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Mobility and Transportation
INTRODUCTION

Mobility-sensitive community design: The way we design our communities—both the built and natural environments—has a significant impact on the mobility and transportation options available to all Americans. Mobility and transportation options play a vital role in securing and enhancing residents' quality of life by providing easy access to employment, shopping, medical care, recreational services, family and friends, religious services, civic facilities, and other community resources. However, many individuals who do not or cannot drive (including frail older adults and individuals with disabilities) face greater vulnerability to isolation, the continual burden of reliance on others, and a decreased sense of independence and competence, which has a negative impact on physical and mental health. For other residents (both older and younger), lack of transit or mobility alternatives has prevented access to work opportunities, increased the burden of performing family responsibilities, and impeded the ability to carry out routine activities of daily life.

In addition to easy access to daily destinations, a well-planned community that is sensitive to the mobility and transportation needs of all residents can provide safe and comfortable facilities for walking, bicycling, and use of small-motor vehicles; safe and affordable access to public transit; safer driving and road-way conditions; and a more livable, resident-friendly environment for neighborhoods.

Past development patterns: The sprawling development patterns that have dominated the metropolitan landscape for the past 60 years have diminished the mobility alternatives available to all Americans. This widely dispersed, low-density development pattern separates and isolates different land uses, with rigidly separate functions—home, work, recreation, entertainment, shopping, commercial—increasing the distances between destinations and connected by a limited number of access roadways.[1] Conventional, single-use zoning promotes this development pattern by separating the different land uses into isolated pods, accessible only by high-volume, high-speed roads. In such development, the car is the primary mode of transportation; there are few functional sidewalks or lanes for walking and bicycling, little or no access to alternative transit, and many safety concerns expressed by residents.

A 2002 nationwide survey of older people conducted by AARP[2] paints a revealing picture: 40 per cent of respondents said they do not have adequate sidewalks in their neighborhoods; 44 per cent said they do not have accessible public transit; and nearly half (47 per cent) said they cannot cross the main roads safely. This reality is borne out in communities throughout New York; in many areas that were initially designed for pedestrians, many residents now do not even feel comfortable crossing the street and will actually get back in their cars to drive to the other side.

The disconnected, branch-like, wide-roadway system that is a salient feature of a sprawling landscape perpetuates an over-dependence on automobiles, and it creates long and circuitous travel routes to get to just about any destination. In communities, such design reduces through-traffic and alternative travel routes; and wide roads with no sidewalks or curbs invites high-speed car travel—even in residential areas—making pedestrian or bicycle travel unsafe, uncomfortable, and, in many cases, impossible or illegal. This system was designed to satisfy a market for exclusivity, privacy, and isolation. In addition, the dispersed population and lack of density that accompanies a sprawling development pattern makes creating and operating an efficient public transportation system difficult.

Recent trends: Reflecting a variety of demographic, social, and environmental trends across the country, primary reliance on personal-car usage is becoming a less-desired option, the demand for privacy is being replaced with a wish for a greater "sense of community" and interconnectedness, and interest in using alternative mobility modes is increasing rapidly. Two major trends heighten the need to create communities that can be navigated safely and comfortably by foot, bike, car, small-motor vehicles, or accessible public transit:

1. The general aging of America's population, due to the aging of the baby boomers, and increasing longevity among both the general population and individuals with all types of disabilities:
   - People aged 85 and over are the fastest growing segment of our population, and public long-term care policies strongly promote their ability to remain living in their own homes for as long as possible—even into the frail elder years.

   - Similar long-standing public policies stress keeping people with all types of disabilities in conventional housing options—even into old age.

While everyone likes the flexibility and independence of driving a personal car, many elderly and other community residents do not drive (for example, one in five Americans over age 65 no longer drives); and, for a variety of health, safety, and affordability reasons, many more prefer not to rely solely on their cars for mobility.

For frail older people, the greater majority of their care is provided informally by family members and friends, and transportation is a major service provided by caregivers. However, while the number of older people continues to increase, the number of available caregivers is declining, leaving more elderly people in need of alternative options. In addition, as the span of the traditional retirement years lengthens, "well-elderly" individuals have more time for alternative work options, volunteering, leisure, socializing, and exercise—increasing reasons to benefit from greater mobility options.

2. Evolving social norms and trends—societal changes having an impact on the need for diverse mobility options; for example:
   - The proportion of dual-worker families has increased dramatically, presenting a hardship when parents are not available to provide transportation for their

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children and when time must be taken off from work to provide transportation for their own elderly parents.

- The recent emphasis by Americans on fitness, nutrition, and exercise, as well as public health concerns about rampant obesity and diabetes, underscores the need for planning communities that can be navigated safely and comfortably by foot and bike.

- Across the country, the growing emphasis on environmental issues (such as air quality and limited natural resources) accents the need for planning that easily accommodates mobility by foot, bike, and a variety of public transit alternatives.

Greater choice in affordable, accessible, and safe mobility/transportation options is a critical element of a livable community, as well as a characteristic of the recent development movement to re-create "traditional neighborhoods" using smart growth principles. Municipalities can use various elements/strategies to promote mobility and transportation choices and, thus, create more livable, resident-friendly communities; for example:
- Grid-style street design.

- Traffic-calming measures (see *Safe Driving Strategies: Traffic Calming* in the *Resource Manual*), such as:
  - More sidewalks.
  - Shorter blocks.
  - Narrower streets.
  - Ample public landscaping.
  - Traffic medians.
  - Bike lanes.
  - Walking, biking, and jogging trails.
  - Cross-walks.

- Inter-connected streets and neighborhoods.

- Increased density.

- Mixed-use development.

- Enhanced signage, signals, and road markings.

- Increased public transit and other community transportation services.

The "Mobility and Transportation" section of the *Resource Manual* provides examples, models, resources, and recommendations that will address the needs of—as well as provide benefits to—older adults, families, young adults, children, and individuals with disabilities, helping to improve the quality of life for all residents.

References:

[1] Anthony Flint (2006), *This Land: The Battle Over Sprawl and the Future of America*, p. 51. Baltimore, MD: Johns Hopkins Press.

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PLANNING for MOBILITY and TRANSPORTATION
Benefits, Limitations, Ordinances, and Resources

Description:

The way we design our communities—both the built and natural environments—has a significant impact on the mobility and transportation options available to all community members. Available, accessible options in transportation and mobility are an important element of a livable community—playing a vital role in securing and enhancing quality of life for all community members by providing access to employment, shopping, medical care, caregiving responsibilities, family and social events, school, religious services, recreational activities, and other community resources.

Limited or no appropriate mobility alternatives affects many community residents in different ways. For example, lack of pedestrian and biking venues can make travel to school and recreational areas hazardous for children. Older adults and individuals with disabilities who no longer drive, or who formerly relied on a family member or neighbor for transportation, may suddenly find themselves alone, which can lead to social and economic isolation. Unavailable or unaffordable public transit can have a negative economic impact on adults who cannot afford the expenses associated with owning a personal car.

While poorly planned communities can significantly diminish mobility and transportation options, a community's planning and zoning decisions that increase age-, ability-, and income-sensitive mobility and transportation options can achieve important, positive goals for all residents and for the overall community.

Benefits—of greater mobility and transportation options:

For residents:

- *Social and mental health—*
  - Greater variety in mobility options and transportation alternatives bolsters social interaction among diverse community members, strengthening connections among all community members and enhancing a sense of community.
  - The social and mental health of older adults, individuals with disabilities, and other residents who must rely upon mobility options in order to engage in routine activities and tasks of daily life is enhanced, prolonging independence and countering the depression that can accompany isolation.
  - A built environment that expands mobility options beyond the personal automobile:
    - Helps preserve a sense of independence, competence, and freedom for residents who have lost their choice or ability to drive and their ability to navigate conventional public transit;

- o Reduces the obligation of friends, family members, and society to accommodate their mobility needs. This is a critical emotional and mental health issue for frail older people and individuals with disabilities, who have a strong aversion to becoming a dependent burden on others.
  - ▪ Public transportation options that are convenient clean, safe, and affordable encourage community residents to stay socially connected and live active lives.

- *Physical health—*
  - ▪ Communities designed with easily accessible areas for children, adults, and older people to walk, jog, bike, and use small-motor vehicles:
    - o Offer greater, regular opportunities for exercise—maintaining fitness and improving physical health.
    - o Provide greater access to health care (doctors, drug stores, hospitals) and to fresh, healthy food (neighborhood stores, farmers markets, fresh produce stands).
  - ▪ Elements of well-designed communities (for example, pathways with amenities such as trees for shade, benches for resting and visiting, public transportation shelters, and restrooms) make walking or strolling more desirable, make people feel safer and more secure, and, thereby, make people more likely to engage in those socializing and exercising activities.

For the community:
- *Increased user-friendliness—*
  - ▪ Newer transportation options include buses with lower floors, and "kneeling vehicles" that dip to make access easier for small children, those with mobility issues, and those who use mobility aids.
  - ▪ Buses that are equipped with bicycle racks allow riders to bring bicycles to recreational destinations instead of riding in traffic—encouraging more people to exercise and adding to their overall health and fitness.
  - ▪ Street and sidewalk design standards (for example, smooth sidewalks, pathways, and surfaces—of uniform width, with Americans with Disabilities Act curb-compliance, and slope considerations for wheel chairs, strollers, baby carriages, grocery carts, walkers, scooters, other mobility aids, and other mobility options, such as biking and walking) benefit older adults, individuals with disabilities, but also other community members such as mothers, toddlers, young adults, school children, workers, and others. Shorter and narrower streets, typical of grid-style street designs, can improve pedestrian access and navigation. It is easy to get lost in cul-de-sacs and housing developments where the pedestrian cannot logically determine where they are and where direct connections to other subdivisions are missing.

- *Public Safety—*
  - ▪ Communities that invite greater activity on the streets, in public gathering places, and at commercial and civic establishments are generally safer and more comfortable to use, particularly for more vulnerable populations, such as seniors, children, people with disabilities, and women. This is particularly

important in encouraging older people to venture out of their homes and avoid isolation, as seniors have a high *fear* of crime.

- The increased vigilance of the people on the streets (also known as "eyes-on-the-streets") increases the likelihood that criminal activity will be detected—which tends to deter crime.
- When communities are walkable, with buildings arranged closer to one another and closer to the street, the line of vision from building to street increases neighborhood vigilance and safety—a built-in neighborhood crime watch.
- Mixed-use is an aspect of walkable communities; when building types are mixed together, different land uses generate street activity after-hours; and public spaces offer safety in the number of people in one place.
- Larger street signs with bigger fonts and street lighting will also help pedestrians and drivers navigate.
- Crosswalks that are well-marked with reflective road paints, wider crosswalks, and calibrated traffic signals to allow more time to cross the street make crossing an intersection safer, especially for slower-moving pedestrians.

- *Community financial viability—*
  - Increased street activity, both during the day and evening, generates greater commercial activity and economic gains for the community.

- *Traffic and pollution relief—*
  - Reduced public transportation:
    - When daily destinations are designed to be closer to one another and mixed together, and street and trail connections within and between neighborhoods are increased, the distance we travel in our cars and the number of car trips we take will both decrease. This type of community design is more conducive to using alternative mobility options (such as walking, bicycling, and mass transit) in place of the personal car.
    - Increased public transportation alternatives reduces overall dependence on automobile travel—reducing the number of private cars on the roads and the number of auto-related accidents; reduces the number of Vehicle Miles Traveled (VMT), which relieves traffic congestion on area roads and improves traffic safety; and reduces green house gas emissions—resulting in a cleaner, safer environment for everyone.

- *Sense of place/sense of community—*
  - Choices in mobility and transportation options are aspects of a well-planned community—enhancing residents' "sense of place." A community's sense of place is hard to define, yet easy to recognize; basically we know it when it's there, and we sense its absence when it's not. A sense of place boosts community pride and identity, encourages people to get out and engage in public activity, and provides metaphysical benefits to residents. Well-planned community design encourages residents, both young and old, to remain living in their communities rather than moving to other towns or other states. As a result, a community's population is stabilized and its social

capital is strengthened. This is particularly important regarding older people, as a growing trend across the country is to help communities understand the skills, experience, and knowledge inherent in the retired population and to encourage them to capitalize on that valuable asset in the form of volunteering.

- *Lifestyle accommodations . . . market draw—*
  - Older people are living much longer and remaining active and healthy for many more years; and well-designed communities offer seniors greater opportunities during these years to engage in lifestyle pursuits that were not feasible during their work and child-rearing years. Older Americans prefer walkable, mixed-use, diverse, and interesting places that enhance and cater to their changing lifestyles—places where they can buy a book, grab a cup of coffee, stop at the post office or the bank, shop, recreate, engage in volunteering, or take a part time job—all within walking distance or a short car ride.

Impediments or barriers to development or implementation:
- *Historical context—automobile-dominated community design*— The impediments to creating diverse mobility options are best understood in a historical context. Post-war community design and development elevated automobile travel to predominant status, and relegated pedestrian, bicycle, and transit travel to second-class—or, in many cases, non-existent—status. Streets were designed and built wider to accommodate faster automobile speeds to serve the commuting needs of a burgeoning suburban population, but quickly created an unsafe and uncomfortable pedestrian environment, as well as traffic congestion, traffic safety, and pollution problems. Disconnected road systems and increased traffic congestion made driving more time-consuming, stressful, and dangerous. Daily destinations (shops, civic buildings, parks, downtowns, cultural activities, health care) were separated and dispersed to the point that they became accessible only by car.

  Consequently, by the 1980s, over half of the U. S. metropolitan landscape was designed to suit personal cars almost exclusively, making walking, biking, small-motor vehicles, and alternative transit almost impossible. The impact of these conditions has become increasingly apparent as the number of older persons and the number of individuals with disabilities has grown dramatically, the efforts of informal unpaid caregivers have increased substantially, the prevalence of long-distance caregiving has grown as families are increasingly dispersed, and public policies stress that both elderly frail people and adults with disabilities are to continue living in conventional housing options and integrated with the wider community.

- *Local zoning*— Most communities were not zoned to accommodate the needs, lifestyles, and preferences of older adults and individuals with disabilities (mixed-use, age-integrated, walkable communities with a range of housing options), nor the increasing preferences of families (compact, diverse, walkable, green housing and environments). Streets were not designed for walking or

biking. Stores, parks, restaurants, libraries, civic buildings, work places, health facilities, and other daily amenities were isolated from one another and located far from residential neighborhoods. Public transit was inaccessible or completely non-existent. Efforts to transform the design of communities or to modify zoning are very difficult because they require educating and convincing residents that changing from "how things have always been done" will be beneficial; in and of itself, change" is very often hard to accept.

- *Feasibility*— It may not be economically feasible to extend some transportation options to areas in geographically remote or rural areas; if such options are provided, routes and time tables may be inconvenient.

Resource—statutory authority:

- The Intermodal Surface Transportation Efficiency Act (ISTEA) was enacted in 1991; it was reauthorized in 1998 as The Transportation Equity Act for the 21st Century (TEA-21) under Public Law 105-206. Under TEA-21, funding was set aside for the Surface Transportation Program (STP), which currently funds several programs and authorization provided for under ISTEA and TEA- 21. http://www.cr.nps.gov/history/online_books/fhpl/istea.pdf.

- The Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU) was enacted in 2005; it reauthorized federal surface transportation programs through September, 2009. http://www.nhtsa.gov/nhtsa/Cfc_title49/PL109-59.pdf.

- Elderly Individuals and Individuals with Disabilities Program, U. S. Department of Transportation, Federal Transit Administration (Federal Transit Laws, Title 49, United States Code, Chapter 53, §5310); the goal of this program is to improve mobility for elderly individuals and individuals with disabilities; funds are used to meet the special transportation needs of these two population groups. In New York, this program is administered by the New York State Department of Transportation. http://www.fta.dot.gov/laws/circulars/leg_reg_6622.html. The law: http://www.fta.dot.gov/documents/C9070.1F.pdf.

- Transportation Services for Individuals with Disabilities: Code of Federal Regulations (CFR), Title 49, Transportation, Part 37: http://www.fta.dot.gov/civilrights/ada/civil_rights_3906.html.

- Bicycle Transportation and Pedestrian Walkways (TEA-21, §1202) authorizes funding to be used for improving facilities for pedestrians and bicyclists.

- Congestion Mitigation and Air Quality program (CMAQ) is funded under the Surface Transportation Program. Its goal is to reduce congestion and improve traffic conditions, as well as reduce harmful vehicle emissions. Funds are used to fund transit projects, buy buses and vans, subsidize bus operations, and implement ridesharing programs.

Resource—examples and ordinances:

- *Onondaga County Settlement Plan Transportation Polices* (Appendix H), Onondaga County, New York: www.smtcmpo.org/docs/reports/LRTP_update_2007/a-h.pdf .

- Michael Ernst and Barbara McCann (October, 2005), *Legislating Mobility Options: A Survey of State Laws Promoting Public Transit, Walking and Bicycling,* Surface Transportation Policy Project. Washington, DC: AARP, Public Policy Institute. http://assets.aarp.org/rgcenter/il/2005_12_mobility.pdf.

- City of Portland, Oregon, *Transportation System Plan*: www.portlandonline.com/transportation/index.cfm?c=38838.

- *New Jersey Statewide Bicycle and Pedestrian Master Plan*. New Jersey Department of Transportation and the New Jersey Metropolitan Planning Organizations: http://www.bikemap.com/RBA/.

