2: THE CHANGING TRANSPORTATION SYSTEM

The transportation system itself is already evolving to enhance safety and to provide more options for older travelers. How are the car, the roadway system, and the transit system evolving to meet the changing needs of the baby boomers? Will these changes be enough, and will they happen quickly enough to keep this generation safe and mobile?

McCormick, Underwood, and Wang introduce the newest technological advances expected to become standard on automobiles between now and 2021 in Chapter 5. These changes include collision avoidance systems and parking assistance, as well as devices that enable communication between vehicles and between the vehicle and the road environment. Yet older adults are more likely than younger adults to resist new technology if its value is not clearly evident, even when it enhances safety. Baby boomers may buck this trend and accept newer and ever-evolving automobile technologies, but they will need in-vehicle safety features that are easy to learn and to use.

In Chapter 6, Tibbits and Lariviere outline changes and recommendations in infrastructure that will make the highway systems more usable for older adults and for all drivers. Communities will need to make significant investments in roadway infrastructure to implement these advances, which involve changing signage and signals and making intersections easier to navigate for older drivers and older pedestrians alike.

Shaheen in Chapter 7 provides a discussion of the various modes of transportation available to older adults. The advent of new partnerships and new information technologies will allow service providers to use a larger pool of public vehicles to provide efficient and cost-effective transportation to more people in urban areas and in suburban and rural areas. In order to do so, providers of public transportation will have to work together, sharing both information and resources in new and creative ways.

SECTION 3: THE NEW OLDER DRIVER

The baby boomers will be unlike any previous generation in the sheer number of drivers on the road and in the number of miles driven. This emerging generation of older drivers, as described by Dobbs in Chapter 8, contains more women and more Hispanics than in previous generations. Although this generation, on average, lives longer and has better health than older generations, there are several subgroups within it that offer a striking contrast. Baby boomers have a higher incidence of heart disease and diabetes, both conditions that can affect driver performance. What will be the impact of different medical conditions and of medications on driving performance, and how can doctors and licensing agencies screen and counsel drivers effectively to continue to drive safely?

In Chapter 9, Evans discusses the issues facing all drivers as older adults continue to drive even after driver performance deteriorates and as their bodies become more frail and hence less able to survive a collision. He argues, contrary to media reports, that older road users present relatively little threat to other transportation system users; instead, younger road users are far more likely to imperil other road users. This chapter details the types of crashes likely to kill older drivers and to put pedestrians at risk, and Evans argues that simple safety measures may have a significant impact on the overall safety of all road users.

Hardin and Sheridan discuss the alternatives to driving likely to become available to older drivers in the future as well as the barriers to using public transportation options in Chapter 10. In many communities, particularly rural and suburban communities, these services are not cost effective. Also, older adults have traditionally avoided public transportation options, in many cases for good reason. This chapter highlights the changes in alternative transportation options that might turn the tide away from automobile dependence.

SECTION 4: INNOVATIONS FOR FUTURE MOBILITY OF THE BABY BOOMERS

The fourth section of the book discusses several issues that will present the greatest challenges, and the highest potential for real change, for older drivers in 2021. These include educational programs to prepare older drivers for the ways in which they will change as drivers, along with bold steps needed to change the local transportation system to meet the diverse needs of the baby boomers and to accommodate older drivers as riders.

In Chapter 11, D'Ambrosio et al. suggest that driver education might be considered a part of lifelong learning. They outline the need for driver education programs that will address the needs and concerns of older drivers, including driver evaluations and rehabilitation, if appropriate. Driver education programs also have the potential to provide information to older adults about new public transportation options for mobility. Israels et al. in Chapter 12 review some of the current educational offerings more widely available to older drivers.

Burkhardt offers a look at the types of partnerships that might make new transportation options available to older adults in Chapter 13. To create these partnerships, community leaders will have to think and work creatively, perhaps forming a single transportation umbrella organization under which many types of public vehicles are managed as a single fleet, offering fixed-route, variable-route, and single-trip solutions to the transportation needs of older adults. This fleet could use both paid and volunteer drivers to

provide the kind of assistance adults need at every stage of their lives, from active driver to frail passenger.

A look of what might be the near future for transportation and aging is presented in Chapter 14. Based upon a survey of the nation's metropolitan planning organizations, Coughlin and Proulx reveal a sobering view of what is being planned and financed to support an aging society. While the nation's transportation planners indicate an overwhelming understanding of the impacts of a graying nation, a combination of competing transportation goals and scarce resources conspire to keep aging from being a leading policy priority—suggesting that there is a great deal of awareness but little investment in keeping an aging America a mobile America.

The final chapter by the National Older Driver Safety Advisory Council includes a list of recommendations made by authors and Council members and reviewed by the Council. These recommendations are the ones that policy makers, transportation practitioners, and researchers should consider as they contemplate the aging of the baby boomers and the ability of the transportation system to meet this generation's needs. The future quality of life of the baby boomers, and the generations of older adults to follow, will depend in large part on the ability of the transportation system to keep them mobile. The technology, knowledge, and need to evolve the system are there, and the potential is great to assure this generation of baby boomers of their continued mobility as they age. This volume provides a basis on which to define and address future challenges and opportunities to keep an aging America a mobile America.

