

Older Adult-Friendly Active Mobility Infrastructure Toolkits: Understanding How Older Adults Experience Poorly Designed and Maintained Infrastructure

Project 2466
July 2024

Carol Kachadoorian

This article came from work on several fronts: preparing for presentations at the 2023 Cycling & Society Symposium, publishing the 50+ Cycling Survey, Year 4, working on a project in Los Angeles aimed at improving active mobility for older adults, and developing an implementation tool for the Older Adult Typology of Physical Activity. Special thank you to Jeff Brubaker, AICP, Town Planner at Town of Eliot, ME, who reviewed and helped finalize this article.

Creating age-friendly active mobility infrastructure is key in reaching a goal of increasing mobility and physical activity for older adults, while reducing crashes and injuries.

The last few decades of one's life can be fraught with limitations in many aspects. Working to remain physically active and mobile, whether independently or with a companion, is one way to push back against some of these limitations.

This article lays out several frameworks for understanding how to work towards sustained physical activity for older adults. While many toolkits aimed at age-friendly design speak to the benefits of specific active mobility infrastructure design, they neither recognize nor address how older adults experience a built environment that does not offer safety, comfort, and mobility. These experiences are presented here. A list of useful resources for designing this infrastructure is also included.

We begin by describing three inter-connected frameworks.



The **Older Adult Typology of Physical Activity (OAT-PA)** recognizes four levels of physical activity for older adults along a continuum based on ability or need and inclination or lifestyle. The OAT-PA and its accompanying implementation tool can promote intentional work towards older adults gaining the ability and inclination for increased or sustained physical activity.

Understanding what Age-Friendly Active Mobility Infrastructure Means
dbITilde CORE, Inc., February 2024

The **Person-Environment Fit Theory (P-EF)** is a well-known tool for determining if something is right for a person. Whether considering if a person is the right fit as a friend, a house is the right fit for the family, or a sidewalk is the right fit to take a walk, the Person-Environment Fit tells us that people avoid things that do not fit. For older adults, a built environment that doesn't fit can discourage walking, cycling, using public transit, etc., resulting in reduced mobility, socializing, and overall well-being.

The **Life-Space Mobility Framework (LSM)** reflects a person's mobility range during daily activities. This framework consists of six potential spaces beginning with their bedroom and ending with the broader community. While three spaces in the home are outside the purview of active mobility infrastructure work, the three remaining are: Neighborhood, Town, Beyond. This framework is typically used to assess older adults with cognitive or physical limitations, without assessing available active mobility infrastructure. However, it is helpful to consider the impact of missing, poorly or well-designed active mobility infrastructure on an older adult's life-space range.

Here is a way to connect these three frameworks to better understand mobility for older adults: *If the Active Mobility Infrastructure is available to an older adult in their neighborhood, town, and beyond 'fits' their mobility ability, it will support a lifestyle and inclination to increase or sustain their level of physical activity.*

What do older adults experience?

Learning how older adults experience active mobility infrastructure when it is present and where there are gaps is the first step in creating a network that supports mobility through the ageing process. Missing or poorly designed active mobility infrastructure affects older adults in ways that can make active mobility feel unsafe, uncomfortable, and sometimes impossible. This section describes typical reactions to various active mobility infrastructure contexts. The goal is to adapt the built environment so it better meets the mobility needs of older adults, instead of expecting them to adapt their needs and abilities to what is typically available. Understanding how older adults experience active mobility infrastructure is a logical place to start.

Overall, older adults' experiences can be characterized as follows:

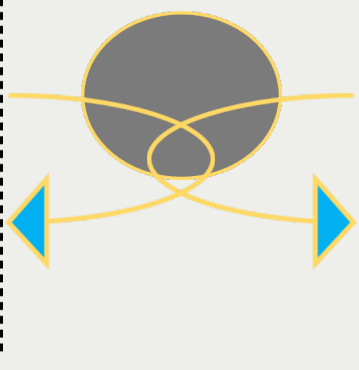
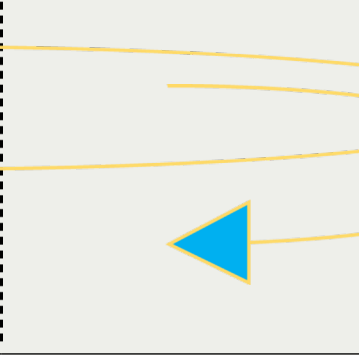
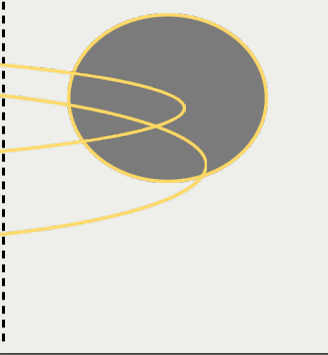
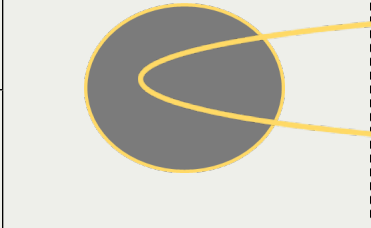
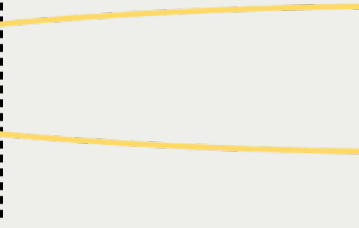
- Insufficient capacity that provides room to move comfortably, such a sidewalk width for so-cialable walking
- Poor fit with built feature (such as curb ramp placement, sidewalk pathways (lack of direct-ness), transit stop waiting area)
- Uncertainty about what a motorist will do, especially if it increases crash risk



- Concern about being invisible to others, including those walking, cycling, and driving
- Startling or unsettling that results in stopping or change of direction
- Things are not coherent or easily read (signage and design)
- Uncertainty about the time, safety, and ease of built features on planned travel route_
- Lack of courtesy bordering on ageism
- Sense of lack of dignity to them as a person or for their neighborhood

Laying out these nine types of experiences by the three frameworks help to understand the impact of inadequate active mobility infrastructure on older adults' mobility and wellness. The experiences are grouped by the prevailing framework and show the impact on one or both of the remaining two frameworks.



Reaction	Older Adult Typology of Physical Activity	Person-Environment Fit Theory	Life-Space Mobility Framework
<p>Insufficient capacity that provides room to move comfortably</p> <p>Poor fit with built feature (such as curb ramps; sidewalk pathways; transit stop waiting area)</p> <p>Concern about being invisible to others, including those walking, cycling, and driving</p> <p>Uncertainty about the time, safety, and ease of built features on planned travel route</p>	<p>Reduced PA or likelihood of PA</p>		<p>Smaller mobility range</p>
<p>Uncertainty about what a motorist will do, especially if it increases crash risk</p> <p>Startling or unsettling that results in stopping or change of direction</p> <p>Incoherent or difficult to read (signage and design)</p>	<p>Reduced PA or likelihood of PA</p>		
<p>Lack of courtesy bordering on ageism</p> <p>Lack of dignity to them as a person or for their neighborhood</p>			<p>Smaller mobility range</p>



Neighborhood Streets are especially important for daily trips on foot, by bicycle, or public transit.

Older adults can be more affected by all elements of neighborhood streets, such as missing or inadequately designed and maintained sidewalks; greater traffic volumes and speeds; and roadway crossings, especially those in their neighborhood. These can be unsettling and reduce the likelihood that an older adult will walk, bicycle, or use public transit within their neighborhood for exercise or for daily activities. Other street elements such as lighting, street furniture, and landscaping can also create concerns for older adults, reducing their inclination to be physically active within their neighborhood.

The following section describes what an older adult may experience with various active mobility infrastructure contexts. Reactions vary by person depending on factors such as their age, overall health including physical strength and ability, hearing and vision, reaction time, etc. It's easiest to understand the descriptions by asking this type of question for each: How does an older adult experience crossing where there is a slip lane? Or, how does an older adult experience crossing a busy roadway where there are missing or inadequate bicycle facilities?