- *Westfield Connections: The Westfield Community Planning & Design Initiative,* Village of Westfield, New York. www.villageofwestfield.org/WestfieldConnections081004.htm.

- *Bus Buddy*, Eugene, OR: this program teaches seniors how to ride the bus in a relaxed way by breaking down barriers and building confidence. http://www.ltd.org/search/showresult.html?versionthread=503027d33ef453b141c5d450d1895ffa.

- Peoria, IL: two rural transportation systems teamed up to provide seniors in rural areas with service to supermarkets, hospitals, and shopping centers. To introduce seniors to this service, they issued free passes and, later, a discounted fare of $.50 per trip. *Seniorjournal.com:* http://www.seniorjournal.com/NEWS/Features/5-05-16PublicTransEasyRider.htm.

- *Seniors in Motion*, Palm Beach County, FL: this program is aimed at individuals aged 85 and over who are living in gated communities or remote areas— advising them of their transportation options, such as free, fixed-route service and reduced fares on door-to-door service. http://www.pbcgov.com/palmtran/marketing/seniors.htm.

Resource—written and web:

- *Easy Rider: Advancing Mobility Needs for Aging Americans,* American Public Transportation Association. To address the transportation needs of older Americans; survey results are online: http://seniorjournal.com/NEWS/Features/5-05-16PublicTransEasyRider.htm. http://www.retirement-living.com/blog/easy-rider/.

- *Sidewalk Design Guidelines and Existing Practices* , Federal Highway Administration: http://www.fhwa.dot.gov/environment/sidewalks/chap4b.htm.

- *Aurora Urban Street Standards In Transit Oriented Developments and Urban Centers,* Aurora, Colorado: http://www.auroragov.org/stellent/groups/public/documents/article-publication/030275.pdf.

- American Public Health Association (APHA), Washington, DC. "A community's transportation decision-making has an impact on a range of critical issues affecting residents and overall community well-being, including public safety, air quality, physical activity and fitness, obesity, the built environment, health and cost equity, accessibility, and others." This web site provides a tool kit, case studies, and extensive resources that help create a "community-building" bridge between the public health and transportation sectors to ensure that a community's transportation policies help rather than hinder critical public health concerns.
  APHA—transportation issues: http://www.apha.org/advocacy/priorities/issues/transportation/.
    - *Transportation and Health Tool Kit* (2011): http://www.apha.org/advocacy/priorities/issues/transportation/Toolkit.htm.
    - *Public Health and Transportation Case Studies:* http://www.apha.org/advocacy/priorities/issues/transportation/casestudies.htm.

- *A Blueprint for Action: Developing a Livable Community for All Ages* (May, 2007): MetLife Foundation, Partners for Livable Communities, and National Association of Area Agencies on Aging (n4a). http://www.n4a.org/pdf/07-116-n4a-blueprint4actionwcovers.pdf.

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- *Highway Design Handbook for Older Drivers and Pedestrians.* Washington, DC: The Federal Highway Administration: http://safety.fhwa.dot.gov/intersection/resources/fhwasa09027/resources/Highway%20Design%20Handbook%20for%20Older%20Drivers%20and%20Pedestrians.pdf.
    - "Older Road Users," *FHWA—Safety*, U. S. Department of Transportation, Federal Highway Administration on line—a companion to the *Highway Design Handbook:* http://safety.fhwa.dot.gov/older_users/.

- Dan Burden (Executive Director, Walkable Communities), *Dan Burden's Principles for Healthy Neighborhood Street Design.* Sierra Club: http://www.sierraclub.org/sprawl/community/design.asp.

- National Complete Streets Coalition: www.completestreets.org.

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- *Senior Transportation: Toolkit and Best Practices,* Community Transportation Association of America, a technical assistance manual for planning and implementing transportation options for seniors; contains information on grants, but because it is an older publication (1st Ed. May 2003), the status of these grant programs should be checked: http://www.ctaa.org/webmodules/webarticles/articlefiles/senior_toolkit.pdf.

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- Tri-State Transportation Campaign: http://www.tstc.org/.

- Transportation Alternatives: www.transalt.org.

- Surface Transportation Policy Project: www.transact.org.

- Pedestrian and Bicycle Information Center: www.pedbikeinfo.org and www.walkinginfo.org.

- City of Raleigh, North Carolina, Department of Transportation:
  - Urban Design Guidelines—General Street Principles: http://www.raleighnc.gov/business/content/PlanUrbanDesign/Articles/RaleighUrbanDesignCenter.html. On right side of screen, under "More Information," click on *Urban Design Guidelines;* under "Downtown," click on *Streetscape Master Plan* and *Livable Streets Plan.*
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COMPLETE STREETS

Description:
The goal of a complete streets strategy is to provide mobility for all users by maximizing the number of mobility/transit options available. Walking, biking, small motorized vehicles (scooters, wheelchairs, golf carts, etc.), mass transit, and autos are all given equal consideration. Walking and biking are promoted. The specific safety needs of those with acute mobility issues, such as frail older people and younger individuals with disabilities, are an essential component of the design process.

Depending on the context, using a complete streets design methodology will produce different results depending on the context. For example, an appropriate design for a major boulevard in a dense urban setting will differ from that for a road in a low-density residential area. However, certain elements do occur frequently enough to be considered as "best practices": wide sidewalks, curb extensions, and pedestrian islands allow pedestrians to walk comfortably at their own pace; narrow lanes and other traffic calming measures slow motor traffic, reducing accidents; shelters protect transit users as they wait for a bus or train; and bicyclists ride in bike lanes or widened road shoulders, and are provided with bike racks. Landscaping and public art are often included.

Complete streets rely on network connectivity to reach their potential. For example, a sidewalk along a single block is not enough to turn that block's residents into pedestrians; to be used, the sidewalk must connect to a destination, such as a school, a market, a park, a downtown area. Each additional destination added to the network will result in increased use of the network.

The complete streets agenda arose in reaction to the traditional approach to transportation planning, in which streets were designed primarily for the benefit of automobiles, which led to the creation of a "barrier effect," in which those unable or disinclined to drive become isolated and dependent for transport on those that do drive. Car-oriented streets can diminish a sense of community (since such street design can greatly reduce contact among neighbors) and can affect development patterns, favoring strip malls and other signs of sprawl.

Governments are increasingly adopting complete streets policies. Legislation is under consideration at both the Federal and the New York State levels that would require future road projects to consider pedestrian, bicycle, and other transit uses; and laws have already been adopted by the City of Buffalo and Erie County. Complete streets are a natural complement to Transit-Oriented Development (TOD) projects, which are based on the concept of multi-modal transportation. Such policies are cited as strategies to promote personal health (by encouraging physical activity) and community health (by reducing air pollution from car usage). The

benefits of complete streets policies have resulted in an increasing range of advocacy groups championing their adoption.

Benefits:
For residents:
- Designing to allow the use of multiple forms of mobility and transit accommodates the needs of people of all ages and abilities, including children, older adults, individuals with disabilities, and persons who are unable to drive:
  - Provides greater independence, decreased isolation, and easier access to amenities, family, and friends.
  - Decreases the need for caregivers and parents of children to play the role of "chauffer."

- Improves health and fitness by encouraging biking and walking.

- Strengthens a sense of community by increasing contact among all residents.

For the community:
- Increases safety and reduces injuries for users of all transport modes:
  - Timing for street-crossing is increased, and audible signals supplement visual street-crossing cues.
  - Pedestrians are provided with sidewalks that are clearly separated from traffic.
  - Cross walks are improved and increased in number.
  - Bicyclists are protected from cars by having their own separate lane or, if they share the road with cars, benefit from reduced traffic speeds.
  - Both pedestrians and drivers with slow reaction times benefit from reduced traffic speeds.

- Aids economic development:
  - Promotes vibrant pedestrian retail corridors.
  - Improves access to retail businesses by all residents and visitors, including those who are unable to drive.

- Addresses environmental issues:
  - Reduced automobile-use results in:
    - Reduced use of fossil fuels;
    - Reduced air pollutionn from vehicle emissions; and
    - Reduced traffic congestion.

Impediments or barriers to development or implementation:
- *Inertia:* Many transportation departments and transportation engineers remain invested in a "cars first" mentality. For example, metrics still used to evaluate the design of streets may be limited to only *vehicle* design speed and level of service. Or, traffic modeling may fail to consider reduced car-use that would result from people who choose to use alternative transport modes.

- *Lack of follow-through:* Complete streets policies are sometimes adopted without establishing methods/steps for implementation—for example, creation of design standards, and education of those responsible for implementation.

- *Costs:* Providing adequate bike and pedestrian paths may require an expansion of a road's right-of way. The costs of acquiring this from adjacent property owners may be too high; or, property owners may resist the appropriation of their land, even if adequate compensation is offered.

- Though a complete streets strategy is scalable to a range of different population densities, benefits may not accrue to rural areas that are too sparsely populated to justify the cost of transit options, street re-designs, sidewalks, or bike lanes.

Resource—examples:
- Killingsworth Street, Portland, Oregon. The expansion of a light rail line prompted Portland's Office of Transportation to improve connectivity between the rail line and local businesses and residences. Working closely with the community, Portland's Office of Transportation crafted a comprehensive plan that increased space and safety for pedestrians, bicyclists, and transit riders. Additional improvements included the installation of street trees, ornamental street lighting, benches, and artwork. The project helped launch an economic revitalization of the neighborhood. Contact: Winston Sandino, Project Manager, Portland Department of Transportation, (503) 823-5767, winston.sandino@portlandoregon.gov. http://www.portlandonline.com/transportation/index.cfm?c=36376.

- 28th Street, Boulder, Colorado. Boulder's Transportation Division sought to change the city's main corridor into a "gateway" of which the city could be proud. An outside consulting firm was hired to organize public participation in the design process. The result is a truly multi-modal street accommodating pedestrians, bicyclists, transit riders, and motorists. An emphasis on aesthetics resulted in the addition of numerous artworks and drought-resistant landscaping. Boulder was a winner of the Exemplary Human Environment Initiatives (EHEI) award from the Federal Highway Administration. Contact: Noreen Walsh, Senior Planner, Boulder Department of Transportation, (303) 441-3266, walshn@bouldercolorado.gov. http://ci.boulder.co.us/index.php?option=com_content&view=article&id=294&Itemid=3674.

Resource—written and web:
- National Complete Streets Coalition—the most prominent organization promoting the adoption of complete streets, the coalition is a one-stop source of information, including the benefits of complete streets, links to reports and presentations, a guide on changing policy, and complete streets efforts and campaigns in the news: http://www.completestreets.org.

- Jana Lynott, Jessica Haase, Kristin Nelson, Amanda Taylor, Hannah Twaddell, Jared Ulmer, and Barbara McCann (2009), *AARP: Planning Complete Streets for*

an Aging America. Washington, DC: AARP, Public Policy Institute. This report targets the ways in which older adults can benefit from complete streets policies. A list of best design practices is included.
- Brief: http://assets.aarp.org/rgcenter/il/inb167_streets.pdf.
- Full Report: http://assets.aarp.org/rgcenter/ppi/liv-com/2009-12-streets.pdf.

- *A Resident's Guide for Creating Safe and Walkable Communities* (2008). Washington, DC: Federal Highway Administration. The *Guide* addresses common pedestrian safety problems and offers potential remedies. http://safety.fhwa.dot.gov/ped_bike/ped_cmnity/ped_walkguide/index.cfm.

- Institute of Transportation Engineers (ITE), Washington, DC—ITE's online *Bookstore* (http://www.ite.org/emodules/scriptcontent/Orders/index.cfm) lists numerous publications related to designing complete streets (some free; some for a cost), including:
  - *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities* (2006). Report provides guidance on street design from a transportation planner's point of view. View report online: http://www.ite.org/bookstore/RP036.pdf.
  - *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, an ITE Recommended Practice* (March, 2010). Can view on line, at no cost, by registering with the ITE Bookstore: http://www.ite.org/emodules/scriptcontent/Orders/ProductDetail.cfm?pc=RP-036A-E.

- *Complete Streets Resource List*, American Planning Association, Washington, DC. Provides links to resources on a variety of complete streets topics: http://www.planning.org/research/streets/resources.htm.

- Laura K. Khan, et al. (2009), *Recommended Community Strategies and Measurements to Prevent Obesity in the United States.* Atlanta, GA: Centers for Disease Control and Prevention. Report cites policy options that communities can adopt to tackle obesity. Many of these policies represent elements of a complete streets program. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5807a1.htm.

- *Street Design Manual* (2009), New York, NY: City Department of Transportation. The manual provides an extensive list of design solutions for development densities ranging from low-level residential to central business districts. Many pictures and diagrams of examples are provided. http://www.nyc.gov/html/dot/html/about/streetdesignmanual.shtml.

Resource—technical assistance contact name:
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SAFE DRIVING STRATEGIES
Traffic Calming

Description:
The current reality is that cars are still the primary mode of transportation, even though communities should create a variety of mobility options to meet the diverse needs of a typical community's resident population—particularly those with specific mobility limitations, such as frail older adults and individuals with temporary or permanent disabilities or mobility-limiting conditions. With this in mind, municipalities can take steps to create a safer driving environment for residents— steps that reinforce and complement a pedestrian-friendly neighborhood and street-design elements discussed in other sections of the Resource Manual.

Traffic Calming: Traffic calming creates a safe and comfortable travel environment for both automobile and non-automobile mobility (pedestrian, bicycle, wheel-chair, roller-blade, small-motor vehicle, public transit). One expert[1] defines traffic calming as ". . . changes in street alignment, installation of barriers, and other physical measures to reduce traffic speeds and/or cut-through volumes in the interest of street safety, livability, and other public purposes."

Traffic calming is not traffic congestion; traffic continues to move, but more smoothly, steadily, and slowly. Under a traffic calming framework, it is more important that traffic move steadily—traffic characterized by areas of high speeds, interspersed with areas of slow congestion, is far less safe and less tolerable than traffic that moves at a steady, but manageable pace. Drivers are more tolerant of traffic if it is moving steadily through interesting, well-planned, well-landscaped, aesthetically pleasing areas with pedestrian and street activity.

Traffic calming strategies include:
- *Safe intersections:* Streetscape changes at intersections can create "safe zones" for pedestrians waiting to cross the street (particularly for frail older adults, children, and others with mobility issues), and can shorten the distance required to cross a street or intersection. Such changes include:
  - *Smaller Turning Radii:* The turning radius is the distance provided from the curb in which the driver can make a turn—the larger the radius, the more room to turn; the shorter the radius, the less room to turn. Distance of radii determines how fast and safely drivers make the turns—with a wide radius, the driver has more room to make the turn at a higher speed; a narrow radius forces the driver to slow down, or risk hitting the curb. Right-angled "T" intersection radii yield the slowest speed and the safest pedestrian environment—the driver must slow down enough to make a sharper turn. The speed of the cars making the turn has an impact on the safety and comfort of the pedestrians crossing and navigating the street.

- *Bulb-outs:* At an intersection, a bulb-out is an expansion of the curbed pedestrian area that extends out into the traditional street area. By extending this area, three things happen: pedestrians have a wider, safer area to congregate while waiting to cross the street; the walking distance to cross the street decreases; and cars have less room to turn and, thus, must take the turn at a slower, safer speed.

- *Traffic medians:* Medians are strips of raised pavement, usually landscaped, between the two directions of car traffic. This measure slows traffic and provides a "safe zone" in the middle of a pedestrian's trip across the street.

- *Round-abouts:* Round-abouts keep traffic flowing at a steady speed—they avoid the stops and starts associated with conventional intersections with traffic signals; they decrease traffic congestion and bottlenecks; and they minimize sudden stops, drivers running lights at high speeds, drivers "jumping" lights, and "speed-spiking" (quick acceleration to make up for lost time at stop signs or signals). The benefits are multiplied by the size of the intersection they replace because large intersections are more confusing, unpredictable, and dangerous. Unlike their early 20th-century cousin, the traffic circle, round-abouts eliminate the need for stop signals altogether.

Though confusing and seemingly less safe at first—largely because they are new to most Americans—round-abouts become easier to navigate and much safer than conventional-signaled intersections. In addition to decreasing driving speed and reducing frenetic driving, roundabouts have fewer points of contact that would lead to accidents, such as head-on left-turn accidents or angled crashes.[2] The added vigilance and attention required in a round-about makes drivers pay more attention and, thus, drive safer.

The Indiana suburb of Carmel has built 50 round-abouts since 2001. Since that time, the rate of accidents involving injuries dropped 78 per cent.[3] A Michigan study found that round-abouts produce a 40 per cent reduction in crashes, an 80 per cent reduction in injuries, and a 90 per cent reduction in accidents causing death or serious injury.[4]

Ancillary benefits accrue to many drivers, including older adults (who may be experiencing aging-related frailties); drivers of all ages with physical disabilities (including vision and hearing impairment); and others whose driving situations are fraught with distractions (cell-phone use, other people in the car, reading, etc.). Round-abouts generally reduce traffic delays and, thus, reduce stress, anxiety, and lost time. For example, round-abouts in Kansas produced a 62 per cent reduction in traffic delays.[5]

Benefits also accrue to the general community—air quality is improved (an idling car creates 30 per cent more air pollution than a car traveling at 30 mph), which is a direct benefit to seniors, children, and others with respiratory impairments or allergies; car emissions (hydrocarbon emissions,

in particular) are reduced because of reductions in both idling and quick accelerations; and gasoline consumption is reduced.

- *Mini-circles (often referred to as 'mini-round-abouts'):* Smaller than a round-about (about 10-20 feet in diameter), mini-circles usually replace stop signs at less-travelled intersections.

