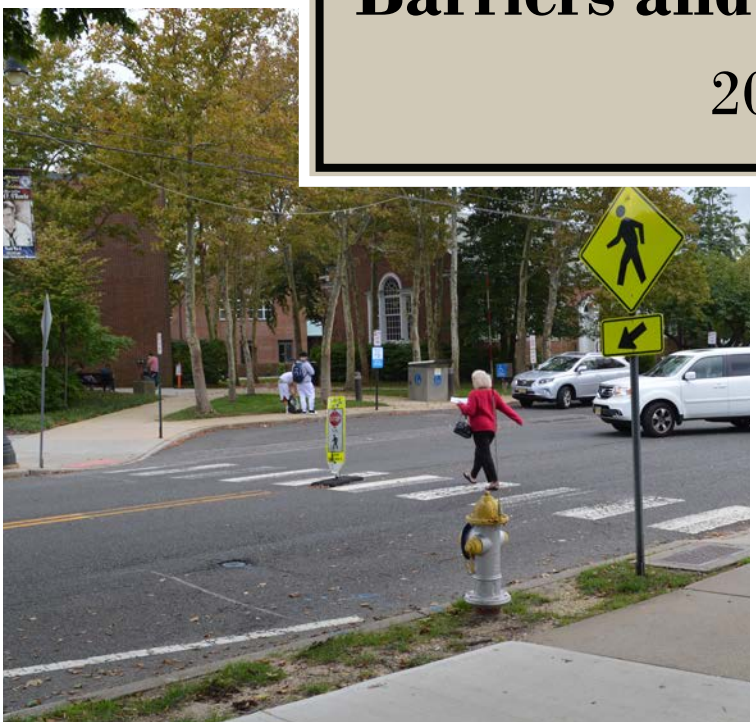
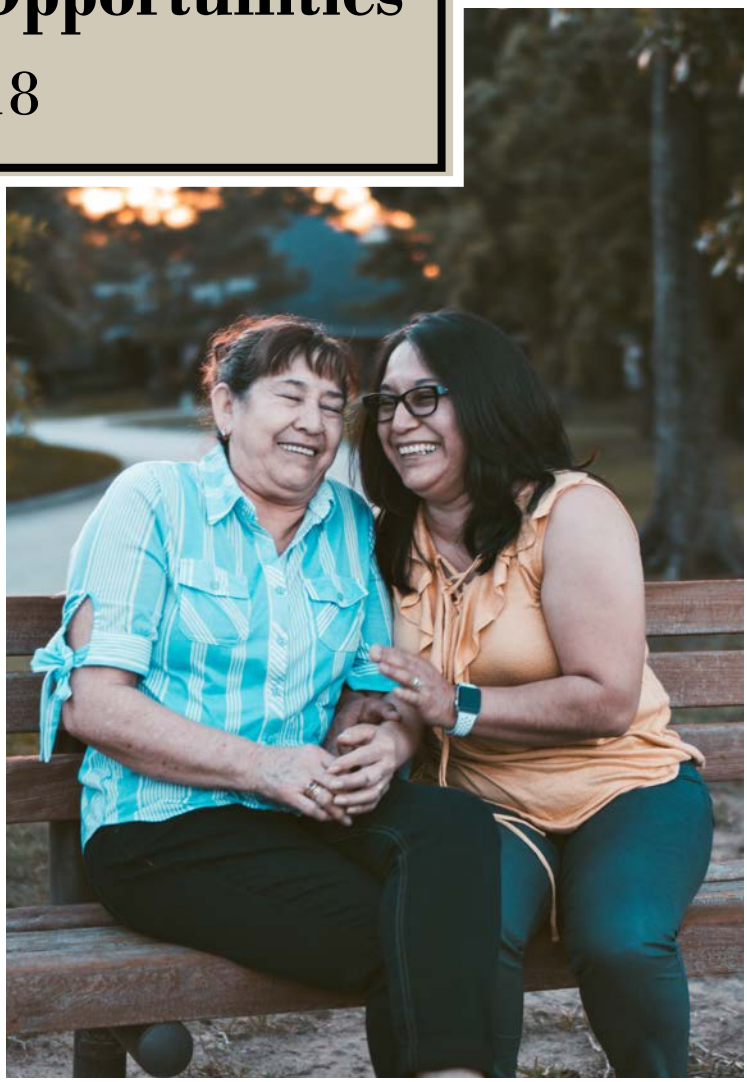
Seniors & Walking:
Barriers and Opportunities
2018





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ABOUT

This report was developed by the Bicycle and Pedestrian Resource Center within the Alan M. Voorhees Transportation Center (VTC) at Rutgers, The State University of New Jersey. The research team included: Charles T. Brown, MPA, Principal Investigator, Devajyoti Deka, Ph.D., Andrea Lubin, James Sinclair, and Lisa Cintron.

The Alan M. Voorhees Transportation Center (VTC) is a national leader in the research and development of innovative transportation policy. Located within the Edward J. Bloustein School of Planning and Public Policy at Rutgers University, VTC has the full array of resources from a major research university on transportation issues of regional and national significance.

The New Jersey Bicycle and Pedestrian Resource Center (BPRC) assists public officials, transportation and health professionals, and the public in creating a safer and more accessible walking and bicycling environment through primary research, education and dissemination of information about best practices in policy and design. The Center is supported by the New Jersey Department of Transportation through funds provided by the Federal Highway Administration.

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EXECUTIVE SUMMARY

With the growth of older adults due to the aging of the baby boomers and the aging of population in suburban and exurban areas where mobility depends almost exclusively on the automobile, there is a growing concern among transportation planners about the transportation needs and barriers of older adults. The growth of older adults in New Jersey is also substantial, as evident from the fact the share of the population aged 55 or over increased from 22 percent to 28 during the 2000–2016 period. There is also a growing concern among health professionals and researchers that older adults do not walk or participate in physical activities enough despite widespread knowledge that physical activities have a positive effect on health and well-being. With that background, this study sought to fulfill the following objectives in the context of New Jersey:

(a) Comprehend the walking patterns, needs, and barriers of older adults living in different types of neighborhoods;

(b) Comprehend their perception of walking needs, barriers, and health benefits from walking;

(c) Assess the health and well-being of older adults living in different environments;

(d) Assess the relationship between leisure/exercise and transportation walking and health and well-being of older adults.

(e) Present recommendations for removing barriers and enhancing walking among older adults with the objective of improving their health and overall well-being.

The study involved three distinct tasks: (a) a review of pertinent literature, (b) focus groups involving older adults, and (c) a randomized mail survey of older adults. Because of a high concentration of older adults and the existence of many gated and non-gated age-restricted communities in those municipalities, Monroe Township in Middlesex County and Berkeley Township in Ocean County were chosen as the study area. The subject populations for this study are adults age 50 or over living in (a) age-restricted gated communities of Monroe Township, (b) age-restricted non-gated communities of Berkeley Township, and (c) adults aged 50 or over living in non-age-restricted regular neighborhoods of Monroe and Berkeley Townships. The study distinguishes between these three types of communities because each provides a distinct set of environmental characteristics for walking and physical activities, including both indoor and outdoor walking infrastructure and facilities.

Thirty older adults living in three types of communities participated in three focus groups convened in the communities, whereas 701 older adults completed the mail survey. The observations from the focus groups and the survey were consistent. Some of these consistent findings are:

(a) Older adults living in all three types of communities are only mildly concerned about crime or traffic when walking in their neighborhoods. The concern about traffic is slightly greater than the concern about crime.

(b) Relative to other considerations such as housing cost and property tax, the availability/quality of neighborhood pedestrian infrastructure, including sidewalks, was less important to older adults in all three types of communities. Despite not being of the highest importance, sidewalks were considered important for neighborhood quality, walking, and safety.

(c) The frequency and duration of walking varies widely among the older adults of the three types of communities, but the differences between different types of communities was minimal.

(d) When asked to compare indoor and outdoor walking environments of their current neighborhoods with the neighborhoods where they previously lived, the residents of the gated communities clearly indicated that their current neighborhoods provided significantly better environments.

(e) Not having destinations nearby to walk to is one of the most common barriers to walking.

Some of the findings from the survey alone are:

(a) Older adults walk more frequently for leisure and exercise than for transportation. Whereas 45 percent of all older adults from the three types of communities did not walk at all for transportation within seven days, only 20 percent did not walk at all leisure or exercise.

(b) The share of persons who never walked and walked often (5-7 days a week) varied little across the three types of communities.

(c) The most common purposes for transportation walking trips for all three types of communities combined were to visit clubhouses, grocery/drug stores, friends and family, banks/post offices, and neighborhood stores.

(d) The most commonly used pedestrian infrastructure for leisure/exercise walking for all three types of communities is neighborhood sidewalks as two-thirds of the survey respondents from each type of community walked on neighborhood sidewalks. Neighborhood sidewalks are followed by indoor walking (e.g., shopping malls) and fitness centers, respectively, but a substantial share also walked on roads, within neighborhood parks, and on sidewalks outside their own neighborhoods.

(e) Survey respondents are supportive of various types of improvements of pedestrian infrastructure and facilities, but they are most supportive of improving lighting sidewalks and paths, followed by improving sidewalks and crosswalks. Although generally supportive of all types of improvements, they showed less enthusiasm about improving trails/paths, installing benches, and planting trees.

(f) Support for all types of pedestrian infrastructure improvements was greater among the residents of regular neighborhoods than the gated and non-gated age-restricted communities.

(g) The concern about traffic was greater among the residents of general neighborhoods than the residents of gated and non-gated communities.

(h) Although only about 23 percent of the older adults from all communities combined used a device like Fitbit or smartphone to track steps, they walked more often and for longer duration than the non-users, indicating that such devices have a discernible positive effect on walking for older adults.

(i) Correlation analysis showed that personal health and walking for leisure and exercise are positively related. The relationship between physical health and walking is more discernible than the relationship between walking and psychological indicators such as ability to concentrate and anxiousness. The relationship between walking for transportation and

health is less discernible than the relationship between walking for leisure/exercise and health.

(j) A comparison of older adults who have sidewalks in front of their houses with those who do not have sidewalks showed that the former group walks more frequently for both leisure/exercise and transportation.

Based on the study's findings, the following recommendations are made:

(a) Promote the development of affordable age-restricted communities for older adults throughout the state because such developments provide greater opportunities for physical activities and social interactions and thus reduce isolation and promote a healthy lifestyle.

(b) Develop age-restricted communities within walking distance of parks, grocery/drug stores, convenience/neighborhood stores, and banks/post offices to increase transportation walking among older adults.

(c) Develop age-restricted communities in areas with similar neighborhood characteristics as the ones in the study areas, especially in areas with less apprehension about crime and traffic.

(d) Improve all types of pedestrian infrastructure and facilities, but place greater emphasis on the improvements of lighting, sidewalks, and crosswalks.

(e) Municipalities with a high concentration of older adults living in general neighborhoods should encourage private fitness centers to locate in those communities and place a high level of emphasis on improving their pedestrian infrastructure to emulate conditions similar to gated and non-gated age-restricted communities.

(f) Educate older adults about the health benefits of walking, including the benefits from tracking their physical activities with devices.

(g) Provide grants for sidewalk improvements in areas with high concentrations of older adults because older adults with sidewalks in front of their houses clearly walk more for both leisure/exercise and transportation.

1. INTRODUCTION

Transportation needs and barriers of older adults have become a serious concern for transportation planners nationwide because of a number of factors, including the aging of the baby boomers, many of whom continue to live in suburban areas with little or no public transportation. Health professionals are also concerned that older adults do not participate in physical activities like walking despite widespread knowledge that walking is highly beneficial to health. Some have attributed this lack of physical activity, especially walking for leisure/exercise and transportation, to unconducive neighborhood environments, such as lack of destinations, lack of or poor quality of sidewalks and crosswalks, and unsafe traffic conditions.

In recent years, the share of older adults in New Jersey has rapidly increased. A comparison of data from the 2016 the American Community Survey (ACS) with data from the 2000 decennial census shows that the share of persons aged 55 or over in the state increased from 22 percent to 28 percent, while the share of persons aged 65 and over increased from 13 percent to 15 percent during just 16 years. There are many reasons for the growth of older adults nationally, including an increase in life expectancy, the significant size of the aging baby boom generation, and a decrease in reproduction between the baby boom generation (born up to mid-1960s) and the millennial generation (born between 1980 and 2000). In the case of New Jersey, the migration of retirees from other states to specific areas may also have added to the growth of older adults. Active-living communities, 55+ communities, etc., — exclusive communities for older adults — have been established in different parts of the state to attract retirees from within and outside the state.

The growth of older adults has serious consequences for transportation planning and policy for several reasons. First, older adults are likely to have disabilities far more often than younger people. The disabilities impose restrictions on their mobility, often preventing them from walking and taking fixed-route transit. Second, because many people are aging in places where they formed their households, a substantial growth of older people is taking place in suburban and exurban areas, where the provision of mass transit is often inefficient. As shown in Figure 1, the 55+ population of New Jersey is scattered all over the state, including large parts of the state where the built environment is of suburban nature, sidewalks and crosswalks are less commonly found that urban areas, and public transportation is rarely available. The isolation created by lack of transportation options often affects older adults in an adverse manner, diminishing their self-efficacy and overall psychological well-being.

Providing the opportunity to walk to older adults in New Jersey is important for transportation planners and society at large. Numerous studies have shown that walking can help to keep older adults healthier and reduce their social isolation. Thus, by providing adequate walking infrastructure and facilities and making walking safer, society can improve the quality of life of the state's older adults.

With that background, this study seeks to fulfill the following objectives in the context of New Jersey:

(f) Comprehend the walking patterns, needs, and barriers of older adults living in different types of neighborhoods;

(g) Comprehend their perception of walking needs, barriers, and health benefits from walking;

(h) Assess the health and well-being of older adults living in different environments;

(i) Assess the relationship between leisure/exercise and transportation walking and health and well-being of older adults.

(j) Present recommendations for removing barriers and enhancing walking among older adults with the objective of improving their health and overall well-being.

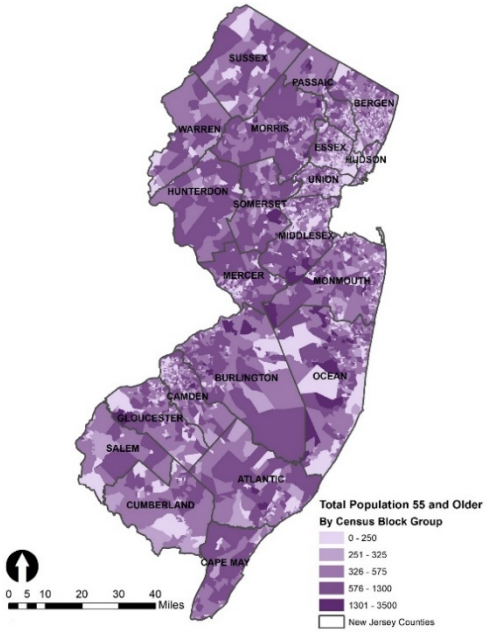

Figure 1. Residential location of 55+ populations in New Jersey (ACS 5-year summary data, 2016)

To fulfill the aforementioned objectives, the study focuses on older adults (aged 50 or older) living in three types of communities of Monroe Township in Middlesex County and Berkeley Township of Ocean County: (a) age-restricted gated communities in Monroe, (b) age-restricted non-gated communities in Berkeley, and (c) non-restricted general neighborhoods in both Monroe and Berkeley (Figure 2). These communities were chosen because (a) a significantly higher concentration of older adults live there compared to other parts of the state, and (b) they provide an opportunity to compare people living in areas with different types of built environment and facilities for physical activities.

Information was collected from older adults living in those areas by a random mail survey as well as three focus groups. The mail survey collected data from a total of 701 older adults. Thirty older adults participated in three focus groups. While the survey provided data from a large number of older adults, the focus groups provided deeper insights about the perceptions, needs, and barriers to walking for older adults from different types of communities. The survey and the focus groups were designed on the basis of a review of a large number of relevant studies.

