

Deliverable #VII.30—Report 1 of 4:

**“Results of Health &
Physical Activity Questionnaire”**

Submitted to the Georgia Department of Transportation,
under GDOT Research Project No. 9819:
Task Order 97-13

Disclaimer: The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Department of Transportation of the State of Georgia or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

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DISCLAIMER

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SMARTRAQ BACKGROUND

SMARTRAQ's ("Strategies for Metropolitan Atlanta's Transportation and Air Quality") stated goal is to "develop a framework for assessing land use and transportation policies having the greatest potential for reducing the level of auto dependence and vehicle emissions in the Atlanta metropolitan area while sustaining the economic vitality and environmental health of the region." SMARTRAQ (www.smartraq.net) was initiated by the Georgia Department of Transportation (GDOT) and has received additional and significant financial support from the Georgia Regional Transportation Authority (GRTA) and the U.S. Centers for Disease Control and Prevention (CDC), among other organizations. The research program's central goal has been to develop and implement an activity-based household travel survey for the Atlanta region that generates a better understanding of the relationships between land use patterns, travel behavior, and vehicle emissions.



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I. EXECUTIVE SUMMARY

SMARTRAQ (Strategies for Metropolitan Atlanta's Regional Transportation and Air Quality Project) is an integrated transportation, land use, urban design and physical activity study focusing on the thirteen-county ozone non-attainment area for the Atlanta metropolitan region. The project was launched in 1998 with funding from the Georgia Department of Transportation (GDOT), the Georgia Regional Transportation Authority (GRTA), the Centers for Disease Control and Prevention (CDC), the Turner Foundation, and a cooperative working relationship with the Atlanta Regional Commission (ARC).

CDC and the larger public health community seek to develop new ways for capturing the relationship between walking and the physical environment in order to provide planners and health officials with the information needed to inform health-promoting policy decisions; in part due to alarming increases in the number and proportion of obese adults in the United States. The SMARTRAQ research program was designed to facilitate this effort.

The health and physical activity data from 816 people reported on here was collected through a sub-survey of the larger Atlanta 2001 and 2002 activity-based household travel survey (AHTS) and consisted of a sample of the population living in the 13-county metropolitan area. Participants in the sub-survey received a paper questionnaire and one of two personal equipment packages—an activity monitor or an electronic travel diary (ETD).

Recruitment for this sub-survey was based on a case-control model borrowed from public health study methodologies whereby participants were recruited into a control group (low walkability) or a case group (high walkability) and separated based upon income. Walkability was defined to include both a measure of net-residential density and street connectivity. The design set forth isolated the effect of the stimulus (walkability) on non-motorized travel patterns for lower and higher income households.



This deliverable reports on the results of the three primary sections of the paper questionnaire—walking, bicycling, and social interaction. For the results from the two personal equipment packages also used in the sub-survey, please see Georgia Department of Transportation deliverable #30, part four. The unweighted findings include:

Walking

- Walking frequency varied positively with increased neighborhood net residential density (NRD). The NRD of the 51.0% of respondents who walk at least once per week is 8.2 housing units/ net-residential acre, compared to 10.2 for the 7.3% daily walkers.
- Residents of high density neighborhoods walk more in their own community (mean NRD of 10.2 units/net res. acre for persons that walk daily), while residents of low density neighborhoods walk more frequently elsewhere (mean NRD of 3.05 units/net res. acre for persons that walk daily).
- Respondents living in neighborhoods with a high mix of residential, commercial and office land uses (and also high density) tended to strongly agree there were destinations such as services and shops within walking distance of their home (mean NRD of 12.43 units/net res. acre, mean use mix of 0.52, and mean intersection density of 42.67 ints/km²). Respondents living in areas with a lower mix of uses (and less density) strongly disagreed with this statement (mean NRD of 2.26 units/net res. acre, mean use mix of 0.14, and mean intersection density of 29.10 ints/km²).
- The largest proportion of obese individuals (body mass index of 30 or greater) is in the category of respondents that do not walk at all in a given week (24.8%), and unexpectedly the second highest proportion is associated with daily walkers (22.2%). The group of people who walk three to six times per week had the lowest obesity percentage (15.0%).

Bicycling

- The frequency of bicycling and the presence of bicyclists in a neighborhood both increase with residential density. While most respondents (74.9%) do not ride a bicycle at all, 24.8% (N=202) ride a bicycle occasionally (six times per week or fewer) but not every day.

- While relatively few people surveyed actually ride a bicycle on a regular basis, 64.6% reported seeing bicyclists present in their neighborhood at least once per week, indicating that most neighborhoods are able to support at least some bicycling.
- Although people that bicycle at least once per week tend to live in higher density, more mixed neighborhoods, the conditions for bicycling are not necessarily better there. People in high density neighborhoods tended to disagree with the statement “there are good road conditions for bicycling in my neighborhood” (mean NRD of 13.49 units/net res. acre, mean use mix of 0.40, and mean intersection density of 44.95 ints/km²). Those that strongly agreed with the statement generally live in lower density neighborhoods (mean NRD of 2.71 units/net res. acre, mean use mix of 0.24, and mean intersection density of 34.41 ints/km²).

Social Interaction

- Slightly over half of respondents reported knowing seven or more neighbors. All but 5.7% know at least one neighbor.
- Despite denser living conditions, the number of neighbors known tended to be inversely related to mean net residential density. The set of respondents that know seven or more neighbors had the lowest mean NRD (6.22 units/net res. acre) while the set of respondents that know only one or two neighbors had the highest mean NRD (7.57 units/net res. acre).
- Similarly, use mix tended to be highest for those that strongly disagreed or disagreed with the statement “living in my neighborhood gives me a sense of community” (overall mean use mix of 0.40). Mix tended to be lowest for those that agreed with the statement (0.28). A blend of commercial, office and residential uses also does not appear to necessarily ensure a sense of community. NRD was highest for those that strongly disagreed or disagreed (overall mean NRD of 8.93 units/net res. acre) and lowest for those that were neutral (5.52 units/net res. acre). Despite the more compact living conditions of a higher NRD neighborhood, the close proximity of neighbors does not necessarily instill a sense of community.

While this physical activity, social interaction and urban form research conducted by SMARTRAQ is focused within the Atlanta region, the models, tools, and techniques developed in this study will also prove useful for other areas seeking to maximize the benefits of investments in transportation and public health. Future research will continue to explore the effects of land use and its mix that can best make the places in which we live, work, and play have a positive affect on our health.

II. INTRODUCTION

The SMARTRAQ (Strategies for Metropolitan Atlanta's Regional Transportation and Air Quality) research project is an integrated transportation, land use, urban design and physical activity study focusing on the thirteen-county ozone non-attainment area for the Atlanta metropolitan region. The project was launched in 1998 with funding from the Georgia Department of Transportation (GDOT), the Georgia Regional Transportation Authority (GRTA), the Centers for Disease Control and Prevention (CDC), the Turner Foundation, and a cooperative working relationship with the Atlanta Regional Commission (ARC).

CDC seeks to develop new ways for capturing the relationship between walking and the physical environment in order to provide planners and health officials with the information needed to inform health-promoting policy decisions. Fueling their interest in this effort is the alarming increase in the number and proportion of obese adults in the United States over the past two decades (Mokdad, et al, 2000). While the research conducted by SMARTRAQ is focused within the Atlanta region, the models, tools, and techniques developed in this study will prove useful for other areas seeking to maximize the benefits of investments in transportation and public health.

The data collection effort for this report was a subcomponent of the larger Atlanta 2001 and 2002 activity-based household travel survey (AHTS). For this larger survey the research design employed a stratified sampling plan designed to ensure that representative household populations (e.g., household size, income) and levels of residential density are selected for participation.

A sub-set of participants from this survey was also asked to complete a health and physical activity sub-survey consisting of questions about non-motorized travel behavior, social interaction and physical health. Participants in the physical activity survey received a paper questionnaire and one of two personal equipment packages—an activity monitor or an electronic travel diary (ETD). This sub-survey provides the data for an analysis of the relationships between urban form characteristics, physical activity and non-motorized transportation patterns.



This deliverable reports on the results of the paper questionnaire. For the results of the activity monitor and ETD, please see Georgia Department of Transportation deliverable #30, parts three and four.

A. Study Goals

The purpose of the health and physical activity survey component was to determine additional self-reported typical physical activity for a sub-set of the 8,069-household Atlanta travel survey. Although detailed travel behavior was noted for a specific two-day period for each respondent, certain anomalies may exist in behavior over the time frame. The questionnaire provided activity data over a longer time period, e.g. the average number of times an individual walked or bicycled per week, in addition to relevant information about walking and bicycling conditions, interactions with neighbors and a general sense of community in one's neighborhood.

B. Approach

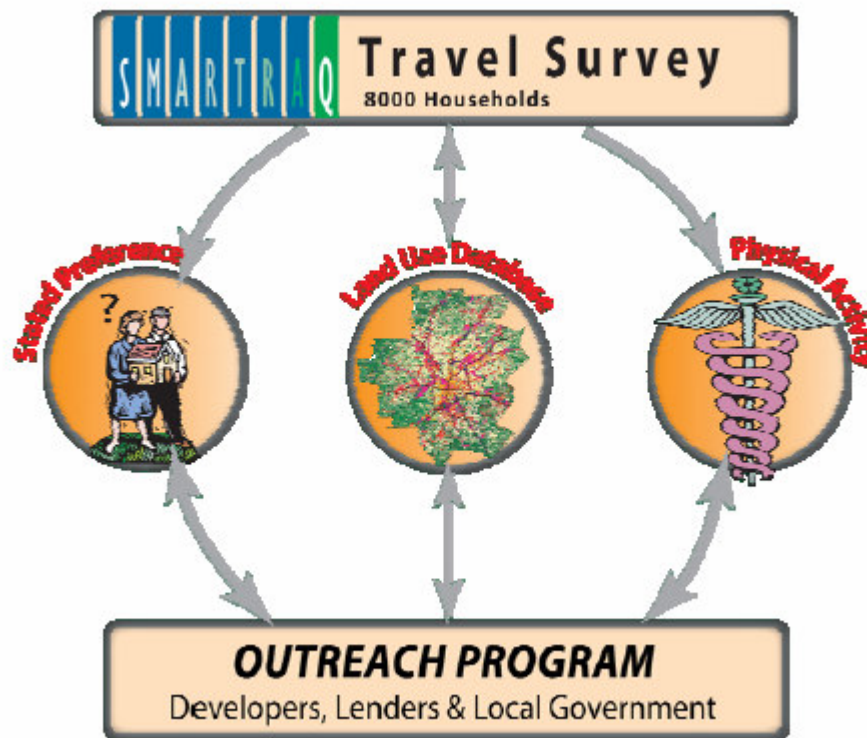
These study goals were achieved through a sub-survey nested in a larger survey. For the larger survey all members over five years of age in 8,069 households in the 13-county Atlanta region participated. This two-day activity-based household travel survey (AHTS)¹ occurred for all days of the week² and was primarily done during 2001 and 2002, with a smaller supplemental data collection effort in spring 2003 done for the health and physical activity subsurvey. A random-digit-dial method of telephone-based recruitment was used. The household travel survey sample was stratified by net residential density (NRD—number of housing units divided by number of residential land acres) with an intentional over sampling of households in higher density areas. This was done to allow for the analysis of the effects of land use patterns on travel behavior across a range of densities, including higher density locations. Sufficient distribution across annual household income and household size was also achieved.

¹ Ground-level ozone non-attainment area under the federal Clean Air Act for Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding, and Rockdale

² All possible pairs of the days of the week, except Saturday with Sunday, were allowed. Weekend travel is reported by households assigned either a Friday/Saturday travel day pair or a Sunday/Monday pair. Therefore, it is important to note that weekend travel was under-sampled relative to weekdays and the distribution of trips by day of week shown is not representative of reality. While the proportion of weekend travel may be low, it is important to acknowledge that having any weekend travel at all within a traditional household travel survey is an advancement over past practices

As part of the AHTS effort SMARTRAQ created the first contiguous parcel-level land use information system in the Atlanta Region and conducted two additional sub-surveys – one on the stated preferences for residential location choice and the other on physical activity and health (Figure 1).

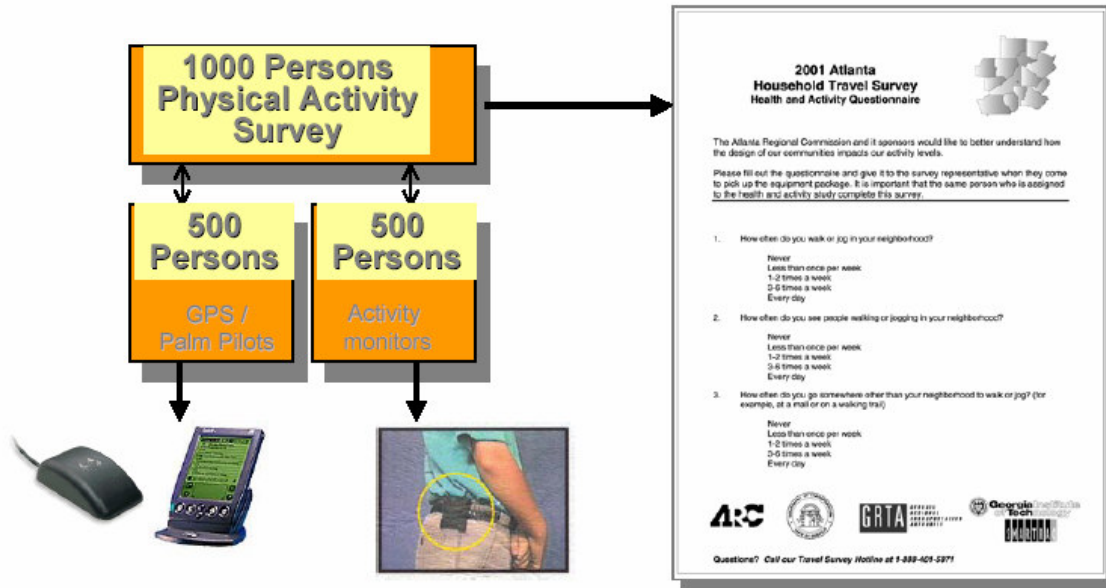
Figure 1: Structure of SMARTRAQ Program



A sub-set of participants (1,200 persons from separate households) from the AHTS was asked to complete the health and physical activity sub-survey. Recruitment for this sub-survey was based on a *case-control* model borrowed from public health study methodologies whereby participants were recruited into a control group (low walkability) or a case group (high walkability) and separated based upon income. Walkability was defined to include both a measure of net-residential density and street connectivity. The design set forth isolated the effect of the stimulus (walkability) on non-motorized travel patterns for lower and higher income households.

Participants received a paper questionnaire (PAQ) and one of two personal equipment packages—an activity monitor or an electronic travel diary (ETD) – shown in Figure 2.

Figure 2: Equipment Packages & Questionnaire



C. Survey Design

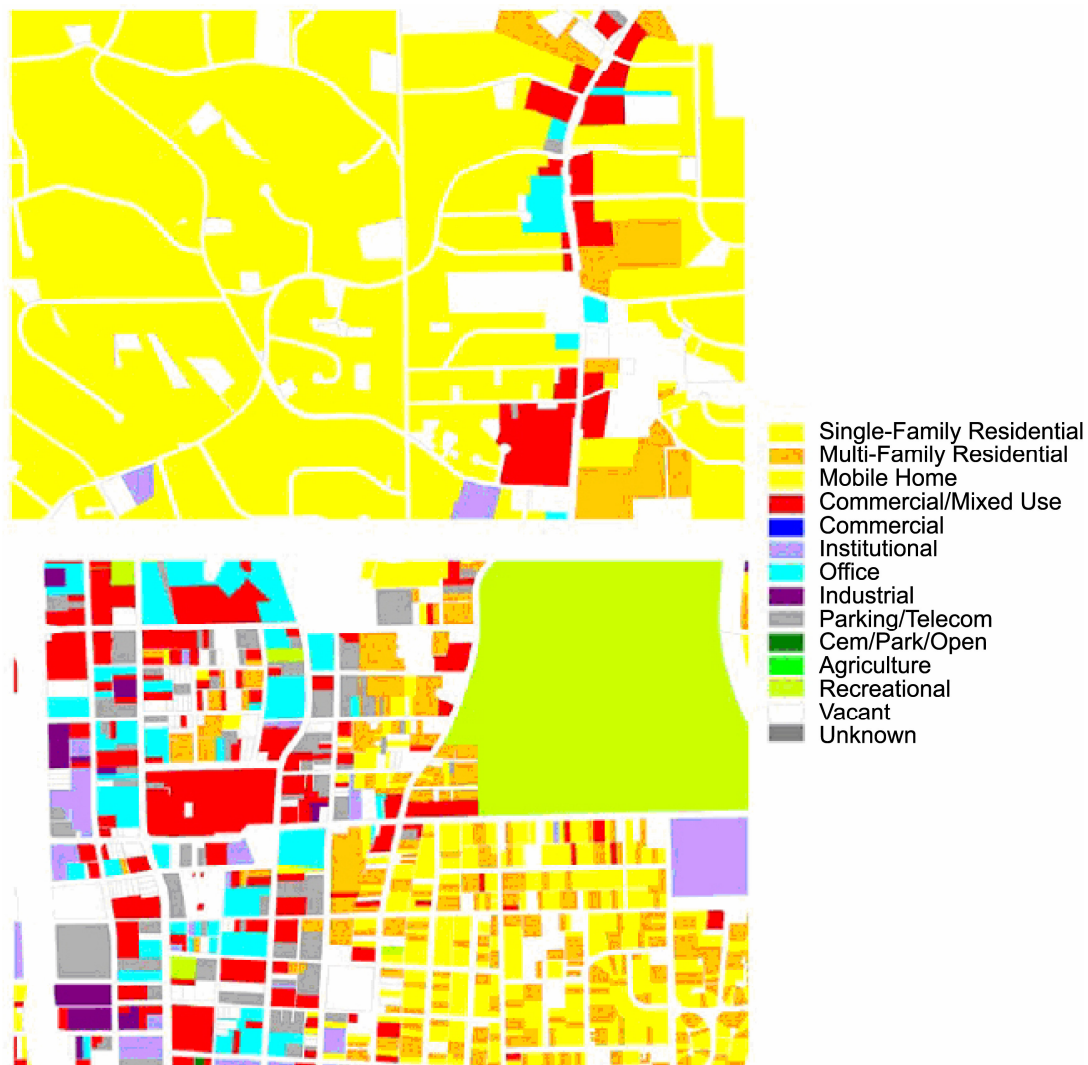
The content of the PAQ was developed from the review of many subject-related surveys, and the adoption and adaptation of the questions they contained. The surveys reviewed included the Center for Disease Control and Prevention’s Behavioral Risk Factor Surveillance System, San Diego Health and Exercise Survey, Amherst Health & Activity Study: Adult Survey, and the Yale Physical Activity Survey. The final PAQ is a five page, 17 question survey that was completed by the participant and mailed back for data entry. It is organized into sections—walking, bicycling, work and leisure time, physical activity, social interaction, and general health. Please see Appendix I for a copy of the questionnaire.

D. Sampling Design

The physical activity component of SMARTRAQ is designed to address a variety of research questions about the relationships between the built environment and household physical activity

patterns. In particular, the sampling frame that was developed for this study is an adaptation of a case control design whereby households were selected from the highest and lowest density land use patterns. In this design, high-density environments are seen as more supportive of non-motorized travel and low-density environments are seen as less supportive. While net residential density is one component of a walkable environment, the absence of a connected environment or the presence of complementary land uses or land use mix are also critical attributes of walkable places (Frank 2000).

Therefore, households were also screened based on the level of street connectivity in which they were located. Figure 3 provides a visual characterization of two contrasting urban forms from which households were recruited for the physical activity component. The top neighborhood is considered a less walkable area by the nature of its lower street connectivity and more segregation of different land uses, and the lower one is more walkable due to the greater connectivity and mix of land uses.

Figure 3: Contrasting Urban Forms

When a household was selected from a high-density environment, it was further screened based on the level of street connectivity of the area in which the household is located. In addition to these two urban form metrics, households were also selected based on income forming a four-quadrant matrix of walkability and income. The selection criteria for recruiting the person within a desired household was the first person between 20 and 65 years old who agreed to participate.

The original survey design called for the highest and lowest brackets of income and highest neighborhood density (as compared to regional demographics) to be over-sampled in order to compare these extremes and determine the effect of urban form on travel. The original

completion goal of 1000 PAQ users (from 600 recruits) evenly distributed across the four cells of income and density as shown in Table 1 was not achieved.

Table 1: Distribution goal across income, NRD & Intersection Density

Annual Household Income	Net Residential Density—dwelling units/ net-residential acre	
	<4	6+
	Intersection/ sq. km	
	<30	30+
\$10,000-\$39,999	250	250
\$60,000-\$99,999	250	250
	Lower- walkability	Higher walkability

In order to increase completion rates financial incentives were used. Over the course of the data collection period, five separate incentives were used. The initial incentive was \$1 with a thank you note included in the equipment package delivery. In order to boost lower than expected completion rates, this was revised in two ways—the amount was increased (\$5, \$10, and \$20) and the payment was not sent until the completed survey package was returned with valid data. See Table 2 for the distribution of PAQ participants by incentive level.