- *Bump-outs:* Bump-outs are similar to bulb-outs, but are located along the street between intersections. Like bulb-outs, bump-outs are a raised extension of the curbed pedestrian area into the street area, usually replacing one parking space. Bump-outs provide greater safety and comfort for pedestrians and more area for street activity; they can also be used as the pedestrian waiting area for mid-block street cross-walks.

- *Cross-walks:* Raised cross-walks, and cross-walks constructed of different materials from the road, signal visually to the driver to slow down and be aware of pedestrians; drivers will also naturally slow down when they recognize that they will drive over a raised or different surface. Brightly-colored cross-walks serve the same purpose, though less effectively. These three measures are more effective than simple signs directing cars to yield to pedestrians; drivers should instinctively recognize a pedestrian area by its design, rather than having to read a sign.

The Psychology of Traffic Calming: Traffic calming is as much a study in behavioral psychology as it is in traffic engineering discipline. That is, traffic calming influences the intricate relationship between drivers and their physical surroundings, and between drivers and pedestrians. Many traffic calming measures, for example, create "boundaries" for cars and drivers—e.g., curbs, traffic medians, on-street parking, street trees and landscaping. These boundaries help drivers gauge, and be more aware of, their speed, which tends to lead them to slow down and pay closer attention to their surroundings.

Think about a wide country road with treeless farmland on either side. With no objects to drive by—against which to judge our speed—and no boundaries to navigate, a driver feels perfectly comfortable driving faster and less vigilantly; indeed, the driver will often not even notice the speed. But put that same driver on a narrow, curbed, tree-lined street with on-street parking and raised cross-walks— suddenly there are objects that must be navigated and that serve to gauge car speed, and most drivers will automatically slow down and pay more attention to their surroundings, for their own safety as well as the safety of others.

Traffic calming also creates a self-perpetuating and mutually reinforcing cycle of pedestrian and driver safety: simply the presence of more people on the street (a product of people-friendly streetscape reforms) signals to the driver to slow down and drive more carefully; slower traffic, in turn, invites more pedestrians to the street by creating a safer and more comfortable environment; more pedestrians generate slower traffic; and so on.

References:

[1, 3, 4, 5] Reid Ewing (September, 1999), *Traffic Calming State of the Practice.* Washington, DC: Institute of Transportation Engineers. To view full text: http://www.ite.org/traffic/tcstate.asp#tcsop.

[2] Leslie Kettren (2006), *Talking the Walk: Building Walkable Communities,* p. 92. Chicago, IL: Congress for the New Urbanism. Full text: http://www.cnu.org/sites/www.cnu.org/files/KettrenTalkingtheWalk.pdf.

Benefits:

For residents:

- Pedestrians and bicyclists perceive the environment as safer and more comfortable, which increases the use of walking and bicycling as modes of mobility.

- Roadways and streets are more easily and comfortably navigated by drivers and transit riders.

- As traffic and driving conditions have become faster, more complex, and with greater numbers of drivers, traffic calming measures ameliorate the fear and stress older people with aging-related and other frailties, people with disabilities, and others with mobility restrictions feel when navigating the streets and sidewalks, resulting in greater numbers of community residents leaving the isolation of their homes and venturing out into downtowns and other areas of their communities.

- Traffic calming strategies help modify the general driving behavior of individuals, leading to safer streets overall and fewer accidents.

For the community:

- Structural aspects of traffic calming amenities contribute to overall neighborhood aesthetics, making communities more attractive to residents and visitors.

- Traffic calming elements are an important aspect of a livable community . . . contributing to the "sense of community" residents feel about their neighborhoods and encouraging them to remain living in their communities rather than relocating to other places. This is a particularly important as the population ages and a significant proportion of older people are leaving New York for other states, taking their discretionary income and their skills and talents with them.

- The pollution-lowering aspects associated with traffic calming results in a cleaner, healthier living environment for residents to grow up, work, and grow old.

- When necessary, round-abouts are easily modified and do not rely upon electricity when there is a power outage.

Impediments or barriers to development or implementation:

- Often, residents and community leaders are unaware of the many implications of retaining conventional traffic and driving policies and procedures and do not understand the individual and community benefits of instituting traffic calming measures; thus, there is little resident-level pressure to incorporate such elements or to include them in planning discussions. Like alternative forms of development, traffic calming must be communicated to the public effectively, carefully and patiently.

- Many drivers view roads simply as a way to travel faster by car, and are often resistant to measures that appear to slow traffic and favor pedestrians and bicyclists.

- Most existing transportation codes do not include—and may even discourage—traffic calming measures.

Resource—examples and ordinances:

- Round-abouts: For a series of examples, including photographs, of where round-abouts have been successfully implemented, see: Leslie Kettren (2006), *Talking the Walk: Building Walkable Communities.* Chicago, IL: Congress for the New Urbanism. Full text: http://www.cnu.org/sites/www.cnu.org/files/KettrenTalkingtheWalk.pdf.

- Traffic calming: For a list of numerous cities in the United States and several foreign countries that have developed traffic calming manuals, policies, and programs, see: "Traffic calming Programs," *Traffic calming.org:* http://trafficcalming.org/.

- 146-slide power point presentation regarding complete streets and walkability, including photos of examples of good street design in a variety of cities:

Resource—written and web:

- Dan Burden (April, 2000), *Streets and Sidewalks, People and Cars: The Citizens' Guide to Traffic Calming.* Sacramento, CA: Local Government Commission, Center for Livable Communities.

- "Traffic calming," *Bike Plan Source:* www.bikeplan.com/calm.htm.

- National Center for Bicycling and Walking: www.bikewalk.org.

- Pedestrian and Bicycle Information Center: www.walkinginfo.org.

- Carmen Haas-Klau, et al (1992), *Civilized Streets—A Guide to Traffic Calming.* Brighton: Environmental and Transport Planning.

- *Traffic Calming, The Solution to Urban Traffic* (1993) and *New Vision for Neighborhood Livability*. Draper, Utah: Citizens Advocating Responsible

Transportation. Also, Walkable Communities: http://www.walkable.org/readinglist.html.

- Pedestrian and Bicycle Safety Research Program, Federal Highway Administration: www.fhwa.dot.gov/environment/bikeped/index.htmwww.trafficcalming.org.

- *Traffic calming, Auto-Restricted Zones, and Other Traffic Management Techniques: Their Effects on Bicycling and Pedestrians— National Bicycling and Walking Study* (1994). Washington, DC: U. S. Department of Transportation.

- Institute of Transportation Engineers, *Traffic Calming Library:* http://www.ite.org/traffic/.

- Walkable Communities, Orlando, FL; founded by Dan Burden; promotes walkability as the cornerstone of a successful, vibrant community through education, resources, videos, and technical assistance to large and small cities, neighborhoods, school districts, parks, and roadway corridors to improve transportation efficiency and create whole, healthy communities: http://www.walkable.org/.

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ENHANCED SIGNAGE, SIGNALS, and ROAD MARKINGS

Description:
Eyesight, physical ability, and response time can be compromised by the aging process or by conditions of birth or by life events. For these older people or younger individuals, conventional street signs, signals, and road markings may not serve their driving needs, particularly in congested, confusing, high-speed areas. Municipalities can take several steps to help seniors and younger-aged people with temporary or permanent impairments to navigate the roadways more safely and comfortably:

Larger, easily readable sign lettering: Street name and directional signs can be made more visible by using larger lettering, more legible fonts, color-contrast between lettering and the background, and avoiding the addition of pictures as a background to the lettering (such as trees, houses, flowers, etc.). As a cost-saving measure, Departments of Transportation can introduce user-friendly signs incrementally as old signs are replaced.

Brighter stop lights: Increased brightness means increased visibility.

Appropriately timed signals. Traffic signals should be timed to allow enough time for both elderly and younger people of varying abilities and situations to cross the street safely, particularly in areas frequented by pedestrians.

Bright, colorful road markings: Like stop lights, brighter, colorful road markings are more visible; contrasting colors can be read more quickly.

Protected left-turn signals: Left turns at busy intersections pose the greatest danger to drivers, and research has shown that left-turns are a particularly dangerous spot for older drivers. A particular issue for left-hand turns is the ability to discern who has the right of way; adding more green lights specifically for left turns, while all other traffic is stopped, creates a safer environment.

Four-way stops: Communities can selectively convert two-way stops to four-way stops at heavily-trafficked intersections. (Note: Too many four-way stops can actually compromise safety by encouraging "speed spiking" – quick accelerations to make up for lost time at stop signs – and "rolling" – driving through the stop sign without coming to, or near, a complete stop.)

Benefits:
- Safer driving conditions for all residents, particularly older people, children, and people with disabilities.

- Safer environment for pedestrians and bicyclists.

Impediments or barriers to development or implementation:

- Communities may feel they cannot afford the cost of replacing existing amenities and infrastructure; however, costs can be minimized by gradually incorporating these recommendations in the normal course of replacement and maintenance.

Resource—written and web:

- *A Blueprint for Action: Developing a Livable Community for All Ages* (May, 2007). MetLife Foundation, Partners for Livable Communities, National Association of Area Agencies on Aging. View on-line: U. S. Department of Housing and Urban Development, Regulatory Barriers Clearing House: http://www.aginginplaceinitiative.org/storage/aipi/documents/Blueprint_for_Action_web.pdf.

- Mary Kihl, et al (2005), *Livable Communities: An Evaluation Guide.* Washington, DC: AARP, Public Policy Institute: http://assets.aarp.org/rgcenter/il/d18311_communities.pdf.

- Deborah A. Howe (November/December, 1992), "Creating Vital Communities: Planning for Our Aging Society," *Planners Web: Planning Commissioners Journal*, Issue #7: http://www.plannersweb.com/articles/how030.html.

- Michael Payne, et al (2008), "Livable Communities: Helping Older Ohioans Live Independent and Fulfilling Lives," Scripps Gerontology Center Publications, Oxford, Ohio: Miami University: http://sc.lib.muohio.edu/bitstream/handle/2374.MIA/263/fulltext.pdf?sequence=1.

- *Wendy P. Craig, Older Drivers: Show'em Some Grace.* Western North Carolina Elder Law: http://www.wncelderlaw.com/older-drivers.htm.

- Anita Stowell-Ritter (March, 2002), *Understanding Senior Transportation: Report and Analysis of a Survey of Consumers Age 50+.* Washington, DC: AARP, Public Policy Institute: http://assets.aarp.org/rgcenter/il/2002_04_transport.pdf.

- *Highway Design Handbook for Older Drivers and Pedestrians* (May, 2001). McLean, VA: The Federal Highway Administration, Research, Development, and Technology Turner-Fairbank Highway Research Center. http://www.fhwa.dot.gov/publications/research/safety/humanfac/01103/.

- "Reducing Highway Fatalities," *Welcome to the FHWA Safety Program.* Washington, DC: U. S. Department of Transportation, Federal Highway Administration. http://safety.fhwa.dot.gov/.

- LED-enhanced solar-powered signage—signage systems that provide advance warning to motorists of required road stops; they can be free standing stop signs, used in conjunction with warning signs of all types, or can be customized

for site-specific applications with in-pavement signal lights, overhead beacons, and/or other signaling devices. Example of one brand: http://www.lightguardsystems.com/activeStop.shtml.

- Articulated, spring-back post foot for road signs, traffic signals, smaller street lights, and the like: http://www.patentstorm.us/patents/5379716/description.html.

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OLDER DRIVER ASSISTANCE NETWORK

Description:
Community-based Older Driver Assistance Networks (ODANs) are being developed in New York State to: (1) assist older drivers remain safely behind the wheel, (2) help family caregivers effectively address unsafe driving situations involving an impaired, at-risk older family member, and (3) provide support and access to resources to anyone attempting to help a potentially at-risk older driver. These networks are a partnership of experts from the fields of aging, healthcare, law enforcement, rehabilitation, and transportation, together with consumers and advocacy groups. In urban, suburban and rural areas, collaboration among a network of county-based partners, or a cluster of regional partners, promotes community conversations that can lead to increased individual driver safety, as well as improved highway safety for everyone.

Demographic change is a major factor underlying the development of ODANs. Transportation is one of the most important issues for older individuals, and as the Baby Boomers age, increasing numbers of older persons will be driving their personal cars—for a variety of reasons: (1) the emotional and mental health benefits accruing from the independence associated with continued driving, (2) the flexibility of having access to one's own car for daily tasks, activities, and health appointments, (3) relief from the reluctance and indignity of constantly placing the burden for one's transportation needs on busy family members and friends, and (4) often, as the only option in the face of limited or no alternative means of transportation. In addition, public health and long-term care policies that promote the ability of older people to continue living in their own homes throughout the elder years will result in many more people driving for longer periods of time.

In discussions about driving issues, older drivers often face discriminatory attitudes based purely on their age, with simplistic solutions offered for what is really a complex situation. In contrast, ODANs are a reasoned response to a multifaceted aging issue, which is only one aspect of the larger safe-driving and safe-roads concerns of communities. Driver safety issues involve all age groups, as is evidenced by U. S. data from the 2000 Census Bureau, which indicates (1) that the proportion of drivers in traffic accidents is greater among younger age groups than older age groups, and (2) substantial numbers of drivers of *all* ages are involved in traffic accidents:

Age group	# of licensed drivers	# of licensed drivers in traffic accidents	% of age group's licensed drivers in traffic accidents
25 – 34	37.3 M	4.9 M	13 %
35 – 44	41.9 M	4.4 M	11 %
45 – 54	33.7 M	2.9 M	9 %
55-64	21.3 M	1.6 M	7 %
65 – 74	15.2 M	1.0 M	7 %
75+	10.6 M	710 T	7 %

Professionals and advocates stress that issues around driving are not a matter of age, but how a driver functions on the streets and highways. Within various population groups, differing factors have an impact on their functional ability while driving. Factors specifically related to aging underlie the efforts of communities to establish Older Driver Assistance Networks to address the concerns of law enforcement officers, health care workers, aging advocates, and older people's caregiving family members, as well as older persons themselves:

- There is a relationship between increasing age and vulnerability to a variety of frailties, and when a driver's health or physical limitation gets in the way of on-road safety, dangerous and life threatening situations can occur.

- The two most common aging-related impairments are vision and hearing loss, two critical sensory elements needed for safe driving.

- Although the majority of older adults are living healthy lives for much longer periods of time, some older people experience declines in memory, physical strength, agility, reaction time, or range of motion. Any of these maladies affect the safe operation of a motor vehicle.

- Increasing longevity is resulting in the rising prevalence of older people with cognitive impairment, particularly Alzheimer's disease. Many individuals diagnosed with early stages of Alzheimer's disease are licensed drivers who own or have access to a motor vehicle.

- The side-effects of medications, regardless of age, can temper an individual's ability to drive safely.

- Trends show that older persons are driving greater distances for the necessities of life as once-local retailers and services move to malls and commercial zones farther away from residential areas.

- While older drivers are involved in fewer traffic accidents than other age groups, when in a crash, older drivers are far more likely to sustain fatal injuries due to physical frailties resulting from aging.

In the ODAN model, an assembly of partners working together is enabled to:

- Establish a reliable, sustainable, and broad-based network of mutually supportive referral pathways and coordinated support services for anyone attempting to provide assistance to an older driver;

- Build shared capacity among network partners to assist primary referral sources (such as families, physicians, professional aging services providers, and law enforcement) in dealing with safety concerns related to an older driver;

- Provide information and assistance to help the older driver, their families, and other members of the community to successfully identify and address potentially unsafe and at-risk situations; and

- Provide education to older people, families, and the general community to:
  (1) promote greater awareness about interventions that are available to help older persons drive safely longer, and
  (2) support older individuals who are no longer able to drive without presenting a risk to themselves or others.

Benefits:
- Older driver collaborative networks can be successfully implemented in rural, suburban, and urban areas.

- The ODAN model is replicable to address driving and safe-road issues among other age groups or population groups.

- ODANs are a preventative model—enabling individual older driver issues to be addressed before a crisis, injury, or death occurs.

- There is little or no cost associated with the establishment of an Older Driver Assistance Network.

- In the face of a growing older population— with increasing numbers of older adults staying in their communities and living much longer lives—older adults can continue to drive safely, maintaining their independence for longer periods of times, which has been shown to have a positive impact on health and well-being.

- The concerns of family caregivers about the safety of older family members, as well as their concerns about potential injuries caused to others, are moderated; and their substantial caregiving efforts and decision-making are supported through education, help, and resources.

- Inappropriate actions and decisions by family members and professionals are reduced—for example, in the many situations where they are aware of the problem but are often reluctant to remove or limit an older person's driving ability because they understand that this can be a heart-breaking, life-changing event for an older person.

- There is increased knowledge and understanding among professionals in community agencies and organizations, who frequently lack the knowledge and information necessary to assist older people and their families in unsafe-driving situations.

- Family members have an increased ability to successfully address driving issues presented by their older family members. Families are usually the first to be confronted by problems associated with a potentially unsafe older driver. Without a coordinated, collaborative network approach, many families are unaware of available help or resources on "aging and driving"; others may be able to find various resources, but lack the ability to assemble all the pieces of the puzzle, and others need help in successfully implementing tips and techniques when applying them in a family situation.

- The coalition framework of an ODAN reduces fragmentation and gaps in successfully addressing an individual older driver issue. For example, where there is no coalition, law enforcement officials are often engaging an older driver for the first time upon observing an act of unsafe driving or a serious crash; or, physicians are aware of older person's decline in physical and mental functioning or the side effects of medications that can affect driving ability, but often are unaware of the steps they, the older person, or the family can take to receive help regarding continued safe driving or alternative transit.