Click on each active mobility topic to see older adults' experiences

- [All Things Sidewalks](#)
- [All Things to Cross the Road](#)
- [All Things Public Transit](#)
- [All Things Bicycle Network](#)

All Things Sidewalks

Missing or poorly designed sidewalks' effect on older pedestrians include:

- Constrained sidewalk capacity where there are high pedestrian volumes can result in older adults being jostled by other people walking.
- Varying sidewalk width and capacity due to street scaping, cafes, tree boxes, etc. make it difficult to walk sociably or comfortably.
- A lack of courtesy from others to 'give way' to older adults can force them to step-aside and feel disrespect. Admittedly, this is a social courtesy issue, but may be exacerbated when there is limited space.
- People running or using e-scooters can cause a startle effect if there is insufficient capacity for pedestrian volumes



- Cracked and uneven surfaces, as well as those with vegetation encroaching creates tripping or stumbling hazard. In addition, mobility devices can get caught in them causing the people to stumble or fall.
- Grates over tree boxes that have large holes or are missing provide tripping hazards.

Inconsistent sidewalk maintenance resulting in excessive litter, overgrown weeds or debris such as mud, loose gravel, or sand, affects the dignity of an older adults.

Driveway design, placement, and clustering affect older pedestrians in a number of ways, including:

- Driveways encroaching on sidewalk space resulting in a non-level sidewalk can cause balance issues due to the need to walk at an angle.
- Multiple driveways in a short space or very wide driveways can interrupt walking rhythm and cadence because of the need to keep track of the number of people driving in and out.
- Multiple driveways can create uncertainty about when they have the right-of-way and it is safe to continue walking, especially for people entering the driveway from the street.

Lighting

Some older adults tend to look downward to avoid tripping on rough surfaces or debris on the sidewalk. The lack of lighting with good coverage affects visibility of sidewalks and paths and can create concerns about tripping, as well as about personal harm. Poor lighting can result from the orientation of lights towards the street, rather than the sidewalk, or from trees that block lights intended to illuminate sidewalks, bus stops, and intersections.

Poor lighting can also cause concern for older adults about people driving and cycling not seeing them in order to yield the right-of-way when they cross the roadway.

Street furniture and parklets

The lack of adequate street furniture and parklets restricts older adults' ability to be social when out walking in their neighborhood and elsewhere. It may reduce the amount of time an older adult chooses to walk or cycle. Older adults will likely avoid dirty, broken, and overall uncomfortable furniture or furniture that is placed in awkward locations such as below trees that shed seeds or bugs, furniture that is not placed in a sociable space that allows for eye contact and other passive interactions with other people walking in the area, or with direct exposure to the elements such as a hot sun. Older adults that choose to walk or cycle within their neighborhood may have a strong sense of civic pride in that neighborhood – pride that might be diminished by the lack of or poorly maintained street furniture.



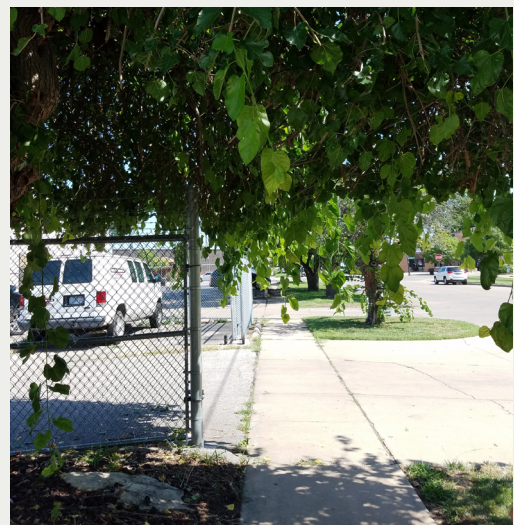
Parklets are a particularly beneficial feature for older adults. They are typically small, allowing for them to be more easily established and offering intimate social spaces. Because of the size and location, parklets are typically close to but not in the flow of people using sidewalks.

Trees and landscaping

Older adults may avoid or reduce how much they walk or bike on hot days if there is insufficient shade. Older adults tend to be more sensitive to excessive heat than younger adults.

Trees and landscaping may create negative experiences for older adults when walking at times of low light. Older adults may feel uncomfortable if trees block street and building lights so that they cannot see the sidewalk. In addition, tree and landscaping debris can create slipping hazard that can make it difficult to walk at various times of the year.