Table 2: Participation Incentives

Incentive	# of Participants	% of 816
\$1	567	69%
\$1 and \$5	9	1%
\$5	53	6%
\$10	153	19%
\$20	34	4%
Total	816	

In order to achieve the goal of 1,000 completes, 1,325 people were successfully recruited and a survey package was sent to them across three deployment periods³. Of the 957 PAQs that were returned completed not all completed the AHTS, which is the source of the participants demographic and other data.

Table 3 indicates how the number of completes decreases as the requirement of completing the AHTS is added. In the end, the final set of data for analysis is those PAQs completed by the 816 people (62% of deployments) who did both the PAQ and the AHTS.

Table 3: Complete by survey component

	Complete Goal	Deployed	PAQ returned, complete	AHTS survey & PAQ returned, complete
People	1,000	1,325	957	816

The 816 people who did both the PAQ and AHTS were distributed across the stratification income and walkability as shown in Table 4. Of these 816 people, 598 (or 73.3%) are in one of the four cells of the original selection criteria matrix shown in Table 1.

Table 4: Completed across income, NRD & Intersection Density

Annual Household Income	Net Residential Density—dwelling units/ net-residential acre	
	<4	6+
	Intersection/ sq. km	
	<30	30+
\$10,000-\$39,999	115	85
\$60,000-\$99,999	311	87
	Lower-walkability	Higher-walkability

Table 5 shows the distribution of all 816 people across all categories of income and NRD. For a variety of reasons including selection criteria changes to improve recruitment rates the final

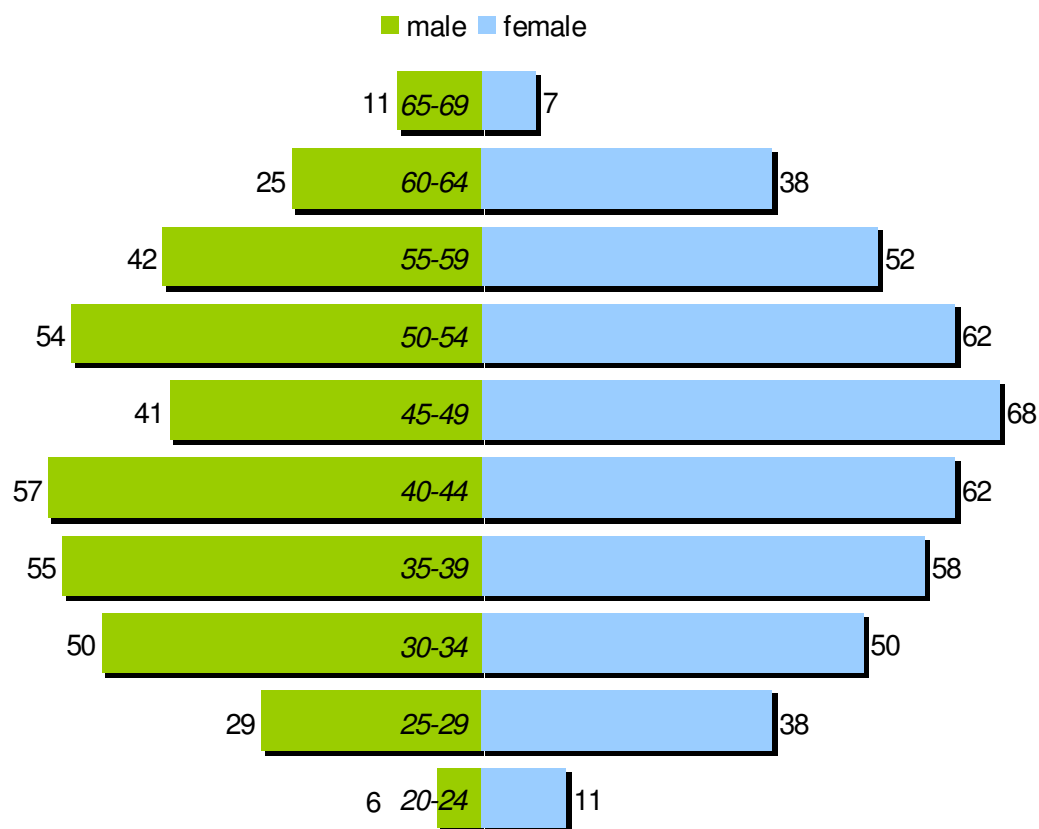
³ The spring 2001 Physical Activity Study began on May 1 and was completed on June 13, 2001. The fall 2001 deployment period began on August 19, 2001 and was completed on December 15, 2001. The spring 2002 deployment period began on January 6 and ended on April 20.

dataset includes 143 people from the middle density range, 89 people in the middle-income range, and two people with an annual household income of over \$100,000.

Table 5: NRD and income distribution of all ETD/household travel survey participants (unweighted)

Annual Household Income	Net Residential Density (units/net-res. acre)					Total (N=people)
	1-1.999	2-3.999	4-5.999	6-7.999	8+	
\$10,000-\$19,999	5	6	2	2	0	15
\$20,000-\$29,999	32	21	31	10	25	119
\$30,000-\$39,999	25	26	21	12	36	120
\$40,000-\$49,999	13	12	9	1	10	45
\$50,000-\$59,999	18	14	5	3	4	44
\$60,000-\$74,999	94	47	31	8	29	209
\$75,000-\$99,999	97	71	44	15	35	262
\$100,000 or more	2	0	0	0	0	2
Total	286	197	143	51	139	816

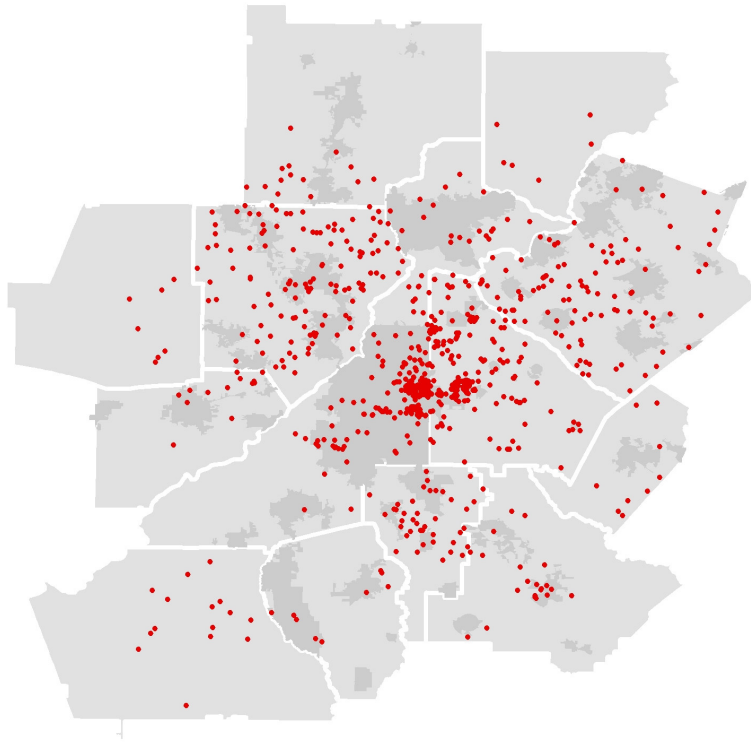
In addition to income and NRD distribution goals for the sample, age was a selection criterion for participation. The original range was 25 to 60 years old, however through the recruitment process this was relaxed to increase recruitment rates. Figure 4 and Table 6 show the age, gender and ethnicity distribution of the 816-person final sample. Gender and ethnicity were not used as selection criteria but are presented here to more completely describe the resulting data set.

Figure 4: Gender and age**Table 6: GPS survey households by ethnicity**

Ethnicity	N households	% of GPS survey	% of region (2000 Census)
Black/African American	616	18.1	32.3
White/Caucasian	148	75.5	60.3
Other	52	6.4	7.4
Total	816	100.0	100.0

Figure 5 shows the locations of the households of PAQ participants. With a center region concentration, due to the walkability selection criteria, the households radiate out across all thirteen counties.

Figure 5: Household locations of PAQ participants



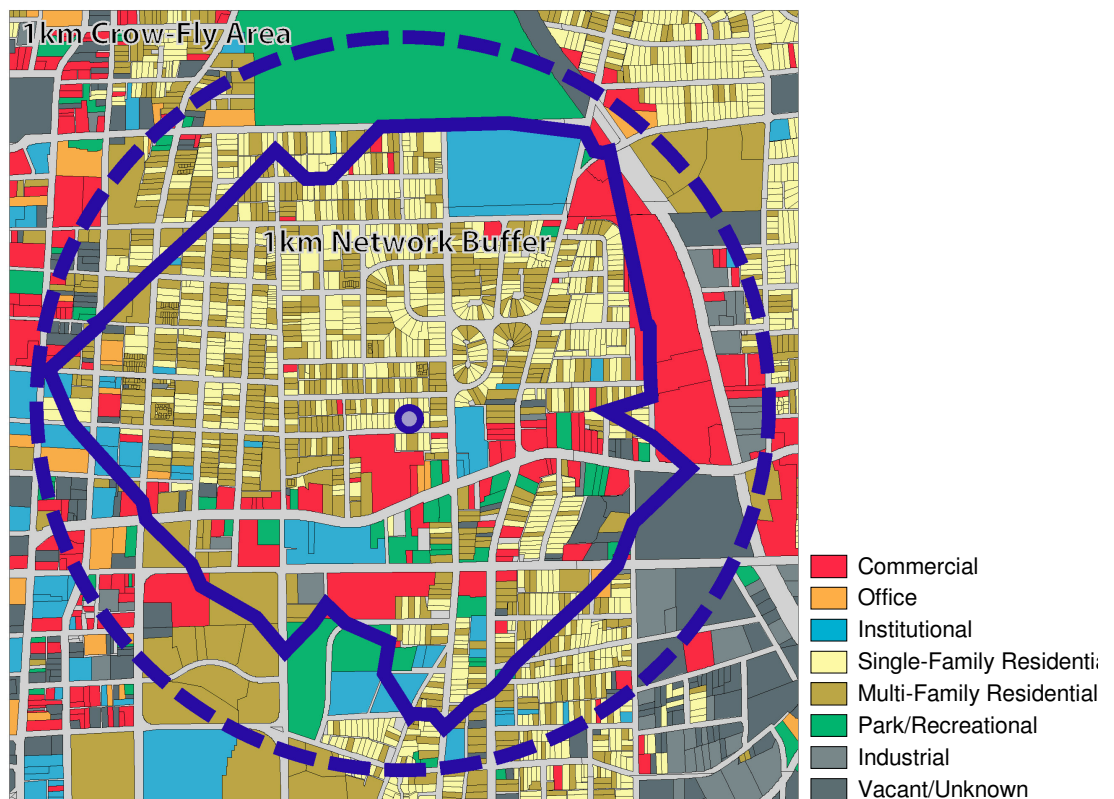
III. URBAN FORM & WALK TRIPS

As described previously, all households were recruited based upon their income and the levels of net residential and intersection densities. These density measurements were done using a one-square-kilometer grid cell surface arbitrarily placed on the region. Density values for each grid cell were determined from the parcel database and road network, and assigned to the households within them. However, the analysis results below use the two densities and a mixed use value calculated at a different spatial aggregation level. The analysis below is based on a buffer around each participant's household. The methods and data used for each of these measures are described below, with the subsequent section containing an analysis of PAQ results across these measures.

A. Household Buffer

The method for calculating urban form data in this analysis was at the one-kilometer road-network-based buffer level around each participant's house and the locations they traveled to, as shown in Figure 6. Using geographic information system (GIS) software⁴ buffers were drawn around these locations along the street network. A service network consisting of roads within one kilometer of the household was used to define a compact service area accessible to the household. This area is, in most cases, substantially smaller than a crow-fly buffer, which consists of the area surrounding the household in a one-kilometer radius. The mean buffer size of those households completing the GPS survey was 241 acres, as compared to about 775 acres for a circle with a one kilometer radius. The minimum size was 17 acres and the maximum 518 acres.

⁴ Network Analyst extension tool for ESRI's ArcView 3.2.

Figure 6: One-kilometer network buffer

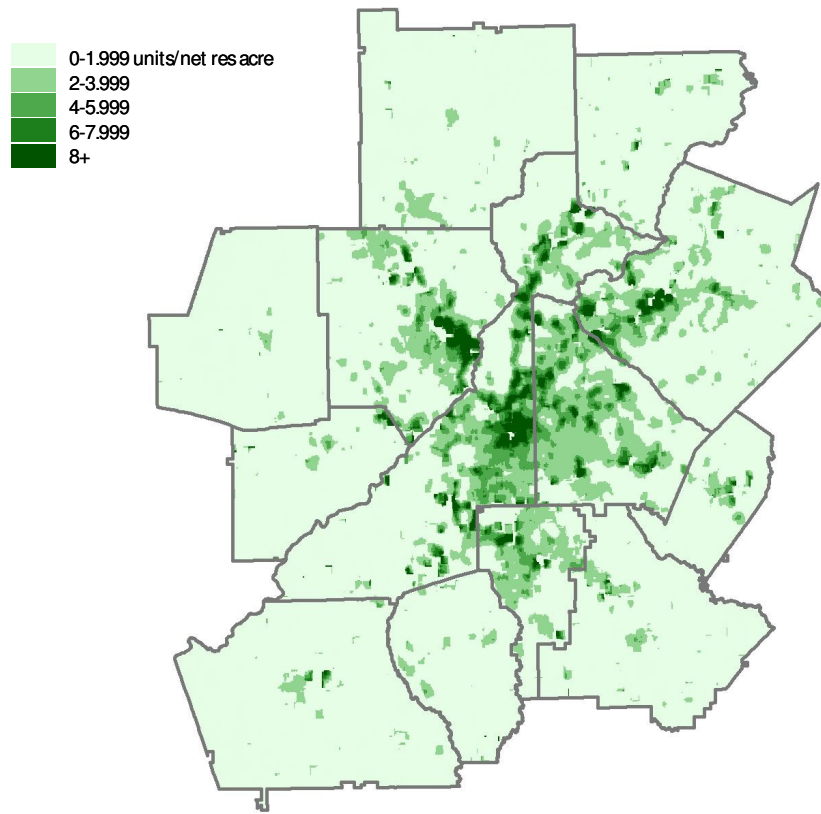
B. Net Residential Density

Net residential density is the total number of housing units divided by residential land area. The number of housing units comes from Census block data and was aggregated or disaggregated to these polygons. Residential acreage was derived from the ARC 2000 LandPro land cover data (from aerial photography). NRD is highest in traditional neighborhoods with small residential lot sizes and lower in neighborhoods with sprawling development and larger lot sizes.

The variation of NRD across the region is shown below in Figure 7. In order to show this regional surface of NRD, a 200 square meter grid system devised by ARC is used. Each grid cell has an NRD value that is the mean of it and 48 cells surrounding it. This 300,000+ cell surface covers the entire region, unlike the one kilometer household based buffers, which are only available for the surveyed households. The mean NRD for the 816 person sample analyzed here is 6.59 housing units per net-residential acre. This relatively high (in comparison to the region)

value is due to the over sampling of higher density, more walkable areas. In fact, forty of the 816 live in neighborhoods where the NRD is over 20 units/net-residential acre, with the highest being approximately 94 units/net-residential acre.

Figure 7: Net residential density by 49 grid cell buffer⁵



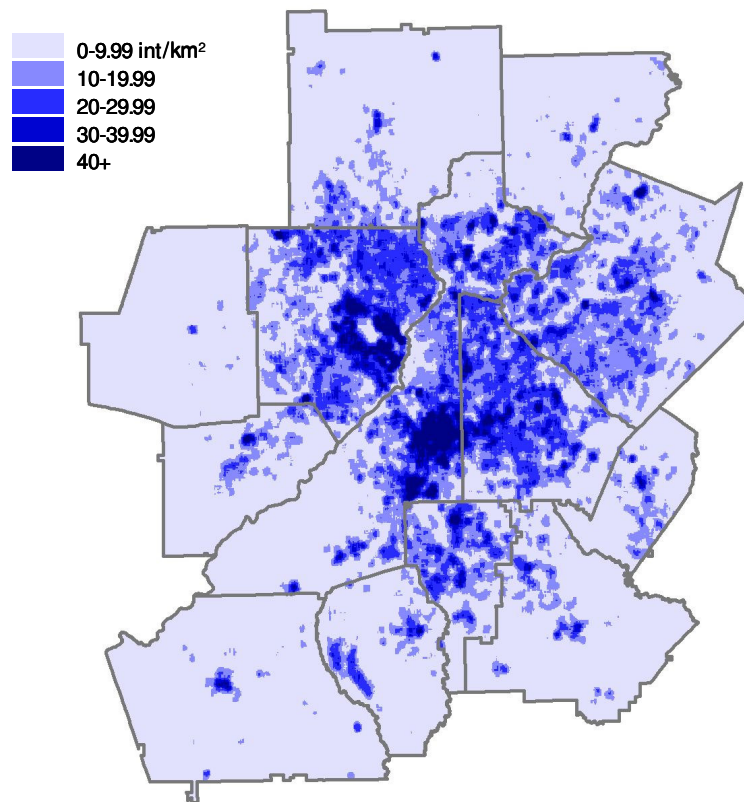
C. Intersection Density

Intersection density, another indicator of urban form, impacts the walkability of a neighborhood. The number of intersections per area was determined using GIS and a valence count of three or more, meaning an intersection is where three or more roads meet (excluding controlled access interchanges and ramps intersecting with surface streets).

⁵ Each 200m grid cell was buffered with its 48 adjacent cells. The mean value of NRD and other attributes for this block of 49 cells was averaged and assigned to the center cell.

This measure is highest in dense urban areas as shown in Figure 8, below. Increased intersection density allows more direct route choices, slows traffic, increases crosswalk options and creates, what is generally considered, a more safe and inviting pedestrian environment. The mean intersection density for the 816 person sample analyzed here is 35.6 intersections per square kilometer.

Figure 8: Intersection density by 49 grid cell buffer



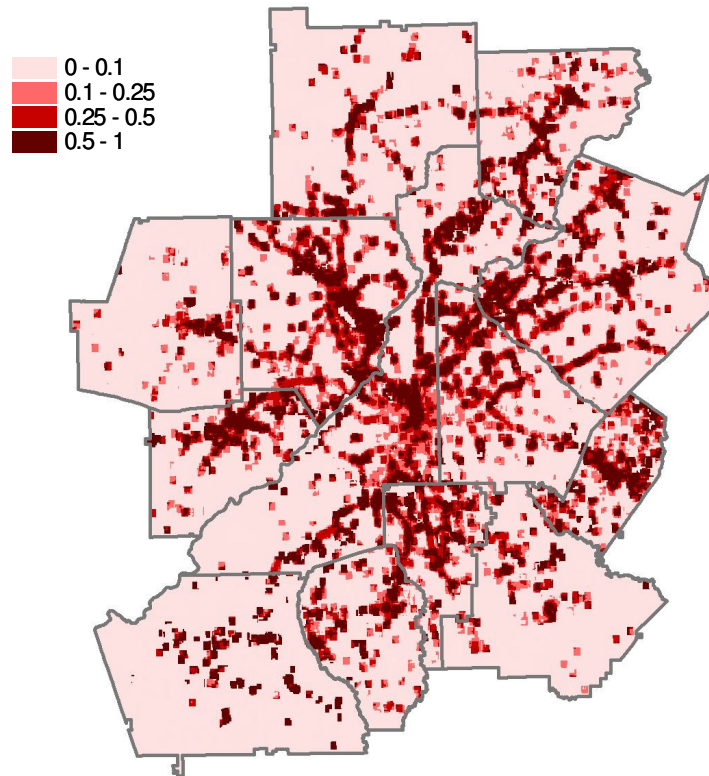
D. Mixed Use

The mixed-use factor takes into account the number of different land uses among three categories (residential, commercial, and office) as well as their relative amounts in terms of building floor areas. Please see Figure 9 for the regional variation of mixed use.

Building floor area data, by use type, came from the SMARTRAQ parcel level land use database, version 1.5. The mixed value is between zero and one. A greater mixed use value

means a more even distribution of the relative amount of floor area for the land uses present. A value of one means that the land uses present have equal amounts of total floor area. Please see Appendix II for a description of the equation used. The mean mixed use value for the 816 person sample analyzed here is 0.33.