- Traffic accidents are reduced as, according to traffic safety experts from across the country, the key to safe driving is to intervene early before an on-the-road crisis or death occurs.

- The goals of many segments of our communities are supported—public and private agencies, families, law enforcement officials, physicians, public policymakers, and other professionals who serve older persons—all of whom have an investment in maintaining the independence and the safety of older people.

Impediments or barriers to development or implementation:
Communities and organizations have not reported significant barriers or opposition to the development and implementation an Older Driver Assistance Network. However, some challenges include:
- Individual public and private agencies often view a problem exclusively through the lens of their own agency's mission, often lacking an ability to visualize a blend of interventions to address the complex issues facing older drivers.

- Coalition-building is not always easy; for example:
  - Community support and political will are essential to facilitate needed changes among all partners for maintaining safe mobility by older persons.
  - Routine behaviors and attitudes (particularly, a traditional "silo mode" of functional operation, or an ingrained resistance to change in how "something has always been done") can present an impediment to the collaborative structure of an ODAN.
  - Some local partners may not be able to see how they fit into "the bigger picture" of community well-being, or fail to recognize how collaboration with others will improve overall assistance to older adults in the community.

- Marketing the program: community members are often hesitant to intervene when family members, friends, or neighbors become potentially at-risk drivers.

Resource—examples:
Older Driver Family Assistance Network, Erie County Department of Senior Services, Buffalo, New York, 14202; (716) 858-7253; kelly.asher@erie.gov; www.erie.gov/driving.

- Older Driver Family Assistance Network, Westchester County Department of Senior Programs and Services, Mount Vernon, New York: www.westchestergov.com.

- Older Driver Assistance Project, New York State Office for the Aging, Albany, New York: www.aging.ny.gov.

Resource—written and web:
- Federal and New York State laws that relate to traffic safety and older drivers: http://www.nysgtsc.state.ny.us/enablinleg.htm.

- Philip LePore (2000). *When You Are Concerned: A Handbook for Families, Friends and Caregivers Worried about the Safety of an Aging Driver.* Albany, New York: New York State Office for the Aging. This is an award-winning, 56-page publication developed to guide families facing the dilemma of what to do when an aging family member is an at-risk driver. The New York State Office for the Aging was funded to develop this publication by the New York State Governor's Traffic Safety Committee, with support from the New York State Department of Motor Vehicles and the New York State Department of Health. For a paper copy of *When You Are Concerned,* contact the New York State Office for the Aging: 1-800-342-9871, or email nysofa@ofa.state.ny.us. The publication is also available on-line: http://www.aging.ny.gov.

- National Highway Traffic Safety Administration: http://www.nhtsa.gov/. Under *Key Issues,* select "Senior Driving."

- *How to Understand and Influence Older Drivers* (June, 2006). U. S. Department of Transportation: National Highway Traffic Safety Administration., http://www.nhtsa.gov/people/injury/olddrive/UnderstandOlderDrivers/.

- National Institutes of Health, National Eye Institute, Bethesda, MD: "What You Should Know," *Information for Healthy* Vision is available on the Web: www.nei.nih.gov/lowvision/content/know.asp.

- American Medical Association, Chicago, IL: *AMA Physician's Guide to Assessing and Counseling Older Drivers.* This ten-chapter book, developed by the American Medical Association in cooperation with the National Highway Traffic Safety Administration, is available on the Web at: www.ama-assn.org; on the top menu, choose "Physician Resources" and choose "Patient Educational Materials"; on the left menu, choose "Older Driver Safety"; on the left menu, choose "Assessing Counseling Older Drivers."

- National Highway and Traffic Safety Administration (NHTSA) and American Society on Aging (ASA) (nd). *Drive Well: Promoting Older Driver Safety and Mobility in Your Community*. Washington, DC: NHTSA; ASA. A tool kit to prepare professionals for effective conversations about driver safety and community mobility issues with older adults, their families, and community members.

http://www.nhtsa.gov/Driving+Safety/Driver+Education/Senior+Drivers/Drive+Well+Toolkit:+Promoting+Older+Driver+Safety+and+Mobility+in+Your+Community.

Resource—technical assistance contact names:

- Beverly Carter, Program Coordinator
  Older Driver Family Assistance Network
  Westchester County Department of Senior Programs and Services
  9 South First Avenue, 10th Floor
  Mount Vernon, New York 10550
  (914) 813-6188 or (914) 813-6400
  Bdc1@westchestergov.com

- Michael Paris, Project Director
  Older Driver Assistance Project
  New York State Office for the Aging
  2 Empire State Plaza
  Albany, New York 12223
  (518) 474-2473
  Michael.paris@ofa.state.ny.us
  nysofa@ofa.state.ny.us.

Paul Beyer, Director of Smart Growth
Governor's Smart Growth Cabinet
Albany, NY

PUBLIC TRANSPORTATION

Description:
Public transit: Public transit (mass transit) requires mass; that is, a concentration of people/users in the service area is necessary to support the significant fiscal/municipal investment in public transit. Mass transit also requires accessibility—proximity to several users (commuters, shoppers, visitors), and safe, comfortable connections and pathways for pedestrians and bicyclists.

Various elements are necessary to successfully attract a consumer market large enough to sustain the financial viability of a mass transit system: safety and comfort features; easy pedestrian access to transit stops; adequate, well-lit waiting areas; shelters that protect users from the elements; and regular, reliable service to reduce waiting times.

Compact, mixed-use communities offer additional inducements to transit use: transit becomes more accessible by foot, bicycle, and short car ride because of the increased proximity to homes and other destinations; and density provides the critical market mass necessary to sustain the investment.

Transportation services: Local governments or community organizations can organize volunteer driver programs. These programs are helpful to those seniors or individuals with disabilities who cannot drive or access public transit. Some of these programs are organized around specific housing facilities (such as senior housing or housing for people with various special-needs), and others can accommodate requests from individual homes and scattered homes on a call-in basis.

Benefits:
For older consumers, as well as those with varying abilities and situations:
- Transit systems that include the elements mentioned above encourage higher use by all types of consumers. This is particularly important for those older people and people with disabilities who have had to relinquish driving personal cars. Available, easily accessible, safe alternatives allow access to amenities necessary for daily tasks and to family and friends; alleviate social isolation, which can result in depression and other health issues; and maintain residents' sense of independence and competence.

For the community:
- Greater use of mass transit systems reduces the use of personal cars, thus providing a positive impact on environmental air quality by reducing the use of fossil fuels—leading to reduced levels of greenhouse emissions.

Impediments or barriers to development or implementation:
- Low-density zoning and development patterns inhibit the population density needed to support public transit systems.

- The cost of public transit can be prohibitive in areas that do not have the population density to adequately support it.

- Volunteer driver services can require significant effort to successfully recruit, coordinate, train, and retain volunteers.

Resource—written and web:
- The Community Transportation Association of America: http://web1.ctaa.org/webmodules/webarticles/PPL.search.asp:
  - Select "Resources;" then "Senior Mobility" on the menu bar at the top of the page, for: Resources, Tool Kits, Best Practices, and Volunteer Driver Transportation Programs.
  - Select "Programs: on the menu bar, for: Community Transportation Assistance Programs.

- *Innovations for Seniors: Public and Community Transit Services Respond to Special Needs,* The Beverly Foundation: http://beverlyfoundation.org/

- *Improving Public Transit Options for Older Persons,* U. S. Department of Transportation, Transit Cooperative Research Program.

Friedhilde Milburn, Principal
ThirdAge Partners
Mamaroneck, NY

Catherine Wynkoop, Executive Director
Active Living Over Fifty (ALOFT)
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TRANSPORTATION MODELS

Description:
When striving to create livable communities, the lack of dependable, affordable public transportation is the most prominent need voiced by consumers, various types of providers, businesses, and workers. This need spans the urban, suburban, and rural segments in every state, and New York is no exception. Lack of transit options is often attributed to:

- Planning and land use policies that are tied to dependence on the individual automobile—which, in turn, reflects strong consumer preferences for the flexibility and privacy of personal auto use;

- The economics of service-provision, which often force providers to eliminate costly transportation services from strapped program budgets; and

- Traditional program funding streams, together with a cautious approach to collaboration among organizations, that inhibit the development of cost-saving, shared-transportation models.

Increasingly, however, changes in demographics, as well as shifts in public long-term care and housing policies, are increasing attention on mobility and transportation issues. New York has a growing frail elderly population, a large population of residents with disabilities, and a significant low-income population. The State's long-term care policies support and reinforce the ability of these individuals to live in conventional housing, to be integrated with the wider community, and to live as independently as possible for as long as possible. Housing policies promote homeownership among all population groups, as well as the integration of income groups. All these policies have significantly increased the need, and the demand, for affordable, accessible transportation—to jobs, training sites, medical appointments, adult and child day programs, schools, rehabilitation centers, stores, meal sites, services, social and faith-based events, and more. A look across the country finds that communities are creatively addressing this issue; for example:

Coordinated transportation models:
Historically, transit services have not been consistently available to all residents in a community and have not been coordinated among agencies and organizations. Both communities and individuals experience negative impacts when transportation alternatives are limited or non-existent; when rules and eligibility for multiple, uncoordinated transportation options differ significantly; or when transportation services go in and out of business. In particular, lack of coordination leads to infrequent, unreliable, or interrupted rides; long waits for service at either end of a

trip; and a dismal time for those who are frail or ill. Time spent in transit to and from work is extended. Low-income workers, such as home health aides, have great difficulty reaching patients in rural areas. Too often, school buses run near empty or sit idle in the garage, while older adults who could climb into a school bus are without rides—at the same time, buses and vans designated for older adults or people with disabilities inefficiently transport only a few riders to medical appointments or shopping destinations.

In response to the growing demand for services and increasing transportation costs, many communities are overcoming their aversion to cooperative ventures across jurisdictional and service lines, successfully implementing sustainable collaborative models in areas with vastly varied topography, climate, and population density. Communities find that with these models the outcome is a fully integrated transportation system that maximizes efficiency, avoids isolating specific populations, and eliminates duplication of services. Examples include:

- *Ride Connection* is a "one-call" coordinated human services transportation plan serving three counties in Oregon. This nonprofit organization coordinates access to transportation services for the clients of a coalition of 24 local service-provider agencies, resulting in more efficient, fewer duplicated services; better communication among partners; identification of service gaps; and improved strategic thinking in mobility awareness. This plan provides access to a full range of transportation options for elders and people with disabilities, fostering independent and productive lives, and strengthening community connections. http://www.rideconnection.org/aboutUs/index.htm.

- *Human Services and Public Transit Coordination Plan* is a one-call center in the Lower Savannah region of South Carolina, which serves six counties, including both urban and rural areas. This model program took seven years to develop and has now been adopted statewide, with all ten of South Carolina's Councils of Government charged with transit coordination and planning responsibilities. http://www.lscog.org/common/content.asp?PAGE=367. www.olmsteadva.com/mfp/downloads/ExpandingAccess.ppt.

- *Rural public/private partnership model:* The Kenai Peninsula, one hour south of Anchorage, Alaska, has a population of 50,000 and an area spanning 25,600 square miles, 15,700 of which are land. The Kenai Peninsula Center for Independent Living (CIL) convened a group of providers that serve CIL clients, including senior centers, developmental disability service providers, mental health service providers, local cab companies, and representatives of healthy communities programs. "Everyone agreed that coordinated transportation would be helpful, but programs that already had vans were concerned that their clientele would not get the services they needed elsewhere . . . and were unwilling to lend their vans to a coordinated transportation effort." After much discussion, they created a successful, affordable, on-demand transportation model that addressed the concerns of individual agencies: CIL purchased a lift-equipped van through grant funds from the Alaska Department of Transportation (DOT) and the Alaska Mental Health Trust Authority, which it then leased to a

cab company at no cost. In return, the cab company gave all CIL clients a cost break on their transportation. CIL sells coupons to consumers to use the van and 13 other vehicles owned by the cab company. The lift-equipped van is used solely for individuals needing that service. Everyone contributes in this model— the cab company charges $5.00 for a $7.00 ride; the rider pays $2.00; CIL, through its DOT grant, covers the remaining $3.00; CIL administers the coupon program free of charge; and the cab company is in charge of all driving, dispatching, maintenance and repair, and operations.
Contact: Joyanna Geisler, Executive Director, Kenai Peninsula CIL, PO Box 2474, Homer, AK, 99603, (907) 235-7911, email: ilc@xyz.net,
http://www.peninsulailc.org.

Community-based transportation strategies:

- Supplemental Transportation Programs (STP) are community-based programs that are meant to complement existing transportation alternatives—and are typically developed to address the affordability, accessibility, and flexibility needs of older people and people with disabilities.   Successful, and often innovative, STPs exist around the country, often as public/private partnerships. Examples include:

  - *Travel training program:* Travel training programs provide free assessment and instruction either to groups or on an individualized, one-on-one basis to seniors and people with disabilities to enable them to confidently and safely travel independently on conventional or paratransit (transportation service that supplements larger public transit systems by providing individualized rides without fixed routes or timetables) public transportation alternatives. Various organizations across the country offer these programs. One example is the Westchester, New York, *Travel Training Program*, sponsored by the County's Office for the Disabled and Department of Transportation, which provides one-on-one training for people with disabilities to use the Bee Line ParaTransit Service. Contact: (914) 995-2959, or email ammi@westchestergov.com.
  http://disabled.westchestergov.com/index.php?option=com_content&task=view&id=2559&Itemid=4435.

  - *On-line reservation system:* In 2009, Metro Mobility, a paratransit program of the St. Paul, Minnesota, Metropolitan Council, is currently customer-testing its new online system powered by TRAFFIX, the same software used by professional transit planners. The system will significantly ease access to its paratransit system by allowing customers to make, change, or cancel their travel arrangements 24 hours a day, using their home computer. http://www.metrocouncil.org/directions/transit/transit2007/MetroMobility.htm. And, more information: http://www.metrocouncil.org/transportation/MetroMobility/index.htm.

  - ITN*America*[®]: The only national nonprofit transportation network of community-based transit programs in the United States, the *Independent Transportation Network*[®] provides door-to-door, arm-through-arm ride service 24 hours a day, 365 days a year, for seniors. There are no

limitations on the consumer's purpose for the ride, the program uses both volunteer and paid drivers, and consumers use Personal Transportation Accounts from which fares are debited. Contact: 90 Bridge Street, Westbrook, Maine, 04902, (207) 857-9001, email: info@itnamerica.org, www.itnamerica.org.

▪ *Trip banking:* The principles underlying volunteer-service time banking can be applied to transportation. In time banking, an individual's hours of volunteer service are recorded, and he receives equivalent hours of free services when needed at a later date. In a trip banking program, volunteer drivers use their own vehicles to provide free ride services for others, accumulating owed hours to be redeemed when they, themselves, need transit at a future date. In another version, exchanges can be made in current, rather than future, time—drivers can exchange their volunteer driving services for alternative services that they may currently require. Versions of the trip banking concept are operated by ITN*America®*: (1) the *Transportation Social Security*™program, where volunteer drivers earn mileage credits for their own future use, (2) volunteer drivers can give their mileage credits to low-income seniors through the *Road Scholarship Program,*™or (3) personal cars can be donated and exchanged for credits toward rides through the Car*Trade*™ program. http://www.itnamerica.org

• In an attempt to conserve fossil fuels and reduce environmental toxins, communities and agencies are increasingly employing inventive strategies to reduce reliance on personal automobiles, while addressing the mobility and transportation needs of employees and residents. Examples include:

▪ *Guaranteed ride home:* Many people would give up the flexibility of driving their own cars to work in order to save money by sharing rides; but they do not do so because they fear they will be stranded with no way to get home if there is a family emergency, if they have to unexpectedly work late, or if their share-pool driver has to leave work early. To encourage car-pooling and use of mass transit, communities have instituted programs that guarantee a ride home, at no cost, in those emergency situations. For, example:
  o Capital District Transportation Authority, covering the counties in New York's Capital District—*Guaranteed Ride Home Program*: http://www.capitalmoves.org/guaranteed-ride-home/.
  o New York's Metropolitan Transportation Authority (MTA)—*Guaranteed Ride Home Program:* http://www.mta.info/mnr/html/guaranteed/guaranteed.htm.
  o Alameda County, California— *Guaranteed Ride Home Program*: http://www.grh.accma.ca.gov/.
  o Arlington County, Virginia—*Guaranteed Ride Home* http://www.commuterpage.com/ridehome.htm.
  o State of Georgia's Regional Transportation Authority—*Guaranteed Ride Home:*

http://www.xpressga.com/index.php?option=com_content&task=blogcategory&id=29&Itemid=53.

- *Commercial car-sharing:* Car-sharing programs are a very successful option for urban areas, where most residents use public transportation for daily activities, but would like the use of an automobile for occasional longer (distance and time) trips, or for those who need a car for only a one-hour or several-hour use. For easy access by consumers, the car-sharing company's cars are located at numerous locations throughout a service area; and reservation procedures, cost, and usage are much more flexible than traditional car rentals. This concept started in Switzerland in 1987 and has expanded into other foreign countries and the United States. According to Susan Shaheen, University of California (2009), there are 24 car-sharing companies in the United States, with almost 310,000 members sharing 6,093 cars. Flexcar (operating primarily on the west coast) and Zipcar (operating primarily on the east coast) are the two major car-sharing companies in the United States— see news article: Eric Pryne (July 12, 2005), "Car-sharing rival plans to head west," *The Seattle Times*: http://seattletimes.nwsource.com/html/localnews/2002374592_zipcar12m.html.

