

Cycling Past 50: A Closer Look into the World of Older Cyclists

Carol Kachadoorian



MINETA TRANSPORTATION INSTITUTE

Founded in 1991, the Mineta Transportation Institute (MTI), an organized research and training unit in partnership with the Lucas College and Graduate School of Business at San José State University (SJSU), increases mobility for all by improving the safety, efficiency, accessibility, and convenience of our nation's transportation system. Through research, education, workforce development, and technology transfer, we help create a connected world. MTI leads the [Mineta Consortium for Transportation Mobility \(MCTM\)](#) funded by the U.S. Department of Transportation and the [California State University Transportation Consortium \(CSUTC\)](#) funded by the State of California through Senate Bill 1. MTI focuses on three primary responsibilities:

Research

MTI conducts multi-disciplinary research focused on surface transportation that contributes to effective decision making. Research areas include: active transportation; planning and policy; security and counterterrorism; sustainable transportation and land use; transit and passenger rail; transportation engineering; transportation finance; transportation technology; and workforce and labor. MTI research publications undergo expert peer review to ensure the quality of the research.

Education and Workforce Development

To ensure the efficient movement of people and products, we must prepare a new cohort of transportation professionals who are ready to lead a more diverse, inclusive, and equitable transportation industry. To help achieve this, MTI sponsors a suite of workforce development and education opportunities. The Institute supports educational programs offered by the Lucas Graduate School of Business: a Master of Science in Transportation Management, plus graduate certificates that include High-Speed and Intercity Rail Management and Transportation Security Management. These flexible programs offer live online classes so that working transportation professionals can pursue an advanced degree regardless of their location.

Information and Technology Transfer

MTI utilizes a diverse array of dissemination methods and media to ensure research results reach those responsible for managing change. These methods include publication, seminars, workshops, websites, social media, webinars, and other technology transfer mechanisms. Additionally, MTI promotes the availability of completed research to professional organizations and works to integrate the research findings into the graduate education program. MTI's extensive collection of transportation-related publications is integrated into San José State University's world-class Martin Luther King, Jr. Library.

Disclaimer

The contents of this report reflect the views of the authors, who are responsible for the facts and accuracy of the information presented herein. This document is disseminated in the interest of information exchange. MTI's research is funded, partially or entirely, by grants from the U.S. Department of Transportation, the U.S. Department of Homeland Security, the California Department of Transportation, and the California State University Office of the Chancellor, whom assume no liability for the contents or use thereof. This report does not constitute a standard specification, design standard, or regulation.

REPORT 21-09

CYCLING PAST 50: A CLOSER LOOK INTO THE WORLD OF OLDER CYCLISTS

Carol Kachadoorian

April 2021

A publication of

Mineta Transportation Institute

Created by Congress in 1991

College of Business
San José State University
San José, CA 95192-0219

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. 21-10	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Cycling Past 50: A Closer Look into the World of Older Cyclists		5. Report Date April 2021	
		6. Performing Organization Code	
7. Authors Carol Kachadoorian		8. Performing Organization Report CA-MTI-2112	
9. Performing Organization Name and Address Mineta Transportation Institute College of Business San José State University San José, CA 95192-0219		10. Work Unit No.	
		11. Contract or Grant No. 69A3551747127	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Office of the Assistant Secretary for Research and Technology University Transportation Centers Program 1200 New Jersey Avenue, SE Washington, DC 20590		13. Type of Report and Period Covered Final Report	
		14. Sponsoring Agency Code	
15. Supplemental Notes DOI: 10.31979/mti.2021.2112			
16. Abstract <p>This document reports on 2,300 responses to a nationwide survey of older adults who cycle. The survey, open from February through September 2020, includes questions about a rider's cycling history, current cycling habits, and falls. It includes a visual preference survey of various cycling facilities and an online journaling option for two rides subsequent to completing the survey (results of the online journals will be available in the summer 2021). Responses reflect the impact of COVID-19 on older adults' cycling habits, the impact of aging on ability and agility, the impact of the built environment, types of bicycles, and opportunities to cycle with others. Responses were analyzed by gender and age. Questions such as cycling frequency and falls were compared to a modified version of Geller's four types of cyclists. Key take-aways include: Many older adults will need to adapt to their changing cycling abilities with a different bicycle, a different expectation about their cycling experience, and local programs to encourage sustained cycling. A fair number of respondents learned to cycle as an adult which suggests that local programs can also encourage older adults to learn to ride and how to select a bicycle. Lower cycling rates may result from not having a bikeable or proper-fitting bicycle, or the money to fix or purchase a bike. Questions posed for further consideration include: Can education and outreach help reduce near misses? Can planning and engineering help reduce near misses, especially in areas where more older adults cycle? How can falls due to poor infrastructure or maintenance or the actions of others be reduced?</p>			
17. Key Words Bicycling, older adults, surveys	18. Distribution Statement No restrictions. This document is available to the public through The National Technical Information Service, Springfield, VA 22161		
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 85	22. Price

Copyright © 2021
by **Mineta Transportation Institute**
All rights reserved

DOI: 10.31979/mti.2021.2112

Mineta Transportation Institute
College of Business
San José State University
San José, CA 95192-0219

Tel: (408) 924-7560
Fax: (408) 924-7565
Email: mineta-institute@sjsu.edu

transweb.sjsu.edu

ACKNOWLEDGMENTS

The author would like to thank everyone who responded to the survey; Danielle Arigoni and Melissa Stanton from AARP's Livable Communities program for distributing the survey; Christine Lee of Cal Media Consulting for report layout assistance; Tony Hull of Civil Streets and Kristin Gladwin from Florida State University for their review and guidance; and MTI staff, including Executive Director Karen Philbrick, PhD, Deputy Executive Director Hilary Nixon, PhD, Graphic Designer Alverina Eka Weinardy, and Communications and Operations Manager Irma Garcia.

Cover image source (top): <https://bicycledutch.wordpress.com/2013/10/31/elderly-people-on-a-cycle-tour/>

TABLE OF CONTENTS

I. Characteristics of Survey Respondents	2
Overview	2
Gender, Age, Income, and Ethnicity	2
Learned to Cycle	5
II. Cycling Habits & Preferences	6
Cycling Frequency	6
Type of Cyclist	10
Changes in Cycling	13
Factors Affecting Cycling	16
Age and Cycling Habits	19
eBikes and Trikes	21
Visual Preference Survey	27
III. Safety: Near Misses and Falls	31
Near Misses	31
Falls	38
Excerpt from AARP Article	53
How Local Leaders Can Support Safe Bicycling	53
How Individuals Can Support Safe Cycling	54
Appendix A - Cycling Survey	56
Appendix B - Cambridge, MA Flyers	64
Appendix C - Visual Survey	66
Appendix D - Detailed Charts of Falls	74
Appendix E – Resources	82
Cycling and Older Adults	82
Cycling and Gender	83
Cycling and Safety	83
Cycling Types and Behavior	83
e-Bikes and Trikes	84
Physical Activity and Wellness	84
About the Author	85

LIST OF FIGURES

1. Map of Survey Responses	2
2. Responses by Gender	3
3. Percent Respondents by Age and Gender	3
4. Percent Responses by Household Income	4
5. Percent Respondents by Ethnicity	4
6. When Did You Learn to Cycle? by Age Group	5
7. Do You Cycle Regularly? Total by Gender	6
8. Do You Cycle Regularly? Totals by Age Group	7
9. Do You Cycle Regularly? Women by Age Group	7
10. Do You Cycle Regularly? Men by Age Group	7
11. Frequency of Cycling for Cyclists Who Cycle Regularly	8
12. Frequency of Cycling for Women Who Cycle Regularly	8
13. Frequency of Cycling for Men Who Cycle Regularly	9
14. Sampling of Reasons to Cycle, Non-Regular Cyclists, N=149	10
15. Typical Distribution Among Four Types of Cyclists	11
16. 50+ Cyclist Survey Type of Cyclist Responses	12
17. Type of Cyclist by Gender	12
18. Type of Cyclist Compared to if Cycle Regularly	13
19. Photo from Survey Respondent Completing Online Journal	13
20. Cycling More in Past Year, Women, Men, Total N=1521	14
21. Why More Cycling in Past Year, Age Group, N=1533	14
22. Why Cycling Less in Past Year, N=554	15
23. Specific COVID-19 Reasons for Cycling Less, N=70	16

24. What Affects Where You Ride? Women, Men, Total N=13,413	17
25. What Affects Where You Ride? Age Group, N=10,959	18
26. Older Cyclists Value Things such as Benches, Pleasant Vistas, and Someone to Ride with	18
27. Reasons Would Stop Cycling, Women, Men, N=3857	19
28. Reasons I Would Stop Cycling, Age Group, Total N=3380	20
29. Parisian Cyclists During COVID-19 Restrictions	20
30. Do You Own an eBike? by Age Group	21
31. Do You Own an eBike? by Gender	21
32. What Motivated You to Buy an eBike? Women, Men, Total, N=406	22
33. What Motivated You to Buy an eBike? Age Group, N=366	23
34. Expected Reason for Future eBike Purchase, Women, Men, N=2620	24
35. Expected Reason for Future eBike Purchase, Responses within Each Age Group	25
36. Anticipated Reason to Purchase a Trike N=2692	26
37. Standard Adult Trike with Basket (left); Recumbent Trike with Two Front Wheels (right)	26
38. Image of Visual Preference Survey from 50+ Cycling Survey	28
39. Along the Roadway Example Photos from Visual Preference Survey	29
40. Across the Roadway Example Photos from Visual Preference Survey	30
41. Photo Provided by Survey Respondents of Neighborhood Street to Include in Next Visual Preference Survey	30
42. Near Miss Rates by Mode	32
43. Reported Near Misses, Gender and Age, N=2280	33
44. Survey Responses, All Questions, Gender and Age N=2297	33
45. Near Miss Rates by Mode and Age	34

46. Near Misses with Other Cyclists, Gender, Age Group	34
47. Near Misses with Scooters, Gender, Age Group	34
48. Near Misses with Walkers, Gender, Age Group	35
49. Near Misses with Joggers, Gender, Age Group	35
50. Near Misses with Motorists, Gender, Age Group	35
51. How Do eScooters Affect Older Adults?	37
52. Examples of Separate Pathways for Cyclists and Pedestrians	38
53. Percent Reporting Fall, Gender, N=2223	39
54. Percent Reporting Fall, by Total, Gender and Age Group; by Age Group and Total Survey Responses	39
55. Percent Reporting Fall, by Gender and Age Group	39
56. Fall and No Fall, Women, Type of Cyclist, Women N=824	46
57. Fall and No Fall, Men, Type of Cyclist, Men N=1381	46
58. Women Fall Rates, Age Group and Type of Cyclist	47
59. Men Fall Rates, Age Group and Type of Cyclist	47
60. Cyclists Who Cycling 3 or More Times a Week, Age Group	48
61. Fall Rates for Those Cycling 3 or More Times per Week, Age Group	48
62. Comparison of Fall Rates and eBike Ownership, N=2251	49
63. Comparison of Fall Rates for eBike Owners, Women N=194, Men N=448	49
64. Comparison of Fall Rates, eBike Owners to All Cyclists, Age Group	50
65. Driveway Gravel Impacts Surface Quality for Cyclists	51
66. Bike Lane Widens and Narrows, with On-Again/Off-Again Buffer	52

LIST OF TABLES

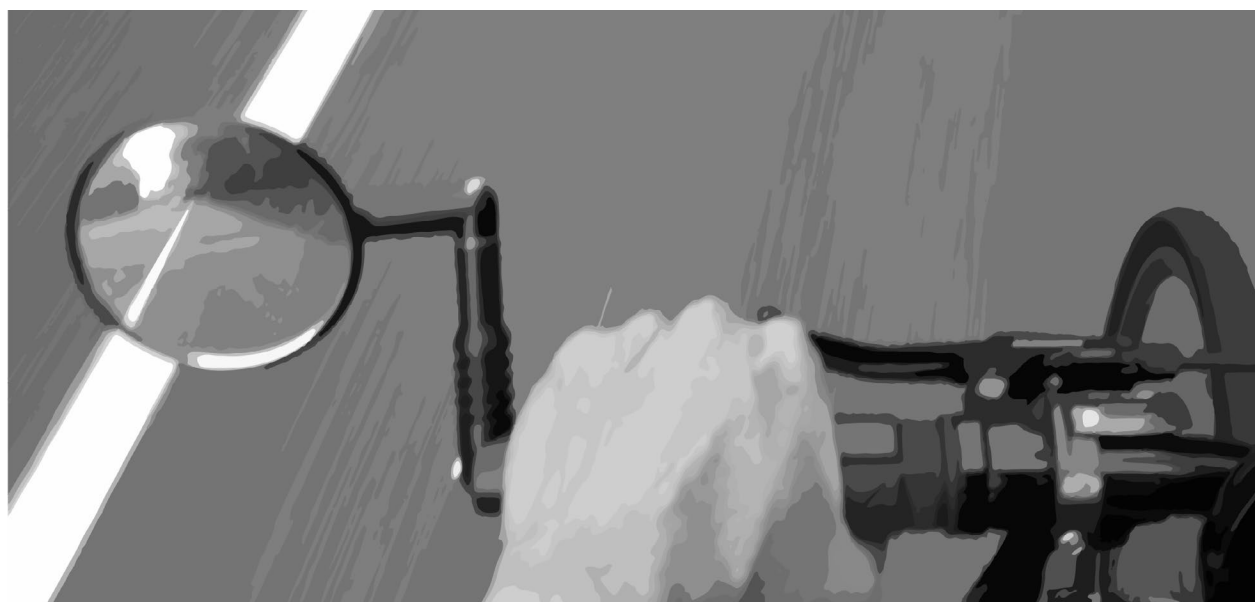
1. Grouping of Factors Drawn from Fall Descriptions	41
2. Differences in Fall Factors between Women and Men	43
3. Unable to Unclip Factor by Age Group	43
4. Sample Fall Descriptions by Factor Group	43
5. Noticeable Differences in Fall Rates and Type of Cyclist	47

Cycling is a powerful and fulfilling experience

“ I used to ride a bike when I was teenager now that I am old and alone, I wish to ride again. ”

“ I used to cycle regularly (2 or 3 times a week) but my ‘riding buddy’ moved away & my motivation left with her! ”

“ Five years ago, we moved to a large city from a small city where I regularly cycled to work and to do errands. Daily cycling does not feel safe in my current city though I live close enough to work to cycle easily. Just got a new old bike so am cautiously sticking a toe back into cycling but will probably only be on our city’s protected bikeways or around my neighborhood. Also, wind is an ever-present barrier to cycling in OK, if not for the sheer force of it, for the allergens it stirs up. ”



I. CHARACTERISTICS OF SURVEY RESPONDENTS

OVERVIEW

At least two responses from each U.S. state except Mississippi (plus some from Canada), as shown in the map below.

Results in this Databook are for just under 2,300 separate responses. This number does not include duplicate responses. Further, results by question or comparison of questions include those responding. For example, percentages showing how frequently respondents cycle are based on those who answered the question, not all who responded to the survey.

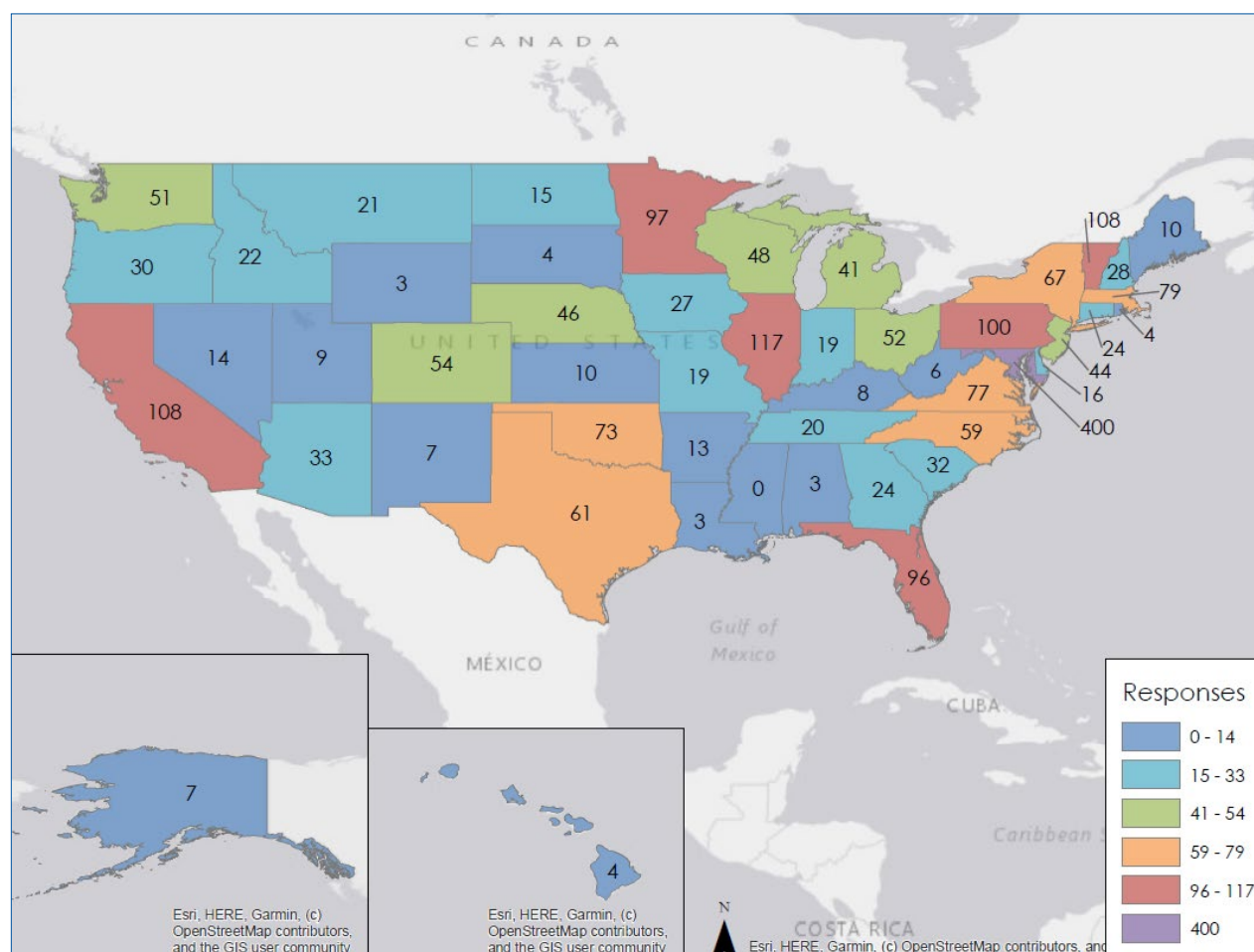


Figure 1. Map of Survey Responses

GENDER, AGE, INCOME, AND ETHNICITY

Figure 2 shows responses by gender, including those who did not provide a gender. The largest group responding were men, with just over 60%. Figure 3 shows the response rate by age group drops off at the 71–75 age group, however, 16.3% of responses are from those 71+.

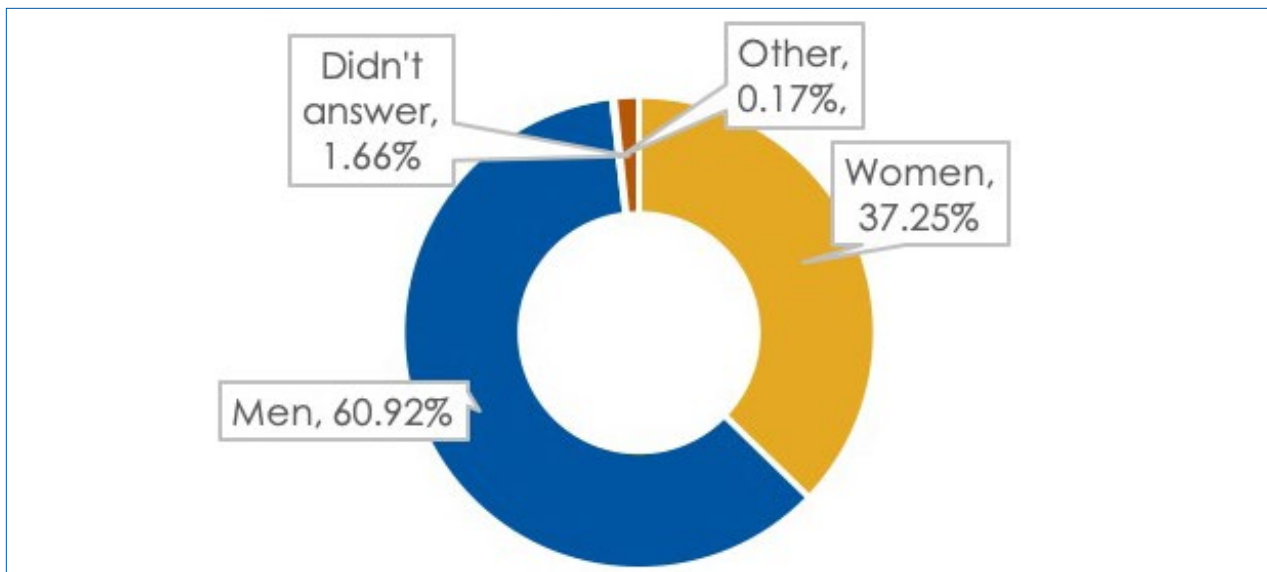


Figure 2. Responses by Gender

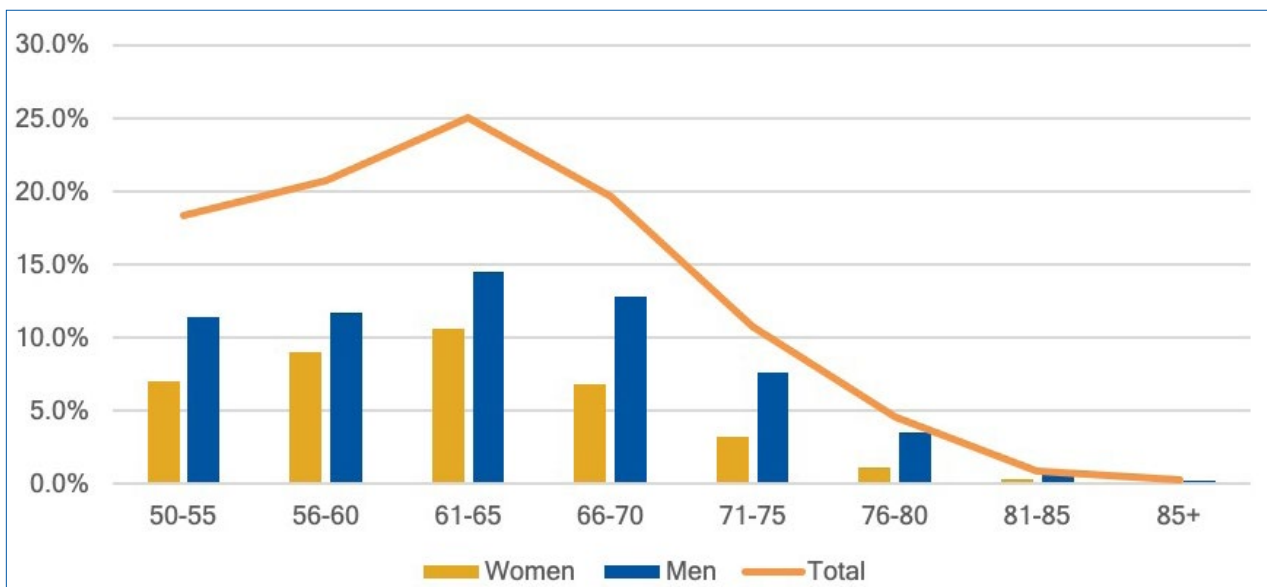


Figure 3. Percent Respondents by Age and Gender

As shown in Figures 4 and 5, respondents were primarily white and of higher household income. This is a recognized weakness of the survey. AARP’s involvement in promoting the survey in 2020 increased the number of other ethnicities. However, there is a strong need to expand the future surveys to specifically target underrepresented populations of all ethnicities and household income, so survey results reflect national demographics.

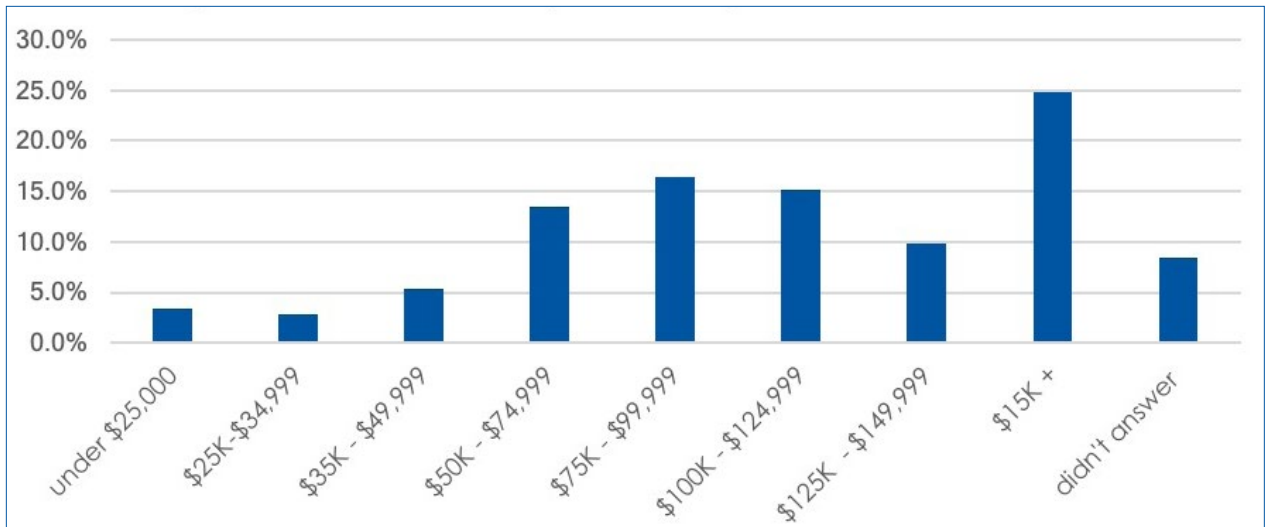


Figure 4. Percent Responses by Household Income

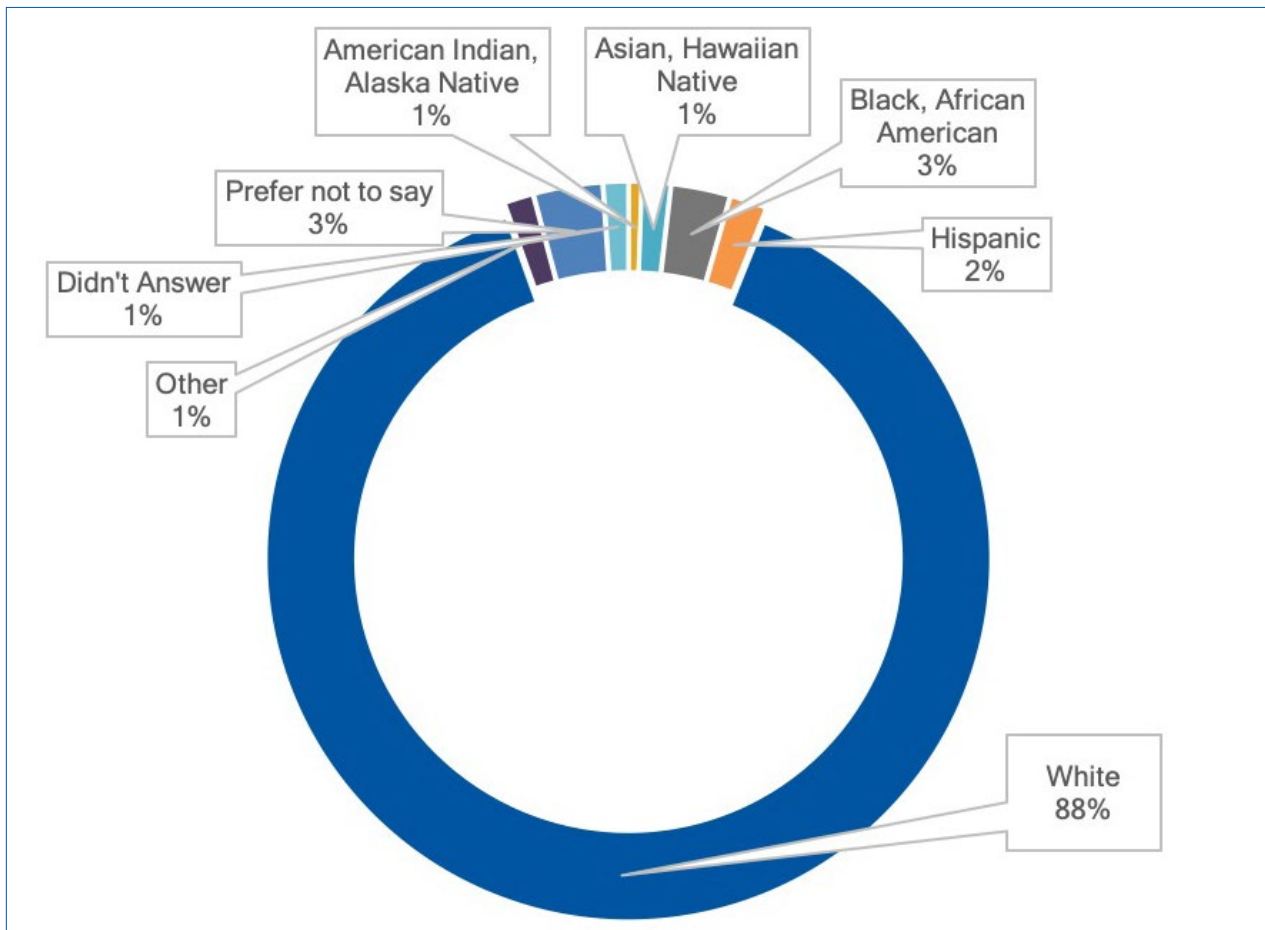


Figure 5. Percent Respondents by Ethnicity

LEARNED TO CYCLE

While the largest percent of respondents for each age group learned to cycle as a child, learning to ride as an adult, including after age 50 was not uncommon, as shown in Figure 6.

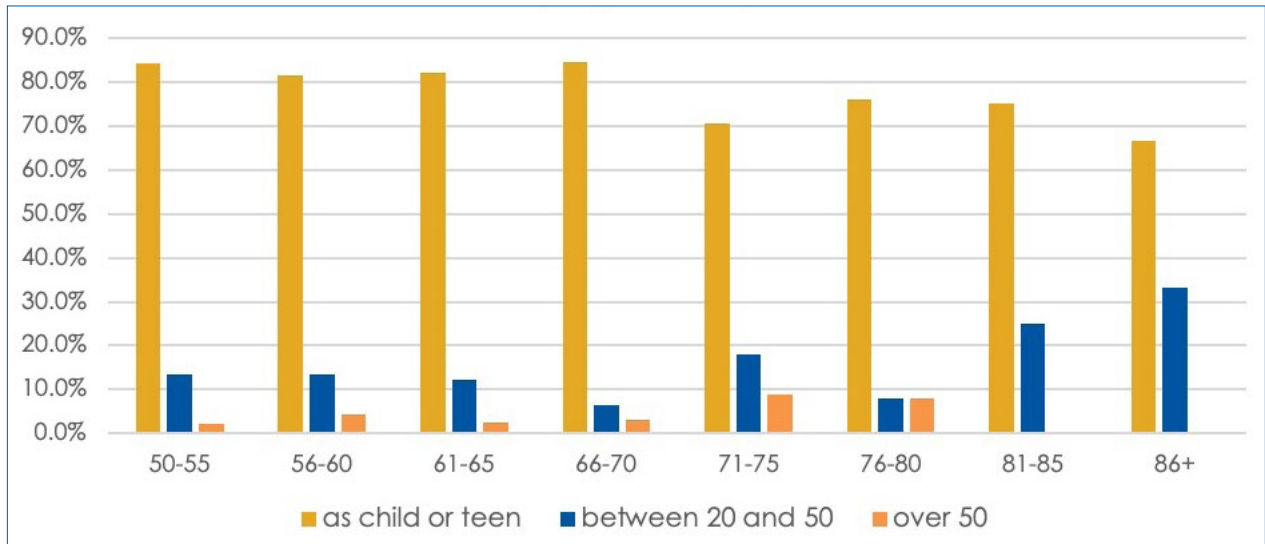


Figure 6. When Did You Learn to Cycle? by Age Group

Take-away. Non-cycling adults can and do learn to ride. Some communities offer programs to encourage older adults to learn to ride, including options for a good-fitting bicycle. These programs can be developed by a local health or recreation department, the local area agency on aging, or by a local bicycle shop. For example, Cambridge, MA is developing a multi-part program for older adult to learn or re-learn to cycle, and to enhance their cycling agility. While the pandemic has shifted the original program plan, staff held a webinar series in the fall 2020, posting the recordings on their YouTube channel. They followed-up the webinar series with monthly virtual meetups and will launch a virtual exercise and strength training program in March 2021 to help prepare older adults for spring riding. The program promotional flyers in Appendix B provides more information.

II. CYCLING HABITS & PREFERENCES

CYCLING FREQUENCY

Respondents answered the question about whether they cycled regularly using their own definition of the term 'regularly' – a type of self-assessment – with a follow-up question to provide frequency details. Those who responded that they do not cycle regularly answered a subsequent question on circumstances prompting them to ride.

Regardless of gender or age, most respondents cycle regularly, as shown in Figure 7, with higher rates of regular cycling for men than women.¹

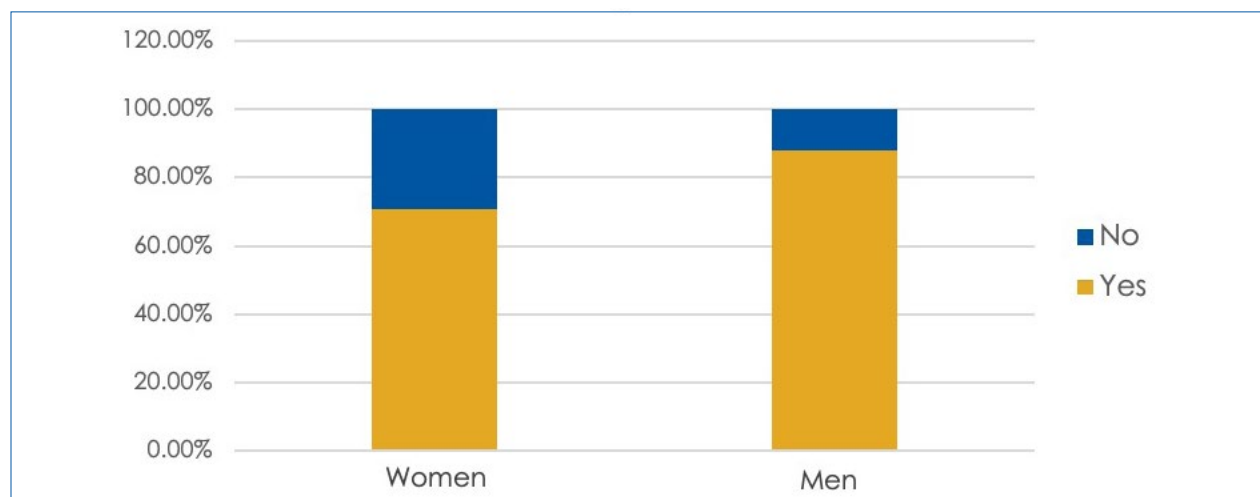


Figure 7. Do You Cycle Regularly? Total by Gender

The rate of regular cycling habits is consistent by age group, however, declines for women between 76 to 85. See Figures 8, 9 and 10. The low number of responses from women and men 85+ affects the rate of regular cycling for this gender and age group.

¹ It is important to note that this group is mostly comprised of older adults who remain active as they age, which provides an understanding of how aging influences their cycling behavior and safety more than what may encourage people as they age to take up cycling.

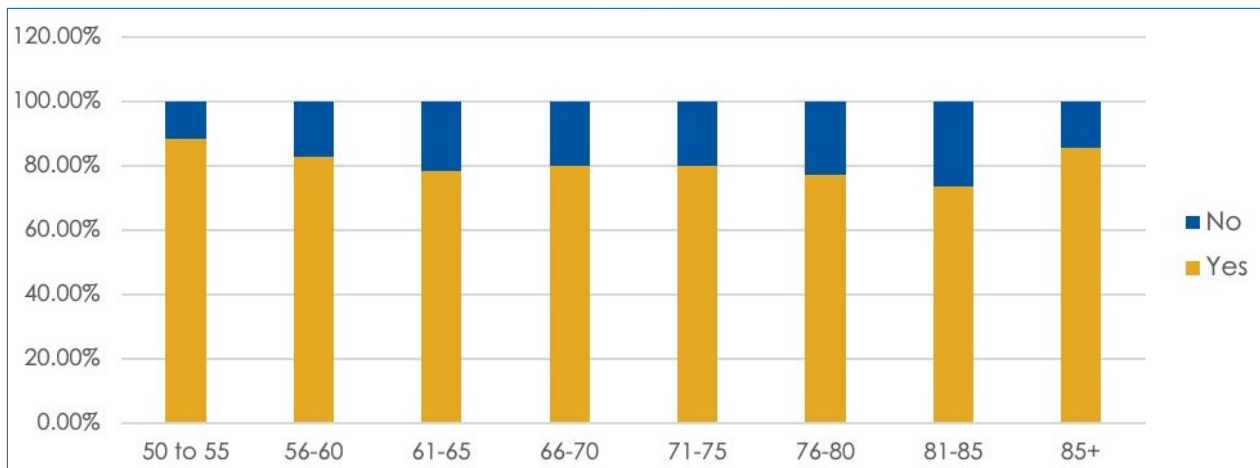


Figure 8. Do You Cycle Regularly? Totals by Age Group

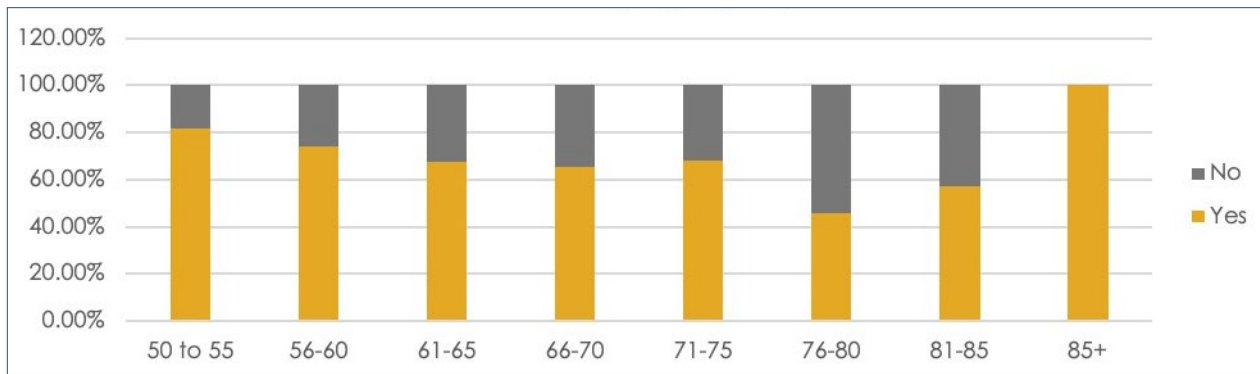


Figure 9. Do You Cycle Regularly? Women by Age Group

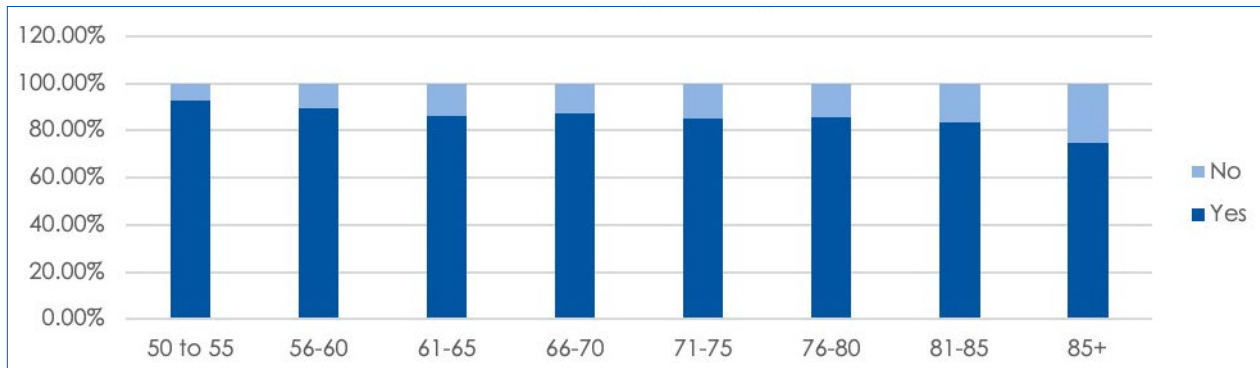


Figure 10. Do You Cycle Regularly? Men by Age Group

When regular cyclists were asked about the frequency, many cycle three to five times a week, which may be comparable to younger, regular cyclists. Overall, the frequency of weekly cycling increases with age. See Figure 11.

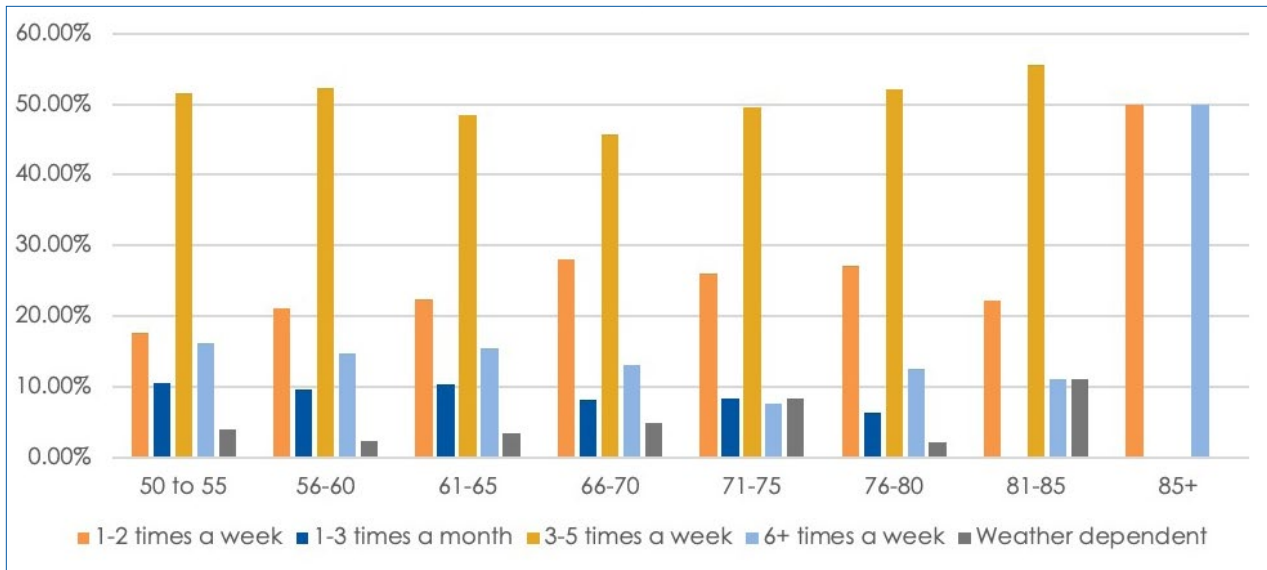


Figure 11. Frequency of Cycling for Cyclists Who Cycle Regularly

There are few differences in cycling rates between women and men by age group, as shown in Figures 12 and 13. Weather was not a strong indicator of cycling frequency for most age groups, except for 71-75.

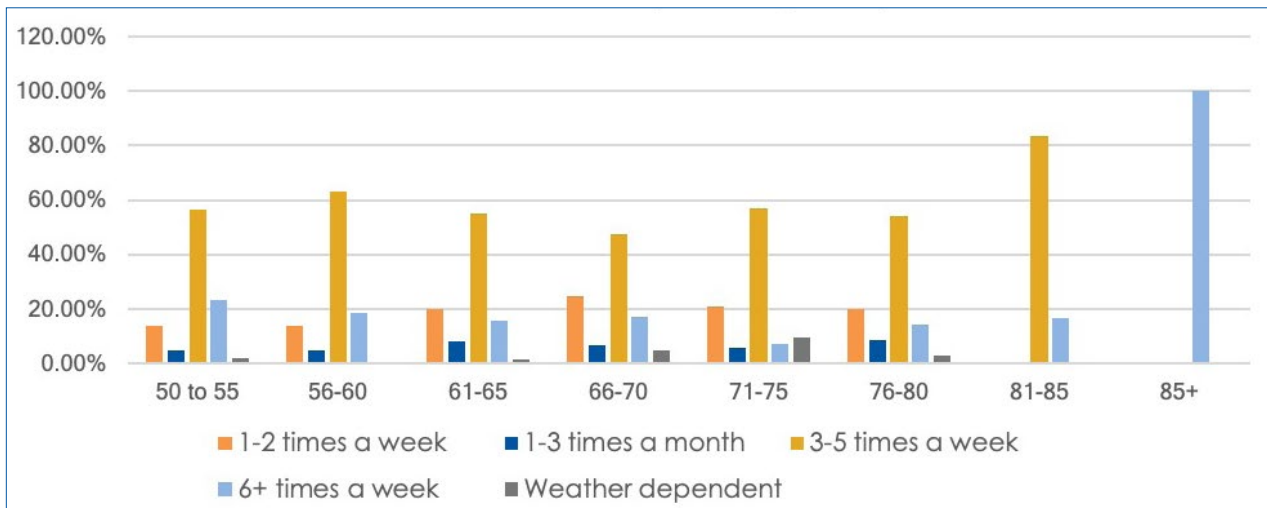


Figure 12. Frequency of Cycling for Women Who Cycle Regularly

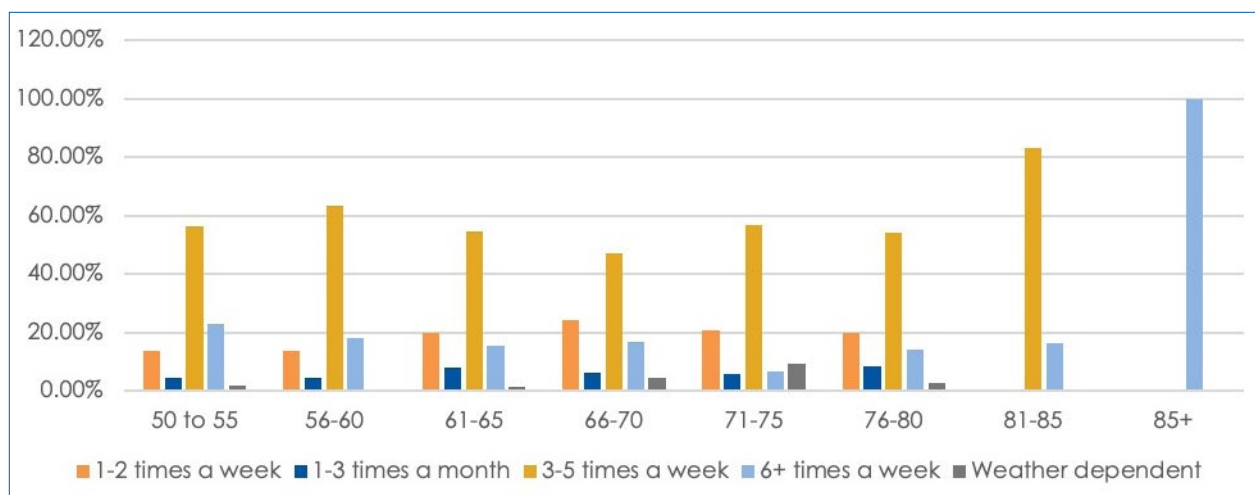


Figure 13. Frequency of Cycling for Men Who Cycle Regularly

Circumstances prompting non-regular cyclists to ride varied, as shown in Figure 14. Some common reasons include:

- Good weather
- Having a bikeable bike
- The desire for exercise or a different type of exercise
- When there is time or when motivated
- Where errands are bikeable
- Where there are safe places, such as trails and separated facilities

Take-away. Based on the number of reasons related to not having a bikeable bike, it appears that bicycle shops can be a valuable resource. Bike shops have experienced a renaissance due to COVID-19, as more people return to cycling. Shops could consider doing more outreach to let older cyclists know of their COVID-19 safety protocols, allowing them to offer in-neighborhood pop-up shops to repair bikes and sell new or used bikes.

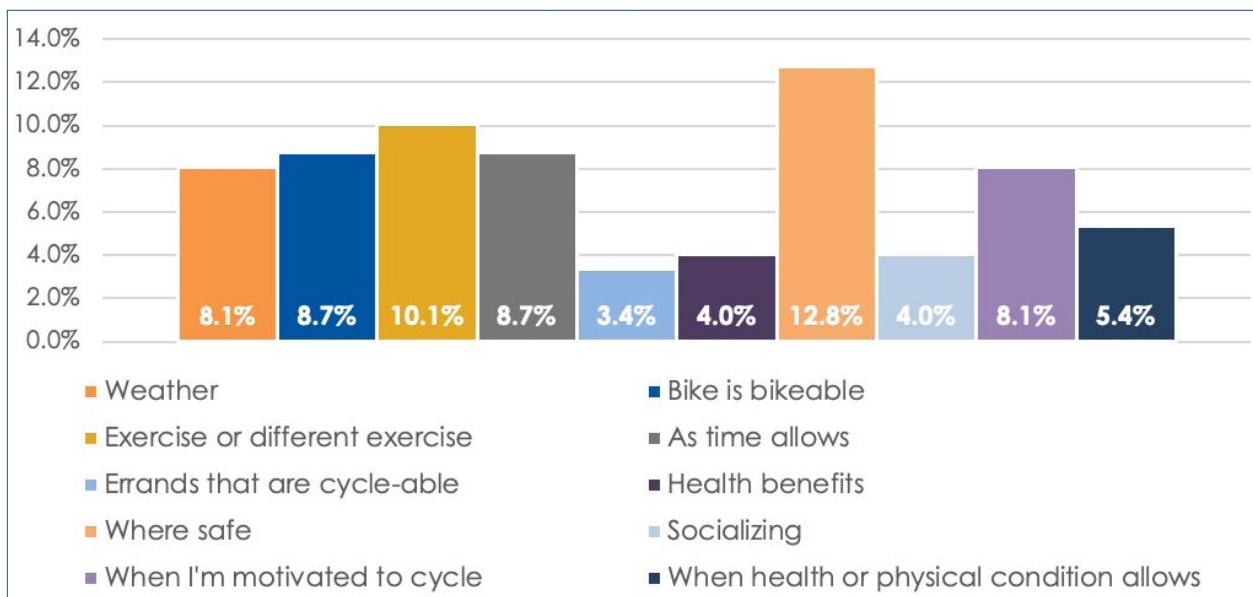


Figure 14. Sampling of Reasons to Cycle, Non-Regular Cyclists, N=149

TYPE OF CYCLIST

This question is based on the four types of cyclists developed by Roger Geller from Portland, OR.² The typology, based on a study of 3,000 cyclists in Portland, has been used to support designing and building cycling facilities that are ‘low stress’, i.e., offer increased safety and comfort for cyclists. The four types, which include non-cyclists, and typical percent of people self-identifying in each are defined below and shown in Figure 15:

² <https://www.portlandoregon.gov/transportation/article/264746>

Strong and Fearless: People willing to bicycle with limited or no bicycle-specific infrastructure.

Enthusied and Confident: People willing to bicycle if some bicycle-specific infrastructure is in place.

Interested but Concerned: People willing to bicycle if high-quality bicycle infrastructure is in place.

No Way, No How: People unwilling to bicycle even if high-quality bicycle infrastructure is in place.³

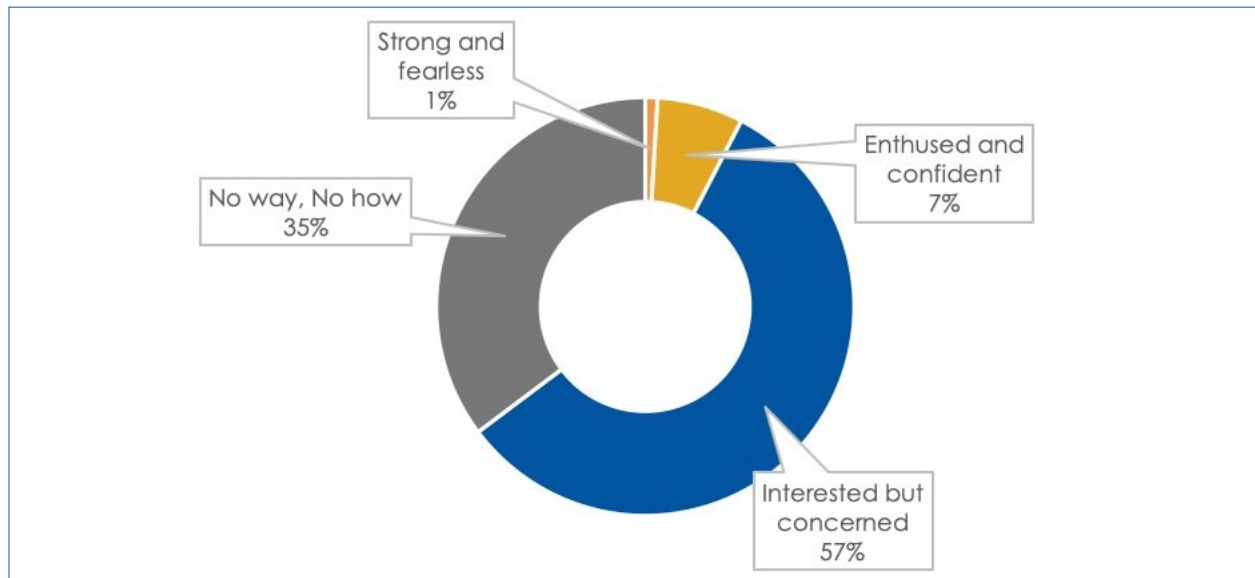


Figure 15. Typical Distribution Among Four Types of Cyclists

Towards the end of the 50% Cycling Survey, respondents were asked to select the type of cyclists with which they associated. Because the 50+ Cycling Survey is for those who cycle, the survey question replaced the *No way, No how* type with *A mix -- depends on circumstances* type.⁴ The results differ from the typical Geller percentage distribution in two significant ways. First, twenty percent (20%) of respondents identified as *Enthusied and confident* (Geller) cum *Casual and somewhat confident* (50+ Cycling Survey); and fifty-five percent (55%) of respondents identified as *Enthusied and confident* (Geller) cum *Experienced and confident* (50+ Cycling Survey).⁵ The new type, *A mix – depends on the circumstances*, was selected by 22% of respondents, suggesting that this type may be needed, as it resonates as accurate for many cyclists. See Figure 16.

³ <https://altago.com/understanding-the-four-types-of-cyclists/>

⁴ Type names differed from the Geller type names. Also, a handful of respondents said they do not cycle, primarily due to health or balance issues, or concerns for safety while cycling.

⁵ The difference in names may have affected which type respondents chose.



Figure 16. 50+ Cyclist Survey Type of Cyclist Responses

As noted in the introduction to this section, Geller’s typology is used to support developing low stress bicycle networks. The analysis for determining Level of Traffic Stress (LTS) identifies various conditions that create comfort or discomfort for cyclists.⁶ Geller’s typology which typically results in a 57% share of Interested but concerned cyclists, becomes the type to design for. The distribution of 50+ Cycling Survey respondents varies significantly from the typical distribution of Geller’s typology; the 55% Experienced and confident should not suggest that older adults can tolerate higher stress networks. Instead, low stress networks are needed for older adults, as much as they are needed for all other cyclists.

There are noticeable differences in type of cyclists by gender, as shown in Figure 17. Women were more evenly distributed among the four types, with the lowest identification with Interested but Concerned, while nearly 70% of men identified as Experienced and Confident and very few as Interested but Concerned.

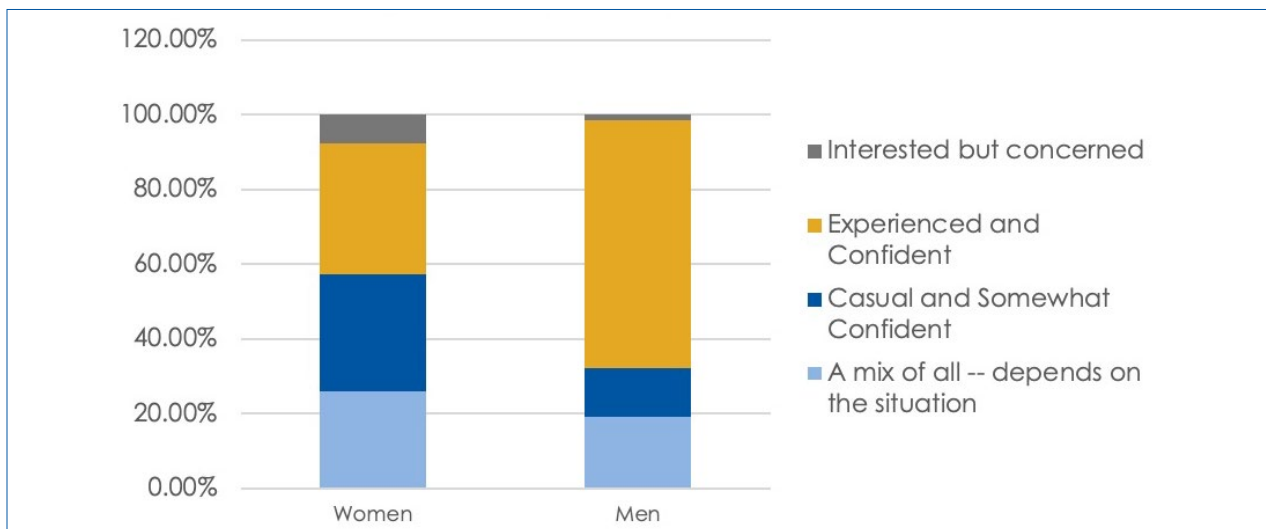


Figure 17. Type of Cyclist by Gender

⁶ <https://transweb.sjsu.edu/research/Low-Stress-Bicycling-and-Network-Connectivity>

Not surprisingly, those who said they cycle regularly were more likely to consider themselves as Experienced and confident riders, while those who do not cycle regularly were more likely to consider themselves as Casual and Somewhat Confident, as shown in Figure 18. Regardless of whether they cycle regularly, cyclists chose the *Mix – Depends on the situation* type second most often.

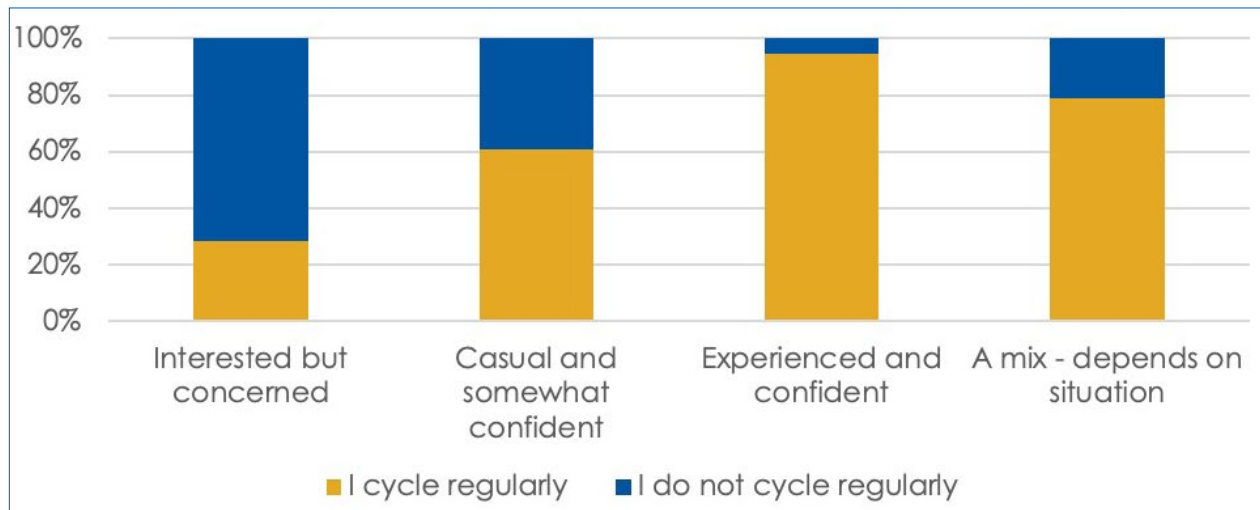


Figure 18. Type of Cyclist Compared to if Cycle Regularly

CHANGES IN CYCLING

Changes in the frequency and length of cycling from year-to-year occurs because of many factors. The rate of change in 2020 reflects the usual factors, however, the most significant factor was COVID-19. Respondents both cycled more often or reduced the amount of cycling because of COVID-19.

Cycling more. Cycling for exercise during COVID-19 restrictions was the most common response for those whose cycling increased in the past year, as shown in Figure 20.

It is difficult to speculate if the cycling increases will continue, so focusing on the other reasons for increased cycling may be more useful. Importantly, having someone to cycle with and good places to cycle rated second in affecting increased cycling, as well as shifting to cycling from a different sport. Responses by age group (see Figure 21) shown that maintaining exercise during the pandemic was a strong motivator for most age



Figure 19. Photo from Survey Respondent Completing Online Journal

groups. In addition, those between 50 and 60 seemed to use the COVID-19 time to train for a long-distance ride. Acquiring an eBike was less of a factor, but this could be due to the relatively low rate of eBike ownership among respondents.

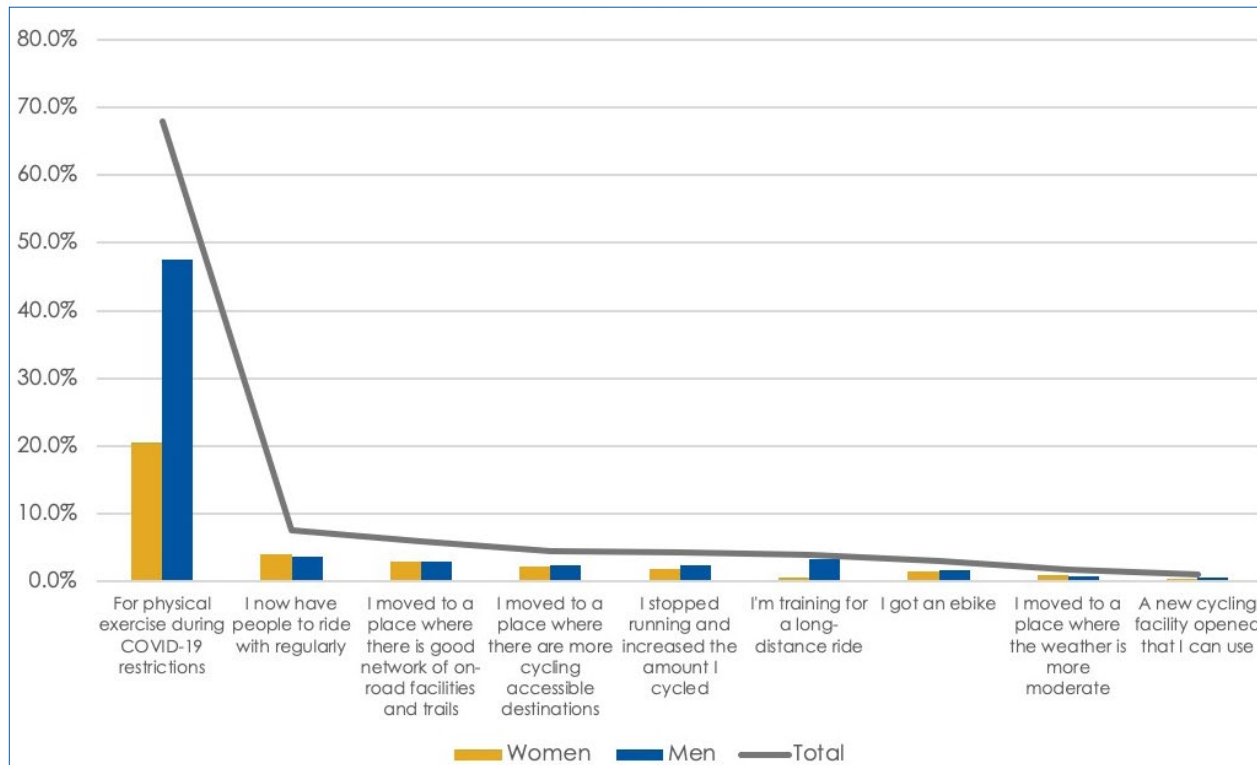


Figure 20. Cycling More in Past Year, Women, Men, Total N=1521

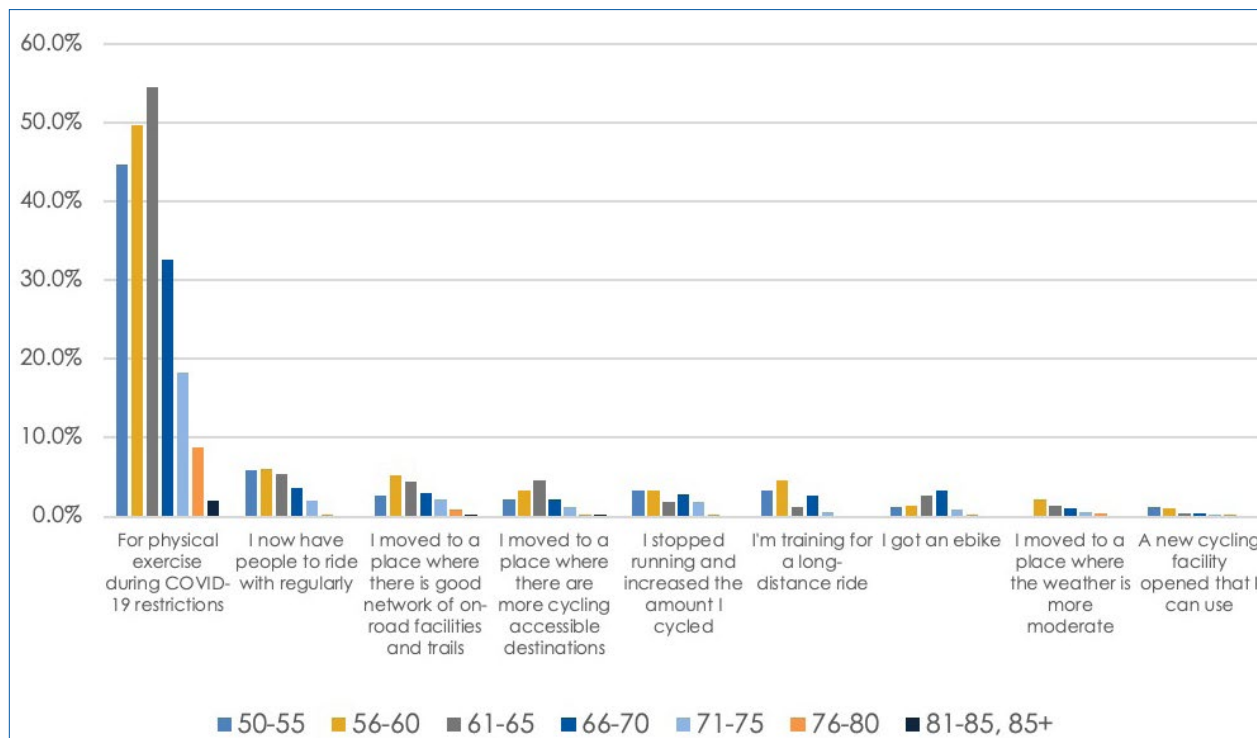


Figure 21. Why More Cycling in Past Year, Age Group, N=1533

Cycling less. Those cycling less did so for fewer days and/or for shorter distances. As shown in Figure 22, the most frequently noted reason for cycling less was safety concerns. When considered alongside responses to other questions such as near misses and falls, safety concerns may be related to actions of others as well as a lower level of confidence in their own cycling agility. Changes in home or work responsibilities and health issues were also cited as reasons for cycling less. COVID-19-related reasons for less cycling was not as strong a reason for this group, however some reasons are based on changes to daily schedules due to the pandemic. See Figure 23 for a breakout of specific COVID-19-related reasons for cycling less provided by 70 respondents.

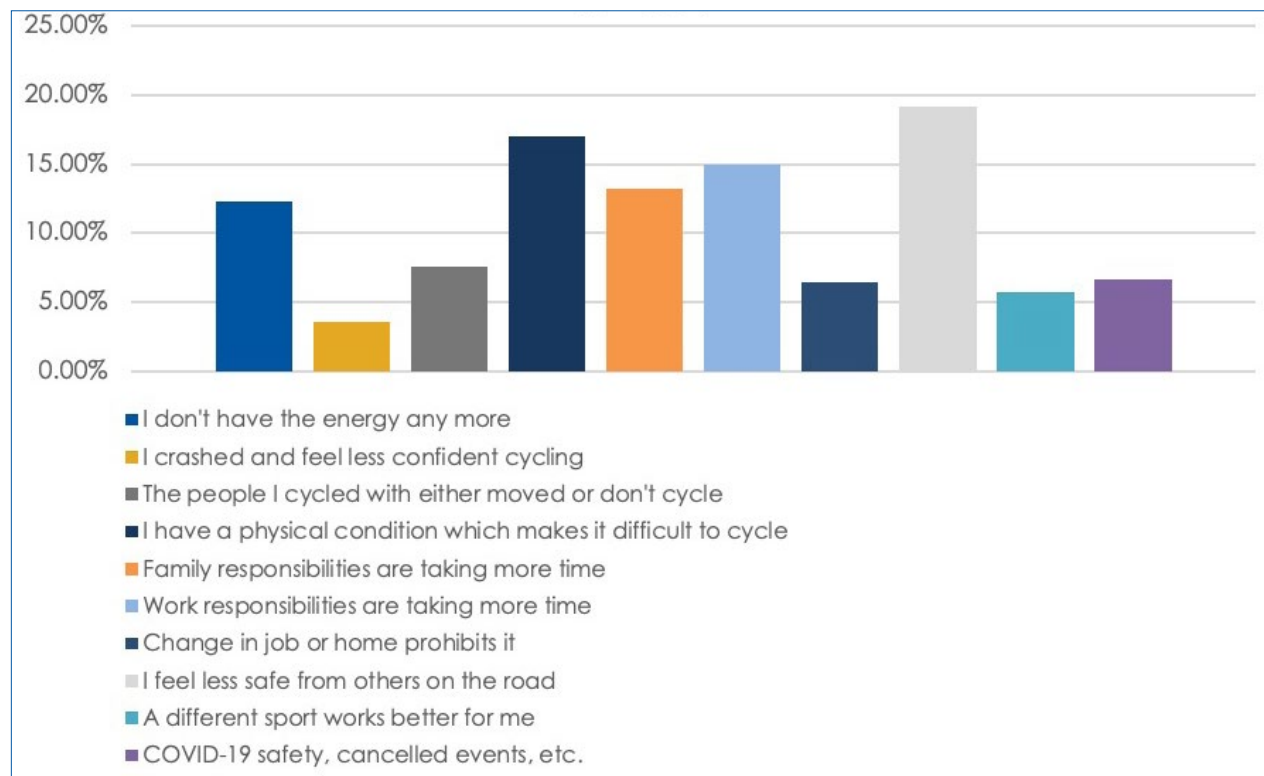


Figure 22. Why Cycling Less in Past Year, N=554

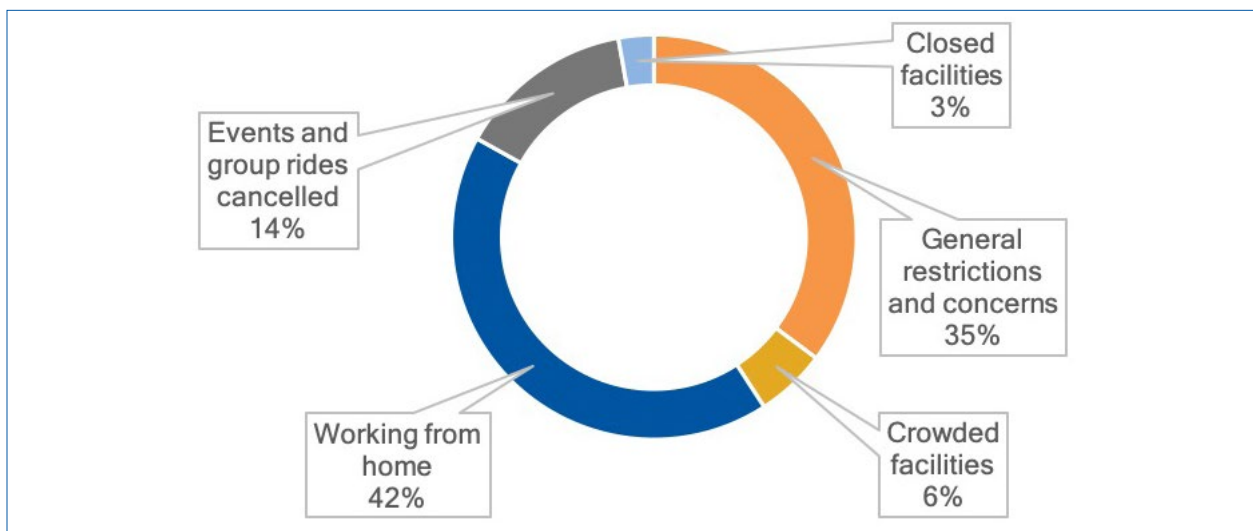


Figure 23. Specific COVID-19 Reasons for Cycling Less, N=70

FACTORS AFFECTING CYCLING

Figure 24 shows responses to the question about factors affecting where older adults ride, such as a mix of good infrastructure, end of- and during-trip facilities, and destinations. Group rides were more important for men than women. There do not appear to be age-based differences in factors, however, as shown in Figure 25.

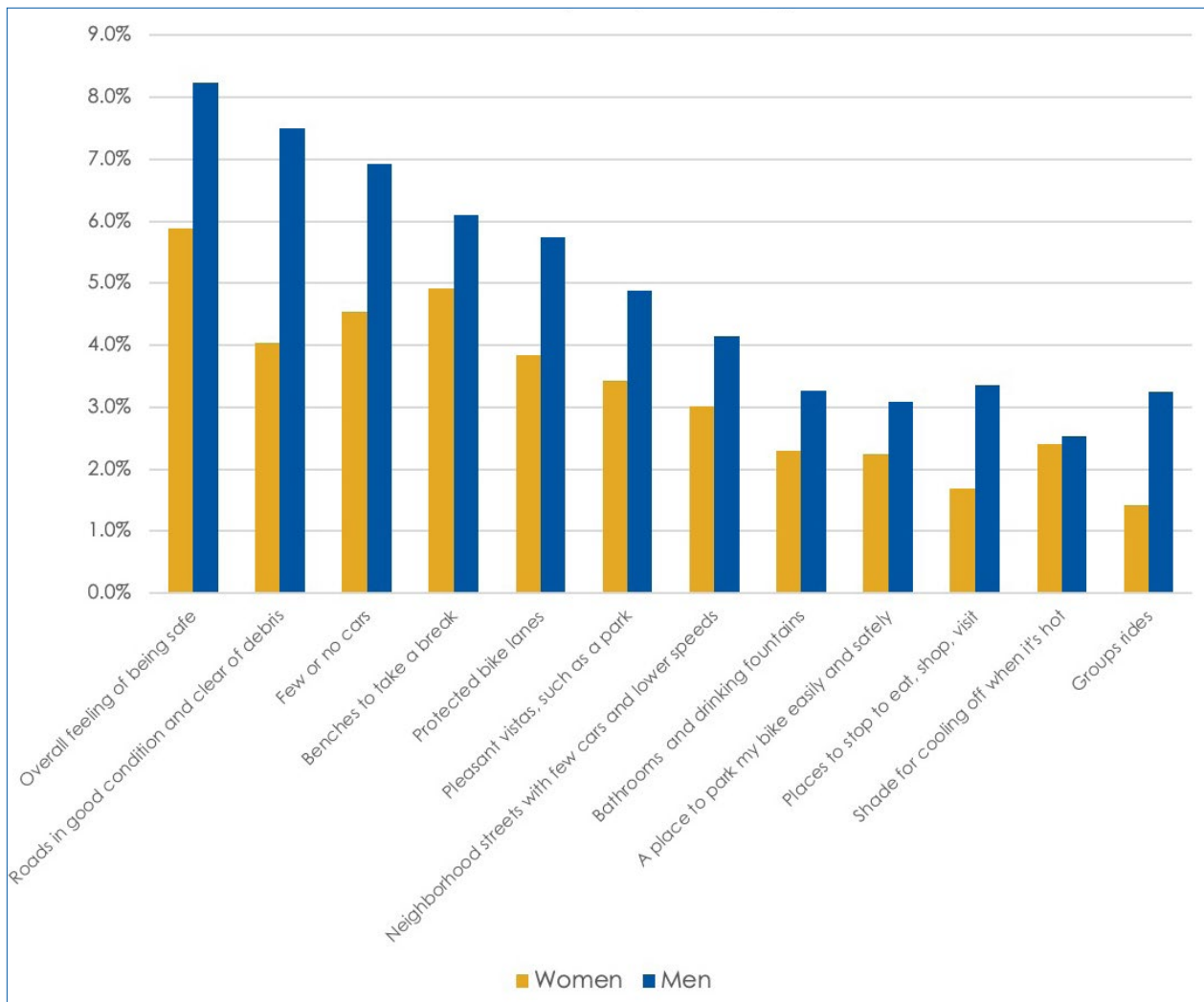


Figure 24. What Affects Where You Ride? Women, Men, Total N=13,413

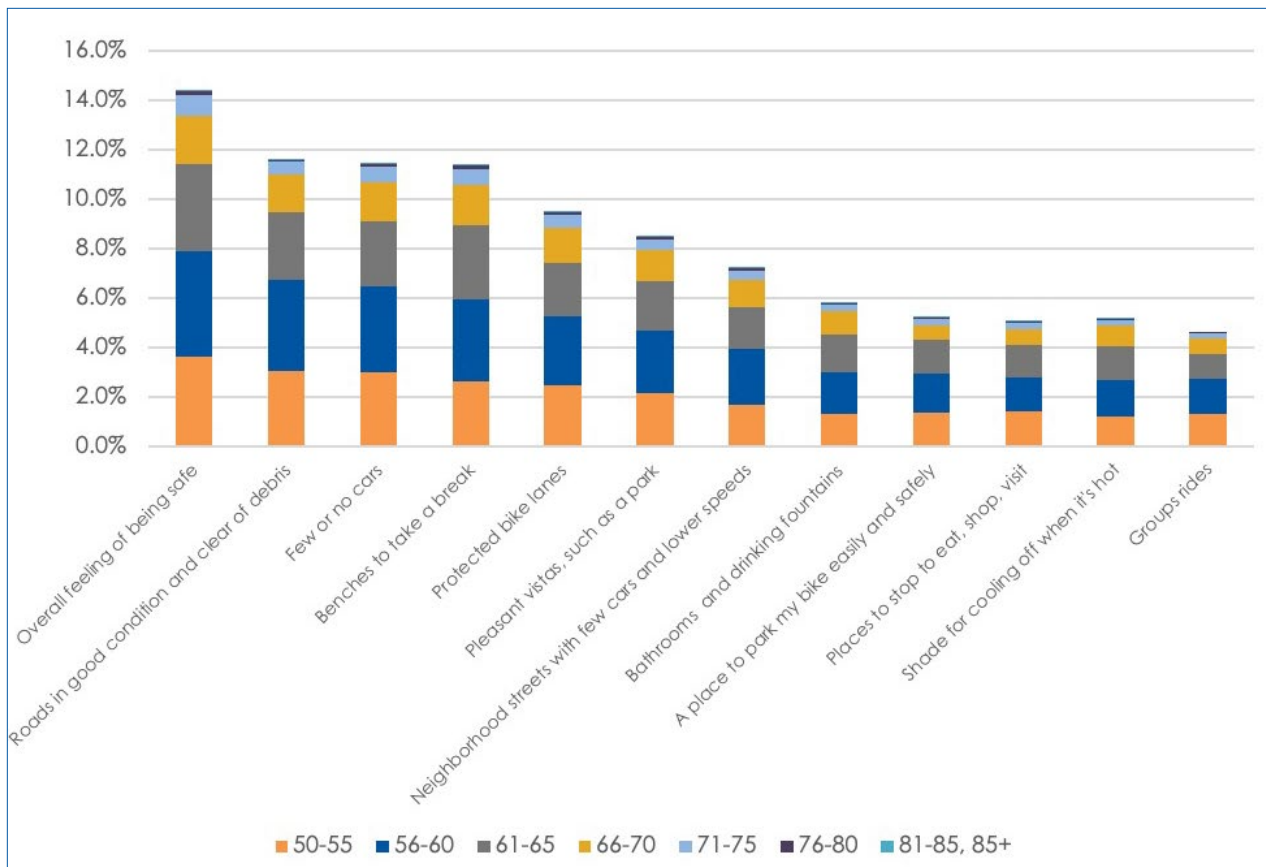


Figure 25. What Affects Where You Ride? Age Group, N=10,959 (multiple answers allowed)



Figure 26. Older Cyclists Value Things such as Benches, Pleasant Vistas, and Someone to Ride with

AGE AND CYCLING HABITS

The amount of cycling typically changes at different times in a person's life. While a portion of respondents intend to continue cycling as long as possible, some anticipate a time when they would stop cycling. Top reasons for discontinuing cycling, regardless of gender or age group, are a physical condition or a move to a place with no safe places to ride. Many older cyclists responded that they could not envision a time or circumstances that they would stop riding – in fact, this response was the third highest for all ages, especially among men. See Figures 27. The ranking of these reasons were similar by age group, as shown in Figure 28.

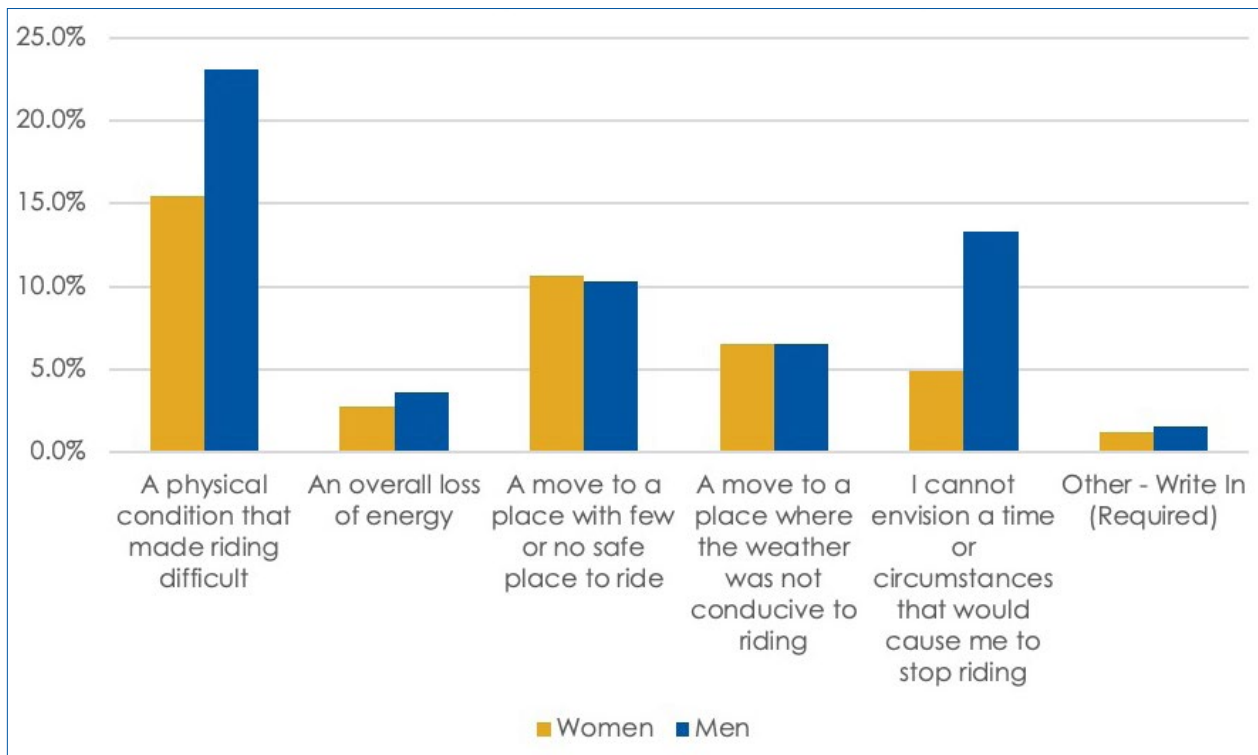


Figure 27. Reasons Would Stop Cycling, Women, Men, N=3857 (multiple answers allowed)

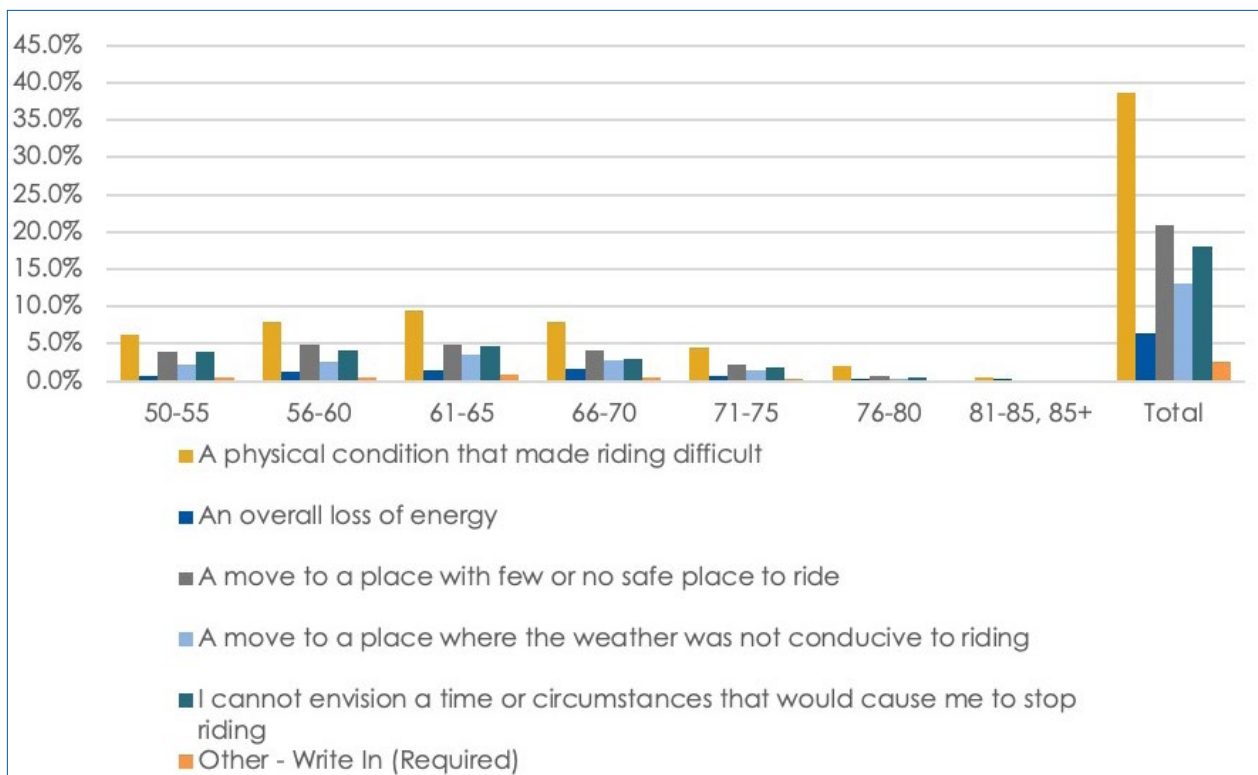


Figure 28. Reasons I Would Stop Cycling, Age Group, Total N=3380 (multiple answers allowed)

Take-away. Older adults’ desire to continue riding means that planners and designers need to include this demographic in network planning, design, and maintenance. Planning for older adult communities should also be design to support cycling both within and with connections to the adjacent bicycle network. The worldwide COVID-19 pandemic has increased cycling rates in many countries and cities, which may continue as the pandemic fades. Some U.S. cities are taking the advice of Paris’s mayor who in a piece published by The Economist speaks to trusting Parisians for telling their government what they want: *We trusted Parisians by opening new cycle lanes, and with their bikes they are bringing this transformation to life.*⁷



Figure 29. Parisian Cyclists During COVID-19 Restrictions

Source: <https://www.bbc.com/news/world-europe-52483684>

⁷ “The City of fight,” The World in 2021, The Economist, pg. 94.

EBIKES AND TRIKES

eBikes

eBikes have grown in popularity for people of all ages. AARP encourages older adults to remain physically active, including cycling. A 2018 AARP article by Jay Walljasper begins with this assessment: *By providing a boost to get up hills or give older bones and weary muscles a bit of a break, electric-assist bicycles make cycling a practical option for getting around.*⁸

The 50+ Cycling Survey showed an eBike ownership rate of 8.2%, with the greatest ownership rate among those 76 and older. See Figure 30. Slightly more men than women own an eBike. See Figure 31.

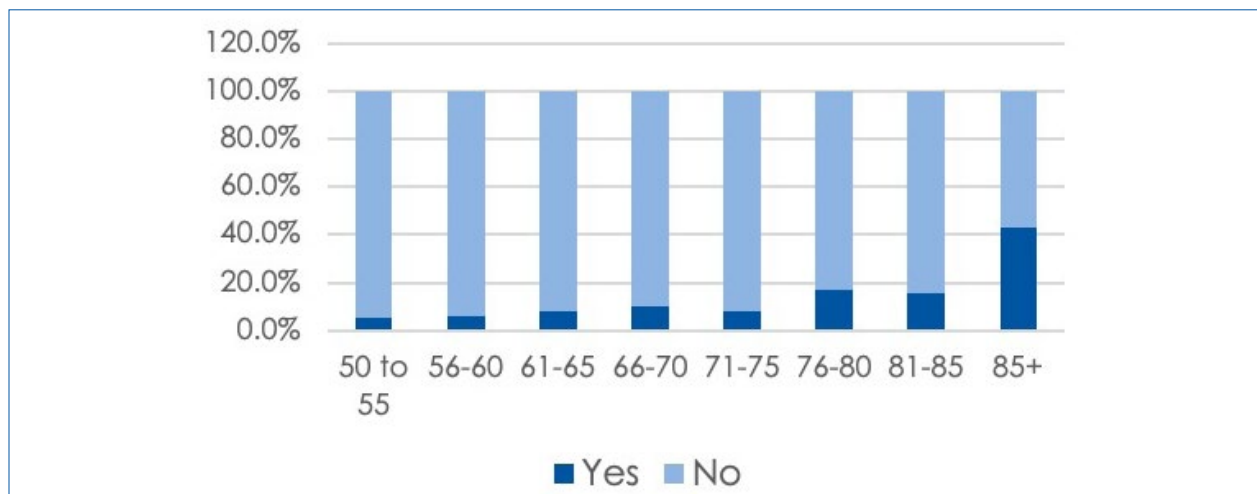


Figure 30. Do You Own an eBike? by Age Group

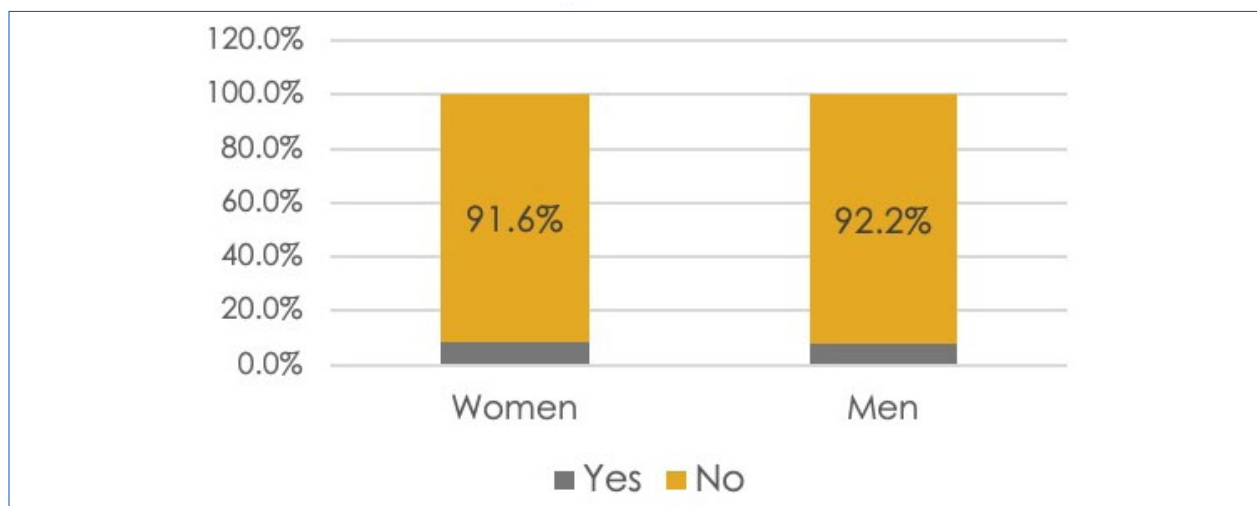


Figure 31. Do You Own an eBike? by Gender

⁸ <https://www.aarp.org/livable-communities/getting-around/info-2018/e-bikes-energize-bicycling.html>

Regardless of gender or age group, survey respondents reported “to make it easier to ride up hills” as the most popular reason for purchasing an eBike. The next two most common reasons were to satisfy their curiosity about eBikes, to make it more comfortable to ride in hot weather, and to ride farther. See Figure 32.

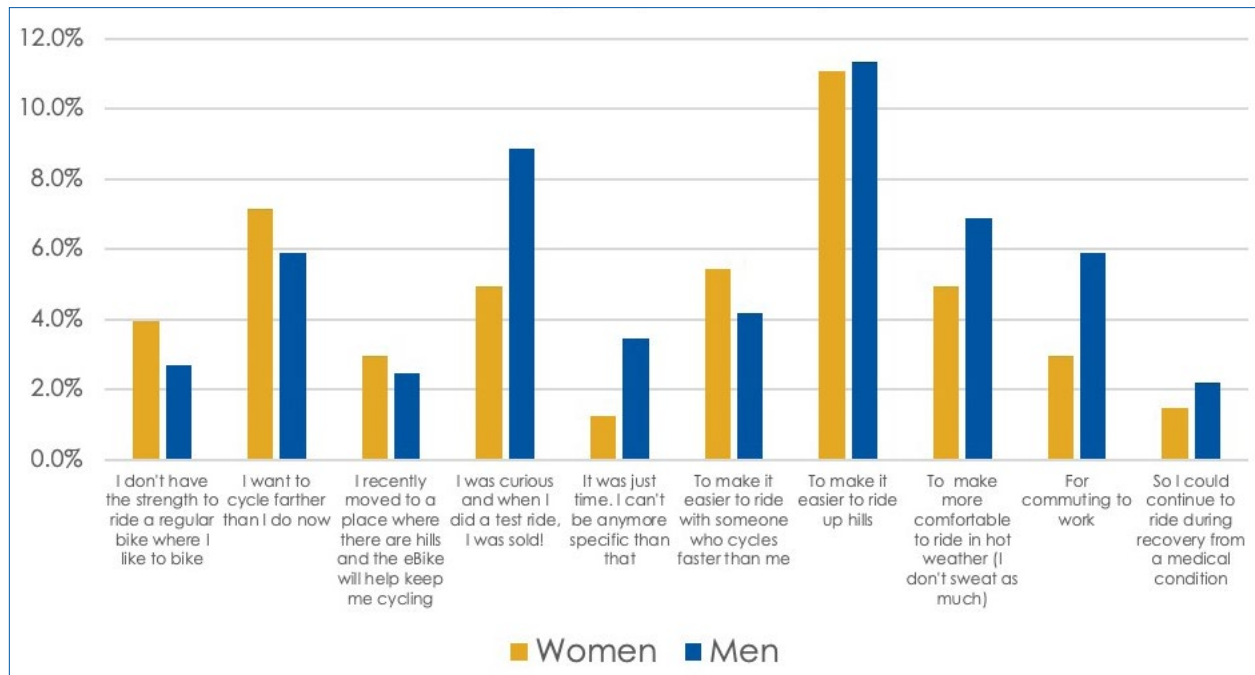


Figure 32. What Motivated You to Buy an eBike? Women, Men, Total, N=406 (multiple answers)

Figure 33 shows reasons for owning an eBike by age group. Hill-riding was especially important for the 61-65 age group, as was a desire to cycle farther and to ride with stronger fellow cyclists for those over 70.

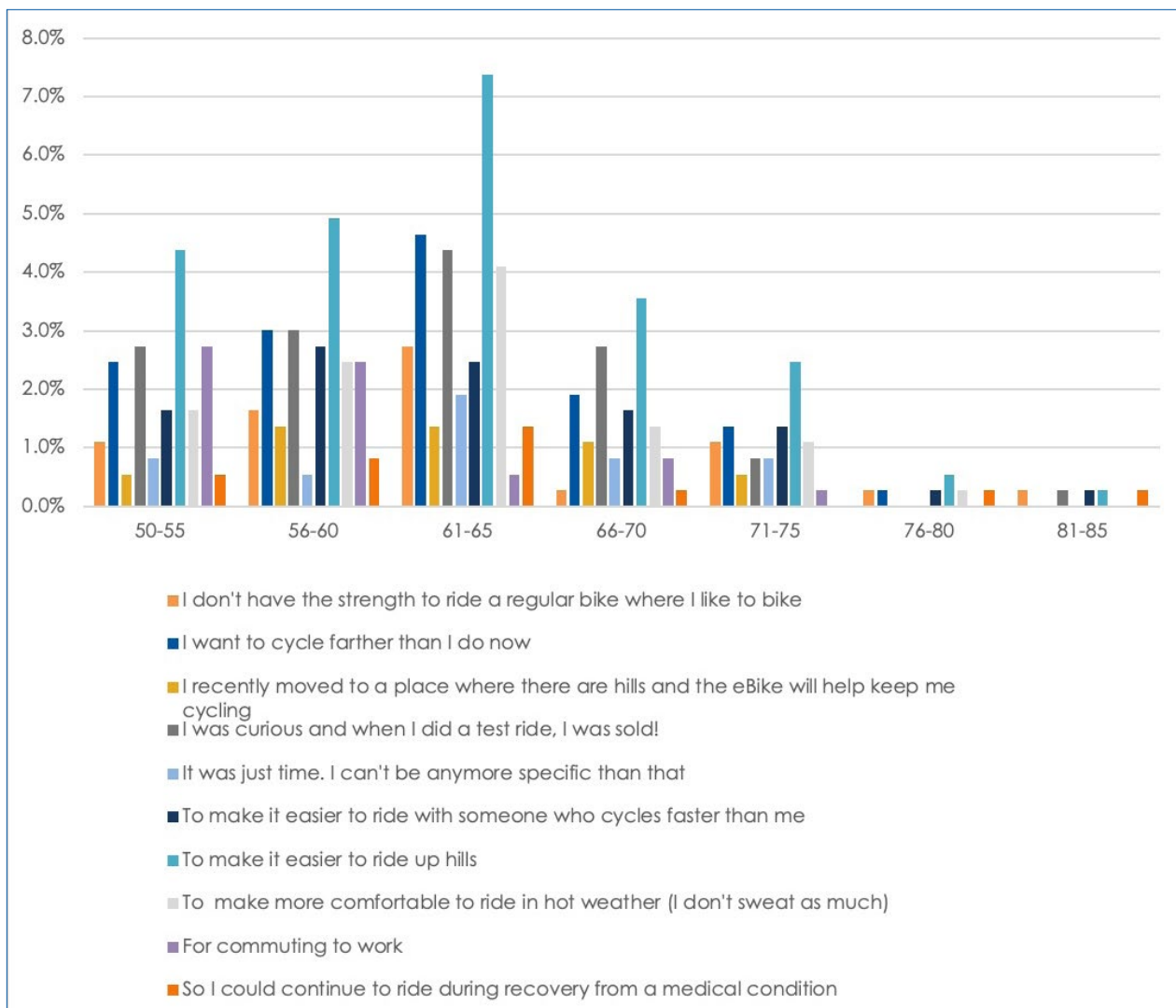


Figure 33. What Motivated You to Buy an eBike? Age Group, N=366 (multiple answers)

The majority of those who do not own an eBike either do not anticipate purchasing one or will do so when they experience a physical limitation to riding a regular pedal bicycle. See Figure 34. While questions that ask what someone will do in the future are hypothetical, answers to this question convey the strength of conviction to remaining an able cyclist. The sense is that purchasing an eBike denotes an unwelcome change in physical ability.

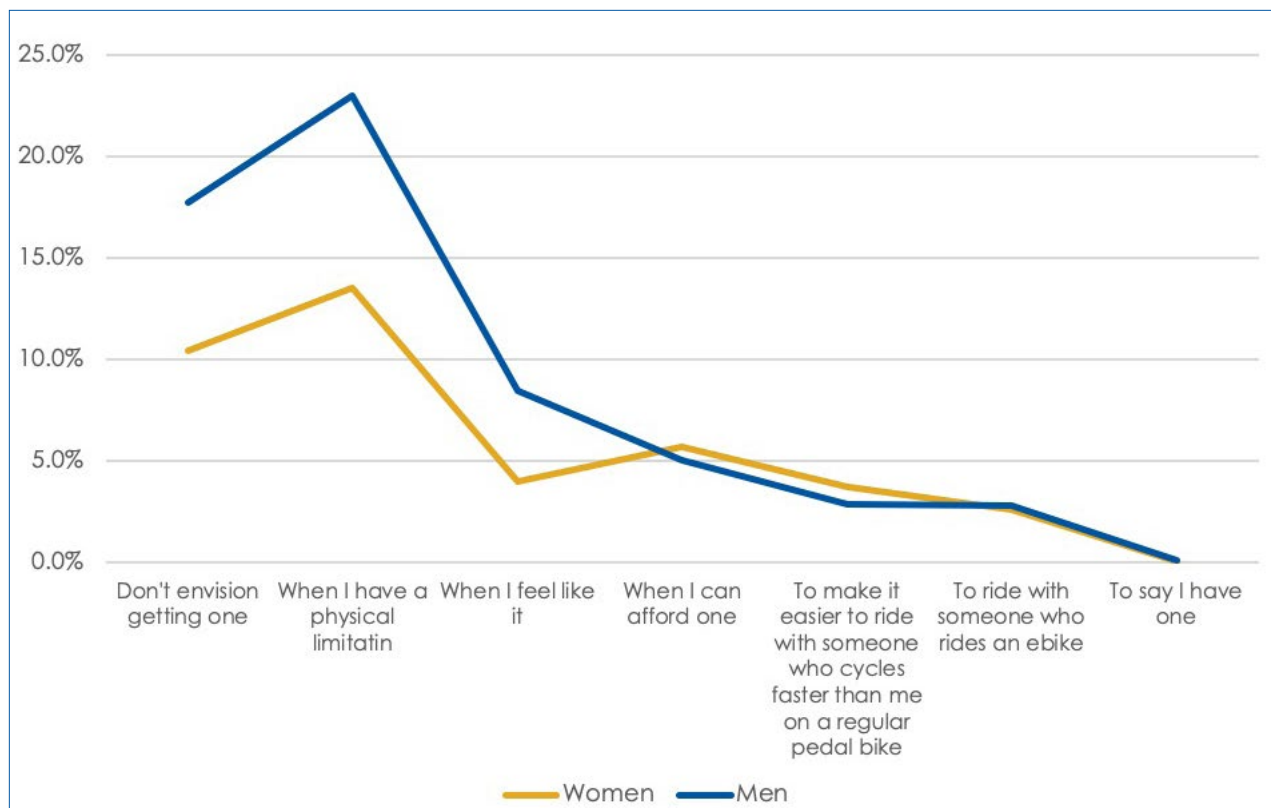


Figure 34. Expected Reason for Future eBike Purchase, Women, Men, N=2620 (multiple answers)

Figure 35 shows how answers differ somewhat by age group, with the reason, “When I have a physical limitation” as the most common response for all but those 76 and older. This age group was also uninterested in getting an eBike just to have one. Instead, ease of riding and ability to ride with others were highly rated reasons.

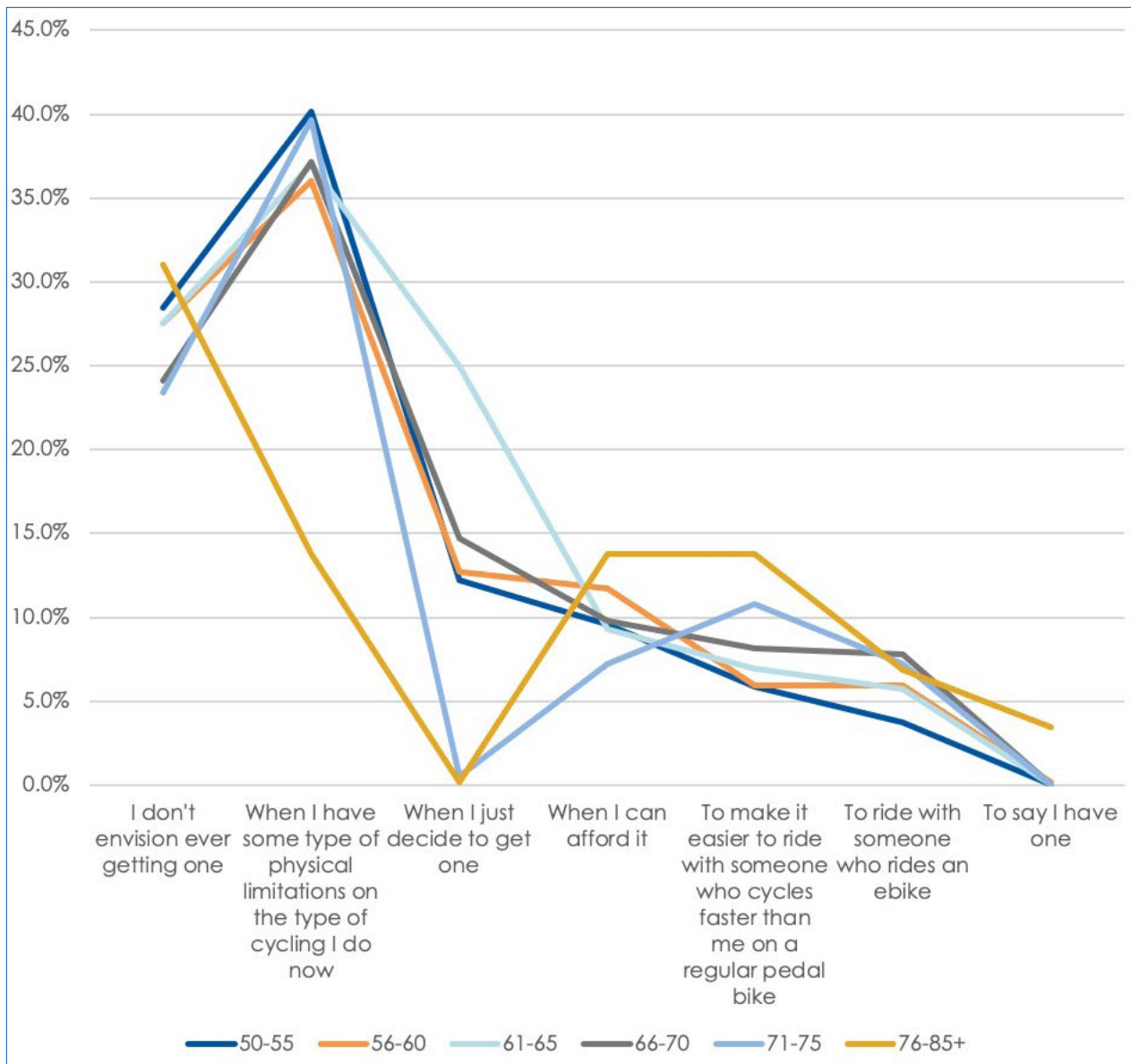


Figure 35. Expected Reason for Future eBike Purchase, Responses within Each Age Group (multiple answers)

Take-away. Ebikes will continue to grow in popularity, especially as more models are introduced in the market. It is likely that some older cyclists will resist purchasing one until they feel it is necessary, such as the desire to keep cycling. When advising older adults on what bicycle to purchase, it is more useful to discuss the full range of options, such as number of wheels, sitting position, and propelling choices, rather than to immediately recommend an eBike. For example, the analysis of [Falls](#) in this Databook includes respondent-provided information on balance issues, which is important to consider when selecting a bicycle.

Trikes

Far fewer respondents own a trike – just 2.7%. More men than women own them. The majority are recumbent trikes; few are e-assist. Reasons for purchasing a trike range from wanting more stability and ease of getting on and off the bike. Figure 36 shows anticipated reasons for a future trike purchase, including when respondents have a physical limitation or health issue. Some will get one when they can afford it.

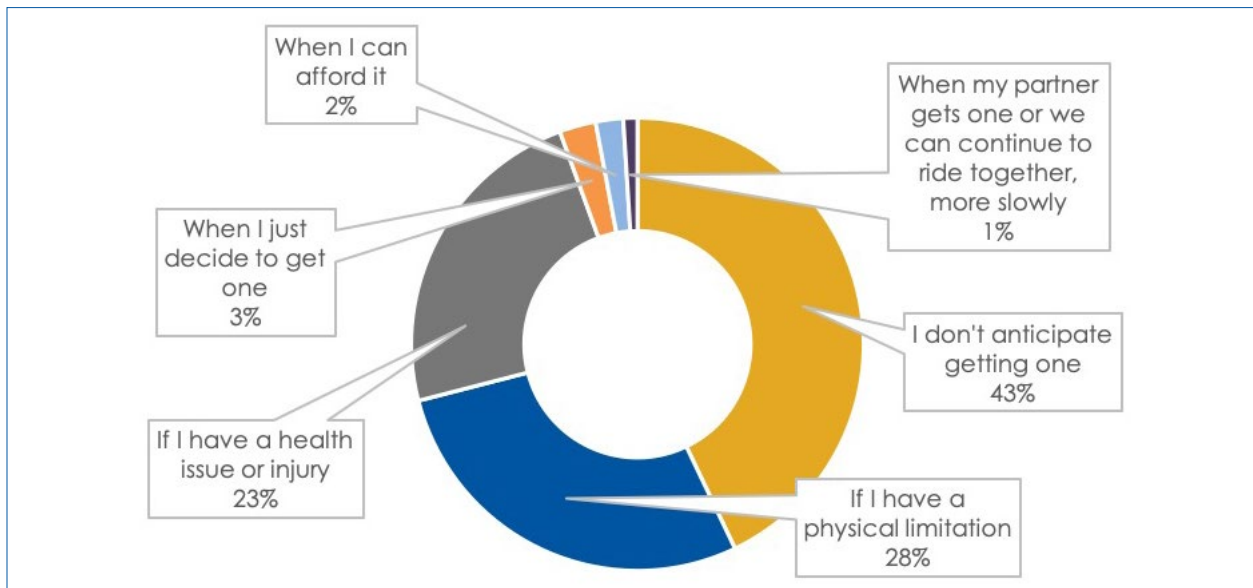


Figure 36. Anticipated Reason to Purchase a Trike N=2692 (multiple answers)

Affordability affects an older cyclist's ability to purchase both an eBike (10.7%) or trike (2%). While this Databook does not cross-reference these affordability answers with household income, affordability does affect the type of bicycle people own. A bicycle that does not fit the rider or a rider's type of cycling may reduce the amount of riding if a proper fitting bicycle is not affordable.



Figure 37. Standard Adult Trike with Basket (left); Recumbent Trike with Two Front Wheels (right)

An older cyclist's **desired cycling experience** can change as they age. For example, 12 responses conveyed the sentiment, "I'm not in a hurry and having this bike helps me be more leisurely." Conversely, some cyclists may ride with others to help maintain their cycling fitness. One group of 70+ cyclists asked how they compared with others taking the survey. As shown in the text box below, the answer is keeping them cycling and talking.

*I have looked at your website and participated in your survey. I am a **70-year-old male and a fairly active cyclist (~4500 miles /year)**. I ride with a group of men **all about the same age** and we constantly debate a question that I hope you can help us with: **Among 70-year-old men and older, who own a road bike and primarily do road cycling, what would be the average mileage for 1-year and the average speed?***

Based on data provided from respondents in early 2020 (speed and type of two-wheel normal pedal bike information in NOT part of the survey), these cyclists concluded,

*In general, I think it appears that at our age and riding > 40 miles/week (2080 miles/year) puts us **in the top 10% of cyclist distance** regardless of "purpose of activity i.e., social, exercise, or competitive."*

*You should know **the 4 of us argue about this frequently which is excellent fodder/discussion for our longer rides and a source of great amusement.***

VISUAL PREFERENCE SURVEY

This portion of the 50+ Cycling Survey asked respondents to identify which bicycling facilities and conditions they would feel comfortable using. Photos of a variety of facilities and conditions were divided into two groups: Along the Roadway and Across the Roadway. Respondents clicked on photos of facilities they would use based on the conditions shown. See Figure 38.

This report shows the results of the Visual Preference Survey from high to low preference. The Visual Preference Survey was optional, with about 75% of respondents completing it. This portion of the survey provides direct cyclist information for specific conditions, similarly to portions of the Online Journal that some respondents completed.⁹

⁹ An analysis of the Online Journals will be available in early Spring 2021.



Figure 38. Image of Visual Preference Survey from 50+ Cycling Survey

Some facilities that are generally considered desirable for all types of cyclists were not selected as 'would feel comfortable using.' Image bias may have affected respondents' reactions to the photos. For example, as shown in Figure 39, only 69% of respondents said they would feel comfortable using a sidepath next to a major arterial. The 50MPH speed limit sign may have affected this rate, as it could convey undesirable conditions such as a high noise level and stress from traveling close to fast-moving vehicles. Conversely, only 44% of respondents would use a road in a rural setting with no visible traffic and a posted speed limit of 30MPH.



Figure 39. Along the Roadway Example Photos from Visual Preference Survey

Similarly, photos of roundabouts shown in Figure 40 received different reactions, perhaps because of the different context or perspective of each. The image of the left is an aerial of the entire roundabout, while the image on the right provides a user-level view of one piece of the roundabout. Respondents may have interpreted these two Across the Roadway examples as different facilities, even though they both were roundabouts with a bus and vehicle in each image.

The visual preference survey will be revised for the 2021 survey, including different photos and a way to determine why respondents would or would not use the facility. One respondent asked that the survey include cycling conditions more familiar to him, such as the neighborhood street shown in the photograph to the right that he provided.



Figure 40. Across the Roadway Example Photos from Visual Preference Survey

See [Appendix C](#) for the full Visual Preference Survey results.



Figure 41. Photo Provided by Survey Respondents of Neighborhood Street to Include in Next Visual Preference Survey

III. SAFETY: NEAR MISSES AND FALLS

The survey includes questions about Near Misses and Falls. The questions are intended to show any changes in cycling agility and balance as people age, as well as how adequately facilities can accommodate more users and those of different modes. The analysis shows respondents by gender, by age by gender, and with whom the near misses occurred. The table below provides a hyperlinked sub-table of contents for the analysis of these two questions.

Near Misses	Falls	Fall Comparisons with Other Questions
Near Misses by Mode, Gender, and Age Group	Typical Falling Incidents	Fall Rates and Type of Cyclist
Are Fewer Near Misses Possible?	Unpacking Fall Descriptions	Fall Rates and Frequency of Cycling
Can Education and Outreach Help?	Results and Typical Combination of Factors	Fall Rates for Cyclists with eBikes
Can Planning and Engineering Help?	Noticeable Differences between Genders	Are Fewer Falls Possible?
	Noticeable Differences by Age	
	Sampling of Fall Descriptions	

NEAR MISSES

Just over 62% of those responding to the survey reported at least one near miss with another cyclist, scooter, walker, jogger, or motorist. This section parses response data based on gender, age group, and mode. Speculative narrative attempts to understand the responses provided and identify potential mitigations.¹⁰

The top two modes were motorists at 50% and other cyclists at 21%. See Figure 42. The survey did not ask for details on the near miss.¹¹ Near misses with scooters were the lowest reported, perhaps due to an increasing understanding between cyclists and scooterists about each other, i.e. they are cross-over modes traveling at comparable speed.

¹⁰ NOTE: Some of the falls reported cite a near miss as causing the fall. Because of the connection between the two, these two questions for the 2021 survey will be combined.

¹¹ Because some of this information was provided in descriptions of falls, these two questions will be consolidated for the 2021 survey.

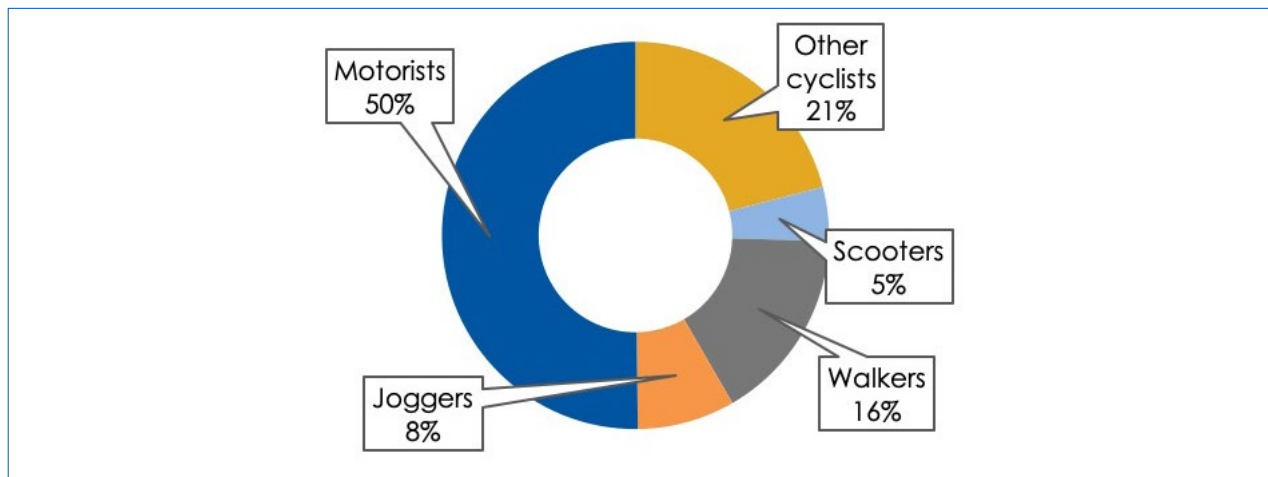


Figure 42. Near Miss Rates by Mode

Both genders and all age groups reported near misses in rates similar to the overall survey response rates. In other words, a particular age group or gender was not more or less likely to report a near miss. See Figures 43 and 44 to compare response rates.

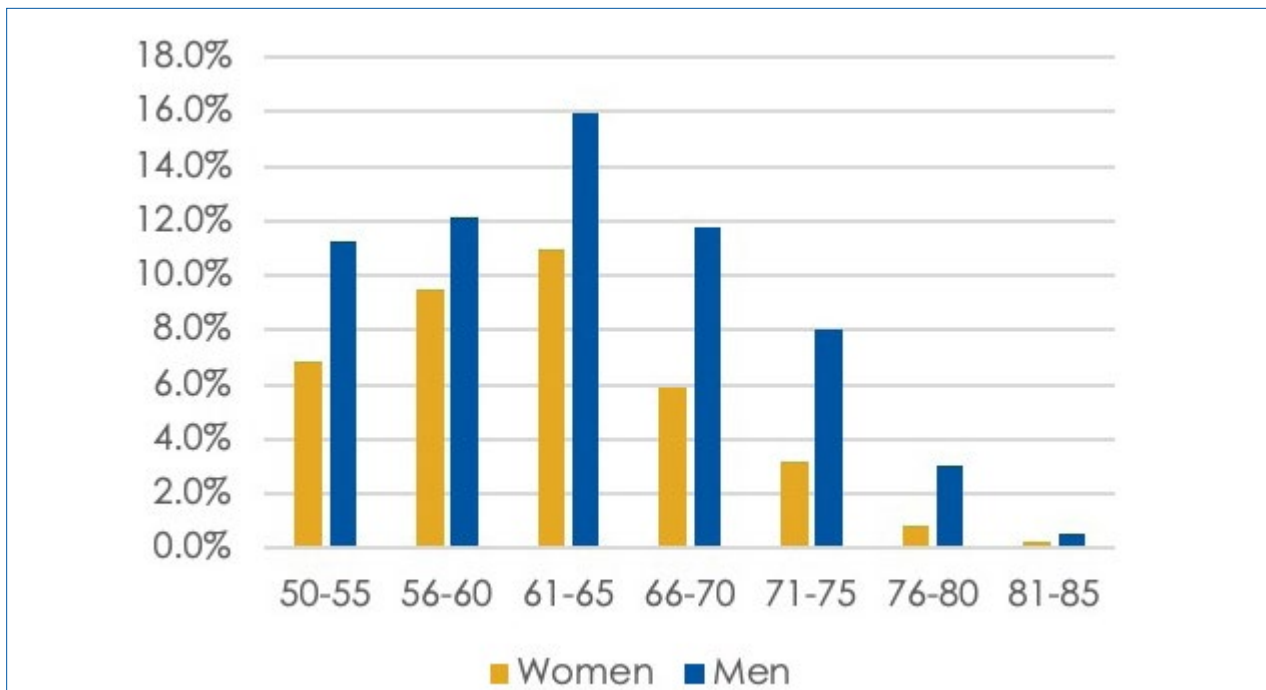


Figure 43. Reported Near Misses, Gender and Age, N=2280

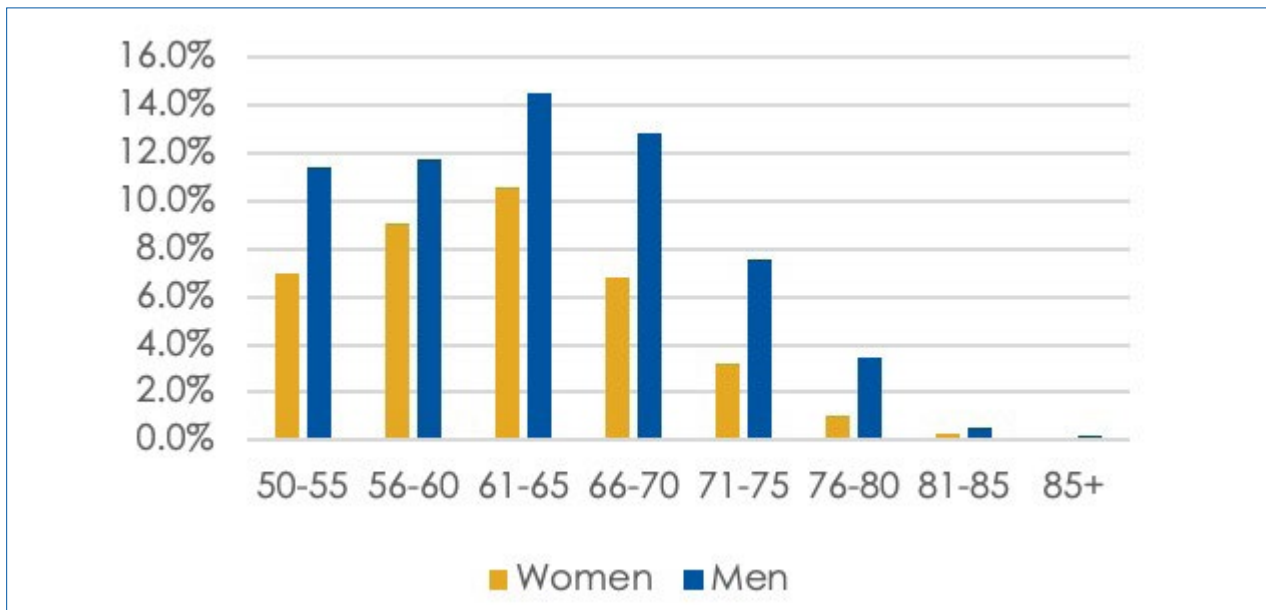


Figure 44. Survey Responses, All Questions, Gender and Age N=2297

However, there are differences among age groups with respect to the near miss mode, as shown in Figure 45. The rate of near misses with motorists decreases with age, while the rate of near misses with other cyclists increases noticeably beginning with the 76-80 age group. Near miss rates with joggers and scooters was relatively level for all age groups. The low rate of near misses with scooters may be a result of the presence of fewer scooters and may increase in subsequent surveys as scooter use increases.

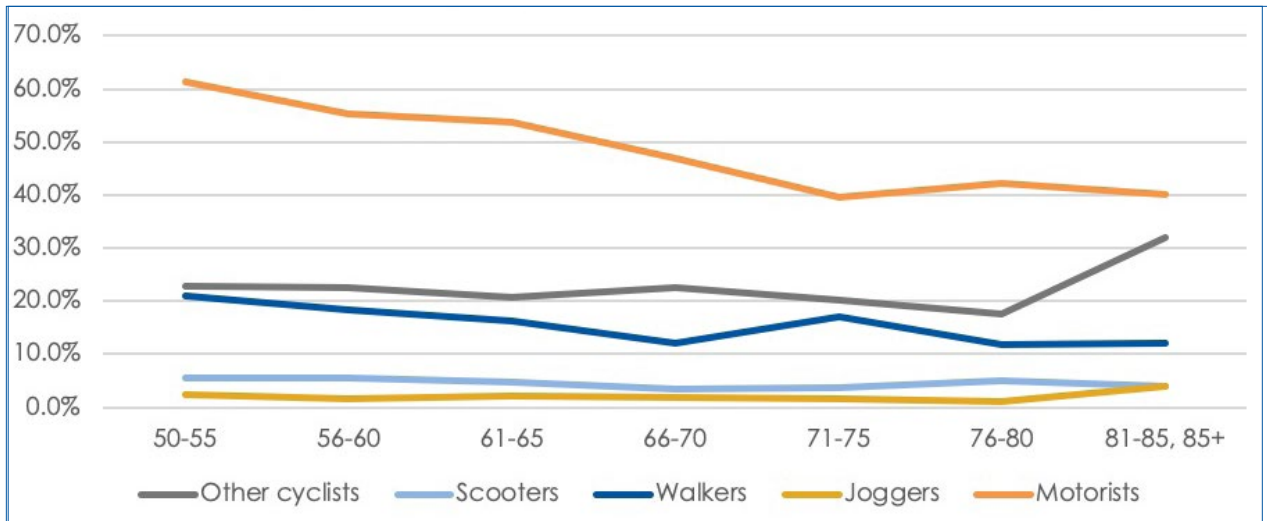
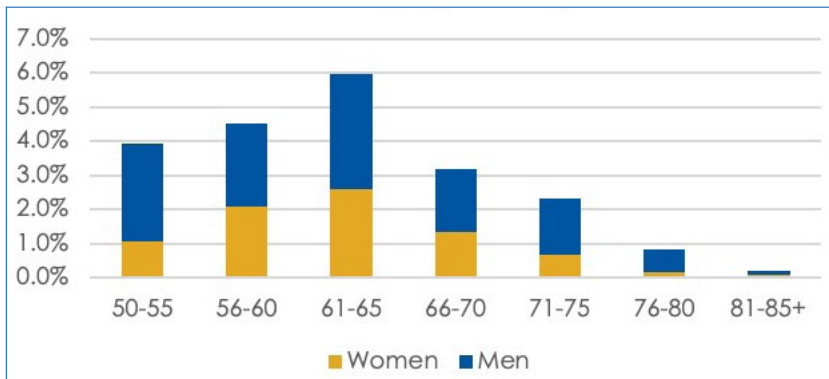


Figure 45. Near Miss Rates by Mode and Age (total responses by age compared to number near misses)

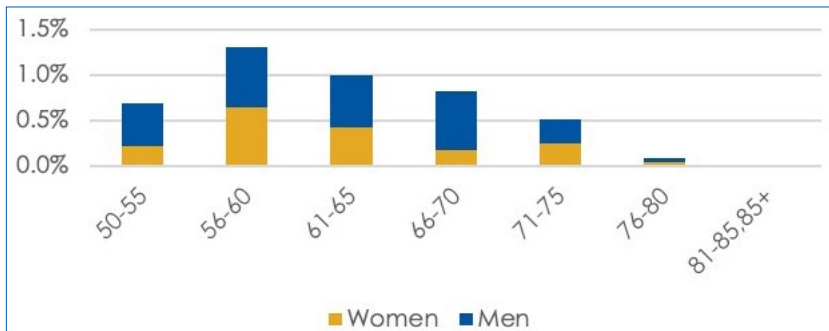
Near Misses by Mode, Gender, and Age Group

Individual charts of near misses by mode, age and gender shown below, Figures 46 through 50.



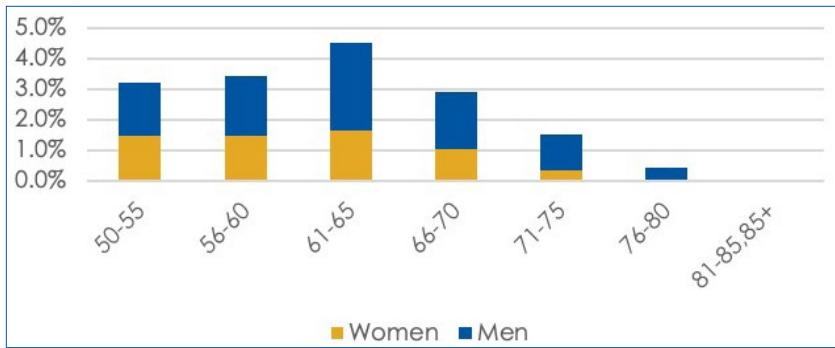
Other Cyclists
27%

Figure 46. Near Misses with Other Cyclists, Gender, Age Group



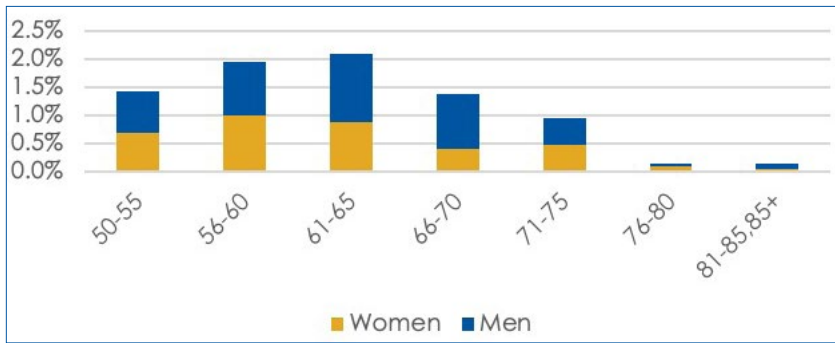
Scooters
4.8%

Figure 47. Near Misses with Scooters, Gender, Age Group



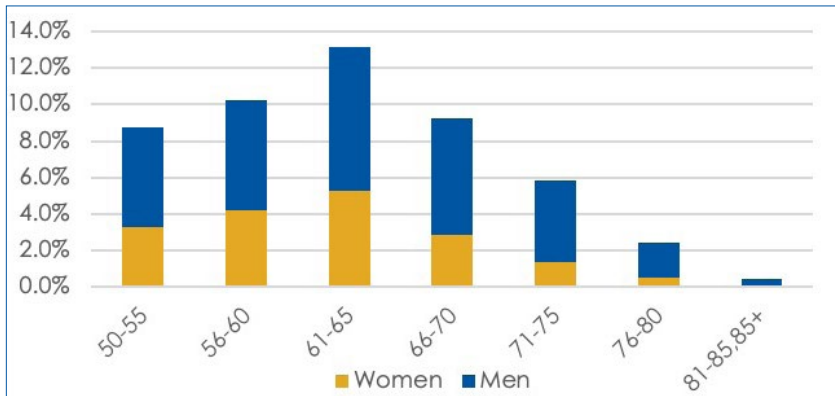
Walkers
16.2%

Figure 48. Near Misses with Walkers, Gender, Age Group



Joggers
8.2%

Figure 49. Near Misses with Joggers, Gender, Age Group



Motorists
50.2%

Figure 50. Near Misses with Motorists, Gender, Age Group

Question to Consider: Are Fewer Near Misses Possible?

Determining why near misses occur can help identify mitigations. This section speculates about potential ways to reduce near misses through education and outreach, and with planning and design strategies. It is presented here to invite others to provide their experience on effective strategies.

Some initial observations from the 50+ Cycling Survey are:

- While most near misses do not appear to make many older adults reluctant to cycle, the frequency of those with motorists may.
- The general increase in cycling, with more eBikes and eScooters sharing space designed for cyclists can create stress and uncertainty for older cyclists. See the text box labeled Figure 51 for information on a conversation on this topic convened by the [Safe Routes Partnership](#).

Question to Consider: Can Education and Outreach Help?

Providing information about multi-modal transportation systems and how people can travel successfully within them may reduce some near misses. This strategy requires people to adopt strong habits of situational awareness, i.e., be aware of others traveling where they are, and a desire or willingness of people to change their behavior. It relies on effective communication and opportunities for discussion, along with established safety campaigns. For example, hosting community conversations among people with varying primary travel modes is one tactic. Others include ad campaigns showing people of all ages and abilities walking, bicycling, scootering, etc.; and education and skill-building programs such as the one Cambridge, MA is developing (see Appendix B).

In the winter 2020, the Safe Routes Partnership brought together diverse stakeholders to better understand the potential opportunities and challenges facing older adults due to the advent of shared eScooters. The group explored how scooters affect walking, cycling, physical activity, and other public health goals, including safe, convenient mobility for people of all ages, and began to identify potential policy needs and implications. The effort is related to larger policy agendas through collaborations such as with the American Heart Association and Robert Wood Johnson Foundations' Voices for Health Kids initiative.

The group's work was paused due to the pandemic, but a final set of findings and recommendations will be issued in 2021. The discussion included several items with respect to the impact of eScooters on older adults and their mobility needs:

- It is not clear to what extent older adults want to ride eScooters, but in some cities, there is organized opposition to them with participation by older adults.
- There are a variety of devices entering the eScooter market, including those with seats and larger devices that provide more stability, which may be attractive to some older adults
- While cycling or walking, older adults may experience a 'startle effect' when someone on an eScooter passes them, causing some instability for older adults.
- Among people with disabilities, the sidewalk clutter increased by eScooter use presents barriers to access curb ramps and present tripping hazards for people with vision impairment.
- Increased education and outreach would benefit eScooters users and those who travel with them within cycling facilities.

Figure 51. How Do eScooters Affect Older Adults?

Question to Consider: Can Planning and Engineering Help?

Just over half the near misses were with motorists. While the survey did not ask for details of the near miss, based on comments in open-ended question, we can conclude that the near miss occurred while cyclists were riding in the roadway in either an unbuffered bike lane or in the regular travel lane, through in an intersection, or entering the roadway.

The second and third most frequently occurring near misses were with other cyclists and walkers. One effective solution is to create separate space for cyclists and walkers or joggers, like portions of the Burke Gillman Trail in Seattle, WA, or guidance to walkers provided on the lead-up to the Big Dam Bridge in Little Rock, AR. See Figure 52.



Figure 52. Examples of Separate Pathways for Cyclists and Pedestrians

Source: <https://place.la/project/burke-gilman/> (left image)

FALLS

The survey asked respondents if they had fallen or nearly fallen in the past year. Those that had, were asked to describe the circumstances about the fall. The questions are intended to show changes in cycling agility and balance as people age, as well as built environment conditions that may contribute to falls.

As Figure 53 shows, just under 29% of respondents reported a fall. These 641 falls are comprised of 193 women and 448 men.¹² When looking at all survey respondents by gender, the fall rate for men was 32.4%, compared to the rate for women of 23.0%. This nearly 10% difference may be explained by women having better risk-adverse attitudes and behavior, especially with respect to route and facility choice.¹³

¹² Some falls occurred when mountain biking, which respondents noted in the description of the fall. The 2021 survey will be clearer about its focus on road and trail (Shared Use Path) riding, rather than mountain biking.

¹³ <https://nacto.org/wp-content/uploads/2012/02/Dill-and-Gliebe-2008.pdf>, page 52.

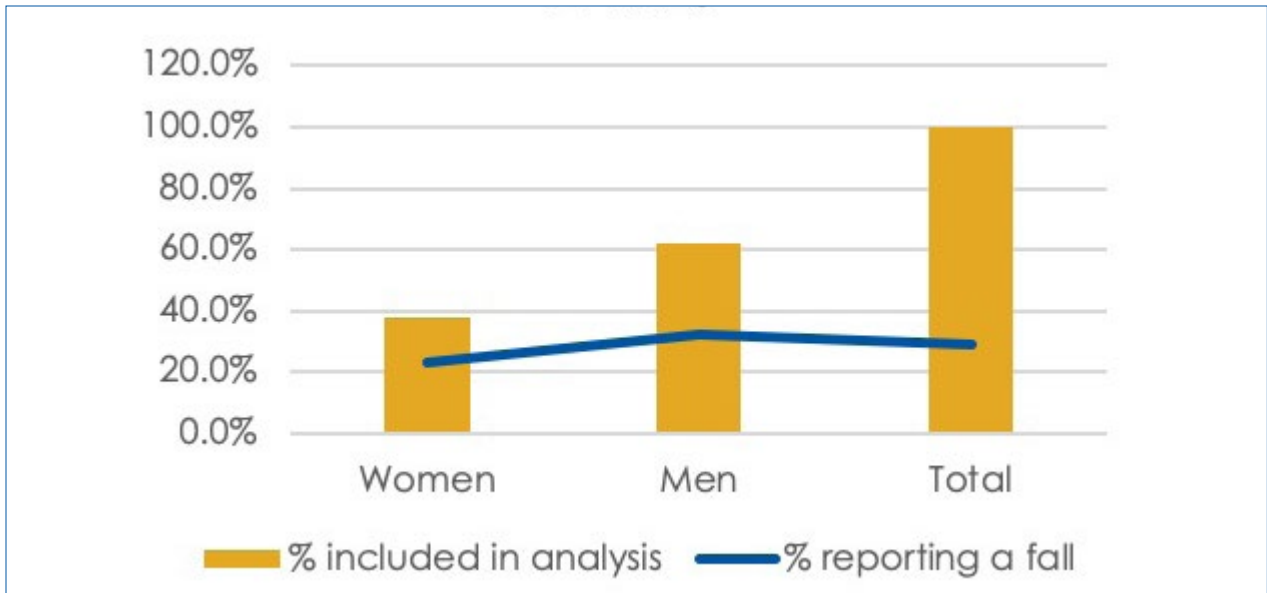


Figure 53. Percent Reporting Fall, Gender, N=2223

When looking at fall rates for women and men compared to all survey respondents, rates peak at age group 56 to 60, with overall higher rates for men. See Figure 54. However, a different pattern emerges when looking at those who fell by gender within each age group. Fall rates are greater for women than men in age groups 50 to 65. This trend reverses at age 66, with greater fall rates for men. See Figure 55.

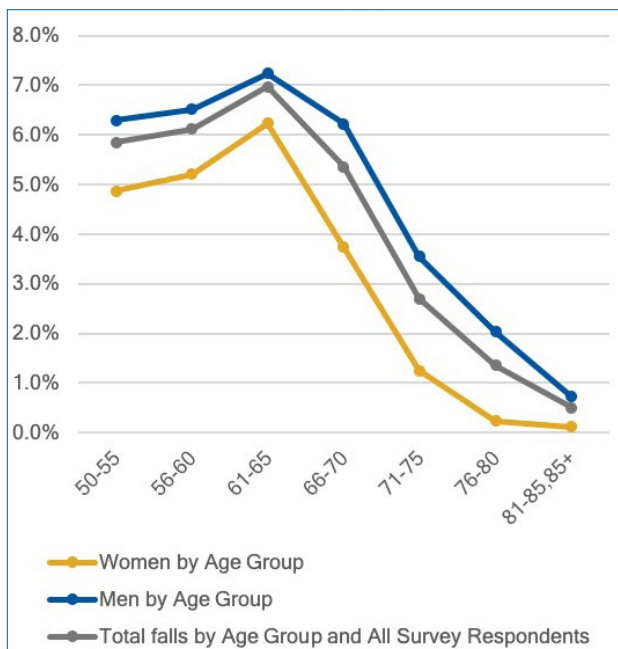


Figure 54. Percent Reporting Fall, by Total, Gender and Age Group; by Age Group and Total Survey Responses

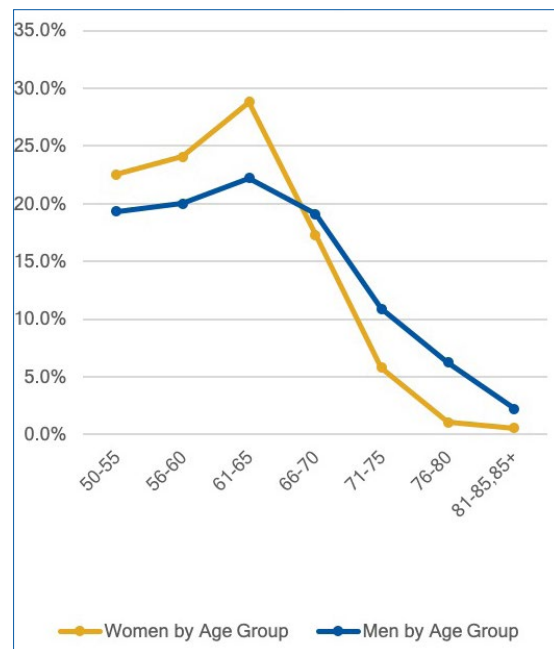


Figure 55. Percent Reporting Fall, by Gender and Age Group

Typical Falling Incidents

Totals of riders above include those riding on paved and unpaved surfaces, including mountain biking. Because the 50+ Cycling Survey in 2020 was not intended to include mountain biking, the description of falls included here does not include mountain biking.¹⁴ As a result, 433 people are included in this analysis. This represents those who provided both their gender and age group, and who provided a description of a non-mountain-biking fall.¹⁵

Unpacking Fall Descriptions

Each fall description by gender and age was reviewed to identify common factors – 27 factors in all – further organized into six groups, as shown in Table 1. The groups are intended to help identify potential ways to reduce falls, such as through infrastructure design or maintenance changes, education, and outreach, etc. The results were sorted in various ways, including by totals, age, and age and gender. See the Appendix D for charts of falls by gender, age, and factor.

The last section of the report on falls compares fall rates to three other questions: Type of Cyclist, Frequency of Cycling, eBike Ownership.

¹⁴ Many who described a fall while mountain biking stated that it came with mountain biking, i.e., they expect to fall. One cyclist said, “Regarding mountain biking: I mountain bike and sometimes falls happen. I still love it. I don’t fall much anymore.”

¹⁵ A couple of notes. First, only 3 respondents indicated ‘other’ as gender, so they were not included in these calculations. Second, responses were a mix of a few words to several sentences, hence some descriptions only have one factor noted, while others have 2 or 3.

Table 1. Grouping of Factors Drawn from Fall Descriptions

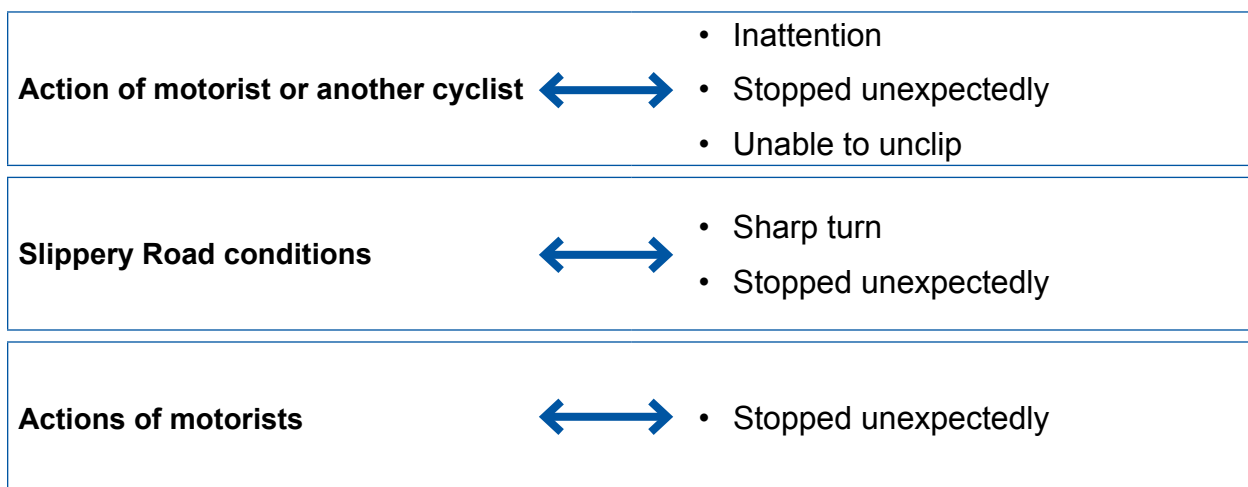
Group <i>Rationale</i>	Factors
Weather <i>On-going weather conditions while riding, rather than residual impacts of weather</i>	<ul style="list-style-type: none"> • Rain • Wind
Surface condition & Construction <i>Residual impacts of weather and other existing conditions which could suggest maintenance needs; construction logistics that impacted riding.</i>	<ul style="list-style-type: none"> • Ice, mud, wet surface • Gravel or sand on surface or pathway • Slippery bridge surface • Potholes • Cracks in pavement, between surfaces, transitions • Uneven surface • Obstacles, debris, etc., on pavement or pathway • Construction-related
Operator error <i>Actions by cyclists that contributed to the fall</i>	<ul style="list-style-type: none"> • Stopped unexpectedly • Going too fast • Sharp turn • Trouble with hills – up or down • Inattention, poor bike handling, poor decision while riding • I don't know or remember
Actions of others <i>Actions by other traveling on the same pathway, driveway, intersection, etc., that contributed to the fall.</i>	<ul style="list-style-type: none"> • Action of pedestrian/s, including kids and dogs • Action of another cyclist • Action of motorists • Dooring
Bike issues <i>Poorly fitting bicycles or a mechanical issue caused or contributing to falls. In many cases, cyclists could not unclip to avoid a crash due to another precipitating factor.</i>	<ul style="list-style-type: none"> • Factor X (unusual circumstance that did not fit into another group) • Could not unclip • Mechanical issue such as chain, flat, other • Poor bike fit; learning new bike
Issues related to skill or age <i>This group of factors are most directly related to age.</i>	<ul style="list-style-type: none"> • Balance issue; fall at slow speed, getting on or off bike • Health issue; physical strength • Effects of aging

Results and Typical Combination of Factors

Of the 27 factors, the following four were noted at least 10% of the time as contributing to the fall:

- Actions of motorists – 12%
- Slippery surface conditions due to ice, mud, or water – 11%
- Cyclist couldn't unclip – 11%
- Cyclist inattention, including poor decisions – 10%

Responses often included a sequence of factors, such as those shown below. The first one shows how the actions of a motorists or another cyclist results in a fall when the older cyclist is a bit inattentive, needs to stop unexpectedly, and unable to unclip.



Noticeable Difference between Genders

There are several noticeable differences between women and men with respect to factors attributable to falls. Some studies show that aging does not necessarily affect the postural balance of women between 65 and 74;¹⁶ and that women are more likely than men to retain postural balance as they age.¹⁷ However, survey responses indicate a difference, as shown in Table 2. Women had higher rates of falls due to stopping unexpectedly, inattention or poor decisions, the actions of other riders, and various balance issues. Only falls for men due to the actions of motorists were higher. This is surprising, given a recent study showing motorists to be more likely to encroach on cycling space for women than men.¹⁸

¹⁶<https://www.sciencedirect.com/science/article/pii/S1873959812001548>

¹⁷<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5955023/>

¹⁸<https://genderpolicyreport.umn.edu/bicycles-gender-and-risk/>

Table 2. Differences in Fall Factors between Women and Men

Factor	Women	Men
Stopped unexpectedly	8.2% ↑	5.8%
Inattention, poor decision	13.5% ↑	8.0%
Actions of other riders	9.4% ↑	8.0%
Actions of motorists	10.5%	12.4% ↑
Balance issues (various)	9.9% ↑	4.4%

Noticeable Differences by Age

Table 3 shows a noticeable age-related difference for the ‘unable to unclip’ factor. Those under 70 reported higher rates, which may mean that cyclists stop using pedal clips as they age.

Table 3. Unable to Unclip Factor by Age Group

Factor	Highest Age Group/s	Lowest Age Group/s
Unable to unclip	56 - 60	76 through 85+
	66 - 70	Begins to decline at 71-75

Sampling of Fall Descriptions

Falling was a source of embarrassment for many riders. These riders included a brief description of what happened, then concluded by say, ‘embarrassed,’ ‘felt stupid,’ and ‘totally my fault,’ etc. In addition, several noted they had ‘no idea’ of what happened or simply could not remember. Table 4 provides a sampling of description organized by the factor group. Where it makes sense a potential take-away is provided.

Table 4. Sample Fall Descriptions by Factor Group

Group	Description	Take-away
Weather	<i>Wind drove me into an anti-traffic pole.</i>	Bike-handling skills, especially for biking in the wind (or deciding to bike in spite of the wind) may help.

Table 4. Sample Fall Descriptions by Factor Group, Continued

Group	Description	Take-away
Surface condition & Construction	<p><i>Brand new storm grate installed on my daily commuting route which would catch tires and flip the bike over. City had construction company replace it with the bicycle friendly one.</i></p> <p><i>Difficult stop sign on an upslope with poor intersection visibility.</i></p> <p><i>Poor signage. Missed a bicycle route turn, breeched a blind hill, and found myself riding down a concrete staircase.</i></p> <p><i>Slipperiness of painted signage on the road surface with leaves on the ground after a rain.</i></p> <p><i>Encountered a curb where the bike lane narrowed at a bridge.</i></p> <p><i>Could not avoid pothole due to car traffic on surface street without dedicated bike lane.</i></p> <p><i>Poorly placed trail closure barricade with no advanced warning.</i></p>	<p>Each condition described is somewhat out a cyclist's control, regardless of age. Periodic bike audits to identify needed updates and careful attention to construction logistics could help eliminate these.</p>
Actions of others	<p><i>Another cyclist suddenly stopped in front of me and I nearly fell before I could get my foot unclipped from the pedal.</i></p> <p><i>The biggest problem I have is when cars go by me without yielding to the side of the road as they pass by.</i></p> <p><i>A woman drove through the mass of cyclists at the Baltimore Bike Party. Missed my front wheel by an inch.</i></p> <p><i>Unsafe conditions due to the overcrowding on multipurpose trails. Cars and cyclists that cut you off or get too close causing one to swerve or brake abruptly.</i></p>	<p>Each condition described is fairly common. Education and outreach may help alleviate.</p>

Table 4. Sample Fall Descriptions by Factor Group, Continued

Group	Description	Take-away
Bike issues	<p><i>Bike does not fit right.</i></p> <p><i>Using e-bike and was not properly mounted when it started forward.</i></p> <p><i>Note: Some comments were about rental bikes.</i></p>	<p>Important to stress the value of good-fitting bicycles. Bicycle type and fit may change as people age.</p>
Operator error	<p><i>My jacket got caught on the seat while I was getting off.</i></p> <p><i>I forgot to unclip, and I was carrying a big load on my bike. Basically, I came to a stop and fell over.</i></p>	<p>Odd-ball things happen (consider them due to Factor X)</p> <p>Several riders noted they forgot to unclip. As people age and continue to cycle, they may consider using clipless pedals.</p>
Issues related to skill, age, health, or age	<p><i>Agility problems, difficulty dismounting even at low speed.</i></p> <p><i>Diagnosed with Parkinson's for 6 years; when I started to stop at a stop sign tremors became very bad on both sides of my body. Once I got going again, I was fine.</i></p> <p><i>I am blind in one eye, so I cannot always see my path ahead with clarity. I was making a sharp turn on an up-slope and my tire went off the path causing me to fall into some bushes, suffering minor scrapes.</i></p> <p><i>Because of neuropathy my balance is off. I can only bike 10 yards before falling. So I moved to a trike.</i></p> <p><i>Sometimes I clip my shoes onto pedals. Sometimes I forget to unclip when stopping.</i></p> <p><i>Mobility issues -- old age catching up.</i></p> <p><i>One typically falls getting on or off a bike or starting/stopping. That's when to be extra careful. Tip, if you're a man over 60, buy a step through bike. What we used to call a girl's bike. Much easier to get on and off.</i></p>	<p>As people age and their cycling strength, agility, balance, etc., change, it important to consider and support different bikes that work. Some riders who responded are doing that. Others may benefit from changing the type of bike they use.</p>

Fall Comparison with Other Questions

Responses to other questions may help understand the likelihood that an older cyclist may fall, such as those that characterize a rider’s overall cycling profile, including the Type of Cyclist, Frequency of Riding, and those riding eBikes. This section compares answers to these three questions with fall rates.

Fall Rates and Type of Cyclist

Overall, fall rates peaked for both women and men who considered themselves Experienced and Confident. See Figures 56 and 57 for Fall and No fall rates by gender and type of cyclist.

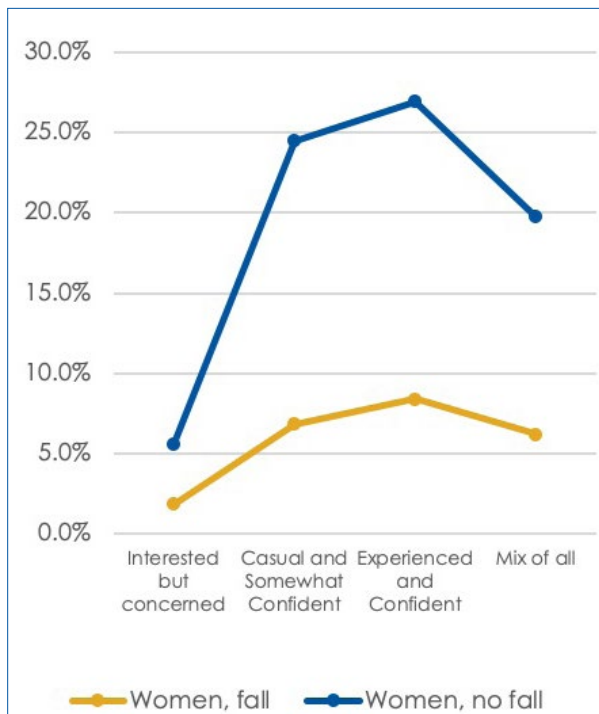


Figure 56. Fall and No Fall, Women, Type of Cyclist, Women N=824

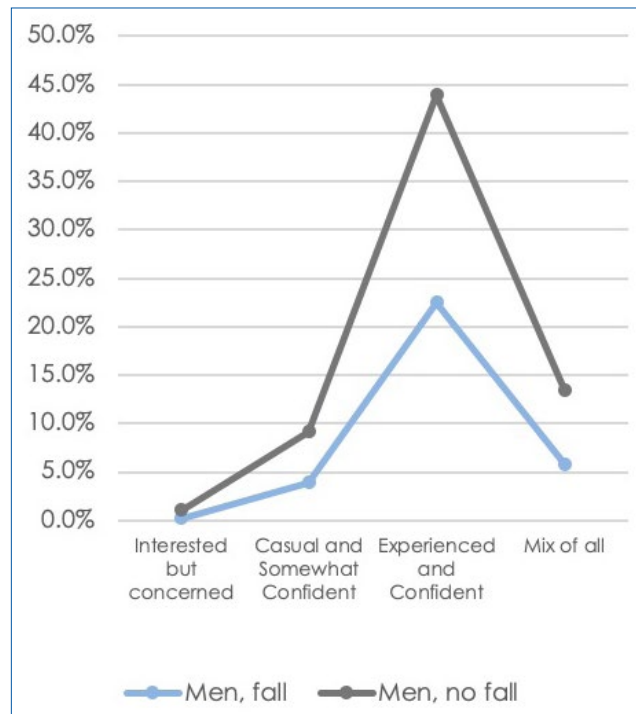


Figure 57. Fall and No Fall, Men, Type of Cyclist, Men N=1381

Some differences emerge when parsing responses by age group and gender. Noticeable differences are in Table 5, based on Figures 58 and 59.

Table 5. Noticeable Differences in Fall Rates and Type of Cyclist

	50-55	56-60	61-65	66-70	71-75	76-80	81+
A mix of all				Lowest fall rate for men			
Experienced and confident					Lowest fall rate for women		Highest fall rate for women
Casual and somewhat confident						No women reporting a fall	
Interested but concerned	No men reporting a fall	Highest fall rate for men	No men reporting a fall	No men reporting a fall		No women or men reporting a fall	No women or men reporting a fall

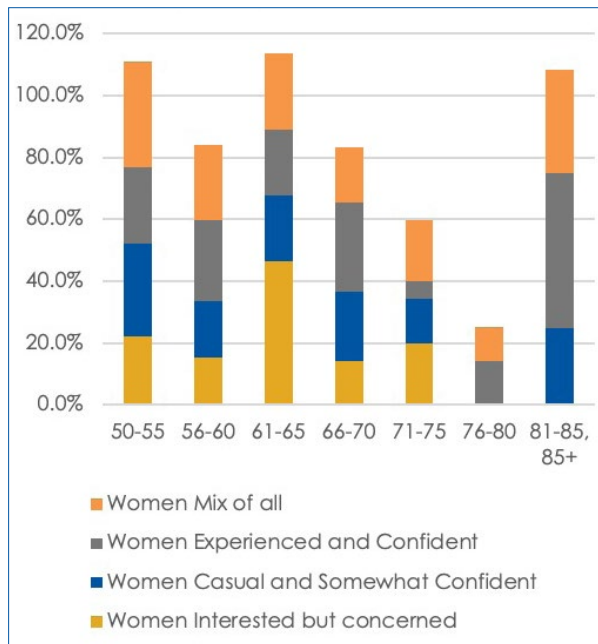


Figure 58. Women Fall Rates, Age Group and Type of Cyclist

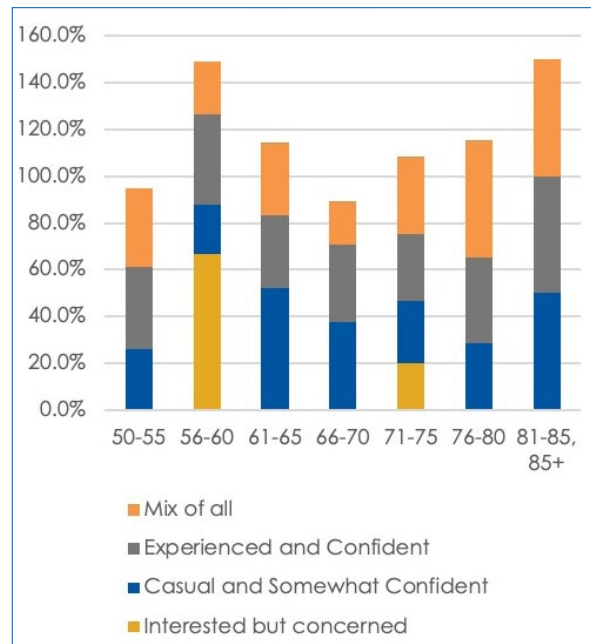


Figure 59. Men Fall Rates, Age Group and Type of Cyclist

Fall Rates and Frequency of Cycling

Overall cycling rates for older adults responding to the survey are strong, with many cycling at least 3 times a week. See Figure 60. It may be that cycling more frequently reduces the likelihood of falls due to increased skill and experience. Conversely, it may be that cycling more frequently increased the likelihood of falls due to increased exposure.

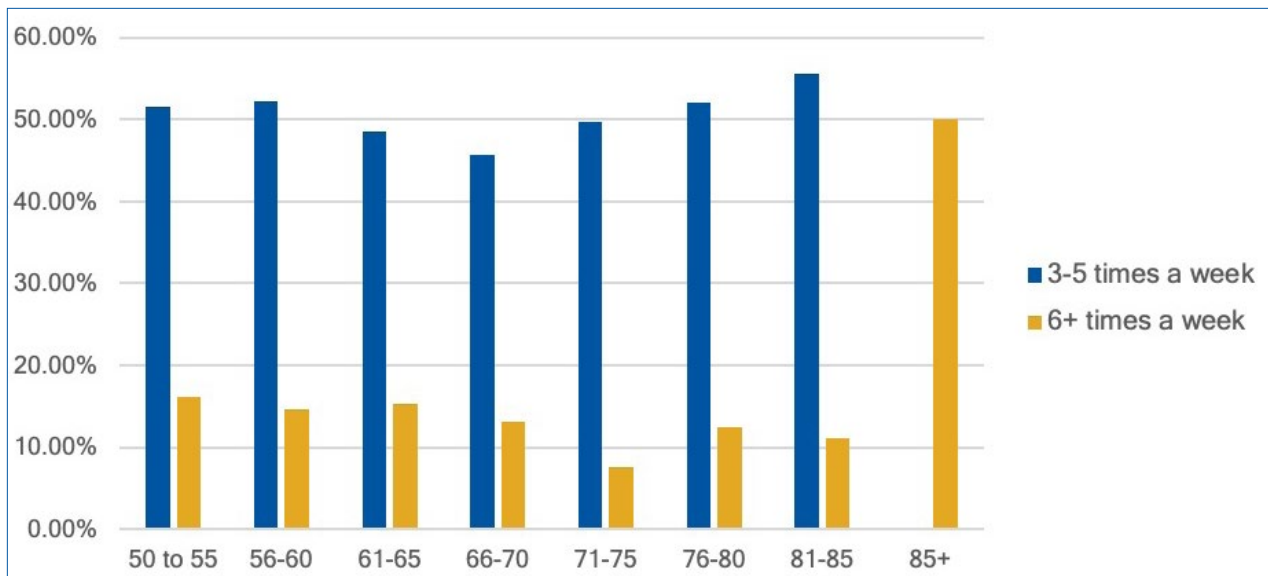


Figure 60. Cyclists Who Cycling 3 or More Times a Week, Age Group

Figure 61 shows fall rates for those cycling at least 3 times a week. The fall rate is relatively comparable between 56 and 70. It is highest for the 50-55 age group cycling at least 6 times a week, which may be due to commute to work risks. It is lowest for the 76-89 age group cycling 3-5 times a week. The fall rate increases for those above 80, however, because the N for these age groups is low the fall rate may be different with more responses from these older cyclists.

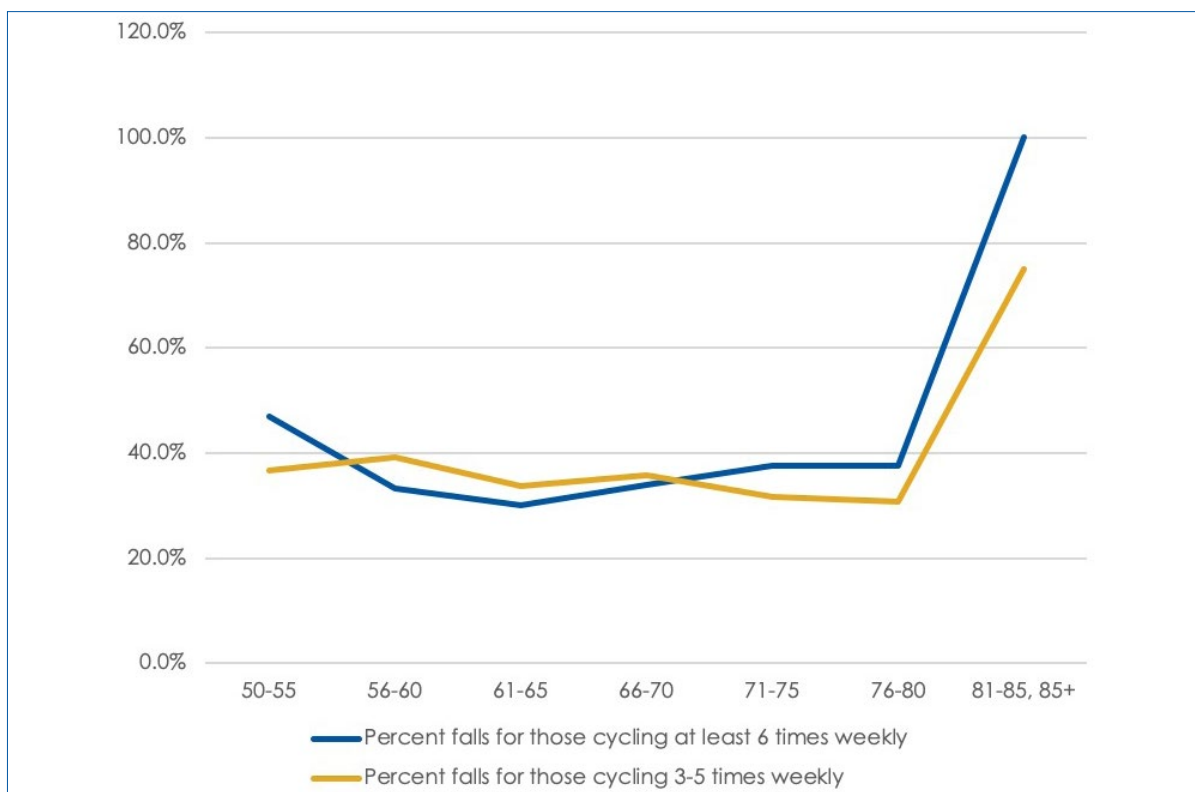


Figure 61. Fall Rates for Those Cycling 3 or More Times per Week, Age Group

Fall Rates for Cyclists with eBikes

Fall rates for those owning an eBike is higher than the rate for all respondents, regardless of bicycle type. Figure 62 shows the difference in fall rates for eBike owners and regular pedal bike owners.

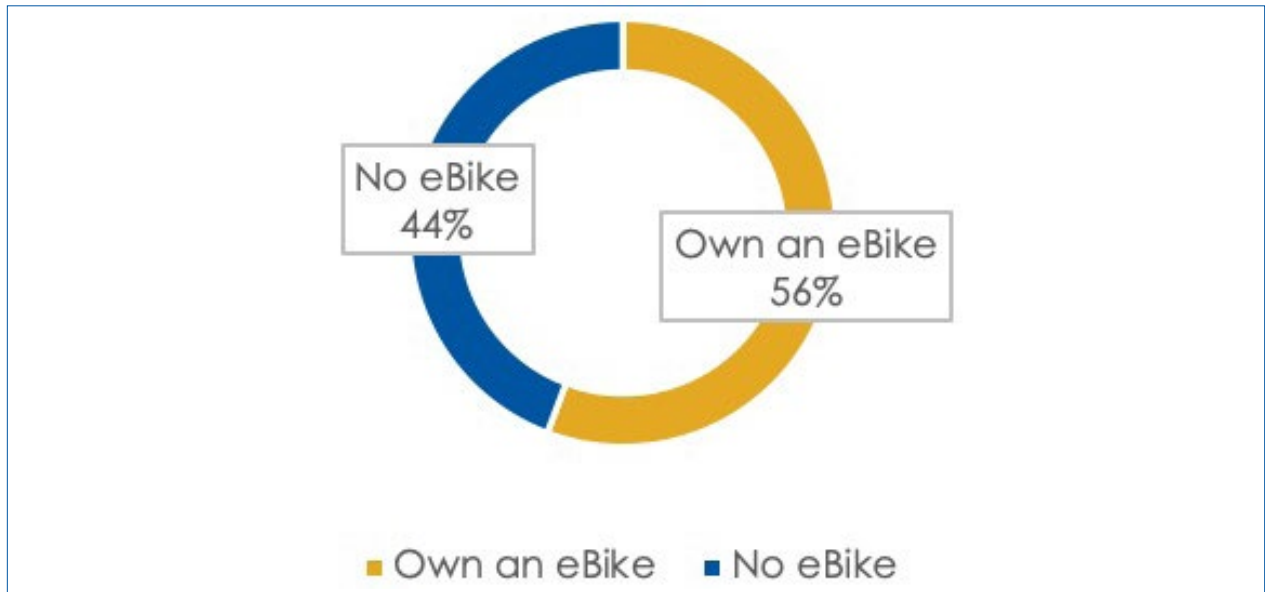


Figure 62. Comparison of Fall Rates and eBike Ownership, N=2251

Fall rates are different between women and men eBike owners, as shown in Figure 63.

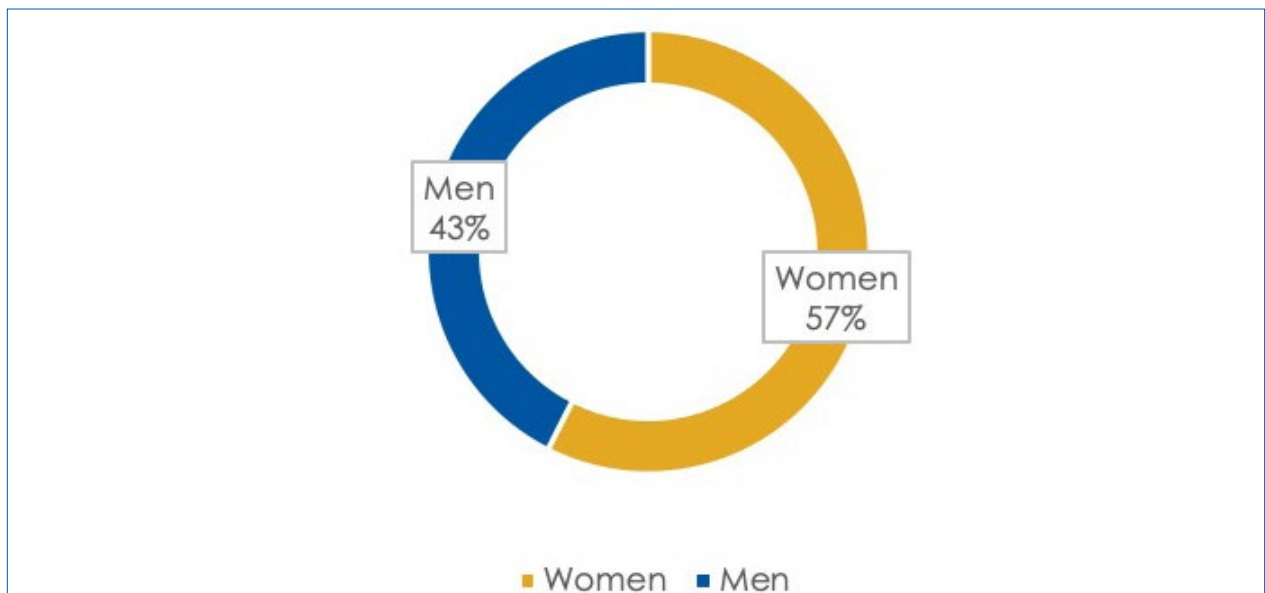


Figure 63. Comparison of Fall Rates for eBike Owners, Women N=194, Men N=448

Fall rates for all eBike owners, regardless of gender are higher than fall rates for all cyclists, regardless of gender. For several age groups, the rate is double or more. Fall rates for the youngest and oldest age groups are comparable. Falls may be due to different factors. For example, because 'younger' riders may be commuting to work and be more confident in their cycling skills, they may be more aggressive (i.e., take more risks). Older cyclists may have age-related balance and health issues that result in falls, especially when riding an eBike that is both heavier and faster than a normal pedal bike.

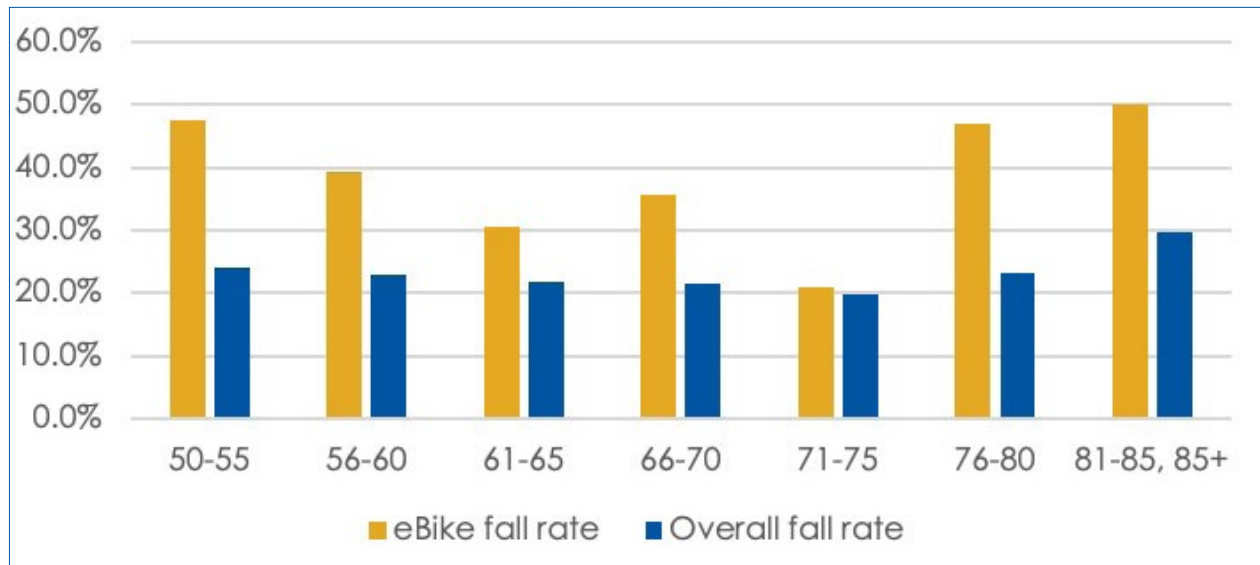


Figure 64. Comparison of Fall Rates, eBike Owners to All Cyclists, Age Group

Are Fewer Falls Possible?

Question to Consider: How can falls due to poor infrastructure or maintenance or the actions of others be reduced?

Some communities establish 'Senior Zones' along streets with a high percentage of older adults and popular walking destinations. Bicycle facilities in areas with many older adults who cycle can be considered similarly (without the specific designation by signs) by doing a better job of designing, building, and maintaining these facilities. See the [below discussion](#).

How do cyclists as they age recognize changes in their agility, ability, stamina, etc.?

Those who continue to ride as they age can be surprised when a fall happens or they cannot ride as far and fast as they used to. Their suspicion that age is a factor should prompt consideration of ways to continue cycling as an enjoyable activity, while remaining safe. See the [below discussion](#).

Question to Consider: What basic design or maintenance standards can reduce some of these falls, benefitting all cyclists?

Older cyclists can be more sensitive to poor cycling surfaces, affecting their balance. Rough surfaces can also be harder on older bodies, generating physical discomfort.

Gravel. Some survey respondents slipped on gravel, sand, or stones on the pavement. Basic regular maintenance will eliminate this risk. In addition, requiring paved driveway aprons reduces the number of stones that migrate onto shoulders, sidewalks, or bikeways from unpaved driveways.



Figure 65. Driveway Gravel Impacts Surface Quality for Cyclists

Poor cycling surfaces. Cyclists have a lower tolerance threshold for potholes, cracks, and debris than motorists. Separate triggers should be established and adhered to for maintenance and repair, noted through regularly surveying popular cycling routes.

Narrowing pathways. While narrow pathways can be an engineering strategy to force cyclists to slow down, they can also contribute to falls and crashes. For example, a cyclist can get caught in another's handlebars when passing each other or may fall when an unexpected pathway narrowing occurs. Narrowing that occurs adjacent to motor vehicle lanes can also create a crash risk. See Figure 66.



Figure 66. Bike Lane Widens and Narrows, with On-Again/Off-Again Buffer

Question to Consider: Do cyclists recognize and adapt to changes in their cycling profile?

The goal for many older cyclists to continue to cycle may require thoughtful adaptations. Some cyclists may be slow to recognize and respond to changes in their cycling ability and agility. This can result in continuing to ride a bicycle that does not 'fit' them or cycling in places that do not provide important safety and comfort features such as lighting, easy to read signs, wide pathways, and formalized roadway crossings.

While state and national safe driving programs for older drivers are not needed,¹⁹ some level of conversation and tactics are. Bicycle shops can be important partners in this with some type of assessment tool or structured conversation with customers. For example, the analysis shows that those using eBikes have a higher crash rate than regular pedal bikes. Fall descriptions also show that a change in bicycle type may be needed for improved stability and balance. National and local bicycle organizations can help with this conversation, too, by providing resources for older cyclists, such as an updated version of the one from Vinnova, [Better Bicycles: An analysis of the needs and requirements of older cyclists](#).

Another resource is a [self-assessment of physical activity intensity](#) offered by the Centers for Disease Control. This webpage also includes links to tools to measure target and maximum heart rates and the perceived exertion rate (Borg Rating of the Perceived Exertion scale).

¹⁹ There are many older driver safety programs nationally, such as [this one by NHTSA](#), as well as programs in state safety plans.

EXCERPT FROM AARP ARTICLE

September 15, 2020, AARP Livable Communities eNewsletter²⁰

HOW LOCAL LEADERS CAN SUPPORT SAFE BICYCLING

Creating safe streets and sidewalks for all users involves effective community engagement, smart policies and, often, infrastructure changes. Some ways elected officials and other local leaders can advance safe cycling:

- **Convene** community meetings with people who travel by different modes — walking, cycling, driving — to identify needs and concerns, but also to help them learn from one another about their experiences using the street network. The free [AARP Roadmap to Livability: Community Listening Session Tool Kit](#) includes step-by-step instructions and worksheets for hosting such discussions and the dbiTilde Collaborative offers a [suggested meeting agenda](#).
- **Conduct** a cycling survey of area residents — including why they bike, what amenities they seek, and what type of infrastructure they favor — and then compare its findings with the community's current bicycle network.
- **Demonstrate** and/or test cycling infrastructure — such as protected bike lanes — by hosting a pop-up demonstration to show the community what can be done to enhance cycling safety, and then assess the reaction and support for such changes. ([The Pop-Up Placemaking Tool Kit](#), a free publication by AARP and the firm Team Better Block, features information and “recipes” for pop-up bike lanes and other demonstration projects.)
- **Develop** or update an existing bicycle plan to minimize conflict points between pedestrians, cyclists, and drivers. There are many ways to identify locations with conflicts, and there are great resources for learning how to fix them, such as these from the [National Association of City Transportation Officials: Urban Bikeway Design Guide](#), [Don't Give Up the Intersection](#) and the [Urban Bikeway Design Guide for All Ages and Abilities](#).
- **Use** resources from the [League of American Bicyclists](#), such as its Quick Start Guide to help people bicycle safely or seek bicycle-friendly certification for your community or business.
- **Work** with local businesses to establish bike-friendly amenities — such as convenient bike parking — or new services connected to key locations, on-site parking, etc.

²⁰ Available at <https://bit.ly/Over50CyclingArticle>

- **Establish** an effective maintenance program to ensure that cycling surfaces are smooth and free of debris, pavement striping is refreshed regularly, and that signage and protective features are present where needed. See the Federal Highway Administration’s [Bikeway Selection Guide](#) for ways to incorporate maintenance into facilities planning and operations.
- **Support** or create bicycling groups and community activities. Sponsor events to support more biking — such as [Cyclovia-style “Open Streets”](#) events. Partner with groups (e.g., health, aging and recreation agencies; local bicycle shops; residential communities and facilities for older adults) to identify new opportunities to expand cycling.
- **Engage** with organizations that pave the way for more inclusive participation, such as those for older people with physical limitations ([Cycling Without Age](#)); young riders (the national [Youth Bike Summit](#) and [Safe Routes to School](#) programs); and women (such as [Girls on Bikes](#) and [Black Girls Do Bike](#)).

HOW INDIVIDUALS CAN SUPPORT SAFE CYCLING

- **Research** the community’s bicycle network to see what exists — and then get out and use the existing network of trails, paths, and separated bike lanes. Check online or pick up a bike map at a local bike shop if you’re unsure of where to begin. Using the existing network is one way to illustrate demand for more and better infrastructure. Pay attention to what is missing — and what future transportation links or amenities may be needed.
- **Connect** with the community’s bicycle and pedestrian advocacy organizations. Those may be formal advisory commissions or committees, or member-driven bicycling or walking organizations. These groups are critical to advocating for more and better cycling infrastructure. If there’s a vacancy on a commission, consider applying.
- **Contact** elected officials, the department of transportation or streets, and other people and programs in a position to advance needed change. As a cyclist, you bring valued insight into how the built environment does — or doesn’t — provide a protected, safe, and healthy riding experience. Share that insight with local leaders.

Tips for Cycling at 50+

Whether you ride a bike for sport, recreation or as a means of getting around, bicycling is an age-friendly activity that people of all ages can enjoy. Some tips:

- Dust off the bicycle that's been sitting in storage unused. (Before riding, have the bicycle checked and serviced by a bike shop.)
- If a bicycle is needed, buy a new or re-used one. Make sure it fits properly and has features that promote cycling with ease, whether it's a three-wheeler, e-bike or a traditional two-wheel pedal bike.
- Research local cycling groups and join one. Having others to ride with is a great motivator for starting and continuing riding.
- Invite a friend to ride and explore new places together.
- Make a plan to bicycle regularly, perhaps replacing one car trip with a bike trip.

Not a Bike Rider?

Take lessons! It's rarely too late to learn to ride a bike. Local recreation departments, senior centers and bicycle shops often offer classes. Self-service videos (such as [“How to Teach an Adult to Ride a Bike”](#)) are available online. Many communities offer classes by [League of American Cyclists-certified instructors](#) who can ensure that new riders can take to the road safely and with confidence.

Cycling Stories

About 400 people who responded to the 50+ Cycling Survey completed journal entries for two of their rides. The journals captured real-time experiences such as the weather, how the cyclist felt, the trip's purpose, and information about the trip's length. Most trips were for recreation — either alone or with others in informal or formal groups — with about the same number of rides for 6 to 10 miles, 11 to 15 miles, 16 to 20 miles, and 26 to 36 miles. The journals also captured information on the safety and comfort of various cycling facilities used. Not surprisingly, cyclists felt the safest and most comfortable in locations with where bicycling paths are separate from motor vehicle traffic.

Bicycling at 80+

More than two-dozen people age 80 or older completed the survey. All but two had learned to ride as a child or teenager. Among those who said their cycling habits changed in the past year, they're cycling shorter distances — due to a cycling partner moving away, a health condition or a loss of energy. Those cycling more than in the past report cycling longer distances, often for exercise during the COVID-19 restrictions.

APPENDIX A - CYCLING SURVEY

50+ Cycling Survey - Summer 2020

Cycling Past 50 Survey

1. **PRE-SURVEY QUESTION:** Is this the first time you are taking the survey?

- Yes
 No

2. Please indicate your age.

- 50 to 55
 56-60
 61-65
 66-70
 71-75
 76-80
 81-85
 85+

3. Is this the same age range for you as last year?

- Yes
 No, it's one age range older

6. Please indicate your annual household income

- Less than \$25,000
 \$25,000 to \$34,999
 \$35,000 to \$49,999
 \$50,000 to \$74,999
 \$75,000 to \$99,999
 \$100,000 to \$124,999
 \$125,000 to \$149,999
 \$150,000 or more

7. Do you cycle regularly now?

- Yes
 No

8. How often do you cycle now?

- 6+ times a week
 3-5 times a week
 1-2 times a week
 1-3 times a month
 Weather dependant

4. Please indicate your gender

- Male
 Female
 Other

5. Please indicate your primary ethnicity

- Asian
 Native Hawaiian or Other Pacific Islander
 Black/African-American
 White
 Hispanic/Latino
 American Indian/Alaska Native
 Other - Write In

 Prefer not to answer

9. Since you don't cycle regularly, what prompts you to cycle?

- When I'm on vacation
 When I visit my children or grandchildren
 Good weather
 When someone pushes me to
 Other - Write In (Required)

10. Copy of When did you first start biking?

- As a child
 As a teenager
 20-29
 30-39
 40-49
 50-55
 56-60
 61-65
 66-70
 71+

11. Is there a time in your life when you stopped cycling for at least a year?

- Yes
 No

12. What was the reason you stopped cycling?

Select up to 3.

- Parenting or other caretaker responsibilities
- My work situation or schedule changed
- I was in the military
- I moved abroad
- I got a driver's license and was more interested in cars
- I experienced health challenges or a long-term recovery from an injury or surgery
- Location (topography, weather, remote)
- Lack of cycling infrastructure
- I did not feel safe biking
- Social pressure or stigmas
- I did not have anyone to cycle with
- I switched to another form of exercise or sport
- I did not have a bicycle or anywhere to store a bicycle
- I just gradually got away from cycling; no specific reason

13. Why did you start cycling again?

Select up to 3.

- I moved where cycling was easier
- New or improved cycling infrastructure near me
- My children were old enough for me to resume cycling
- More free time or retirement
- Health reasons or concerns made cycling a preferred form of exercise
- For physical exercise during COVID-19 restrictions
- To join my friends cycling or for social connections and networking
- As a form of transit/ bike commuting
- Environmental concerns -- wanted to eliminate or reduce personal car usage
- Economic -- could not afford or wanted to reduce costs associated with car ownership or transit usage
- I acquired another bicycle or had access to a bicycle and bicycle storage
- I missed it and just decided to cycle
- N/A -- I do not currently cycle

14. In the past year, have you changed the amount of cycling you do?

- Yes
- No

15. How has the frequency of your rides changed?

- I'm cycling less often
- I'm cycling more often
- No change

16. How has the distance of your rides changed?

- I'm cycling shorter distances
- I'm cycling longer distances
- No change

17. Why has your amount of cycling decreased in distance or duration in the past year?

Select up to 3.

- The people I cycled with either moved or don't cycle
- I crashed and feel less confident cycling
- I feel less safe from others on the road
- I don't have the energy any more
- I have a physical condition which makes it difficult to cycle
- Family responsibilities are taking more time
- Work responsibilities are taking more time
- Change in job or home prohibits it
- A different sport works better for me
- Other - Write In (Required)

18. Why has your amount of cycling increased in distance or duration in the past year?

Select up to 3.

- I now have people to ride with regularly
- A new cycling facility opened that I can use
- I moved to a place where there is good network of on-road facilities and trails
- I moved to a place where there are more cycling accessible destinations
- I moved to a place where the weather is more moderate
- For physical exercise during COVID-19 restrictions
- I stopped running and increased the amount I cycled
- I'm training for a long-distance ride
- I got an ebike

 Other - Write In (Required)

19. Under what circumstances would you stop riding all together?

Click all that apply.

- A physical condition that made riding difficult
- An overall loss of energy
- A move to a place with few or no safe place to ride
- A move to a place where the weather was not conducive to riding
- I cannot envision a time or circumstances that would cause me to stop riding

 Other - Write In (Required)

20. Indicate any near misses you have had while cycling in the past year with...

Click all that apply.

- Other cyclists
- Scooters
- Walkers
- Joggers
- Motorists
- I have not had any near misses

21. In the past year, have you fallen or nearly fallen while cycling?

- Yes
- No

22. Thinking about the most recent incidence, briefly describe what caused you to fall or nearly fall

23. Are you comfortable biking at night, assuming you have a front and back light on your bike?

- Yes, generally
- No, never
- Sometimes

24. If you answered sometimes what factors does this depend upon?

Select all that apply.

- Location
- Lighting (on street, path or trail)
- Presence of bike lanes or shoulder to bike on
- Biking with others
- Weather
- Familiarity of route

25. Are you comfortable biking alone?

- Always
- Sometimes, depending on the circumstances
- Never

26. If you answered sometimes what circumstances does this depend upon?

Select all that apply.

- Location
- Lighting (on street, path or trail)
- Presence of bike lanes or shoulder to bike on
- Time of day
- Weather
- Familiarity of route
- Distance traveled

27. What factors effect where you ride?

Select all that apply.

- The presence of other cyclists
- Places to stop to eat, shop, visit
- A place to park my bike easily and safely
- Pleasant vistas, such as a park
- Benches for taking a break
- Shade for cooling off when it's hot
- Bathrooms and drinking fountains
- Few or no cars
- Roads in good condition and clear of debris
- Groups rides
- Neighborhood streets with few cars and lower speeds
- Protected bike lanes
- An overall feeling of being safe

28. For which trip purposes do you ride and what is the average trip length?

	A few blocks	No more than 2 miles	Between 2 and 10 miles	More than 10 but fewer than 15 miles	More than 15 but fewer than 50 miles	More than 25 but fewer than 40 miles	40 or more miles	NA
To be social or for companionship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To travel to and from work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For daily errands, including shopping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As a competitive cyclist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

29. Do you own an eBike?

An eBike, or electric bike, is a generic term used for a bicycle that uses a battery to provide assistance when pedaling.

- Yes
- No

30. What motivated you to purchase an eBike?

Click all that apply.

- I don't have the strength to ride a regular bike where I like to bike
- I want to cycle farther than I do now
- I recently moved to a place where there are hills and the eBike will help keep me cycling
- I was curious and when I did a test ride, I was sold!
- It was just time. I can't be anymore specific than that
- To make it easier to ride with someone who cycles faster than me
- To make it easier to ride up hills
- To make more comfortable to ride in hot weather (I don't sweat as much)
- For commuting to work
- So I could continue to ride during recovery from a medical condition
- Other - Write In (Required)

31. What would make you consider purchasing an eBike?

Click all that apply.

- I don't envision ever getting one
- When I have some type of physical limitations on the type of cycling I do now
- When I just decide to get one
- When I can afford it
- To make it easier to ride with someone who cycles faster than me on a regular pedal bike
- To ride with someone who rides an ebike
- To say I have one
- Other - Write In (Required)

32. Do you own a 3-wheel bike for adults?

- Yes
- No

33. What type is your 3-wheel bike for adults, i.e., what is your sitting position when you ride?

Regular sitting up position (bike on the left) or in a recumbent position (bike on the right):

- Regular sit up position
- Recumbent position
- Other - Write In (Required)

34. Is your 3-wheel bike e-assist?

- Yes
- No

35. What motivated you to purchase a 3-wheel bike for adults?

Click all that apply.

- I wanted more stability when I ride
- I'm not in a hurry and having this bike helps me be more leisurely
- I like the large basket for when I go shopping
- I just decided to get one to add to my bike collection
- It's easier to get on and off than my two-wheel bike
- Purchased one for my much older parent
- More convenient for cycling with my dog
- Other - Write In (Required)

36. What would make you consider purchasing a 3-wheel bike for adults?

Click all that apply.

- When I have some type of physical limitations on the type of cycling I do now
- When I just decide to get one
- To say I have one
- When I can afford it
- If I developed a health issue or had an injury requiring it
- When my partner gets one, I'll get one too so we can ride together
- I don't anticipate a time or reason for getting one
- Other - Write In (Required)

37. Now that you've provided a lot of information about your cycling habits, which types of cyclists are you?

- Interested but concerned
- Casual and Somewhat Confident
- Experienced and Confident
- A mix of all -- depends on the situation

38. You've just completed Part 1 of the survey.

Will you complete Part 2 of the survey?

For this part, you will review photos of various cycling facilities and conditions, selecting the conditions under which you would feel comfortable cycling.

- Yes
- No thanks

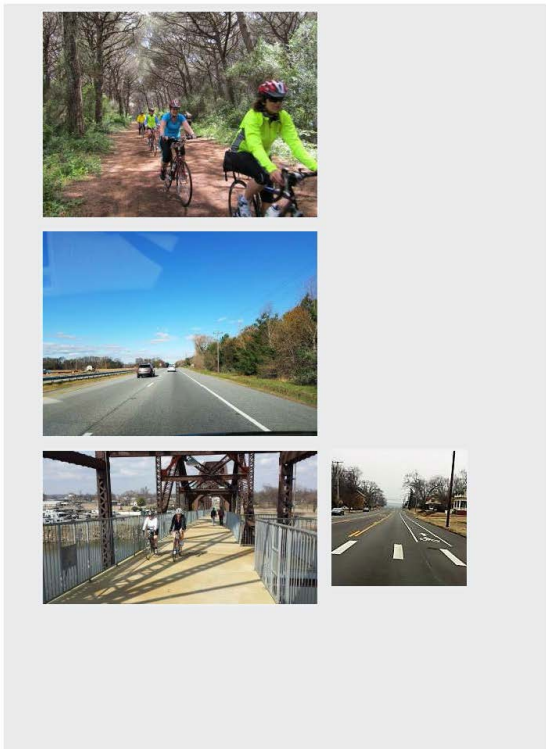
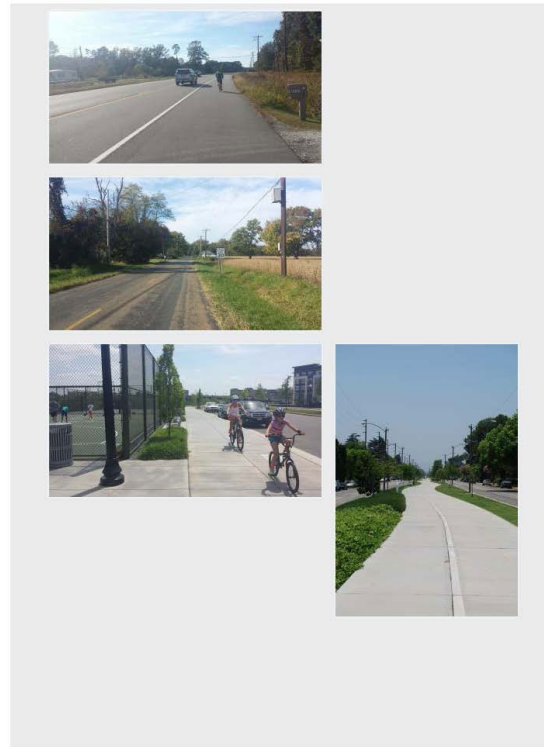
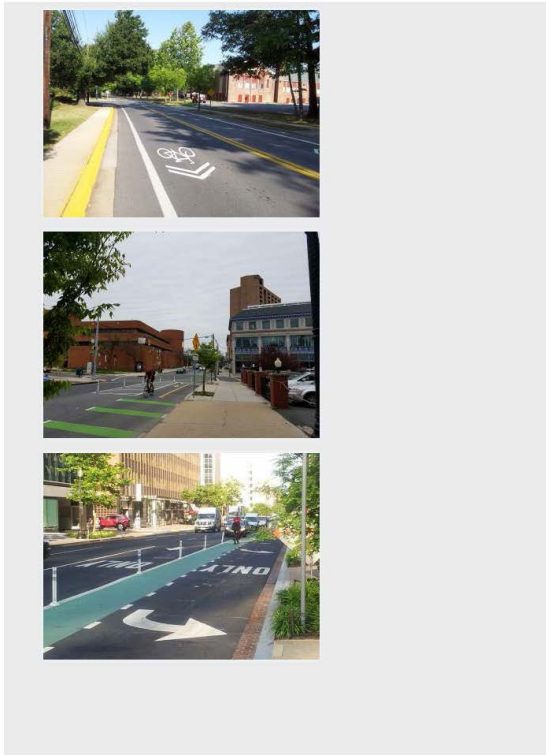

(untitled)

39. Where would you feel comfortable riding?

Click on those photos where you would feel comfortable riding, given the conditions you see.

Remember: A green check mark will appear in the upper left hand corner of the photo when you click on it.




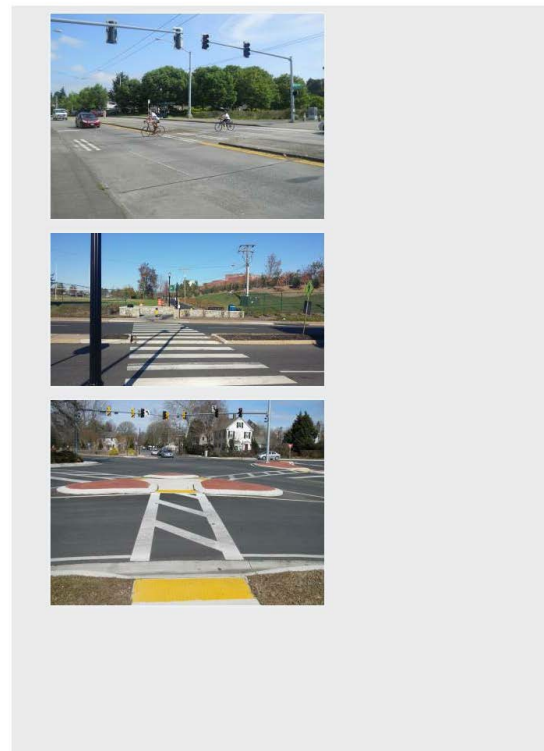
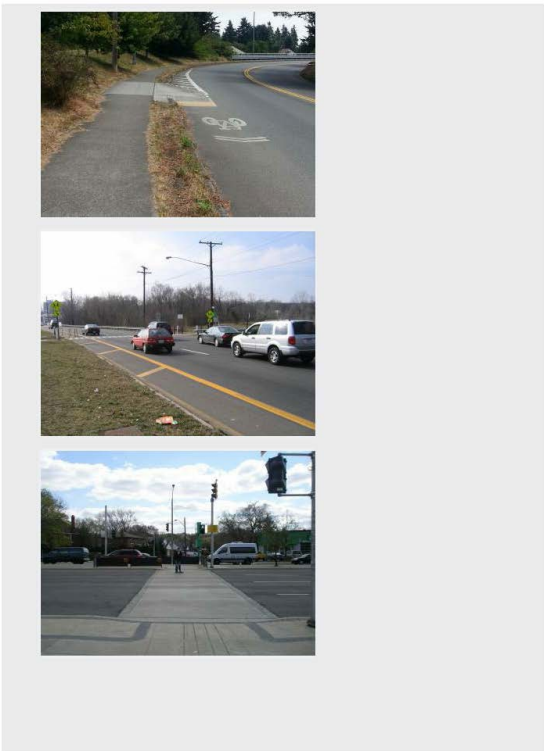
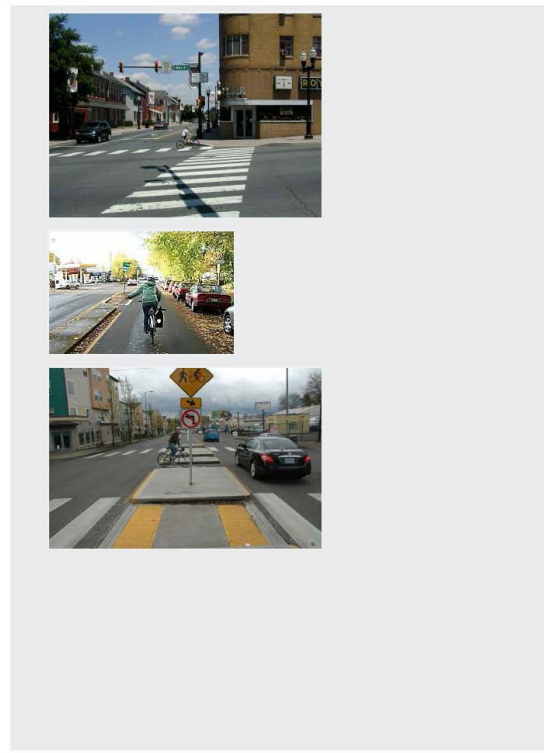
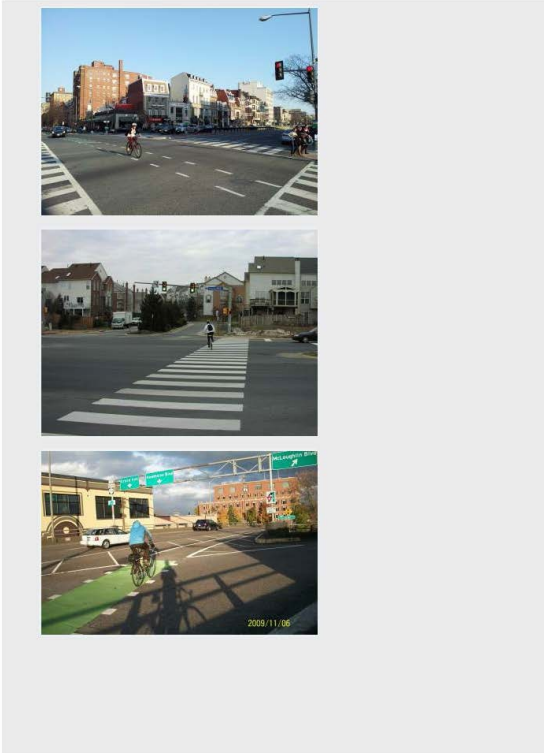



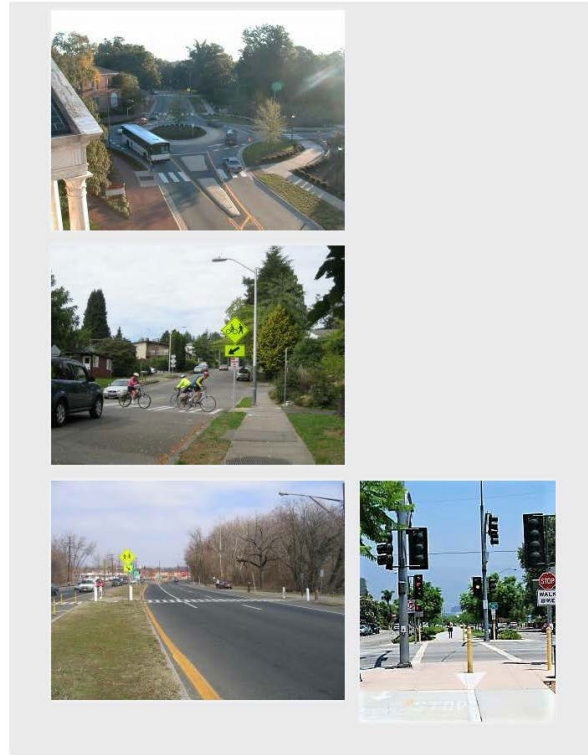
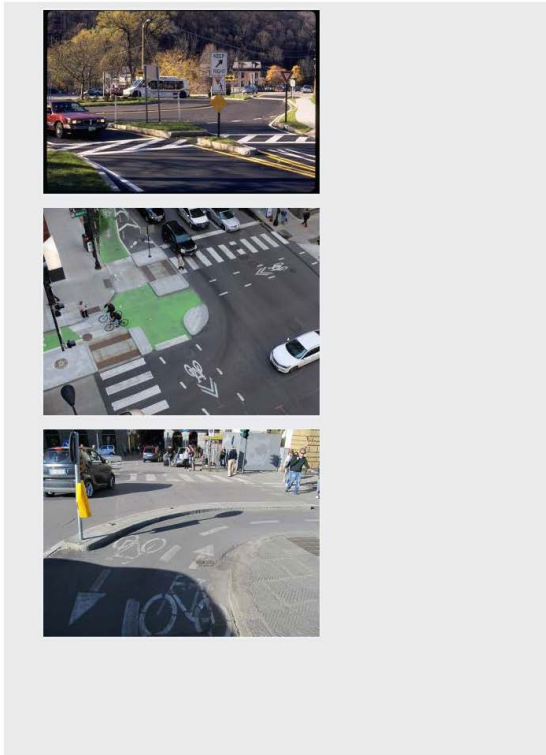
40. Which conditions for traveling through an intersection or crossing the roadway would you feel comfortable using?

Click on those photos where you would feel comfortable riding, given the conditions you see.

Remember: A green check mark will appear in the upper left hand corner of the photo when you click on it.







41. Would you agree to complete this survey again in about a year?

Yes

No

42. Please provide your email address

43. Would you agree to journal at least two biking trips during the next month?

The online journal form is designed with pre-populated answers and open-ended questions. It should take about 10 minutes to complete and is accessible on your home computer, a tablet, or smart phone.

Yes

No

APPENDIX B - CAMBRIDGE, MA FLYERS

Healthy Aging and Bicycling in Cambridge Virtual Series

Do you **enjoy cycling** and are looking for ways to be active while respecting social distancing?

Do you want to **try bicycling again**, but are feeling rusty?

Are you interested in learning about cycling considerations for older adults **from the comfort of your home**?

Cambridge's Community Development Department, in partnership with the Council on Aging, is launching a **Healthy Aging and Bicycling in Cambridge program** this October. Five 1-hour workshops followed by a 15-minute question and answer session will be held virtually over Zoom. Participants and instructors will be able to see and engage with each other. For more information, visit cambridgema.gov/bikeworkshops.

**Classes on Tuesdays (Oct. 13, 20, 27 and Nov. 3, 10)
from 9:30 AM to 10:45 AM**

Click Here to Register
or call the Cambridge Council on Aging
at 617-349-6220

Class	Date	Time
Cycling Basics for Older Adults	October 13	9:30am - 10:45am
Getting Back on the Bike	October 20	9:30am - 10:45am
Urban Cycling Basics	October 27	9:30am - 10:45am
Design for All Ages: Bike Lanes in Cambridge	November 3	9:30am - 10:45am
Adaptive Cycling	November 10	9:30am - 10:45am



Healthy Aging and Bicycling in Cambridge Virtual Series

[Getting Back on the Bike](#)

October 20, 9:30am - 10:45am

As we get older, what are the considerations to think about when bicycling to maximize safety and prevent injury? We will cover strategies to adapt your riding style to accommodate physical changes.

[Cycling Basics for Older Adults](#)

October 13, 9:30am-10:45am

Riding a bicycle is a great low-impact way to stay active and improve mobility as well as an excellent transportation option. This workshop will discuss getting started (or back on the road) as an older adult!

[Urban Cycling Basics](#)

October 27, 9:30am - 10:45am

Bicycling in a city can be intimidating for anyone! This workshop will cover what you need to know in order to get moving around the city.

[Adaptive Cycling](#)

November 10, 9:30am - 10:45am

Interested in learning about adaptive cycling options? We will present different types of adaptive bicycles as well as adaptive cycling programs and other ways to engage with cycling as an older adult.

[Design for All Ages: Bike Lanes in Cambridge](#)

November 3, 9:30am - 10:45am

Find out about the types of bicycle infrastructure in Cambridge and how the design process takes older adults into consideration along with how you could be part of the design process and dialogue!

[Click Here to Register](#)



APPENDIX C - VISUAL SURVEY

This portion of the 50+ Cycling Survey asked respondents to identify which bicycling facilities and conditions they would use. Photos of a variety of facilities and conditions were divided into two groups: along the roadway and across the roadway. Respondents clicked on photos if they would use the conditions shown. This report shows the results of the Visual Preference Survey from high to low preference. The Visual Preference Survey is optional, with about 75% of respondents complete it.

NOTE: The standard practice for rounding up or down decimals was used for the percentages shown here.

Along the Roadway, Highest Percentage Selected to Lowest



Multi-use trail bridge

87%



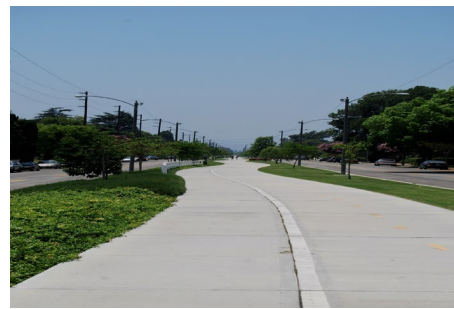
Sidewalk bike lane

85%



Wide unpaved trail

85%



2-way trail down center median

83%



2-way green lane sidepath

82%



Wood-chipped path in forest

79%



Shared lane marking

75%



Buffered bike lane

74%



Leftside contraflow bike lane

73%



Bike lane on commercial street

72%



2-way sidepath next to arterial

69%



Wide shoulder along state road

66%



Wide shoulder into rural town

66%



Green bike lane between through and left turn lane on urban street

63%



2-way separated bike Lane on urban street

63%



Bike lane on road with 2 motor vehicle lanes, center left turn lane

63%



**Sidepath next to 2 motor vehicle lanes,
CLTL**

56%



Gravel rail trail in rural town

57%



**Wide sidewalk in residential
development's linear park**

50%



Rural road into village

44%



**Major arterial with sidewalk in urban
setting**

37%



**Major arterial with center median,
narrow sidewalk**

18%

Conclusions

In general, respondents prefer bicycling conditions away from roadways. Cycling along wide shoulders or where there are separated, and designated facilities received lower preferences. Conditions shown in the photos such as speed limit signs and multiple cycling options may have affected the respondent's choice.

Across the Roadway, Highest Percentage Selected to Lowest



Protected urban intersection
78%



Crosswalk on suburban arterial
73%



Trail crossing, signs and striping only
70%



Crosswalk or cross-bike on in-town commercial street
67%



Left turn pocket, frontage to main road
67%



Bikebox
66%



2-way trail intersection

66%



2-way cycle track

65%



Midblock trail crossing

64%



Midblock 2-stage crossing

63%



Midblock 1-stage Crossing

62%



Multi-leg intersection

61%



Merging ramp onto roadway

58%



Green bike lane across freeway ramp

55%



Bike lane continuation through urban intersection

52%



One lane roundabout

50%



2-stage unsignalized crossing on multi-lane road

49%



Crossing with median refuge island

43%

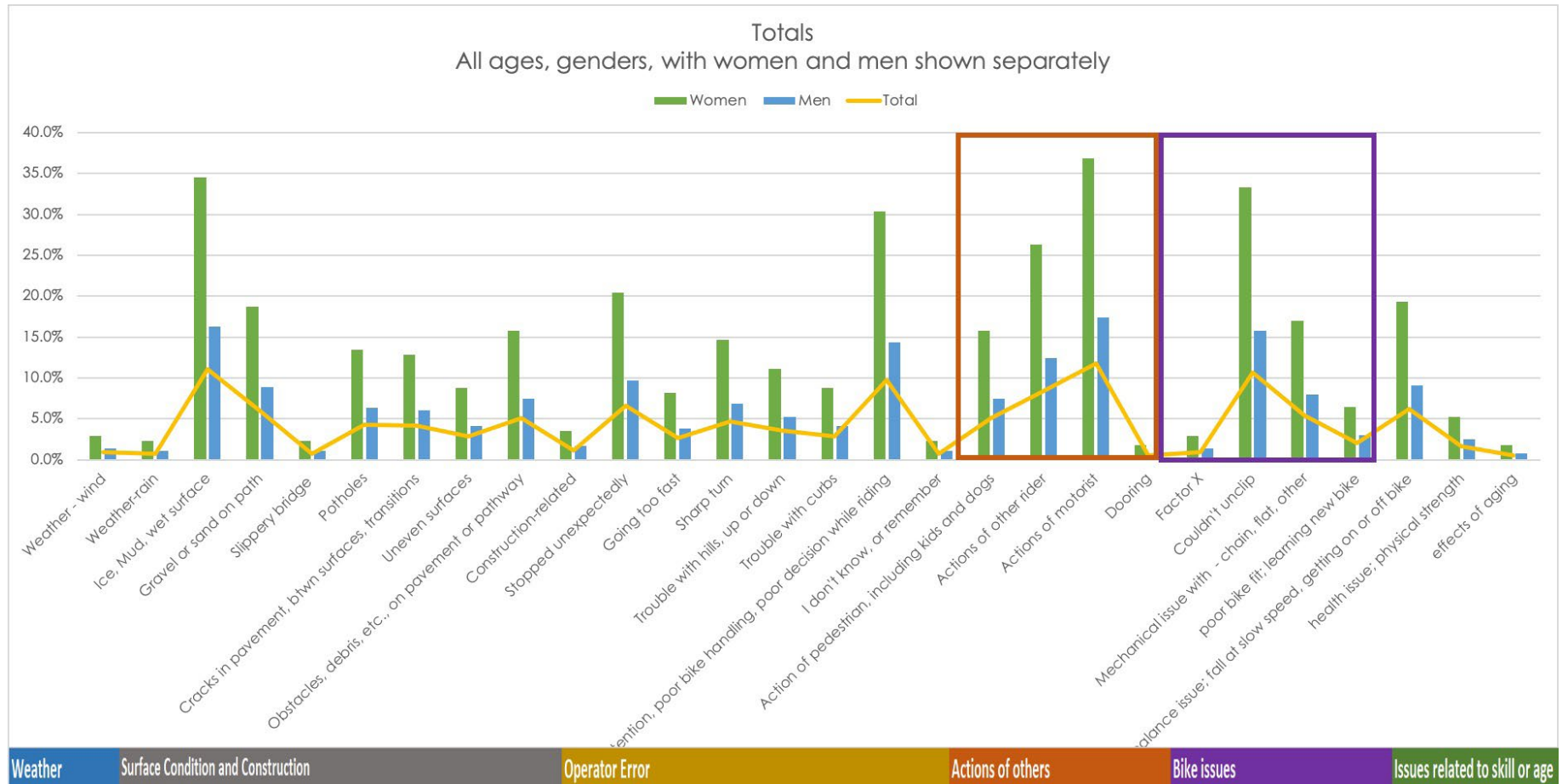
**One lane roundabout****38%****Unsignalized midblock trail crossing****28%**

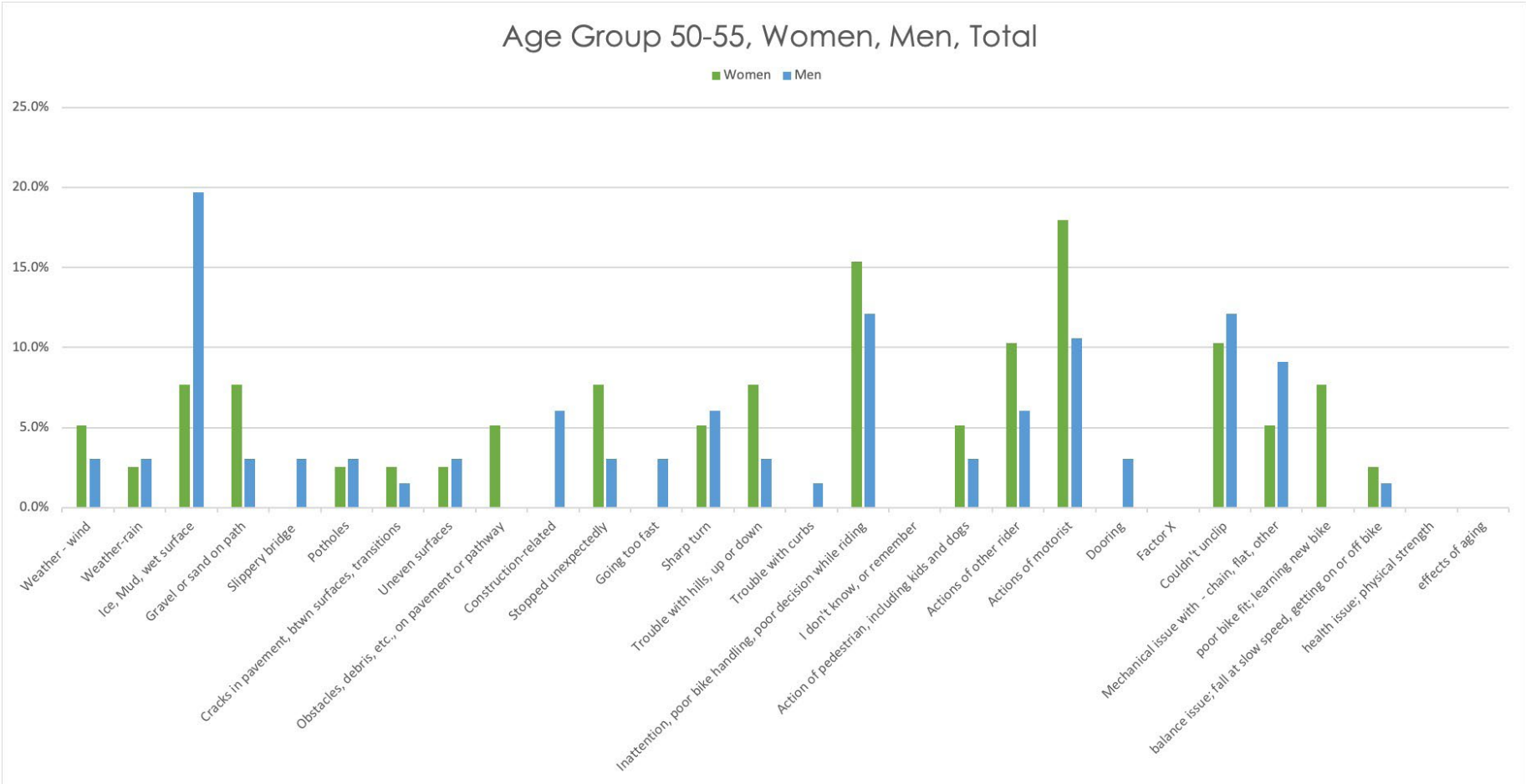
Conclusions

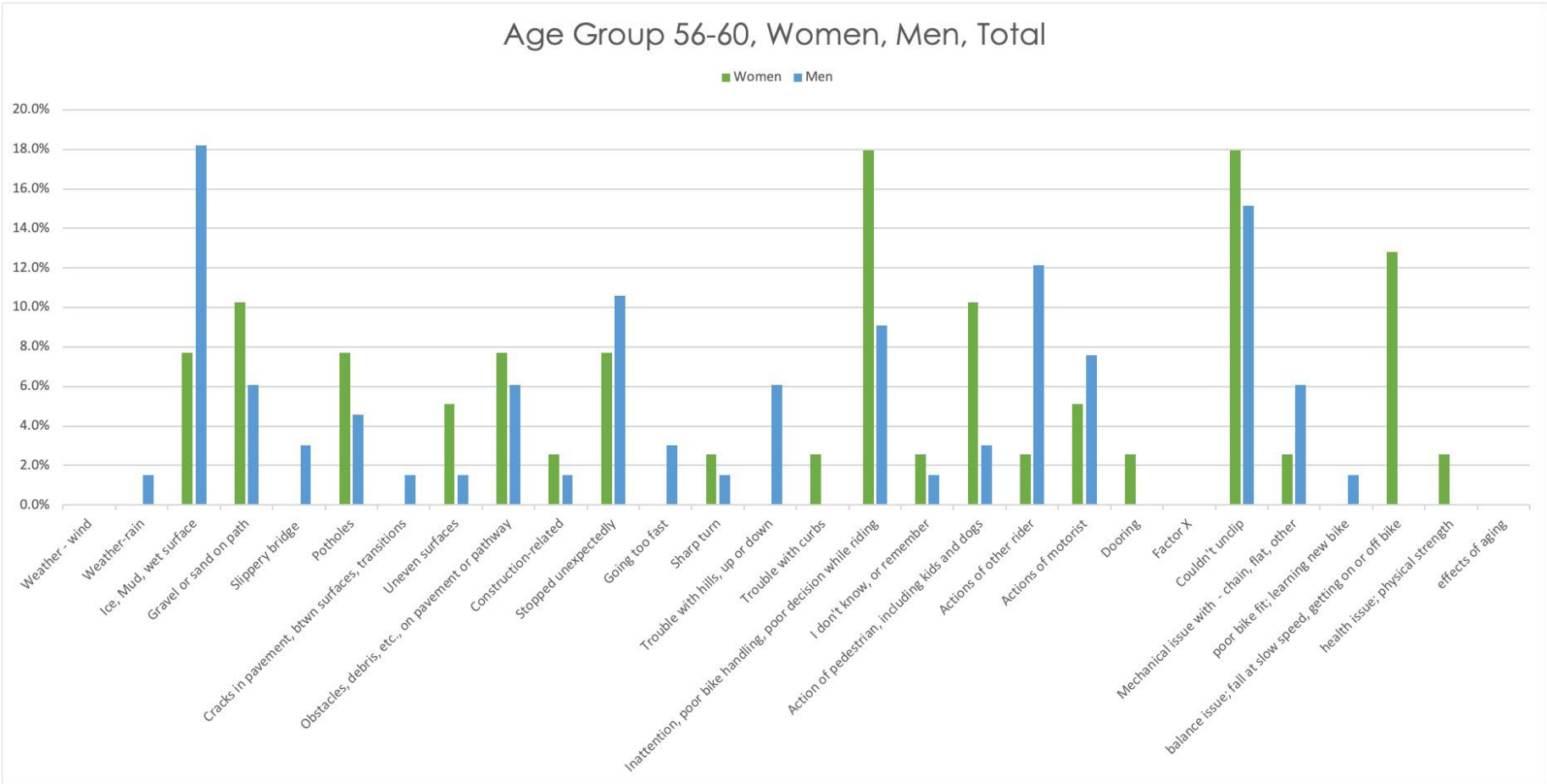
In general, respondents prefer crossing conditions that are well-marked and with a lower potential for conflicts with motorists. Roundabouts, while shown to be safer for all modes, ranked low, as did trail crossings along multi-lane roads in less developed areas. None of the across the road features received as high a usage selection percentage as the top along the roadway features. This supports cyclists' preference for trails away from the roadway with fewer roadway crossings which were stated in open ended questions in the survey.

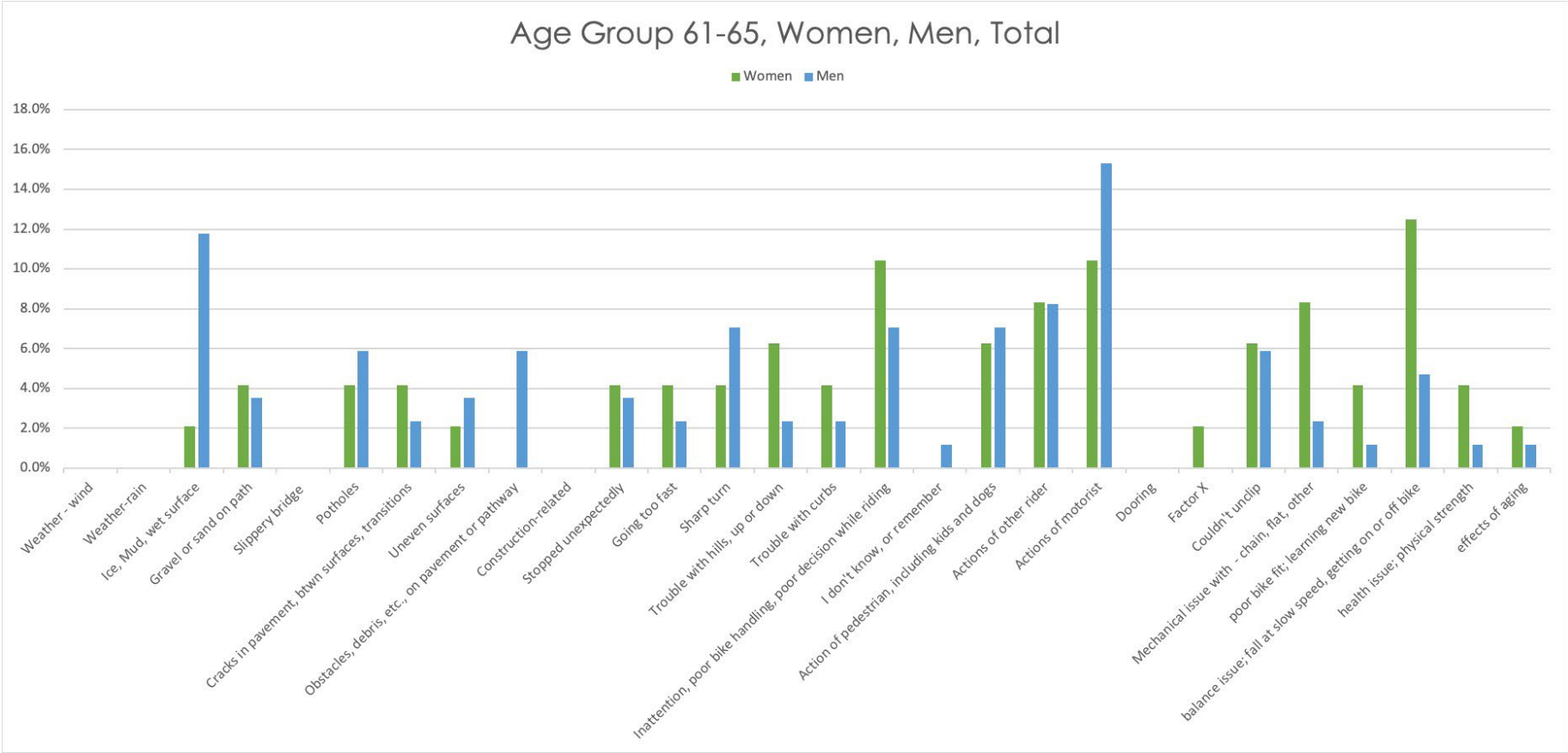
APPENDIX D - DETAILED CHARTS OF FALLS

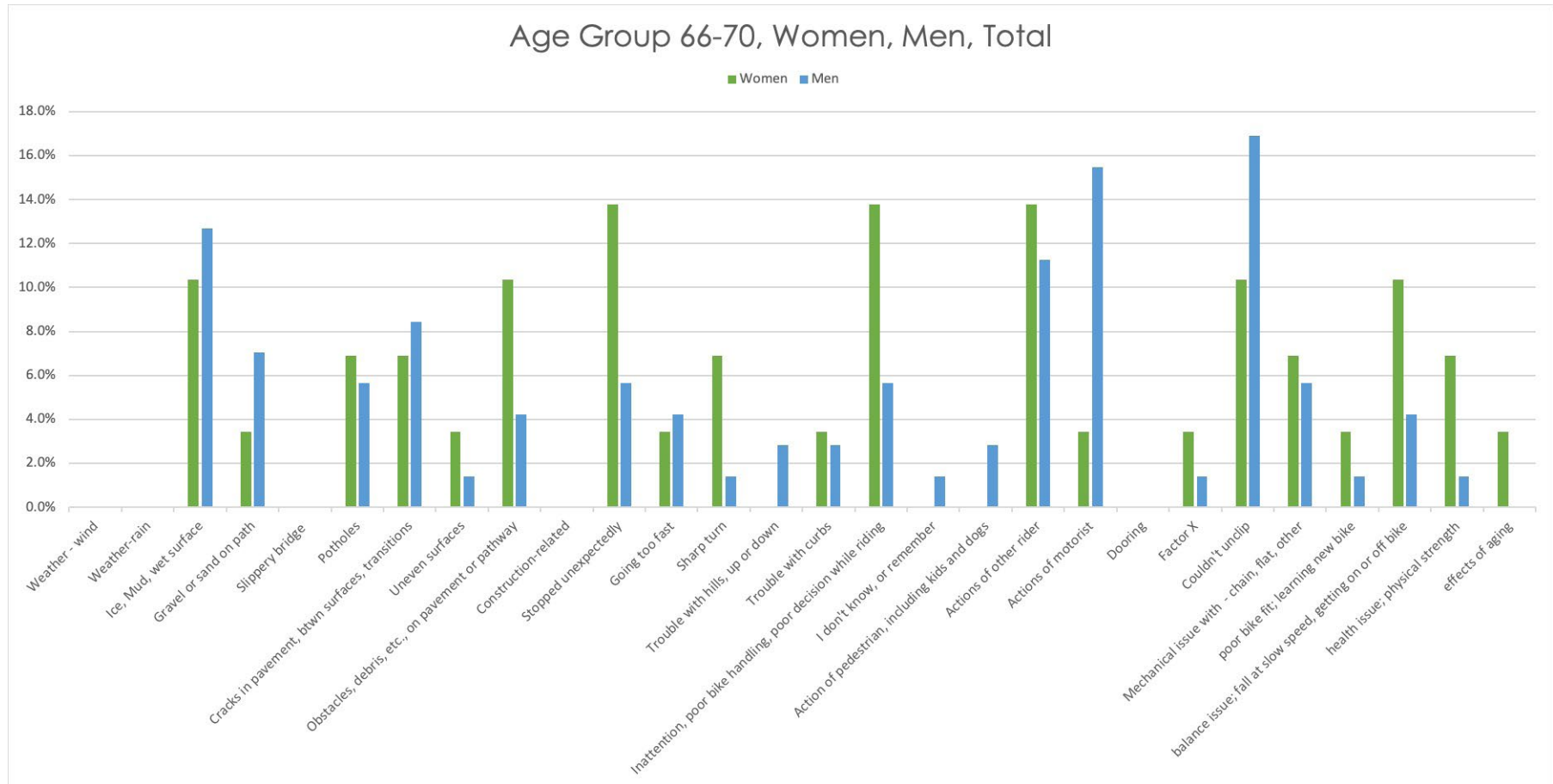
Detailed information by gender, age group, and factor are provided in this appendix. The first chart shows a grand total, as well as totals for women and men. The remaining charts provide these totals for each age group.

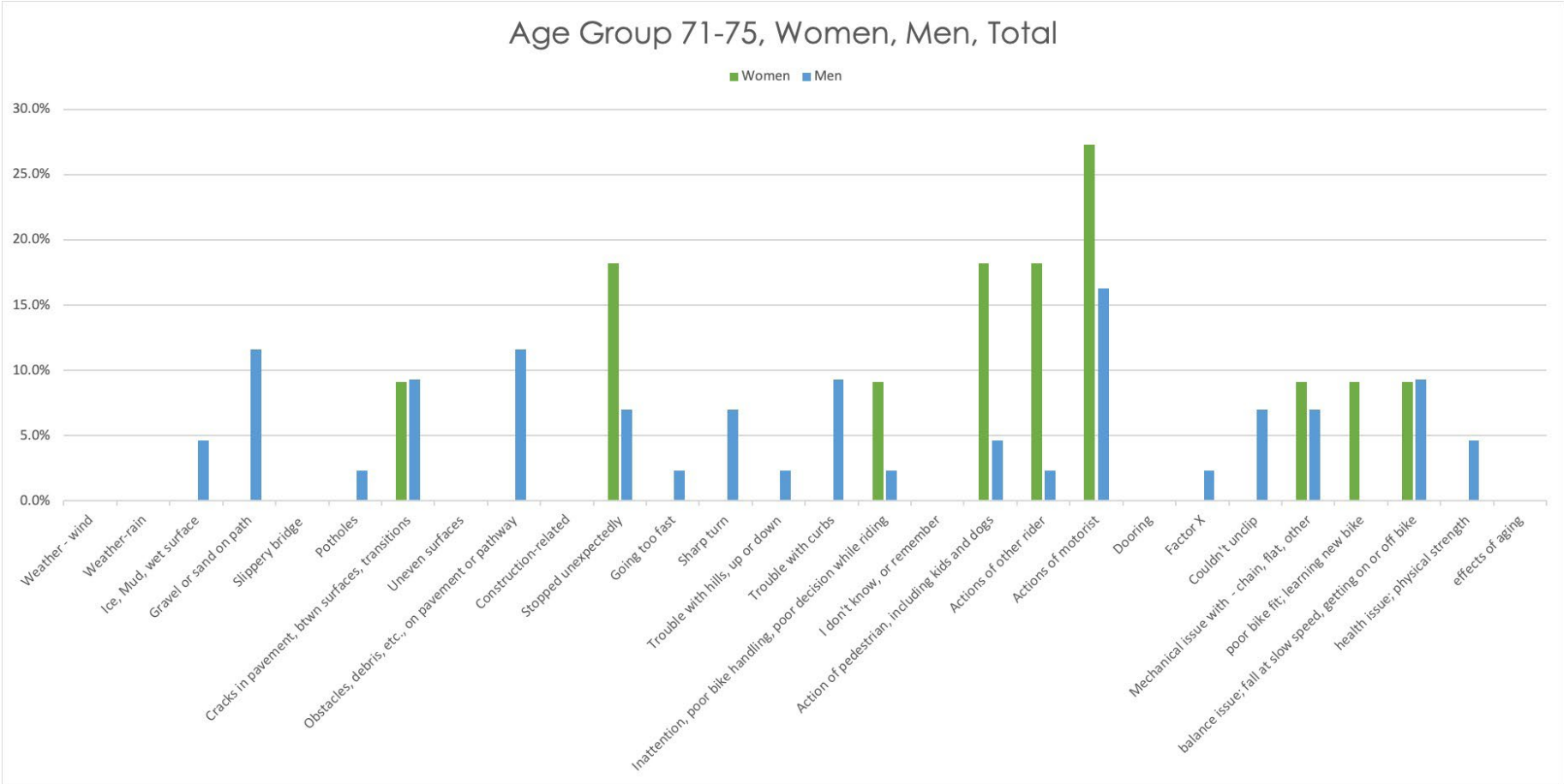


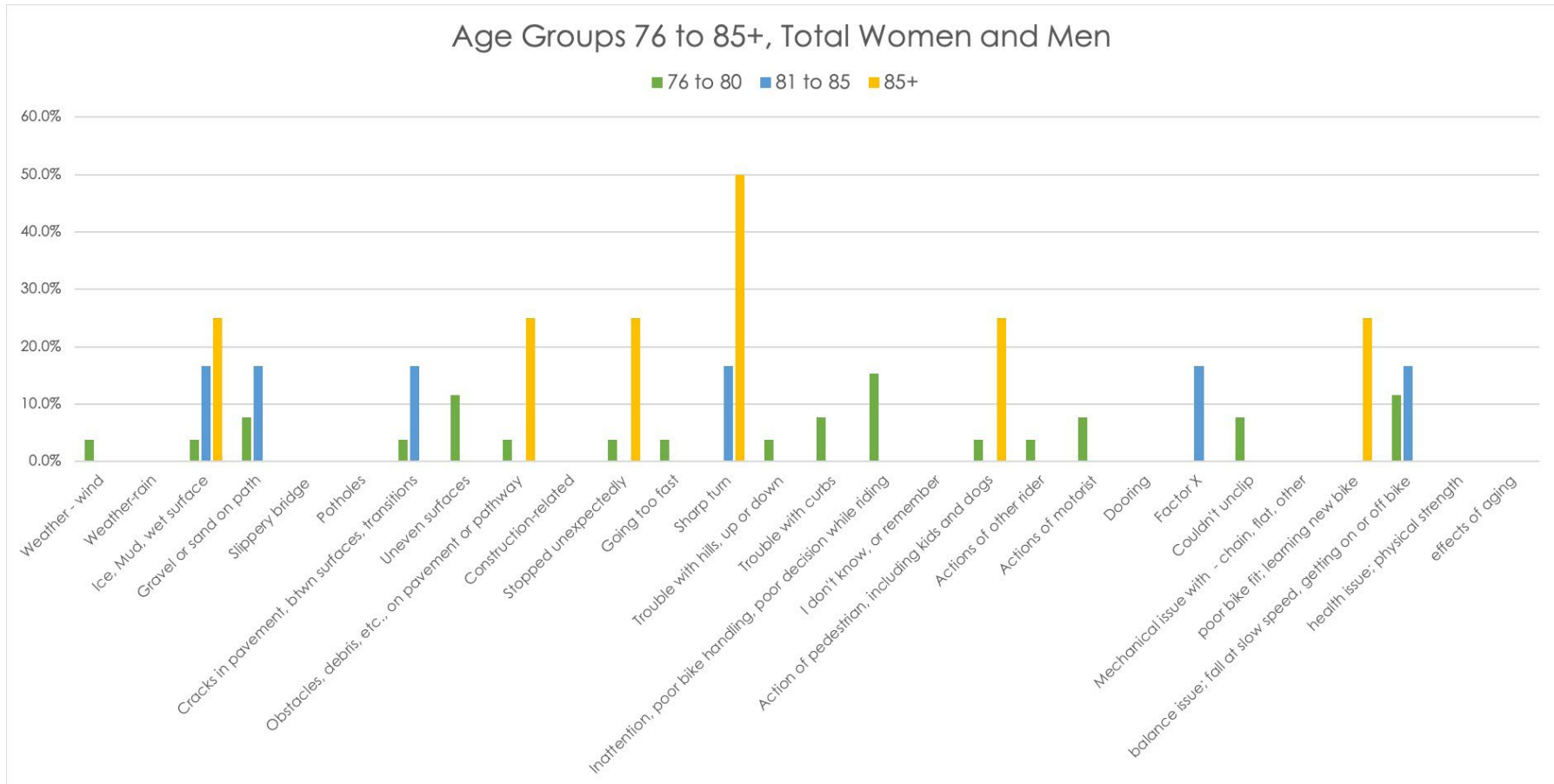












APPENDIX E – RESOURCES

The following resources are provided as a place to begin and will be expanded over time. Included here are resources cited in the Databook, as well as others. Please resources you find to be useful to dbtildecollab@gmail.com.

CYCLING AND OLDER ADULTS

Barriers and Motivators of Bicycling by Gender Among Older Adult Bicyclists in the Midwest

<https://pubmed.ncbi.nlm.nih.gov/31597479/>

Better Bicycles: An analysis of the needs and requirements of older cyclists (December 2007)

<https://www.vinnova.se/contentassets/99c0a936480b463cbd9f6a6fc9cb417e/vr-07-17.pdf>

Cycling strategies of young and older cyclists (April 2016)

https://www.researchgate.net/publication/291086539_Cycling_strategies_of_young_and_older_cyclists

The 50+ Cycling Survey (September 2020)

https://www.aarp.org/livable-communities/getting-around/info-2020/50-plus-cycling-survey.html?cmp=EMC-DSM-NLC-LC-HOMFAM-20200915_LivableCommunities_899300_1359001-091520-F2-cycling-CTA_Button-CTRL-4857209&encparam=qVa53IE39uHPI4uny63%2BvFK1b2vLCngL01EKaSIRZ7A%3D

Geriatric Cyclists: Assessing Risks, Safety, and Benefits (January 23, 2018)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5784561/>

Smart Cycling Tips for Older Adults

<https://www.bikeleague.org/ridesmart>

CYCLING AND GENDER

Are millennial women the answer to ending the gender gap in bicycling?

<https://jenniferdill.net/2017/03/31/are-millennial-women-the-answer-to-ending-the-gender-gap-in-bicycling/>

Explaining Gender Differences in Bicycle Behavior (February 2009)

<https://activelivingresearch.org/explaining-gender-differences-bicycle-behavior>

CYCLING AND SAFETY

Bicycles, Gender, and Risk: Driver Behaviors When Passing Cyclists (July 15, 2019)

<https://genderpolicyreport.umn.edu/bicycles-gender-and-risk/>

Characteristics of single-vehicle crashes in e-bikes in Switzerland (August 2018)

<https://www.sciencedirect.com/science/article/pii/S000145751830174X>

E-Bike Injuries: Experience from an Urban Emergency Department – A Retrospective Study from Switzerland (2014)

<https://www.hindawi.com/journals/emi/2014/850236/>

CYCLING TYPES AND BEHAVIOR

The City of the Future, The World in 2021, The Economist, pg. 94.

Designing for All Ages and Abilities

https://nacto.org/wp-content/uploads/2017/12/NACTO_Designing-for-All-Ages-Abilities.pdf

Four Types of Cyclists

<https://www.portlandoregon.gov/transportation/article/264746>

Low-Stress Bicycling and Network Connectivity (May 2012)

<https://transweb.sjsu.edu/research/Low-Stress-Bicycling-and-Network-Connectivity>

Understanding and Measuring Bicycle Behavior: A Focus on Travel Time and Route Choice (December 2008)

<https://nacto.org/wp-content/uploads/2012/02/Dill-and-Gliebe-2008.pdf>

Understanding the “Four Types of Cyclists” (August 2017)

<https://altago.com/understanding-the-four-types-of-cyclists/>

E-BIKES AND TRIKES

Hot Wheels: Today’s Adult Tricycles are Low, Sleek, Speedy, and Finding a Larger Fan Base (October 2018)

https://www.washingtonpost.com/lifestyle/wellness/hot-wheels-todays-adult-tricycles-are-low-sleek-and-speedy/2018/10/09/58570dd4-bdc6-11e8-8792-78719177250f_story.html

The Unlikely way eBikes Could Transform How We Age (May 9, 2019)

<https://www.fastcompany.com/90341686/the-unlikely-way-e-bikes-could-transform-how-we-age>

Would an E-Bike Get you Pedaling? (2018)

<https://www.aarp.org/livable-communities/getting-around/info-2018/e-bikes-energize-bicycling.html>

PHYSICAL ACTIVITY AND WELLNESS

Measuring Physical Activity Intensity (September 2020)

<https://www.cdc.gov/physicalactivity/basics/measuring/index.html>

Reducing Isolation and Loneliness Through Membership in a Fitness Program for Older Adults: Implications for Health (November 2018)

https://www.researchgate.net/publication/328742003_Reducing_Isolation_and_Loneliness_Through_Membership_in_a_Fitness_Program_for_Older_Adults_Implications_for_Health

ABOUT THE AUTHOR

CAROL KACHADOORIAN

Carol 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 db|Tilde 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."

MTI FOUNDER

Hon. Norman Y. Mineta

MTI BOARD OF TRUSTEES

Founder, Honorable Norman Mineta*
Secretary (ret.),
US Department of Transportation

Chair, Abbas Mohaddes
President & COO
Econolite Group Inc.

Vice Chair, Will Kempton
Retired Transportation Executive

Executive Director, Karen Philbrick, PhD*
Mineta Transportation Institute
San José State University

Winsome Bowen
Chief Regional Transportation
Strategy
Facebook

David Castagnetti
Co-Founder
Mehlman Castagnetti
Rosen & Thomas

Maria Cino
Vice President
America & U.S. Government
Relations Hewlett-Packard Enterprise

Grace Crunican**
Owner
Crunican LLC

Donna DeMartino
Managing Director
Los Angeles-San Diego-San Luis
Obispo Rail Corridor Agency

John Flaherty
Senior Fellow
Silicon Valley American
Leadership Form

William Flynn *
President & CEO
Amtrak

Rose Guilbault
Board Member
Peninsula Corridor
Joint Powers Board

Ian Jefferies*
President & CEO
Association of American Railroads

Diane Woodend Jones
Principal & Chair of Board
Lea + Elliott, Inc.

David S. Kim*
Secretary
California State Transportation
Agency (CALSTA)

Therese McMillan
Executive Director
Metropolitan Transportation
Commission (MTC)

Jeff Morales
Managing Principal
InfraStrategies, LLC

Dan Moshavi, PhD*
Dean, Lucas College and
Graduate School of Business
San José State University

Toks Omishakin*
Director
California Department of
Transportation (Caltrans)

Takayoshi Oshima
Chairman & CEO
Allied Telesis, Inc.

Paul Skoutelas*
President & CEO
American Public Transportation
Association (APTA)

Beverley Swaim-Staley
President
Union Station Redevelopment
Corporation

Jim Tymon*
Executive Director
American Association of
State Highway and Transportation
Officials (AASHTO)

* = Ex-Officio

** = Past Chair, Board of Trustees

Directors

Karen Philbrick, PhD
Executive Director

Hilary Nixon, PhD
Deputy Executive Director

Asha Weinstein Agrawal, PhD
Education Director
National Transportation Finance
Center Director

Brian Michael Jenkins
National Transportation Security
Center Director