Figure 9: Use mix by 49 grid cell buffer



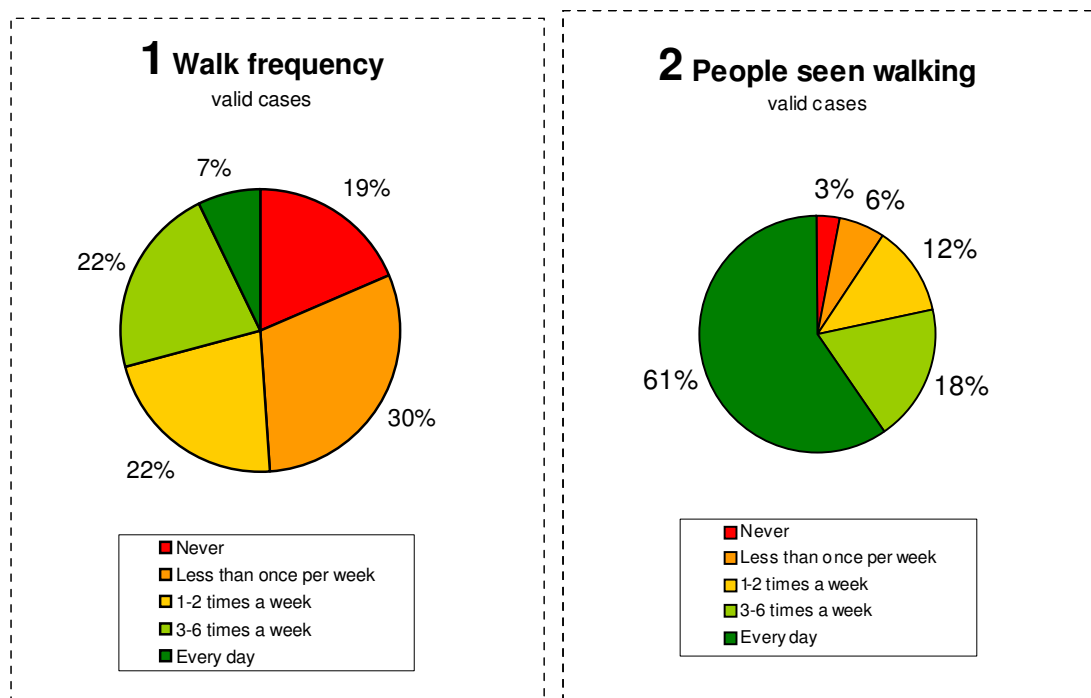
IV. PHYSICAL ACTIVITY QUESTIONNAIRE RESULTS

Below are detailed discussions of the results of the physical activity and health questionnaire for the sections on walking, bicycling and social interaction, specifically questions 1, 3 through 6, 8, 9, and 12 through 15. The unweighted results for all 17 of the PAQ questions and associated mean NRD, intersection density, use mix and body mass index (BMI) are contained in Appendix III. In cases where mean urban form and BMI varied in a significant manner, the results are contained in the body of the text. In some instances, very small numbers of responses were observed. These cases are noted in the text, otherwise see Appendix III for the number of responses.

A. Walking

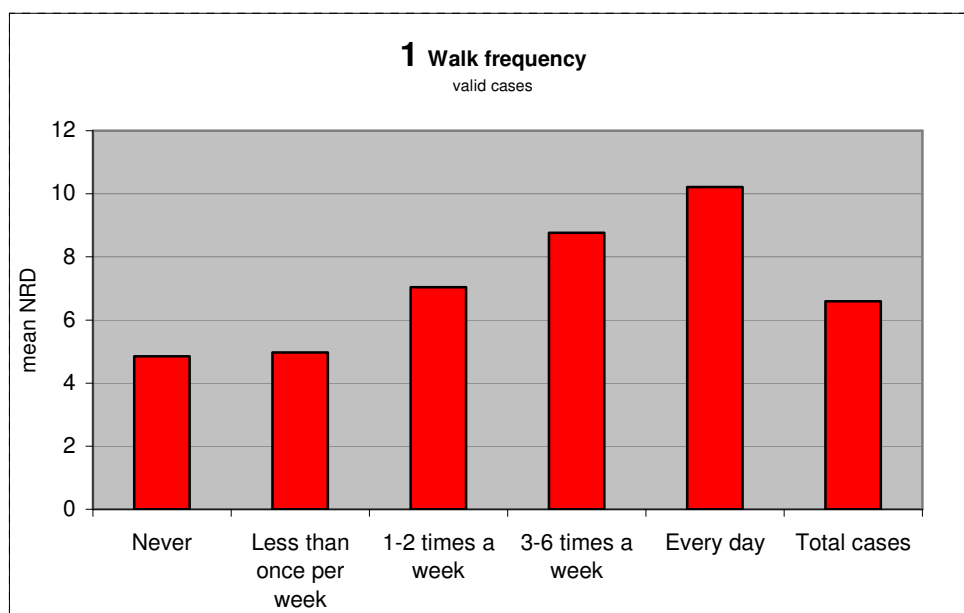
The first question in the physical activity survey inquired how often the respondent walks or jogs in his or her neighborhood. Overall, 51.0% of respondents reported that they walk at least once per week (shown below in Figure 10A). Only 7.3% of the respondents in the survey reported that they walk every day. A high proportion of respondents in the survey (90.5%) stated that they see others walking in their neighborhoods at least once per week and a majority (61.0%) see pedestrians on a daily basis (Figure 10B).

Figure 10A (Question 1, left) and B (Question 2, right)



Respondents that reported walking less than once per week or not walking at all had the lowest mean net residential densities at the one-kilometer network buffer level, about 4.9 units/net res. acre (Figure 11). Those that reported walking at least once per day had the highest mean net residential density at about 10.2 units/net res. acre, about twice that of the non-walkers.

Figure 11: Question 1

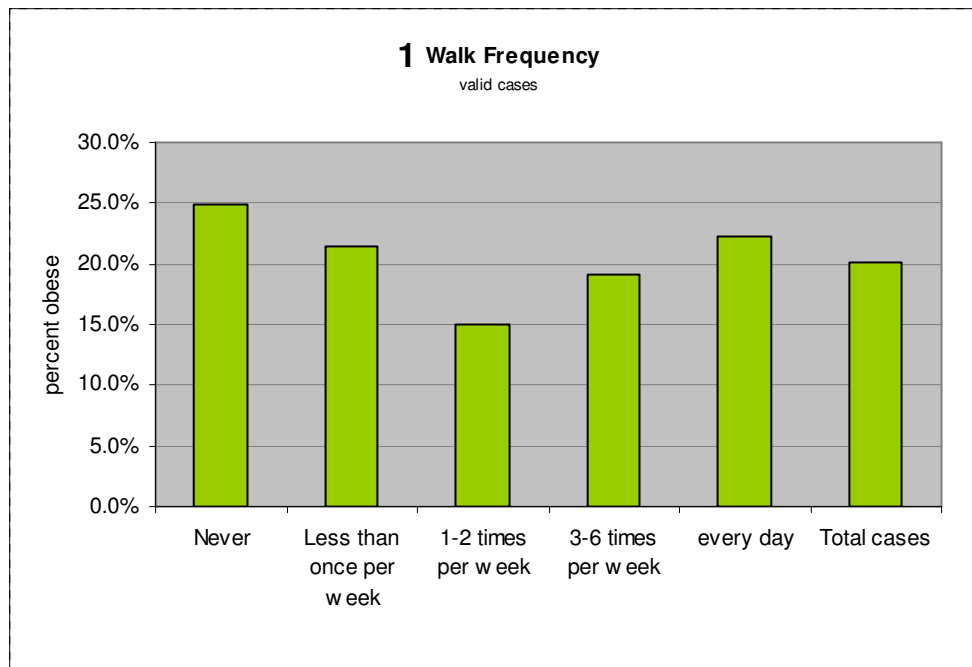


Variations in mean body mass index (BMI) did not significantly vary with frequency of walk trips, however the percentage of individuals with a BMI greater than or equal to 30 varied greatly⁶. A person with a BMI of 30 or greater is considered to have a very high amount of body fat in relation to lean body mass, and is considered obese, according to the National Institutes of Health.

The percentage of obese respondents out of total respondents in each individual walk frequency category is shown below in Figure 12. The largest proportion of obese individuals occurred in the category of respondents that do not walk at all in a given week. The proportion decreased with walk frequency until the category of people walking three to six times per week, when it steadily rose with increased walk frequency. Higher incidences of obesity occurred in the categories of non-walkers and, unexpectedly, very frequent walkers. While this question asked about walk frequency it does not provide information on duration or level of exertion, both of which are important determinants of the health impacts. Like all the other questions reported on here this question relies on self-reported data.

⁶ Body Mass Index (BMI): a measure of an adult's weight in relation to his or her height, specifically the adult's weight in kilograms divided by the square of his or her height in meters

Figure 12: Question 1



While the majority of individuals that walk at least once per week have incomes of greater than \$60,000, there was no clear pattern to the frequency of walk trips per week by income. The lowest income bracket surveyed (\$10,000 to \$19,999) had the highest percentage of respondents that never walk (26.7%) and the lowest percentage of those that walk every day (0%).

Figure 13: Question 1

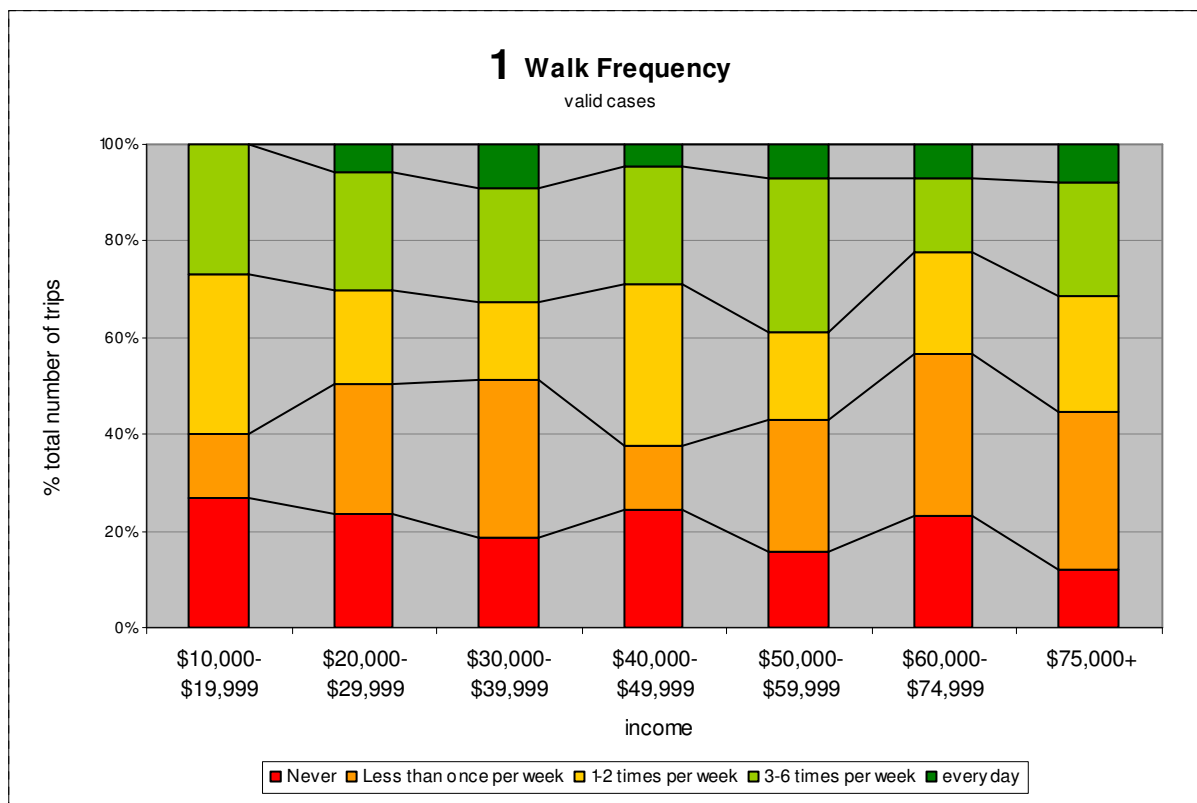
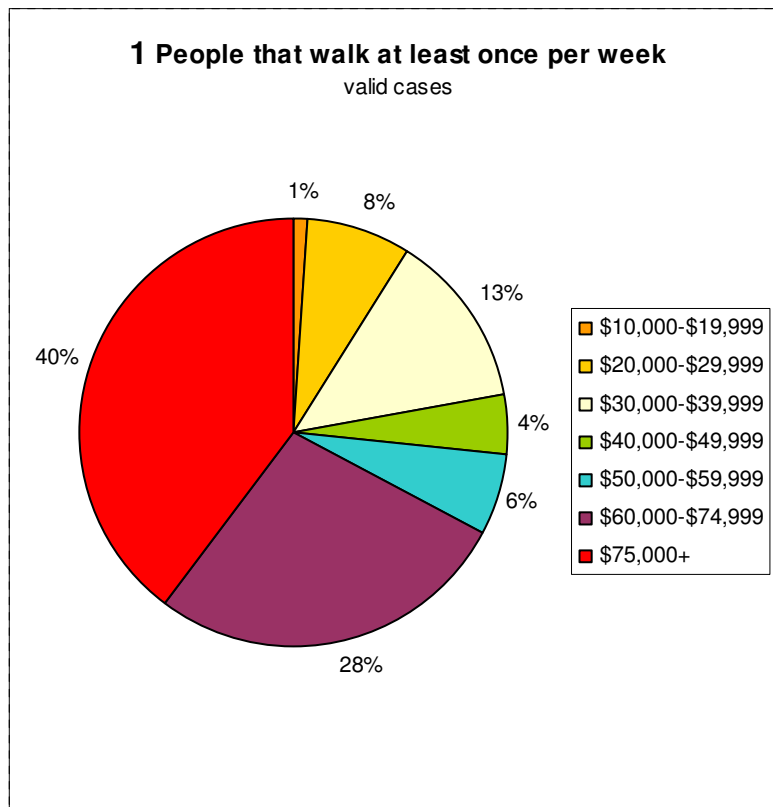
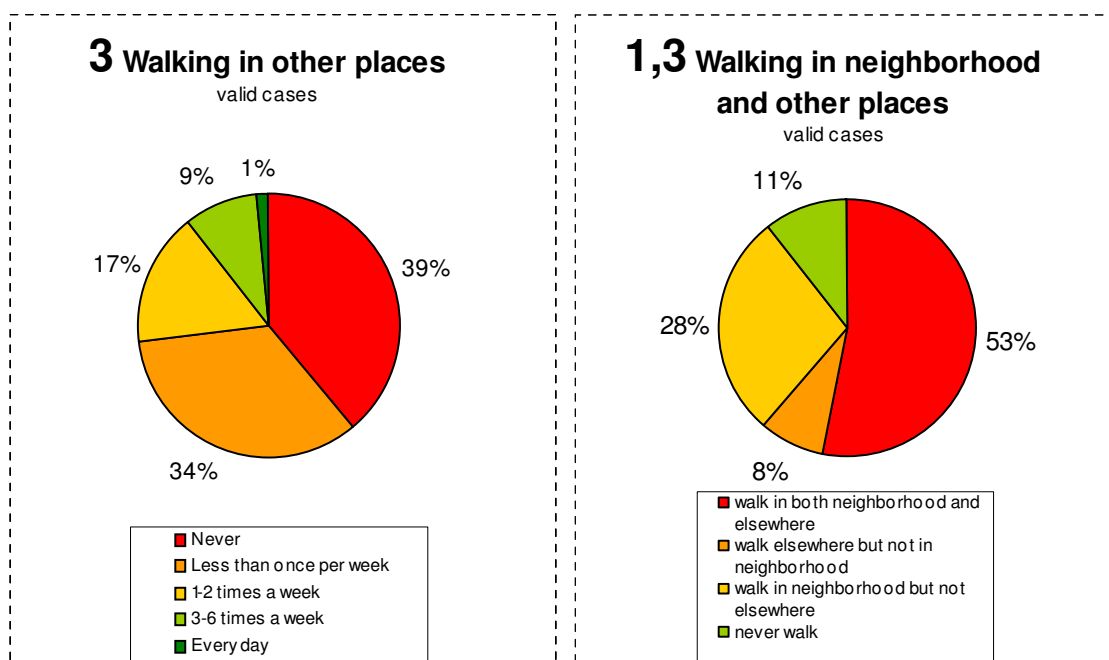


Figure 14: Question 1



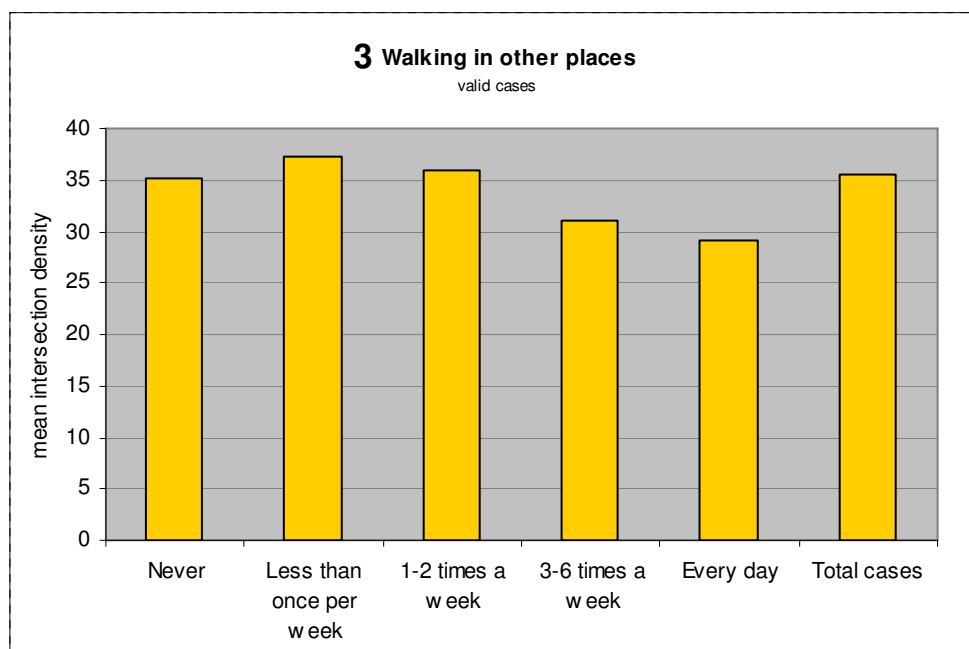
Question three asked, "How often do you go somewhere other than your neighborhood to walk or jog? (For example, at a mall or on a walking trail)." About a quarter of all respondents (27.2%) reported walking at least once per week in areas other than their own neighborhood. In the entire survey, 8.0% of respondents reported walking at least once per week in neighborhoods other than their own, 28.4% reported walking in the neighborhood but not elsewhere, 10.6% never walked in either location, and 53.0% walked in both (shown in Figure 15B, below).

Figure 15A (left) and 10B (right): Question 3



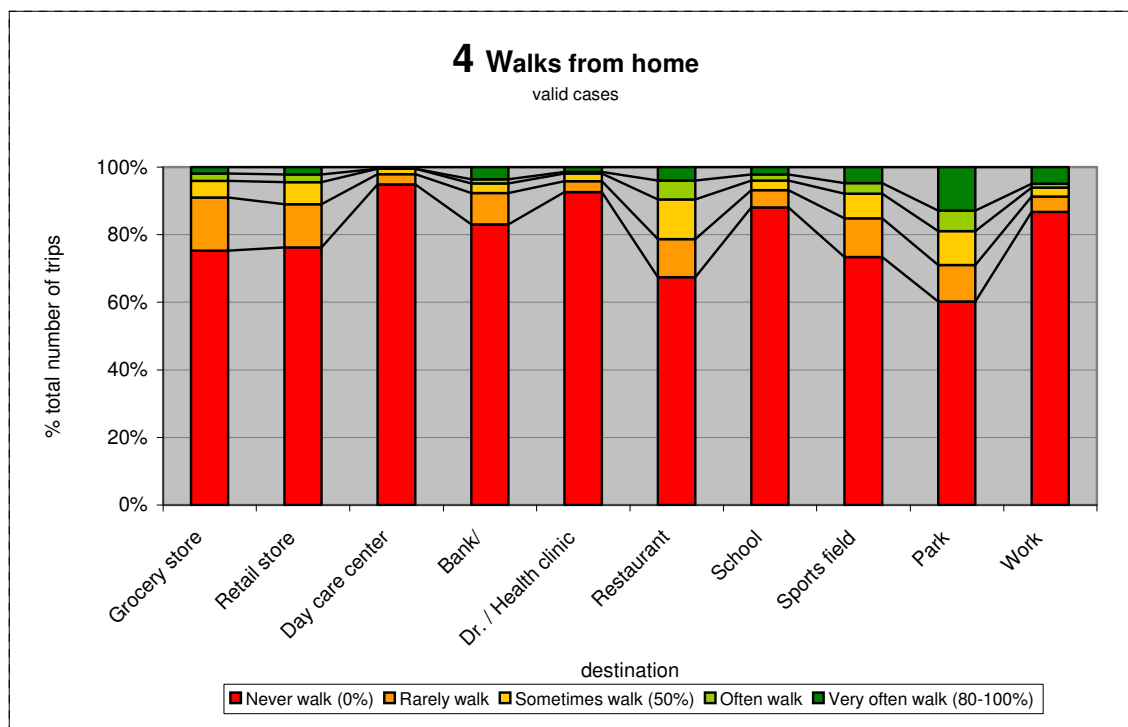
Respondents residing in low density areas tend to walk in other areas more frequently than those residing in walkable, high density areas (Table 16). Intersection density per square kilometer decreased with increased frequency of walk trips in other places. Residents of high density neighborhoods walk more in their own community, while residents of low density neighborhoods walk more frequently elsewhere.