Benefits:

For older adults and individuals with disabilities:
- Transportation programs that increase accessible, available, and affordable travel options:
  - Allow residents to access needed services and amenities when they have lost the ability to drive independently.
  - Allow them to remain self-managing for longer periods of time.
  - Support their ability to remain living in their current homes and communities.
  - Increase their sense of self-confidence and competence.
  - Increase their ability to visit family and friends.
  - Reduce their vulnerability to isolation and depression.

For family caregivers (who provide the greatest amount of care for their elderly or impaired family members):
- Availability of affordable, safe, and accessible transportation for frail or impaired family members:
  - Significantly reduces the burdens of family caregivers.
  - Reduces caregivers' lost work days.
  - Has a positive impact on caregivers' workplace productivity.

For home care workers and other direct care workers:
- Workers' livelihood is substantially enhanced by available, affordable transportation options.

- More direct care workers will be available to families and individuals when transportation costs do not act as a barrier to workers' remaining in the health care field.

For communities:

- Collaborative models bring community-wide investment in the system's success, continual attention to service improvement, and the creativity and innovative thinking of multiple partners.

- Coordinated transportation systems save public service dollars.

- Alternative, accessible, available, affordable transportation options are a critical component of a "livable community," encouraging residents to remain living in those communities instead of moving elsewhere.

- Strategies that increase the use of public mass transit in place of personal automobiles have a positive impact on the health of community residents, on the environment, and on budgets associated with environmental decline.

Impediments or barriers to development or implementation:

- The most critical barrier to creating a coordinated transportation program is the traditional "silo mentality" of many public and private enterprises, which find it extremely difficult to overcome fears that they will invest more into a program than they will receive, that they will lose control over transportation services for their clientele, and that *their* clients will not receive their fair share of services.

- Regardless of the type of transportation program, costs are high for vehicles, drivers, fuel, insurance, upkeep, and repair, often making transportation services the first to be cut in times of fiscal constraint.

- Cost and availability of liability insurance has an impact on the use of volunteers in a transportation program.

- Service program funding streams often do not allow program dollars to be spent outside of the program's specific framework or will not allow expenditures that involve a for-profit partner, thereby eliminating consideration of a collaborative program or a public/private partnership.

- Various transportation alternatives/programs require on-going attention to marketing and education in order to address the concerns and fears of some elderly people and people with disabilities; for example:
  - Fear of riding with other people who are unknown;
  - Reluctance to ride with an unknown driver;
  - Loss of privacy and the personal control that is inherent in the use of one's own personal car;
  - Too many questions or too much information is required before joining a program or plan;
  - Unsure of how to use a trip calendar— which depresses completion of the sign-up process;
  - Lack of an actual person to walk a person through the registration process or the trip schedules;

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- Unfamiliarity with use of the Internet for program sign-up, or do not have a computer;
- On-line programs that are not user-friendly;
- Programs may require "meeting up" at a mutually agreed upon place—but unable to find parking spots;
- Curbside pickup is not sufficient for many frail or impaired individuals.

Resource—examples:

- *Ride Connection*, a one-call coordinated human services transportation plan serving the Tri-County area of Washington, Multnomah and Clackamas Counties in Oregon, providing a full range of options for older people and people with disabilities. Components include centralized information and referral, Travel Training, door-to-door demand response, community shuttles, shared vehicle and retired vehicle program, and taxi vouchers. The key component is the Ride Connection Service Center— the primary information and referral hub, which coordinates the transportation services of multiple programs and providers, including private shuttles and public transit (public bus, light rail, street car, and aerial tram), and provides a reliable and consistent customer service experience through three Travel Navigators and one Scheduler.
http://www.rideconnection.org; on the main menu, choose "About Us."
Contact: Cora Lee Potter, Service Center Supervisor, Ride Connection,
3030 SW Moody Avenue, Suite 230, Portland, Oregon, 97201;
email: cpotter@rideconnection.org.

- *Transportation Management Association,* a one-call center in the Lower Savannah Region of South Carolina, comprising six counties— one sliver of one large urban county and the rest is very rural. The Lower Savannah Council of Government has the lead on this coordination effort, and available transit is provided largely by multiple human service agencies. The program took seven years to develop and has been adopted statewide, with all ten of South Carolina's Councils of Government being charged with transit coordination and planning responsibilities. Excellent power point presentation:
www.olmsteadva.com/mfp/downloads/ExpandingAccess.ppt.
For information: Lynnda Bassham, Director, Human Services, Lower Savannah Council of Governments, PO Box 850, Aiken, SC, 29802; e-mail:
lbassham@lscog.org.

- Supplemental Transportation Programs (STP) are community-based programs for older people and people with disabilities that complement existing transportation alternatives. Many exist around the country. A good resource for locating information on successful programs, as well as several reports on STPs and innovative transportation models across America, is the STP Exchange, a Web Site of the Beverly Foundation:
http://www.stpexchange.org/whoweare.htm.
http://www.stpexchange.org/reports.htm.

- More successful models include:
  - *MetroPool*: Connecticut and New York Departments of Transportation. Provides free commuter services to employers and commuters. Mission is to manage transportation-demand of people, improving workforce effectiveness, economic wellbeing, and quality of life. Contact: 1-800-346-3743; info@metropool.com; www.metropool.com.
  - Merrimack Valley, MA: A transportation program that includes a medical advocate. See Beverly Foundation website: www.beverlyfoundation.org.
  - Austin, TX: Faith in Action Caregivers. According to the Beverly Foundation, this program does more with less money than any other organization we fund— and cross jurisdictional boundaries":   Contact: (512) 250-5021; www.faithinactioncaregivers.org.
  - Sanford, ME: York County Community Action Corporation. Paratransit with volunteer drivers who supplement transportation, taking seniors beyond city, county, and state boundaries: www.YCCAC.org.
  - Columbia, MD: *Neighbor Ride, Inc.*—believes volunteers are critical for an acceptable and sustainable transportation program: Contact: Robert Martin, President, 8950 Route 108, Columbia, MD, 21045; (410) 884-7433; www.neighborride.org.
  - *Travel Training Course*: Project Action, Easter Seals*:* http://projectaction.easterseals.com/site/PageServer?pagename=ESPA_travel_training&s_esLocation=tc.

Resource—written and web:

- *Transportation for Elderly Persons and Persons with Disabilities,* 49 U.S.C. Section 5310, provides formula funding to States to help private nonprofit groups meet the transportation needs of older people and persons with disabilities in situations where transportation service is unavailable, insufficient, or inappropriate to meet the needs of these populations. Funding is based on each State's share of these population groups. United States Department of Transportation: http://www.fta.dot.gov/funding/grants/grants_financing_3556.html.

- New York State Governor's Traffic Safety Committee (GTSC), chaired by the State Department of Motor Vehicles, was created under the National Highway Safety Program. The New York GTSC includes 12 state agencies whose missions relate to transportation; it awards federal highway safety grant funds to local, state, and not-for-profit agencies for projects to improve highway safety and reduce deaths and serious injuries due to crashes. http://www.nysgtsc.state.ny.us/overview.htm.

- Philip LePore (2001), *When You Are Concerned: A Handbook for Families, Friends and Caregivers Worried About the Safety of an Aging Driver*, reprinted 2008. Albany, New York: New York State Office for the Aging. Available on-line at: http://www.aging.ny.gov/.

- "Models of Rural Transportation for People with Disabilities" (2007), Research and Training Center on Disability in Rural Communities, The University of

Montana Rural Institute. Brief descriptions of types of public transportation models, agency-focused models, cooperative models, volunteer and voucher models, public/private partnerships, and a list of resources. http://rtc.ruralinstitute.umt.edu/Trn/models.htm.

- Kelly Greene (January 12, 2006), "Coaxing Seniors Out From Behind the Wheel: As Driving Population Ages, Growing Number of Programs Offer Incentives—and a Lift," *The Wall Street Journal.* Brief descriptions of several transportation programs for older people, including Web links to each. http://thetransitcoalition.us/NewsPDF/TTC20060112a.pdf.

- Beverly Foundation, *Volunteer Driver TurnKey Kit*, three volumes. A free, practical, "how to" technical assistance tool for planning, implementing, and evaluating economical, convenient, and easy-to-use transportation services for older people who are unable to use standard public transit options. http://www.stpexchange.org/turnkey.htm.

- *United We Ride,* a program of the Interagency Transportation Coordinating Council on Access and Mobility, which was established in 2004 and chaired by the Secretary of Transportation. The Council coordinates 62 different Federal transportation programs across nine Federal departments, providing coordination grants to States, and providing States and local agencies with technical assistance, resources, and a transportation-coordination and planning self-assessment tool.   http://www.unitedweride.gov/1_72_ENG_HTML.htm.

- The Beverly Foundation, an organization devoted to improving transportation, with multiple links to successful transportation initiatives throughout America— where new ideas and options are fostered to enhance mobility and transportation for today's and tomorrow's older population. Provides useful cost comparisons, promotes the five A's of Senior Friendliness: availability, accessibility, acceptability, adaptability, affordability. Contact: Helen Kirshner, PhD, Executive Director, (505) 322-0620. http://beverlyfoundation.org/.

- Steve Brown (2002), "Innovative Rural Transportation: Leasing Vans to Cab Companies" (describes the Kenai Peninsula, Alaska, Center for Independent Living's coordinated transportation program), *Readings in Independent Living,* Institute on Disability Culture, Center on Disability Studies, University of Hawaii: http://www.bcm.edu/ilru/html/publications/readings_in_IL/vans.html.

- The National Center on Senior Transportation: extensive information and resources on transportation programs for older people; offers training and technical assistance, as well as publishes tools, to help transportation providers increase and improve services for older adults. http://seniortransportation.easterseals.com/site/PageServer?pagename=NCST2_transit.

- Good power point presentation providing information, examples, and resources: For easiest access, use an Internet search engine and type in: "Community

Coordination of Transportation Services: Local Solutions: Progress Report from 1988 to 2003." Fran Carlin Rogers (March 27, 2008), presentation, National Council on Aging and American Society on Aging conference.

- American Public Transportation Association (APTA): http://www.apta.com/.

- California Association for Coordinated Transportation (CalAct), representing 300 small, rural, and specialized transportation providers statewide: www.calact.org.

- AAA Foundation for Traffic Safety: www.aaafoundations.org.

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AUTOMOBILES with AUTONOMOUS FEATURES

Description:
According to the Federal Highway Administration, in 2008 there were 208.3 million licensed drivers in the United States; 22 per cent (46.7 million) of these drivers were aged 60 and over.[1] As the baby boomers age and the population of older adults in the United States grows, significantly more seniors will be driving in the years to come. This demographic trend has stimulated increasing discussion, research, and product development devoted to issues related to older drivers— among a variety of disciplines, including the automotive industry, gerontologists, mobility and transportation professionals, caregivers, policy makers, and aging advocates

Data about driving-related consequences associated with various age groups is sometimes reported in a way that is misleading. For example, while seniors over the age of 80 are more likely than any other age group to be involved in *deadly* car accidents,[2] this does not mean that older adults are involved in *more* accidents, but that they are more susceptible to injury and death in these situations because of the increased frailty associated with the aging process. In addition to unclear reporting, imbalanced media coverage of isolated auto-accident events can muddy the discussions about drivers of all ages. Data provided by the Federal Highway Administration show that the negative consequences of driving behaviors and driving conditions have an impact across all age groups (Table 1), and a scan of the automotive industry's efforts outlined in this article clearly demonstrates the industry's realization that the technological advancements that grew out of the world's aging phenomenon have major benefits for communities and for drivers of all ages and all functional abilities. As seniors are becoming significant consumers in the automobile market, auto industry engineers have dedicated more energy to designing cars that provide the entire population with a safer and less intensive ride.

Table 1 United States Licensed Driver Statistics (Total Number Licensed Drivers: 186,284,071) 2007		
Licensed Driver Age Group	Age Group as a % of Total Licensed Drivers	% of Total Car-Accident Fatalities by Driver Age Group
16 - 29	22%	34%
30 – 44	33%	27%
45 – 59	25%	19%
60 – 79	17%	14%
80 – 84	1.7%	3%
85 and Over	.7%	2%
Total	100%	100%

U. S. Department of Transportation, Federal Highway Administration, *Policy Information, Highway Statistics 2007*, "Fatalities by 100 Mil VMT by Age" Table NHTS 12.3.1: http://www.fhwa.dot.gov/policyinformation/statistics/2007/nhts1231.cfm.

Autonomous automotive technology:
Though important changes are being made in roadway design and signage that help compensate for driver frailties and impairments, increasing attention is being given to cars that are equipped to eliminate tasks that are too arduous for frail older

people and for younger individuals with disabilities or other mobility impairments. Laboratories at major universities in the United States are even developing and testing driverless cars, which do not require the usual operating control of the driver. While driverless cars are still some decades away, automobiles with autonomous features are expected to become standard equipment in the near future. More currently available is automobile technology being developed that relies on autonomous devices, making way for a more self-directed vehicle while providing the driver with ease and safety. For example:

- *Lane-departure warning system*: Developed to decrease the incidence of accidents caused by driver distraction or drowsiness, a lane-departure warning system alerts the driver when it detects the car moving out of its lane on freeways and major roads; and the National Highway Traffic Safety Administration has even considered mandating these systems on automobiles.

  In the past decade, some cars have come already equipped with a lane departure warning system that cautions the driver through a visual, audible, or vibrating mechanism. Others automatically maneuver the car back into the lane if the driver does not respond to the warning; however, if the driver turns on a turn signal, the system will not issue a warning. In 2009, Mercedes-Benz introduced a car that warns the driver through a vibrating steering wheel when it detects the vehicle leaving its lane; it is also able to ascertain whether the driver is intentionally trying to leave the lane, and reacts accordingly.

- *Automatic parking:* In the past decade, some cars, such as the Lexus, have included an automatic parking feature which performs parallel parking—an especially convenient feature for people who are unable to physically perform this function or who experience discomfort with the physical maneuvers required for parallel parking.

- *Driverless car:* Some of the world's most prominent automakers are partnering with research universities to develop vehicles that have *fully* autonomous features—or, cars that drive themselves. In fact, these automakers note that completely autonomous vehicles are not too far into the future. For example, General Motors stated that it could have a driverless car on the market by 2018 and Volkswagen plans on releasing its own model in 2028, though many experts and other automakers believe that driverless cars will not make an appearance on the road until at least 2030.

  The United States Department of Defense has created autonomous-type technology to develop driverless vehicles that engage in military operations, preventing harm to soldiers. The automaker, Audi (which is owned by Volkswagen), has teamed up with Stanford University to develop a driverless car named Shelley; Shelley has been fitted with a Global Positioning System (GPS) that can be programmed to travel any route. Additionally, automotive researchers have already developed prototype automobiles that can drive long distances and steer through city streets without the control of a driver.

- *Blind-Spot Detection System:* Blind spots refer to areas around an automobile that are blocked by certain structures in the car. Because drivers have physical constraints in eye movement and head and body rotation, some areas of the road are unseen by the driver. This is especially a concern for people who drive larger vehicles.

  A blind-spot detection system belongs to a class of technology that uses mechanisms that provide accident avoidance. For example, the 2007 Volvo S80 includes a Blind Spot Information System (BLIS), which operates through the use of a camera placed under the car's side mirrors, allowing a view of areas that are difficult for drivers to see in the side and rearview mirrors. When a car comes into a driver's blind spot, a light on the door panel turns red; the light goes off once the area is clear.

- *Adaptive Cruise Control:* This function goes by different names (e.g., autonomous cruise control) and is designed to regulate a vehicle's speed to maintain a safe distance from the vehicles ahead. This technology uses forward-looking radar positioned in the back of the vehicle and detects the speed and distance of the vehicle it is following. These more recent autonomous systems are related to conventional cruise control in that they maintain the vehicle's predetermined speed, but are unique because they can automatically change the speed to maintain a safe distance between vehicles in the same lane. The 2010 Ford Taurus includes an adaptive cruise-control system that uses radar, allowing a driver to set a top speed so that he or she can maneuver while the car regulates its own velocity based on road traffic.

Certain driving-related tasks create hazardous situations—for example, making left-hand turns, keeping the car in an appropriate lane, and responding to unexpected situations. These difficulties are associated with drivers of all ages—because of increasing distractions while driving; driving while under the influence of drugs, alcohol, or prescription medications; increasing numbers of drivers with disabilities and impairments; and more complex roadway systems—but are noted to proportionately affect older drivers to a greater degree because of this population's greater likelihood of experiencing limitations in mobility, vision, hearing, response time, and agility, all of which make vehicles a hazard to operate.

As the baby boomer population ages, growing concern about their safety on the road is reflected in: (1) automakers' stepped-up efforts to build cars that are self-sufficient, allowing the driver to pay more attention to the road and saving lives in a health- or automobile-related emergency, and (2) advocacy organizations' efforts in programming that will improve driver safety. For example:
- Auto engineers at the Ford Motor Company have gone as far as wearing padded jumpsuits that are said to make the test-driving experience similar to what some older drivers encounter on the road.

- In 2009, the American Automobile Association (AAA) partnered with a software developer of brain fitness programs to create a program called DriveSharp. The program seeks to help baby boomers lessen the impact of aging on the brain.