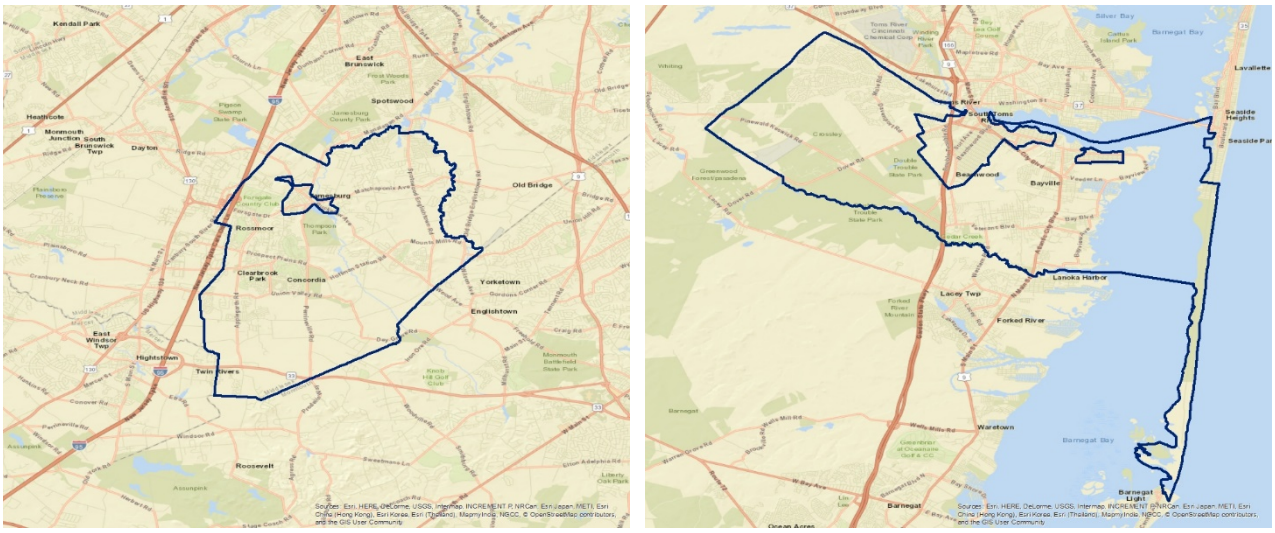

Figure 2. Monroe Township (Left) and Berkeley Township (Right) communities selected for survey

The remainder of this report is divided into four broad sections. Section 2 includes a review of relevant past studies. Section 3 describes the focus groups and the key observations/themes from the focus groups. Section 4 describes the mail survey and results from the analysis of survey data. Section 5 summarizes the key findings and presents the recommendations.

2. DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERSITICS

2.1. AGE

Figure 3 shows the age distribution of the survey respondents by community type. Of all respondents, 13 percent are between age 50 and 59, 29 percent are between age 60 and 69, 32 percent are between age 70 and 79, and 26 percent are 80 or older. The figure shows that the respondents from the gated communities, on average, are older than the respondents from the non-gated communities as well as the general neighborhoods, whereas the respondents from the non-gated communities are older than the respondents from the general neighborhoods. For example, the share of respondents aged 80 or older in gated communities is almost 34 percent, compared to the share of similar persons in the non-gated communities (22 percent) and general neighborhoods (14 percent). It is also worth noting that the share of people from general neighborhoods in age 50-59 is significantly greater (33 percent) compared to the gated communities (4 percent) and the non-gated communities (8 percent).

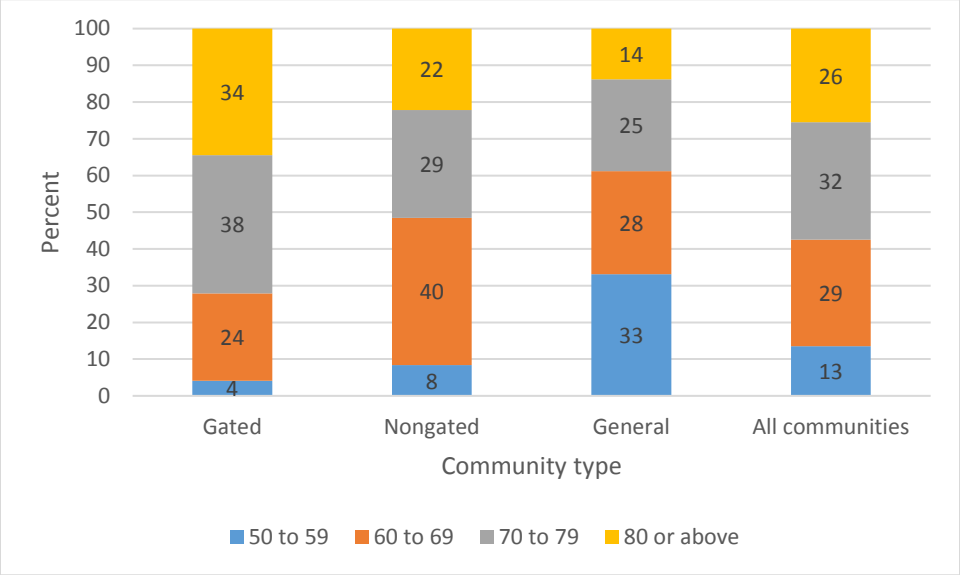

Figure 3. Age distribution of respondents

2.2. SEX

The sex distribution of the respondents is shown by community type in Figure 4. The distribution of all respondents combined is slightly different from the sex distribution of New Jersey as a whole in that the state's female population is slightly larger than its male population whereas the distribution for all communities combined shows an equal share for both sexes. The greatest discrepancy is observed for the non-gated communities where the share of female respondents is noticeably higher (54 percent) than the share of male respondents (46 percent). On the whole, however, the sex distribution of all three types of communities is within the expected range.

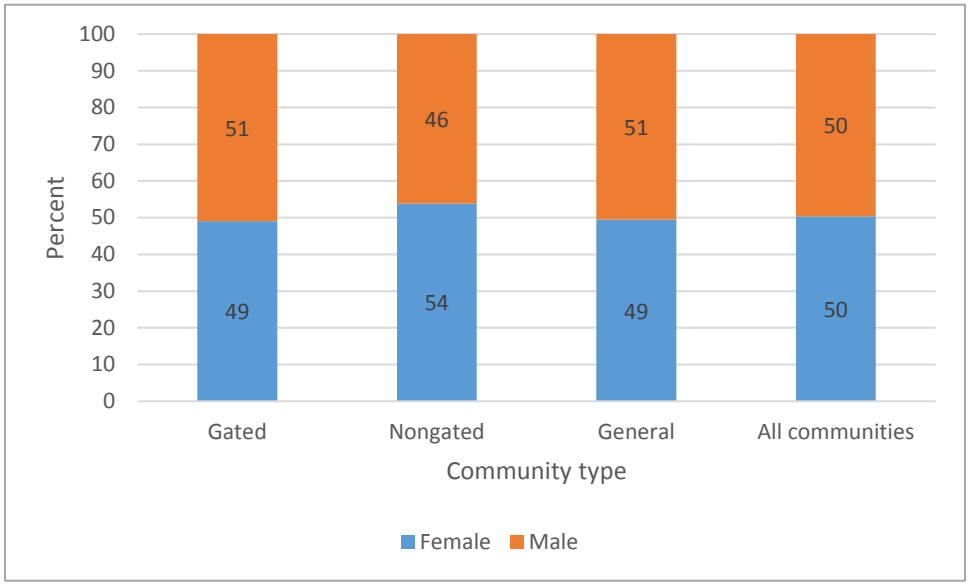

Figure 4. Sex distribution of respondents

2.3. Race and Ethnicity

The distribution of the respondents by race is shown by community type in Figure 5. It is evident that the share of respondents belonging to minority races is smaller than what would be expected in the New Jersey, where 70 percent are white, 15 percent are Black, and 10 percent are Asian (American Community Survey, 2016). In contrast, the share of white respondents among all respondents is 93 percent and non-white minorities constitute only 7 percent. The share of white respondents is even higher for the gated communities and the non-gated communities. However, the racial distribution of the survey respondents is not surprising because of the focus of the study on specific types of communities.

Similar to Blacks or African Americans and Asians, the share of Hispanic persons is also lower among the survey respondents compared to the state of New Jersey. While more than 19 percent of the state's population is Hispanic, the share of Hispanic respondents from the three types of communities combined was less than 2 percent. The share of Hispanic respondents from gated communities, the non-gated communities, and general neighborhoods were 1 percent, 2 percent, and 3 percent, respectively. For both Hispanic and non-white population, the shares are higher for the general neighborhoods than the other two types of communities.

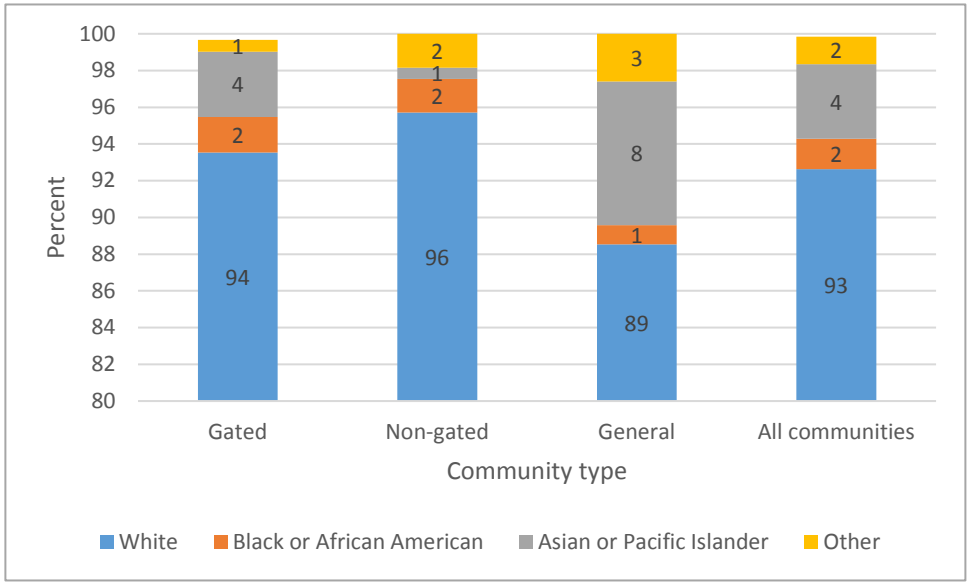

Figure 5. Distribution of respondents by race

2.4. Educational Attainment

The distribution of educational attainment of the survey respondents is shown by type of community in Figure 6. The survey respondents from the three types of communities combined are more educated than the population of New Jersey. While the share of persons aged 25 or older in the state with less than high school diploma is more than 11 percent, the share of respondents with that level of education among all respondents is only 2 percent. On the other hand, while the share of New Jersey residents with postgraduate degree is 14 percent, the share for the survey respondents is 23 percent.

Figure 6 shows that the level of education varies substantially across the three types of communities. The residents of gated communities appear to have the highest level of education as almost 32 percent of them have a postgraduate degree and almost 60 percent have at least a bachelor's degree. The residents of general neighborhoods appear to have a higher level of education than the residents of the non-gated communities as the share of respondents from the former having a bachelor's degree or high is almost 44 percent compared to only 23 percent in the latter. The share of respondents with a high school diploma or less is correspondingly smaller in the general neighborhoods than the non-gated communities. On the whole, substantial variations exist in educational attainment among the three types of communities. The respondents from the gated communities are the most educated, followed by the respondents of the general neighborhoods and the non-gated communities, respectively.

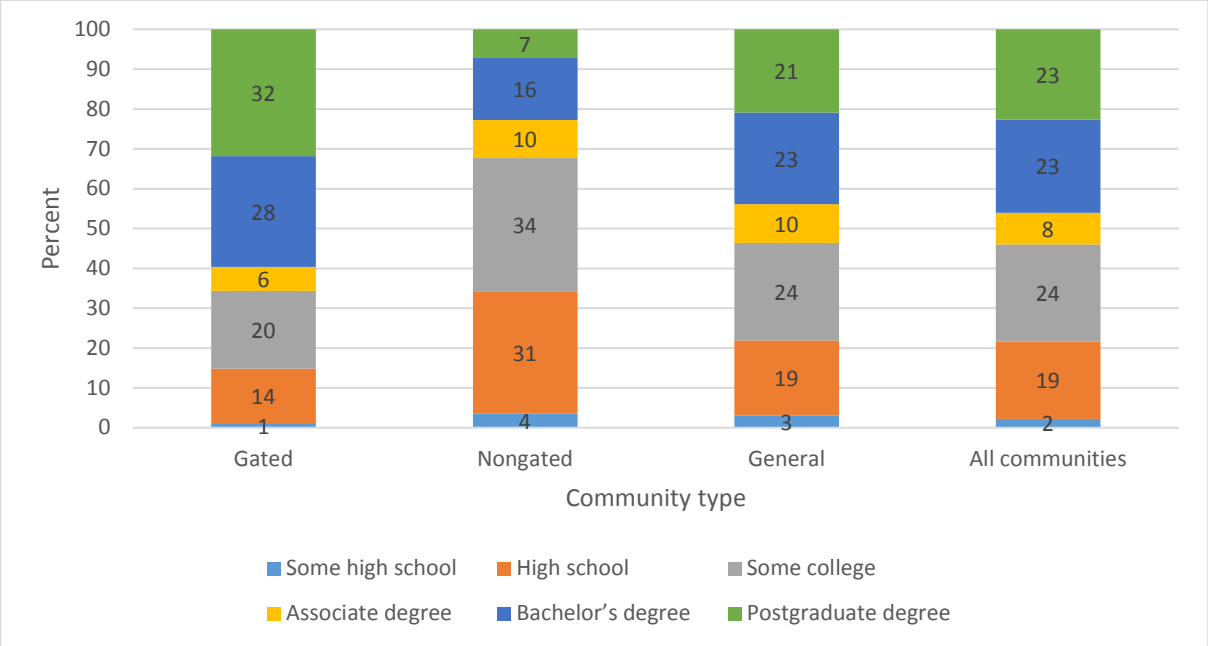

Figure 6. Respondents by educational attainment

2.5. HOUSEHOLD INCOME

The survey respondents from the three types of communities combined mostly belong to middle-income households. As shown in Figure 7, among all respondents from the three types of communities, approximately 33 percent belong to households with income between $50,000 and $100,000 and 13 percent belong to households with income between $100,000 and $150,000. However, household income of the respondents for the three types of communities varies across the three types of communities.

Among the three types of communities, the share of respondents with high income is the highest for general neighborhoods, where the share of respondents with income $150,000 or over is 22 percent compared to 13 percent for all types of communities combined. The share of households with high income appears to be the lowest for the non-gated communities, whereas the respondents from gated communities appear to have higher income than those from the non-gated communities, but lower income than those from regular neighborhoods. Although the respondents from the gated communities, on average, have higher education than the respondents from regular neighborhoods, their average income appears to be lower than the latter. A reason for this discrepancy may be the higher age of the respondents from gated communities, where the share of retired persons is likely to be higher than the general neighborhoods. The income of respondents in general neighborhoods may be higher because of their lower age, which makes them more likely to be gainfully employed.