Figure 16: Question 3



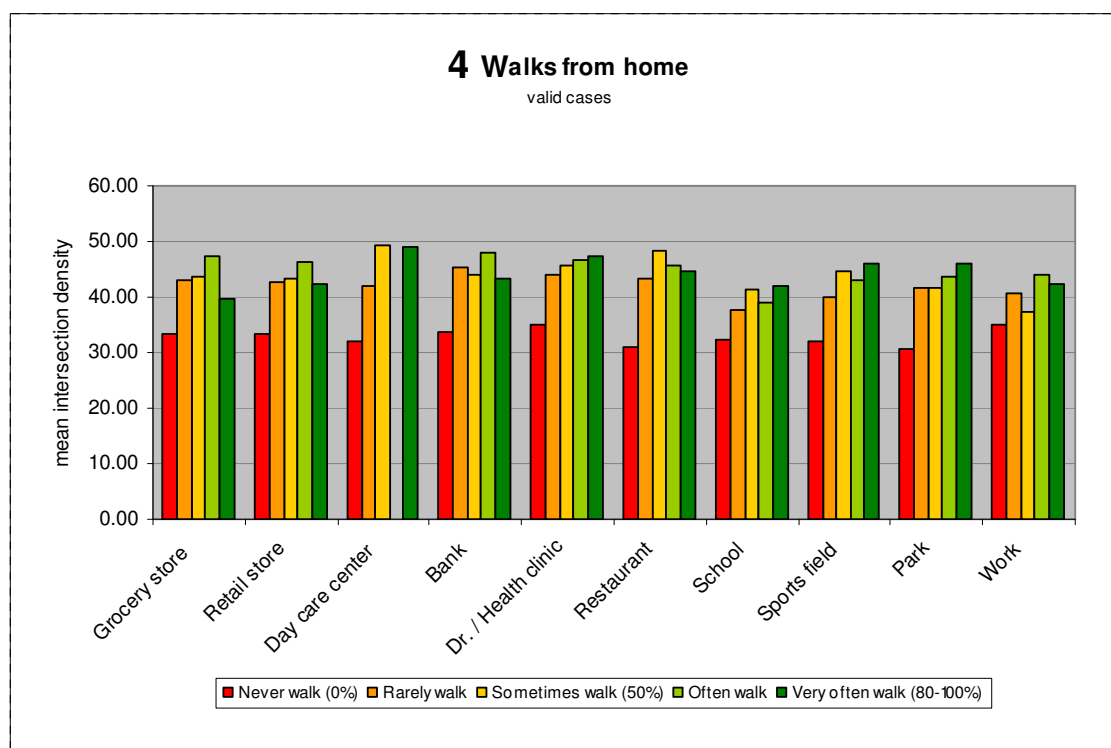
In order to examine the nature of walks from home, question four asked with what frequency trips to various shops or amenities were made. Respondents tended to walk to the park more often than any other location in the survey, with trips to the day care center and the doctor comprising the smallest percentage of respondents walking to these locations with any regularity. The full results of this question can be seen in Figure 17.

Figure 17: Question 4



As shown in Figure 18, the mean intersection density in the neighborhoods of respondents that reported never walking was the lowest among the walk frequency categories for all locations. In most cases, intersection density increased with walk frequency, although small sample sizes may have accounted for the handful of trend breaking variables. People who “very often walk” have the highest mean intersection density, with the exceptions of grocery and retail store, bank, restaurant and work destinations. Of these five, all but restaurant have the highest mean density for people who “often walk.”

Figure 18: Question 4

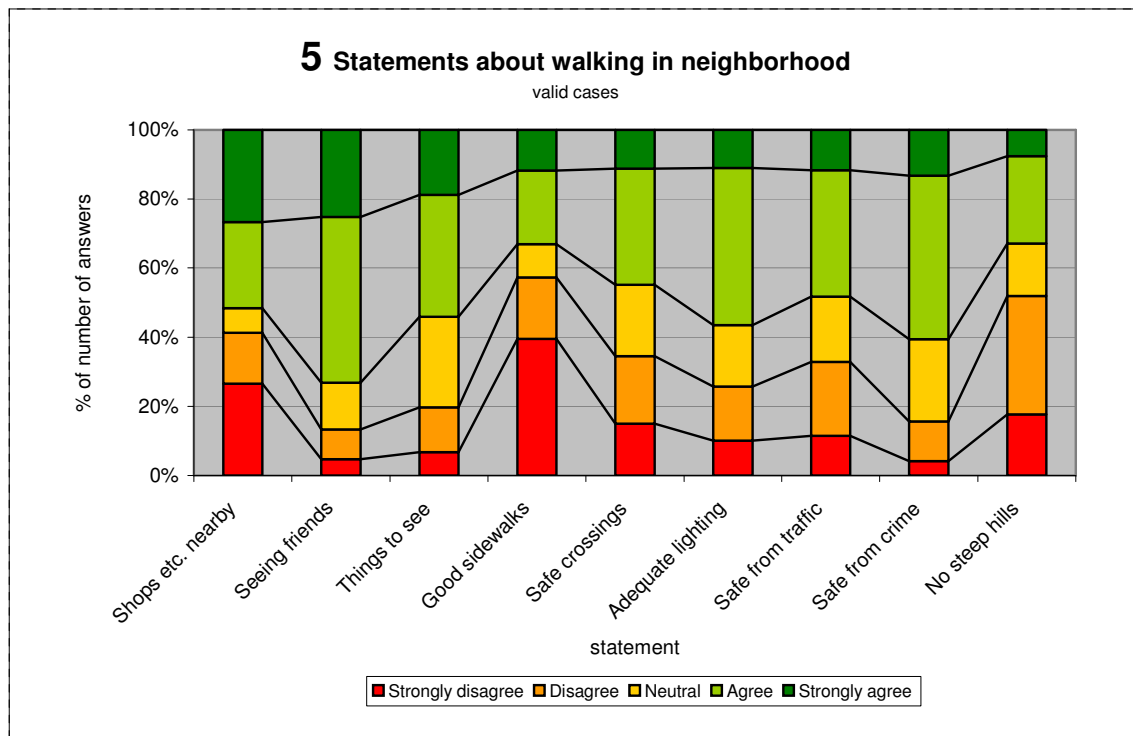


Question five asked survey participants whether they agreed with, disagreed with, or were neutral for several statements about the walkability of their neighborhoods. The results of the following statements can be seen in Figure 19:

- There are services, shops and restaurants within a walkable distance from my home,
- When I walk in my neighborhood I see friends and neighbors along the way,
- When I walk in my neighborhood there are interesting things to see along the way,
- There are good sidewalks in my neighborhood,
- There are safe street crossings in my neighborhood,
- There is adequate street lighting in my neighborhood,
- When I walk in my neighborhood I am safe from traffic,
- When I walk in my neighborhood I am safe from crime, and
- There are no steep hills in my neighborhood.

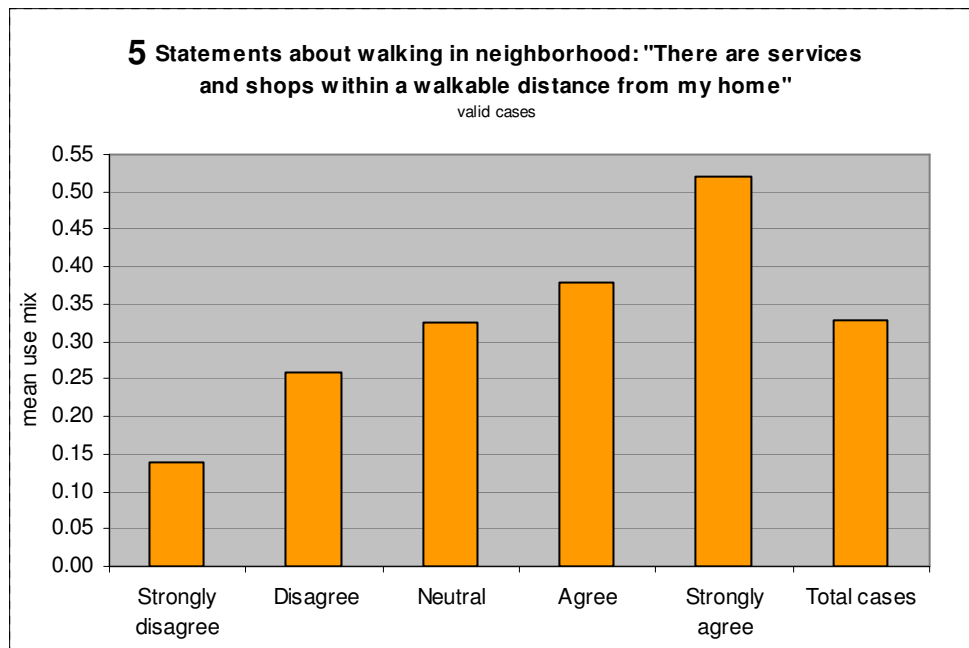
The most positive responses were reported for the statement regarding seeing friends along the way, with 73.2% either agreeing or strongly agreeing with this statement. The fewest positive responses were reported for the statement about good sidewalks. Only 33.1% of respondents felt sidewalks are adequate where they live.

Figure 19: Question 5



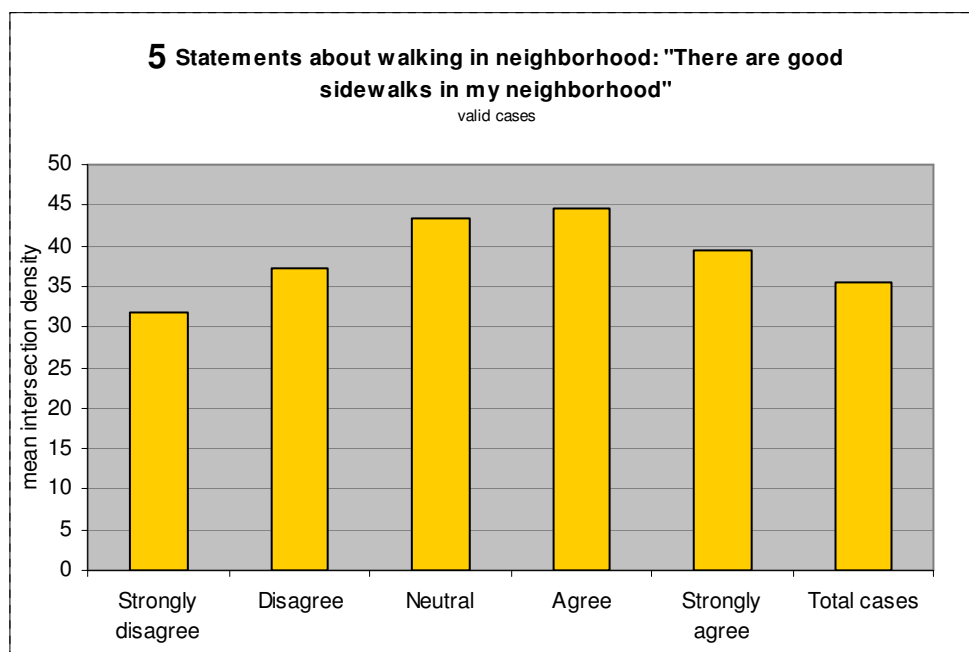
For two of these statements, urban form data varied significantly, as shown in Figure 20. The first statement asked whether respondents agreed there are services and shops in walking distance from their home. Respondents in highly mixed (and also dense) neighborhoods tended to strongly agree, while those respondents living in areas with a lower mix of uses (and less density) strongly disagreed with this statement. These are expected results given that areas with a mix of residential, commercial and office space have more shops and services to walk to in their neighborhoods.

Figure 20: Question 5



The second statement asked whether or not there are good sidewalks in the respondents' neighborhoods. Intersection density (as well as NRD and, to some extent, use mix) varied with the magnitude of agreement. Those who strongly disagreed and ostensibly are displeased with the quality of sidewalks in their neighborhood tended to live in neighborhoods with the lowest intersection density. While the set of responses strongly agreeing with the statement came from households living in somewhat less dense neighborhoods than those that agreed or were neutral, the quality of sidewalks generally increased with intersection density. Please see Figure 21.

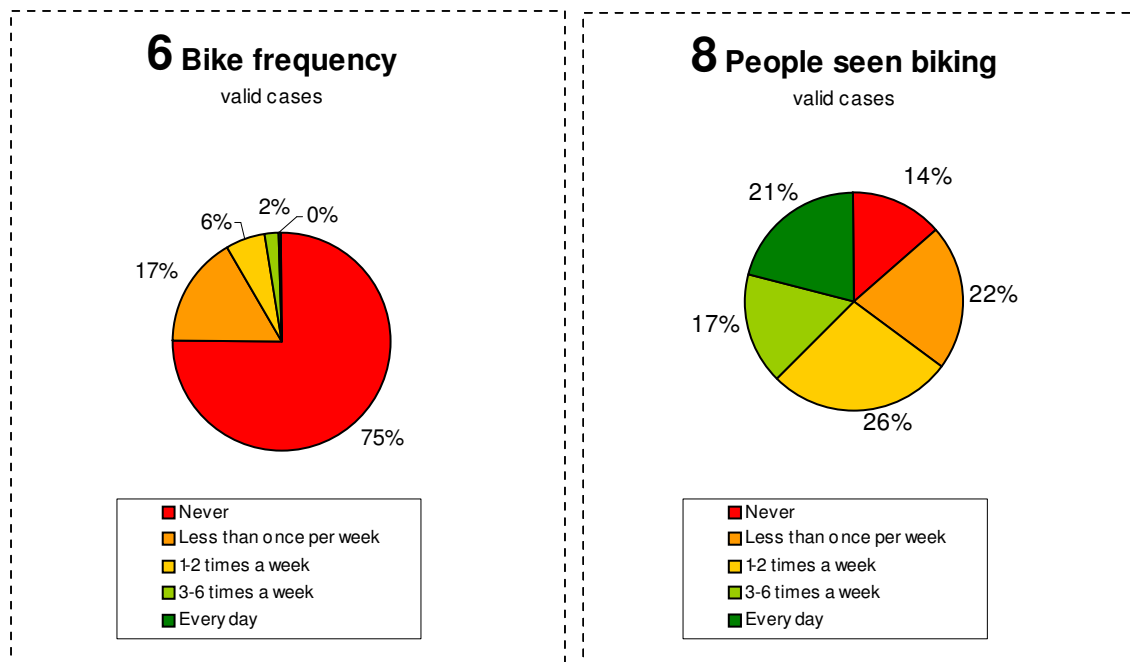
Figure 21: Question 5



B. Bicycling

The physical activity survey asked about bicycle riding behavior and the quality of bicycle conditions in Atlanta neighborhoods. Question six asked how often survey participants ride their bike (Figure 22A). Most (74.9%) do not ride a bicycle at all and only 0.2% (N=2) of individuals surveyed reported riding a bike on a daily basis. The remaining 24.8% (N=202) ride a bicycle occasionally but not every day (six times per week or fewer). While relatively few people surveyed actually ride a bicycle on a regular basis, 64.3% reported seeing bicyclists present in their neighborhood at least once per week, indicating that most neighborhoods are able to support at least some bicycling. The large discrepancy in individuals that use bicycles and those that tend to see bicyclists may indicate that the neighborhood bicyclists are children, and therefore not included in this survey.

Figure 22A (Question 6, left) and B (Question 8, right)



The frequency of bicycling (Figure 23) and the presence of bicyclists (Figure 24) in a neighborhood both increase drastically with residential density. At the one-kilometer buffer level, the density for respondents that never bicycle was 6.22 units/net residential acre. For the 17 people who bicycled at least three times per week the average density was 8.24 units/net residential acre. The NRD for respondents that reported never seeing bicyclists was 3.59 units/net res. acre, compared to 11.80 for respondents that reported seeing bicyclists every day. Increased residential densities are positively related to increased bicycling.

Figure 23: Question 6

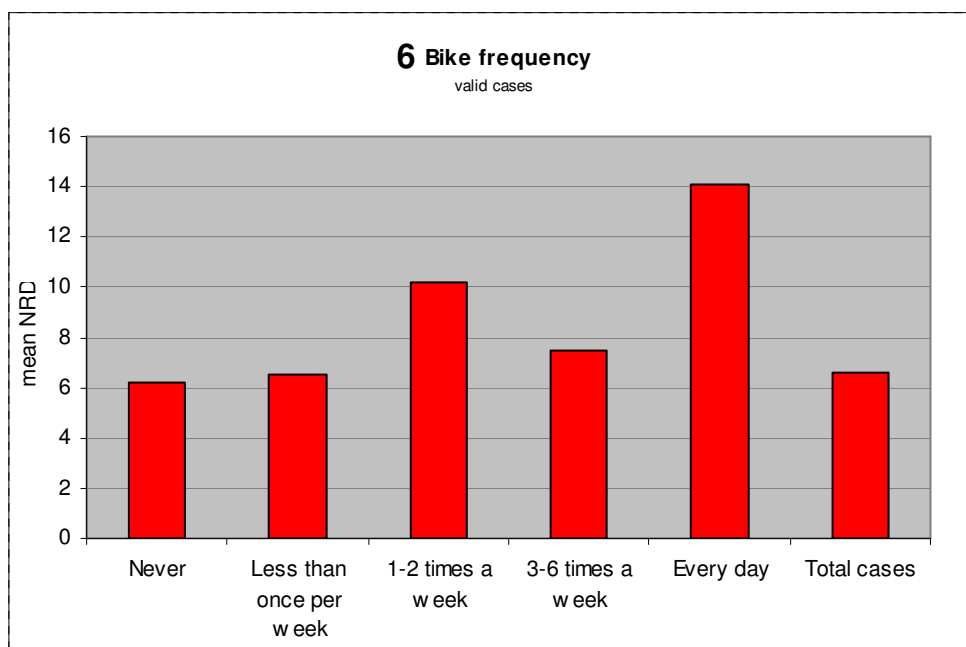
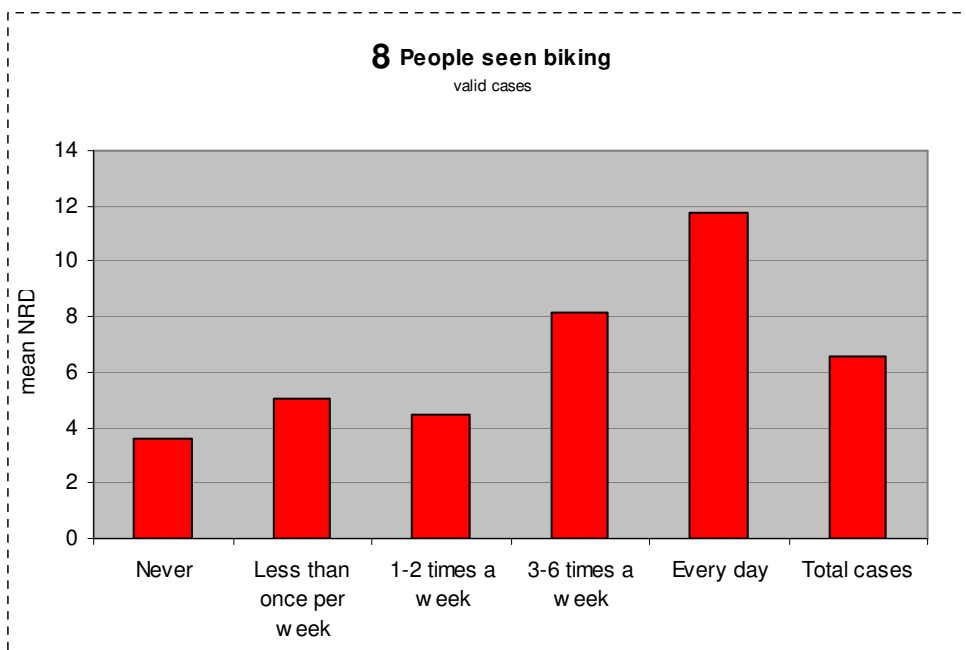


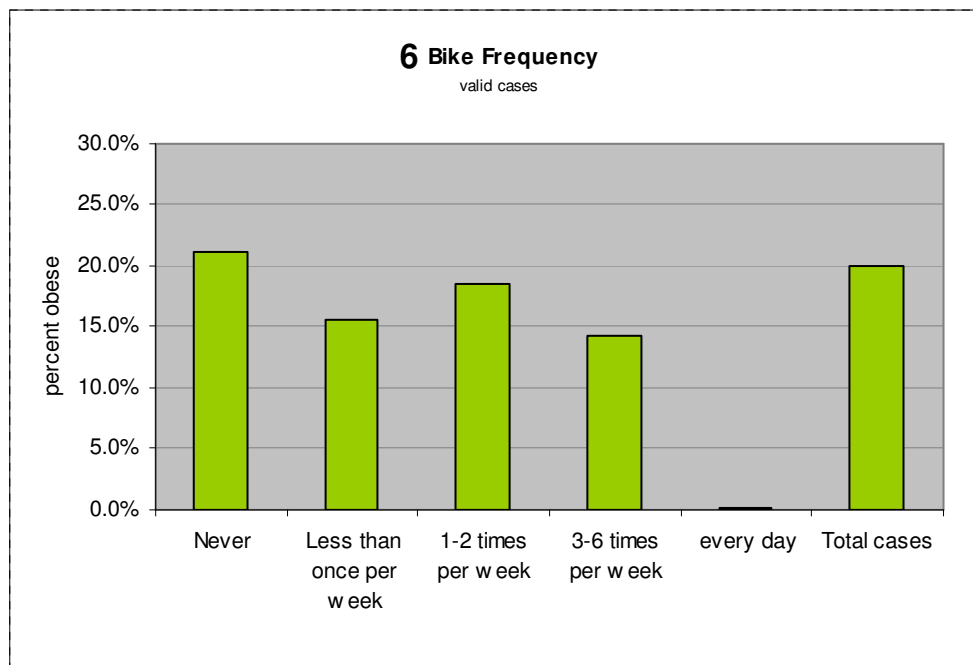
Figure 24: Question 8



As shown in Figure 25, the percentage of the 168 respondents with body mass indices in the obese range was highest (over 20%) for the group of respondents that never bike. It was lowest (0%) for those that bike every day, a category of only two people. In general, the proportion of

obese bikers decreased with frequency of bicycling, although a small spike occurred at the middle, one to two times per week, category.