Sidewalks that are too narrow for sociable walking affect older pedestrians, causing people walking in twos to revert to single file. Capacity limitations due to tree boxes and other landscaping narrow the sidewalk, even when well-designed. Missing tree box grates especially restrict sidewalk width and create a tripping hazard for some older adults. Poorly designed tree boxes may result in surrounding sidewalk slabs to heave, causing tripping hazards. Infrequent tree maintenance, inappropriate tree types or tree placement can also reduce vertical clearance, forcing older adults to walk around or duck under branches.



All Things to Cross the Road

Roadway crossing widths

For some older adults, a roadway crossing can appear too far to cross within pedestrian signal time, time provided by gaps in traffic at an uncontrolled intersection (no pedestrian signal or a 2-way stop only), or whether people driving yield to or stop for pedestrians in a crosswalk. At crosswalks that are striped but have no additional controls, older adults may be uncertain if a person driving will look right or left to see if someone is there, i.e., the feeling of being invisible, especially if there are cars parked close to the corner or the crosswalk.



Older adults may not walk at their full speed, given the uncertainty about potential motor vehicles, or simply have a slower walking speed. The person driving may show impatience for the pace at which the older adult is walking and continue driving towards them.

Connecting the sidewalk and crosswalk

Older adults can find it difficult to cross a street when it requires them to step down and up the full curb height. Curb tops can be slippery in wet or icy weather; gutters can puddle, too. Those using a wheelchair, cane, or walker can find the height difference equally as difficult or impossible to navigate.

Curb ramps with limited width can force pedestrians to compete with each other for space, especially when people are going in both directions (departing and arriving). In these situations, older adults may be the last to use the ramp, reducing the amount of time they have to cross the street at signalized intersections.

Curb ramps that are out of alignment with roadway crossing desire lines can cause older adults to cross outside of the crosswalk. This can make them less visible or create concerns about people driving not yielding the right-of-way to them.



Crosswalk encroachments

People driving often ‘cut corners’ when turning left, potentially cutting off an older adult whose walking speeds are slower. This can be unsettling, causing an older adult to stop walking, leaving them exposed for a longer period of time.

Can you see me?

Older adults may feel invisible to people driving or may not see people walking or cycling at intersections, whether signal- or stop-controlled or without any controls. Poor site lines, motor vehicles parked too close to the corner, the presence of mature street trees, the placement and number of some signage and traffic control boxes can make older pedestrians less visible. This can reduce their level of comfort in beginning to cross, causing people driving to be unsure about the older adult’s intentions.



Traffic Circle Woes

Older adults may avoid roundabouts due to concerns related to insufficient crossing time between gaps in traffic or uncertainty about whether a person driving will look to see if someone is walking there and yield the right-of-way.

The shortest distance between two points is...

While walking and cycling benefit older adults, exposure to motor vehicle traffic is a concern. For example, crossing two legs of a busy and larger intersection doubles crossing times and exposure to motor vehicle traffic.

Will traffic really stop for me?

Older adults may avoid using an uncontrolled pedestrian crossing unless a rectangular rapid flashing beacon (RRFB) is present. Knowing how to use it and what to expect from people driving is key for older adults to feel comfortable crossing at locations where these are present, especially since RRFBs do not require people driving to stop for pedestrians, only yield.

A different type of signalized pedestrian crossing can take some getting used to

Older adults may avoid using an uncontrolled pedestrian crossing unless a pedestrian hybrid beacon (PHB) is present. Signage alerting people walking and driving about what the light sequences of a PHB mean for their ability to walk across the street or travel through can be confusing. Knowing how to use it and whether people driving know what the light sequence means is key for older adults to feel comfortable crossing at locations with a PHB. A PHB crossing four or more motor vehicle travel lanes can create stress for some older adults due to the exposure time. While people driving are required to stop at a specific point in the PHB cycle, motorists can become impatient if an older adult is crossing too slowly and proceeds through the crossing before the person completes their crossing. In areas with a higher rate of older pedestrians, a median refuge would provide the older adult with some respite.



Four is better than two

Older adults may be uncertain when they can cross or if there is enough time to cross between gaps in traffic when crossing the non-stop-controlled leg of a two-way stop intersection. Relying on the inclination of people driving to yield or stop to pedestrians in a crosswalk can create anxiety or cause older adults to choose a different route or a non-active mobility mode. In addition, waiting for sufficient time to cross the uncontrolled intersection leg and constant flow of motor vehicles passing can increase overall discomfort.