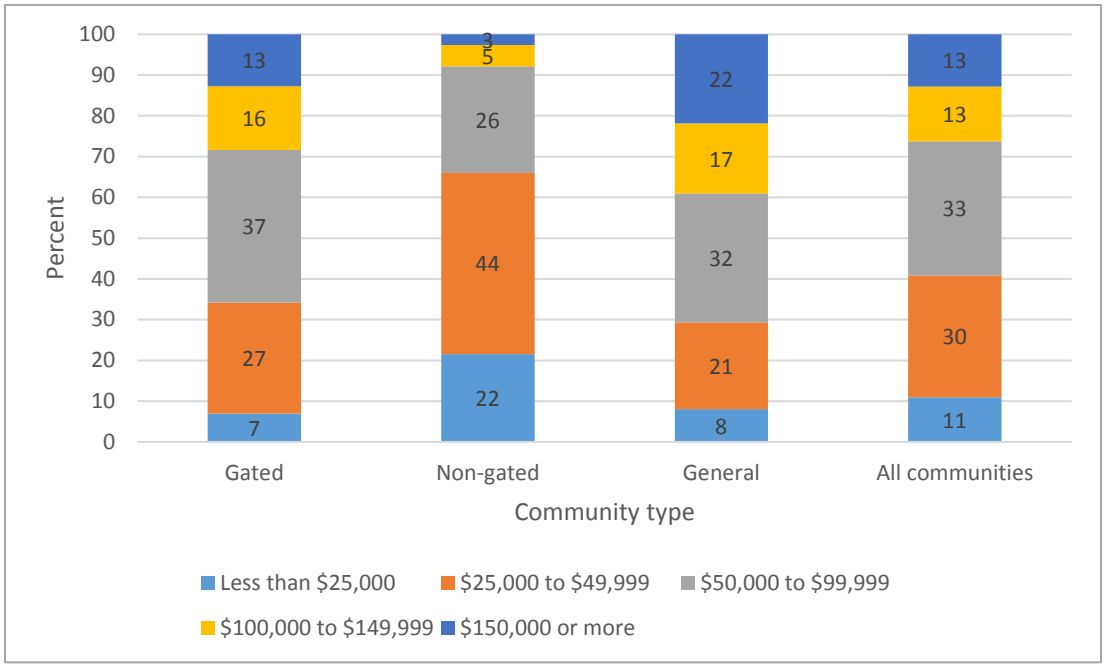

Figure 7. Respondents by household income

2.6. Occupation

Figure 8 shows the share of retirees and workers (full-time or part-time). For all communities combined, the share of retirees is 70 percent and the share of workers is 30 percent. However, the share of retirees in gated communities is as high as 81 percent and share of workers is only 19 percent. In contrast, only 53 percent of the respondents from general neighborhoods are retirees even though all respondents are over age 50.

Among the workers, only 30 percent are employed full-time whereas 70 percent work part-time. The share of voluntary workers is less than 6 percent and unemployed people constitute less than 2 percent for all communities combined. Seventy percent of all respondents who are still working also mentioned that they were employed in physically-demoing jobs (such as machinists, construction workers, etc.), whereas the other 30 percent were employed in non-physical jobs (such as office workers, computer programmers, etc.).

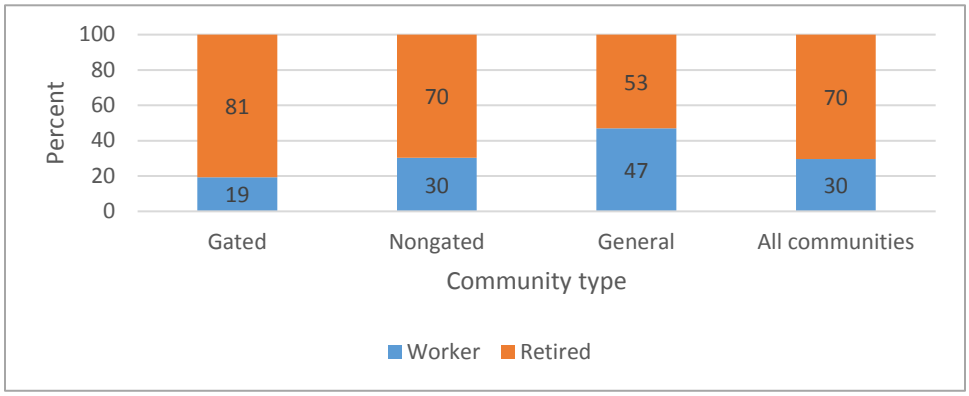

Figure 8. Share of retirees and workers

2.7. Car Ownership

Although older persons are often perceived to be less reliant on cars than younger persons, that is certainly not the case with the survey respondents. Figure 9 shows that only about 3 percent of the respondents from all three types of communities combined belong to households with no cars, whereas 13 percent belong to households with three or more cars. A reason for the high car ownership among the residents may be that the surveyed areas are primarily suburban with very little public transit service available.

Among the three types of communities surveyed, car ownership is the highest in the regular neighborhoods. In those communities 32 percent have three or more cars per household and 68 percent have two or more cars. A reason for the higher car ownership rate in regular neighborhoods could be that a larger share of their residents are workers, whereas a greater share of the respondents in the other two types of communities are retired. Although car ownership is lower in the gated and non-gated communities than the regular neighborhoods, even in those communities a large proportion of households own two or more cars. On the whole, number of cars in household for all three types of communities seems to suggest that the respondents are highly reliant on cars.

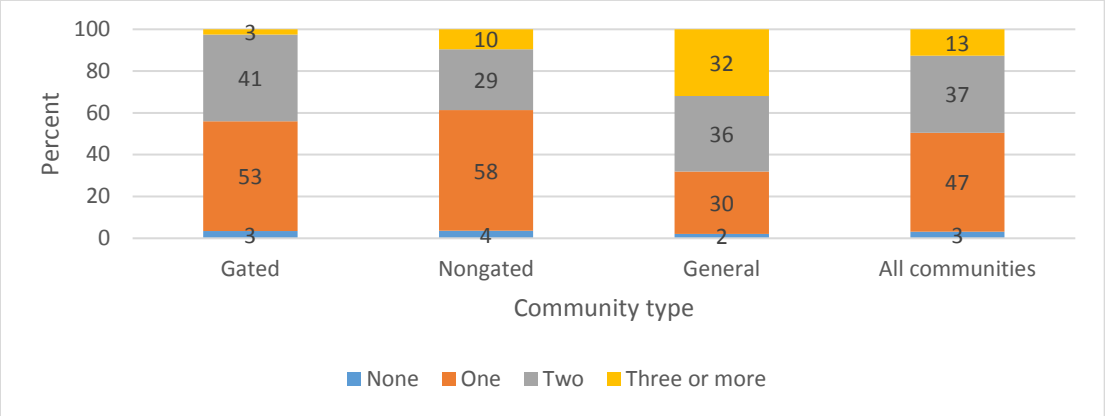

Figure 9. Cars in household

2.8. Driving

The survey respondents were asked whether they drove during the past 30 days. Their responses, summarized in Figure 10, show that driving is very common in all three types of communities. For all three types of communities combined, only 6 percent of the respondents did not drive during 30 days. The share of non-drivers is even smaller in the general neighborhoods, where only 4 percent respondents reported not driving. Once again, the share of drivers in general neighborhoods may be higher because of younger age and larger share of workers in those neighborhoods.

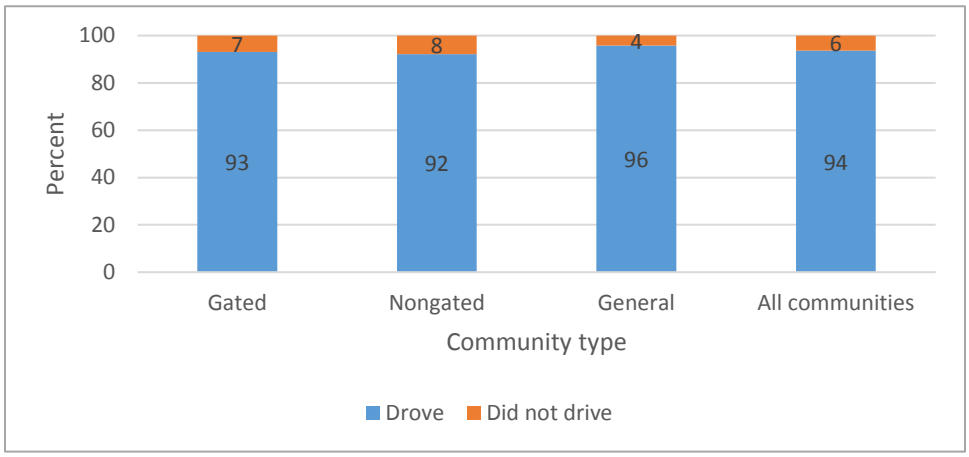

Figure 10. Driving in the past 30 days

2.9. Use of Mobility Devices

The survey included a question inquiring about the use of mobility devices by the respondents at least some of the time. The responses to the question are summarized in Table 1. A table is used to show the percentages instead of a chart because a single respondent could use multiple devices. The figure shows that about 75 percent of the respondents from all types of communities do not use any type of mobility devices, whereas the other 25 percent use one or more types of devices. The use of walking sticks/canes is the most common as 17 percent of the respondents mentioned using them, followed by walker (7 percent) and orthotic devices (5 percent). The differences between the three types of communities are not substantial with the exception of walkers, which seem to be used by a noticeably larger proportion in the non-gated communities. Given that the share of respondents using mobility devices is substantial at 25 percent, the large proportion of drivers (almost 94 percent) among the respondents seems to suggest that the disabilities that compel them to use mobility devices do not necessarily impede their ability to drive. In other words, despite using mobility devices in certain times, many respondents have the ability to drive.

Table 1 – Percent Respondents Using Mobility Devices at Least Some of the Time

Mobility Devices Used	Gated	Non-gated	General	All communities
None	74	69	83	75
Walking stick/cane	18	16	16	17
Wheelchair/scooter	2	4	3	3
Walker	6	10	6	7
Crutches	0	0	1	0
Orthotic devices	5	5	6	5
Prosthetic devices	1	2	0.0	1

Note: Percentages do not add to 100 percent because respondents could select multiple devices.

3. FREQUENCY, DURATION, AND PLACES OF WALKING

3.1. WALKING FOR EXERCISE

All survey respondents were asked how often they walked outside their home or yard for leisure or exercise within the past seven days. The responses to that question are summarized by community type in Figure 11. It shows that for all respondents from the three types of communities, approximately 20 percent did not walk at all in seven days, whereas the remaining 80 percent walked at least once. Almost 31 percent of the respondents walked five or more days a week, indicating that the share of respondents walking often is larger than not walking at all.

Figure 11 shows that the differences in walking frequency between the three types of communities is not substantial. For example, the share of respondents who did not walk at all varied between 17 percent and 21 percent, whereas the share of respondents who walked five to seven days a week varied between 28 percent and 34 percent. Although the share of respondents from general neighborhoods who did not walk at all is lower than the other two types of communities, the share of respondents who walked five or more times was also lower for general neighborhoods.

The frequency of walking for leisure and exercise appears to be mostly similar in the three types of communities from Figure 11, but when age is controlled for, walking frequency of the respondents from the gated communities and the non-gated communities may be higher than the respondents from general neighborhoods. For example, the share of respondents who are aged 70 or older from gated communities, the non-gated communities, and general neighborhoods is 72 percent, 52 percent, and 39 percent, respectively. Similarly, the share of respondents who are 80 or older is 25 percent, 22 percent, and 14 percent, respectively, for the three types of communities. The similarity of walking frequency among the residents of the three types of communities can perhaps be interpreted as greater walking frequency for the gated and non-gated communities than the general neighborhoods, controlling for age of the respondents. Statistical models will be needed to demonstrate how walking frequency varies across the three types of communities when age is controlled for.

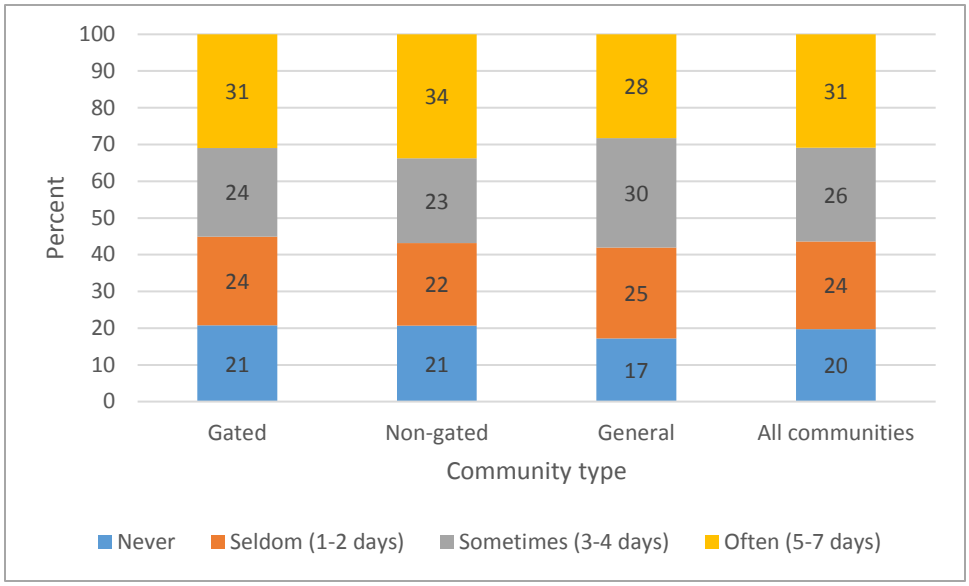

Figure 11. Frequency of walking for leisure or exercise

A question was asked to those who walked at least some time for leisure or exercise how much time they walked on average each day. The responses, summarized in Figure 12, show that walking between half hour and one hour (i.e., 30 to 59 minutes) is the most common for the respondents from all three types of communities. The share of respondents who walk more than one hour seems to be slightly greater for the respondents from the gated communities (19 percent) compared to the respondents from regular neighborhoods (15 percent) and the non-gated communities (10 percent). It appears that when age is controlled for, once again, the respondents from the gated communities would appear to walk even more.

The survey respondents were also asked where they walk for leisure or exercise, allowing them to select all that applied. Those responses are summarized by community type in Table 2. The use of sidewalks within own neighborhood is the most common practice, as 68 percent of the respondents from all three types of communities combined use such facilities. Many respondents also walked on sidewalks outside their own neighborhoods. The use of sidewalks by a large proportion of the respondents indicates that sidewalks can be highly useful for promoting walking among older adults, especially if the sidewalks are in their own neighborhoods. The second most common practice is walking indoors (in shopping malls, etc.), but walking on roads and in gyms/fitness centers is also common. Parks and trails are also used, but it seems they are used less commonly than sidewalks.

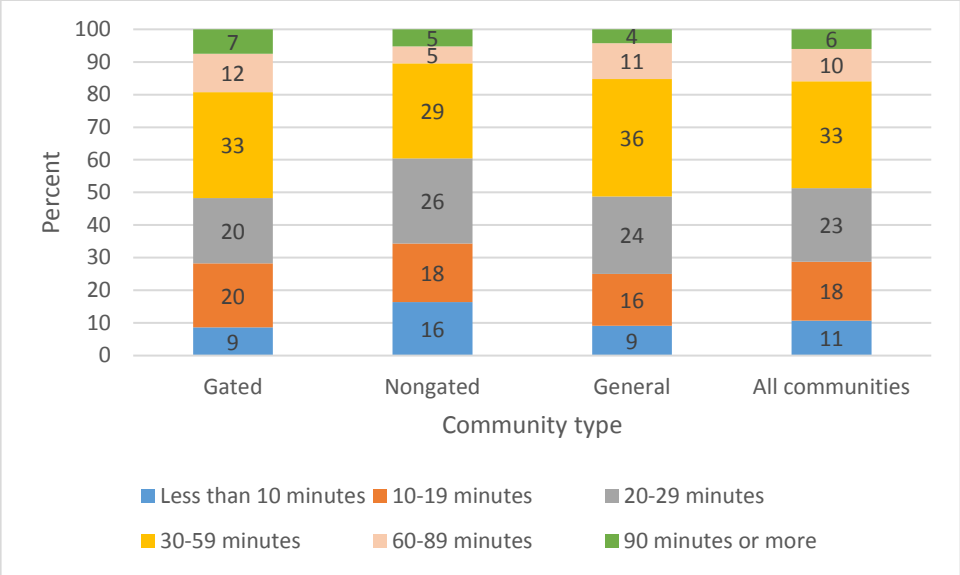

Figure 12. Duration of walking for leisure or exercise

Table 2 – Percent of Respondents by Facilities Used for Leisure/Exercise Walk

Walking Facility	Gated	Non-gated	General	All Communities
Sidewalks within your neighborhood	69	66	66	68
Sidewalks outside neighborhood	14	14	18	15
Neighborhood parks	15	19	29	20
On the road	19	23	33	24
Parks outside neighborhood	9	16	13	12
Walking trails within neighborhood	15	4	9	10
Walking trails outside neighborhood	4	11	12	8
Gym/Fitness center	28	16	23	23
Indoor walking (e.g., mall)	30	30	28	29
Other places (golf course, board walk, etc.)	11	16	12	12

Note: Percentages do not add to 100 percent because respondents could select multiple facilities.

Although walking on sidewalks within and outside neighborhoods is common in all three types of communities, some variations can be seen among the three types regarding the use of other types of facilities. For example, walking on roads and neighborhood parks is more common in general neighborhoods than gated communities and the non-gated communities, whereas walking on trails within neighborhood and gym/fitness centers is more common in gated communities than the other two types of community. A reason for this discrepancy may be greater availability of trails and fitness centers within gated communities. Finally, the survey data revealed that a sizeable number of respondents from the gated communities walked in golf courses, whereas some respondents from the non-gated communities and general neighborhoods mentioned walking on board walks. However, walking on board walks is not common for the respondents from gated communities, perhaps because they are located further from the shoreline, where boardwalks are located.

3.2. Walking for Transportation

Similar to walking for leisure and exercise, the survey respondents were asked how often they walked for transportation purposes, that is, to go somewhere such as work, store, bank, etc., within the past seven days. Such walking, especially when the objective is fulfilled at the destination, is often referred to as walking for transportation.

The responses to the question on transportation walking frequency are summarized in Figure 13. It shows that 45 percent of the respondents from the three types of communities combined did not walk at all for such purposes. In contrast, only about 20 percent of the respondents from the communities mentioned not walking at all when they were asked about walking for leisure and exercise. This difference indicates that walking for leisure and exercise is more common among the respondents than walking for transportation.

Although one would expect the frequency of transportation walking to be greater for the residents of general neighborhoods because of a larger share of workers and a lower average age, 54 percent of the respondents from general neighborhoods reported not walking at all compared to 41 percent for the gated communities and 42 percent for the non-gated communities. However, the differences between the community types is little when one considers the share of respondents who walk three or more days a week. That is because the share or respondents who walk 1 to 2 days a week is lower for the general neighborhoods. On the whole, it is somewhat surprising that the share or respondents living in general neighborhoods is lower, considering that people from those communities are younger and a larger share of them are still working.

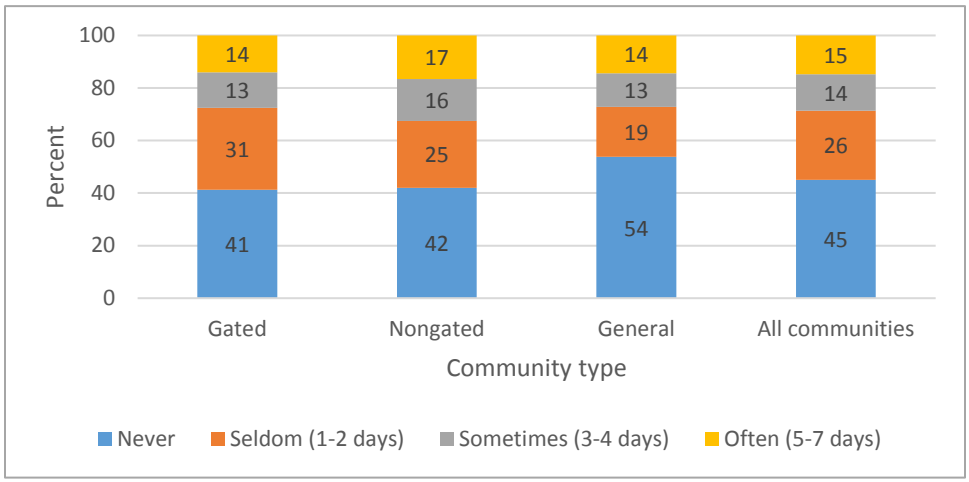

Figure 13. Frequency of walking for leisure or exercise

Similar to walking for leisure and exercise, the respondents who walked for transportation at least some time were asked about the duration of their walking. The results, summarized in Figure 14, show that the duration of walking for most respondents is fairly short. For example, for all communities combined, 56 percent of the walking trips are for less than 20 minutes. In contrast, Figure 12 showed that only around 29 percent of the walking trips for leisure and exercise are that short in duration. The duration of walking trips for leisure and exercise may be longer because people usually take those walks for better health and fitness.

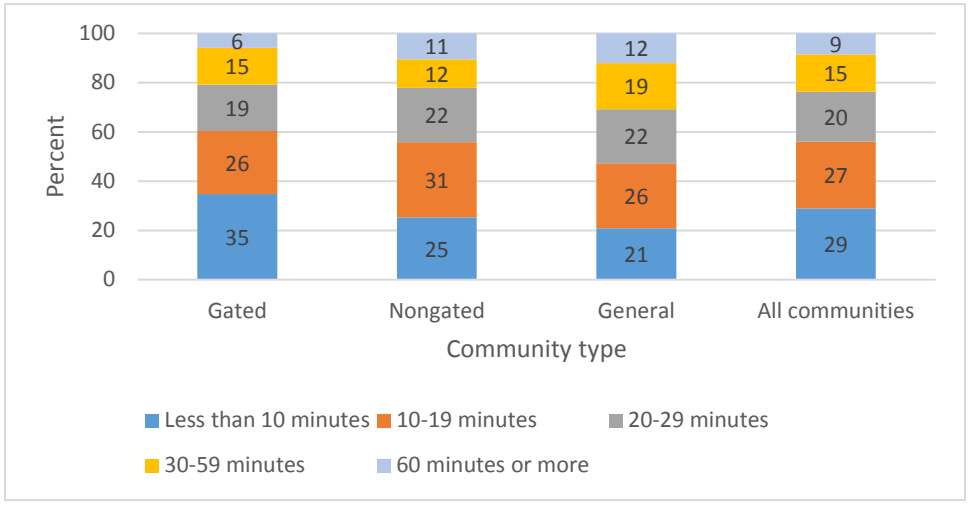

Figure 14. Duration of transportation walking to go someplace

The respondents from the general neighborhoods, on average, appear to take longer walking trips for transportation than the respondents from the other two types of communities. For example, 31 percent of the respondents from general neighborhoods mentioned taking trips longer than 30 minutes, whereas only 21 percent of the respondents from the gated communities and 22 percent of the respondents from the non-gated communities reported their trips being that long. A reason for the longer trips by the respondents from the general neighborhoods may be lower age and greater employment. It is also possible that the destinations of those people are more distant than the respondents from the other two types of communities.

The survey respondents who walked for transportation were asked about their destinations, or the places to which they walked. Their responses are summarized in Table 3. For all communities combined, the share of respondents walking to club houses is the highest at almost 45 percent, but that is because an overwhelming 63 percent of those living in gated communities walked to club houses. In the two other types of communities, the share of persons walking to club houses is low. In contrast, the share of respondents walking to grocery/drug store, neighborhood store, bank/post office, restaurant/café, and friend/family's homes is large for community types. Given their age distribution, it is not surprising that the share of respondents walking to work is low. The higher share of walk trips to work for the residents of general neighborhoods is consistent with the greater share of workers in those communities.

Table 3 – Percent of Respondents by Transportation Walking Trip Destination

Destinations	Gated	Non-gated	General	All Communities
Work	7	5	16	9
Grocery/drug store	36	45	38	39
Neighborhood store	26	33	44	32
Clubhouse	63	33	18	45
Senior center	13	3	5	9
Restaurant/café	26	27	32	28
Bank/Post Office	30	37	34	33
Church/temple	13	16	12	13
Medical/dental establishment	21	25	27	24
Train/bus station	5	1	7	4
Visit family/friend	32	33	51	37
Library	12	9	13	12
Mailbox	4	1	1	2
Other	4	7	11	7

Note: Percentages do not add to 100 percent because respondents could select multiple destinations.

Table 3 reveals that having mixed land uses in neighborhoods can increase the propensity of walking for older adults. Activities that tend to generate most walking trips, according to the table, are grocery/drug stores, neighborhood stores, recreational facilities such as club houses, restaurant/cafés, and banks/post offices. Having medical/dental facilities nearby can also potentially increase walking trips by older adults.

4. SUPPORT FOR FUNDING TRANSPORTATION INFRASTRUCTURE

Consistent with one of the primary objectives of this study, the survey included six questions regarding support for municipal funding for different types of infrastructure that are often hypothesized to affect walking among older adults. The questions were about support for (i) sidewalk improvement/ installation, (ii) crosswalk improvement/installation, (iii) lighting along sidewalks and paths, (iv) bench installation, (v) tree planning, and (vi) walking path/trail improvements. The respondents were given a five-point scale, ranging from very unsupportive to very supportive. The results, presented sequentially in Tables 4 through 9, provide insights about the respondents' relative support for different types of infrastructure.

The distributions in the six tables show that the respondents are generally supportive of all six types of infrastructure because far greater respondents were somewhat supportive or very supportive than somewhat unsupportive or very unsupportive for each. However, it is evident that the support for some types of infrastructure is greater than other types. For example, the share of respondents from all three communities combined who are somewhat supportive or very supportive is substantially greater for lighting (73 percent), crosswalk improvement/installation (70 percent), and sidewalk improvement/installation (69 percent) than tree planting (52 percent), bench installation (57 percent), and walking path/trail improvement (61 percent). One would come to the same conclusion by considering the share of respondents who are very supportive instead of considering both very supportive and somewhat supportive.

Table 4 – Percent of Respondents by Support for Sidewalk Improvement/Installation

Support Level	Gated	Non-gated	General	All Communities
Very Unsupportive	6	10	6	7
Somewhat Unsupportive	6	5	4	5
Neutral	18	21	17	19
Somewhat Supportive	28	25	24	26
Very Supportive	41	39	49	43
Total	100	100	100	100

Table 5 – Percent of Respondents by Support for Crosswalk Improvement/Installation

Support Level	Gated	Non-gated	General	All Communities
Very Unsupportive	4	9	6	6
Somewhat Unsupportive	5	6	3	4
Neutral	19	22	21	20
Somewhat Supportive	29	27	25	28
Very Supportive	44	36	46	42
Total	100	100	100	100

Table 6 – Percent of Respondents by Support for Lighting Along Sidewalks/Paths

Support Level	Gated	Non-gated	General	All Communities
Very Unsupportive	6	10	7	7
Somewhat Unsupportive	3	5	3	4
Neutral	17	17	13	16
Somewhat Supportive	22	22	24	23
Very Supportive	51	46	53	50
Total	100	100	100	100

Table 7 – Percent of Respondents by Support for Bench Installation

Support Level	Gated	Non-gated	General	All Communities
Very Unsupportive	6	8	7	7
Somewhat Unsupportive	6	8	4	6
Neutral	27	25	38	30
Somewhat Supportive	28	31	17	26
Very Supportive	32	28	34	32
Total	100	100	100	100

Table 8 – Percent of Respondents by Support for Tree Planting

Support Level	Gated	Non-gated	General	All Communities
Very Unsupportive	5	8	6	6
Somewhat Unsupportive	8	10	5	8
Neutral	35	36	32	34
Somewhat Supportive	23	24	21	23
Very Supportive	28	22	36	29
Total	100	100	100	100

Table 9 – Percent of Respondents by Support for Walking Path/Trail Improvements

Support Level	Gated	Non-gated	General	All Communities
Very Unsupportive	6	10	6	7
Somewhat Unsupportive	5	4	5	5
Neutral	26	33	24	27
Somewhat Supportive	28	22	24	26
Very Supportive	36	30	41	35
Total	100	100	100	100

Tables 4 through 9 also show some variations in support for funding across the three types of communities. Those differences clearer in Figure 15, where the share of respondents who were very supportive of the improvements mentioned in the tables. It shows that the support for lighting is the highest in all three types of communities, followed by sidewalk and crosswalk improvement. The figure also shows that respondents from general neighborhoods are more supportive of funding for all six types of infrastructure than the respondents from the other two types of communities. A reason may be that the respondents living in gated communities and non-gated communities already have higher quality infrastructure than those living in general neighborhoods. Although the differences between the respondents from the gated communities and the non-gated communities are not substantial, for most types of infrastructure, the respondents from gated communities are more supportive.

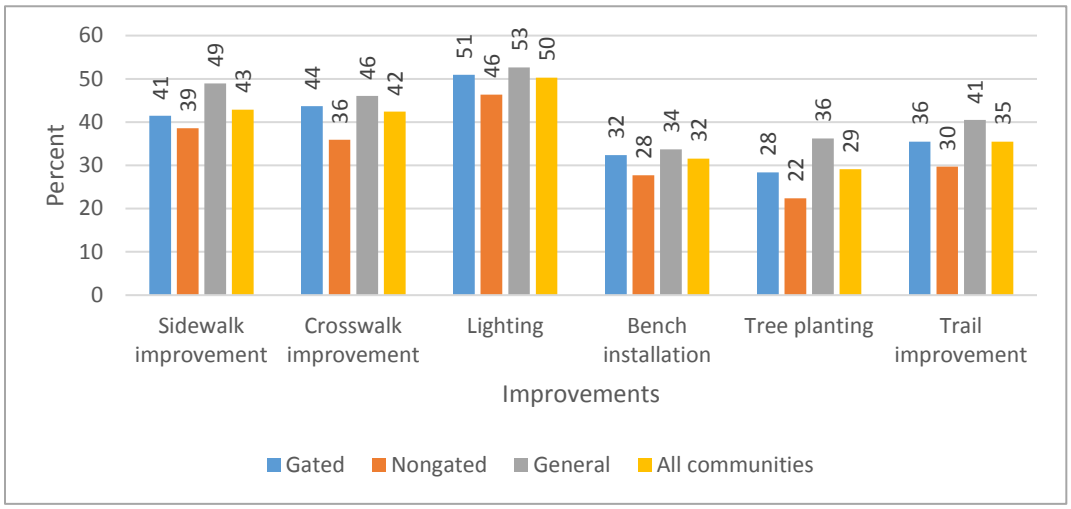

Figure 15. Share of respondents very supportive of specific types of improvement

5. DIFFICULTIES AND BARRIERS TO WALKING

5.1. DIFFICULTIES FOR WALKING

Based on existing literature on difficulties encountered by older adults for walking, the survey respondents were asked about some specific types of difficulties. The respondents were also allowed to indicate if they did not have any of the difficulties. The responses are summarized in Table 10.

Table 10 – Percent of Respondents by Walking Difficulty

Difficulties	Gated	Non-gated	General	All Communities
None	34	30	29	32
Difficulty walking in areas without sidewalks	37	31	46	39
Risk of falling	28	38	24	30
Difficulty crossing streets	10	17	18	14
Difficulty judging distance and/or speed of cars	3	7	11	6
Difficulty navigating cars and traffic	8	12	25	14
Difficulty determining directions/route	1	2	1	1
Difficulty dealing with other pedestrians	1	0	2	1
Others, including medical conditions	17	19	9	16

Note: Percentages do not add to 100 percent because respondents could select multiple difficulties.

The results shown in Table 10 indicate that only 32 percent of all respondents from the three types of communities combined do not encounter any difficulties, whereas the other 68 percent encounter at least one form of difficulty. The proportion of respondents not encountering any difficulty is slightly larger for the respondents from gated communities (34 percent) than the non-gated communities (30 percent) and general neighborhoods (29 percent) even though their average age appears to be higher.

Among all the difficulties specified in the survey, walking in areas without sidewalks appears to be the greatest for all respondents combined as well as for the residents of gated communities and general neighborhoods, but not the residents of the non-gated communities. For the respondents from the non-gated communities, the greatest proportion mentioned risk of falling (almost 38 percent). Risk of falling appears to be a significant difficulty for the respondents from the gated communities and general neighborhoods also.

Perhaps because the gated communities and non-gated communities are separated from regional traffic by design, a far greater proportion of respondents from the general neighborhoods mentioned cars and traffic as a difficulty for walking (25 percent, versus only 8 percent for gated communities and 12 percent for the non-gated communities). Crossing street appears to be another difficulty experienced by a sizeable number of respondents from all three types of communities. Some other difficulties listed in the survey, such as difficulty determining directions/route and too many people on sidewalks, do not seem to be experienced by many.

Finally, a large proportion of the respondents used the "Other difficulty" category to indicate that they experienced difficulties not listed in the survey. The share of all respondents mentioning other difficulties was almost 16 percent. A review of the written descriptions from those respondents revealed that a large number of respondents considered medical conditions, especially aches/pain, and in some cases fatigue, as a difficulty for walking.

5.2. Environmental Barriers to Walking

The survey respondents were asked another question about barriers to walking. In contrast to the difficulties, which were meant to include personal difficulties, the barriers include environmental barriers. Similar to the question on difficulties, a number of barriers were included in the survey and the respondents were asked to select those that applied. The results are summarized in Table 11.

Table 11 – Percent of Respondents by Barriers Encountered When Walking

Barriers	Gated	Non-gated	General	All Communities
None	47	38	22	38
Absence/poor quality of sidewalks/pathways	28	20	41	30
Absence of streetlights	4	8	23	11
Poor quality of street crossings/intersections	3	8	12	7
Traffic speed or amount of cars	11	19	28	18
No destinations nearby	24	32	34	29
Crime	0	2	1	1
Dog	0	1	2	1
Other	1	1	1	1

Note: Percentages do not add to 100 percent because respondents could select multiple barriers.

For all communities combined, a little over 38 percent of the respondents mentioned that they did not encounter any of the barriers listed in the survey. However, the share of respondents who did not

encounter any barrier was significantly larger for the respondents from the gated communities (47 percent) compared to the respondents from the non-gated communities (38 percent) and the general neighborhoods (22 percent). Absence or poor quality of sidewalks (30 percent) and lack of nearby destinations (29 percent) are the two most common barriers for all communities combined, followed by traffic and car speed (18 percent). In contrast, crime and dogs appear not to be a barrier for most respondents in all three types of communities.

One of the most important observations from Table 11 is that the respondents from the general neighborhoods encountered greater environmental barriers of all types compared to the respondents from the gated communities and the non-gated communities. For some of the barriers encountered, such as absence of streetlights, poor quality of street crossings, and traffic and car speed, the share of respondents from general neighborhoods is more than twice as large as the as the share of respondents from gated communities. For other barriers also, such as absence or poor quality of sidewalks and unavailability of nearby destinations, the respondents from the general neighborhoods appear to encounter a higher degree of obstacles. On the whole, the results reveal that the residents of the general neighborhoods encounter environmental barriers to a greater extent than the residents of the other two types of neighborhoods.

6. WALKING INFRASTRUCTURE IN RESIDENTIAL LOCATION

Several questions were asked in the survey about the importance they placed on walking facilities when they moved to their current residential community and whether the facilities at their current location provided better opportunities for walking and exercise compared to the communities they moved from. The responses to these questions are summarized below.

6.1. Duration of Stay at Current Residence

Before inquiring about the importance of walking infrastructure when moving to their current residential community, the survey respondents were asked about the year in which they moved in to the current residence. The results are summarized by community type in Figure 16. It shows that the share of respondents who have lived longer in their current residence is greater for general neighborhoods than the gated and non-gated communities. For example, almost 21 percent of respondents from general communities moved to their current residence before 1990, whereas less than 3 percent did so for gated and non-gated communities. Similarly, the share of respondents who moved to their current residence in or after 2010 is almost 45 percent for gated communities and 47 percent for the non-gated communities, compared to only about 29 percent for general neighborhoods.

The differences in moving years between the communities seem to suggest that people are simply aging in place in the general neighborhoods, whereas many people are moving to gated communities and the non-gated communities after retirement. Another reason for the differences could be differences in time period of establishments of the communities. While the people in the general neighborhoods may have been living for any length of time, the non-gated communities in Berkeley Township, Holiday City, was developed between 1960 and 1996, whereas the gated communities in

Monroe are even newer. Therefore, it is not surprising that people moved in to the communities in different time periods.

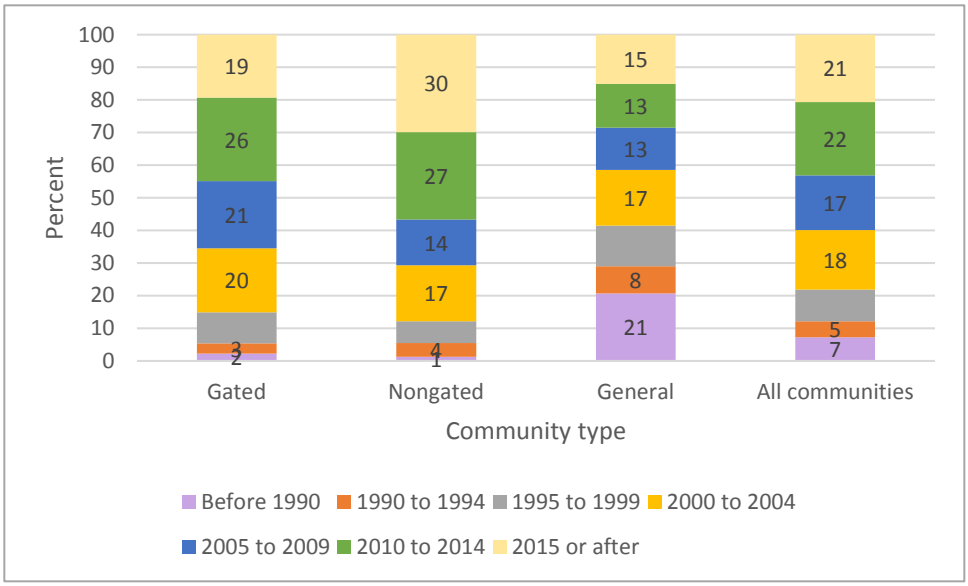

Figure 16. Year moved to current residential community

6.2. Importance of Sidewalks when Moving to Current Residence

The survey respondents were asked how important the availability, quality, and connectivity of sidewalks in the community was when they decided to move into their current residence. An 11-point scale, ranging from 0 to 10, was provided, where 0 represented not at all important and 10 represented very important. The responses are summarized in Figure 17 by community type. The results show that sidewalks are important for some, but not for others. For all communities combined, 41 percent gave a score of 6 or higher, whereas 45 percent gave a score of 4 or lower, indicating that the share of respondents for whom sidewalk characteristics were important is slightly lower than the share of respondents for whom sidewalk characteristics were not important. The share of respondents who perceived sidewalks as less important was the highest for general neighborhoods, where 55 percent gave a score of 4 or lower, and lowest for the non-gated communities, where only 38 percent gave a score of 4 or lower.

The mean score for the gated communities, the non-gated communities, the general neighborhoods, and all communities combined were 4.8, 5.4, 4.2, and 4.8, respectively, indicating that only for the non-gated communities the mean score was higher than the mid-point of the scale, 5. For gated communities and general neighborhoods, the mean score is lower than 5. On the whole, the availability, quality, and connectivity of sidewalks was of only modest importance to the respondents when they moved to their neighborhoods.

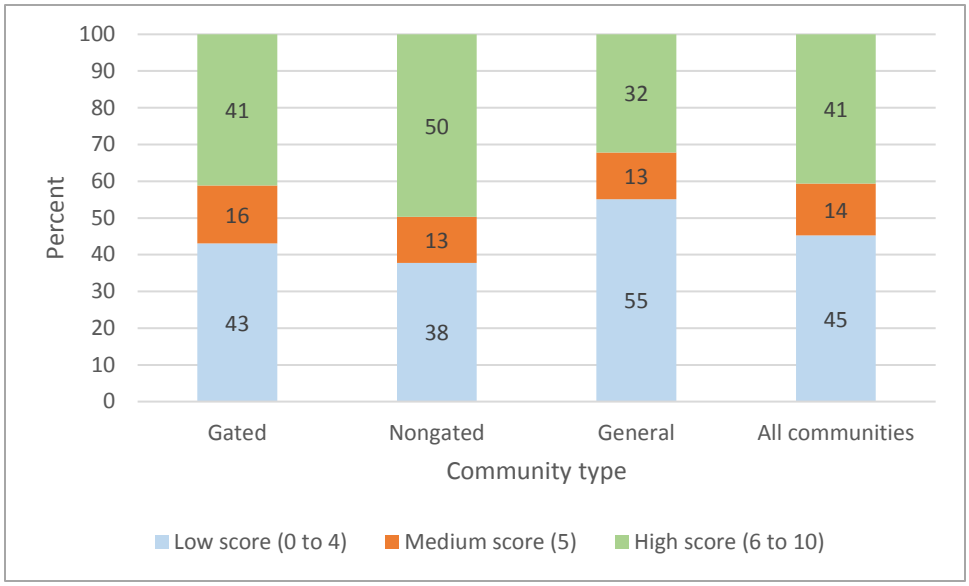

Table 17. Importance of sidewalk availability, quality, and connectivity when moving to current residence

6.3. Importance of Outdoor Paths and Trails when Moving to Current Residence

A question was included in the survey that inquired about the importance of outdoor paths and trails in the community when they decided to move to the community. Similar to the question on sidewalks, an 11-point scale was given to rate the importance. The results are summarized in Figure 18. Similar to the responses to the question on sidewalks, the results show that the residents of the three types of communities placed only a modest level of emphasis on outdoor paths and trails. Overall, only 35 percent of the respondents from the three types of communities combined gave a score of 6 or more, whereas 51 percent gave a score of 0 to 4. The variation between the three types of communities in this regard is also modest, although a slightly larger proportion of respondents from gated communities gave a score of 10 compared to the two other types of communities. The mean scores for the gated communities, the non-gated communities, the general neighborhoods, and all communities combined were 4.5, 4.3, 4.0, and 4.3, respectively, showing that the share people who gave scores lower than 5 was greater than the share of people who gave scores greater than five for all communities.

A comparison of the results in Figure 18 with the results in Figure 17 shows that sidewalks are considered as more important than outdoor parks and trails by the respondents as a whole and also by respondents of each type of community. A comparison of the mean and median scores in the two tables also show that he availability and quality of sidewalks are more important than the availability and quality of paths and trails.

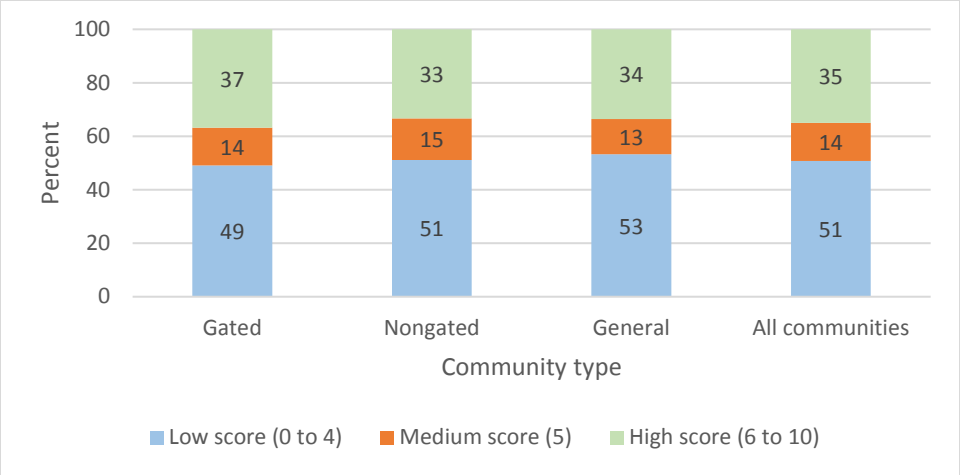

Figure 18. Importance of outdoor paths and trails when moving to current residence

6.4. Importance of Indoor Walking/Exercise Facilities when Moving to Current Residence

Regarding the importance of walking infrastructure, the respondents were asked a final question about the importance of the availability of indoor walking/exercise facilities when moving to the current residence. The responses are summarized in Figure 19. Although the overall results in Figure 19 are not very different from the results in Figure 17 or Figure 18 because a relatively larger share of respondents (49 percent) gave scores of 0 to 4 than those who gave scores of 6 to 10 (37 percent) regarding the importance of indoor facilities, the respondents from gated communities are distinct from the respondents from the two other types of communities because a significantly larger share (49 percent) gave scores of 6 to 10 compared to only 36 percent who gave scores of 0 to 4.

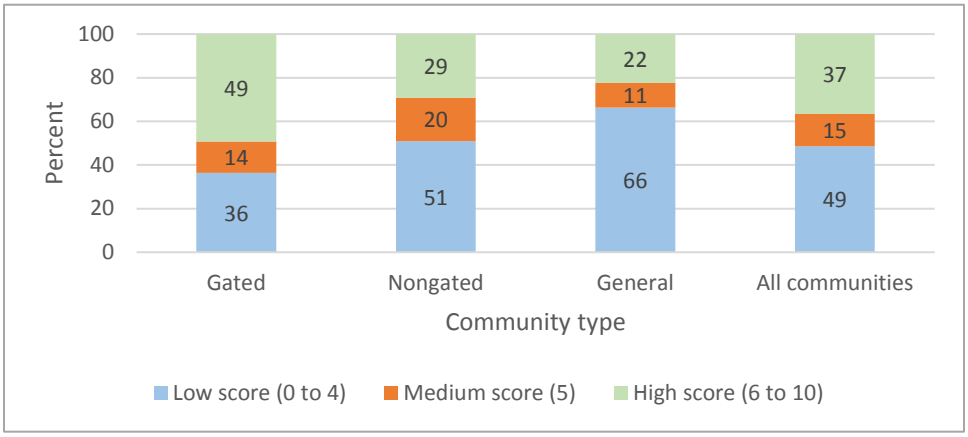

Figure 19. Importance of indoor walking facilities when moving to current residence

The mean scores for the gated communities, the non-gated communities, the general neighborhoods, and all communities combined were 5.4., 4.0, 3.3, and 4.5. The mean score for the respondents from the gated communities regarding indoor walking and exercise facilities (5.4) is greater than the mean score of the same respondents regarding sidewalks and paths/trails. The results indicate that the

availability of indoor walking/exercise facilities is a more important consideration for older adults who move to gated communities than those who move in to non-gated or general communities. Indoor walking and exercise facilities in gated communities may thus be an attraction for older adults. The very low mean and median score for the respondents from general neighborhoods may indicate that indoor walking and exercise facilities are not very important to them.

6.5. Opportunity for Walking Outdoors at the Current Residential Location

The respondents were asked whether their current residence provided better or worse opportunities for walking outdoors compared to their previous residential location. The responses to that question are summarized by community type in Figure 20. It shows that for all community types, the share of respondents who believed their current location provided better opportunities is larger the share of respondents who believed their current location provided less opportunities. One reason could be that the areas where the communities are located provide greater opportunities than other areas generally. A second reason could be that older adults seek residential locations that provide greater opportunities for walking outdoors, but previous analysis showed availability or sidewalks, trails, etc., may not be their most important considerations (as shown in Figures 17 and 18). Figure 20 shows that a greater share of respondents from gated communities believe that their current residence provides greater opportunities for walking outdoors (41 percent) compared to the residents of the non-gated communities (32 percent) and the general communities (also 32 percent). The difference between the share of respondents who believe their current residence provides better opportunities and the share of respondents who believe their current residence provides less opportunities (29 percent) is also greater for the gated community residents.

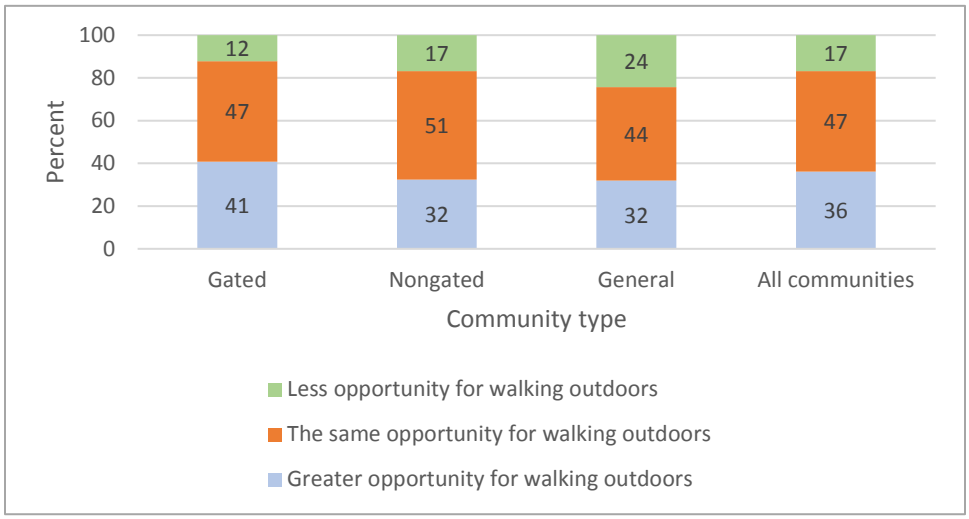

Figure 20. Opportunity for walking outdoors in current location compared to previous location

6.6. Opportunity for Indoor Exercise at the Current Residential Location

Similar to the question on walking outdoors, a question was included in the survey to inquire about the opportunity for indoor exercise at their current residential location relative to their previous residential location. The responses, summarized in Figure 21, show that the respondents in all three types of communities believe they have a greater opportunity for indoor exercise at the current location than previous location. Similar to Figure 20, a greater proportion of the respondents from the gated communities believe that they have a greater opportunity in their current location compared to the respondents from the other two types of communities. An overwhelming 80 percent of respondents from the gated communities mentioned that they had greater opportunities whereas only 4 percent mentioned having less opportunities. Although more respondents from the non-gated communities and the general neighborhoods also stated that they have greater opportunities than those who stated that they have less opportunities, their proportions are far smaller than the respondents from the gated communities. One can surmise from the results in Figure 20 and Figure 21 that the gated communities provide greater opportunities for their residents to participate in both outdoor and indoor walking and exercise. Between outdoor and indoor facilities, it appears more opportunities are provided in the gated communities for the latter because 80 percent stated they had greater indoor facilities compared to 41 percent who stated they have greater outdoor facilities.

Figure 21. Opportunity for indoor exercise in current location compared to previous location

6.7. PERCEPTION OF SAFETY, SECURITY, AND ACCESS TO PARKS

Three questions were included in the survey to inquire about the perception of safety, security (i.e., safety from people and animals), and access to parks from the respondents' residential location. The questions on safety and access were separated by time of day, namely, daytime and after dark, to gauge differences in perception between day and night. The responses to the questions are summarized below.

6.8. Perception of Neighborhood Traffic Safety for Walking

The specific question in the survey about the perception of traffic safety was "Considering the ease of crossing roads, quality of sidewalks, and traffic, how safe is walking in your neighborhood?" and the respondents were asked to select a score between 0 and 10, where 0 represented very unsafe and 10 represented very safe. Figure 22 shows, separately for daytime and after dark, the mean and median scores from the responses for the respondents from the three types of communities.

As expected, the daytime scores for all three community types are larger than the after-dark scores. The higher daytime scores indicate that older adults generally feel less safe from traffic after dark. It is also evident from the results that the respondents from gated communities feel safer than the respondents from the other two types of communities, both at daytime and after dark. Their daytime mean score of 8.1 and median score of 9, as well as their after-dark mean score of 6.3 and median score of 7, are larger than the respective scores for the other two types of communities. It is noteworthy that the results in Figure 22 are consistent with the results on difficulty walking and barriers to walking in Table 10 and Table 11, for they indicated that the respondents from gated communities are less concerned than the respondents from the other two types of communities regarding traffic. A reason for the respondents feeling safer from traffic in gated communities could be that the communities are separated from regional traffic and located away from major roads, which may not be the case for the other two types of communities.

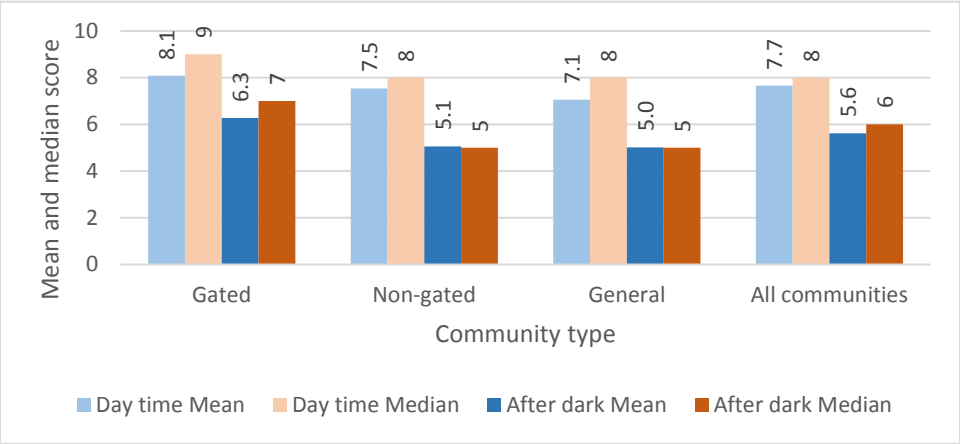

Figure 22. Mean and median score for perception of safety from traffic

6.9. Perception of Neighborhood Safety from People and Animals for Walking

A question was included in the survey to investigate how people in the three types of communities perceived safety for walking in their neighborhoods by considering chances of being attacked by people or animals. Similar to the question on traffic safety, the respondents were asked to indicate their feeling of safety in day time and after dark on an 11-point scale between 0 and 10. The mean and median scores from the responses to the question are shown in Figure 23.

Consistent with the results on perception of traffic safety in Figure 22, Figure 23 shows that the respondents from the gated communities feel the safest, both at daytime and after dark, regarding potential attack by people or animals when walking. Also consistent with Figure 22, the respondents in all three types of communities feel safer at daytime than after dark. Finally, and perhaps most importantly, a comparison between Figure 22 and Figure 23 shows that the respondents of the three types of communities are less concerned about being attacked by people or animals when walking than about traffic. This conclusion can be drawn from the fact that the mean and median scores in Figure 23 are higher than the scores in Figure 22 for all three types of communities, both at daytime and after dark.

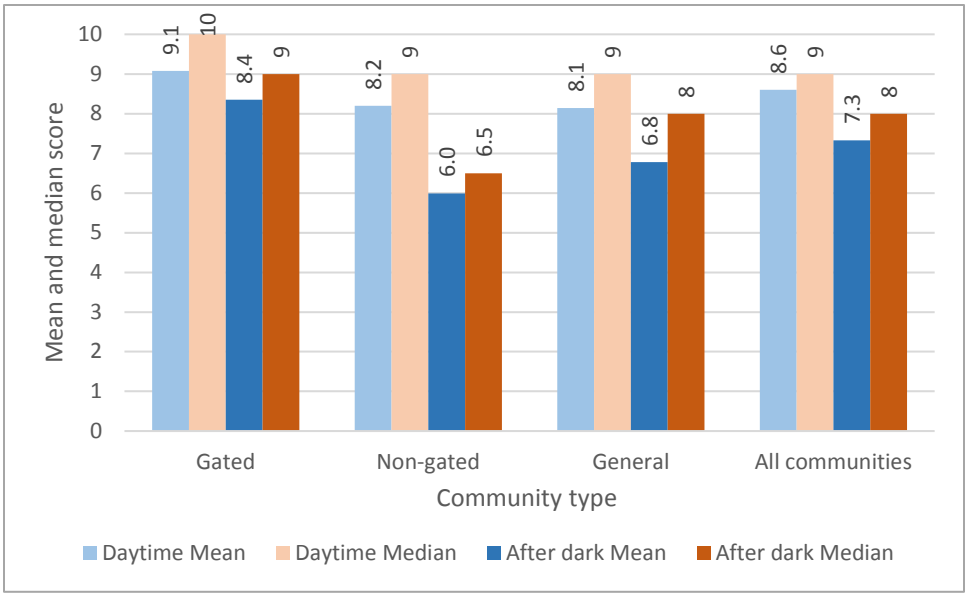

Figure 23. Mean and median score for perception of safety from people and animals

6.10. Perception of Access to Parks

Through another question, the respondents were asked how accessible parks were from their neighborhoods when they considered all factors, including traffic safety and the potential for being attacked by people or animals. Similar to the questions on perception of traffic and being attacked by people or animals, the respondents were asked about daytime and after dark and given an 11-point scale, with 0 representing very difficult or least accessible and 10 representing very easy or highly accessible. The mean and median scores estimated from the responses to the question are shown in Figure 24.

The responses to the question on access to parks appears to contradict the responses to the questions on perception of traffic safety and potential of being attacked in Figure 22 and Figure 23. While the high scores in the two previous tables showed that the respondents in the three types of communities mostly felt safe, the low scores in Figure 24 seems to indicate that despite feeling safe, the respondents do not feel parks are accessible from their neighborhood. A potential reason for the difference in responses about safety and access to parks is that the parks are not nearby despite the respondents feeling safe. The lack of proximity must have prompted the respondents in all three types of communities to give lower scores for access to parks than safety and security. Among the

three types of communities, the respondents from general neighborhoods, on average, gave higher scores to park access than the respondents from the other two types of communities. However, the differences in scores between the three types of communities are very small. On the whole, the major takeaway from this analysis is that people consider physical proximity as much as they care about safety when they think about access to parks.

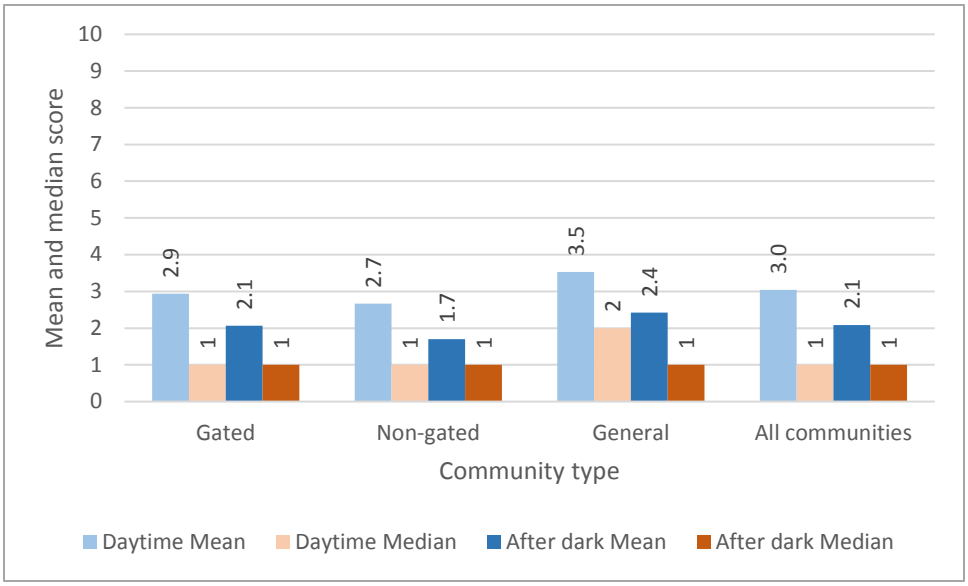

Figure 24. Perception of access to parks from neighborhood

6.11. Physical Activity Tracker and Physical Activity

The respondents were asked whether they tracked the number of steps they took daily by devices such as Fitbit, smartphone, etc., followed by a question inquiring whether the use of the devices increased their walking. Responses to those two questions are summarized in Figure 25. The first column of the chart shows the percent of respondents from each type of community that used tracking devices. The three subsequent columns show whether the respondents walked a lot more, a little more, or the same after wearing the devices. Thus, the three columns are pertinent only to those who used tracking devices.

Among all respondents from the three types of communities, Figure 25 shows, only about 23 percent of respondents used an activity-tracking device. The use of such devices is the discernibly higher in regular neighborhoods (31 percent) compared to the gated communities (21 percent) and the non-gated communities (17 percent). A reason for the larger share of devise users in general neighborhoods could be that their residents are younger than the other two types of communities. As discussed previously, the share of respondents below age 60 in general neighborhoods is 33 percent, whereas the share of respondents below age 60 is less than 10 percent for the non-gated communities and less than 5 percent for the gated communities.

Figure 25 shows that the perceived effect of activity-tracking devices on walking varies across community types. The effect appears to be the highest for the respondents from the non-gated communities because 43 of them mentioned walking a lot more and 39 percent mentioned walking a little more. The share of respondents walking a lot more is smaller for the gated community (30 percent) and the general neighborhoods (34 percent), whereas the share of respondents walking a little more in those two types of communities is only slightly higher than the non-gated community respondents.

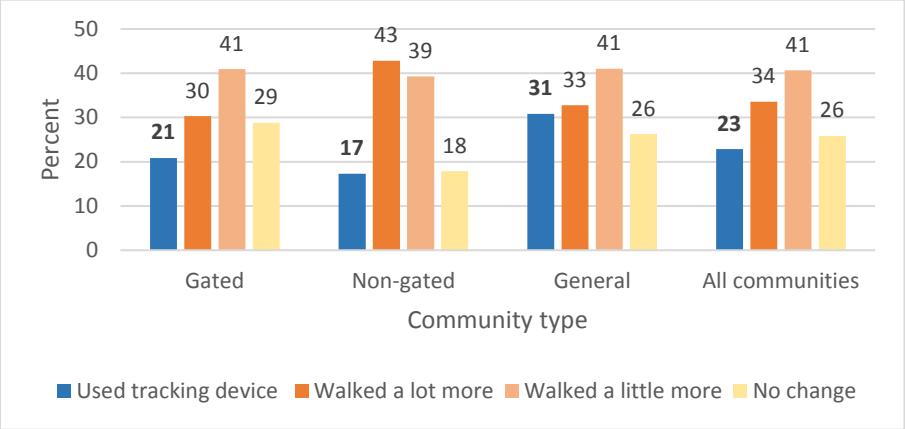

Figure 25. Physical activity tracking device use and its effect on walking

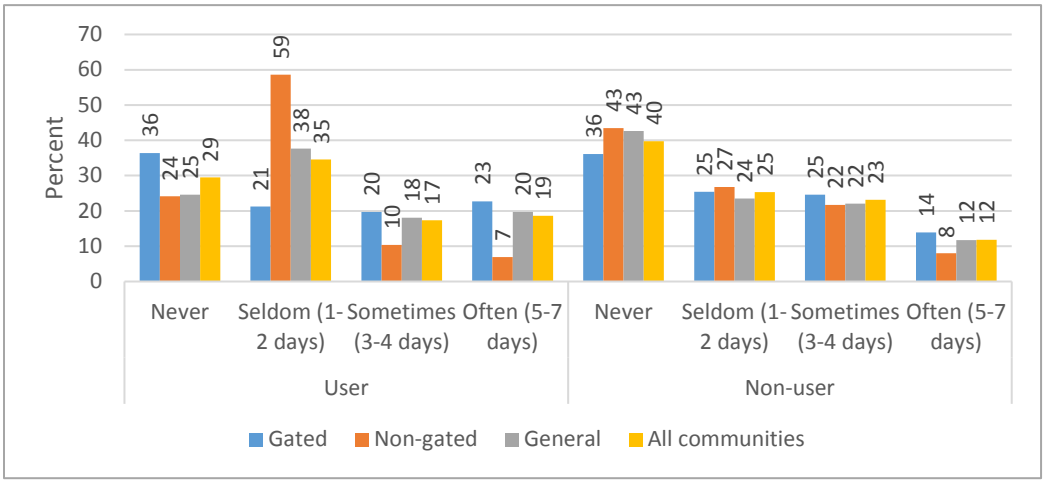

Figure 26. Physical activity tracking device use and physical activity frequency

Although Figure 25 is informative, it only shows what the respondents believe to be the effect of wearing activity-tracking devices. Additional insights can be obtained by combining the device-use information with the responses to another question that inquired about the level of physical activity over the seven days before the survey without any reference to device use.

Figure 26 shows the responses to the question on level of physical activity by classifying the respondents into tracking device users and non-users. It is evident that the share of respondents from all communities who did not participate in any physical activity in seven days is larger among the device non-users (40 percent) compared to device users (29 percent). The share of respondents who

never undertook any physical activity among the non-users is greater not only for all communities combined, but also for each type of community. The figure also shows that the share of those who participated in physical activity often (5-7 days) is also larger among device users from all communities combined (19 percent) compared to device non-users (12 percent). These overall results are mostly, but not always, consistent for each community type.

6.12. Physical and Psychological Health

Literature shows that health, walking, and physical activities are interrelated. Before embarking on the relationship between health and walking in the subsequent sections, responses to questions on physical and psychological well-being are analyzed here. Five questions were included in the survey about health and well-being, including physical health, ability to climb stairs, ability to concentrate, the feeling of anxiousness, and satisfaction with social ties. In each case, respondents were asked to use an 11-point scale, ranging from 0 to 10, where a score of 0 represented the least favorable response and a score of 10 represented the most favorable response. Specifically, 0 represented very poor and 10 represented very good in the question on physical health; 0 represented very difficult and 10 represented not at all difficult in the questions on climbing stairs and concentration; 0 represented very anxious and 10 represented not at all anxious in the question on anxiousness; and 0 represented very unsatisfied and 10 represented very satisfied in the question on satisfaction with social ties.

Figure 27 shows the mean and median scores for physical health, Figure 28 shows the scores for ability to climb stairs, Figure 29 shows the scores for ability to concentrate, Figure 30 shows the scores for not feeling anxious, and Figure 31 shows the scores for satisfaction with social ties. From the mean and median scores in Figures 27 through 31, it is apparent that the respondents, on average, have good physical and psychological health as well as good social ties. That conclusion can be drawn from the fact that the mean and median scores are greater than 5 – the midpoint of the scale – in all tables for all three types of communities.

Regarding physical health (Figure 27), both the mean and median scores seem to indicate that the respondents from the gated communities are slightly better off than the other two types of communities. While the mean and median scores for the respondents from gated communities are 7.4 and 8, the mean and median scores for the other two types of communities are smaller. This finding is somewhat surprising because the respondents from gated communities, on average, are older.

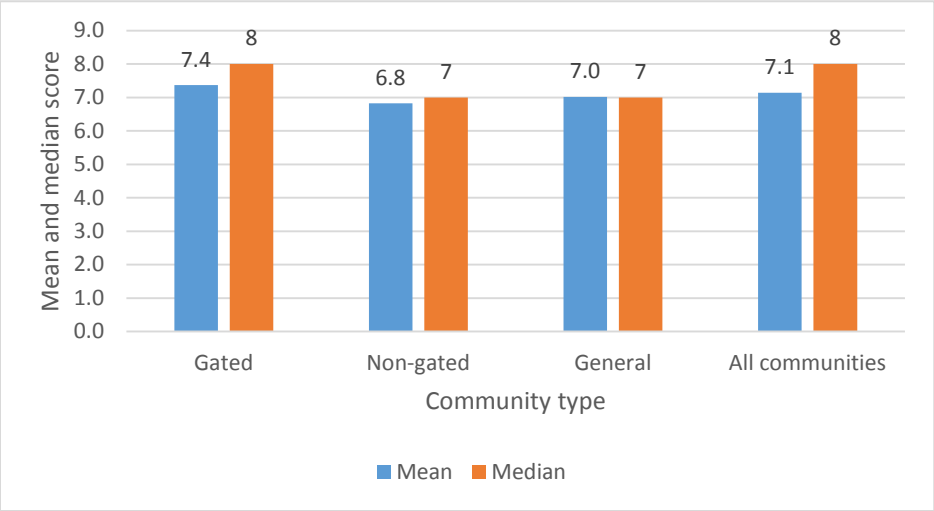

Figure 27. Respondents' rating of own physical health

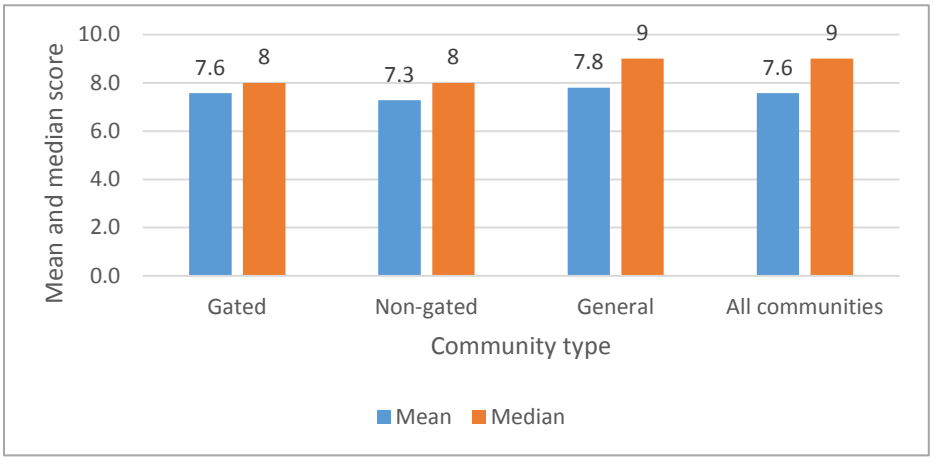

Figure 28. Respondents' rating of ability to climb stairs without help

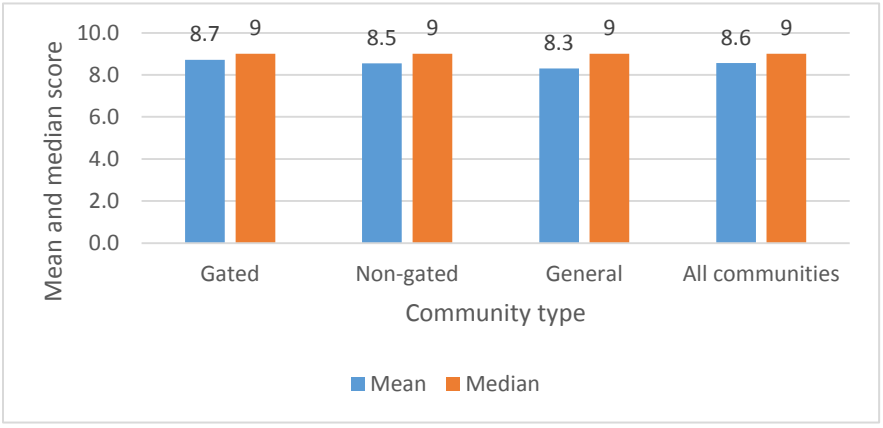

Figure 29. Respondents' rating of ability to concentrate

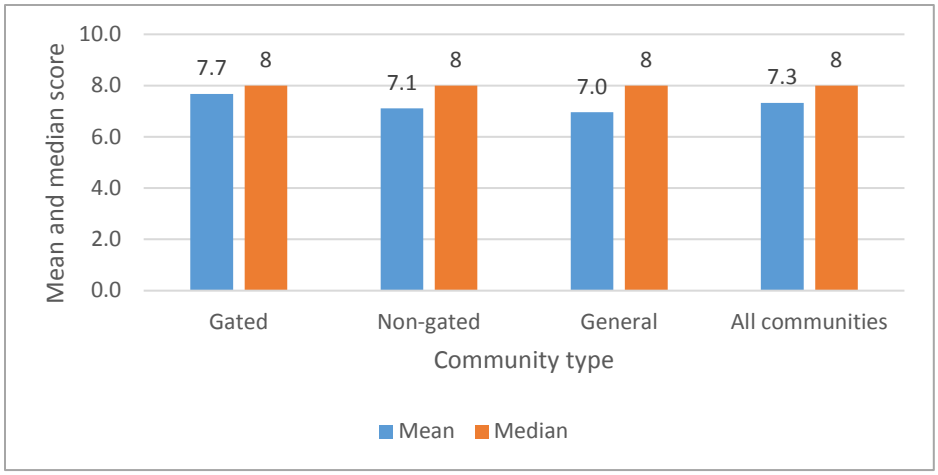

Figure 30. Respondents' rating of feeling anxious

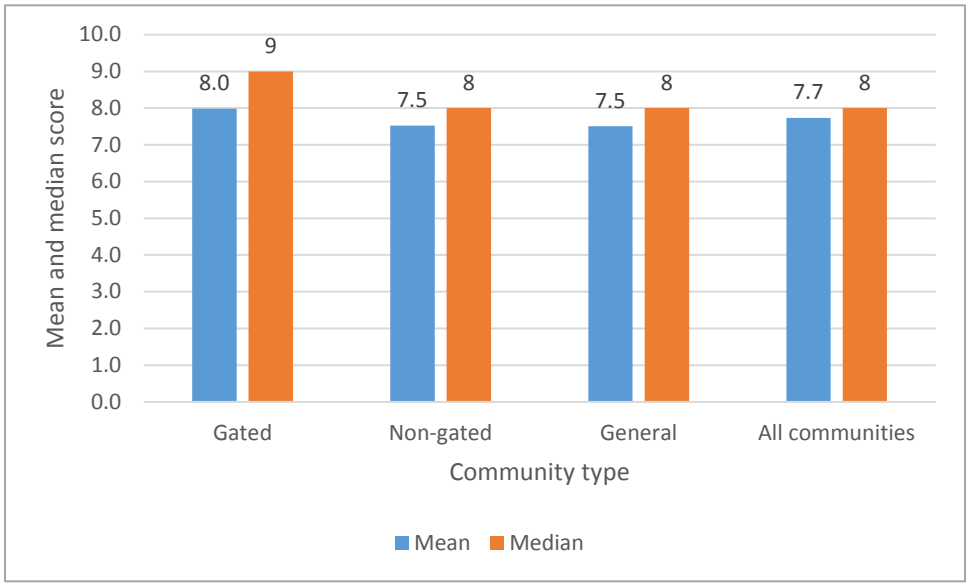

Figure 31. Respondents' satisfaction with social ties

Regarding climbing stairs (Figure 28), the greater mean and median scores for respondents from general neighborhoods indicate that they are better off than the respondents form the other two types of communities. The differences between the three community types are very small regarding the ability to concentrate (Figure 29). While the mean scores vary a little, the median scores are the same for all three types of communities. The mean and median scores for concentration is also higher than those for physical health and ability to climb, indicating that the ability to concentrate is not much of an issue for most respondents.

Regarding feeling anxious (Figure 30), the respondents from the gated communities appear to be better off because a greater mean score, but the median scores are the same for all three types of communities. In terms of satisfaction with social ties, the respondents from the gated communities are better off than the respondents from the other two types of communities (Figure 31). The mean

and median scores for the respondents from the gated communities are discernibly greater than the respondents from the other two types of communities.

The respondents from gated communities appear to be better off than the respondents from the other two types of communities in terms of physical health and satisfaction with social ties, but the respondents from general communities appear to be better off regarding ability to climb stairs. Differences between the community types is almost non-existent regarding the ability to concentrate and the feeling of anxiousness. Thus, from an overall perspective, the respondents form the gated communities may be somewhat better off than the respondents from the other types of communities despite a higher average age.

6.13. The Relation Between Health and Walking for Recreation and Exercise

Existing literature for the general population as well as for older adults has often examined the relationship between physical health, psychological health, and social interaction with walking and the level of physical activity. The data collected through the survey in this study provided an opportunity to examine those relationships. In the two following sections, the correlation between certain health and social well-being variables and walking for leisure/exercise and transportation are examined.

The relationship between health/social well-being and walking is examined here by using Spearman's correlation analysis, which is also known as rank correlation. The Spearman correlation methods is considered more appropriate than Pearson's correlation when the data are ranked or ordered such as the survey responses. The correlation coefficient between any two variables lies between -1 and +1, where -1 represents a perfect negative correlation, 0 represents total absences of correlation and +1 represents a perfect positive correlation. A correlation between two variables indicates the degree of relationship between the two variables, but it does not show the effect of one variable on the other. Thus, the analysis below indicates whether walking and health are related, but does not indicate whether one of them affects the other.

6.14. Relationship between Health and Leisure and Exercise Walking

Table 12 shows the correlation between the five health and well-being variables discussed in Section 9 with the frequency and duration of walking for leisure and exercise in Section 3. For each variable in Table 12 are shown the correlation coefficient (ρ), the level of significance of the correlation (p), and N, the number of data points or records used in the analysis. It may be noted that a value of p lower than 0.05 indicates a correlation being significant at 5 percent level, or 95 percent confidence level. The first column of Table 12 shows the association of the health variables with walking *frequency*, whereas the second column shows the association with walking *duration*.

Table 12 – Correlation Between Health and Walking for Leisure and Exercise

Variables	Frequency of Walking for Exercise and Leisure	Duration of Walking for Exercise and Leisure
Physical health		
Correlation coefficient (ρ)	0.291	0.290
Significance (p)	0.000	0.000
N	682	549
Ability to climb stairs		
Correlation coefficient (ρ)	0.303	0.317
Significance (p)	0.000	0.000
N	687	552
Ability to concentrate		
Correlation coefficient (ρ)	0.074	0.090
Sig. (2-tailed)	0.051	0.035
N	688	553
Not feeling anxious		
Correlation coefficient (ρ)	0.035	0.08
Significance (p)	0.362	0.060
N	680	547
Satisfied with social ties		
Correlation coefficient (ρ)	0.120	0.136
Significance (p)	0.002	0.001
N	684	551

Note: N for duration is smaller than N for frequency because the question about duration was asked only to those who walked during the past seven days.

The significance of correlation (p) in the first column indicates that walking frequency for leisure/exercise is statistically related to physical health, ability to climb stairs, and satisfaction with social ties, but not with the ability to concentrate or the feeling of anxiousness. The p values for the first three variables are smaller than 0.05, but not for the remaining two. The positive sign of the correlation coefficients (ρ) indicates that when physical health is better, ability to climb stairs is higher, and social ties are greater, the survey respondents walk more frequently for leisure and exercise. However, the correlation can also be interpreted as people who walk more frequently for leisure and exercise have better physical health, greater ability to climb stairs, and better social ties.

The correlation of walking duration in the second column is similar to the correlation of walking frequency in the first column with one exception. While the ability to concentrate is not correlated with walking frequency at the 5 percent level, it is significant at that level for walking duration. Yet the correlation of this variable is smaller than the correlation of physical health, ability to climb, and satisfaction with social ties.

6.15. Relationship between Health and Transportation Walking

The correlation of walking frequency and duration for transportation with the health and well-being variables in Section 9 is shown in Table 13. Similar to Table 12, the correlation of walking frequency is shown in the first column and the correlation of walking duration is shown in the second column. The parameters shown in Table 13 are the same as the parameters in Table 12, namely, Spearman correlation coefficient(ρ), significance (p), and number of records used (N).

Table 13 – Correlation Between Health and Walking for Transportation

Variables	Frequency of Walking for Transportation	Duration of Walking for Transportation
Physical health		
Correlation coefficient (ρ)	0.032	0.065
Significance (p)	0.407	0.208
N	677	372
Ability to climb stairs		
Correlation coefficient (ρ)	–0.094	0.046
Significance (p)	0.014	0.377
N	681	372
Ability to concentrate		
Correlation coefficient (ρ)	–0.052	–0.037

Sig. (2-tailed)	0.178	0.479
N	682	373
Not feeling anxious		
Correlation coefficient (ρ)	–0.055	–0.034
Significance (p)	0.155	0.519
N	674	371
Satisfied with social ties		
Correlation coefficient (ρ)	–0.008	0.034
Significance (p)	0.829	0.513
N	678	372

The results of the correlation analysis in Table 13 on transportation walking are substantially different from the results in Table 12 on walking for leisure and exercise. While three variables were correlated with leisure/exercise walking frequency and four variables were correlated with leisure/exercise duration with a positive sign, none of the variables in Table 13 are significantly correlated with transportation walking duration and only one variable—the variable on ability to climb stairs—is correlated with walking frequency, but even that variable shown a counterintuitive negative sign. From the overall results in Table 13, it is clear that frequency and duration of walking for transportation are not significantly associated with the health measures considered. One possible explanation of the lack of association between health/well-being and transportation walking may be that some older adults walk for transportation despite modest health. Another explanation may be that transportation walking is not substantial enough to have any effect on health and well-being. The fact that leisure/exercise is more closely associated with health than transportation walking may also be because people who are more health-conscious walk for leisure/exercise, but does not walk for transportation.

6.16. Sidewalk Availability and Walking

All analyses in the previous sections of this report were conducted on the basis of survey data only. After the survey was completed, the research team used Google Street View to determine whether the survey respondents lived in dwellings that had sidewalks in front. A variable was created with two categories, one representing cases where the road fronting a respondent's dwelling had a sidewalk on one or both sides, and the other representing cases where the road fronting the respondent's dwelling had no sidewalk on either side. The objective of creating this variable was to examine whether older adults with sidewalks in front of their houses walked more frequently and/or for greater duration.

6.17. Sidewalk Availability and Walking for Leisure or Exercise

Figure 32 shows the relationship between sidewalk availability in front of homes and the survey respondents' frequency of walking for leisure and exercise. By comparing the percentages for those with no sidewalks with those who had sidewalks on either side of the road, one can determine that the respondents with sidewalk in front of their houses walked more frequently. For example, only 25 percent of the respondents who had no sidewalks in front of their houses mentioned walking often (5-7 days a week) for leisure or exercise, whereas 34 percent of those who had sidewalks in front walked often. Similarly, 24 percent of those with no sidewalks in front of their houses mentioned never walking for leisure or exercise, whereas only 17 percent of those having sidewalks in front of their houses mentioned never walking for leisure and exercise.

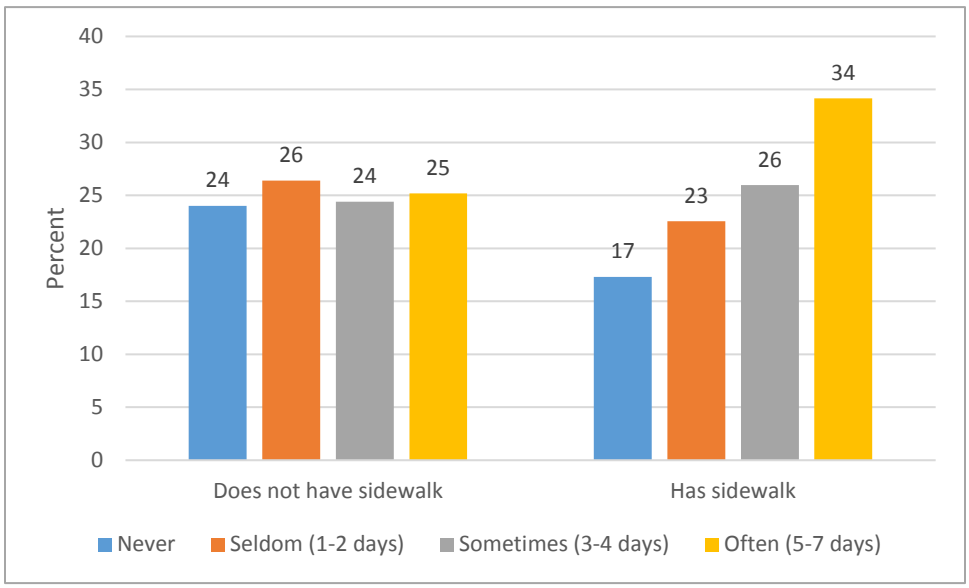

Figure 32. Sidewalk availability and frequency of walking for leisure and exercise

Figure 33 shows the relationship between sidewalks in front of dwellings and the duration of walking for leisure and exercise for the survey respondents. Similar to the relationship with walking frequency in Figure 32, it shows that older adults who live in dwellings having sidewalks in front walk for longer duration than those who live in dwellings without sidewalks. For example, only 3 percent and 9 percent of those living in dwelling without sidewalks in front walked 90+ minutes or 60-89 minutes, respectively. In contrast, 7 percent and 10 percent of those having sidewalks mentioned walking such long durations. Figure 32 and 33 together indicate that older adults having sidewalks in front of their houses walk more frequently and for longer duration for leisure and exercise.

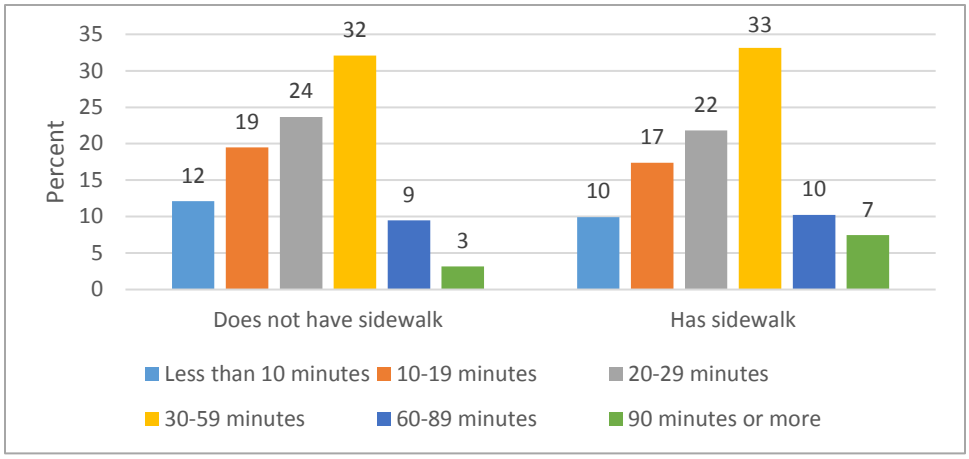

Figure 33. Sidewalk availability and duration of walking for leisure and exercise

6.18. Sidewalk Availability and Walking for Transportation

Figure 34 shows the frequency of walking for transportation (i.e., to go someplace) versus sidewalk availability in front of the respondents' homes. The classification of sidewalk is the same as Figure 32 and 33, whereas the frequency of walking is classified by the same categories as Figure 32. Figure 34 shows that the survey respondents who had sidewalk in front of their houses walked more frequently than those with no sidewalks. For example, 49 percent of those without sidewalks mentioned not walking at all for transportation in seven days compared to only 43 percent for those with sidewalks. Similarly, 16 percent of those with sidewalks in front of their houses mentioned walking often (5-7 times a week), whereas only 13 percent did so when there was no sidewalk in front of their houses.

Figure 35 shows the duration of walking for transportation versus sidewalk availability. Similar to Figure 33, which showed that older adults walk for longer duration for leisure and exercise when sidewalks are present in front of their dwellings, Figure 35 shows that they also walk longer duration for transportation when sidewalks are available in front of their houses. For example, 10 percent of respondents walk 60 or more minutes for transportation when sidewalks are present against 6 percent for those without sidewalks. Similarly, 31 percent of those without sidewalks walk less than ten minutes compared to 28 percent of those with sidewalks.

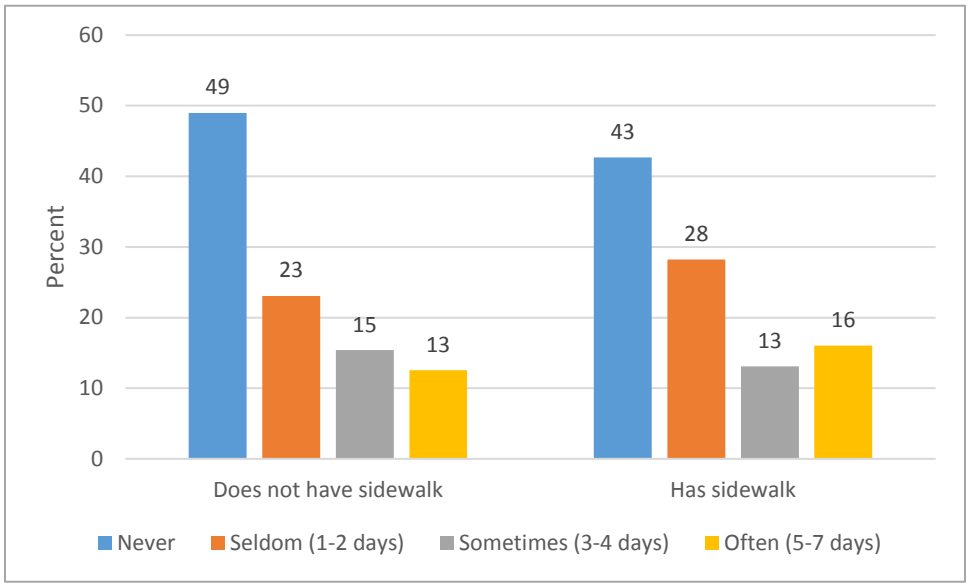

Figure 34. Sidewalk availability and frequency of walking for transportation

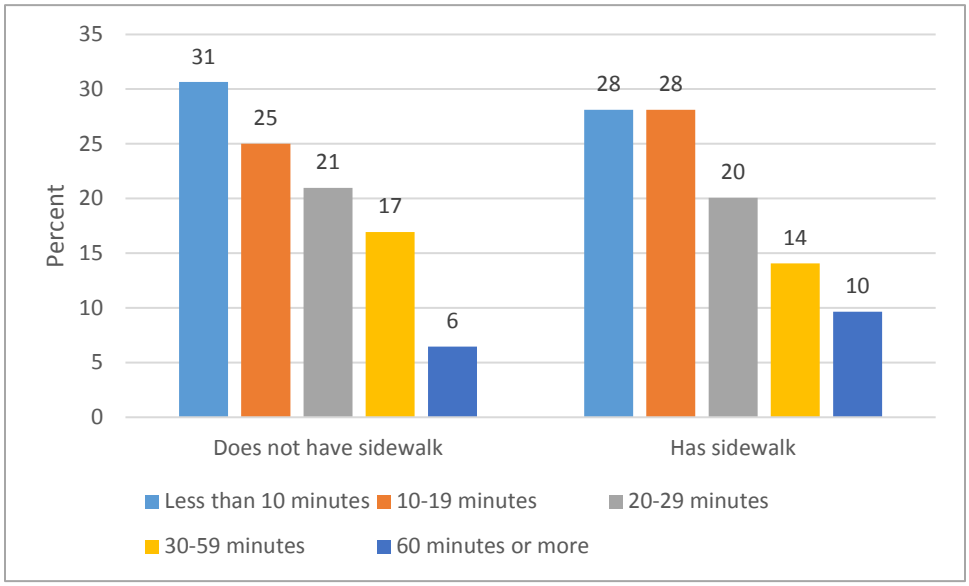

Figure 35. Sidewalk availability and duration of walking for transportation

7. CONCLUSIONS

In view of the statewide growth of older adults in New Jersey, concentration of older adults in certain parts of the state, and issues related to mobility of older adults due to disabilities and other health issues, this study included a survey of older adults focusing on their walking characteristics, difficulties, and environmental barriers. Because of the recent growth of exclusive planned communities for older adults, this study conducted most analyses separately for residents of gated communities, non-gated communities, and general neighborhoods by focusing on two municipalities of New Jersey: Monroe Township in Middlesex County and Berkeley Township in Ocean County

Analyses showed that the demographic and socioeconomic characteristics of the residents of the three types of communities are somewhat different. Although the survey was targeted to people aged 50 and over, the residents of general communities, on average, are younger than the residents of the gated and non-gated communities. The likely reason for this difference is that people have to be of a certain minimum age, such as age 55, to be eligible to live in exclusive communities for older adults.

The residents of the three types of communities are mostly white, but that is because the study specifically targeted specific communities in a part if the state where the share of white population is larger than the state average. The residents of the gated communities have the highest educational attainment, followed by the residents of general neighborhoods, and the non-gated communities, respectively. The residents of the non-gated communities also have lower household income, on average, than the other two types of neighborhoods. The share of residents with very high income appeared to be the highest for the general neighborhoods, followed by the residents of the gated communities. That may be because a larger share of the residents in the general neighborhoods are still in the work force compared to the other two types of neighborhoods. More than 80 percent of the respondents form gated communities are retired, whereas 70 percent and 53 percent of respondents from non-gated communities and general neighborhoods are retired.

Although studies on older adults often emphasize the importance of public transit for enhancing mobility, the residents of the three types of communities surveyed are mostly car users. Of all survey respondents, only 3 percent did not have any car in household and 94 percent of the respondents mentioned driving at least once in the past 30 days.

Approximately 20 percent of the respondents from all three types of communities did not walk at all for leisure and exercise within seven days, but 80 percent walked at least a little and about 30 percent walked 5 to 7 days a week. The difference in leisure walking frequency is little between the three types of communities. About 16 percent of the respondents from all communities walked for a duration of one hour or more. On the whole, walking for leisure seems to be quite common in all three types of neighborhoods.

From transportation planning and policy perspective, one of the key findings of this research is that the facility most often used for leisure and exercise walking by the older adults in all three types of communities are neighborhood sidewalks. More than two-thirds of all respondents mentioned neighborhood sidewalks and the differences in this regard were little among the community types. It is also common for the survey respondents to walk on roads, indoor shopping malls, and fitness centers. People walked more in parks in the general neighborhoods than the other two types of neighborhoods.

Walking for transportation is less common among the survey respondents from all three types of communities than walking for leisure and exercise as 45 percent never walk for transportation (compared to 20 percent for leisure and exercise walking). The duration of transportation walking is also less than the duration for leisure/exercise walking. It appeared from the survey responses that the older adults from all three types of communities walk to a variety of destinations. The most common destinations for walking trips appear to be grocery/drug store, neighborhood store, bank/post office, and friend/family's home. Walking trips to clubhouses is also very common in gated and non-gated communities. On the whole, the destinations seem to suggest that mixed-use developments with stores/shops, banks, post offices, etc., would increase the propensity of frequency of walking trips for older adults.

A comparison of walking frequency and duration for leisure/exercise and transportation by sidewalk availability in front of dwellings revealed that older adults who have sidewalks in front of their dwellings walked more frequently and for longer duration than those who did not have sidewalks in front of their dwellings. The differences are more discernible for leisure/exercise walking than transportation walking.

The respondents from all three types of communities are highly supportive of municipal funding for improving walking infrastructure. Among all types of infrastructure, support was the highest for lighting along sidewalks and paths, followed by sidewalk installation/improvement, crosswalk installment/improvement. Support for walking path/trail improvement, bench installation, tree planning, etc., was also high, but lower than lighting, sidewalk improvement, and crosswalk improvement. Support from the residents of general neighborhoods was generally higher for all types of walking infrastructure. This may be because many of the gated and non-gated communities already provide such infrastructure.

The survey revealed that environmental barriers to walking are encountered more often by the residents of general neighborhoods than the residents of gated and non-gated communities. Residents of gated communities appear to encounter barriers the least. Among the barriers, lack of sidewalks/paths is the most common, followed by lack of nearby destinations, and traffic. The residents of general neighborhoods encounter barriers due to traffic more often than the residents of the gated and non-gated communities.

The survey also revealed that the residents of all three types of communities considered to a certain extent the availability of walking facilities when they moved to their current locations, including sidewalks, indoor walking/exercise facilities, and outdoor paths/trails. The survey also showed that their current residential locations provide greater opportunities for walking and exercise than their previous locations. These results seem to indicate that older adults, at least in the communities studied, take into account the availability of walking facilities when they move.

When asked about safety from traffic, people, and animals, the respondents seemed to be only modestly concerned. Obviously, the concern was higher for walking after dark than daytime. The respondents are more concerned about safety from traffic than about being attacked by people or animals. The survey also showed that despite having only modest concern about traffic, people, and animals, the respondents do not feel they have a high level of access to parks. That is most likely because most survey residents did not have parks near their homes or neighborhoods.

Another key finding from the survey is that physical activity trackers such as Fitbits and smartphones have a positive effect on physical activity levels of older adults. Although a majority of the survey respondents did not use a tracker, those who did thought they participated in activities more because of the trackers. Analysis of a question on physical activity level showed that the level was higher for those who used trackers.

The survey revealed that the respondents of the three types of communities are generally in good health. The older adults who had greater physical health, greater ability to climb stairs, and greater satisfaction with their social connections walked more for leisure and exercise than others. However, health appeared to have no relation with walking for transportation.

This study intentionally avoided statistical tests and models to make it accessible to general audiences. Rigorous statistical models will be tested with the survey data to examine some of the intricate relationships when the research team prepares article manuscripts and conference papers for publication and presentation.