Figure 25: Question 6



Bicycle riding frequency differed by income as well (please see Figure 26). The percentage of respondents that reported never riding bikes decreased with income. Lower-income households tended to bike less than higher-income households, which tended to have higher percentage of individuals riding less than once per week. As shown in Figure 27, the percentage of respondents in each income group riding more than once per week was variable across all categories but was highest for the middle range of income (\$40,000 to \$49,999). Of the people that answered that they bike at least once per week, 68% were in the two highest income brackets (\$60,000 and above) and only 9% were in the lowest income brackets (\$10,000 to \$29,999)

Figure 26: Question 6

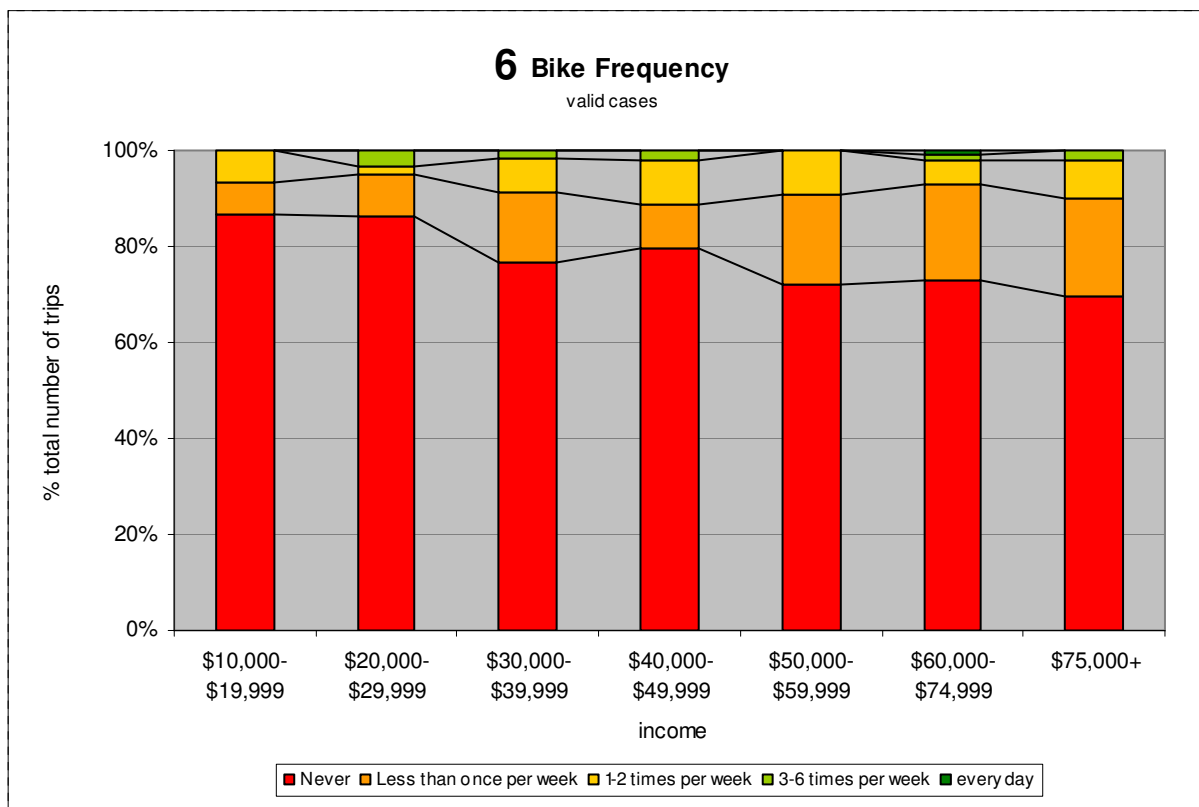
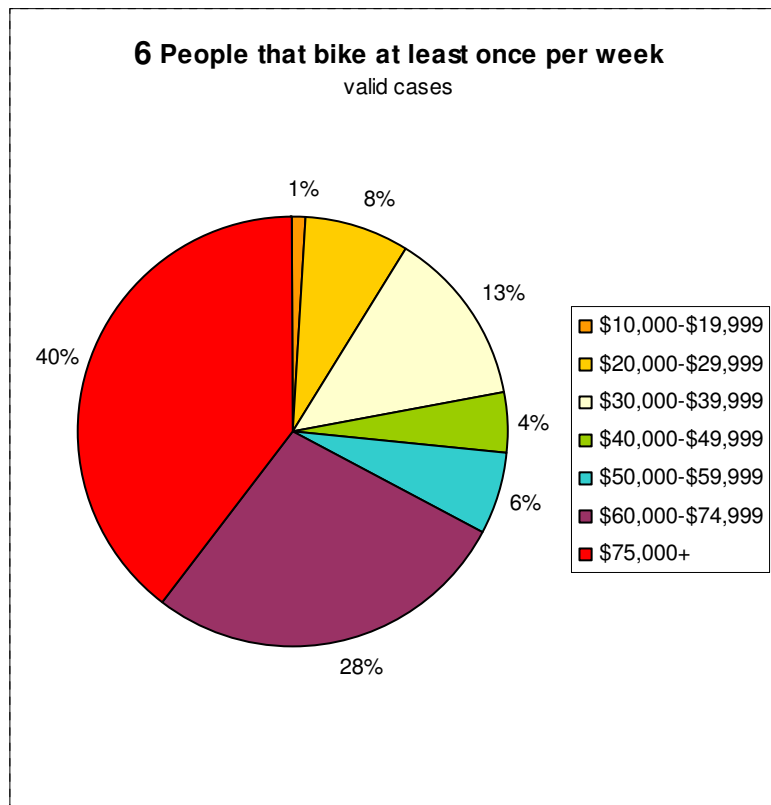
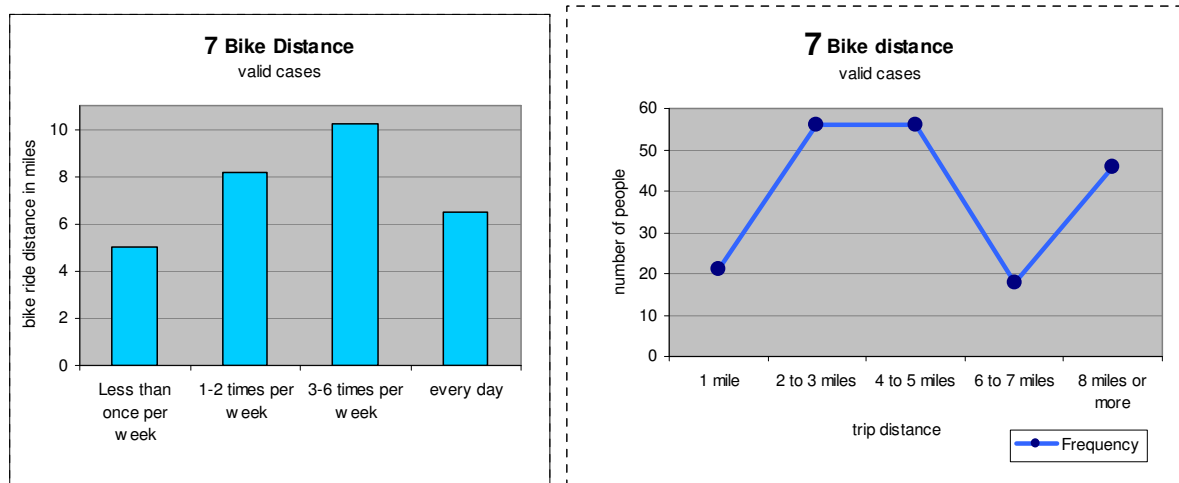


Figure 27: Question 6



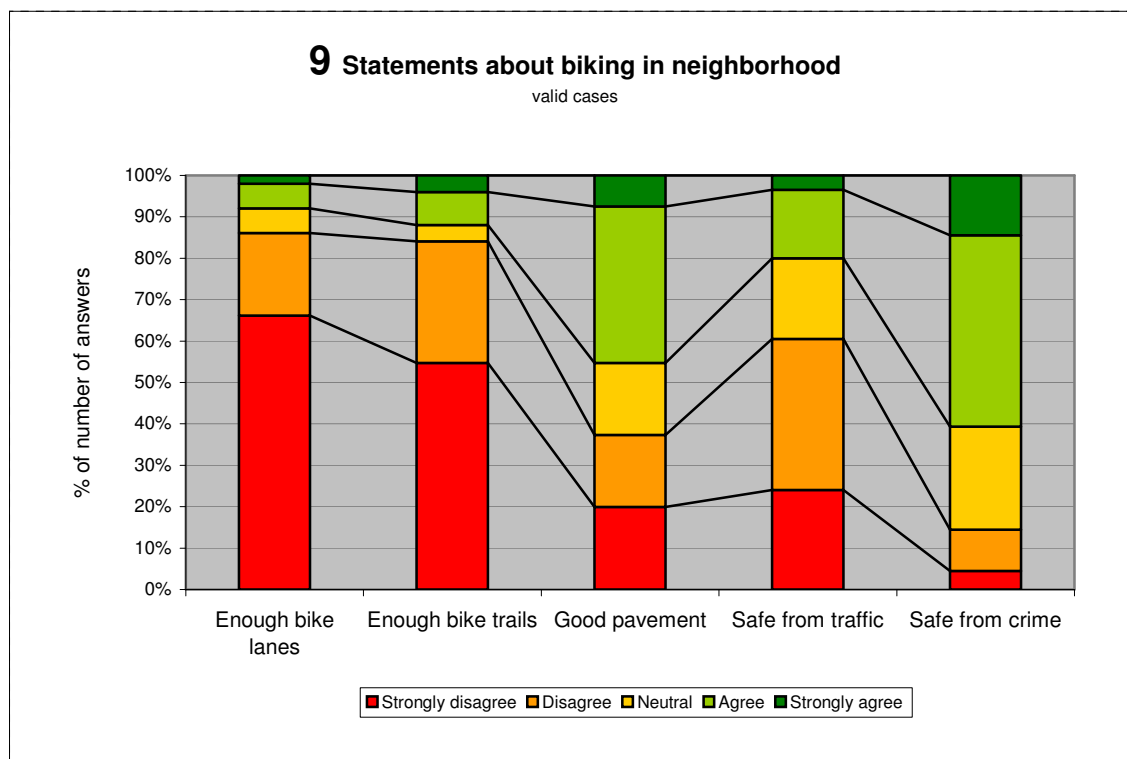
Question seven asked of the 212 respondents that reported riding a bicycle at least once a week: "When you bicycle, how far do you normally ride?" Of the valid responses, most (56.8%) traveled between two and five miles. A large number (23.4%) also reported traveling eight miles or more, shown in Figure 28A. Very few rode only one mile or six to seven miles. The six to seven mile category comprises a distance typically considered to be too long for a commute or errand and too short for a vigorous workout. The mean distance increased with bicycle frequency until the category of people riding daily, which fell off significantly. This category likely contains a large proportion of commuters, who tend to travel a more manageable distance. Those that rode three to six times per week had a mean distance 10.2 miles, which would be a very lengthy commute and most likely comprises individuals bicycling fairly frequently for sport or fitness.

Figure 28A (Question 7, left) and B (Question 7, right)



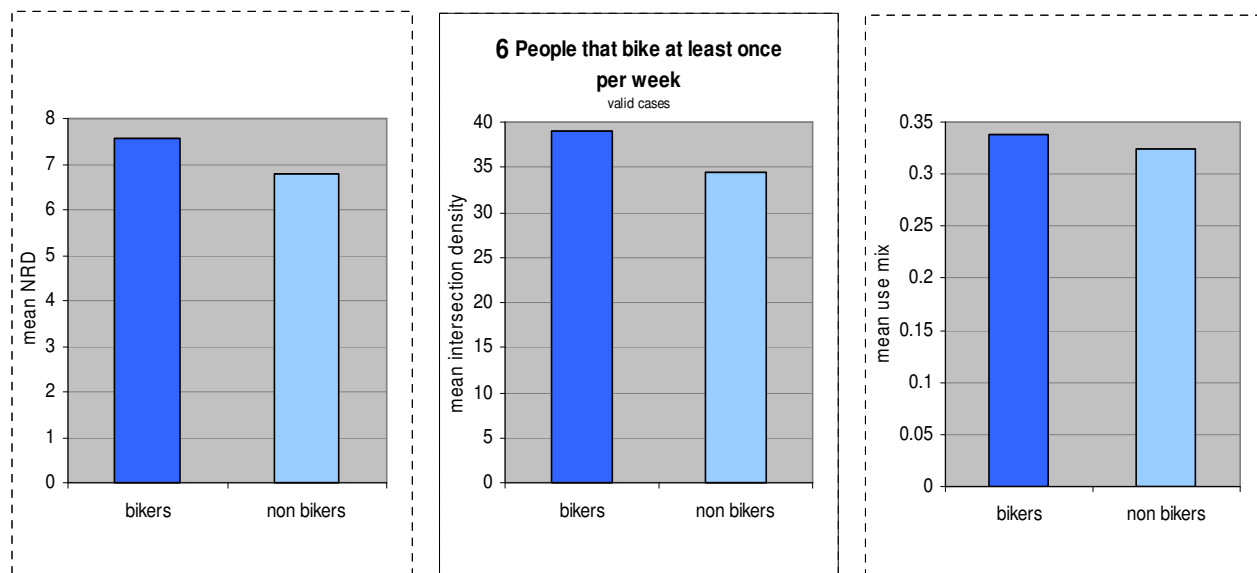
A final set of questions about bicycling focused on neighborhood characteristics and bicycle safety and was again asked only of the 212 participants that bike on a regular basis. Most survey respondents did not feel that their neighborhoods had enough bike lanes, trails, adequate pavement, or safe traffic conditions to support bicycles (please see Figure 29). The final factor, neighborhood safety from crime, was deemed sufficient for most respondents. The most problematic conditions for most respondents seemed to be dedicated right-of-way for non-motorized traffic, with bike trails and lanes and protection from automobile traffic generating the fewest positive responses.

Figure 29: Question 9



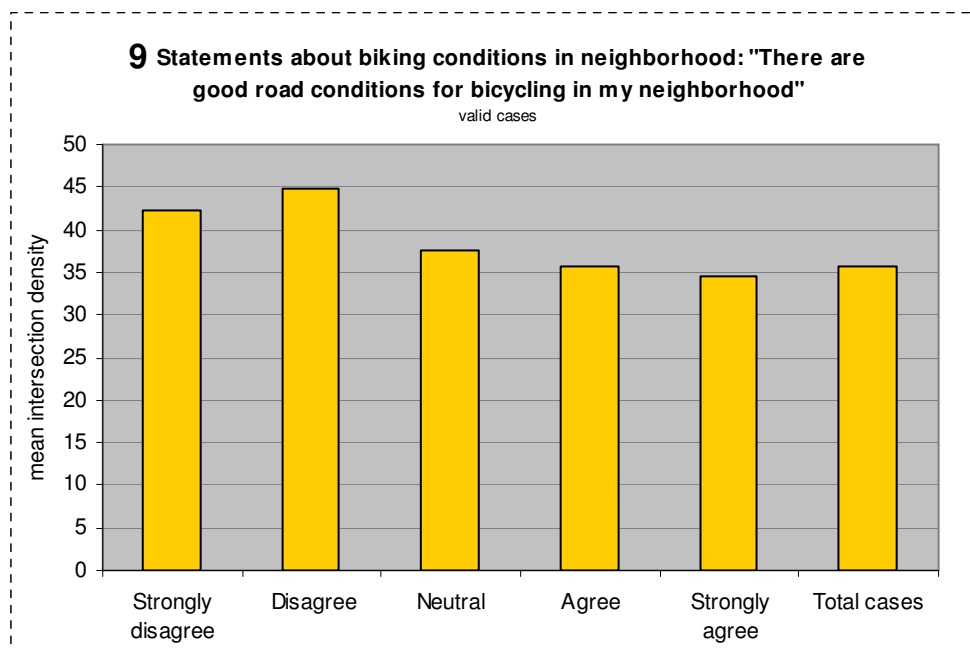
Overall, people that biked at least once per week live in higher density, more mixed neighborhoods, as seen in Figure 30A (left), B (middle) and C (right). The “bikers” category includes only those people that bike at least once per week (202 people) while the “non bikers” category includes all those that do not bike at all (614). Clearly, people that bike are more likely to live in high-density, mixed use and generally less automobile-dependent neighborhoods.

Figure 30A (left), B (middle) and C (right)



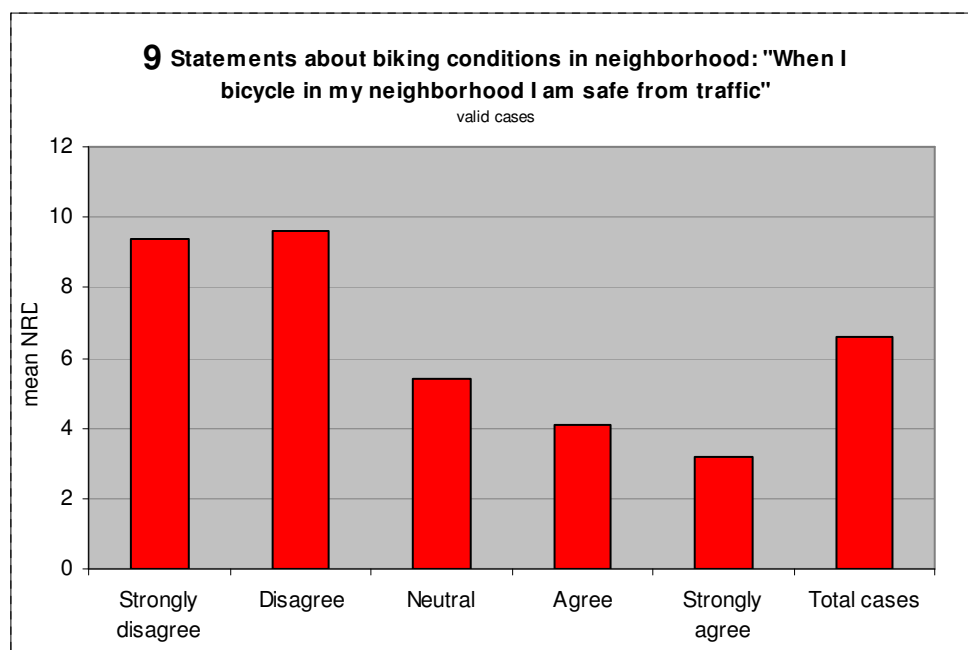
Although bicyclists tend to live in higher density neighborhoods, the conditions for bicycling are not necessarily better in high density areas. In fact, according to a statement about road conditions in question 9, those residing in high density neighborhoods tended to disagree with the statement “there are good road conditions for bicycling in my neighborhood.” Those that agreed with the statement generally live in lower density neighborhoods, see Figure 31, below.

Figure 31: Question 9



The feeling of safety from traffic also tended to be more likely in lower density neighborhoods, as displayed in Figure 32, below. Those that disagreed with the statement lived in neighborhoods with greater than double the density of those that agreed.