DriveSharp is made up of interactive exercises that are designed to improve concentration, reaction time, and improve memory. It also trains the user to engage in visual processing more quickly and improve the driver's ability to track other cars on a busy road. Clinical studies, as well as the AAA, indicate that the DriveSharp program can cut crash risk by up to 50 per cent and that people who are already adequate drivers can improve on their driving.

Some researchers believe that cars will someday be equipped with technology that can monitor brain activity in order to assist both older and younger drivers. One professor has teamed up with Toyota to develop technology that can monitor and determine the driving patterns of drivers and prevent dangerous incidents. These advancements can result in cars that control their interior temperature in order to keep drivers alert, or can sense and slow down if the driver has made an error, such as mistakenly stepping on the gas pedal.

- New automobile technology provides promise for people of all ages with limited mobility. These individuals are often faced with the decision to give up driving, resulting in isolation, feelings of incompetence and loss of independence, and depression resulting from continual reliance upon others. Technology developed by Toyota, however, has led to the creation of a vehicle unveiled in 2005 called the "The WelCab," which provides assistance-free access to drivers who have a frailty or disability. The WelCab has electronic sliding doors, two seats that are built with custom-designed wheelchairs, and an electric lift that lifts the person into the seat. Both older and younger drivers with frailties or disabilities can control the car using a mouse-like controller with the right hand, and can brake or accelerate with the left hand, using a joy-stick-type device.

- German automaker, Bavarian Motor Works (BMW), recently introduced a vehicle with "emergency stop assistance." This feature was developed with the Federal Ministry of Education and Research in Germany through a program called "Smart Senior—intelligent services for seniors." The Emergency Stop Assistant has the potential to stop the car when it detects a health problem with the driver; detection is executed through two types of sensors that monitor vital signs. When the system detects a health problem with the driver, the emergency assistance system activates the car into autonomous driving mode, turns on the warning lights, and maneuvers and stops the car at the side of the road, all while remaining watchful of traffic as it strategizes. The system then sends an emergency signal to rescue services.

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[1] Federal Highway Administration (January, 2008), "Licensed Total Drivers, by Age 1/2008," Table DL-22. Washington, DC: U. S. Department of Transportation, Federal Highway Administration, Policy Information, Highway Statistics 2008: http://www.fhwa.dot.gov/policyinformation/statistics/2008/dl22.cfm.

[2] Federal Highway Administration, "Fatalities by 100 Mil VMT by Age," Table NHTS 12.3.1. Washington, DC: U. S. Department of Transportation, Federal Highway

Administration, Policy Information, Highway Statistics 2007: http://www.fhwa.dot.gov/policyinformation/statistics/2007/nhts1231.cfm.

Benefits:
For policy makers:
- *Cost Savings*
  - In 2004, the World Health Organization (WHO) reported that the United States spent $230 billion on automobile accidents (property damage, lost productivity, health, and other related costs), $32.6 billion of which was spent on health care costs. WHO predicts that, by 2020, car accidents will become the third largest killer throughout the world. The move toward more advanced technology with autonomous features is being designed to prevent collisions and allow drivers of all ages and abilities to pay more attention to other parts of the road. These efforts are expected to cut down on costs and the rate of auto accidents, which severely injure or kill many people each year.

For the community:
- *Safety and Health Emergencies*
  - Collision avoidance technology has been touted to save more lives than airbags and seatbelts. European insurance companies have even offered a 30 per cent discount on premiums for the Volvo XC60, which includes collision assistance technology. Volvo has made collision avoidance a standard in its vehicles; its City Safety collision avoidance system senses if the car is in jeopardy of colliding with a car ahead of it. The system will take its own action by applying the brakes to avoid or curtail a crash if the driver does not respond in time. The Emergency Stop Assistant implemented by BMW is the first system to detect the health condition of the driver even if the car has not been involved in an accident. In the future, additional types of safety features will become more intricate. Automakers are looking to create a method of transmitting vital physiological data to emergency personnel.

For residents:
- Driverless cars can pose a significant convenience to people who feel overwhelmed by car controls and environmental stimuli. It is also of benefit to frail individuals with frequent doctor visits; the vehicles can restore a sense of independence, making the road less intimidating and dangerous.

- *Autonomy & Independence*
  - A major advantage posed by future cars is the amount of autonomy and independence it provides drivers. Increasingly, cars are becoming more responsive to obstacles on the road, making them easier to maneuver. People who are homebound due to health, injury, or disability will have more options in terms of transporting themselves to their desired destinations, fostering a greater sense of self-determination. This independence could provide a better social outlook for people who otherwise feel isolated at home and who appreciate the freedom that driving provides.

- User-Friendly
    - Cars that require less driver participation and that include controls that are easy to use make the driving experience less stressful and with fewer distractions. For people who are limited in the functions they can perform while simultaneously looking at the road, automated technologies can provide less mental and physical strain and more comfort.

Barriers or impediments to development or implementation:
- *Liability*
    - The issue of liability has not been clarified. Some argue that American car companies will be wary of providing technologies with automated control because, if something were to go wrong on the road, one might be more inclined to blame it on the car and the technology. On the other hand, some companies are already being sued for not including adequate safety features.

- *Level of user-friendliness*
    - In the early 2000's, BMW released "iDrive," which controlled the car's radio, temperature, and other features; it included a knob in the middle of a console, similar to a computer mouse. Though it was designed to make the driving experience less intensive, many drivers found it much too complicated. If autonomous technology is to benefit everyone, it must be easy to use. Cars that require the use of multiple controllers, buttons, and wires, could result in drivers being distracted, frustrated, and performing poorly on the road.

- Universal design
    - Manufacturers have a tendency to use a one-size-fits-all approach to car design, with many cars on the road poorly designed to accommodate people of varying heights and functional abilities.

- *Consumer unease*
    - The concept of vehicles with autonomous features, or one that is completely independent, is still new enough as to be unfamiliar to most drivers. Vehicle autonomy can be unsettling for people accustomed to having control of the car, and some will have questions and concerns about lacking personal control in the event of vehicle-malfunction. Drivers may feel safer if the car is equipped with an over-ride feature (already part of most autonomous vehicles) so that they could take personal control should there be a failure in the system—for example, should the car automatically stop or perform an incorrect function in the middle of the road.

- *Physical activity and use of fossil fuels*
    - Because cars will become more autonomous in the near future, people might find it convenient to use their cars often, resulting in less physical activity and more cars on the road, which counters current trends to promote physical fitness and to reduce the use of fossil fuels.

Resource—examples:

- Daniel Patrascu (June 4, 2009), "BMW Emergency Stop Assistant Explained," *autoevolution* web site, *Home, Auto Guide*; or, *News and Articles*: http://www.autoevolution.com/news/bmw-emergency-stop-assistant-explained-7426.html.

- Gregory Mone (July 20, 2009), "Adaptive Cruise Control Goes Mainstream" (2010 Ford Taurus), *Wired* web site, *Magazine, Wired Magazine: 17.08*: http://www.wired.com/print/cars/coolwheels/magazine/17-08/pl_motor. http://www.wired.com/cars/coolwheels/magazine/17-08/pl_motor.

- The Drive Team (March 4, 2005), "Toyota WelCab," (Toyota's innovative car for people with limited mobility), *Drive* web site, *News and Reviews, News:* http://www.drive.com.au/Editorial/ArticleDetail.aspx?ArticleID=9328.

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- (October 10, 2008), "Collision Avoidance Technology Debuts On The New Volvo XC60" (Volvo *City Safety* collision avoidance system—standard equipment on the new XC60), *Press Portal* web site, *Car Brands, T-U-V, Volvo:* http://www.pressportal.com.au/news/263/ARTICLE/3438/2008-10-10.html.

Resources—written and web:

- John D. Stoll (January 7, 2008), "Could GM's Salvation Be Stuff of Science Fiction," *The Wall Street Journal* on line, *Life and Style, Cars.* This article describes General Motors Corporation and its efforts in producing a driverless car; it also discusses the current analysis and trends in autonomous vehicle technology and its development among other automakers. http://online.wsj.com/article/SB119948828539568677.html.

- Terrence Chea (April 9, 2010), "Future tech: Driverless Audi set to climb curvy Pike's Peak," *USA TODAY* on line, *Drive On—a conversation about cars and trucks.* Chea writes about future developments in driverless cars, specifically the work of researchers at Stanford University, who have partnered with Audi to create a car that drives without human control. Also mentioned are previous efforts at building driverless cars and the challenges faced, such as financial expense and inadequate performance. The article notes that technology could be used to develop cars that assist drivers in avoiding collisions when driving too fast. http://www.usatoday.com/money/autos/2010-04-09-driverless-car-pikes-peak_N.htm.

- ScienceDaily (June 19, 2006), "Car Crashes Are More Deadly For Seniors, Traffic Fatalities Expected To Rise," *ScienceDaily* web site, *Science News.* This article brings attention to the fact that senior citizens will die in car accidents at a higher rate in the future as America's 75 million baby boomers age, some of

whom will become too frail to drive. It is important to note that older adults—who are more apt to suffer fatalities when involved in vehicle accidents—are not getting into accidents at greater frequency than other age groups; their greater fatality rate is due to greater frailty that occurs during the aging process. Research that will result in the development of safer driving options for seniors is discussed.
http://www.sciencedaily.com/releases/2006/06/060616124231.htm.

- Tanya Mohn (July 17, 2009), "Helping the Elderly Keep Their Driving Skills," *The New York Times* web site, *Automobiles, Wheels—the Nuts and Bolts of Whatever Moves You.* This article examines the baby boomer generation as it reaches retirement and how this statistic has implication on driving and safety. It notes that declining abilities can put older adults at risk on the road. A new computer program developed by AARP aims to assist baby boomers in driving safely by helping them retrain their brains and delay the influences of aging: http://wheels.blogs.nytimes.com/2009/07/17/helping-the-elderly-keep-their-driving-skills/

    - NOVA (2005), "Cars That Drive Themselves," *NOVA* web site, *The Great Robot Race: Dreamers Wanted.* A transcript of an interview with computer scientist, Sebastian Thrun, head of Stanford University's Artificial Intelligence Lab, which has developed a robotic vehicle named Stanley; the interview includes discussions about the future of driverless automobiles.
    http://www.pbs.org/wgbh/nova/tech/cars-drive-themselves.html.

- The American Automobile Association's (AAA) Foundation for Traffic Safety partnered with Posit Science, a software developer of brain fitness programs, to create a software program called *DriveSharp*. AAA's website also includes an evaluation assessment tool that determines an individual's crash risk and allows one to try a *DriveSharp* exercise for free. Information on ordering the program is also provided. AAA Foundation web site: http://drivesharp.positscience.com/?CJAID=10684534&CJPID=3529639.

- Warren Clarke (2010), "Top 10 Vehicles for Seniors for 2009," *Edmunds* web site, *Top Ten Lists.* Edmunds provides automotive information for consumers. Each year it publishes various top-ten lists, including one that lists its assessment of the top ten vehicles for seniors. A discussion of each vehicle is included. http://www.edmunds.com/car-reviews/top-10/top-10-vehicles-for-seniors-for-2009.html.

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BICYCLE PROGRAMS

Description:
Over the past century, people have depended on personal automobiles at an increasing rate, fostering an environment with fewer transit options and more automobile-centered transportation and land-use policies. This mutually reinforcing cycle of increasing dependence on automobile use in communities throughout the United States has raised issues of urban sprawl, air quality, public health, and aesthetic appeal.

In response, the Federal government, national organizations, and numerous cities in the United States are taking actions to reduce auto travel in favor of biking. The Wall Street Journal reported that over 80 percent of American cities surveyed in 2004 indicated plans to construct new bikeways.[1] Promoting this trend, the League of American Bicyclists awards platinum, gold, silver, and bronze distinctions twice every year to communities "that have made impressive, measurable efforts to integrate bicyclists into the community."

The U.S. Department of Transportation and the Centers for Disease Prevention and Control promote "active transport" through cycling, an effort that looks to combat the obesity epidemic. The Federal Highway Administration (FHA) has provided $25M each to Columbia, Missouri; Marin County, California; Minneapolis-St. Paul, Minnesota; and Sheboygan County, Wisconsin, to exhibit the degree to which biking and walking can make up a large part of the transportation load. For example, the "GetAbout Columbia" program in Missouri, which was devised to increase options for safe and enjoyable downtown travel, is in the midst of constructing 125 miles of new bikeways and sidewalks and seeks to add 66 more miles of streets with striped bike lanes, 23 miles of streets with marked bike routes, 19 miles of paths and trails, and 900 new bicycle parking spots in the downtown area. The FHA hopes that by promoting bicycling in these cities, it will prove that bikes are a critical part of the transportation solution.

Community leaders note that the growing trend to limit reliance on automobiles in favor of bicycles has implications for the environment, health, and transportation-efficiency; and most bicycle programs highlight similar advantages gained when biking is acknowledged as a major part of a transportation system:
• Livability (quality of life) of neighborhoods, including both health and social aspects
• Economic benefits for both families and communities
• Energy savings
• Less pollution
• A cultural shift to reduced loyalties to the automobile

Portland, Oregon, continues to come out on top in "bike-friendly" community rankings—receiving the League of American Bicyclists' designation as a Platinum city, and intending to make cycling an essential, "main pillar" of the city's transportation system and sustainable green economy by 2030. Seeking to make biking available as an alternative to driving for *all* members of the community, Portland's bicycle network has grown from 60 to 260 miles since the early 1990s—connecting all parts of the city. Its "create-a-commuter" program provides low-income adults with commuter bicycles donated by people in the community, as well as with amenities and tools for safe and comfortable riding year-round. Portland's goal is to have over a quarter of all trips made on bicycles.

The measurement of bicycle-use provides evidence of the growing attention to the use of biking as a major transit alternative. For example, statistics released in 2007 by the United States Census Bureau reveal that cycling in Portland accounts for a 3.5 per cent of the transportation populace, 2.4 per cent in Minneapolis, 1.9 per cent in San Francisco, 1.7 per cent in Washington, DC, and .7 per cent in Chicago. Though New York City has a current biking share of 0.5 percent, the City plans to substantially increase cycling amenities and bike parking, as well as developing cycling training, traffic safety, and promotional programs.

Boulder, Colorado, which received a League of American Bicyclists designation, has a public program that strives to make cycling a major means of transportation—making bike maps available on the web, promoting bicycle transportation through education, and emphasizing bike safety. Approximately 95 percent of the main roads in Boulder have bike trails or painted bike lanes, and the City also holds a "Bike to Work Day."[2]

A smaller League-designated city is Davis, California, which has a network of bike lanes, bike paths, and grade-separated bicycle crossings, and where approximately 17 per cent of its residents commute to work on bicycles.[3] Davis has more bikes than cars and has built several bike-only tunnels under major roads so that cyclists can make safe trips, avoiding traffic. The University of California, Davis, has also taken part in the community bicycle effort, banning almost all car traffic.

Bicycle Programs are found throughout the world. Countries and cities that support infrastructure giving preference to bicycle uses (such as bike lanes, wide-ranging services, and bike racks) are more developed in Asian and European countries than in North America. Denmark, The Netherlands, and Germany have strong bicycle cultures—for example, approximately 33 per cent of citizens in Copenhagen and 40 per cent in Amsterdam use bicycles as transportation.[4]

Amsterdam is perhaps the most active cycling city in the world. Biking is at the core of its transportation infrastructure and is aimed at a healthier and more fit way of life. It has created a widespread network of safe routes and has developed a plan to build a 10,000-bike parking garage. People in Amsterdam also have the option of renting public bicycles and parking in underground sheds and outdoor racks. China has been working toward a more distinctive mode of biking. Cities in

China were once crowded with bicycles but have since become much more dependent on the automobile. However, the Chinese government made electric bicycles (e-bikes) a major goal in 1991 due to traffic congestion, and a trend toward the use of e-bikes has grown to be increasingly popular with Chinese citizens, especially in Beijing and Shanghai. In 2008, China's residents purchased 21 million e-bikes, and the country now has extensive bicycle lanes that help citizens avoid rush-hour traffic.

An analysis of data from the U.S. Census Bureau[5] reveals that bicycle users in the United States are typically young, low-income commuters who do not own an automobile and older (forty five and older), more wealthy commuters who own a car but elect to cycle to work. Males make up about 80 per cent of all bicycle commuters, and females use a bicycle to commute less often as they age. Latinos, American Indians, and Asians are more likely than Whites and Blacks to commute by bicycle.

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[1] *Wall Street Journal* (2004), "To Encourage Biking, Cities Add Paths, Racks and Lockers; To Shower or Not to Shower?" http://online.wsj.com/article/SB114730873238949725.html.

[2] Boulder, Colorado ranks as one of the best cities for cycling: http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=8839&Itemid=3278;
Boulder B-Cycle: bike share program: http://boulder.bcycle.com/;
http://www.bouldercolorado.gov/index.php?option=com_content&view=article&id=8843&Itemid=3251;
GoBikeBoulder.net:
http://www.bouldercolorado.gov/index.php?option=com_content&view=article&id=8840&Itemid=3245;
http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=3413&Itemid=1781.

[3] City of Davis Public Works Department and City of Davis Bicycle Advisory Commission (2006), "City of Davis Comprehensive Bicycle Plan." http://cityofdavis.org/pw/pdfs/2006_BikePlan_withMaps.pdf.

[4] *Wall Street Journal* (2007), "Building a Better Bike Lane: Bike-friendly cities in Europe are launching a new attack on car culture. Can the U.S. catch up?" http://marinbike.org/News/Articles/BuildingaBetterBikeLane.pdf.