When crossing the leg with a stop sign, older adults may be cut-off by people driving who do not understand that pedestrians always have the right of way at a stop sign. If the older adult's walking speed is perceived to be too slow, the person driving may hurry through the intersection leaving little room behind the older adult, which can be startling or unsettling.

***Knowing the number is good***

Some older pedestrians may be uncertain about the amount of time available to cross a signalized intersection without a pedestrian countdown signal. Even so, older adults may be concerned that people driving may not see them in the crosswalk or be impatient and drive too close in front or behind them. On the other side, while a leading pedestrian interval (LPI) gives pedestrians a head start on crossing the street, some older adults may feel uneasy entering the crosswalk ahead of motorists.

Crossed signals, present

Protected right and left turns can cause some older pedestrians to begin crossing too early or be impatient and cross when the pedestrian signal tells them to wait. Both leading and lagging protected left turns can create concern about a potential crash risk from 'last second' left turns while they are about to begin or complete their crossing. Older adults may stop walking and wait in the crosswalk.



Crossed signals, present, not present

Older adults may not see or be aware of someone driving a motor vehicle who is turning right across the crosswalk. If they are aware of the driver, older adults may be uncertain if the person driving will yield the right-of-way or give sufficient space to cross before turning directly behind them.

Slip lane slip-ups

When crossing an unsignalized slip lane, older adults may be uncertain if the person driving will see them, then slow or stop for them, even when a crosswalk is striped. Older adults may also be concerned about having sufficient time to cross an unsignalized slip lane between gaps in traffic, especially for slip lanes with large radii allowing faster motor vehicle turns.

All Things Public Transit***How will I know?***

Missing, incomplete, or out-of-date signage dissuades older adults from using transit, can create longer trips, missed trips, or missed connections.

Unreadable signage is a factor in the perceived accessibility of transit service. The signage may be placed too high or be printed with small, difficult to read font.

Clean up, Shovel out needed

Transit stops with and without shelters that are not kept clear of trash and other debris create a lack of dignity for older adults who use them, and often reduce transit use. Older adults may also have concerns about the health effects of trash and other debris. Transit stops are particularly vulnerable to winter weather. Snowbanks created by snow plowing the street can block benches and bus shelters. These barriers create a fall risk for older adults if they try to climb over or walk around.



Accommodate me if you want me

An older adult's sense of dignity can be reduced when seating and transit shelters are lacking or sparse at transit stops. Exposure to heat, wind, rain, and other weather conditions can affect an older adult's reliance on public transit for their mobility. Missing seating and shelters make it difficult for some older adults to rest while waiting for the transit vehicle and re-group after alighting before they continue their trip.

Great idea, but this may not work for me

The presence of a bus boarding island can create uncertainty for older adults about the safety of crossing a bicycle travel lane, especially given the speed differential between bicycling and walking speeds. Older adults can face the same uncertainty about needing to look for people cycling, especially during commuting times.

Depending on its size and design features, a bus boarding island may have insufficient capacity to provide room for seating and a bus shelter, both of which can provide comfort and dignity to an older passenger.

Confusion over limited space

Multiple mobility options competing for curbside and sidewalk space can create uncertainty and potential confusion for older adults about where to get into and out of a taxi or other ridesha

ring vehicles. Constraints on areas for getting into or out of vehicles can be unsettling and reduce the attractiveness of using these mobility options, especially due to jostling with other people for access to mobility modes.

All Things Bicycle Network

Older cyclists may avoid cycling on roads without a designated bicycle facility due to motor vehicle traffic safety issues. At some intersections, there is the potential for some older adults to be slow at decision-making while cycling, changing direction, and cycling beyond their skill level when making a quick turns or stopping to avoid an uncomfortable situation.



Where do I park?

An older cyclist may avoid making a cycling trip if s/he is not sure there will be a place to park the bike. This is especially true for older adults with larger bikes such as e-bikes, trikes, cargo bikes, or tandems.

Where do I ride?

Conventional and buffered bike lanes (Class II) can be unsettling to cycle immediately adjacent to motor vehicle traffic, often resulting in older adults being unwilling to cycle in the roadway with motor vehicle traffic for daily activities or for access to trails. Both conventional and Class II bike lanes also may not have sufficient capacity for multiple cyclists, especially when older cyclists have larger bikes such as e-bikes, trikes, cargo bikes, or tandems. Traffic noise can also



be unsettling to an older adult, even with some buffering. In spite of the safety benefits of buffered bike lanes, older adults can be wary about what people driving will do, especially dangerously encroaching the bicycle lane or on-street parking movement when the bike lane is between the curb and the parking lane.

Low stress, more complex

Some older adults experience anxiety when crossing an intersection that does not include adequate crossing infrastructure, especially if it connects two low-stress bicycle network segments -- even more so if the crossing is needed to get to a trail.

The absence of a protected intersection or designated bicycle facilities at a busy, multimodal intersection may create uncertainty for some older adults about the best position to travel through it. These cyclists may also have concerns about what people driving will do while they are cycling through the intersection.

Curb ramp for cycling

Curb ramps incorporated into roadway crossings for trails or for shifting from an on-road to sidepath cycling route (or vice versa) can present problems for older cyclists. Ramp design and placement, and the placement of other features require older cyclists to pay simultaneous attention to the ramp lip and slope, bollards, landscaping, and people driving. If the ramp is too narrow, other cyclists traveling in both directions can create congestion. Cyclists traveling faster, such as on e-bikes, add to the need for older cyclists to pay particular attention and may cause them to falter.



It's not something for shipping a bike

Large and busy intersections without bike boxes (either one- or two-stage) can create uncertainty for older adults. They may not know how to use a bike box, creating confusion about where to position themselves at a traffic signal so that motorists can see them, especially when starting to cycle on green. Some may opt to travel through an intersection on the sidewalk and crosswalk to avoid potential conflicts with motorists and lack of visibility. An older cyclist may also be concerned about their ability to make it through an intersection on the green light if positioned behind several motor vehicles. Older cyclists may be slow to start cycling and get up to speed once the light is green.

Older adults are more conscious about their health and often cycle to remain active and healthy but can be uncomfortable breathing car fumes while waiting in traffic at a signal, if they cannot position themselves in front of motor vehicles.

Signals just for cyclists

Bicycle signals help all cyclists but can be especially helpful for older adults when traveling through complex and large intersections. Without a bike signal, older adults may be subject to slow decision-making while cycling; change direction; cycling beyond their skill level when making a quick turn to avoid an uncomfortable situation. Older adults may also experience a lack of patience from other cyclists and people driving, which can negatively affect the older adult's decision-making. An older adult can also be uncertain about what people driving will do when they need to turn left where there is no designated bicycle network feature.

Older adults may be uncertain about how to follow a bikeway that leaves the roadway at or between an intersection if a signal does not direct them (relying primarily on painted surfaces).



The Benefits and Risks of Separation

The safety benefits of shared-use paths, whether a sidepath (along a roadway) or a trail, offer older cyclists the peace of mind from being away from motor vehicle traffic, but are not without challenges. While newer shared-use paths can be wider and accommodate higher usage, narrower paths require mutual accommodation by all who use them. Older adults who use these paths often travel at a slower pace and can be startled or otherwise affected by people passing at a quicker pace whether on foot or wheels. Conversely, older adults using larger bikes such as trikes or tandems, less visible bikes such as recumbent bikes, or e-bikes need to navigate around people on foot. Designated space for those walking and cycling for shared-use paths can be an effective solution if people adhere to it. Finally, shared-use paths can be perceived as unsafe in two other ways. First, because they are typically unmonitored by law enforcement, older adults may be concerned about a timely response time if they need to call for help. Systems identifying where someone is on a shared-use path if a call for help is made are often lacking. Secondly, shared-use paths have historically lacked lighting for a variety of reasons, causing safety concerns regarding not being able to easily see surface conditions and other users, and to cause personal safety concerns.



Understanding what Age-Friendly Active Mobility Infrastructure Means
dbITilde CORE, Inc., February 2024

References

1. Black P, Street E, The Power of Perceptions: Exploring the Role of Urban Design in Cycling Behaviours and Healthy Ageing, *Transportation Research Procedia*, Volume 4, 2014, Pages 68-79, ISSN 2352-1465, <https://doi.org/10.1016/j.trpro.2014.11.006>. (<https://www.sciencedirect.com/science/article/pii/S2352146514002890>)
2. Chopik W, Giasson H, Age Differences in Explicit and Implicit Age Attitudes Across the Life Span, *The Gerontologist*, Volume 57, Issue suppl_2, August 2017, Pages S169–S177, <https://doi.org/10.1093/geront/gnx058>
3. Grimes A, Kachadoorian C. Understanding Physical Activity Differences Among Older Adults: Validating a Proposed Typology of Physical Activity as a Tool to Increase Physical Activity by Older Adults. *Gerontology and Geriatric Medicine*. 2022;8. doi:10.1177/23337214221094187.
4. Gruber, Mosimann, Müri, Nef. (2013)- “Vision and night driving abilities of elderly drivers”. <https://pubmed.ncbi.nlm.nih.gov/23683029/>
5. Johnson J, Rodriguez MA, Al Snih S. Life-Space Mobility in the Elderly: Current Perspectives. *Clin Interv Aging*. 2020 Sep 15;15:1665-1674. doi: 10.2147/CIA.S196944. PMID: 32982200; PMCID: PMC7501960.
6. Kachadoorian, C. Cycling Past 50: Cycling Past 50: A Closer Look into the World of Older Cyclists, Year 4 Survey, Mineta Transportation Institute, December 2024. <https://transweb.sjsu.edu/research/2157.1-Older-Adults-Cycling-Active-Mobility>
7. Kappes, Greve, Hellmers. Fear of crime in old age: precautionous behaviour and its relation to situational fear.” *European Journal of Ageing*, (2013) - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5549117/>
8. Loukaitou-Sideris, A., Brozen, M., & Levy-Storms, L. (2018). Bolstering Mobility and Enhancing Transportation Options for Low-Income Older Adults. UCLA: The Ralph and Goldy Lewis Center for Regional Policy Studies. Retrieved from <https://escholarship.org/uc/item/5bt0m87c>
9. Tournier, I., Dommès, A., & Cavallo, V. (2016). Review of safety and mobility issues among older pedestrians. *Accident; Analysis and Prevention*, 91, 24–35. <https://doi.org/10.1016/j.aap.2016.02.031>. Also see related articles listed below this one on the landing page
10. Weir K, (March 2023), Ageism is one of the last socially acceptable prejudices. Psychologists are working to change that. <https://www.apa.org/monitor/2023/03/cover-new-concept-of-aging>



11. Koren Y, Mairon R, Sofer I, Parmet Y, Ben-Shahar O, Bar-Haim S. 2021 Gazing down increases standing and walking postural steadiness. Soc. Open Sci. 8: 201556. <https://doi.org/10.1098/rsos.201556>



Acknowledgments

The author thanks the Mineta Transportation Institute for the support necessary to produce this project. The authors especially thank Lisa Rose, for editorial services, as well as MTI staff, including Executive Director Karen Philbrick, PhD; Deputy Executive Director Hilary Nixon, PhD; Director of Operations Alverina Eka Weinardy, Project Assistant Rajeshwari Rajesh and Graphic Design Assistant Minhvy Tran.

About the Author

Carol Kachadoorian has a breadth of knowledge and expertise in transportation planning and operations, which began in Alexandria, VA, where she served as a transit analyst before leading the City's first Office of Transit Services. After several years working with a family design-build company and at a major university, Carol returned to the transportation industry with the Washington, DC region's transit agency. There, she worked in operations and communications before focusing on pedestrian and bicyclists access to transit. Carol's work with Toole Design from 2008 to 2020 focused on school- and community-based active transportation plans. She started dbITilde Collaborative in 2020, specializing in older adult mobility and wellness. She describes the motivation for this work this way: "At age 60, I began to consider what my professional and personal life would look like during the next 30+ years. Now in my late 60's, I am working to improve mobility for people as they age.

This report can be accessed at transweb.sjsu.edu/research/2466



MTI is a University Transportation Center sponsored by the U.S. Department of Transportation's Office of the Assistant Secretary for Research and Technology and by Caltrans. The Institute is located within San José State University's Lucas Graduate School of Business.