Figure 32: Question 9

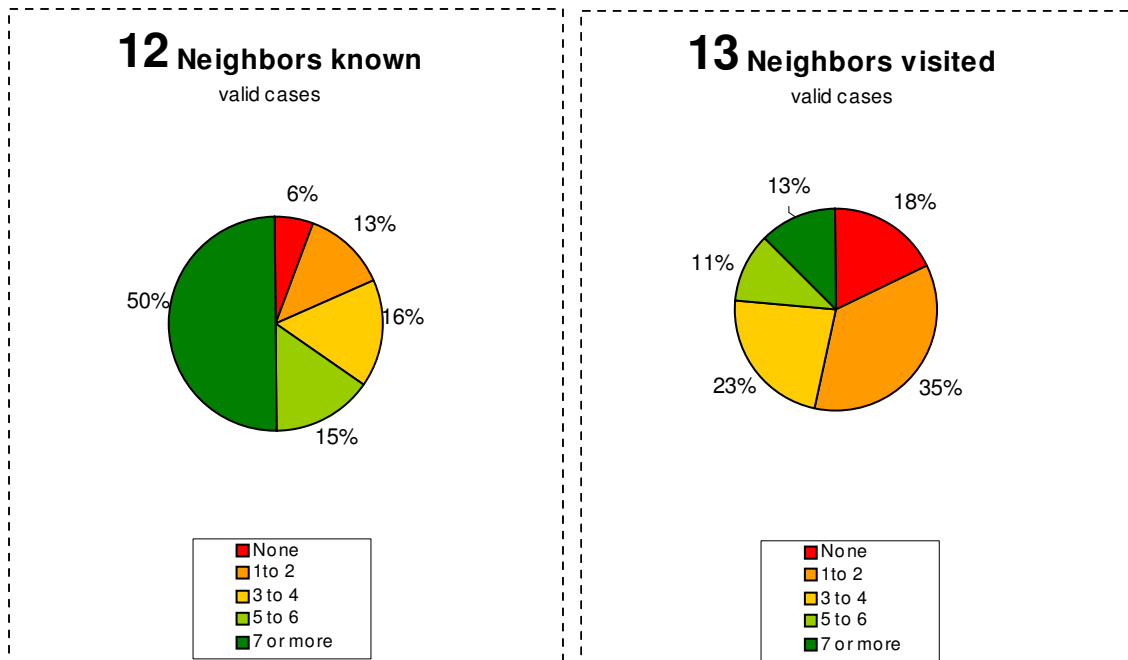


C. Social Interaction

A set of questions was asked in the physical activity survey regarding social interaction in one's neighborhood. Participants were asked whether they knew or visited neighbors and how strong is their neighborhood sense of community. The results are summarized below and compared to urban form data.

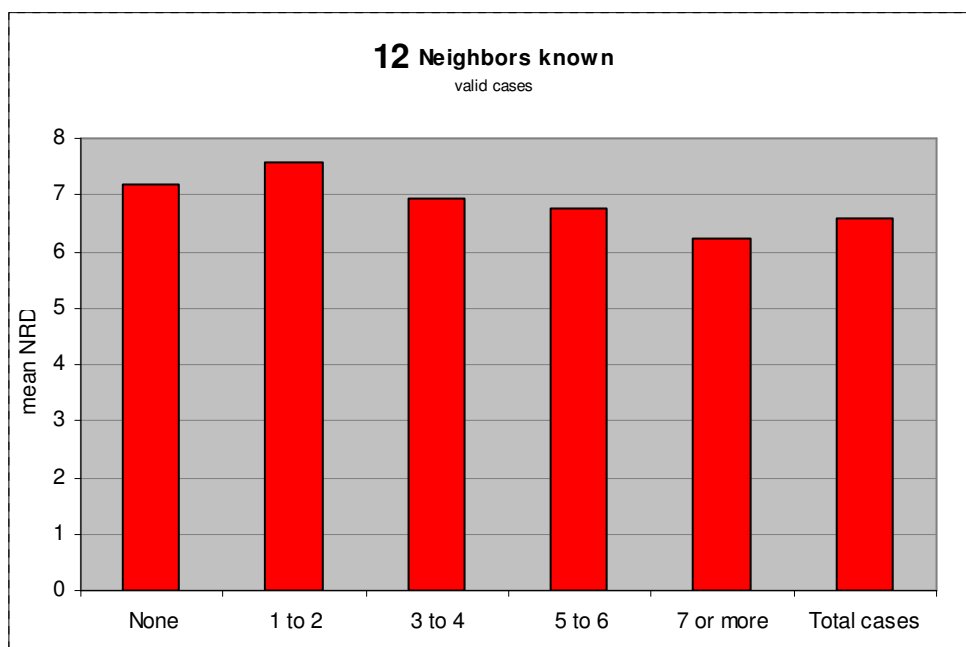
Within the entire survey, over half (50.2%) of respondents reported knowing seven or more neighbors as reported in question 12 (Figure 28A, below). All but 5.7% know at least one neighbor. In question 13, the figures for respondents that actually visited their adult neighbors at least once every two weeks tended to be lower. Only 12.5% visited seven or more neighbors and the percent of participants that visited zero neighbors was 18.1%. Of those that reported knowing at least one neighbor, the percent visiting zero neighbors dropped to 13.8%.

Figure 33A (Question 12, left) and B (Question 13, right)



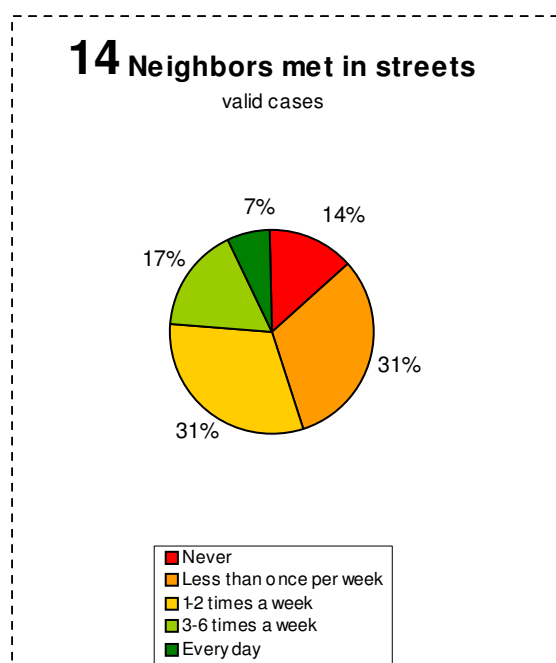
Interestingly, despite denser living conditions, the number of neighbors known tended to be inversely related to mean net residential density, as seen in Figure 34, below. The lowest NRD category was actually found to be the one in which more respondents knew seven or more neighbors. By contrast, the highest NRD category was found to be one in which more knew only one or two neighbors and it was the second-highest category for those who knew none of their neighbors.

Figure 34: Question 12



The tendency to meet neighbors in the street was reported in question 14, Figure 35, below.

Figure 35: Question 14



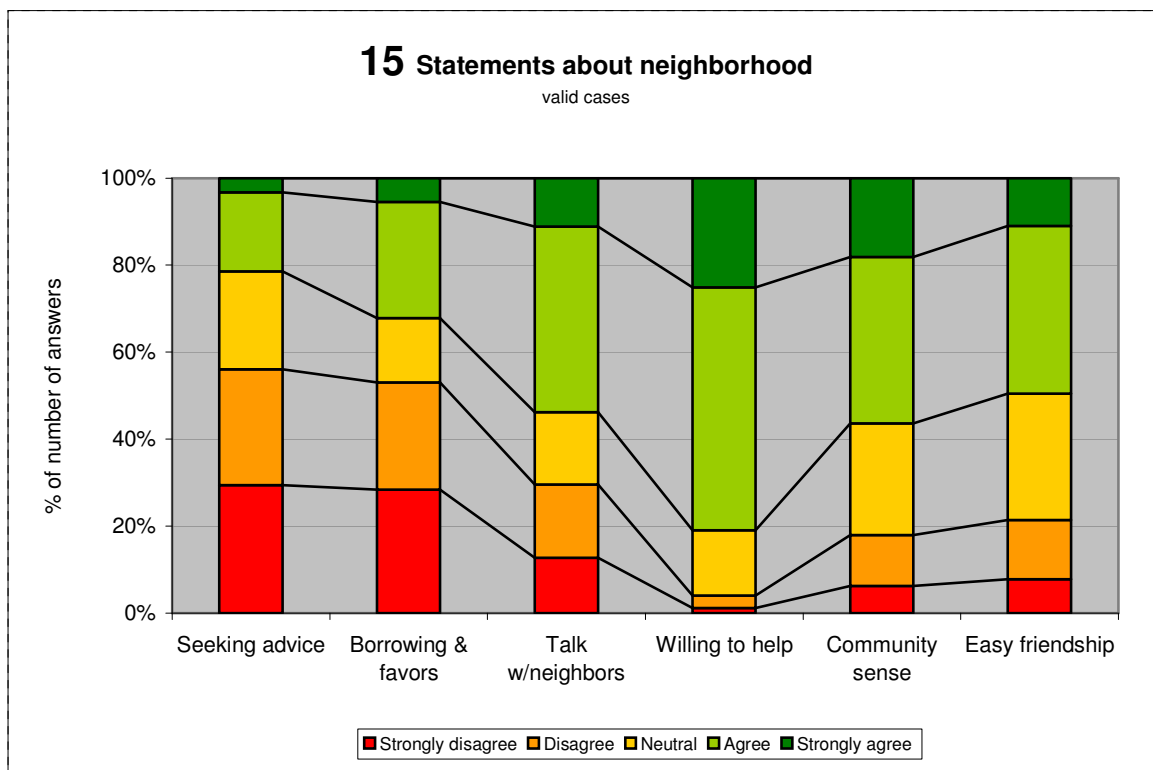
Question 15 in the survey asked about the perception of a community in respondents' neighborhoods, shown in Figure 36, below. Several statements were given and respondents were

asked whether they agreed with, disagreed with, or were neutral to the content. The statements were worded as follows:

- I regularly seek advice from people in my neighborhood;
- I regularly borrow things and exchange favors with my neighbors;
- I regularly stop and talk with people in my neighborhood;
- I would be willing to work together with others on something to improve the living environment in my neighborhood;
- Living in my neighborhood gives me a sense of community; and
- It is easy to make friends in my neighborhood.

The statement garnering the most positive feedback dealt with willingness to work with others to improve the neighborhood. A full 80.9% of respondents agreed or strongly agreed with this statement. The statement regarding asking for advice from neighbors received the most negative responses, perhaps due to the very personal nature of this act. In general, 56.3% of respondents agreed that there is a sense of community in their neighborhoods and about half (49.5%) felt it is easy to make friends in their neighborhoods.

Figure 36: Question 15



Urban form characteristics followed an odd pattern in the statement reading “living in my neighborhood gives me a sense of community.” Use mix tended to be highest for those that strongly disagreed or disagreed with the statement (please see Figure 37). Mix tended to be lowest for those that agreed with the statement. Similarly, net residential density was highest for those that strongly disagreed or disagreed and highest for those that agreed (please see Figure 38). Despite the more compact living conditions of a higher NRD neighborhood, the close proximity of neighbors does not necessarily instill a sense of community. A blend of commercial and residential uses also does not appear to ensure a sense of community. The use mix and NRD increased for those that strongly agreed with the statement, implying that residents of higher density, more mixed communities that are aware of a sense of community feel very strongly that it exists.

Figure 37: Question 15

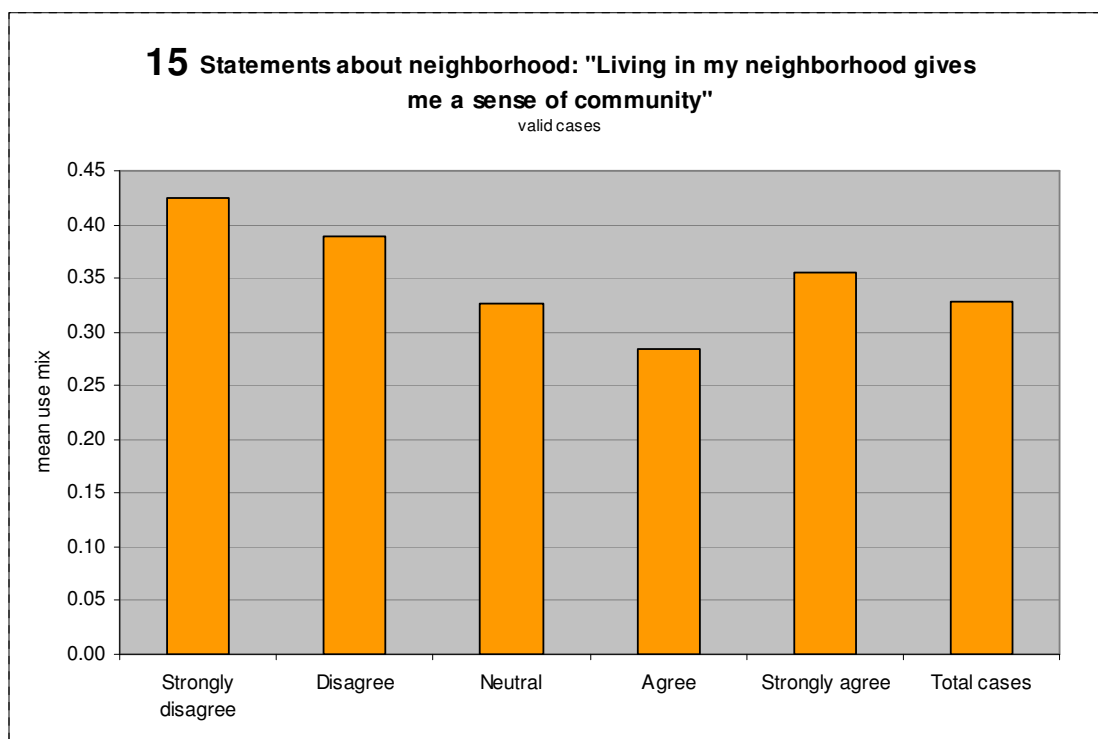
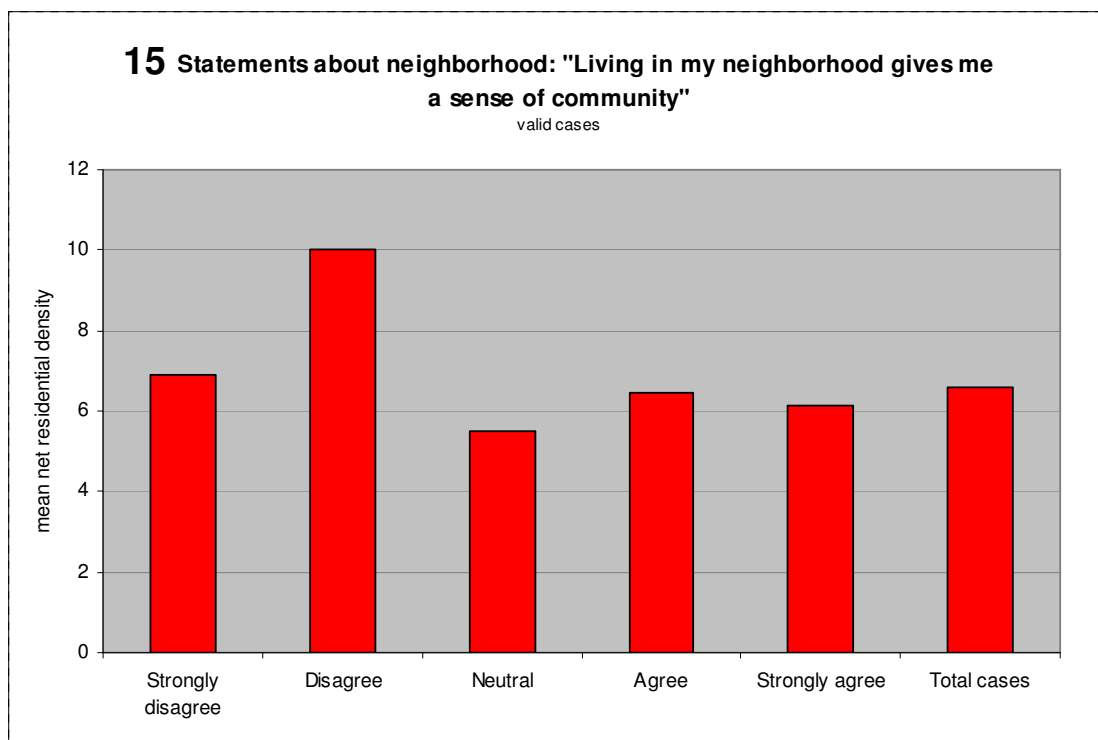


Figure 38: Question 15



V. CONCLUSIONS

The health and physical activity paper questionnaire, and its coupling with a regional land use database and a larger household travel survey make this a nationally unique dataset. The descriptive analyses presented here are part of the broad range of analyses made possible by these interlocking datasets. The findings presented here provide the public health and planning communities with new understandings of the relationship between walking and the physical environment. These walking, bicycling and social interaction related findings (based on unweighted data) include:

Walking

- Walking frequency varied positively with increased neighborhood net residential density (NRD). The NRD of the 51.0% of respondents who walk at least once per week is 8.2 housing units/ net-residential acre, compared to 10.2 for the 7.3% daily walkers.
- Residents of high density neighborhoods walk more in their own community (mean NRD of 10.2 units/net res. acre for persons that walk daily), while residents of low density neighborhoods walk more frequently elsewhere (mean NRD of 3.05 units/net res. acre for persons that walk daily).
- Respondents living in neighborhoods with a high mix of residential, commercial and office land uses (and also high density) tended to strongly agree there were destinations such as services and shops within walking distance of their home (mean NRD of 12.43 units/net res. acre, mean use mix of 0.52, and mean intersection density of 42.67 ints/km²). Respondents living in areas with a lower mix of uses (and less density) strongly disagreed with this statement (mean NRD of 2.26 units/net res. acre, mean use mix of 0.14, and mean intersection density of 29.10 ints/km²).
- The largest proportion of obese individuals (body mass index of 30 or greater) is in the category of respondents that do not walk at all in a given week (24.8%), and unexpectedly the second highest proportion is associated with daily walkers (22.2%). The group of people who walk three to six times per week had the lowest obesity percentage (15.0%).

Bicycling

- The frequency of bicycling and the presence of bicyclists in a neighborhood both increase with residential density. While most respondents (74.9%) do not ride a bicycle at all, 24.8% (N=202) ride a bicycle occasionally (six times per week or fewer) but not every day.
- While relatively few people surveyed actually ride a bicycle on a regular basis, 64.6% reported seeing bicyclists present in their neighborhood at least once per week, indicating that most neighborhoods are able to support at least some bicycling.
- Although people that bicycle at least once per week tend to live in higher density, more mixed neighborhoods, the conditions for bicycling are not necessarily better there. People in high density neighborhoods tended to disagree with the statement “there are good road conditions for bicycling in my neighborhood” (mean NRD of 13.49 units/net res. acre, mean use mix of 0.40, and mean intersection density of 44.95 ints/km²). Those that strongly agreed with the statement generally live in lower density neighborhoods (mean NRD of 2.71 units/net res. acre, mean use mix of 0.24, and mean intersection density of 34.41 ints/km²).

Social Interaction

- Slightly over half of respondents reported knowing seven or more neighbors. All but 5.7% know at least one neighbor.
- Despite denser living conditions, the number of neighbors known tended to be inversely related to mean net residential density. The set of respondents that know seven or more neighbors had the lowest mean NRD (6.22 units/net res. acre) while the set of respondents that know only one or two neighbors had the highest mean NRD (7.57 units/net res. acre).
- Similarly, use mix tended to be highest for those that strongly disagreed or disagreed with the statement “living in my neighborhood gives me a sense of community” (overall mean use mix of 0.40). Mix tended to be lowest for those that agreed with the statement (0.28). A blend of commercial, office and residential uses also does not appear to necessarily ensure a sense of community. NRD was highest for those that strongly disagreed or disagreed (overall mean NRD of 8.93 units/net res. acre) and lowest for those that were

neutral (5.52 units/net res. acre). Despite the more compact living conditions of a higher NRD neighborhood, the close proximity of neighbors does not necessarily instill a sense of community.

In summary, the results of the physical activity and health questionnaire suggest that generally residents of denser neighborhoods tend to walk and bicycle more and to see more walkers and bicyclists in their area than residents of low-density neighborhoods. The high-density group tends to walk more frequently both in their own neighborhoods as well as in other areas of the region. This group in general, however, has less interaction with neighbors and express a lesser degree of sense of community within their neighborhoods.

While this physical activity, social interaction, and urban form research conducted by SMARTRAQ is focused on the Atlanta region, the models, tools, and techniques developed in this study will also prove useful for other areas seeking to maximize the benefits of investments in transportation and public health. Future research will continue to explore the effects of land use and its mix that can best make the places in which we live, work, and play have a positive affect on our health.

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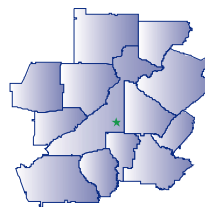
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APPENDIX I HEALTH & PHYSICAL ACTIVITY QUESTIONNAIRE (PAQ)

Physical Activity and Health Questionnaire

2002 Atlanta Household Travel Survey



The Atlanta Regional Commission and its sponsors would like to better understand how the design of our communities impacts our activity levels.