[5] Steven G. Goodridge (2001), "Land-Use, Climatic, Demographic, and Cultural Issues Affecting Utilitarian Bicycle Travel in the Triangle." http://www.humantransport.org/bicycledriving/cyclinguse.htm.

Benefits:
- *Economy*

3

- Bicycle transportation has a positive impact on real estate values and adjacent businesses.
- Bike trails tend to increase revenue by way of higher property values. For example, according to the Wisconsin Department of Transportation: houses by a nearby bike trail in Wisconsin sold for nine per cent more than similar properties farther away; and businesses close to the Fox River bike trail revealed a 39 per cent increase in business. In a 2002 survey of new home buyers by the National Association of Realtors and the National Association of Homebuilders, trails were the second most important feature on a list of eighteen choices.
- Bicycles play a huge role in tourism; for example:
  - Across the country, over 27 million travelers have taken biking vacations in the last five years.
  - The total annual economic impact of bicycle tourism is $66.8M in Maine and $193M in Colorado.
  - The Outer Banks of North Carolina found that 17 percent of annual visitors to the area (680,000 people) reported bicycling while there. The study estimated that over $60M per year was spent by those bicyclists and that 1,400 jobs were created.

- *Cost savings*
  - Using a bicycle as significant mode of transportation cuts cost on gasoline and auto repairs. It costs an individual approximately $4,000 per year to own an automobile compared to $400 per year to own a bicycle.
  - A car commuter could save four hundred gallons of gas every year by giving up a car for a bicycle.
  - Bicycle commuting promotes improved heart and lung function which, in turn, can result in less sick time and fewer days missed at work.

- *Environment*
  - Biking, as a transit alternative, saves the use of fossil fuels and reduces air pollution:
    - According to the United States Environmental Protection Agency, the average passenger vehicle creates 5.20 metric tons of carbon dioxide every year.
    - The U. S. Department of Energy notes that about 50 per cent of all air pollutants and 80 per cent of air pollution in urban areas are due to cars and trucks.
    - Americans use 2.3 billion gallons of gasoline every year idling in traffic.
    - In the San Francisco Bay area alone, automobiles are responsible for 75 per cent of smog and 50 per cent of all greenhouse gasses.
    - The National Highway Traffic Safety Administration notes that if ten commuter cars were replaced by bikes or walking, 25.4 million tons of carbon dioxide emissions could be reduced every year.
    - It is estimated that about 90 per cent of emissions are created in seven-mile journeys—before the motor engine heats up.

- Around 40 per cent of the trips taken in the United States are two miles or less and more than 25 per cent of all trips are under a mile.
- The WorldWatch Institute reports that a four mile round-trip bicycle ride prevents about fifteen pounds of pollutants from entering the air.

- *Livable Communities*
  - Bicycle initiatives advance the goal of creating livable communities—playing a role in furthering community design and its bearing on social, physical, and economic well-being. The Obama administration's urban policy agenda has made fostering livable communities an important goal.
  - A priority of the U.S. Transportation Department is to provide safer, more livable communities by promoting cycling in place of driving. Planners and engineers in communities around the country are being urged to keep all transit users (including bicyclists and walkers) in mind when designing and operating roads and streets.
  - Communities with a robust bicycle culture have strong communities where residents take an active interest in the well-being of their neighborhoods and citizens. For example, Portland's Community Cycling Center notes that "the bicycle is a tool for empowerment and a vehicle for change." Towns and cities can promote community-building and personal empowerment by creating a more personal and sociable environment where individuals can interact with one another and participate in efforts that benefit the community.
  - By encouraging bicycles, cities and towns can conserve roadway and constrained space, lending to a more efficient and safe community as well as an aesthetically pleasing one. Greater use of cycling also reduces the noise, speed, and stress of automobiles and eliminates some of the need to construct and repair cars and roadways.

- *Health and Quality of Life*
  - Bicycling has a positive impact in reducing the risk for coronary heart disease, stroke, and other diseases; therefore, a community with a strong bicycle culture will decrease its visits to healthcare facilities, lowering health care costs.
  - According to the Sacramento Transportation Management Association, bicycle commuters get to work on time more often and have less stress.

Barriers or impediments to development or implementation:
- *Safety*
  - Busy, bumpy, or unrepaired roads can prove dangerous for some riders, especially inexperienced cyclers or those with less agility.
  - While bicycle programs throughout the United States are promoting bicycle-friendly roads to create a safe riding experience, many cities in the United States still have a long way to go in implementing bicycling facilities that are meant to prevent accidents and injuries.

- *Weather*
  - A frequent concern of bicycling transportation is unexpected weather conditions, which can make riding inconvenient and problematic. The strongest bicycle programs are currently located in the mountain and western states where temperatures are consistently mild throughout the year. Riding in harsh winter conditions can put the rider at risk and poses an issue of discomfort when riding through frigid temperatures.

- *Hygiene*
  - Since bicycle-riding requires some physical effort, sweating and body odor are issues, especially for bicyclists commuting to work. Unavailability of facilities for changing clothes and showering can be problem; while some workplaces have showers on the premises, many do not. To combat this issue, cities such as Portland are implementing bike stations where cyclists can stop and shower before work. In addition, clothing designed for hygienic cycling is available.

Resource—laws:
- New York State:
  - *Planning and Policy Models for Pedestrian and Bicycle Friendly Communities in New York State*, a 2007 report published by the Initiative for Healthy Infrastructure at the University at Albany, State University of New York, provides a significant discussion on zoning codes that support bicycling, and proposes some recommendations. It also highlights a new model called "Transit Zoning," which builds upon a paradigm based on "non-automobile-dependent land-use patterns" put forth by Onondaga County, New York, in 2000: http://www.albany.edu/ihi/files/NY_Planning_And_Policy_Models_iHi.pdf.

- New York City:
  - The *Bicycle Access to Office Building Law*, which went into effect in 2009, was developed to increase bicycle commuting by giving bicyclists the "opportunity to park their bicycles in or close to their workplaces." The law states that commercial buildings are to provide the opportunity for bicycle commuters to bring their bicycles into a commercial building if the space is able to be provided by their employers: http://www.nyc.gov/html/dot/html/bicyclists/bikemain.shtml.
  - The *Bicycle Access to Garages Law* became effective in 2009 and requires certain owners of parking garages to provide parking spaces for bikers: http://www.nyc.gov/html/dob/html/sustainability/bicycle_access.shtml.

- United States Department of Transportation:
  - *Intermodal Surface Transportation Efficiency Act* (ISTEA), 1991, sought to increase attention on transportation planning and policy. By creating planning requirements and delegating power to metropolitan planning organizations, many cities were able to strengthen or implement bicycle programs: http://ntl.bts.gov/DOCS/ste.html.
  - *Transportation Equity Act* (TEA-21), 1998, provided over $200B to enhance the country's transportation infrastructure as a means of improving the economic climate and protecting the environment. The Act allows cities to revitalize its communities through development of transportation alternatives: http://www.fhwa.dot.gov/tea21/.
  - *Safe, Accountable, Flexible, Efficient Transportation Equity Act* (SAFETEA), 2005, expired on September 30, 2009; but is expected to be updated and replaced by Congress during its 2009 session. The bill guarantees funding for highways, highway safety, and public transportation at $286.4B over six years. The Act seeks to improve and sustain surface transportation infrastructure, including bicycling facilities: http://www.fhwa.dot.gov/safetealu/.

- Portland, Oregon:
  - *City of Portland, Title 16,* includes regulations for bicycles and riders in regards to traffic regulation, rules for operating bikes in the city, renting bicycles, and rules that allow the city to impound a bicycle: http://www.portlandonline.com/Transportation/index.cfm?a=71947&c=34814.

- Davis, California:
  - The City of Davis' Web site includes a list of laws and city codes regarding bicycles: http://cityofdavis.org/cmo/citycode/chapter.cfm?chapter=6.

- Boulder, Colorado:
  - *Bicycle Policy Statements:* http://www.bouldercolorado.gov/files/Transportation_Master_Plan/Chapter6_2.pdf.

- Google:
  - A search for "bicycle laws" in Google will provide many search results for laws and bicycle programs in the United States and other countries.

Resource—written and web:
- J. Harry Wray (2008), *Pedal Power: The Quiet Rise of the Bicycle in American Public Life.* Boulder, Colorado: Paradigm Publishers.

- *Urban Bikeway Design Guide,* Washington, DC: National Association of Transportation Officials. Provides state-of-the-practice solutions that can help create complete streets that are safe and enjoyable for bicyclists. http://nacto.org/cities-for-cycling/design-guide/.

- *Bicycle Program,* Portland, Oregon:
  - The City of Portland's Office of Transportation provides extensive information about its active bicycle program, with links to bicycle maps, parking resources and organizations, bike laws, bike maintenance and safety, bikeway signing, and presentations regarding various issues related to cycling: http://www.portlandonline.com/transportation/index.cfm?c=34772.
  - This office also includes a link to its *Senior Cyclist Program*, a "three-wheeled" bicycle program that helps seniors who are considering bicycling for the first time or getting back into the habit. Bicycle classes are free and take place at the Willamette Greenway Trail in Southwest Portland. Contact: Kristine Canham, Senior Recreation Coordinator for Parks, 503-823-4328. http://www.portlandonline.com/transportation/index.cfm?a=155167&c=37401.

- Federal Highway Administration, U.S. Department of Transportation:
  - *Bicycle and Pedestrian Program,* which is an effort to promote safe and accessible bicycle-use as a means for transportation. Their Web site includes information on federal funding sources, legislation, and reports on bicycling: http://www.fhwa.dot.gov/environment/bikeped/.
  - *Non-motorized Transportation Pilot Program* (NTTP), which provides $25M each year to four communities. The current cities involved are: Columbia, MO; Marin County, CA; Minneapolis, MN; and Sheboygan County, WI. The goal of this program is to understand how instituting walking and "bicycling networks" can increase cycling and walking as viable means of transportation: http://www.fhwa.dot.gov/environment/bikeped/ntpp.htm.

- U.S. Department of Transportation: www.dot.gov/.

- Pedestrian and Bicycle Information Center (PBIC) provides information regarding health, safety, advocacy, education, and "mobility for pedestrians (including transit users) and bicyclists." The Center serves an advocacy and information source for people interested in bicycle issues, planners, engineers, educators, etc.: http://www.bicyclinginfo.org/.

- "A Case for Bicycle Commuting," published by "Do It Green! Minnesota," highlights the benefits of bicycle commuting for citizens and communities. This publication includes a cost-comparison of commuting options, with charts, purported

disadvantages of bicycle commuting, bicycle laws, and a bicycle resource list: http://www.doitgreen.org/article/transportation/bicycle.

- "Quantifying the Benefits of Non-motorized Transportation for Achieving Mobility Management Objectives," a paper published by the Victoria Transport Policy Institute, presents an extensive overview of non-motorized travel with an emphasis on cycling and its benefits in reducing congestion, road and facility cost-savings, consumer savings, and environmental and social advantages. The paper also discusses strategies that can encourage cycling and notes that the benefits of cycling can be furthered by implementing "cost- effective incentives": www.vtpi.org/nmt-tdm.pdf.

- William E. Moritz, Ph.D. (1997). "A Survey of North American Bicycle Commuters," *Bicycling Life.* This article discusses the results of a study that surveyed bicycle commuters in the United States and Canada. It outlines demographics, distance of trips, costs, bicycle type, facilities used, safety and crash experiences, and innovations for bicycle commuting: http://www.bicyclinglife.com/Library/Moritz1.htm.

- Austin Ramzy (June 14, 2009). "On the Streets of China, Electric Bikes Are Swarming," *Time Magazine.* Article on China's e-bike phenomenon: www.time.com/time/world/article/0,8599,1904334,00.html.

- Cherise Fond (April 2009). "City bike-sharing picks up speed," *Eco Solutions, CNN.com/technology.* This article provides an overview of public bike–sharing programs around the country and its trends: http://edition.cnn.com/2009/TECH/04/15/eco.bikeshare/index.html.

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INDEPENDENT TRANSPORTATION NETWORK®

Description:
Each year more than one million Americans aged 70 and older stop driving and become dependent on others to meet their transportation needs. And, their numbers are growing almost as rapidly as the population is aging. At the most recent White House Conference on Aging, mobility was ranked the third highest issue for older people—ahead of Social Security and Medicare. Today, people remain active and independent into their eighties and beyond, outliving their decision to stop driving by as much as a decade.

The Independent Transportation Network® (ITN) is an affordable alternative transportation solution that allows seniors and younger-aged adults with vision impairment to maintain their independence and their dignity. An ITN program does not compete with a community's public transportation or paratransit systems, but supplements them both. ITNs are community-based nonprofit organizations affiliated with a national parent organization, ITN*America,*® which is the first and only national nonprofit transportation network for America's aging population.

ITNs provide rides with door-to-door, arm-through-arm service. Features of this alternative solution include:
- The ITN model is consumer-oriented.

- Available 24 hours a day, 7 days a week, 365 days a year.

- Available for any type of ride within the service area, with no limitations on ride purpose.

- Rides are provided in private automobiles by a combination of trained volunteer and paid drivers.

- People 60 years and older and visually impaired adults are eligible to join.

- Rides may be booked at any time.

- No money is exchanged in the cars because members have Personal Transportation Accounts™ from which fares are debited.

- Members can choose to save money by scheduling rides in advance or sharing a ride.

Members' rides can be paid for through a variety of strategies:
(1) The member can deposit money into a Personal Transportation Account,™ from which fares are deducted electronically;

(2) Family members or others may contribute to a member's Personal Transportation Account;™

(3) Members may donate their cars for tax credits, or trade them for rides through the Car*Trade*™ program;

(4) Community residents' cars may be donated to the ITN affiliate for tax credits through the car donation program, or exchanged for ride credits which can be donated to an ITN member;

(5) Volunteer drivers may earn mileage credits for their own future use through the Transportation Social Security™ program;

(6) A volunteer driver may donate mileage credits to friends, loved ones, or low-income seniors through the Road Scholarship Program;™

(7) Local businesses can help subsidize members rides through the Ride & Shop or Healthy Miles programs;

(8) Gift certificates are available.

The ITN model marries the power of information technology and the strength of local, grassroots support. There are several ways for a community to launch an ITN affiliate effort, including: a sponsoring public agency (e.g., a mayor's office); at another not-for-profit organization (e.g., a senior services agency); from a faith-based organization; with a single concerned citizen; or with a small private group. ITN*America*® provides community-based affiliates with customized software, a business plan, and marketing materials and programs designed to develop community involvement, including site visits, training for software use, and budget and staff development—all geared toward helping the affiliate reach sustainability.

The ITN model is well-suited to both suburban and urban areas. ITN*Everywhere*, a solution applicable to rural areas and to people of all ages, is currently being developed.

Benefits:
For older adults and younger individuals with vision impairment:
- ITN members continue their chosen activities, improving their quality of life, and contributing to the health of their communities.

- ITN members stay connected to family, friends, and community.

- Older people and people with visual impairments can retain a sense of competence and personal control when no longer needing to depend solely upon friends and family for needed mobility.

- The door-to-door, arm-through-arm aspect of ITN transportation allows seniors and younger people with vision impairment to go to medical and other destinations without the need for much more costly specialized transportation services.

- The flexibility of the program's availability, as well as its non-fixed-route nature, responds to the differing, sometimes unpredictable mobility needs of older people, which are not met by conventional transportation systems designed to meet the routine "schedule and route" needs of the greatest number of people.

- Even where public transportation is available, many older adults cannot reach the bus stop, climb the stairs, wait in the sun or rain for the bus to arrive, or carry their packages. ITN drivers pick up members at their homes, and offer assistance with packages, walkers, etc.

- The "personal-car" aspect of ITN is a much more usable, comfortable, and accessible option for frail older people and people of all ages who have vision impairments.

For caregivers:
- Adult children who have assumed caregiver responsibilities for older family members find relief from the daunting and complex problem of meeting on-going transportation needs.

For the community:
- Variety in transportation options, reflecting the differing needs of a community's diverse population groups, is a critical feature of a livable community. An ITN system helps a community achieve "livability."

- Businesses retain their valuable customers. The economic impact of a mature ITN affiliate to a local community is between $300,000-$500,000 annually.

- Productivity increases when working caregivers have a viable alternative to leaving work to drive a parent to a medical appointment or other destinations. (Caring for an elderly parent has replaced childcare as the number one reason for employee absenteeism.)

- When communities provide an alternative, consumer-oriented, affordable mobility option for elderly drivers, communities reduce property damage, injuries, and fatalities by lowering the risk of collisions, improving overall safety for all residents.

Impediments or barriers to development or implementation:
- Some communities have had to overcome public policy barriers to establish an ITN affiliate. In some cases, state or local laws had to be modified, or clarifying language had to be put in place, to allow an affiliate to operate. ITN*America*® recommends that each community's organizers research thoroughly the laws associated with all aspects of the ITN business model, and especially those related to:
  - Offering nonprofit rides, using volunteer drivers, for reimbursement (i.e., livery);
  - Accepting donated or traded cars, and liquidating them (i.e., car dealership);
  - Insurance availability for both paid and volunteer drivers (e.g., liability coverage).

- While an ITN affiliate is likely to be a new and unique way to provide service for seniors and people with visual impairments, most communities will have laws that govern certain aspects of the ITN affiliate's operation. For example, the ITN service may be interpreted as a taxi service, and could be considered in violation of an ordinance. If a restriction is identified, a local government can either grant an exception, or otherwise modify language which allows an ITN to operate freely.

- It is possible that a state agency might regulate the number of cars that can be traded, such that an ITN could be determined under the law to be a "Used Car Dealer," thus subjecting it to specific regulations, taxes, or fines. If this problem arises, a legislator may introduce legislation to eliminate this "unintended consequence" of existing regulations.

- Automobile insurance is another important area to research, both for paid drivers and volunteer drivers. In all cases, an ITN affiliate must protect itself as well as its members, volunteers, and employees from liability associated with collisions and other roadway hazards.

Resource—examples:
Any senior transportation program requires several kinds of resources, including funds, drivers (staff and volunteer), management, vehicles, and all sorts of support for accounting, administration and marketing. The ITN model is particularly focused on the management of resources—both in terms of planning and acquiring them, as well as in efficiently using finite, and sometimes scarce, resources. Ultimately a key to sustainability of any human enterprise is to identify all the resources available, and to consume them carefully. Below are a series of examples that can provide insights into how various communities gathered and used resources to establish their own ITN affiliates.
- ITN*Bluegrass*, 436 Georgetown Street, Lexington, KY**,** 40508; Gale Reece, Executive Director, (859) 252-8665—planning initiated by a retired professional and the director of the Fayette County Office of Aging Services. For history and extensive information on the program, including costs for rides: http://www.ITNBluegrass.org .

- ITN*CentralCT*, 381 Main Street, Middletown, CT, 06457; William Wasch, Co-Chair, Board of Directors, (860) 346-RIDE (7433)—this program, started by St. Luke's Eldercare Solutions of Central Connecticut, stemmed from an ITN discussion first initiated by West Hartford's Deputy Mayor, which grew into what eventually became the first statewide initiative in the country to fund local groups interested in building local ITN affiliates. For history and extensive information on the program, including costs for rides: http://www.ITNcentralct.org.

- ITN*CharlestonTrident*, 6296 Rivers Avenue, Suite 303, North Charleston, SC, 29406: Jim Ledbetter, Executive Director, (843) 225-2715—initiated by the Trident Area Agency on Aging. For history and extensive information on the program, including costs for rides: http://www.ITNCharlestonTrident.org.

- ITN*Chicago*, 1747 W. Roosevelt Rd., Suite 110, Chicago, IL 60608; Mina Radia, Executive Director, (312) 744-6681—planning initiated by a discussion between the Commissioner of the City of Chicago Department of Senior Services and the Mayor of Chicago. For history and extensive information on the program, including costs for rides: http://www.ITNChicago.org.

- ITN*GreaterLA*, 11901 Santa Monica Blvd. Suite #431, Los Angeles, CA, 90025; Jane Bensussen, Executive Director, (310) 451-1343—started by the Center for Healthy Aging. For history and extensive information on the program, including costs for rides: http://www.ITNGreaterLA.org.

- ITN*NorthCentralConnecticut*, P.O. Box 448, 99 Main Street, Suite 8, East Windsor, CT, 06088; Margaret Smith-Hale, Executive Director, (860) 758-7833—planning initiated by Allied Rehabilitation Centers, Inc., and the Enfield Housing Authority following a community forum organized by Pamela Brown. For history and extensive information on the program, including costs for rides: http://www.ITNNorthCentralCt.org.

- ITN*Orlando*, 988 Woodcock Road, Suite 200, Orlando, FL, 32803; Kimber Threet, Executive Director, (407) 228-7761—planning initiated by AARP, the Senior Resource Alliance (Area Agency of Central Florida, Inc.), the Winter Park Health Foundation, and the Florida Department of Elder Affairs following a presentation by a national expert on senior mobility issues . For history and extensive information on the program, including costs for rides: http://www.ITNOrlando.org.

- ITN*Portland*, 90 Bridge Street, Westbrook, ME, 04092; Mark Sundermann, General Manager, (207) 854-0505—began as a graduate school project at the Edmund S. Muskie School of Public Service in Portland, Maine—inspired by personal experience when her son was hit by an 84-year old driver, ITN's founder Katherine Freund realized that crashes are not the problem—they are the symptom. For history and extensive information on the program, including costs for rides: http://ITNPortland.org.

- ITN*QuadCities*, 1035 West Kimberly Road, Davenport, IA, 52806; John Rushton, Chair, Board of Directors, (563) 386-1626—planning initiated by a grassroots group of individuals as a leadership project hosted by the Bettendorf Chamber of Commerce in conjunction with St. Ambrose University. For history and extensive information on the program, including costs for rides: http://www.ITNQuadCities.org.

- ITN*SanDiego*, 4305 University Avenue, Suite. 110, San Diego, CA, 92105; Kim Gibbens, President, Board of Directors, (619) 282-0073—started by a retired high school administrative secretary whose husband died in a car accident involving an 82-year old driver who lost control of her car. For history and extensive information on the program, including costs for rides: http://www.ITNSanDiego.org.

- ITN*Sarasota*, 2688 Fruitville Road, Sarasota, FL, 34237; Tanice Knopp, Executive Director, (941) 364-7530—initiated by a collaborative grass-roots effort following a community assembly on aging hosted by Sarasota County Openly Plans for Excellence (SCOPE). For history and extensive information on the program, including costs for rides: http://www.ITNSarasota.org.

Resource—written and web:
- ITN*America,*® national parent organization of ITN affiliates, 90 Bridge Street, Westbrook, ME, 04092, (207) 857-9001:   http://www.ITNAmerica.org.
    - Liberty Mutual insurance company, a partner of ITN*America*® is promoting a sustainable, community-based transportation solution for older adults.
    - Brief descriptions of major aspects of an ITN program: http://www.itnamerica.org/content/FAQ.php.

- Katherine Freund (July, 2008). "Dignified Transportation for Seniors," *CQC Capital Commons Quarterly: The Dynamics of Aging and Our Communities.* Vol. 2, No. 2. A description of the Independent Transportation Network.® http://media.itnamerica.org/media/ITNAmerica/CCQJuly2008.pdf.

Resource – technical assistance contact names:
- Ernest K. Ott
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PERSONAL RAPID TRANSIT (PRT) SYSTEMS

Description:
Across the United States and in other countries, there is growing interest in developing community-based Personal Rapid Transit (PRT) Systems as an alternative to the use of personal cars and other traditional mass transit methods. Also known as Personal Automated Transport, this innovative option consists of small, pod-like vehicles that transport between two and six passengers at a time. Pods operate on a track built specifically for their use, the system is powered by electricity, and pods are computer-automated with no human drivers or conductors. Tracks can be at ground level, elevated above ground, or located underground; however, the preference is for an elevated track.

The creation of a PRT system enhances a community's ability to be accessible and livable for all residents, including those populations with additional travel needs such as frail older people, people with disabilities, and pregnant mothers. Stations and the pod cars themselves can be made to ADA standards, and the individualized nature of a PRT travel plan will reduce the time spent in transit, as well as the confusion associated with changing lines and locating the correct stops. The individual cars provide privacy and a guaranteed place to sit down. In addition, PRTs will improve the overall environment by reducing traffic congestion and carbon emissions.

Prior to 1964, PRT research occurred independently in small-scale efforts. Following the 1964 passage of the Urban Mass Transportation Act, the federal government began to support comprehensive research and development of PRT systems in the United States. One example was a collaboration between the federal Urban Mass Transportation Administration (UMTA) and the U. S. Department of Housing and Urban Development, which resulted in published studies assessing the viability of PRT. From such research stemmed the Aerospace Corporation research program and the Morgantown PRT system. Between 1968 and 1976 the Aerospace Corporation, a not-for-profit corporation established by the U. S. Air Force to support missile systems development, developed a PRT prototype; however, it did not have sufficient funding to continue development.

The Morgantown System at West Virginia University (WVU) is one of five automated urban "people mover" systems that have been built in the United States since the late 1970s. Others are in Detroit, Michigan; Irving, Texas; Jacksonville, Florida; and Miami, Florida. WVU's system offers the closest example to a functioning PRT system in the United States. It has been in operation for over 30 years and connects the University's various campuses through 8.2 miles of track and 5 stations, with each vehicle carrying eight to 20 people. The WVU PRT receives funding from the Federal Transit Administration and serves approximately 15,000 people a day during the school year.

The Raytheon Corporation and the Chicago Regional Transportation Authority joined together in the largest effort thus far aimed at creating a traditional PRT in the United States. Their PRT design would connect the suburb of Rosemont, Illinois, with the area's main rail transit line. Despite a functioning prototype and favorable projected outcomes, the project was never constructed due to escalating costs.

Currently, Heathrow International Airport in London, England, will open a fully functioning PRT system in the Fall of 2009. When completed, the ULTra design (Urban Light Transit) will provide service throughout the airport with 18 individual pods, which will provide space for up to four travelers and their luggage. The proposed plan will generate no emissions and is 50 per cent more energy-efficient than traditional travel. Masdar, a carbon-neutral city being developed in the United Arab Emirates, will use a hybrid light-rail and PRT system as its form of mass transit. Interest in PRT has been sparked in Germany, Sweden, and Canada, and in as many as 21 different communities around the United States, including Ithaca, New York, where Connect Ithaca, a volunteer community group, convened a conference on Pod Car Systems and applied for a grant to study how such a system could reduce the number of vehicle miles traveled in the City of Ithaca.

Where PRT systems are implemented or being developed, there is no standardized model as to who would own or operate a PRT system; however, a partnership between a developer with the capacity and the technology and the town or city with the zoning, political, and monetary support would be the most ideal. Additionally, although PRT systems were initially conceived as an alternative for urban centers, their successful implementation in defined areas such as airports and college campuses suggest that these systems would be particularly effective in rural villages and towns. Rural systems could create adaptations to include several extensions from town centers to defined destinations in the wider countryside.

A variety of model designs for PRT systems exist, which vary in their propulsion engineering and physical composition; but all are composed of similar, specific elements of design that qualify a transit model as a PRT system:

- Stations are located off-line, meaning that the pod travels from one location to the next directly, without making stops on the line.

- Vehicles are available to consumers 24 hours a day, as needed, with empty pods moving to locations with increased demand.

- To use the PRT, a consumer buys a ticket from an ATM-like machine with their end location identified, inserts the ticket into the pod's slot to open the door, and the vehicle automatically transports the rider to the end location.

- The distance between stations is approximately 500 meters or less.

- The capacity for each line is 1,500-8,000 passengers per hour, each way.

- Individual pods travel throughout the grid of tracks, in response to demand, and are not specifically designated to a specific area or line.

Benefits:
- For older people, people with disabilities, and other users:
  - PRT systems are an excellent personal-use alternative to the automobile for the many community residents who no longer drive or have no access to personal transportation.
  - Pods can be designed or outfitted to meet the standards of the Americans with Disabilities (ADA) Act, as well as additionally designed to include universal design features to further enhance rider usability.
  - Consumers are not restricted to a pre-determined schedule, but can use the system on an "as-needed" basis.
  - The system is available 24 hrs a day, 7 days a week.
  - Because consumers choose where to go and arrive directly, they are freed from having to understand complex schedules or routes, and are not subjected to unknown schedule or route changes.
  - Multiple stations mean less walking and waiting time.
  - Travel time is shorter.
  - Pods are easily kept clean.
  - Consumers can choose to travel alone or in self-determined groups.
  - PRT can be used to transport directly to shopping centers, medical appointments, civic buildings, schools, churches, etc.

- For the wider community:
  - A "mass transit" alternative with "personal transit" characteristics.
  - Reduce the use of personal cars and commercial vans, thus reducing the use of gasoline and reducing carbon emissions.
  - A "green-energy" option—there are no carbon emissions.
  - Smaller-sized vehicles (pods), so less energy use.
  - Ability to travel at higher speeds because of smaller vehicles and no stops.
  - Fewer "human errors" because systems are computer-automated.
  - Can be used to haul freight, mail, supplies, etc.
  - System operates independently of other transit lines and streets, so avoids the congestion of those transit lanes, as well as reduces congestion in those lanes.
  - Pods can be designed to match aesthetically with surrounding buildings.
  - Reduces parking needs, traffic jams, and traffic accidents.

Impediments to development and implementation:
- In the United States, there is not a tested example of a large-scale operating PRT system that can be used for replication or adaptation.

- At this point, start-up and maintenance costs are only forecast because a large-scale system is yet to be implemented.

- Developing a pilot program will take substantial financial support over an extended period of time, a risk many cities and companies are unwilling to take.

- Pilot programs have ended before permanent implementation because of escalating costs.

- There is a lack of awareness of the concept and, therefore, support from the general public.

- Unions and advocates for current mass transit alternatives often oppose PRT systems because of the low number of employees that are employed.

- Currently, only a small number of engineers and researchers are dedicated to developing a PRT system.

- Duplicative research is being done in separate locations because the development is not public.

- Additional costs associated with manipulating already existing architecture have the potential to be substantial.

- PRT may attract vandalism and there is some fear that the pods could be a target for crime.

- The concept of PRT is seen by many as far reaching and without realistic expectations.

- In outlying rural areas (outside of village or town centers), where travel time between stations would be longer, implementation of PRT may not be feasible. The PRT concept was developed as an alternative to address urban traffic problems, with many stations so that travel time is individualized and short. However, creative design adaptations can address issues identified in rural locations.

Resource—examples:
- Brief descriptions and many photos:
  - Personal Rapid Transit System, Morgantown, West Virginia, connecting several university campuses:
    http://web.presby.edu/~jtbell/transit/morgantown/.
  - Downtown People Mover, Detroit Michigan, urban downtown system:
    http://web.presby.edu/~jtbell/transit/Detroit/DPM/.
  - Las Colinos People Mover, Irving Texas, central business district of a planned community:
    http://web.presby.edu/~jtbell/transit/Irving/.
  - Metromover, Miami, Florida, serves downtown Miami, with branches north to a shopping center and south to the financial district:
    http://web.presby.edu/~jtbell/transit/Miami/Metromover/.

- The Skyway, Jacksonville, Florida, connecting Florida Community College of Jacksonville, Convention Center Station, and the Southbank area across the St. Johns River: http://web.presby.edu/~jtbell/transit/Jacksonville/.

- ULTra Personal Rapid Transit System, Heathrow Airport, London, England: http://www.ultraglobalprt.com/.
  - (October 20, 2009), ULTra PRT comprehensive system specifications: http://www.ultraprt.com/uploads/Documents/ULTraDescriptionOct09.pdf; document is large—wait for downloading to complete.
  - Ultra PRT Station Design guidelines: http://www.ultraprt.com/uploads/DesignContest/Station_modular_design.pdf.

Resource—written and web:
- Ithaca, New York: Grant awarded to Advanced Transport Systems Ltd. in 2009 by the New York State Energy Research and Development Authority (NYSERDA) for a research study, currently underway, of a PRT system for Ithaca, NY. Proposed is a 12-station, 7.7 mi (one-way guide way), Phase I system, which would connect downtown Ithaca to Cornell University and Ithaca College, with a capital cost range of $58M to $116M: http://www.ultraprt.com/applications/proposed-systems/ithaca/.
  - Ithaca PRT feasibility study: http://issuu.com/simplylovelife/docs/final_report_with_endnotes.

- Website resource, providing links to PRT information, including overviews, cost comparisons, reports, feasibility studies, PRT publications, and **links to 21 PRT systems** under development in the United States and many foreign countries. Washington University: http://faculty.washington.edu/jbs/itrans/prtquick.htm.

- Steve Raney (Cities 21) and Stanley Young (Kansas Department of Transportation) (2005). Paper presented at the Transportation Research Board Annual Meeting, Washington, DC. Describes the Morgantown People Mover Group Rapid Transit System, including history, operating principles, depiction of complex station design and station operations, GIS alignment map, description of moving point synchronous control, three operational modes, as well as demand, schedule, and circulation, with a special emphasis on peak period operations.   http://www.cities21.org/morgantown_TRB_111504.pdf.
  - Information about the Morgantown People Mover GRT system is also available at: (304) 293-5011; http://faculty.washington.edu/jbs/itrans/morg.htm.

- Alain L. Kornhauser, et al (2004-2005). *Personal Rapid Transit for New Jersey: P.R.T.—The New Mass Transit*. Princeton, NJ: Princeton University. http://www.princeton.edu/~alaink/Orf467F04/NJ%20PRT%20Final%20Small.pdf

- Bob Dunning, et al (Ian Ford, Editor) (January, 2003). *Personal Automated Transportation: Status and Potential of PRT.* A 36-page publication by the

Advanced Transit Association, an association of international professionals that promotes investigation and development of advanced, cost-effective, service-oriented transit technologies and strategies. Publication includes PRT information on service characteristics, technology details, physical facilities, control systems, and answers to cost, efficiency, and feasibility questions, as well as comparisons of PRT to other transit systems. http://innotrans.net/docx/Atra/tech6.pdf.

- J. E. Anderson (1998). *Personal Rapid Transit: Matching Capacity to Demand*. http://www.advancedtransit.net/files/PRT-Matching_Capacity_to_Demand.pdf.

- BRW, Inc., et al (August, 1997). *City of Sea Tac Personal Rapid Transit Feasibility Project: Technical Appendices.* A 22-page document containing nine Technical Memoranda developed during the analysis and evaluation of transportation alternatives to service the area around the Sea-Tac Airport in Sea Tac, Washington. The 13-member professional project team concluded that PRT was the recommended locally preferred transportation investment strategy. http://www.advancedtransit.net/files/SeaTac_PRT_Feasibility_Project_A_Intro_small.pdf.