Please fill out the questionnaire and give it to the survey representative when they come to pick up the equipment package. It is important that the same person who is assigned to the health and activity study complete this survey.

1. How often do you walk or jog in your neighborhood?
 - ☐ Never
 - ☐ Less than once per week
 - ☐ 1-2 times a week
 - ☐ 3-6 times a week
 - ☐ Every day
2. How often do you see people walking or jogging in your neighborhood?
 - ☐ Never
 - ☐ Less than once per week
 - ☐ 1-2 times a week
 - ☐ 3-6 times a week
 - ☐ Every day
3. How often do you go somewhere other than your neighborhood to walk or jog? (for example, at a mall or on a walking trail)
 - ☐ Never
 - ☐ Less than once per week
 - ☐ 1-2 times a week
 - ☐ 3-6 times a week
 - ☐ Every day



Georgia Institute
of Technology



Questions? Call our Travel Survey Hotline at 1-888-401-5871



4. When you travel to the following places from your home, how **often do you walk** there?

	Never Walk (0%)	Rarely Walk	Sometimes Walk (50%)	Often Walk	Very Often Walk (80-100%)	Not Applicable (I Never travel to this place)
Grocery store	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Retail store	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Day care center	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bank / credit union	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Doctor / Health Clinic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restaurant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sports field / court / track	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Park	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Please rate how much you agree or disagree with each of the following statements about **walking in your neighborhood** (if you never walk in your neighborhood, go to question 6):

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There are services, shops, and restaurants within a walkable distance from my home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I walk in my neighborhood, I see friends and neighbors along the way	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I walk in my neighborhood, there are interesting things to see along the way	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are good sidewalks in my neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are safe street crossings in my neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is adequate street lighting in my neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I walk in my neighborhood, I am safe from traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I walk in my neighborhood, I am safe from crime	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are no steep hills in my neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Questions? Call our Travel Survey Hotline at 1-888-401-5871

6. How often do you bicycle, either in your neighborhood or starting from your neighborhood?

- ☐ Never (go to question 8)
- ☐ Less than once per week
- ☐ 1-2 times a week
- ☐ 3-6 times a week
- ☐ Every day

7. When you bicycle, how far do you normally ride?

_____ miles

8. How often do you see people bicycling in your neighborhood?

- ☐ Never
- ☐ Less than once per week
- ☐ 1-2 times a week
- ☐ 3-6 times a week
- ☐ Every day

9. Please rate how much you agree or disagree with each of the following statements about **bicycling in your neighborhood** (if you never bicycle in your neighborhood, please go to question 10):

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There are enough bike lanes in my neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are enough off-road bike trails/paths in my neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are good road conditions for bicycling in my neighborhood (smooth pavement, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I bicycle in my neighborhood, I am safe from traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I bicycle in my neighborhood, I am safe from crime	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. **When you are at work**, please indicate about how much time you spend doing the following in a typical day: (if you are not employed, go to question 11)

Sitting _____ hours per day

Standing _____ hours per day

Walking _____ hours per day

Doing heavy labor (construction, etc.) _____ hours per day

Climbing stairs _____ minutes per day

Other (specify) _____ minutes per day

Questions? Call our Travel Survey Hotline at 1-888-401-5871

11. Now, thinking about **your leisure time**, have you done any of the following activities in the past week? Please indicate on how many days you did each activity and about how many minutes you did the activity each day.

For any activity you didn't do in the past week, write "0" for the number of days.

Type of Activity	On about how many days in the past week did you do the activity?	About how many minutes did you do the activity each day ?
Housework (laundry, vacuuming, etc.)	_____ days	_____ minutes / day
Gardening (planting, weeding, etc.)	_____ days	_____ minutes / day
Home repair & maintenance (painting, carpentry, lawn mowing, etc.)	_____ days	_____ minutes / day
Leisurely walking (strolling, walking while shopping)	_____ days	_____ minutes / day
Brisk walking (fast walking for exercise)	_____ days	_____ minutes / day
Jogging or running	_____ days	_____ minutes / day
Bicycling	_____ days	_____ minutes / day
Aerobic exercise (swimming laps, step aerobics, jazzercise)	_____ days	_____ minutes / day
Golf (walking only – not riding carts)	_____ days	_____ minutes / day
Vigorous sports (tennis, soccer, racquetball, basketball, etc.)	_____ days	_____ minutes / day
Weight Lifting	_____ days	_____ minutes / day

12. How many of your neighbors do you know? (meaning adults you have met and whose names you know)

- ☐ None
☐ 1-2
☐ 3-4
☐ 5-6
☐ 7 or more

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13. Of the adult neighbors you know, how many do you visit or talk to at least once every two weeks?

- ☐ None
☐ 1-2
☐ 3-4
☐ 5-6
☐ 7 or more

14. About how often do you run into and talk with your neighbors on your neighborhood streets?

- ☐ Never
☐ Less than once per week
☐ 1-2 times a week
☐ 3-6 times a week
☐ Every day

15. This question asks you to evaluate your neighborhood. For each statement, please indicate how strongly you agree or disagree with the statement:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I regularly seek advice from people in my neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I regularly borrow things and exchange favors with my neighbors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I regularly stop and talk with people in my neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would be willing to work together with others on something to improve the living environment in my neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Living in my neighborhood gives me a sense of community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is easy to make friends in my neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Do you need to limit your physical activity because of a physical illness, injury, or long term disability? (Please check only one)

- ☐ No
☐ Yes, because of temporary illness
☐ Yes, because of long term illness
☐ Yes, because of temporary injury
☐ Yes, because of long-term injury or disability

17. With regard to your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good? _____ days

Thank you for your participation! Please give your completed questionnaire to the survey representative when they pick up your equipment package.

Questions? Call our Travel Survey Hotline at 1-888-401-5871

APPENDIX II MIXED USE

In order to determine the mixed use value, three land use types from the INDEX input file were used-- residential, commercial-general and commercial-office. The residential estimated square footage is the sum of multi-family, and single-family residential parcel square footages. A fourth land use used by INDEX, called MIX-ALL, includes all three of these use types. The square footage of these parcels was divided equally between residential, commercial, and office uses for the purpose of the calculation.

The equation used assesses the balance of uses across the entire one kilometer network buffer site, but not the overall quantity of the built environment. Mixed use values range from 0 to 1, with higher values indicating a more even balance of floor areas across uses present. The data was placed into the following formula:

$$\frac{-\sum [P_n * \ln (P_n)]}{\ln(N)}$$

where N= the number of different land uses (that is, of the three land uses, how many have at least one parcel present. N ranges from 0 to 3 depending the presence of the land uses.)

and (P_n) =

$$\frac{\text{total estimated square footage of floor area of land use type "n"}}{\text{total square footage of floor area of for all three uses and mixed use parcels}}$$

where n = residential, commercial-general and commercial-office

APPENDIX III PAQ RESULTS (UNWEIGHTED)

Table 7: Question 1

Question							1
"How often do you walk or jog in your neighborhood?"							
<i>Code</i>	<i>Answer</i>	<i>Frequency</i>	<i>Percent</i>	<i>Mean NRD</i>	<i>Mean Mix</i>	<i>Mean Intersection Density</i>	<i>Mean BMI</i>
0	Never	150	18.5%	4.85	0.31	28.54	27.25
1	Less than once per week	247	30.5%	4.97	0.27	33.34	26.86
2	1-2 times a week	176	21.7%	7.04	0.36	38.44	26.14
3	3-6 times a week	178	22.0%	8.76	0.38	39.73	26.30
4	Every day	59	7.3%	10.22	0.40	41.87	26.54
9	DK/RF	5	-	-	-	-	-
Total cases		815	100.0%				
Valid cases		810	-				
Mode (nominal answer code)		1	-				

Source database: PAQ survey

Table 8: Question 2

Question							2
"How often do you see people walking or jogging in your neighborhood?"							
<i>Code</i>	<i>Answer</i>	<i>Frequency</i>	<i>Percent</i>	<i>Mean NRD</i>	<i>Mean Mix</i>	<i>Mean Intersection Density</i>	<i>Mean BMI</i>
0	Never	26	3.2%	2.91	0.36	24.80	27.66
1	Less than once per week	51	6.3%	5.98	0.33	26.30	28.00
2	1-2 times a week	100	12.3%	2.74	0.24	28.33	26.74
3	3-6 times a week	149	18.3%	4.31	0.32	33.68	27.01
4	Every day	486	59.9%	8.37	0.35	39.21	26.28
9	DK/RF	2	-	-	-	-	-
Total cases		814	100.0%				
Valid cases		812	-				
Mode (nominal answer code)		4	-				

Source database: PAQ survey

Table 9: Question 3

Question							3
"How often do you go somewhere other than your neighborhood to walk or jog? (For example, at a mall or on a walking trail)"							
Code	Answer	Frequency	Percent	Mean NRD	Mean Mix	Mean Intersection Density	Mean BMI
0	Never	315	38.8%	6.34	0.33	35.23	27.11
1	Less than once per week	276	34.0%	7.58	0.33	37.23	26.01
2	1-2 times a week	136	16.7%	6.43	0.35	35.98	27.16
3	3-6 times a week	74	9.1%	4.93	0.32	31.12	25.89
4	Every day	11	1.4%	3.05	0.24	29.14	26.16
9	DK/RF	3	-				
Total cases		815	100.0%				
Valid cases		812	-				
Mode (nominal answer code)		0	-				

Source database: PAQ survey

Table 10: Question 4

Question											4
"When you travel to the following places from your home, how often do you walk there?"											
a) Frequencies											
Code	Answer	Grocery store	Retail store	Day care center	Bank/	Dr. / Health	Restaurant	School	Sports field	Park	Work
0	Never walk (0%)	599	602	461	647	723	532	501	494	453	629
1	Rarely walk	125	100	15	72	25	89	29	77	81	33
2	Sometimes walk (50%)	39	52	8	22	18	92	16	49	76	19
3	Often walk	18	18	0	10	4	45	11	21	45	8
4	Very often walk (80-100%)	15	17	2	28	11	31	12	32	97	36
5	Not applicable (I never travel to these places)	4	8	305	18	18	11	221	126	43	68
9	DK/RF	15	18	24	18	16	15	25	16	20	22
Total cases		815	815	815	815	815	815	815	815	815	815
Valid cases		796	789	486	779	781	789	569	673	752	725
Mode (ordinal answer code)		0	0	0	0	0	0	0	0	0	0
Median (ordinal answer code)		0	0	0	0	0	0	0	0	0	0

Table 11: Question 4

Question											4
Intersection Density											
Code	Answer	Grocery store	Retail store	Day care center	Bank	Dr. / Health clinic	Restaurant	School	Sports field	Park	Work
0	Never walk (0%)	33.29	33.35	31.88	33.70	34.89	30.96	32.43	31.91	30.58	34.94
1	Rarely walk	42.90	42.60	41.88	45.20	44.12	43.28	37.81	39.94	41.57	40.70
2	Sometimes walk (50%)	43.80	43.43	49.19	43.91	45.75	48.26	41.28	44.83	41.79	37.34
3	Often walk	47.22	46.27		48.04	46.75	45.58	38.86	43.15	43.74	43.94
4	Very often walk (80-100%)	39.55	42.35	49.02	43.47	47.21	44.53	42.09	45.96	45.86	42.36
5	Not applicable (I never travel to this place)	34.17	33.10	41.04	40.56	37.92	35.99	42.38	40.95	37.84	37.17
9	DK/RF	27.79	32.99	28.07	30.69	28.97	27.92	28.09	27.13	28.26	25.98
Total											
Mix Use											
Code	Answer	Grocery store	Retail store	Day care center	Bank	Dr. / Health clinic	Restaurant	School	Sports field	Park	Work
0	Never walk (0%)	0.27	0.27	0.27	0.28	0.30	0.24	0.27	0.27	0.26	0.31
1	Rarely walk	0.49	0.52	0.45	0.50	0.54	0.48	0.47	0.38	0.37	0.40
2	Sometimes walk (50%)	0.44	0.52	0.69	0.64	0.63	0.54	0.50	0.46	0.43	0.44
3	Often walk	0.58	0.44		0.50	0.77	0.50	0.42	0.42	0.40	0.33
4	Very often walk (80-100%)	0.58	0.53	0.37	0.57	0.55	0.56	0.60	0.46	0.45	0.49
5	Not applicable (I never travel to this place)	0.35	0.39	0.41	0.44	0.43	0.34	0.43	0.43	0.43	0.38
9	DK/RF	0.31	0.31	0.28	0.25	0.35	0.25	0.22	0.30	0.30	0.26
Total											
NRD											
Code	Answer	Grocery store	Retail store	Day care center	Bank	Dr. / Health clinic	Restaurant	School	Sports field	Park	Work
0	Never walk (0%)	5.06	4.67	4.06	5.18	5.81	3.47	4.28	4.30	4.12	5.90
1	Rarely walk	11.43	13.41	7.05	12.07	10.89	12.91	4.66	9.41	8.18	11.73
2	Sometimes walk (50%)	8.20	12.12	17.26	18.80	16.11	12.44	9.97	6.69	8.56	7.01
3	Often walk	18.13	8.05		13.89	41.11	12.83	12.48	11.88	7.28	16.01
4	Very often walk (80-100%)	12.91	11.86	12.09	13.73	25.02	15.65	10.50	19.31	14.81	13.91
5	Not applicable (I never travel to this place)	5.63	19.11	10.34	8.44	6.85	12.00	11.73	9.70	8.41	6.56
9	DK/RF	3.61	5.01	3.37	3.57	2.84	2.79	3.06	6.63	3.35	3.02
Total											
BMI											
Code	Answer	Grocery store	Retail store	Day care center	Bank	Dr. / Health clinic	Restaurant	School	Sports field	Park	Work
0	Never walk (0%)	26.81	26.90	26.92	26.83	26.59	26.11	26.85	26.98	27.01	26.67
1	Rarely walk	25.81	25.94	27.10	25.98	27.17	25.63	27.19	26.26	27.29	27.14
2	Sometimes walk (50%)	26.69	25.12	28.10	25.52	25.71	26.03	28.28	25.05	25.93	27.21
3	Often walk	25.40	26.05		27.37	28.56	24.12	27.34	26.72	25.41	24.87
4	Very often walk (80-100%)	26.58	26.54	20.30	25.45	25.42	24.24	26.49	24.54	24.86	26.14
5	Not applicable (I never travel to this place)	29.92	27.53	26.27	24.56	28.28	24.50	26.07	26.67	28.21	26.58
9	DK/RF	25.70	25.22	24.74	26.04	25.66	26.85	24.66	25.33	25.22	25.10
Total											

Table 12: Question 5

Question	5
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"Please rate how much you agree or disagree with each of the following statements about walking in your neighborhood (if you never walk in your neighborhood, go to question 6):

- There are services, shops and restaurants within a walkable distance from my home.
- When I walk in my neighborhood, I see friends and neighbors along the way.
- When I walk in my neighborhood there are interesting things to see along the way.
- There are good sidewalks in my neighborhood.
- There are safe street crossings in my neighborhood.
- There is adequate street lighting in my neighborhood.
- When I walk in my neighborhood I am safe from traffic.
- When I walk in my neighborhood I am safe from crime.
- There are no steep hills in my neighborhood."

a) Frequencies

Code	Answer	<i>Shops etc. nearby</i>	<i>Seeing friends</i>	<i>Things to see</i>	<i>Good sidewalks</i>	<i>Safe crossings</i>	<i>Adequate lighting</i>	<i>Safe from traffic</i>	<i>Safe from crime</i>	<i>No steep hills</i>
1	Strongly disagree	169	30	43	251	95	64	73	27	113
2	Disagree	94	55	83	113	124	100	136	73	219
3	Neutral	45	86	167	61	131	113	120	151	97
4	Agree	159	306	225	135	213	289	233	301	161
5	Strongly agree	170	161	120	75	71	70	74	84	49
	Not applicable	0	0	0	0	0	0	0	0	0
9	DK/RF	28	27	27	30	31	29	29	29	26
	Total cases	665	665	665	665	665	665	665	665	665
	Valid cases	637	638	638	635	634	636	636	636	639
	Mode (ordinal answer code)	5	4	4	1	4	4	4	4	2
	Median (ordinal answer code)	4	4	4	2	3	4	4	4	3

Table 13: Question 5

Question										5
Intersection Density										
Code	Answer	Shops etc. nearby	Seeing friends	Things to see	Good sidewalks	Safe crossings	Adequate lighting	Safe from traffic	Safe from crime	No steep hills
1	Strongly disagree	29.10	37.30	34.89	31.74	32.06	30.46	33.44	44.25	37.72
2	Disagree	35.58	40.29	35.84	37.10	37.77	37.94	38.09	41.57	36.93
3	Neutral	38.31	37.15	32.45	43.31	36.05	39.95	39.78	41.14	36.94
4	Agree	41.51	35.79	39.13	44.46	39.49	37.39	37.77	34.63	38.45
5	Strongly agree	42.67	39.61	43.23	39.41	40.27	38.66	34.66	34.72	36.40
Mix Use										
Code	Answer	Shops etc. nearby	Seeing friends	Things to see	Good sidewalks	Safe crossings	Adequate lighting	Safe from traffic	Safe from crime	No steep hills
1	Strongly disagree	0.14	0.30	0.28	0.24	0.28	0.28	0.37	0.46	0.24
2	Disagree	0.26	0.42	0.32	0.32	0.34	0.33	0.32	0.41	0.31
3	Neutral	0.33	0.35	0.29	0.46	0.30	0.32	0.34	0.40	0.35
4	Agree	0.38	0.31	0.34	0.43	0.36	0.34	0.32	0.29	0.40
5	Strongly agree	0.52	0.33	0.40	0.37	0.36	0.34	0.31	0.22	0.39
NRD										
Code	Answer	Shops etc. nearby	Seeing friends	Things to see	Good sidewalks	Safe crossings	Adequate lighting	Safe from traffic	Safe from crime	No steep hills
1	Strongly disagree	2.26	5.08	3.26	4.10	3.62	4.88	5.23	13.21	4.82
2	Disagree	4.52	10.86	6.32	5.22	7.71	6.87	8.02	9.05	6.21
3	Neutral	8.52	8.54	4.54	14.05	5.90	7.38	8.53	10.53	8.37
4	Agree	7.91	6.43	8.17	11.37	9.48	7.90	7.41	5.32	9.33
5	Strongly agree	12.43	6.84	10.86	7.21	6.31	6.19	4.47	4.01	7.05
BMI										
Code	Answer	Shops etc. nearby	Seeing friends	Things to see	Good sidewalks	Safe crossings	Adequate lighting	Safe from traffic	Safe from crime	No steep hills
1	Strongly disagree	26.72	26.33	26.57	26.58	26.80	27.30	26.77	28.55	26.27
2	Disagree	26.96	26.91	28.28	27.30	26.95	27.01	26.42	26.71	25.85
3	Neutral	27.39	26.89	27.15	25.66	26.19	26.50	26.66	26.17	27.26
4	Agree	26.26	26.48	25.73	25.25	25.86	26.05	26.14	26.32	27.09
5	Strongly agree	25.78	25.90	25.29	27.24	26.63	26.02	26.43	26.16	25.33

Table 14: Question 6

Question							6
"How often do you bicycle, either in your neighborhood or starting from your neighborhood?"							
Code	Answer	Frequency	Percent	Mean NRD	Mean Mix	Mean Intersection Density	Mean BMI
0	Never	603	74.9%	6.22	0.32	34.57	26.77
1	Less than once per week	135	16.8%	6.54	0.31	38.88	25.69
2	1-2 times a week	50	6.2%	10.18	0.41	37.45	26.76
3	3-6 times a week	15	1.9%	7.46	0.37	43.90	25.54
4	Every day	2	0.2%	14.12	0.46	46.54	26.38
9	DK/RF	10	-	-	-	-	-
Total cases		815	100.0%				
Valid cases		805	-				
Mode (nominal answer code)		0	-				

Source database: PAQ survey

Table 15: Question 7

Question							7
"When you bicycle, how far do you normally ride?"							
<i>Code</i>	<i>Answer</i>	<i>Frequency</i>	<i>Percent</i>	<i>Mean NRD</i>	<i>Mean Mix</i>	<i>Mean Intersection Density</i>	<i>Mean BMI</i>
1	1 mile	21	10.7%	2.32	0.19	31.78	24.81
2	2 to 3 miles	56	28.4%	7.48	0.33	39.16	26.89
3	4 to 5 miles	56	28.4%	10.48	0.44	40.93	25.48
4	6 to 7 miles	18	9.1%	5.19	0.34	45.45	26.51
5	8 miles or more	46	23.4%	7.94	0.32	37.18	25.72
	Not applicable	0	-	-	-	-	-
999	DK/RF	15	-	6.93	0.36	29.55	28.18
	Total cases	212	100.0%				
	Valid cases	197	-				
	Mean (in miles)	6.24	-				
	Standard deviation	6.45	-				

Source database: PAQ survey

Table 16: Question 8

Question							8
"How often do you see people bicycling in your neighborhood?"							
<i>Code</i>	<i>Answer</i>	<i>Frequency</i>	<i>Percent</i>	<i>Mean NRD</i>	<i>Mean Mix</i>	<i>Mean Intersection Density</i>	<i>Mean BMI</i>
0	Never	109	13.5%	3.59	0.30	29.51	27.46
1	Less than once per week	176	21.9%	5.05	0.31	33.91	26.55
2	1-2 times a week	215	26.7%	4.48	0.29	33.14	26.87
3	3-6 times a week	134	16.6%	8.13	0.35	39.08	26.19
4	Every day	171	21.2%	11.80	0.40	42.00	26.10
9	DK/RF	10	-	-	-	-	-
	Total cases	815	100.0%				
	Valid cases	805	-				
	Mode (nominal answer code)	2	-				

Source database: PAQ survey

Table 17: Question 9

Question	9
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"Please rate how much you agree or disagree with each of the following statements about bicycling in your neighborhood (if you never bicycle in your neighborhood, go to question 10):

- There are enough bike lanes in my neighborhood.
- There are enough off-road bike trails/paths in my neighborhood.
- There are good road conditions for bicycling in my neighborhood (smooth pavement, etc.).
- When I bicycle in my neighborhood I am safe from traffic.
- When I bicycle in my neighborhood I am safe from crime."

a) Frequencies

Code	Answer	Enough bike lanes	Enough bike trails	Good pavement	Safe from traffic	Safe from crime
1	Strongly disagree	133	110	40	48	9
2	Disagree	40	59	35	73	20
3	Neutral	12	8	35	39	50
4	Agree	12	16	76	33	93
5	Strongly agree	4	8	15	7	29
	Not applicable	0	0	0	0	0
9	DK/RF	11	11	11	12	11
	Total cases	212	212	212	212	212
	Valid cases	201	201	201	200	201
	Mode (ordinal answer code)	1	1	4	2	4
	Median (ordinal answer code)	1	1	3	2	4

Table 18: Question 9

Question						9
Intersection Density						
Code	Answer	Enough bike lanes	Enough bike trails	Good pavement	Safe from traffic	Safe from crime
1	Strongly disagree	38.56	37.28	42.30	41.88	34.24
2	Disagree	40.84	42.92	44.95	41.70	45.86
3	Neutral	31.84	38.25	37.63	33.97	39.39
4	Agree	43.89	40.87	35.65	35.48	37.34
5	Strongly agree	34.22	26.88	34.41	32.43	39.29
Mix Use						
Code	Answer	Enough bike lanes	Enough bike trails	Good pavement	Safe from traffic	Safe from crime
1	Strongly disagree	0.35	0.32	0.39	0.40	0.36
2	Disagree	0.30	0.37	0.40	0.34	0.46
3	Neutral	0.34	0.41	0.39	0.38	0.35
4	Agree	0.39	0.36	0.27	0.19	0.32
5	Strongly agree	0.12	0.24	0.24	0.41	0.27
NRD						
Code	Answer	Enough bike lanes	Enough bike trails	Good pavement	Safe from traffic	Safe from crime
1	Strongly disagree	6.86	5.65	8.77	9.38	4.10
2	Disagree	9.04	8.67	13.49	9.64	9.36
3	Neutral	7.86	24.02	9.29	5.38	7.84
4	Agree	12.26	10.98	4.44	4.10	7.95
5	Strongly agree	2.83	3.08	2.71	3.20	5.90
BMI						
Code	Answer	Enough bike lanes	Enough bike trails	Good pavement	Safe from traffic	Safe from crime
1	Strongly disagree	25.74	25.57	24.72	25.13	27.85
2	Disagree	26.19	26.23	27.06	26.10	26.10
3	Neutral	29.95	29.99	26.43	27.32	25.76
4	Agree	25.21	27.07	25.79	26.45	25.82
5	Strongly agree	23.55	24.10	27.01	22.31	26.44

Table 19: Question 10

Question								10
"When you are at work, please indicate about how much time you spend doing the following in a typical day: (if you are not employed go to question 11)"								
a) Frequencies								
Code	Answer	Sitting	Standing	Walking	Heavy labor	Stair climbing	Other	
0	0 to 1 hour	443	681	731	723	803	619	
2	2 to 3 hours	99	113	111	13	4	1	
4	4 to 5 hours	125	54	33	11	1	1	
6	6 to 7 hours	211	37	17	5	0	0	
8	8 hours or more	52	22	19	8	1	0	
9998	Not applicable	145	0	0	0	0	0	
9999	DK/RF	24	49	45	196	147	335	
Total cases		1099	956	956	956	956	956	
Valid cases		930	907	911	760	809	621	
Mean (in hours)		2.9	1.3	1.1	0.3	0.1	0.1	
Standard deviation		3.14	2.01	1.78	1.20	0.44	0.28	

Table 20: Question 11a (Days in last week)

Question													11a
"Now, thinking about your leisure time, have you done any of the following activities in the past week? Please indicate on how many days you did each activity. For any activity you did not do in the past week, write "0" for the number of days."													
a) Frequencies													
Code	Answer	Housework	Gardening	Home repair	Leisurely walking	Brisk walking	Jogging	Bicycling	Aerobic exercise	Golf	Vigorous sports	Weight lifting	
0	Did not do activity	51	430	442	178	466	647	668	621	751	682	592	
1	1 or 2 days per week	359	282	288	334	160	71	76	99	17	79	94	
3	3 or 4 days per week	184	56	45	147	83	41	22	42	1	7	68	
5	5 or 6 days per week	101	8	5	68	57	11	9	14	0	3	15	
7	7 days per week	104	12	4	56	20	2	1	3	0	0	4	
9	DK/RF	14	25	29	30	27	41	37	34	44	42	41	
Total cases		813	813	813	813	813	813	813	813	813	813	814	
Valid cases		799	788	784	783	786	772	776	779	769	771	773	
Mean (in days)		3.05	0.86	0.70	2.20	1.21	0.41	0.29	0.49	0.04	0.19	0.61	
Standard deviation		2.11	1.34	1.08	2.03	1.86	1.08	0.92	1.18	0.24	0.63	1.29	

Table 21: Question 11b (Activity duration)

Question													11b
"Now, thinking about your leisure time, have you done any of the following activities in the past week? Please indicate on how many minutes you did the activity each day."													
a) Frequencies													
Code	Answer	Housework	Gardening	Home repair	Leisurely walking	Brisk walking	Jogging	Bicycling	Aerobic exercise	Golf	Vigorous sports	Weight lifting	
0	0 to 15 min. per day	49	41	18	40	23	11	8	9	2	3	28	
16	16 to 30 min. per day	179	79	60	221	120	53	37	54	2	12	76	
31	31 to 60 min. per day	266	116	111	222	130	54	36	73	3	35	56	
61	61 to 120 min. per day	156	70	81	71	23	3	19	14	2	32	14	
> 120 min. per day	61	42	57	30	14	3	5	6	6	5	5	2	
9999	Not applicable	0	0	0	0	0	1	0	0	0	0	1	
9999	DK/RF	51	35	44	51	37	43	40	36	47	44	46	
Total cases		762	383	371	635	347	168	145	192	62	131	223	
Valid cases		711	348	327	584	310	124	105	156	15	87	176	
Mean (in minutes)		65.06	80.96	94.40	57.33	50.89	41.89	59.85	53.11	113.07	9.31	47.18	
Standard deviation		86.34	91.99	85.09	57.94	57.09	33.71	56.41	47.83	84.76	56.31	27.15	

Table 22: Question 12

Question							12
"How many of your neighbors do you know?"							
Code	Answer	Frequency	Percent	Mean NRD	Mean Mix	Mean Intersection Density	Mean BMI
0	None	46	5.7%	7.17	0.34	37.46	30.97
1	1 to 2	103	12.8%	7.57	0.46	32.96	26.27
2	3 to 4	129	16.1%	6.93	0.36	37.05	26.56
3	5 to 6	122	15.2%	6.77	0.32	34.39	26.43
4	7 or more	403	50.2%	6.22	0.29	36.12	26.21
9	DK/RF	12	-	-	-	-	-
Total cases		815	100.0%				
Valid cases		803	-				
Mode (nominal answer code)		4	-				

Source database: PAQ survey

Table 23: Question 13

Question							13
"Of the adult neighbors you know, how many do you visit or talk to at least once every two weeks?"							
Code	Answer	Frequency	Percent	Mean NRD	Mean Mix	Mean Intersection Density	Mean BMI
0	None	145	18.1%	6.16	0.31	35.18	28.00
1	1 to 2	278	34.8%	7.14	0.35	34.22	26.12
2	3 to 4	187	23.4%	6.34	0.32	34.73	26.45
3	5 to 6	89	11.1%	6.81	0.34	40.31	26.58
4	7 or more	100	12.5%	6.43	0.28	38.43	26.04
9	DK/RF	16	-	-	-	-	-
Total cases		815	100.0%				
Valid cases		799	-				
Mode (nominal answer code)		1	-				

Source database: PAQ survey

Table 24: Question 14

Question							14
"About how often do you run into and talk with your neighbors on your neighborhood streets?"							
Code	Answer	Frequency	Percent	Mean NRD	Mean Mix	Mean Intersection Density	Mean BMI
0	Never	111	13.9%	6.38	0.36	33.29	27.25
1	Less than once per week	248	31.0%	7.44	0.33	34.20	26.74
2	1-2 times a week	248	31.0%	6.70	0.32	35.30	26.72
3	3-6 times a week	138	17.2%	6.07	0.32	39.80	25.83
4	Every day	56	7.0%	4.90	0.28	39.17	25.88
9	DK/RF	14	-	-	-	-	-
Total cases		815	100.0%				
Valid cases		801	-				
Mode (nominal answer code)		1	-				

Source database: PAQ survey

Table 25: Question 15

Question							15
"This question asks you to evaluate your neighborhood. For each statement, please indicate how strongly you agree or disagree with the statement: <ul style="list-style-type: none"> - I regularly seek advice from people in my neighborhood. - I regularly borrow things and exchange favors with my neighbors. - I regularly stop and talk with people in my neighborhood. - I would be willing to work together with others on something to improve the living environment in my neighborhood. - Living in my neighborhood gives me a sense of community - It is easy to make friends in my neighborhood. 							
a) Frequencies							
Code	Answer	Seeking advice	Borrowing & favors	Talk w/neighbors	Willing to help	Community sense	Easy friendship
1	Strongly disagree	235	226	102	9	50	62
2	Disagree	213	196	134	23	93	109
3	Neutral	180	117	133	120	205	233
4	Agree	145	212	341	445	304	308
5	Strongly agree	26	44	89	200	145	88
9	DK/RF	16	20	16	18	18	15
Total cases		815	815	815	815	815	815
Valid cases		799	795	799	797	797	800
Mode (ordinal answer code)		2	1	4	4	4	4
Median (ordinal answer co		2	2	4	4	4	4

Table 26: Question 15

Question	15
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Intersection Density

Code	Answer	Seeking advice	Borrowing & favors	Talk w/neighbors	Willing to help	Community sense	Easy friendship
1	Strongly disagree	34.69	34.64	31.66	35.63	30.71	35.14
2	Disagree	35.33	36.97	36.99	43.04	37.23	37.40
3	Neutral	34.65	35.54	36.57	33.08	34.45	33.64
4	Agree	38.13	34.81	35.50	35.86	34.79	36.23
5	Strongly agree	40.82	40.77	37.37	36.51	40.33	37.93
9	DK/RF	31.29	30.06	32.76	25.93	29.01	27.67
Total							

Mix Use

Code	Answer	Seeking advice	Borrowing & favors	Talk w/neighbors	Willing to help	Community sense	Easy friendship
1	Strongly disagree	0.34	0.37	0.31	0.47	0.42	0.40
2	Disagree	0.39	0.37	0.40	0.37	0.39	0.40
3	Neutral	0.28	0.27	0.38	0.31	0.33	0.30
4	Agree	0.28	0.28	0.30	0.31	0.28	0.32
5	Strongly agree	0.37	0.31	0.28	0.38	0.36	0.31
9	DK/RF	0.26	0.31	0.25	0.26	0.26	0.23
Total							

NRD

Code	Answer	Seeking advice	Borrowing & favors	Talk w/neighbors	Willing to help	Community sense	Easy friendship
1	Strongly disagree	6.27	8.35	6.08	4.53	6.92	8.32
2	Disagree	7.98	7.17	7.10	8.68	10.01	7.52
3	Neutral	6.17	6.87	9.39	5.56	5.52	6.74
4	Agree	6.31	4.83	5.92	6.94	6.46	6.55
5	Strongly agree	4.44	4.60	5.49	6.37	6.16	4.68
9	DK/RF	3.63	2.54	2.70	5.74	6.00	2.58
Total							

BMI

Code	Answer	Seeking advice	Borrowing & favors	Talk w/neighbors	Willing to help	Community sense	Easy friendship
1	Strongly disagree	27.50	27.36	27.30	26.97	26.49	26.81
2	Disagree	26.55	26.84	28.09	25.34	27.46	27.10
3	Neutral	26.49	26.63	26.45	27.72	27.43	27.25
4	Agree	25.83	25.75	26.18	26.54	26.42	26.37
5	Strongly agree	24.60	25.19	25.33	26.16	25.35	25.05
9	DK/RF	25.39	27.31	27.04	27.23	26.69	0.00

Table 27: Question 16

Question							16
"Do you need to limit your physical activity because of a physical illness, injury, or long term disability? (Please check only one)"							
Code	Answer	Frequency	Percent	Mean NRD	Mean Mix	Mean Intersection Density	Mean BMI
1	No	658	82.7%	6.88	0.32	36.13	26.21
2	Yes, because of temporary illness	33	4.1%	4.00	0.31	32.83	28.66
3	Yes, because of long term illness	24	3.0%	4.54	0.32	30.61	29.35
4	Yes, because of temporary injury	34	4.3%	5.74	0.40	35.02	27.85
5	Yes, because of long-term injury or disability	47	5.9%	7.54	0.40	35.93	27.56
9	DK/RF	17	-	3.17	0.32	28.99	28.07
Total cases		813	100.0%				
Valid cases		796	-				
Mode (nominal answer code)		1	-				

Source database: PAQ survey

Table 28: Question 17

Question							17
"With regard to your physical health, which includes physical illness and injury, for how many days during the past 3 was your physical health not good?"							
Code	Answer	Frequency	Percent	Mean NRD	Mean Mix	Mean Intersection Density	Mean BMI
0	0 days	493	63.0%	7.06	0.32	35.34	26.23
1	1 to 2 days	110	14.1%	8.06	0.32	37.14	26.39
2	3 to 7 days	99	12.7%	5.37	0.36	37.20	27.39
3	8 to 15 days	28	3.6%	4.18	0.43	36.87	30.15
4	16 to 30 days	52	6.6%	4.65	0.34	32.81	27.41
99	DK/RF	31	-	3.23	0.23	32.41	26.06
Total cases		813	100.0%				
Valid cases		782	-				
Mean (in days)		6.68	-				
Standard deviation		19.67	-				

Source database: PAQ survey

PAQ Data Dictionary

Item	Variable Name	Variable Description	Data Type	Field Width	IZU Program	IZU Name	IZU Type	Codeset	Skip	Actual Question Text
A-1	SAMPN	Sample Number	N	7	ATPA	SAMPN	N			Sample Number
A-2	SAMP2	Re-entered Sample Number	N	7		SAMP2	N			Re-enter Sample Number
A-3	JOG	Frequency of activity in neighborhood	N	1		JOG	N	JOG		How often do you walk or jog in your neighborhood?
A-4	PJOG	Observation of activity in neighborhood	N	1		PJOG	N	JOG		How often do you see people walking or jogging in your neighborhood?
A-5	JOGO	Go elsewhere to exercise	N	1		JOGO	N	JOG		How often do you go somewhere other than your neighborhood to walk or jog? (for example, at a mall or on a walking trail)
A-6	WALKA	Walk as mode of travel to: Grocery store	N	1		WALKA	N	WALK		When you travel to the following places from your home, how often do you walk there?
A-7	WALKB	Walk as mode of travel: Retail store	N	1		WALKB	N	WALK		When you travel to the following places from your home, how often do you walk there?
A-8	WALKC	Walk as mode of travel: Day care center	N	1		WALKC	N	WALK		When you travel to the following places from your home, how often do you walk there?
A-9	WALKD	Walk as mode of travel: Bank/Credit union	N	1		WALKD	N	WALK		When you travel to the following places from your home, how often do you walk there?
A-10	WALKE	Walk as mode of travel: Doctor/Health clinic	N	1		WALKE	N	WALK		When you travel to the following places from your home, how often do you walk there?
A-11	WALKF	Walk as mode of travel: Restaurant	N	1		WALKF	N	WALK		When you travel to the following places from your home, how often do you walk there?
A-12	WALKG	Walk as mode of travel: School	N	1		WALKG	N	WALK		When you travel to the following places from your home, how often do you walk there?
A-13	WALKH	Walk as mode of travel: Sports field/Court/Track	N	1		WALKH	N	WALK		When you travel to the following places from your home, how often do you walk there?
A-14	WALKI	Walk as mode of travel: Park	N	1		WALKI	N	WALK		When you travel to the following places from your home, how often do you walk there?
A-15	WALKJ	Walk as mode of travel: Work	N	1		WALKJ	N	WALK		When you travel to the following places from your home, how often do you walk there?
A-16	WSTATE1	Walking statement 1: There are services, shops, and restaurants within a walkable distance from my home	N	1		WNHDA	N	STATE	Skip if OFTJOG=0	Please rate how much you agree or disagree with each of the following statements about walking in your neighborhood:
A-17	WSTATE2	Walking statement 2: When I walk in my neighborhood, I see friends and neighbors along the way	N	1		WNHDB	N	STATE	Skip if OFTJOG=0	Please rate how much you agree or disagree with each of the following statements about walking in your neighborhood:
A-18	WSTATE3	Walking statement 3: When I walk in my neighborhood, there are interesting things to see along the way	N	1		WNHDC	N	STATE	Skip if OFTJOG=0	Please rate how much you agree or disagree with each of the following statements about walking in your neighborhood:
A-19	WSTATE4	Walking statement 4: There are good sidewalks in my neighborhood	N	1		WNHDD	N	STATE	Skip if OFTJOG=0	Please rate how much you agree or disagree with each of the following statements about walking in your neighborhood:
A-20	WSTATE5	Walking statement 5: There are safe street crossings in my neighborhood	N	1		WHNDE	N	STATE	Skip if OFTJOG=0	Please rate how much you agree or disagree with each of the following statements about walking in your neighborhood:
A-21	WSTATE6	Walking statement 6: There is adequate street lighting in my neighborhood	N	1		WNHDF	N	STATE	Skip if OFTJOG=0	Please rate how much you agree or disagree with each of the following statements about walking in your neighborhood:
A-22	WSTATE7	Walking statement 7: When I walk in my neighborhood, I am safe about traffic	N	1		WNHDG	N	STATE	Skip if OFTJOG=0	Please rate how much you agree or disagree with each of the following statements about walking in your neighborhood:
A-23	WSTATE8	Walking statement 8: When I walk in my neighborhood, I am safe from crime	N	1		WNHDH	N	STATE	Skip if OFTJOG=0	Please rate how much you agree or disagree with each of the following statements about walking in your neighborhood:
A-24	WSTATE9	Walking statement 9: There are no steep hills in my neighborhood	N	1		WNHDI	N	STATE	Skip if OFTJOG=0	Please rate how much you agree or disagree with each of the following statements about walking in your neighborhood:
A-25	BIKE	Biking in neighborhood	N	1		BIKE	N	JOG		How often do you bicycle, either in your neighborhood or starting from your neighborhood?
A-26	MILES	Distance of biking	N	3		MILES	N	999=DK/R F	Skip if BIKE=0	When you bicycle, how far do you normally ride? (miles)
A-27	PBIKE	Observation of others biking in neighborhood	N	1		PBIKE	N	JOG		How often do you see people bicycling in your neighborhood?
A-28	BSTATE1	Biking statement 1: There are enough bike lanes in my neighborhood	N	1		BNHDA	N	STATE	Skip if BIKE=0	Please rate how much you agree or disagree with each of the following statements about bicycling in your neighborhood:
A-29	BSTATE2	Biking statement 2: There are enough off-road bike trails/paths in my neighborhood	N	1		BNHDB	N	STATE	Skip if BIKE=0	Please rate how much you agree or disagree with each of the following statements about bicycling in your neighborhood:
A-30	BSTATE3	Biking statement 3: There are good road conditions for bicycling in my neighborhood (smooth pavement, etc)	N	1		BNHDC	N	STATE	Skip if BIKE=0	Please rate how much you agree or disagree with each of the following statements about bicycling in your neighborhood:
A-31	BSTATE4	Biking statement 4: When I bicycle in my neighborhood, I am safe from traffic	N	1		BNHDD	N	STATE	Skip if BIKE=0	Please rate how much you agree or disagree with each of the following statements about bicycling in your neighborhood: