BICYCLING AND WALKING IN COLORADO:

ECONOMIC IMPACT AND HOUSEHOLD SURVEY RESULTS

TECHNICAL REPORT

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Bicycling and Walking in Colorado: Economic Impact and Household Survey Results

Technical Report

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Commissioned by:

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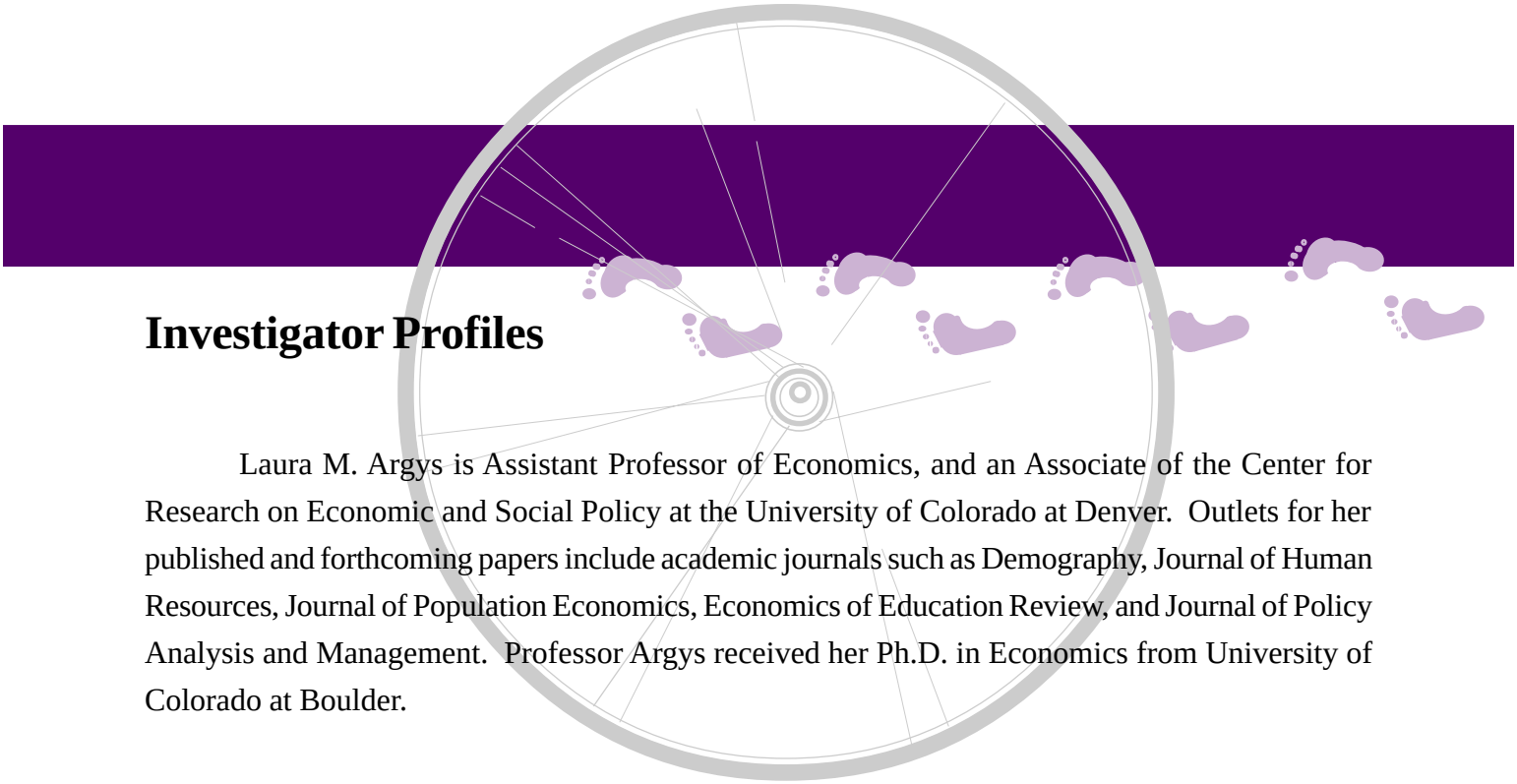
Survey and Analysis Conducted by:

The Center for Research on Economic and Social Policy (CRESP)
of the University of Colorado at Denver



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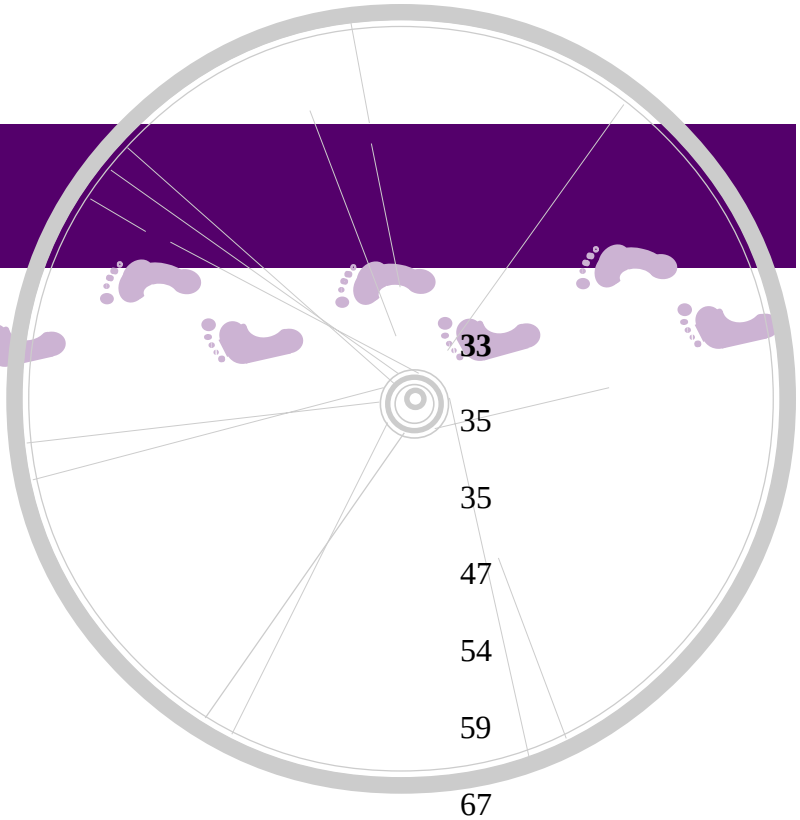
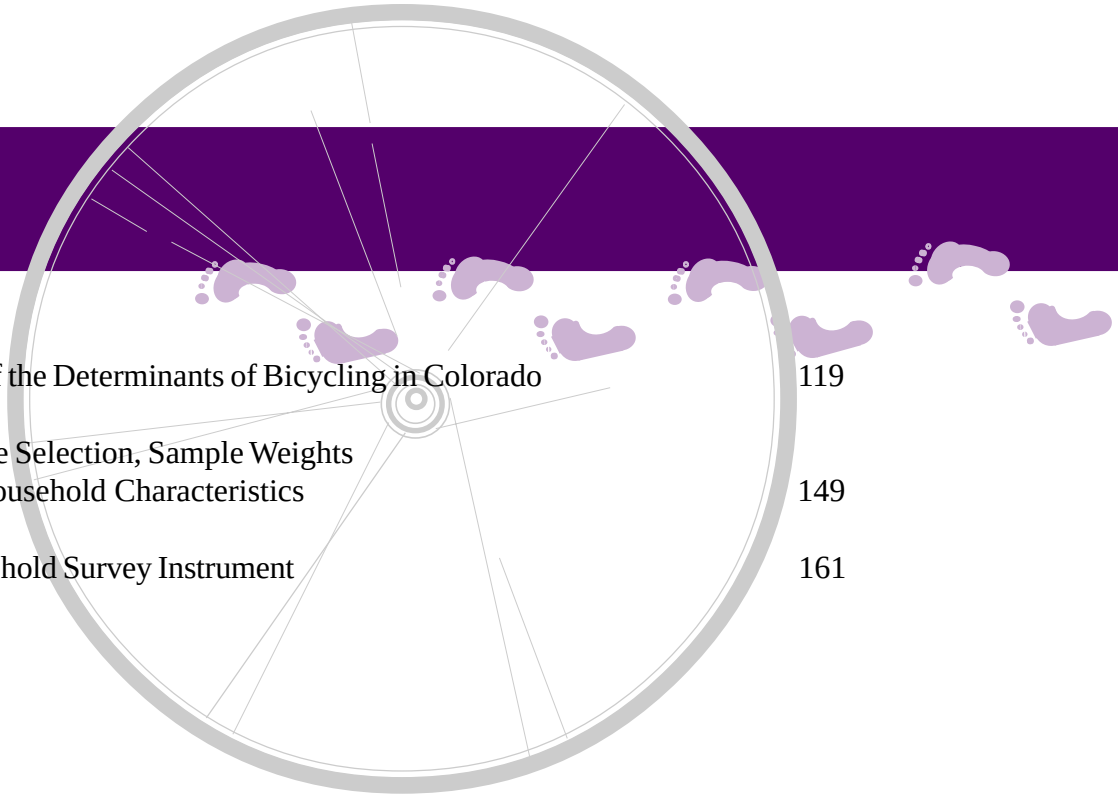
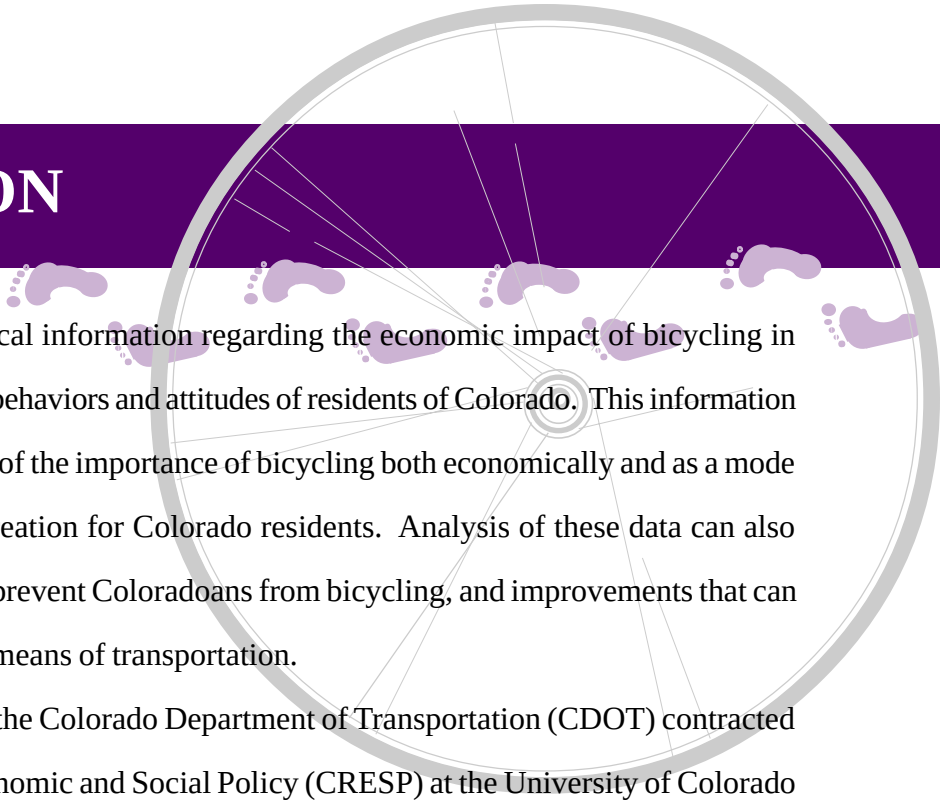


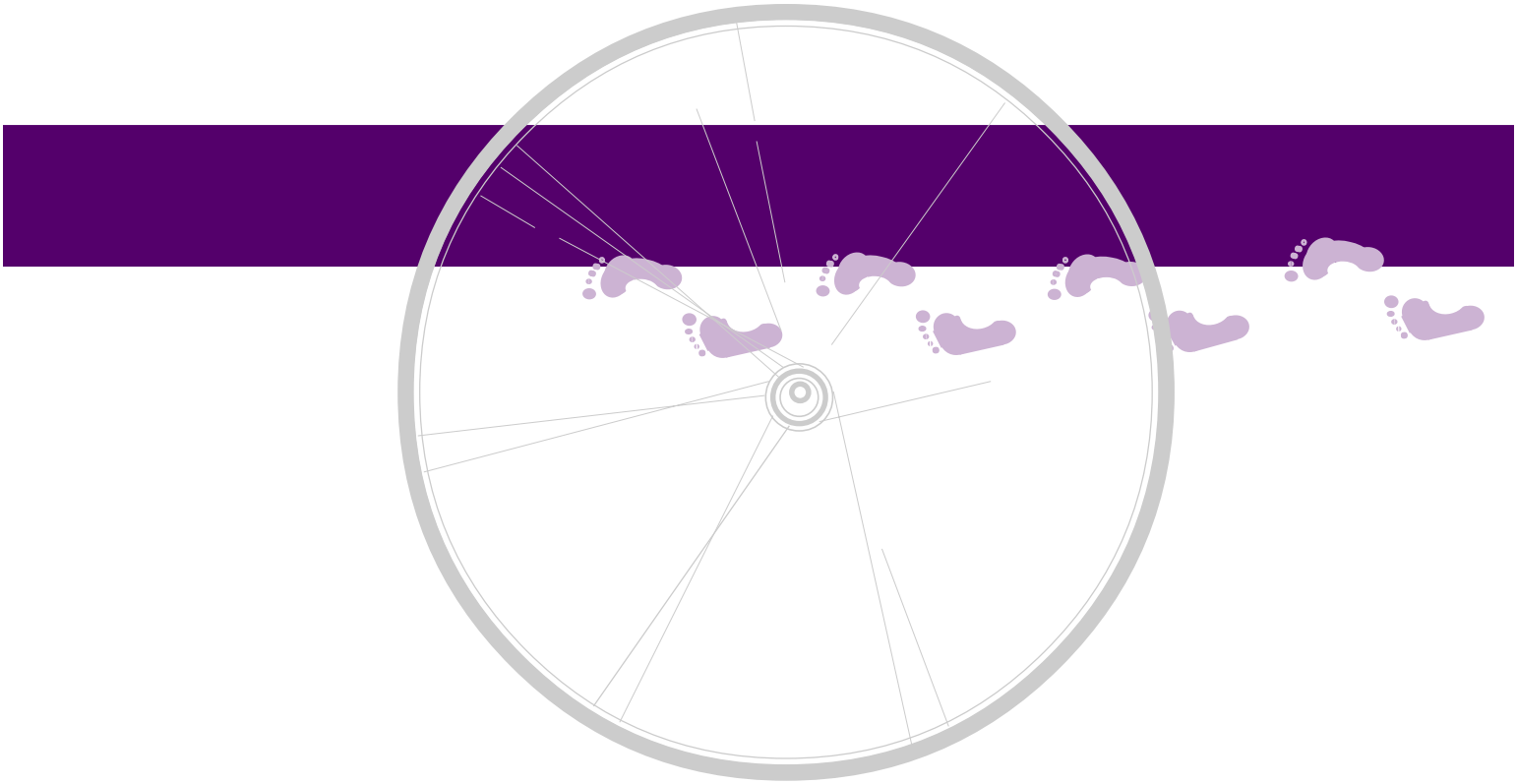


INTRODUCTION



This report provides statistical information regarding the economic impact of bicycling in Colorado, and documents bicycling behaviors and attitudes of residents of Colorado. This information can be used to inform policymakers of the importance of bicycling both economically and as a mode of transportation and means of recreation for Colorado residents. Analysis of these data can also provide insight into the factors that prevent Coloradoans from bicycling, and improvements that can be made to facilitate bicycling as a means of transportation.

Beginning in the Fall 1998, the Colorado Department of Transportation (CDOT) contracted with the Center for Research in Economic and Social Policy (CRESP) at the University of Colorado – Denver, to conduct phone and mail surveys of bicycle manufacturers, retail bicycle shops, and ski resort operators in Colorado. This information is used to summarize the impact of bicycling on the Colorado economy in the form of production, sales, jobs, income and tax revenue. In March 1999, CDOT and CRESP sent nearly 40,000 surveys to randomly selected Colorado households (see Appendix I of the technical report for details regarding sample selection and weighting procedures). The nearly 6,000 completed surveys provide a wide range of information regarding bicycling behavior, attitudes and preferences. (The survey instrument is included as Appendix II of the technical report.)



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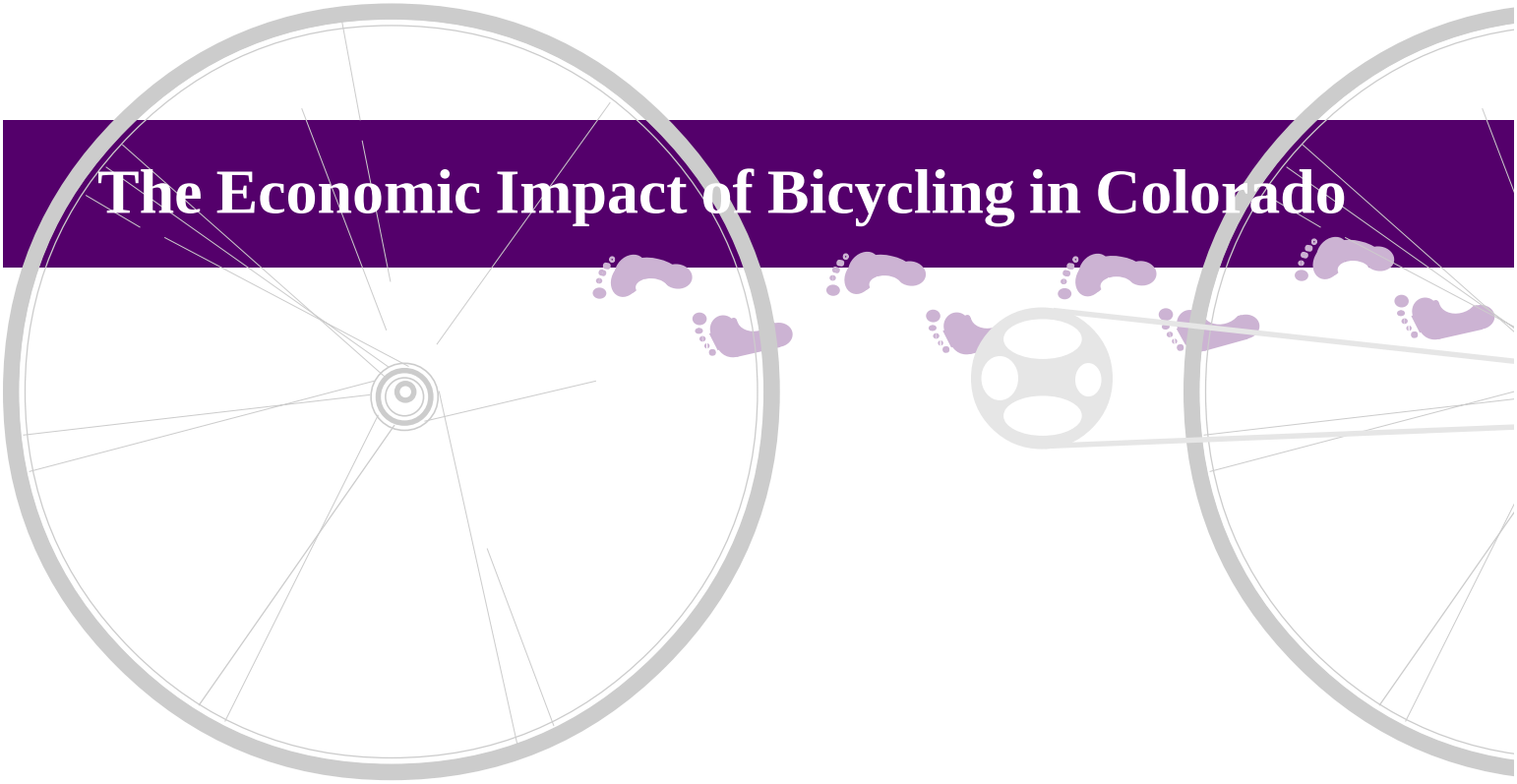
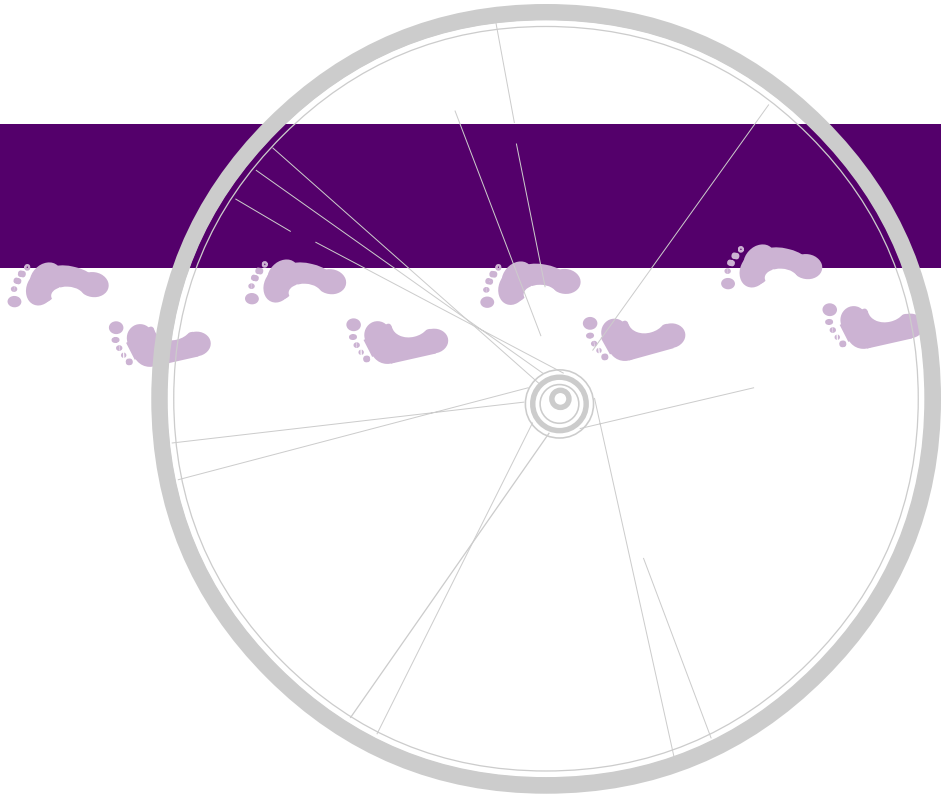
The Economic Impact of Bicycling in Colorado





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I. Bicycle-Related Manufacturing in Colorado

This section summarizes the economic impact of bicycle-related manufacturing and assembling activities of companies located in Colorado. Nearly thirty companies engage in the manufacturing or assembly of bicycles or bicycle-related accessories and clothing. Some of the companies operate exclusively in Colorado; some are branches of organizations that are headquartered elsewhere. We surveyed owners or managers of the six largest manufacturers and forty percent of the remaining companies (eight). Estimates of total statewide employment, payroll and revenue are constructed from these data.

A. Manufacturing Survey Results

The companies that were surveyed had been located in Colorado on average just over 8 years. The oldest companies had been in the state for 12 years. The reasons that respondents gave for choosing Colorado as the location for their company fell into two categories. Fifty-eight percent indicated that their company had located in the state because the owners were already Colorado residents. The remaining 42 percent stated that it was the characteristics of the community that prompted their decision. These respondents cited "the proximity to bicycle customers," "the great cycling community" and the "athletic lifestyle" of Colorado residents as the primary reasons for their location decision. In fact one company representative indicated that the decision to relocate its corporate headquarters from another state was made specifically because of the image of Colorado as a cycling community.

Bicycle product manufacturing companies in Colorado report total annual revenue of $822.5 million. Although 45 percent of these companies produce other products in addition to bicycles (typically other sporting equipment or clothing), $762.7 million, or 93 percent of the total revenues are attributed to the production and distribution of bicycles and bicycle-related products.

In total, the bicycle-related manufacturing and assembling companies employed 552 full-time-equivalent employees at their Colorado sites. The annual payroll for these employees totals $19.5 million. The average annual pay per full-time equivalent (FTE) job is $35,326, although this figure is difficult to interpret since the employees include both assemblers and management (and perhaps owners). Since 93 percent of total revenues are attributable to bicycle activities, the production and distribution of bicycles in the state adds 513 FTE jobs and a payroll of $18.1 million to the state economy.

Twenty-seven percent of these companies indicate that they primarily ship their products to distributors who then sell to retail enterprises. Approximately two-thirds of these manufacturers ship directly to bicycle and sporting good shops. The remaining nine percent ship the components that they produce to other manufacturers who assemble final products. In addition, some make their products available to competitive cyclists as sponsors, and to the general public directly via mail-order.

II. Retail Sales of Bicycles and Accessories in Colorado

Purchases of sporting goods make up a large part of Colorado's retail trade. In 1997, total sales of sporting goods totaled $806 million, just over one percent of all retail sales in the state (Colorado State Department of Revenue). In the U.S. similar figures show that the 24,000 sporting goods and bicycle shops nationwide sold 0.8 percent of total retail sales (U.S. Department of Commerce). Other national statistics show that nearly eight percent of all sporting goods purchases are bicycle related (U.S. Department of Commerce, 1995).

Because the Standard Industrial Classification codes lump together sales by sporting goods and bicycle shops, retail revenues for bicycle shops cannot be separated from the sales of other sporting goods shops in state revenue statistics. Furthermore, bicycles and bicycle accessories and services may be purchased from three broad types of retail outlets: bicycle specialty stores, sporting goods stores and general merchandise stores (including both discount and department stores).

In order to obtain specific information on bicycle and bicycle related sales we have gathered information from two sources: a survey of retail bicycle specialty shops and a household survey including information regarding bicycle purchases from all types of shops. We report results from the two sources separately.

A. Bicycle Specialty Shops

Our first data source is a survey that we conducted of bicycle specialty stores. These establishments included mail-order retail businesses, shops specializing in the sale of bicycles and related equipment and accessories (individual enterprises and chain stores), and large sporting goods stores that advertise bicycle sales. Responding shops provide data regarding employment, sales, and types of retail activity.

We have responses from all of the mail-order businesses, 62 of the specialty shops, and 59 branches of the large sporting goods stores. The 62 specialty shops constitute approximately forty

percent of all specialty shops in Colorado. Trade organizations we contacted estimated that the particular stores that responded to our survey make up almost 60 percent of the sales of all specialty shops. The 59 locations of sporting good stores we surveyed constitute approximately 50 percent of bicycle sales in this category.

Our second source of data is a survey of nearly 6,000 randomly selected households across Colorado. Respondents are queried about bicycle and bicycle accessory purchases during the past year. From this information we are able to assess the total spending by Colorado households and, most importantly, the fraction of bicycle and bicycle related products that are purchased from each of the three types of retail establishments.

Bicycle Specialty Shops in Colorado

Retail bicycle outlets in Colorado engage in a variety of activities, from selling bicycles and bicycling equipment to repairing and renting bicycles to selling other types of sporting goods. All of the mail order businesses sell bicycles, accessories and repair bicycles, but do not sell other sporting goods, and do not rent bicycles. The large sporting goods stores engage in all these activities, but not in every location. The proportion of specialty bicycle shops engaging in the various activities is listed below:

Table 1 Type of Retail Activities Among Bicycle Specialty Shops

Retail Activity	Percent of Stores
Selling New Bicycles	96.8
Selling Bicycle Accessories and/or Clothing	100.0
Repairing Bicycles	98.4
Renting Bicycles	40.3
Selling Non-Bicycle Sporting Goods	75.8

As Table 1 demonstrates, all specialty retail stores sell bicycle accessories. Ninety-seven percent sell new bicycles and 98 percent provide repair services. Forty percent provide rental bicycles for customers and just over three-quarters sell other types of sporting equipment.

Despite the fact that the majority of retail bicycle businesses sell other types of sporting equipment, bicycle revenue (all retail categories except “non-bicycle” sporting goods) accounts for most of their total revenue. The bicycle-related share of total revenues varies by type of shop and

location. Shops located in resort areas often combine bicycle retail activity in the summer with ski retail activity in the winter. General sporting goods shops and shops in mountain resort locations reported large fractions of their revenues came from non bicycle-related sources. Table 2 summarizes the proportion of revenues gained from bicycle accessory and bicycle sales and services by type of business.

Table 2 Percent of Revenue from Bicycle Sales by Type of Specialty Shop

Type of Specialty Shop	Percent of Revenue from Bicycle-Related Products
Mail Order Bicycle Retailers	100
General Sporting Good Stores	7
Bicycle Specialty Shops	83
Bicycle Shops in Mountain Resorts	67
Bicycle Shops	97
Bicycle and Ski Shops	32

Since only a fraction of most stores' activities can be attributed to bicycles and bicycle related items, we calculate revenue, employment and payroll measures by adjusting each shop's report by the fraction of total sales that are bicycle related.

Sales and Revenue at Bicycle Specialty Shops

In this section we estimate total bicycle related retail activity in the state by adding activity from mail-order shops and the prorated estimates of retail activity and employment by specialty shops.[1] The total 1998 revenue of all mail order and bicycle specialty shops in Colorado was $90 million. Deducting sales of non-bicycle-related products, we obtain an estimate of total annual bicycle-related revenues of $80 million.

Of this total, $1 million resulted from 33,000 days of bicycle rental. This implies that the average rental price was $32 per day. The remaining revenue is generated from the sale and repair of bicycles, and the sale of bicycle-related goods. Specialty bicycle shops and mail order outlets in Colorado sold approximately 50,000 bicycles in 1998.

[1]We multiply our survey totals by a factor of 1.67 to reflect statewide industry totals. The general sporting goods shops meeting our survey criteria are combined with household survey responses and included in the sporting goods section below.

Employment at Bicycle Specialty Shops

Shops in our survey provided information regarding the amount of full-time and part-time employment for both the summer and winter seasons.[2] These retail shops also indicated the proportion of all revenue from bicycle-related products, which is used to prorate total employment to reflect the portion of all employment that is due to bicycle-related retail activity. This calculation indicates that 448 full-time equivalent (FTE) workers are employed as a result of bicycle-related retail sales at these shops. The total payroll for these workers is $11 million. This suggests that the average full time worker in retail bicycle sales earns just over $25,000 annually.

B. Retail Sales of Bicycles From Other Retail Outlets

We conducted a survey of nearly 6,000 randomly selected Colorado households. Respondents were queried about their purchases of bicycles, bicycle accessories and expenditures on repairs during the last 12 months. Results indicate that expenditures by Colorado households totaled just over $200 million dollars statewide. Of this total, $120 million was spent on the purchase of bicycles, nearly $25 million was reportedly spent on repair and maintenance, and the remaining $55 million was spent on bicycling accessories.

Respondents were asked to indicate the source of their bicycle purchases from among the following options: general sporting goods stores and bicycle specialty shops, department stores, discount stores, toy stores, mail order or from friends. Among those who purchased bicycles, Table 3 reports the distribution of bicycle purchases from each source by percentage of bicycles bought and by percentage of dollars spent. The average price of a bicycle purchased from each source is reported in column three.

Coloradoans are most likely to purchase a bicycle from sporting goods and bicycle specialty shops. Nearly half of all bicycles are purchased from these shops. The average price of these bicycles is higher than those purchased from other sources ($619), therefore sporting goods and bicycle specialty shops account for 79 percent of total expenditures on bicycles. Discount stores and department stores combined sold nearly 30 percent of all bicycles bought by Colorado households, but the average price of bicycles from these outlets is significantly lower ($95 and $120 per bicycle, respectively), and as a result they received only 8 percent of the total dollars spent on bicycles. Small proportions of bicycles are purchased from toy stores (9 percent of bicycles sold, 2 percent of expenditures) and mail order sources (1 percent of bicycles representing 3.5 percent of expenditures).

[2]For our calculations, we assume that two part-time employees are the equivalent of one full-time employee, and that summer employment levels are maintained for four months of the year and winter employment levels are maintained the remaining eight months.

Five percent of bicycles are purchased from friends, at an average price of $172 per bicycle (not including any bicycles received from a friend at no cost). The remaining 4 percent of bicycles were purchased from other sources including more informal purchases such as from classified advertisements, garage sales, and second-hand stores.

Table 3 Distribution of Bicycle Purchases by Type of Retail Outlet

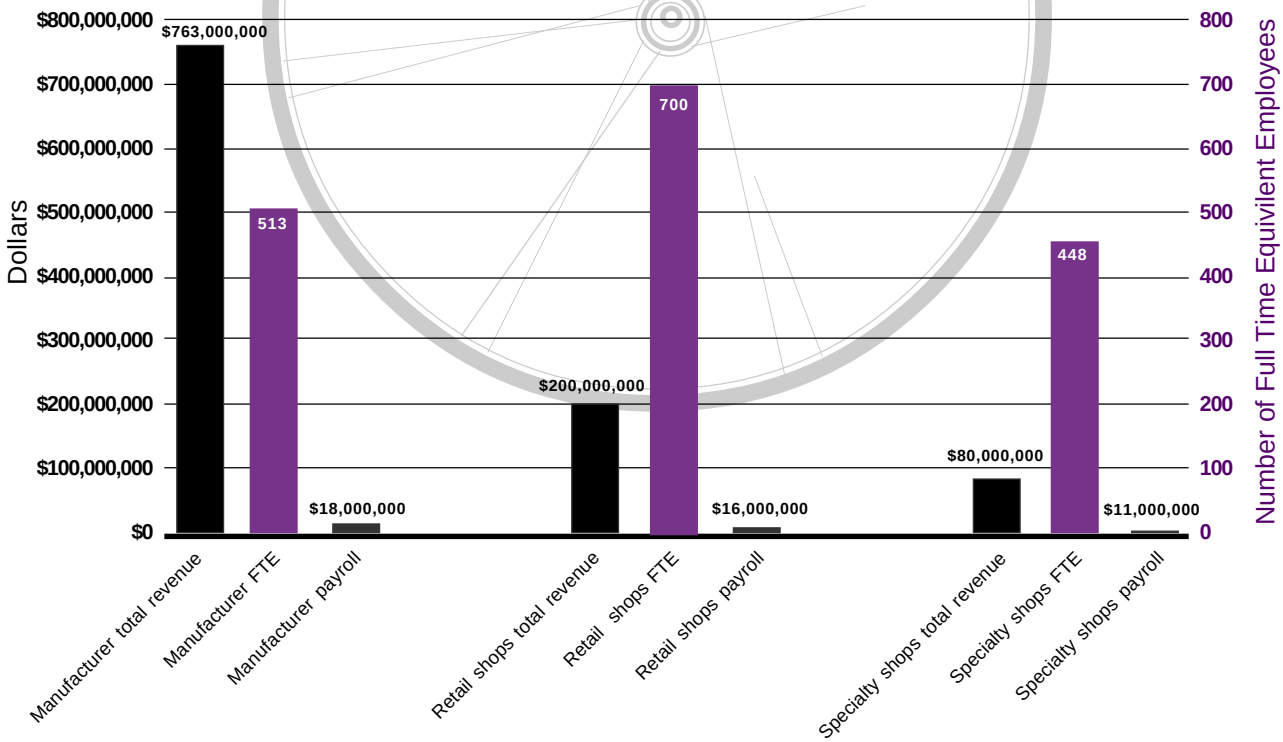
Type of Retail Outlet	Fraction of Bicycles Sold	Fraction of Bicycle Expenditures	Average Bicycle Price
General Sporting Good Store/ Bicycle Specialty Shop	49.8%	79.0%	$619
Discount Store	16.6%	4.0%	$95
Department Store	13.2%	4.1%	$120
Toy Store	9.4%	1.9%	$79
Mail Order	1.4%	3.5%	$987
Friend	5.3%	2.3%	$172
Other	4.4%	5.1%	$448

These expenditures contribute to the Colorado economy by creating jobs and income. We assume that expenditures at stores other than bicycle specialty shops generate employment at the average rate for all retail shops in Colorado. Given this, we estimate that the $200 million of bicycle-related retail and product sales generates 700 FTE jobs with an annual payroll of $16 million.

Summary of the Economic Impact of Bicycle Manufacturing and Retail Sales

Figure 1 summarizes the annual revenue, and employment and payroll from the manufacturing and retail sales of bicycles and bicycle-related products in Colorado. Bicycle manufacturers in Colorado report $763 million in revenue and employ 513 FTE at a payroll of $18 million. Total retail sales in the state are $200 million annually, supporting the employment of 700 FTE earning $16 million. Of this total, bicycle specialty shops account for $80 million in revenue, 448 FTE and $11 million in payroll. $200 million in retail bicycle sales is slightly higher than the total retail sales of motorcycles in Colorado, and about 20% less than total retail sales of recreational vehicles in the state.

Figure 1. Economic Impact of Bicycle Manufacturing and Retail Sales



III. Bicycle-Related Tourism

Tourism is an important industry in Colorado and outdoor activities play an important role in choosing Colorado as a tourism destination. In this section we detail bicycle-related tourism in the ski areas, vacations taken by Colorado residents, and the activities of companies that conduct bicycle tours in Colorado.

A. The Economic Impact of Bicycling in Colorado Ski Resorts

The ski areas have become some of the most lucrative tourist attractions in the state, accounting for over one-third of overnight tourist spending in Colorado (Longwoods, 1998). To accommodate the visitors generated by this sport, many mountain areas in Colorado have invested in ski lifts, mountain maintenance, lodging, restaurants, and facilities for entertainment and other visitor activities. Heavily utilized during the ski season, these facilities were unused or underused in warm-weather months; and many resort towns have responded by promoting summer activities. Currently, a wide range of activities is available in the high country. Visitors can fish and kayak in the rivers, play golf

and tennis, take a ride in a hot-air balloon, and attend rodeos and music festivals in addition to mountain biking. A report available from Colorado Ski Country U.S.A. identifies the summer recreational activities provided in many of Colorado's resort towns. As the most frequently mentioned recreational activity available (along with fishing and golfing), ninety percent of the resorts surveyed by Colorado Ski Country U.S.A. indicated that visitors could engage in mountain biking in the summer. However, retail facilities are not always available to support these activities. The same report indicates that there are no bicycle rental shops in 20 percent of the resorts and only slightly over half of the resorts allow bicycles on their lifts.

In this section we detail the impact of bicycling activities on the economic circumstances of ski resorts in Colorado during the 1998 summer season. To gather this information we conducted phone interviews with the Chambers of Commerce, visitor centers and resort management personnel at thirteen major ski resorts in Colorado. In addition, we conducted a survey of retail shops in these resort towns. To ensure confidentiality of responding resorts, we report only summary statistics regarding the length of the bicycling season, total summer visitors, number of visitors who specifically engaged in bicycling during their visit, bicycle rental activity and revenue generated by bicycles on the ski lifts, employment related to bicycling, advertising to promote bicycling in these resorts and summer bicycling events.

The "summer season" in these resorts typically spans the months from May to October. The length of the bicycling season varies, however, since wet soil conditions prohibit the use of bicycles on mountain trails. Most resorts report a bicycling season of 100 - 120 days. Of the thirteen resorts that we surveyed regarding summer bicycle activity, nine run their ski lifts in the summer and allow bicycles on the lifts for use on the mountains.[3] These nine resorts actively maintain trails on the mountains and some make rental bikes available at the lifts and with hotel packages. In addition, the resorts that encourage bicycling devote employee time and financial resources to advertise this recreational opportunity both within Colorado and in other states and countries. The following estimates are reported for the nine resort towns we surveyed that actively promote bicycling. Additional estimates of informal mountain bike riding among state residents will be incorporated from the household survey.

[3]Two resorts indicated that they could not allow bikes on the mountain during summer 1998 because of necessary maintenance work to improve the bicycling trails. Because they had engaged in the promotion of summer bicycling in the past and are expanding for the future, we included information averaged from their 1996 and 1997 summer seasons in our summary statistics.

Summer Tourism and Visitor Expenditures

All Tourists. The resort towns report a total of 1.38 million tourists visiting during the summer season.[4] Those resorts that could distinguish in-state from out-of-state visitors report a surprisingly consistent estimate that 70 percent of all visitors at these resort towns are from out-of-state. The individual percentages vary from 68 percent to 72 percent.[5]

Tourists Engaged in Bicycling. Based on estimates by resort personnel and visitor surveys conducted at some resorts, approximately 699,000 of these visitors engaged in biking during their resort vacation. In other words, just over 50 percent of all summer visitors to Colorado ski resorts that promoted bicycling participated in bicycling activities.

In order to assess the economic impact of these visitors in terms of spending, one must know the percentage of tourists who stay overnight versus those that visit for one day only. Data compiled from resorts on the breakdown of overnight and day visitors indicate that 419,000 of these visitors stayed overnight, and the remaining 280,000 were day visitors. The total number of nights spent at resorts by those engaged in bicycling is 955,400. The typical number of nights spent by overnight visitors varied from 2 nights on average at some resorts to nearly 5 nights at others.

These visitors contribute to the resort economies by their spending on lodging, meals and a variety of shopping and entertainment purchases. In order to capture this spending we employ estimates of average tourist expenditures in Colorado. We use information from two sources that allow us to calculate lower-bound and upper-bound estimates of tourist spending by those who participate in bicycling in these resorts.

The lower-bound calculation of spending by overnight visitors to Colorado is obtained from two reports prepared for the state of Colorado, which indicate that in 1997, 25.1 million overnight visitors to Colorado spent an estimated $7.1 billion during their trip.[6] On average, an overnight

[4]This is an underestimate because many of the respondents relied heavily on occupancy information obtained from hotels and other rental accommodations.

[5]The estimates of out-of-state visitors come from our surveys of individuals at the resorts who have collected this information, and in one case from a study that was conducted for the Aspen Resort Chamber by Leisure Trends Group (February, 1998).

[6] Travel and Tourism in Colorado: A Report on the 1997 Travel Year is a report prepared for the Colorado Tourism Board and the Colorado Travel and Tourism Authority by Longwoods International. Colorado Travel Impacts: 1997 was prepared by Dean Runyan and Associates, 1998.

visitor in Colorado spends $283 during the length of their stay.[7] At this rate of spending, we estimate that the 419,000 bicyclists who stayed overnight contribute nearly $118.6 million dollars to the various commercial enterprises serving travelers.

As an alternative, we obtained estimates of average expenditures per day spent by those staying overnight at one particular resort town.[8] The estimate of $179 per night for the 955,400 nights spent by bicyclists in Colorado resort towns yields total expenditures of $171 million. This represents our upper bound for spending by overnight bicyclists.

The same source provided a spending estimate of $79 by an average one-day visitor. This suggests that the 280,000 day-only bicyclists spend approximately $22.1 million during the summer season. Adding this spending to the lower- and upper-bound estimates of overnight visitor spending suggests that bicycling tourists spend between $140.7 million and $193.1 million at Colorado resorts.

Tourists in Resorts Primarily Because of Bicycling. To assess the magnitude of the revenues created solely by the availability of biking, one must calculate the number of tourists who would not have visited Colorado mountain resorts, if there were no bicycling opportunities. A survey of tourism in Aspen and a separate survey of tourism state-wide both indicate that golfing and mountain bicycling are of equal importance to visitors of Colorado.[9] Furthermore, 20 percent of visitors to Aspen indicated that outdoor activities were the primary reason for their trip. An additional 24 percent stated that the opportunities for outdoor activities were very important in their choice of destination. A survey of tourists in Winter Park indicated that 25 percent of visitors stated that mountain biking was the primary reason for their visit.[10] We estimate that approximately 276,400 of these visitors would have altered their vacation decisions, were bicycling not available.

Of the 276,400 tourists coming to resorts primarily for bicycling, our survey results suggest that 110,700 visitors bicycled at the resorts for one day only and the remaining 165,700 stayed

[7]This estimate reflects an average of those staying in hotels and other commercial lodging and those staying with relatives or in campgrounds. This estimate also includes individuals staying overnight in Colorado on business, but predominantly reflects expenditures by vacationers. We expect that expenditures are higher for those staying in mountain resorts, but rather than make an adjustment to this average, we use it as our lower-bound estimate.

[8]This resort conducted an extensive survey of its visitors. Their estimate, which is used here as our upper bound, is more heavily weighted toward those staying in commercial hotels and hence represents an upper-bound estimate.

[9] Leisure Trends Group, 1998. Aspen Chamber Resort Association Summer Visitor Study.

[10] Hill and Tashiro Marketing and Advertising Inc., 1998. Grand County Tourism Board Lodging Research: Occupancy and Average Daily Rate 1992-1997.

overnight a total of 377,500 nights. Using the spending averages detailed above, these visitors spent between $55.6 million and $76.3 million at Colorado resorts.

Tourist Summary. In summary, we identify 699,000 visitors who traveled to Colorado mountain resorts in 1998 and participated in bicycling activities. Approximately 70 percent of these bicyclists came to resort towns from out-of-state. Tourists who engaged in bicycling during their vacation at a Colorado resort spent between $141 and $193 million dollars. Of the 699,000 who bicycled during their stay, 276,400 were attracted primarily by the availability of bicycling. Our estimates of the total vacation expenditures by these bicyclists range from nearly $56 million dollars to just over $76 million dollars. These estimates reflect direct expenditures only and are underestimates of the true economic impact to the degree that direct expenditures have multiplier effects.[11]

Bicycle-Related Employment

The presence of bicycling in resort towns in Colorado creates job opportunities for Colorado residents. These jobs can be grouped into two categories: direct bicycle-related employment and indirect bicycle-related employment. Direct bicycle-related employment consists of those individuals who provide bicycle rental, sales and repairs, those who operate the lifts for bicycle riders, those who are employed to organize bicycle events, and those who are employed to deal directly in other ways with bicycle riders in resort towns. Responses from resort ownership, chambers of commerce, event organizers and retail bicycle establishments provide the employment and payroll information summarized here.[12] The nine resorts reporting bicycle activity indicate that 65 full-time summer employees (21.6 full-year FTE) are engaged in providing direct bicycle-related services to visitors. Payroll for these employees during the summer season when they provide these services is $531,000. Therefore, on average, each full-time-equivalent employee is paid $8,200 for his/her work during the summer season. Many of these workers are part-time employees who also work at the resort during ski season. Some are full-time salaried employees whose time spent on bicycling is calculated as a pro-rated portion of their annual salary.

Retail bicycle shops located in the resorts also provide direct bicycle-related employment. We surveyed 31 shops in the resort areas (both specialty shops and locations of chain sporting goods

[11]We do not attempt to estimate the impact that these expenditures have on the spending of resort residents whose income is increased through these expenditures. We do, however, acknowledge that these tourist expenditures create job opportunities for Colorado residents in resort towns. This issue is addressed in our employment estimates.

[12]Again, these are underestimates of direct bicycle-related employment and payroll effects because the retail shop and event sponsor interviews are incomplete.

stores) that account for over 75 percent of the resort bicycle shops. They provide information for us regarding the percentage of their business that is due to bicycle-related products and services that enables us to calculate the proportion of total employment that is due to bicycle-related sales. Twelve of these shops indicate that the sale of bicycles is their primary business, the remaining nineteen shops attribute more than half of their revenues to the sale of other sporting equipment, primarily skis. We estimate that retail shops in resort towns in Colorado employ 82 FTE at a payroll of $3 million.

Tourists engaged in bicycling create employment not just because there are workers needed to provide bicycle-related services, but also because these tourists require other goods and services as well. This is a measure of the indirect bicycle related employment. In the section above, total spending by tourists engaged in bicycling was estimated to fall between $141 million and $193 million each summer. To convert these expenditures into indirect-bicycle-related employment, we rely on estimates of the employment created by tourism expenditures reported in *Colorado Travel Impacts* (Dean Runyan Associates, 1998). They estimate that each $100,000 of visitor expenditures at Colorado mountain resorts create $23,600 of income for 1.49 full-year employees.

The midpoint of the lower- and upper-bound expenditure estimates is $167 million. Using the employment and payroll multipliers above, these expenditures would support the employment of 2,488 year round or 7,465 summer-only workers earning a total of approximately $39.4 million.

Bicycle Rentals, Sales and Lift Activities

Nine of the thirteen responding resort locations provided visitors with bicycles access to lifts running during the summer season.[13] These resorts constructed and maintained trails, and operated the lifts during the summer season. All but one of these nine resorts also had rental bicycles available on the mountain or in town. Resorts that reported lift operations indicated that the lifts typically ran 80-100 days during the summer season. Access to the mountain, especially for bicycle riders was restricted when wet soil caused an increase risk of trail damage or poor riding conditions.

Prices for lift tickets varied, from the two resorts offering rides up the mountain (with or without a bicycle) at no charge, to the highest priced summer lift ticket of $11. Among those that charged, the average ticket price was $8. Totals for the six resort areas that provided information on lift activity indicate that 98,000 bicycle riders rode the lifts and rode their bikes on the mountains. Lift ticket sales for these riders generated $637,070 in revenue for those who charged.

[13]These numbers include one resort that indicated that its lift ran only a couple of times during the entire summer by arrangement with groups of riders.

Bicycle Advertising by Ski Resorts

Most of the resorts have recognized the importance of encouraging summer visitors and have large advertising budgets to attract these tourists. Estimates of total advertising expenditures to promote the availability of recreational and competitive bicycling opportunities at the ski resorts have been obtained through interviews with personnel from the resort ownership, Chambers of Commerce and event sponsors. Responses were obtained from seven of the nine resorts that provide organized bicycling opportunities.[14] Total expenditures on advertising that specifically promoted bicycling were $316,000 for the 1998 summer season. Average spending on the promotion of bicycling per resort is slightly less than $40,000 per summer season. This includes one resort that reported no expenditures in 1998 but indicated that they were developing a campaign and budget for future years.

These expenditures included the purchase of radio, television and print advertising both within and outside of Colorado. Obviously most of this advertising did not feature bicycling exclusively, but the estimates were prorated to reflect the importance of bicycling as part of the advertisement. Other projects included the printing of maps and brochures highlighting trails and lift availability.

Ski Area Summary

Providing tourists with opportunities for bicycling in the Colorado high country generates revenues for ski resorts and towns and creates jobs and income for Colorado mountain residents. Our current estimates suggest that 699,000 people visit resort towns and engage in bicycling during their stay. Slightly over half of these, 276,400, visited a resort for the primary purpose of bicycling. Seventy-percent of these tourists come from out-of-state and, on average, 60 percent of all visitors stay one or more nights at these resorts.

To encourage tourists, many resorts actively promoted the bicycling opportunities available during their summer seasons. Expenditures made by resorts and chambers of commerce for advertising and informational materials devoted to bicycling totaled $316,000 for the 1998 summer season.

These activities create employment at the firms engaged in the direct provision of bicycle-related goods and services in the resort towns. Direct employment estimates indicate that 103 full-time employees worked to promote bicycling at resorts and towns and at retail shops. The total

[14]These totals are very complete estimates of advertising expenditures to encourage bicycling as a recreational pursuit during vacation, except that two resorts did not provide this information. In addition, some data are as yet unavailable from event sponsors regarding advertising and promotion expenditures for races, camps and events. These numbers will be added in the final report.

payroll for these employees was $3.5 million. In addition to the employment resulting from the direct provision of bicycling activities, additional employment opportunities are created if bicycling attracts tourists to the area. Expenditures by the 699,000 visitors engaged in bicycling ranged from $141 million to just over $193 million last summer. These expenditures created employment at lodging establishments, restaurants, retail shops and other tourist related businesses. On average, nearly 7,500 full-time summer jobs are created by these expenditures, generating nearly $40 million of income.

Although the degree to which resorts we surveyed actively promote summer bicycling through advertising, scheduling bicycling events, running lifts and maintaining bicycle trails varies substantially among Colorado ski resorts, it is safe to say that the focus on bicycle-related tourism is increasing. Resorts that already actively promote bicycling plan to maintain or increase their expenditures, and many that have not actively pursued the cycling tourists in the past are making plans to begin in the near future.

B. Bicycle-Related Vacation Spending by Colorado Residents

To capture bicycle-related vacation spending in areas other than ski resorts, we surveyed Colorado households to gather information on any vacations they may take (both in-state and outside of Colorado) that are related to bicycling. Nearly 10 percent of Colorado households indicated that they had taken a bicycle-related vacation within Colorado in the past 12 months. Among those households who did, the typical household spent $360 per vacation. Spending on bicycle-related vacations within Colorado totaled $48 million dollars over the past 12 months. (It should be noted that these expenditures include those that Coloradoans make on bicycle-related vacations at the ski resorts.)

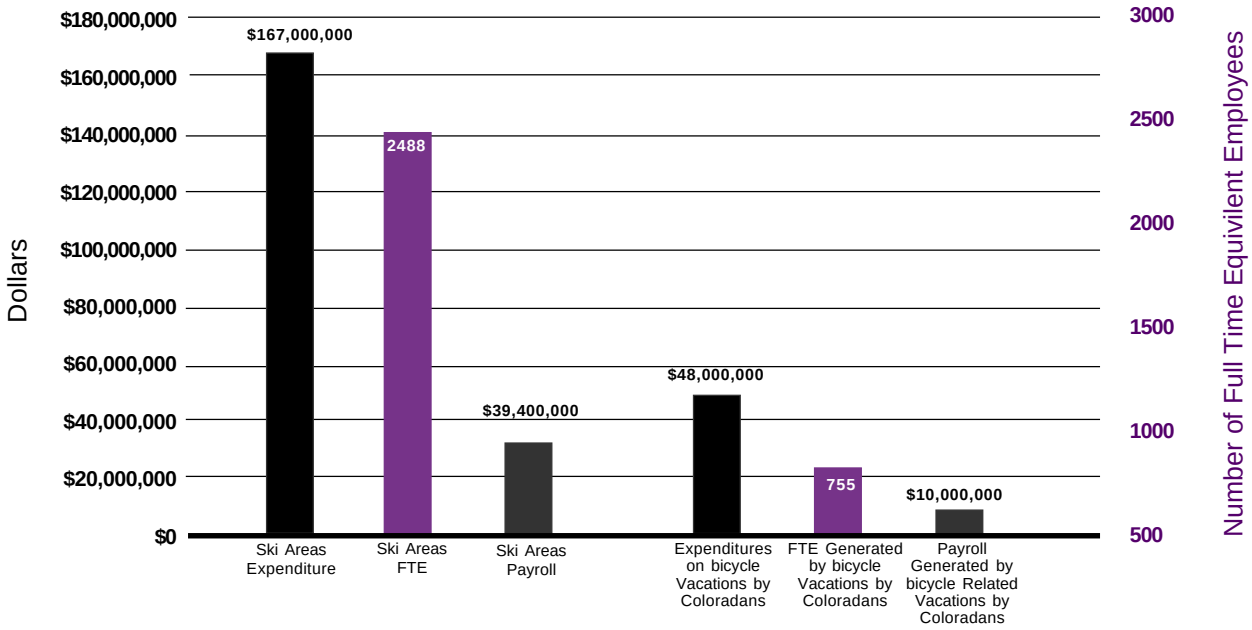
These vacation expenditures also generate jobs for Colorado employees. Specifically, $48 million of vacation spending creates 755 FTE jobs for workers who supply goods and services for vacationers. These 755 employees earn approximately $10 million in income as a result of these expenditures. Some of these are employees in Colorado ski areas and so are also counted in the employment estimates in the previous section.

Though not providing a direct impact on the Colorado economy, our survey also provides information on bicycle-related vacations that Colorado residents take outside the state. Just under 5 percent of Colorado households indicated that they had taken an out-of-state bicycle trip and on average spent $950 per trip.

Summary: The Economic Impact of Bicycle-Related Vacations

Summer vacationers in Colorado often bike in the high country. Nearly $167 million is spent by vacationers who bicycle in Colorado ski areas. This spending creates over $39 million in income for 2,488 FTE employees, both in the retail bicycle or bicycle service industries and in industries that provide general services to tourists. Nearly 70 percent of the visitors to these mountain towns are from out of state. Total vacation spending by Coloradoans is $48 million per year. This supports 755 FTE at a payroll of $10 million. There is some bicycle-related tourism that is not included in our calculations. Specifically, out-of-state tourists who bicycle, but do not visit Colorado ski areas are not part of our vacation estimates.

Figure 2. Economic Impact of Bicycle Related Vacations



C. Bicycle Tours in Colorado

We located nearly 20 companies that offer bicycle tour packages in Colorado. The fraction of their business that is devoted to the sale of bicycle tours varies from ten percent to 100 percent. The bicycle tours offered by these companies range in length from 2 hours to ten or more days. In total, 3,400 riders participated in the tours in 1999 accounting for 5,300 tour days. On average, approximately 50 percent of the participants come from out-of-state to bicycle in Colorado. The typical price for a tour was just over $100 per day. These prices often included meals, lodging, and a guide. Total revenue generated for bicycle tours in Colorado was $640,000. The employment at these companies that is attributable to biking is about 55 FTE. One of the companies is run largely with volunteers.

IV. Bicycle Races and Events in Colorado

Bicyclists in Colorado engage in a variety of organized activities from road and track racing to charity and club rides. These events are detailed in this section. The data were gathered from phone interviews with officials from the Bicycle Racing Association of Colorado, the National Off-Road Bicycling Association, the Velodrome facility in Colorado Springs, representatives from bicycle clubs in Colorado and the sponsors/organizers of charity and non-charity organized rides.

A. Road and Track Racing

Participants in bicycle road and track races in Colorado are typically members of the United States Cycling Federation (USCF) and the Bicycle Racing Association of Colorado (BRAC). Annual membership in these associations is $35. There are approximately 2,000 Colorado members, paying a total of $70,000 in membership fees in 1998. These organizations report 34 road and track races held in Colorado (often jointly sanctioned and cooperatively sponsored in conjunction with the NCAA) during 1998[15]. In total these 34 events took place on 58 days. Ten of these races were multiple-day events, ranging from two to six days in length.

The average number of participants per race-day was 352, ranging from a high of 2,500 to a low of 76, for a total of 11,969 riders. 5,248 riders rode in the single-day events, and 6,721 riders rode in multiple day events. Entry fees for these events ranged from $10 to $75 depending on the event. The average entry fee was $17.86, and the total amount paid in fees was just under $207,000.

The presence of the race provides some direct race-related employment, though the number of jobs created is minimal. Each race employs between 2 and 9 paid race officials per race day. In total this represents 158 officials for an average of 1.71 days per race (276 total official workdays). On average, officials are paid a flat daily rate of approximately $50 plus mileage expenses. Total payments to race officials for all 34 races were $15,170.

To assess the economic impact of attracting riders to these races in terms of indirect expenditures and employment, we adjust spending and employment estimates of typical tourists to reflect the spending of those engaged in racing. Association officials estimate that approximately 10 percent of racers come to Colorado from out-of-state to participate in these races. Assuming that all multiple day racers, and 10 percent of all single-day race participants stay overnight at the location of the race yields an estimate that 16,611 overnight stays are attributable to road and track

[15]Some of these races are track races at the Velodrome facility in Colorado Springs. We were unable to get any statistics on Velodrome track usage from the operators. Therefore, all track activity that is not sanctioned by BRAC and USCF is not included in these estimates.

races being held in Colorado.[16] Because they are engaged in racing throughout the day, race participants are assumed to spend far less than the typical day visitor or overnight tourist. Our estimates suggest that day-only race participants spend $26 per race day ($136,400 for the 5,248 day only participants) and overnight racers spend $60 per day ($996,660 for 16,611 participant overnights). The total expenditures generated by participants in road and track races is $1,133,060. Since races take place throughout Colorado, we use statewide averages for expenditure/employment ratios (Longwoods). As with other types of tourist expenditures, employment is created. $1,133,060 in expenditures is estimated to employ 17 FTE earning $239,000.

B. Off-Road Events

NORBA (National Off-Road Biking Association) reports Colorado membership of approximately 2,200. Fees are $35 per member and total Colorado membership fees for 1998 were $77,000. During 1998 NORBA conducted 46 events in Colorado that attracted nearly 6,900 riders. Total entry fees were $140,000 and the average fee per event was $20.

Accounting for the multiple-day events we estimate 3450 riders in one-day events, and 6,900 overnights associated with the multiple-day events. Using the same expenditure estimates as above these off-road participants are estimated to spend $503,700. These expenditures create 8 FTE jobs paying annual wages of $107,000.

C. Charity and Public Rides

We gathered information from the ten largest charity bicycle rides in Colorado. Typically, these events are put on in conjunction with businesses providing sponsorship. Riders are charged a registration fee to ride, and often gather individual sponsors who pledge donations to the ride charity. Half of the rides were single day or night events. The remainder lasted anywhere from two to seven days.

These ten charity events drew 22,000 riders in 1999. The average rider rode for just over two days. Organizers for the large multi-day rides indicated that approximately 20 percent of their riders came from out-of-state to participate. The average registration fee for a charity ride was $26 per day. Registration usually included meals and souvenirs, and lodging – often camping – for the multi-day rides. Registration fees paid in 1999 totaled $1.2 million. Pledges, donations and fees in excess of costs raised $2.2 million dollars for the represented charities.

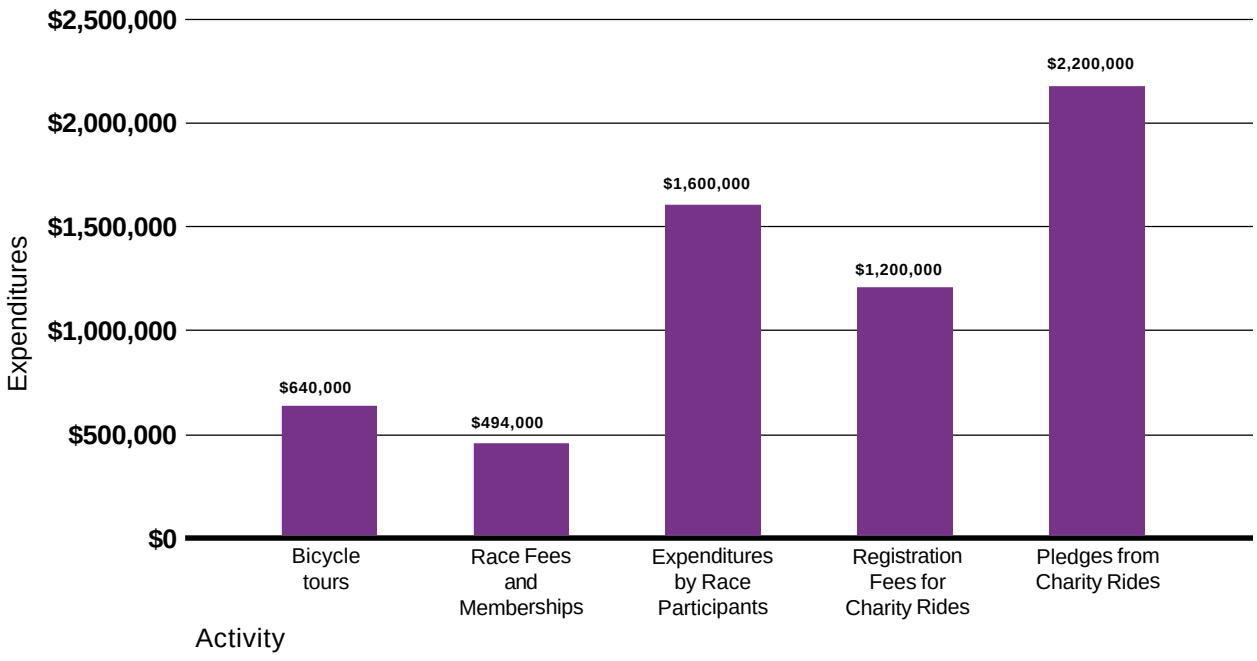
[16]This estimate of tourism accounts only for race participants. Data on spectators are unavailable.

The employment effect of these events is negligible. Approximately 65 workers were paid to organize these ten events. However, an additional 1,500 volunteers donated their time to make these rides successful.

Summary of the Economic Impact of Bicycle Events

Figure 3 illustrates the revenues generated by bicycle tours, races and charity rides that take place in Colorado. Riders in organized tours paid $640,000 to ride in Colorado in 1999. Off-road and track racing combined generated nearly $500,000 in membership and race fees. Participants in these races spent an additional $1.6 million for food lodging and other expenditures. $1.2 million in registration fees were paid for participation in charity rides which generated over $2 million in pledges.

Figure 3. Expenditures on Various Bicycle Activities



V. Costs of Bicycle Crashes

While bicycles positively impact the Colorado economy in the many ways discussed above, there are some negative aspects of bicycling. In this section we document the prevalence of bicycle crashes and the expenses incurred. Our household survey respondents were asked about crashes that they have been involved in while riding a bicycle.

Crashes on Unpaved Trails

Nearly half (46.47 %) of all Colorado bicycle riders report ever having had a crash on an unpaved trail, and many riders (27%) have experienced more than one in the last twelve months. Though many Coloradoans have experienced a crash on an unpaved trail, the consequences typically are not severe. As shown in Figure 4, less than five percent indicated that their crash resulted in severe or worse injuries. Fourteen percent indicated that they received no injuries at all, and 66.5 percent reported only minor injuries. These reports are reinforced when we look at the expenses involved in a bicycle crash on an unpaved trail reported in Figure 5. Three-quarters of the riders who were involved in this type of crash incurred no expenses as a result. Only 5 percent incurred expenses of greater than $100. The average amount spent per crash was $51.

Figure 4. Severity of Injury in Last Bicycle Crash on an Unpaved Trail

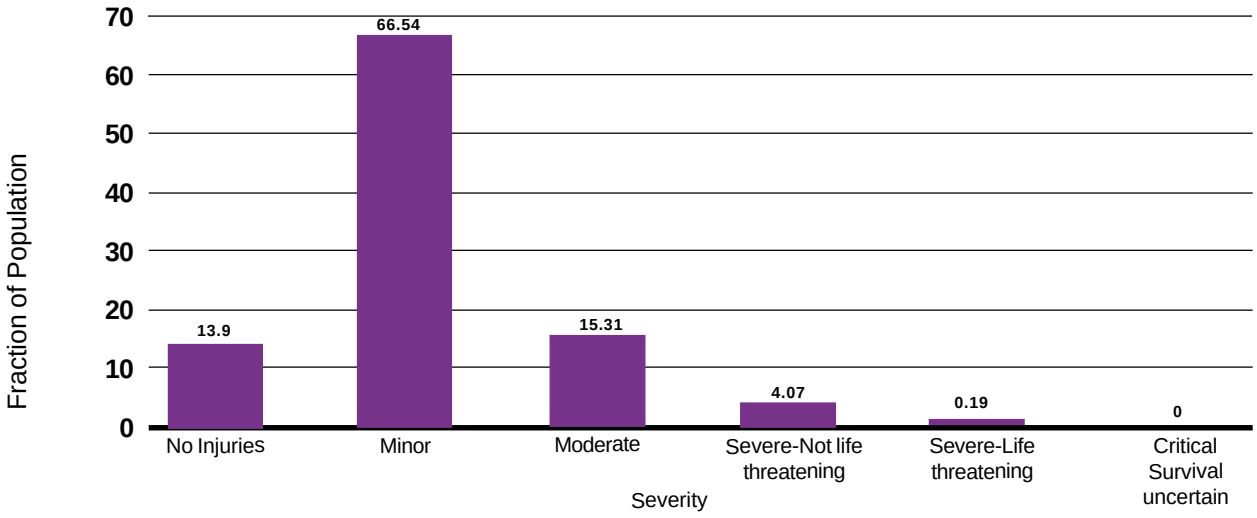
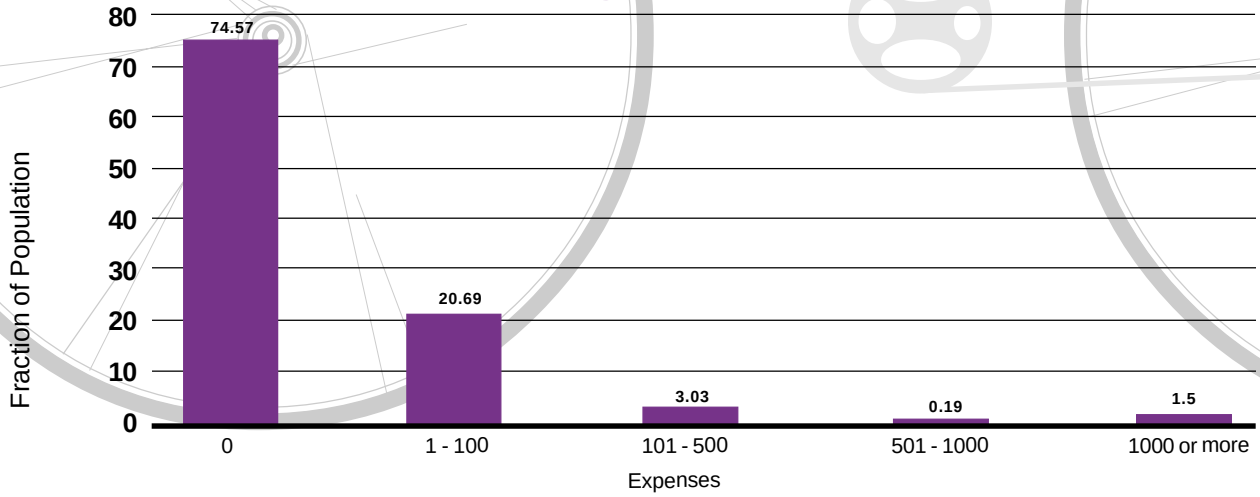


Figure 5. Total Expenses Incurred in Most Recent Bicycle Crash on Unpaved Trail



Crashes on Paved Roads and Trails

Respondents were asked similar questions to those just above regarding crashes that occurred on a paved road or trail. Almost exactly half (49.98%) of respondents who ride bicycles reported that they had ever crashed on a paved road or trail. Within the last 12 months, 28 percent have experienced such a crash, with 10 percent involved in more than one crash. As detailed in Figure 6, most of these crashes were not serious, 73 percent resulted in either no injuries or only minor injuries. Less than one percent resulted in life-threatening or worse injuries. The average expense of the crash, among those involved in a crash on a paved surface was $123. As shown in Figure 7, however, 68 percent incurred no expenses, while 2.76 percent incurred expenses that exceeded $1,000.

Figure 6. Severity of Injury in Last Bicycle Crash on a Paved Trail/Path

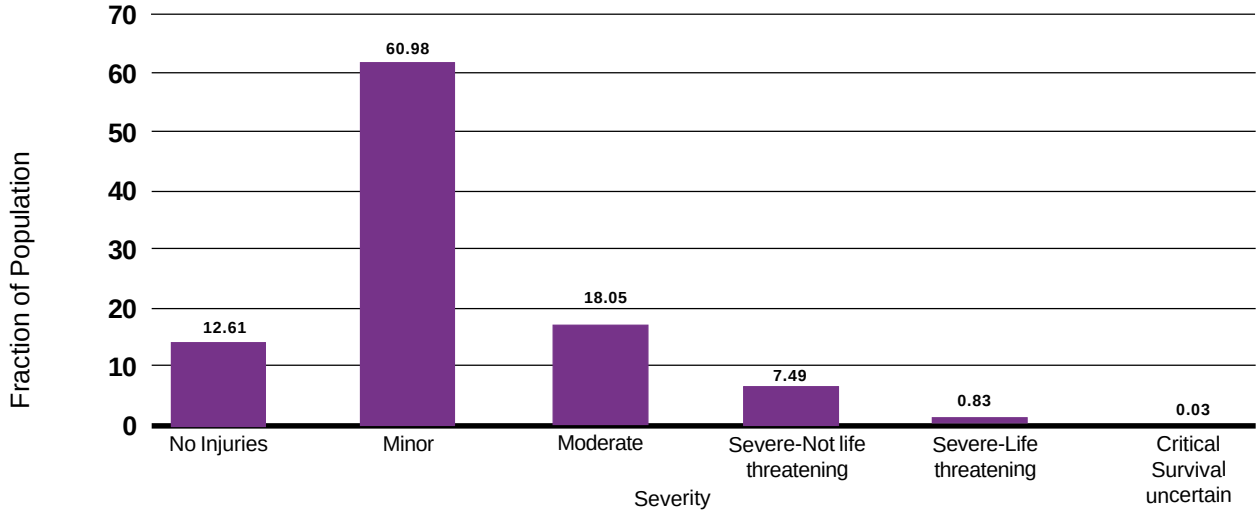
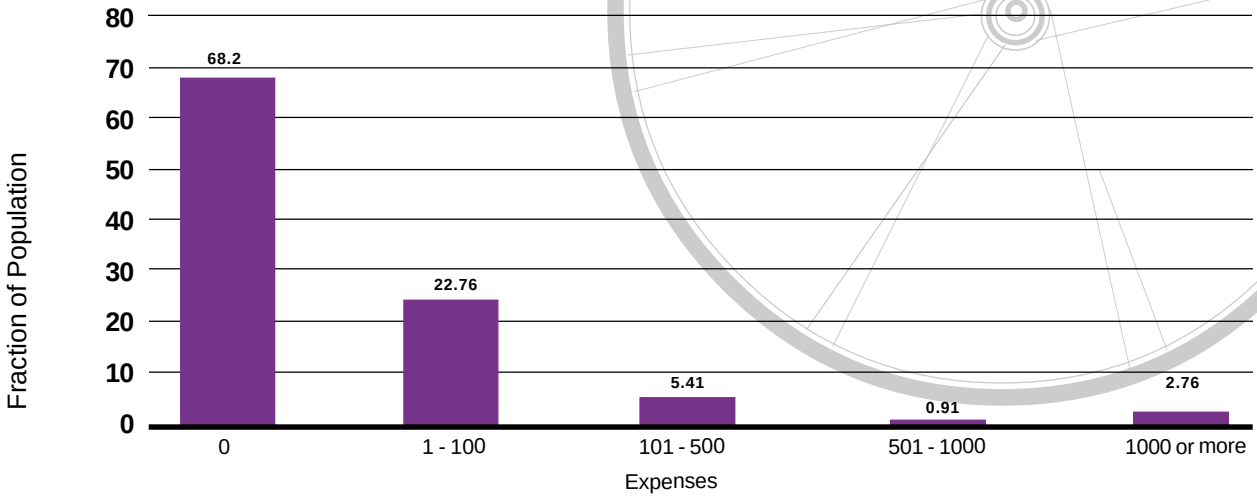


Figure 7. Total Expenses Incurred in Most Recent Bicycle Crash on Paved Trail/Path



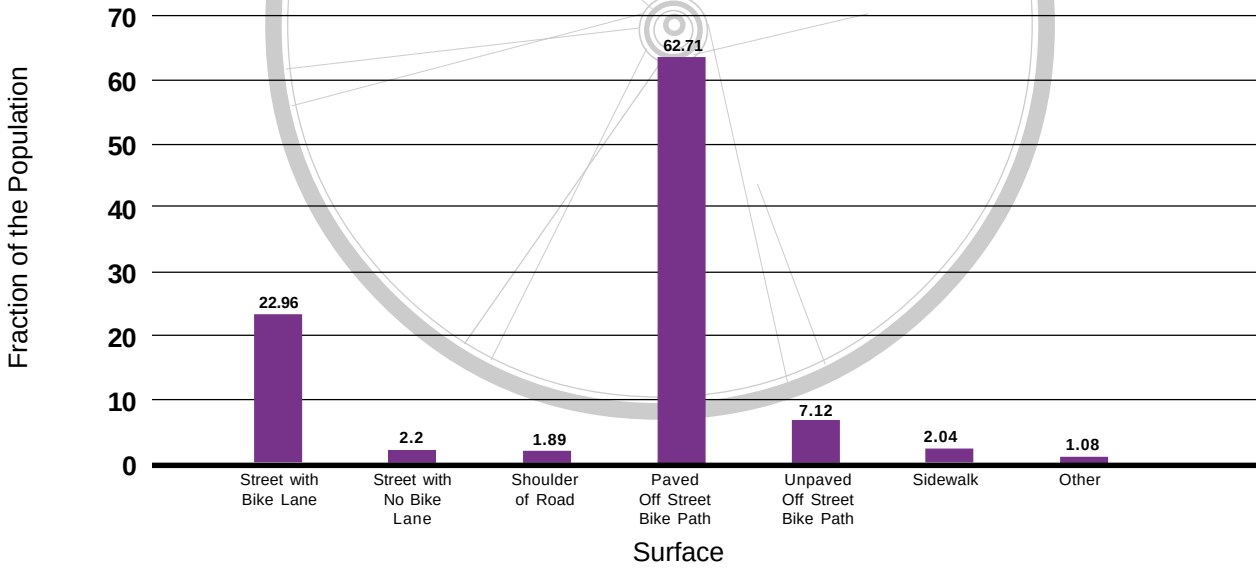
VI. Preferences Regarding Bicycling

We used our household survey to inquire about individuals' preferences as they pertain to bicycling. Respondents were asked about their satisfaction with existing facilities and conditions for bicycling, as well as their desire for increased funding and preferences for funding sources.

A. Preferred Surfaces for Bicycling

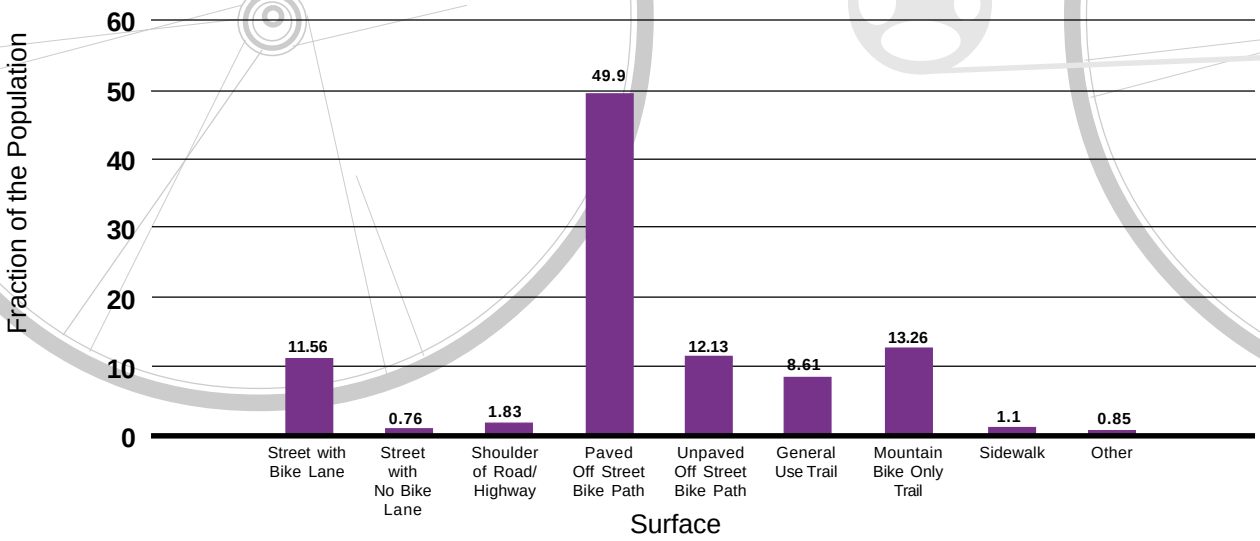
When asked about the riding surfaces they most preferred, bicyclists in Colorado left no doubt: paved off-street bicycle paths. Especially for transportation purposes, survey respondents overwhelmingly preferred this surface. As illustrated in Figure 5, nearly two-thirds (62.7 percent) of Colorado bicyclists prefer to ride on an off-street bike path when they are riding to work, school or for a utility trip. Just under 23 percent prefer riding on the street with a bike lane. An unpaved off-street bike path was the choice of slightly over 7 percent of bike riders, and only a few indicated that they preferred to ride on a street with no bike lane, the shoulder of a road or a sidewalk.

Figure 8. Prefered Surface for Work, School or Utility Trip



Respondents were asked about the surface they preferred when riding for recreation and exercise, and the results are slightly different (Figure 9). Although the most popular surface was again paved off-street bike paths, other surfaces were viewed more favorably when riding for recreation. Almost half of the bicyclists (49.9 percent) indicated that they preferred paved bike paths. Thirteen percent preferred riding on a mountain bike only trail, 12 percent preferred an unpaved off-street bike path and 12 percent most enjoyed riding on a street with a bike lane. A general use trail was preferred by 9 percent of the respondents. Less than 2 percent each indicated that they preferred to ride for recreational purposes on a street, road shoulder or sidewalk.

Figure 9. Preferred Surface for Recreation or Exercise Trip



B. Satisfaction with Bicycling in Colorado

Respondents were asked to rate the degree of satisfaction with 15 different aspects of their bicycling experiences within Colorado. These aspects include the courtesy of others, bicycle parking, and the physical condition of the surfaces on which they ride. They were to indicate their satisfaction on a scale from one to five, with five representing "very satisfied" and one representing "not satisfied."

Table 4 indicates the fraction of respondents indicating either the highest or lowest level of satisfaction with each aspect of bicycling. The features that generated the highest frequency of negative responses were: the courtesy of motorists, debris on the roads, conditions at road intersections and the condition and width of road shoulders. Nearly 30 percent were dissatisfied with the width of road shoulders, and many are also not satisfied with the condition of the road shoulders. Only 1.8 percent indicated they were very satisfied with the condition of road shoulder surfaces, while 19.4 indicated that they were not satisfied.

Table 4 Satisfaction with Aspects of Bicycling in Colorado

	Percent Very Satisfied	Percent Somewhat Satisfied	Percent Somewhat Unsatisfied	Percent Not Satisfied
Bicycle Parking at Work	12%	9%	7%	11%
Bicycle Parking at School	8%	8%	4%	4%
Bicycle Parking at Other Locations	3%	9%	22%	13%
Courtesy of Motorists	1%	7%	28%	28%
Courtesy of Other Cyclists	12%	12%	12%	5%
Courtesy of Walkers, Runners and Skaters	7%	7%	12%	6%
Crossings at Road Intersections	2%	2%	25%	13%
Railroad Crossings	5%	15%	11%	7%
Debris on Roads/Paths	4%	19%	22%	13%
Speed Bumps and Drainage Grates on Roads	3%	15%	19%	10%
Road Surface Conditions	3%	18%	22%	10%
Bike Path Surface Conditions	12%	37%	9%	3%
Road Shoulder Surface Conditions	2%	7%	33%	19%
Road Shoulder Widths	1%	6%	33%	29%
Signs/Travel Markers	4%	19%	18%	11%

For the most part, bicyclists are satisfied with the parking availability at work and school. Nearly 12 percent indicated that they were very satisfied with parking at work and 8.3 were very satisfied with the parking at school. Only 11 and 4 percent indicated they were not satisfied with parking at work and school, respectively. Bicyclists in Colorado are very dissatisfied with the courtesy of motorists. While less than 1 percent of riders rate their satisfaction with the courtesy of motorists in the highest category, more than one-fourth (28 percent) selects the lowest category. Bicyclists rate favorably the courtesy of walkers, runners and skaters, and especially the courtesy of other bicycle riders.

Bicyclists are also more dissatisfied than satisfied with crossings at road intersections. Thirteen percent indicate that they are not satisfied and only 2 percent indicate that they are very satisfied. Similar dissatisfaction is reported with regard to debris littering roads and paths used by bicyclists and the conditions of road surfaces in general.

There are a few things that bicyclists are satisfied with. In addition to the courtesy of bicyclists and walkers, runners and skaters mentioned earlier, respondents indicated that they are very satisfied with the conditions of existing bike paths. Forty-eight percent of bicyclists placed their satisfaction with the condition of bike path surfaces in the highest two categories (12 percent were "very satisfied"). Less than 4 percent chose the two lowest categories.

C. Preferences Regarding Bicycle-Related Public Expenditures

Respondents in Colorado households were asked if they would like to see improvements of conditions to encourage bicycling as a means of transportation. An overwhelming majority (79 percent) indicated that they would like to see such expenditures. Respondents then indicated their preferred funding method(s). Respondents could select from among the options presented in Table 5, and could select as many sources as they liked. Twelve percent did not indicate any preference. Clearly, the use of new taxes is not an attractive funding source: only 6 percent indicated that they would like to use this funding option. The majority of survey respondents preferred to reallocate funds from other transportation projects. There was some support for using fees for trails and path use and bicycle registration and licensing revenue.

Table 5 Preferred Funding Sources for Improvement of Bicycling Conditions

Funding Source	Percent of Households
New Tax	6.2%
User Fees for Trails and Paths	20.9%
Bicycle Registration and Licensing Fees	35.5%
Reallocating Funds from Other Transportation Projects	51.3%
Note: Percentages sum to more than 100% since respondents can select more than one funding source.	

Respondents who bicycle in Colorado were also asked about how they would allocate $100 among various uses to improve their bicycling experiences if they were traveling to work or for a utility trip. The questions listed ten possible uses for the money, and if the $100 were simply split equally between the ten possible uses, each would receive $10. Figure 10 illustrates the projects most frequently mentioned by survey respondents and Figure 8 illustrates the amount of money they would chose to allocate to each project. (It should be noted that the question did not ask if they would like to see any money spent on improving bicycling, but rather, if $100 were to be spent,

where they would like to see the improvements.) Not surprisingly, given the fact that most bicycle riders indicated that they preferred riding on paved off-street bike paths, the most popular expenditure was to create new paved off-street bicycle paths. Figure 10 indicates that just over two-thirds of the bike riders (68 percent) would choose to allocate some money for this use, and from Figure 11 we can tell that they would choose to spend $36 out of the $100 for the creation of new paved paths. The second most frequently mentioned project was to link existing paved paths. Forty-seven percent of respondents also chose this project. The average desired expenditure was $18 of the $100. Other projects receiving support include spending to create recreational unpaved paths (27%), better maintain existing routes and construct and improve road shoulders (30%). Bicyclists supported smaller expenditures on education and enforcement ($6.13), reconstructing on-street routes ($5.24) and striping bike lanes ($4.70).

Figure 10. Public Bicycling Expenditure Preference

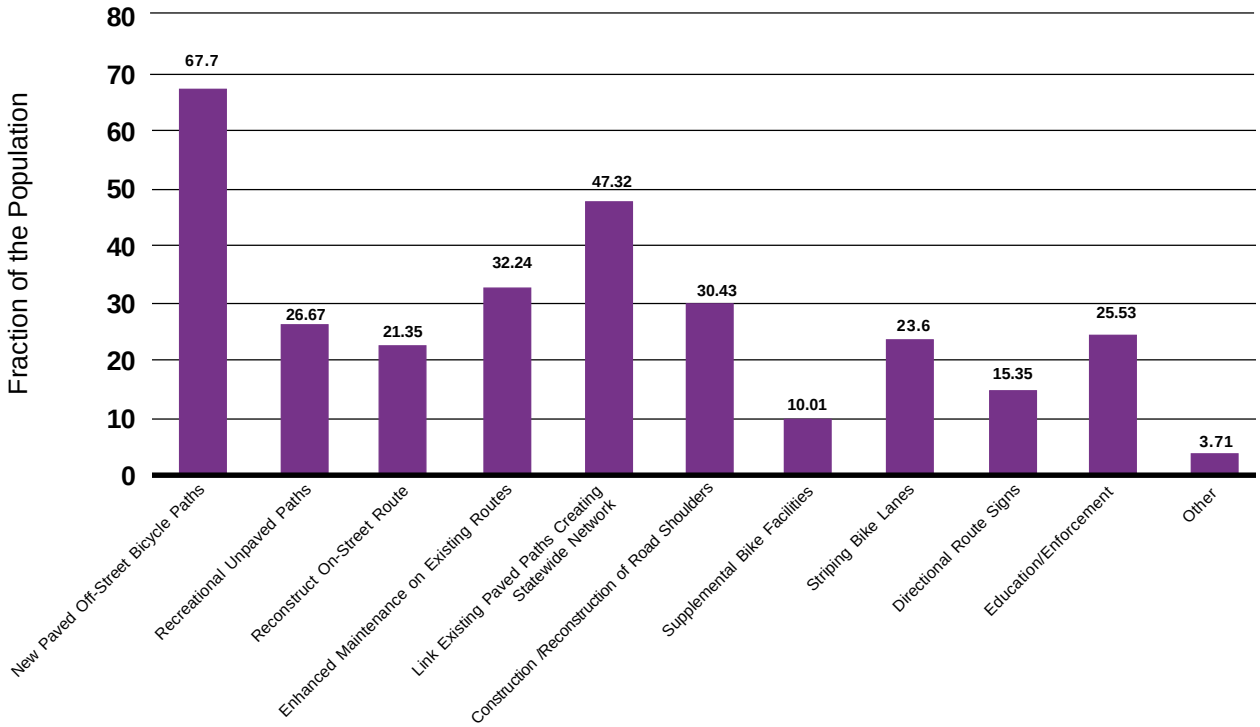
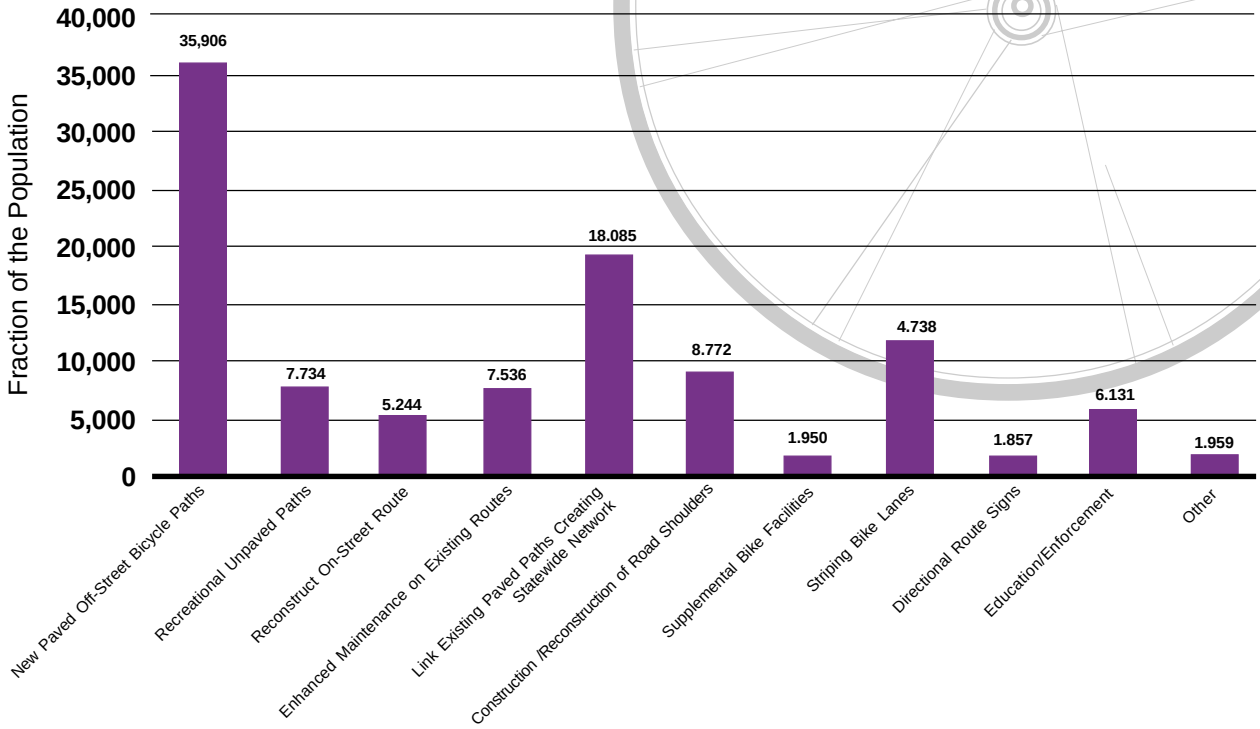
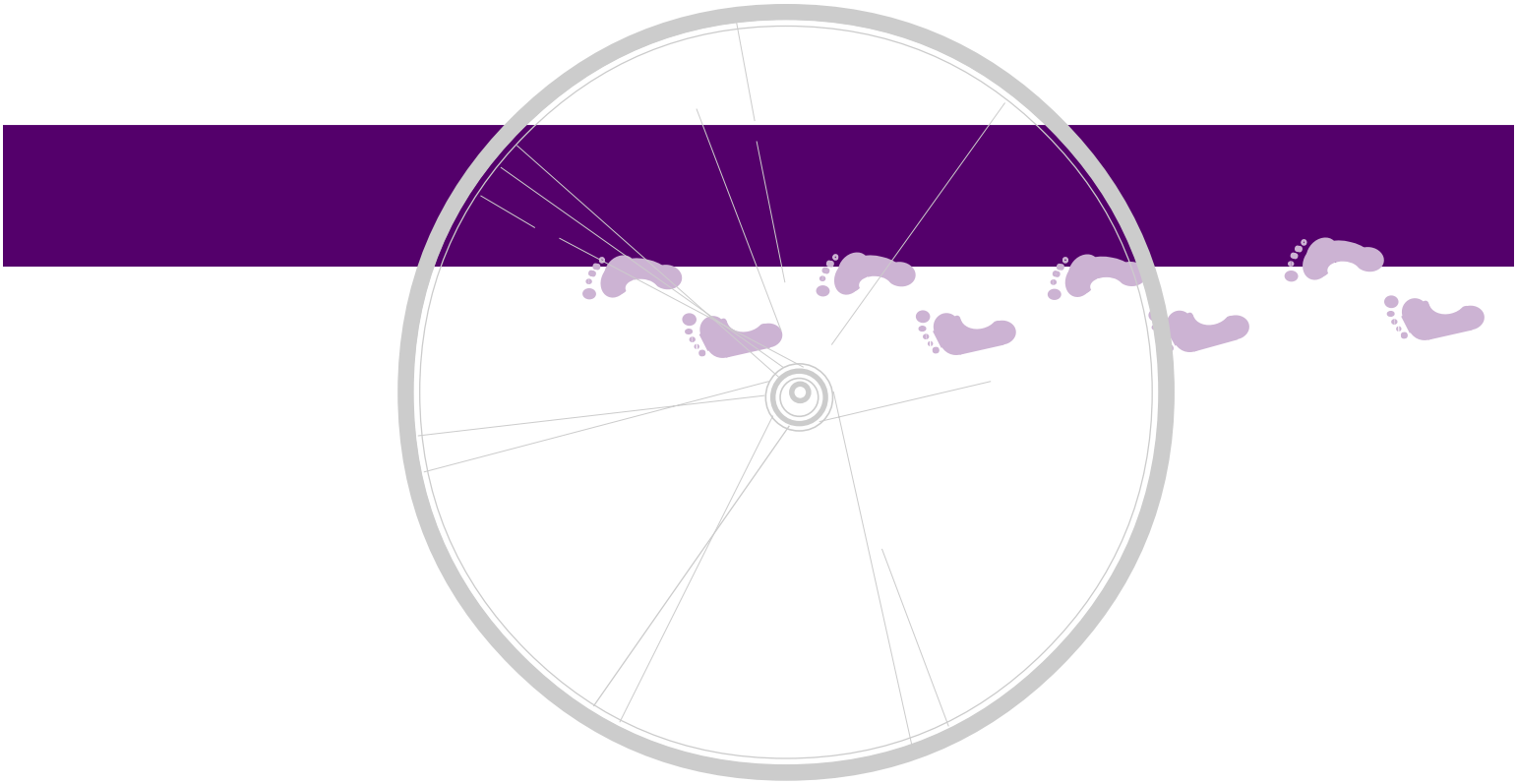


Figure 11. Desired Spending of Public Bicycling Expenditure Out of $100





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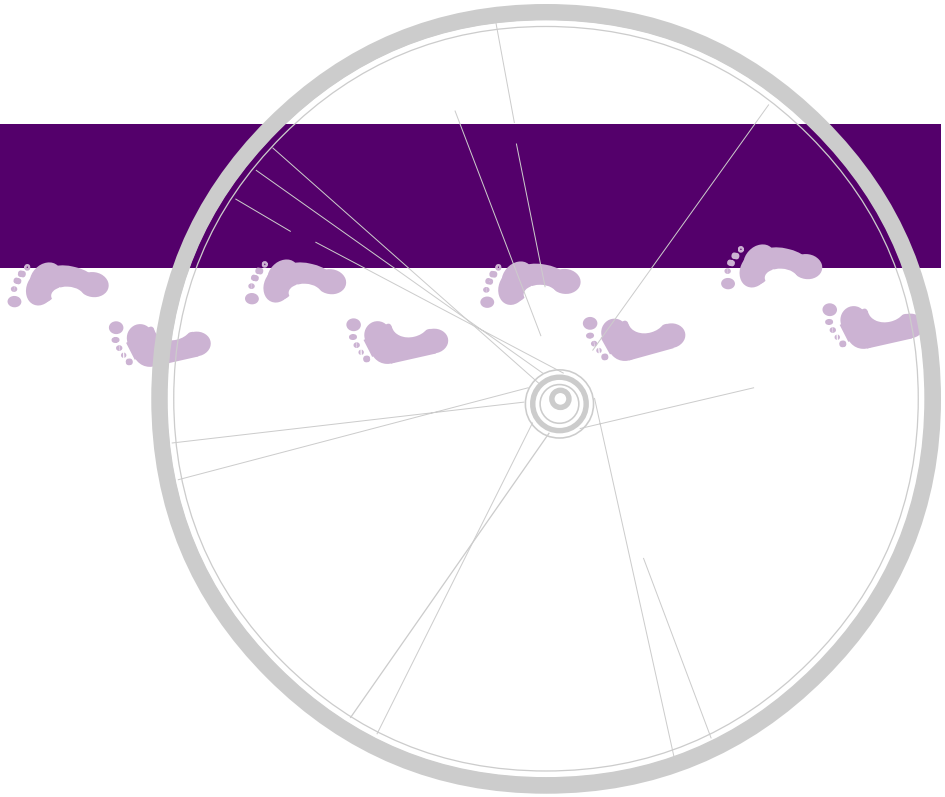
HOUSEHOLD SURVEY RESULTS



I. TRANSPORTATION

In the remainder of this report, the information provided (except as noted otherwise) is based upon population-weighted data. Thus, the information summarized in the remainder of the report can be attributed to the Colorado population as a whole. (Details on weighting procedure are discussed in the appendix.)

A. Commuting to Work

Employment

Six percent of males who are under the age of 65 are unemployed. Thirteen percent of females who are in the same age category are unemployed. Of those individuals working, 18 percent of all workers are self employed.

The majority of individuals (66 percent) are working five days per week (see Figure IA.1). Eight percent are working four days a week, and 14 percent are working six days a week. Three percent indicated that they were working seven days a week. Nine percent work three days per week or less.

Figure IA.1 Average Number of Days Worked per Week

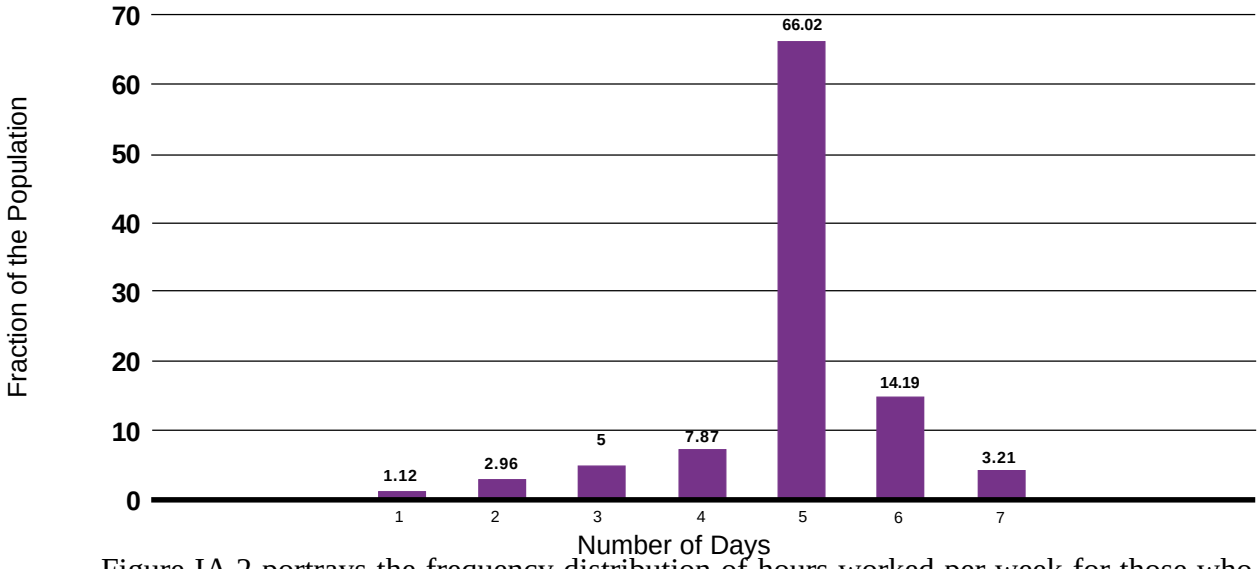
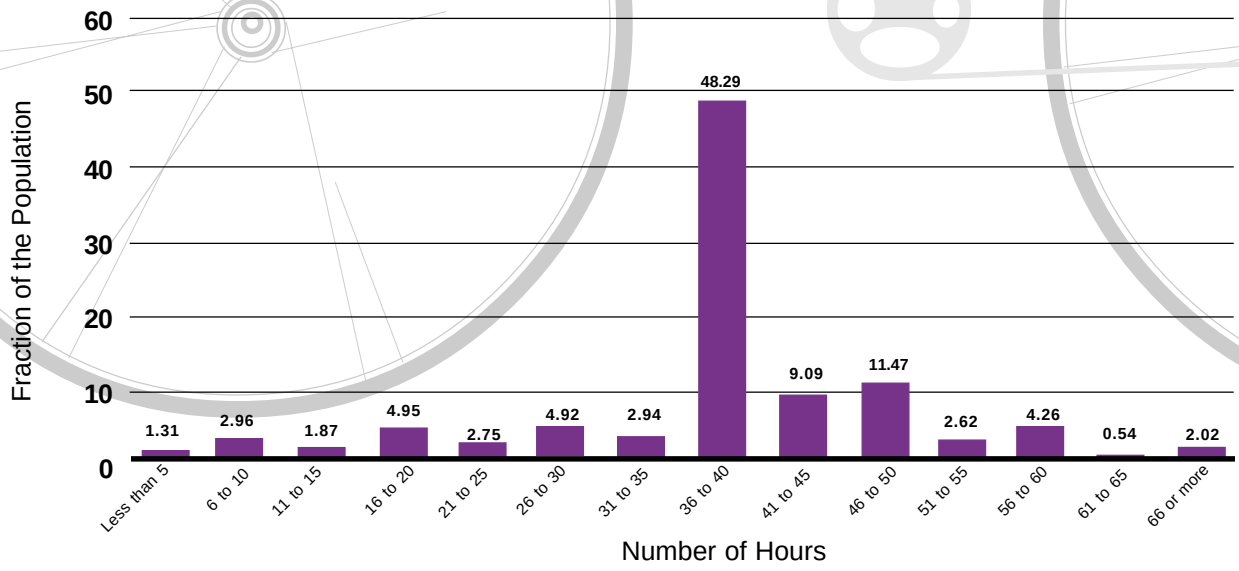


Figure IA.2 portrays the frequency distribution of hours worked per week for those who work. Consistent with Figure IA.1, by far the largest category consists of individuals who work between 36 and 40 hours per week. The second largest category is individuals who work 46 to 50 hour weeks (almost 12 percent). Nine percent work more than 50 hours a week, 11 percent work 21 to 35 hours a week, and another 11 percent work less than 20 hours a week.

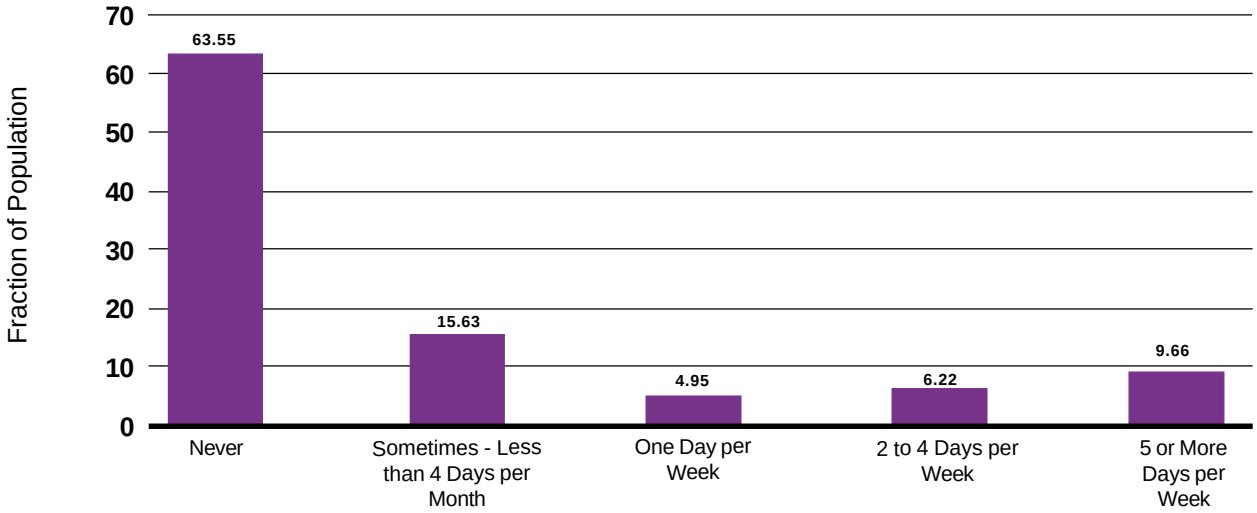
Figure IA.2 Average Number of Hours Worked per Week



Telecommuting

The response to the question "How frequently do you telecommute (use a telephone or computer to work from home)?" is summarized in Figure IA.3. The majority (64 percent) never telecommute. Sixteen percent telecommute infrequently (less than four days per month), five percent telecommute one day per week. Six percent telecommute 2 to 4 days a week, and 10 percent do so at least five days a week.

Figure IA.3 How Often Colorado Residents Telecommute Work



Work Schedules

Workers in Colorado Figure IA.4 displays the information about the time people leave for work in the morning. It resembles a normal distribution with the highest frequency pertaining to those who leave home at 7:00 am. (35 percent). Twenty percent leave for work at 6:00 am, and 18 percent leave around 8:00 am. Eight percent leave at 5:00 in the morning, and five percent leave for work at 9:00 am.

Figure IA.4 Time Begin Work Commute

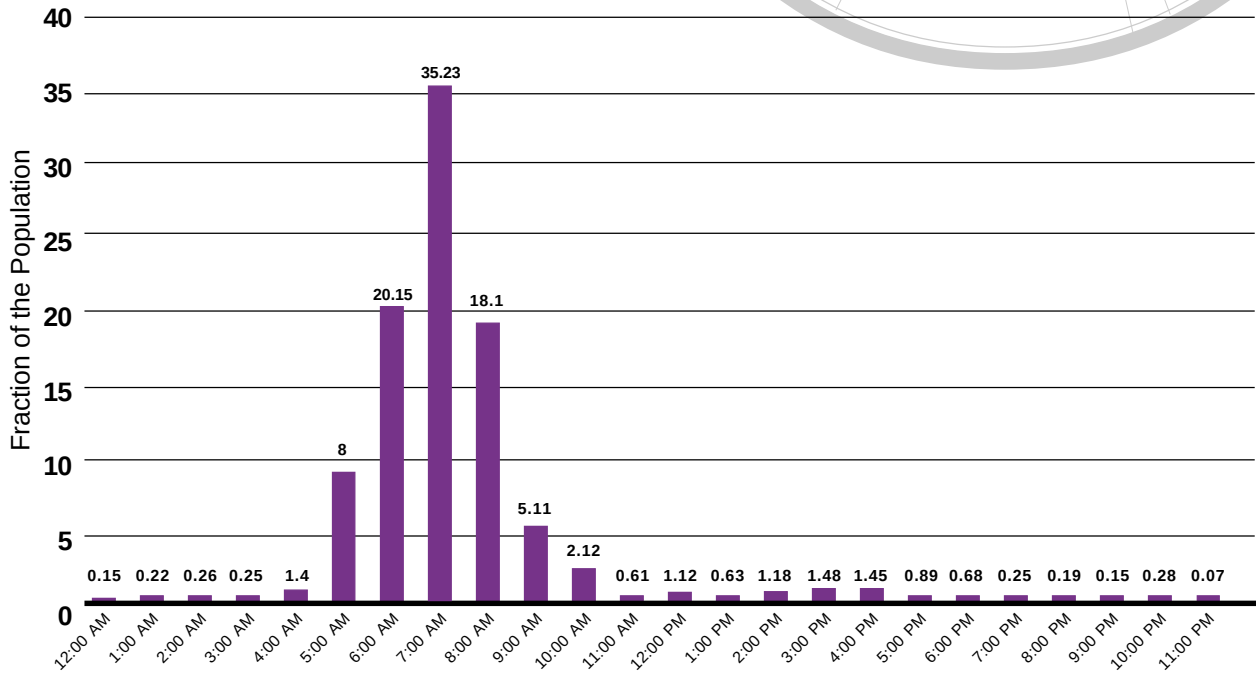
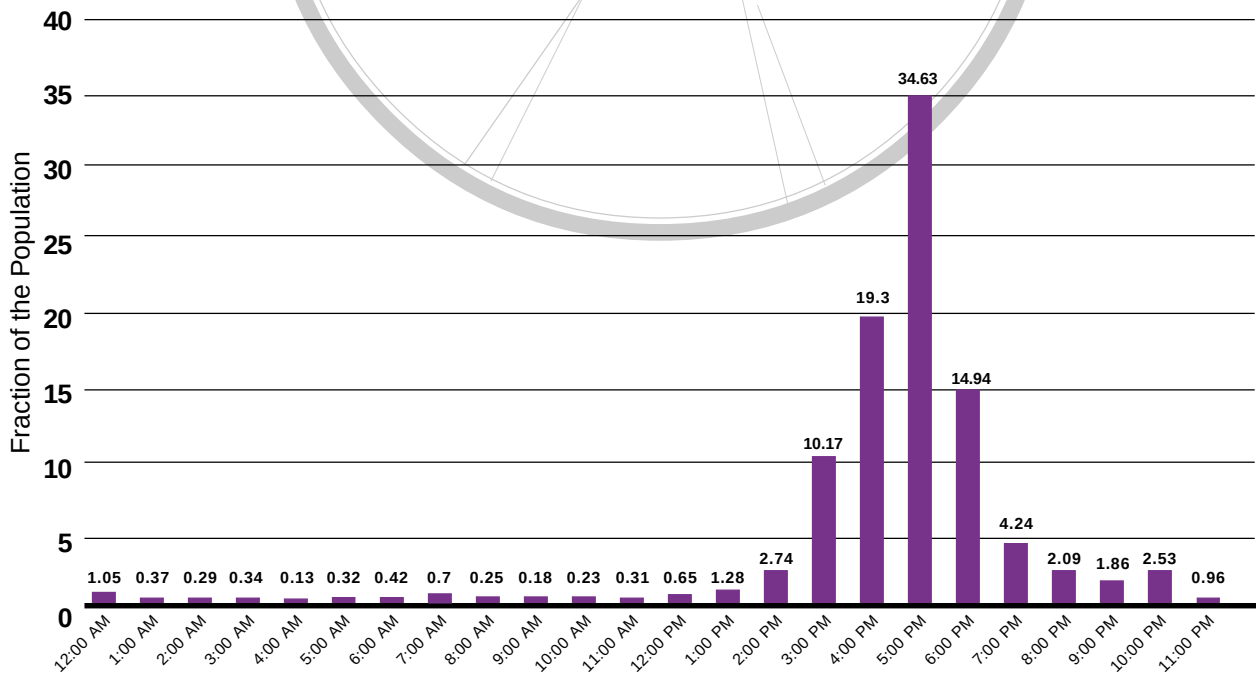


Figure IA.5 demonstrates the frequency distribution of the time individuals leave work. Ten percent leave work at 3:00 p.m. The rate increases to 19 percent at 4:00 p.m., and it peaks at 5:00 p.m. with 35 percent. Fourteen percent leave work at 6:00 p.m., and four percent leave at 7:00 p.m.

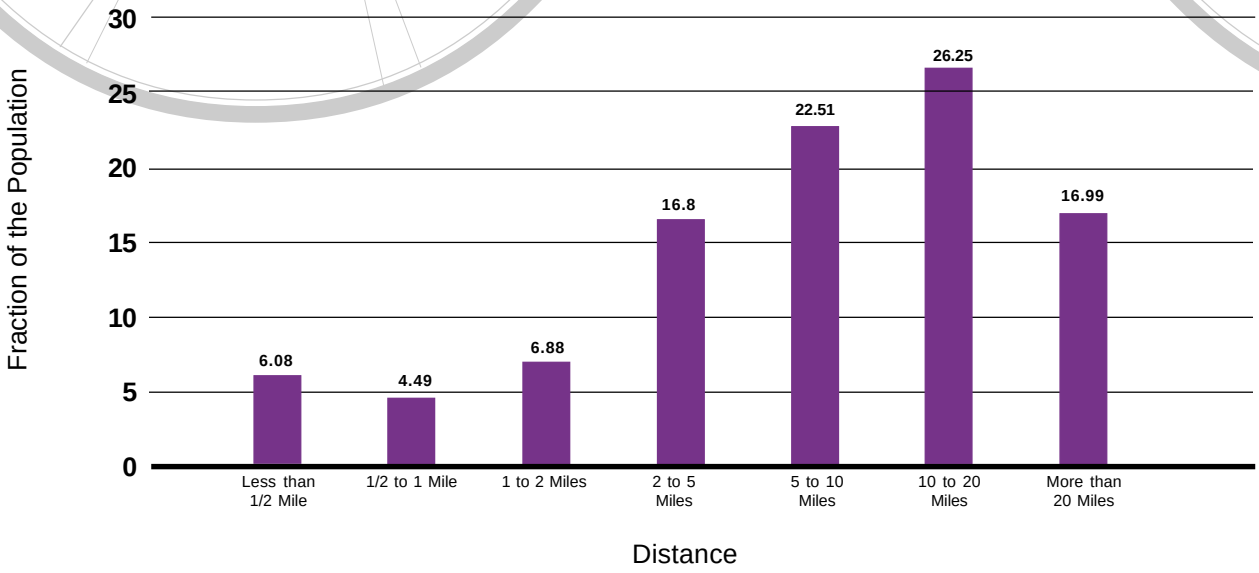
Figure IA.5 Time Leave Work



Commute Distance

Figure IA.6 provides information on the distance between home and work. Eleven percent work within one mile from home. Seven percent travel 1 to 2 miles to go to work, and 17 percent commute 2 to 5 miles. Nearly half of the respondents indicated that they traveled between 2 and 10 miles to go to work, and 17 percent face a work commute of more than 20 miles.

Figure IA.6 Distance from Home to Work



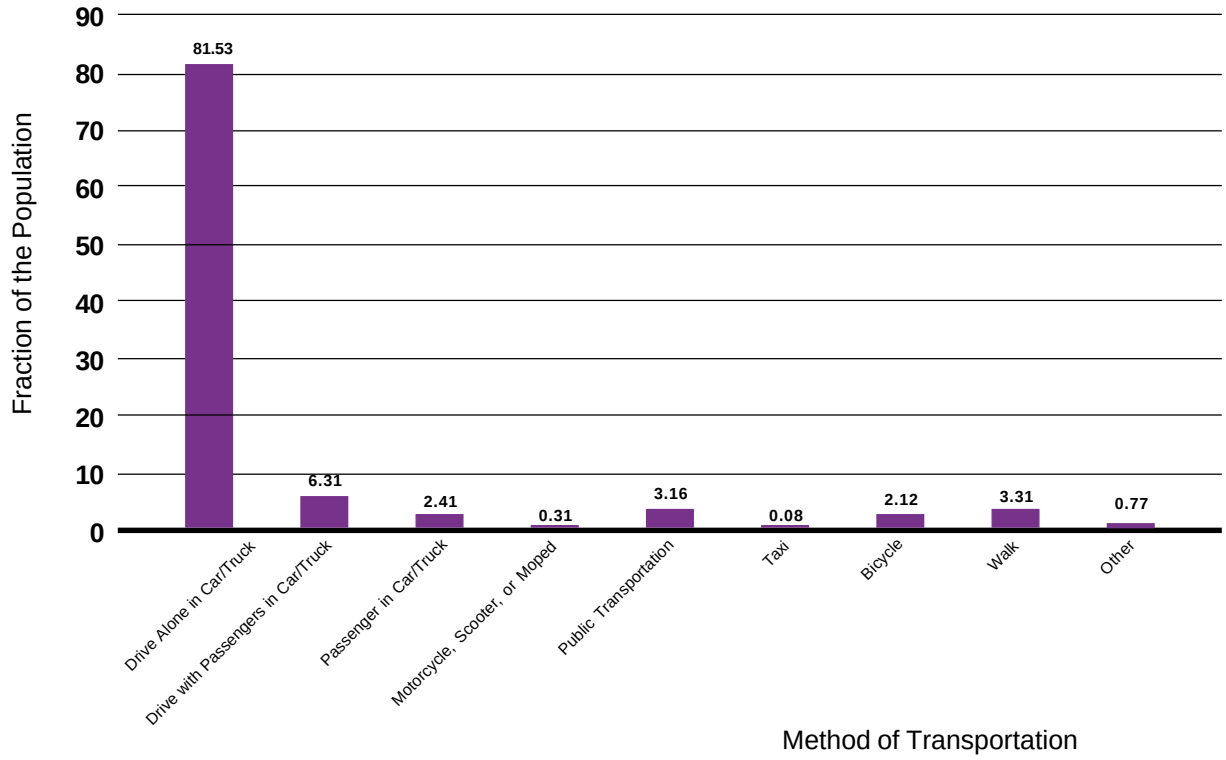
Commuting Mode

Figure IA.7 shows the primary method of transportation to work during a typical good weather week. The overwhelming majority, 82 percent, drive alone in a car or truck. Almost nine percent use a carpool arrangement. They are either passengers, or drive with passengers. Three percent use public transportation as their primary method of transportation to go to work. This is an interesting piece of information, because thirty-five percent of the households are within two blocks of public transportation (see Figure 0.6). This may suggest that the relative price of public transportation (money and/or time price) is high in comparison to driving.

Two percent use a bicycle as their primary method of transportation, 0.3 percent use a motorcycle, scooter or moped, 0.8 percent take a taxi, and 3 percent walk.

It is informative to compare these rates to the nation-wide figures. The data from the 1990 Census indicate that 73 percent of Americans drive alone in a car, truck or van to go to work, and 5.3 percent use public transportation. 3.9 percent walk to work nation-wide, and 0.4 percent bicycle. Thus, the propensity to drive is higher in Colorado in comparison to the national average, and the propensity to use public transportation is lower. The propensity to bicycle to work is five times the national average.

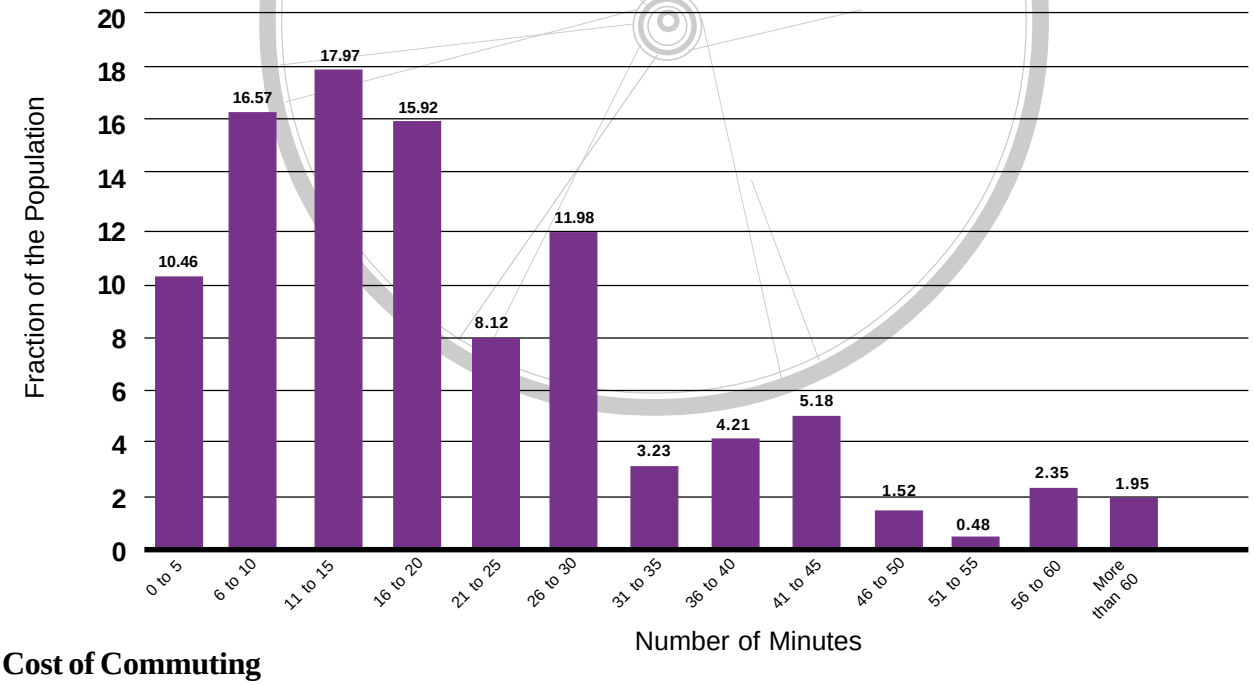
Figure IA.7 Primary Means of Transportation to Work



Travel Time

Figure IA.8 portrays information on the amount of time people spend traveling to work (one way). Forty-five percent of work trips take 15 minutes or less. Thirty-six percent take between 16 and 30 minutes, and 13 percent of the one-way work travel takes 31 to 45 minutes. Four percent of the individuals travel between 45 minutes and hour to go to work, and it takes more than one hour to get to work for two percent of the working population.

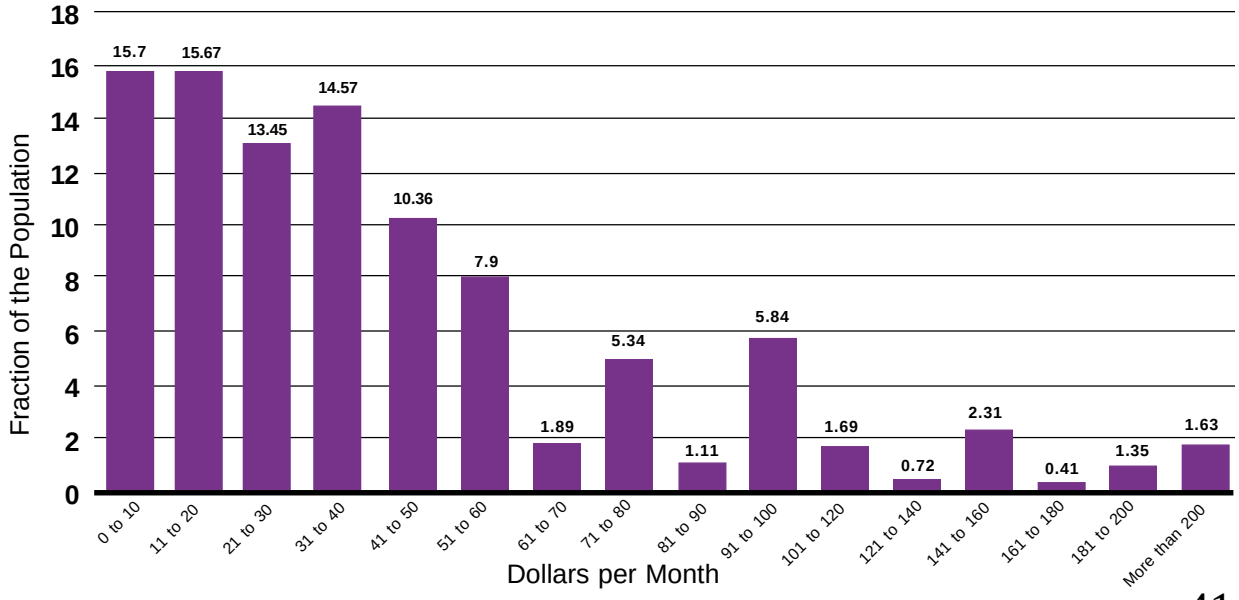
Figure IA.8 Time Required for Work Commute (One Way)



Cost of Commuting

Figure IA.9 presents information on the monthly out-of-pocket spending for commuting to work, including bus fare, gas and parking. Thirty-one percent spend $20 or less per month to commute to work. Thirty-eight percent spend between $21 and $50, and 22 percent spend between $51 and $100 per month. Eight percent spend more than $100 a month for work travel.

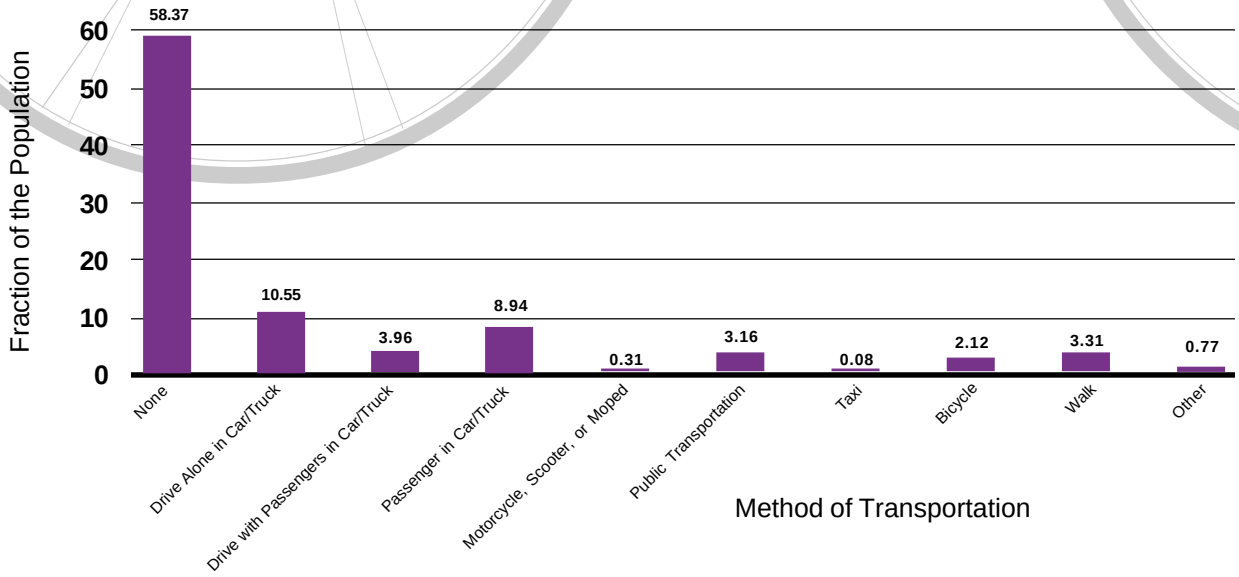
Figure IA.9 Average Cost of the Work Commute per Month



Multiple Methods of Commuting.

Figure IA.10 displays information on the second most frequently used method of transportation to go to work. The majority, 58 percent, do not use a second method of transportation. The secondary method of transportation of 15 percent of individuals who use a secondary method is carpooling (either driving with passengers or being a passenger).

Figure IA.10 Secondary Method of Transportation Used for Work Commute



It is informative to investigate the combination of transportation methods for commuters who use more than one. The distribution of the secondary means of transportation by the primary method of transportation is presented in Table IA.1.

Table IA.1 Work Trips

Primary Method	Secondary Method of Transportation						
	No Secondary Method	Drive Alone	Carpool	Motorcycle	Public Transport	Bicycle	Walk
Drive alone	66%	7.5%	8%	2%	5%	6%	4%
Motorcycle	0%	76%	15%	6%	9%	0%	0%
Public Transport	13%	50%	31%	0.4%	0.4%	1.5%	0.8%
Bicycle	0%	63%	7%	0%	13%	2%	13%
Walk	26%	41%	16%	1%	6%	7%	0.6%
Carpool	35%	30%	18%	1%	12%	1%	5%

According to Table IA.1, sixty-six percent of the individuals who indicated that driving alone was their primary method of transportation to work, revealed that they used no secondary method, and 7.5 percent of the same group said their secondary method was driving alone. Thus 73.5 percent (66%+7.5%) of those who drive alone to work as their primary method of transportation, do not use a secondary method. This in turn implies that 60 percent of all individuals (73.5% of 82%) drive alone in a car or truck to work as their only method of transportation.

Half of those who use public transportation as the primary method of transportation to go to work choose driving alone as their secondary method. Those who use a bicycle or motorcycle as the primary method always use another method as their secondary mode of transportation. Twenty-six percent of those who choose walking as their primary method do not use any other means of transportation to go to work. This means that 8 out of 1,000 people (26 percent of 3 percent) use walking as their exclusive means of transportation to commute to work.

The information above indicates that seven percent of the population is using bicycling as either the primary or secondary method of transportation to go to work. Another seven percent of the population is using walking as either the primary or secondary method of transportation to commute to work.

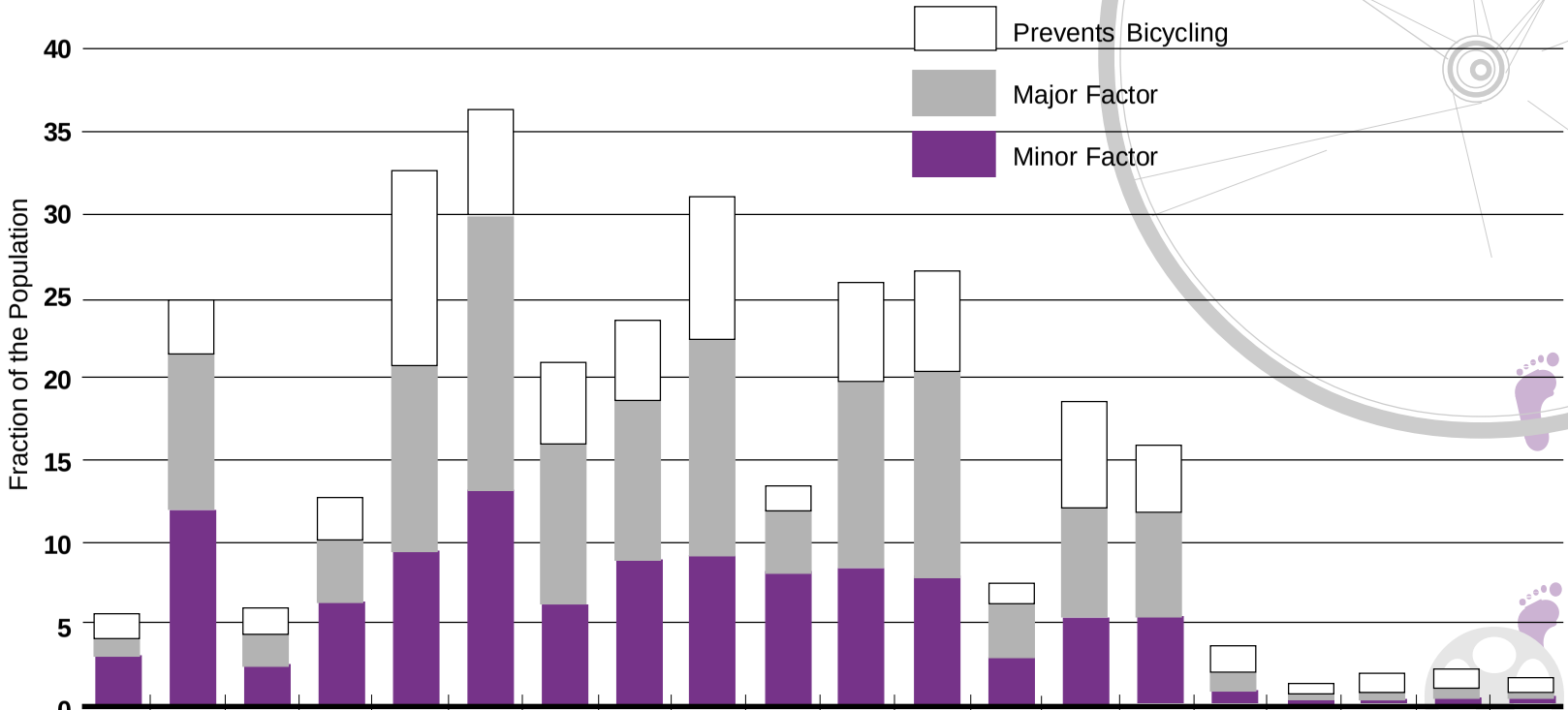
Obstacles to Bicycling

In a separate question, forty-six percent of those surveyed indicated that they never considered using a bicycle to commute to work. The remaining fifty-four percent who consider bicycling as a means of transportation identified the factors which negatively influence their decision to bicycle to work. Figure IA.11 presents information about the factors that impact individuals' decisions to use bicycle to commute to work. The potential factors are listed on the horizontal axis. They are: physically unable, time of day, unable to take bicycle on public transportation, lack of secure bicycle store at destination, distance, weather conditions, lack of shower/dressing facilities at destination, route hazards (gravel, potholes, etc.), traffic safety concerns, lack of personal security (crime), lack of off-street bike paths, lack of shoulders to ride on, lack of transit access, need a car for job, no alternative to crowded routes, time it takes to ride, a need to transport children, a need to carry materials to work and other reasons.

Weather conditions and distance are the most important factors preventing the use of bicycles for commuting to work. Thirty-seven percent of all individuals indicated that weather conditions were either a minor factor, a major factor, or prevented them from bicycling. Twelve percent gave the distance as the reason that prevented them from bicycling to work.

Concerns about traffic safety is the third-leading deterrent to bicycle to work, followed by lack of off-street bike paths and lack of shoulders. Road hazards conditions (e.g. gravel and potholes) and the lack of shower/dressing facilities are the sixth and seventh most important reasons, respectively, that impact people's decision to not bicycle to work.

Figure IA.11 Factors that Prevent Using Bicycle to Commute to Work



	Physically Unable	Time of Day	Unable to take Bike on Public	Lack of Secure Bike	Distance	Weather Condi-tions	Lack of Shower/ Dressing	Route Hazards (surface)	Traffic Safety Con-cerns	Crime	Lack of Off Street Bike Paths	Lack of Shoul-ders	Lack of Transit Access	Need Car for Job	Crowdwd Routes	Other	Time to Ride	No Bike	Need to Transport Children	Need to Carry Items
	1.76	3.29	1.42	2.28	12.07	6.16	5.88	5.07	8.12	1.8	6.47	5.86	1.41	6.31	4.17	2.11	0.51	1.1	1.09	0.85
	1.3	9.63	1.66	4.36	11.62	17.4	9.81	9.23	13.89	3.65	11.39	12.62	2.97	6.47	6.5	1.39	0.3	0.33	0.29	0.15
	3.12	12.03	3.22	6.24	9.49	13.38	6.31	8.06	8.8	8	8.22	8.03	3.41	5.08	5.26	0.76	0.08	0.05	0.15	0.34

Frequency of Bicycle Commuting

Table IA.2 below presents information about the frequency of the use of bicycles to commute to work. This question is asked of all individuals except for those who indicated they never considered bicycling to work. The category "never" in the table below represents people who do consider bicycling to work, but never do so. Eight percent bicycle to work more than once per week. Three percent commute to work by bicycle one a week, and another three percent bicycle to work 2-3 times per month. Seventy-four percent of those who consider bicycling to work never actually do so.

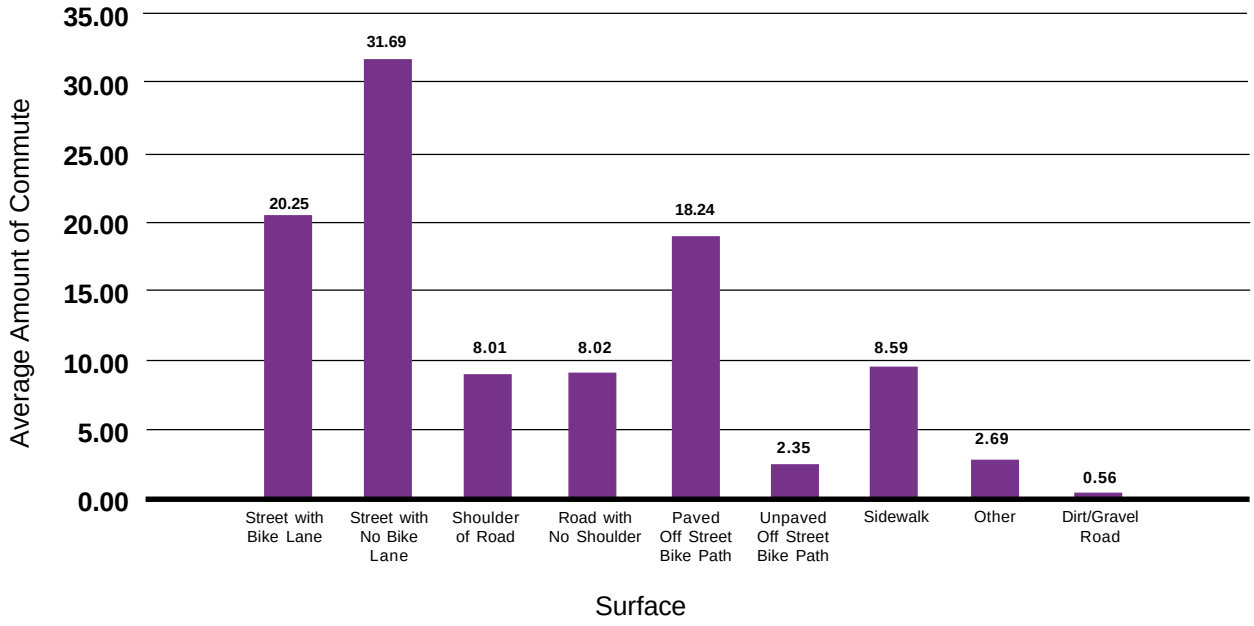
Table IA.2 The Frequency of the Use of Bicycle for Work Travel

More than once per week	Once per week	2-3 times per week	Once per month	Less than once per month	Never
8%	3%	3%	4%	9%	74%

Surfaces Used by Bicycle Commuters

Figure IA.13 displays the distribution of various surfaces used by those who ride their bicycle to work. Thirty-two percent of a typical bicycle work trip takes place on a city street with no bicycle lane/shoulder. Twenty percent of the work bicycle trips use a city street with bicycle lane/shoulder, and 18 percent are on paved off-street bicycle paths.

Figure IA.13 Average Amount of Bicycle Work Commute Ridden on Specific Surfaces



B. School Travel

Fifteen percent of those surveyed are students. It should be remembered that a respondent had to be at least 16 years of age to fill out the survey, so students in our survey attend high school or college. Seventy-five percent of these students go to school full-time.

School Schedules

The majority (56 percent) go to school five days a week. Fifteen percent attend school twice a week. Thirteen percent go to school four days per week, and eight percent go to school once a week.

Figure IB.1 displays the distribution of times students leave home for school. There are two peaks of the distribution: 7:00-8:00 a.m. and 5:00-6:00 p.m. More than half (52 percent) of the students leave home for school between 7:00 and 8:00 a.m., and 17 percent leave for school between 5:00 and 6:00 p.m. Figure IB.2 present the distribution of times students leave school for home. Thirty-eight percent of the students leave school from 2:00-3:00 p.m., nine percent leave at 5:00 p.m., and 15 percent leave school from 9:00-10:00 p.m.

Figure IB.1 Time Leave for School

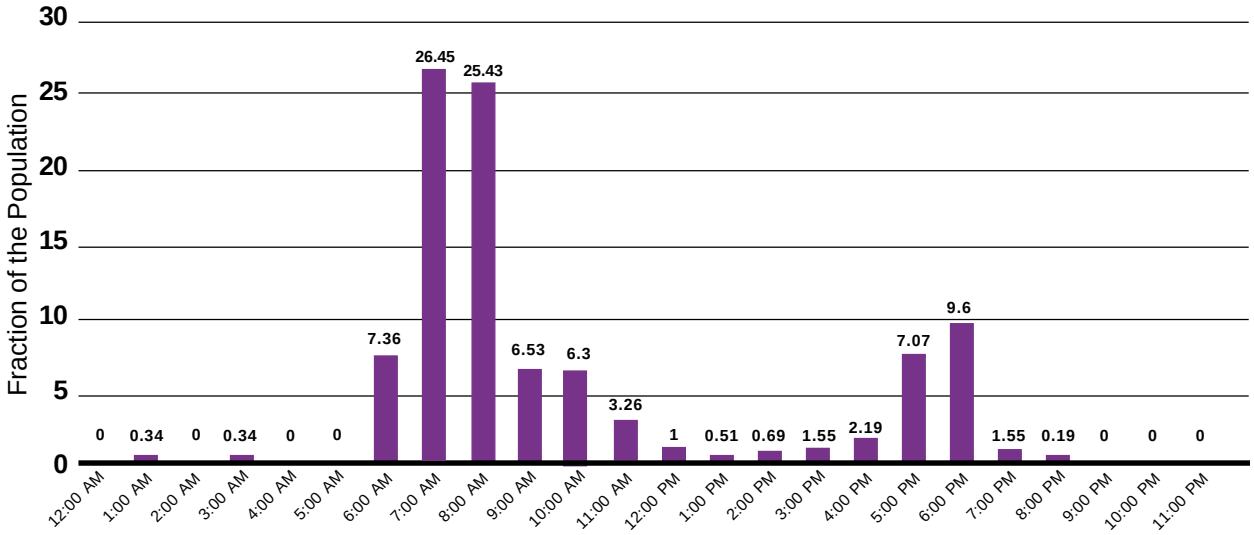
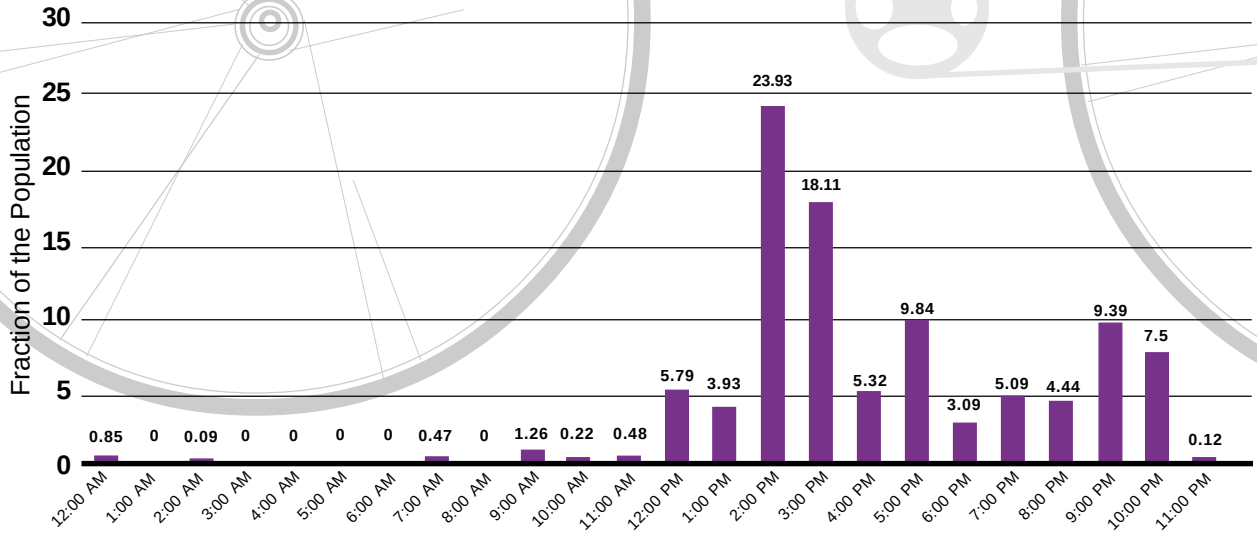


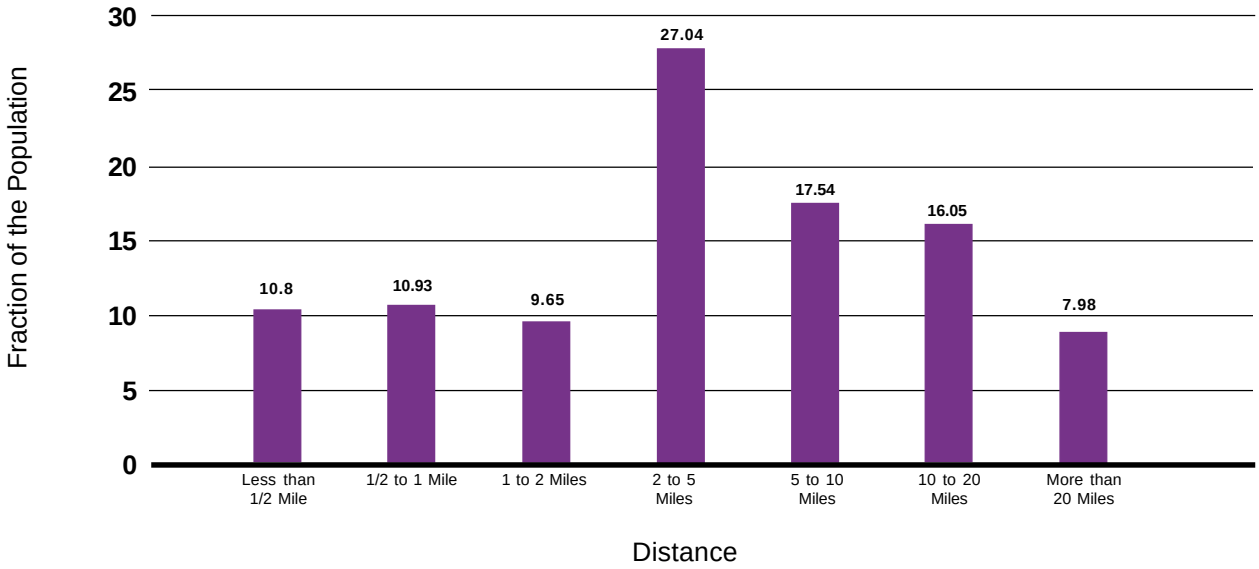
Figure IB.2 Time Leave School



Distance to School

The distribution of one-way travel distance to school is reported in Figure IB.3. Twenty-seven percent of the students travel between 2 and 5 miles to go to school. Eighteen percent travel between 5 and 10 miles, and 16 percent travel between 10 and 20 miles. Twenty-two percent of the student travel less than a mile to go to school, and eight percent travel for more than 20 miles.

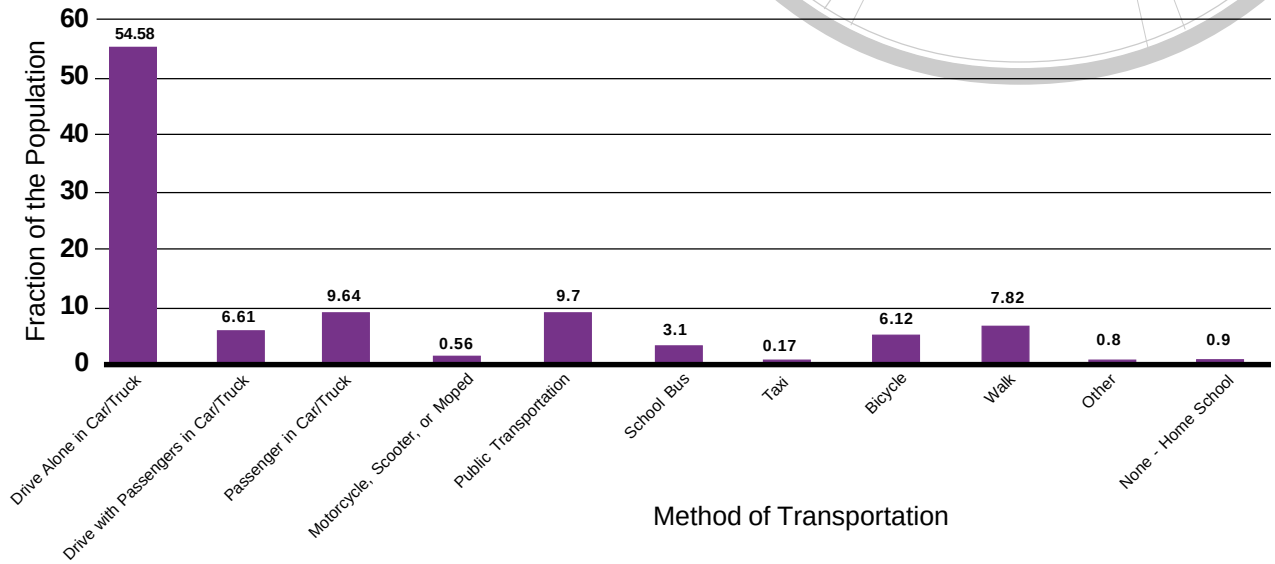
Figure IB.3 One-Way Travel Distance to Class



Method of Commuting to School

The primary commuting method of fifty-five percent of students is driving alone. Sixteen percent are involved in a carpool arrangement, 10 percent use public transportation, six percent use a bicycle as their primary commuting method. Eight percent walk to school (see Figure IB.4). Three percent of all the students who are 16 years of age or older use the school bus as their primary method of transportation.

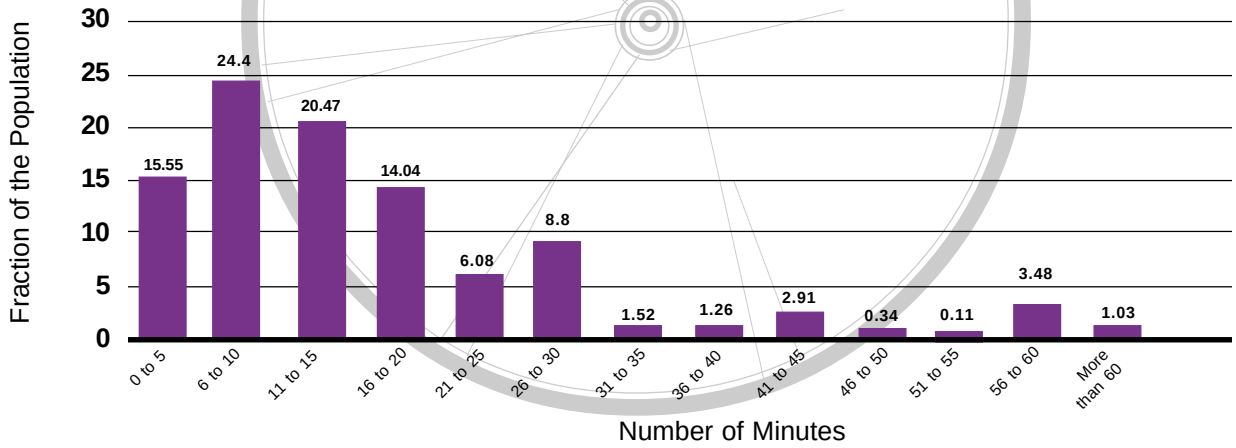
Figure IB.4 Primary Transportation Method for School Commute (16 years and older)



Travel Time

Figure IB.5 shows that 74 percent of the trips to school take less than 20 minutes, which is consistent with Figure IB.3 which reports the distance, and Figure IB.4 which reports the primary transportation method. Only five percent of all school trips last more than 45 minutes (one way).

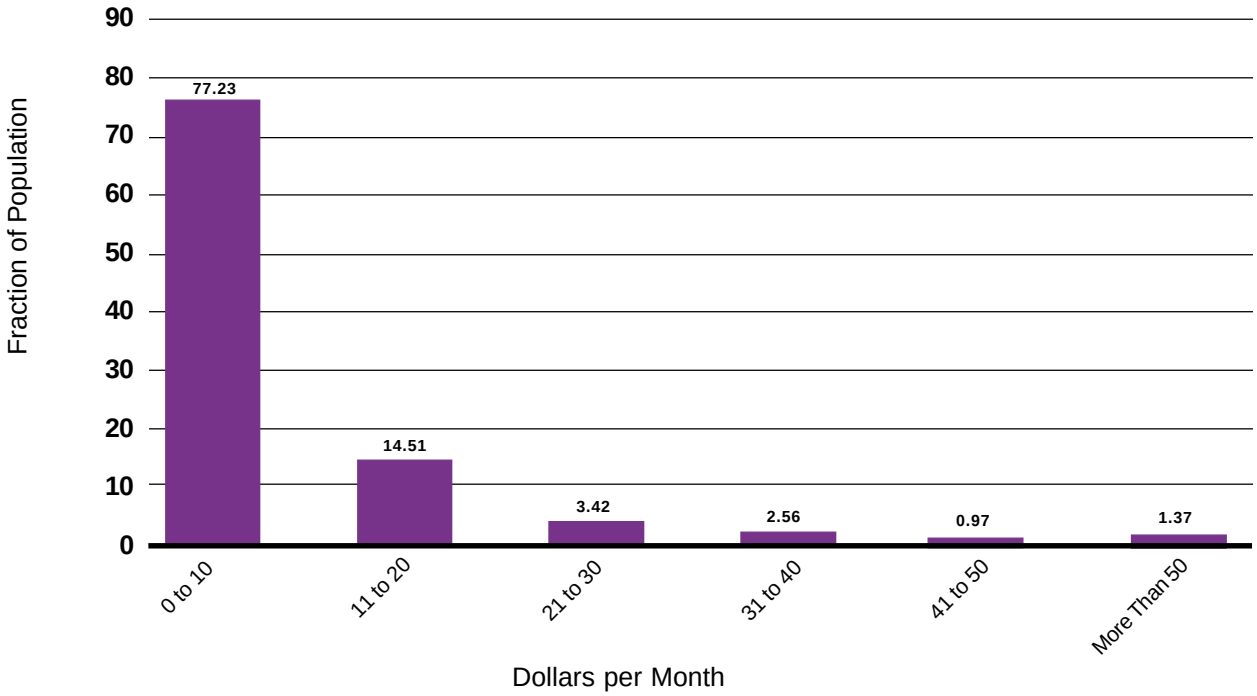
Figure IB.5 Average Time of School Commute (16 years and older)



Cost of Commuting

The weekly out-of-pocket expenditures for school trips are presented in Figure IB.6. The overwhelming majority (77 percent) of the students spend less than $10 per week. Fifteen percent spend between $11 and $20, and only five percent spend more than $30 per week.

Figure IB.6 Average Cost of School Commute (16 years and older)



Multiple Methods of Commuting

Table IB.1 below presents the distribution of secondary method of commuting to school by the primary method. For example, of students for whom the primary method of commuting to school is driving alone, seven percent use public transportation as their secondary method of transportation to school. Simple calculations reveal that more than one-third of students (36 percent) who are 16 years of age and older drive alone in a car or truck to school as their only method of transportation. Twelve percent of the students who are 16 years of age and older use a bicycle as either their primary or secondary means of transportation to school. Sixteen percent walk to school at least some of the time.

Table IB.1 School Trips

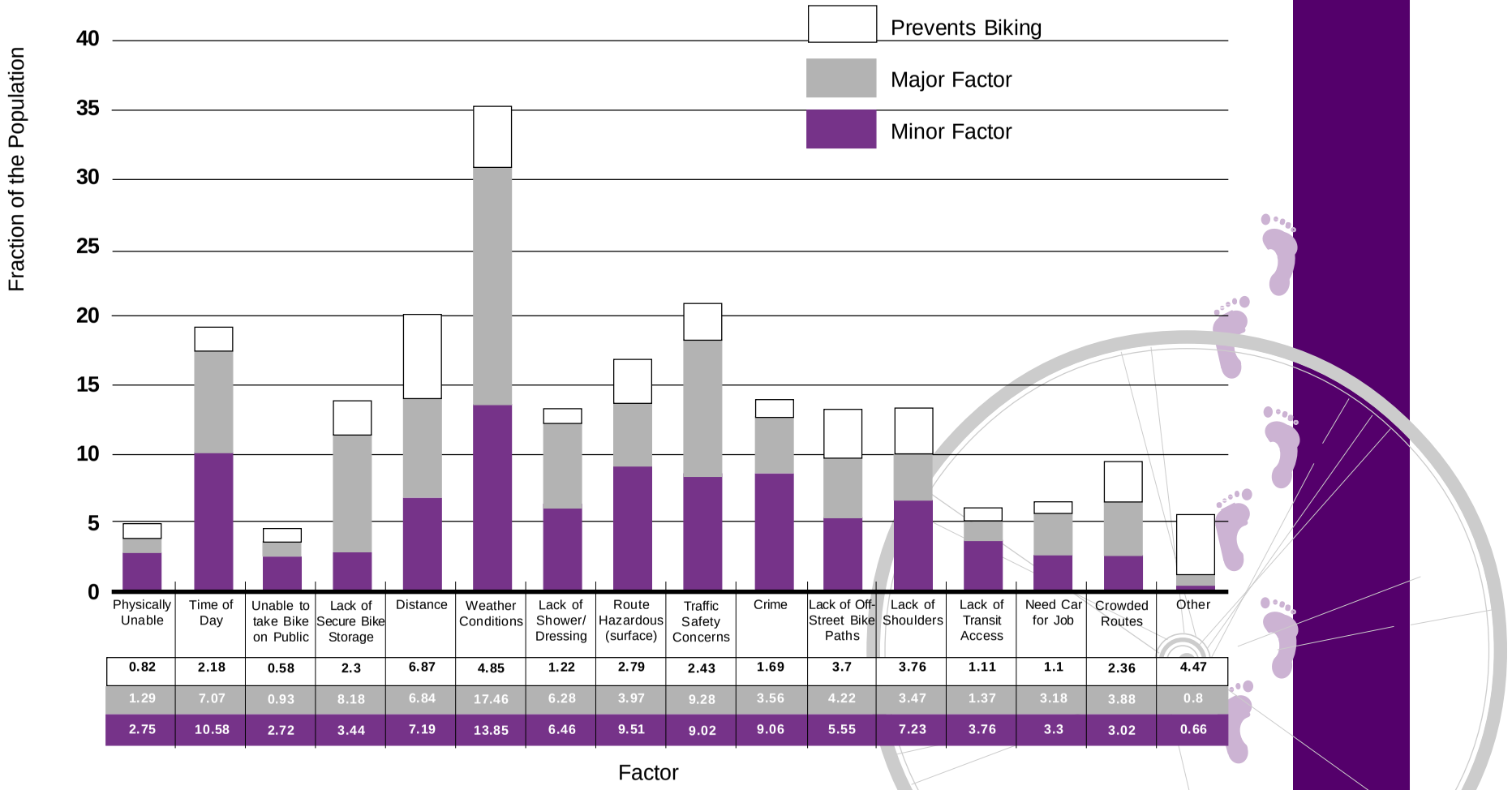
	Secondary Method of Transportation						
Primary Method	No Secondary Method	Drive Alone	Carpool	Motorcycle	Public Transport	Bicycle	Walk
Drive alone	59%	7%	12%	0.4%	7%	7%	1%
School Bus	10%	10%	26%	0%	54%	0%	0%
Public Transport	12%	19%	22%	0%	33%	7%	8%
Bicycle	0%	25%	15%	0%	13%	0%	47%
Walk	23%	16%	14%	7%	5%	17%	12%
Carpool	12%	15%	26%	0%	7%	11%	22%

Obstacles to Bicycling

Figure IB.7 displays the factors that prevent students from bicycling to school. The most significant factor is weather conditions where 36 percent of the students indicated that weather was either a major, or a minor factor, or it prevented them from commuting to school by bicycle. Distance was the second most important factor. Twenty-one percent of students cited distance as a reason. Traffic safety concerns were reported 20 percent of the time as a factor, as was the time of the day.

The frequency of the trips to school in good weather conditions is depicted in Table IB.2 below. This question is asked to all students except for those who indicated they never considered bicycling to school. The category “never” in the table below represents students who do consider bicycling to school, but never do. Twenty-two percent bicycle to school more than once per week. Two percent commute to school by bicycle once a week, and three percent bicycle to school 2-3 times per month. Nine percent bicycle to school one a month, and fifty percent never use a bicycle for commuting to school.

Figure IB.7 Factors that Prevent Using Bicycle for School Commute (16 years and older)



Note that 52 percent of the overall student population indicated that they never considered bicycling to school, indicating that 48 percent did consider it. Table IB.2 indicates that, among those who do consider bicycling 27 percent (22% + 3%) ride their bicycle to school at least one a week. This indicates that 13 percent of all students use bicycles to commute to school at least one a week (0.48 x 0.27), which is consistent with the information calculated earlier indicating that 14 percent of all student use their bicycles as their primary or secondary means of transportation to school.

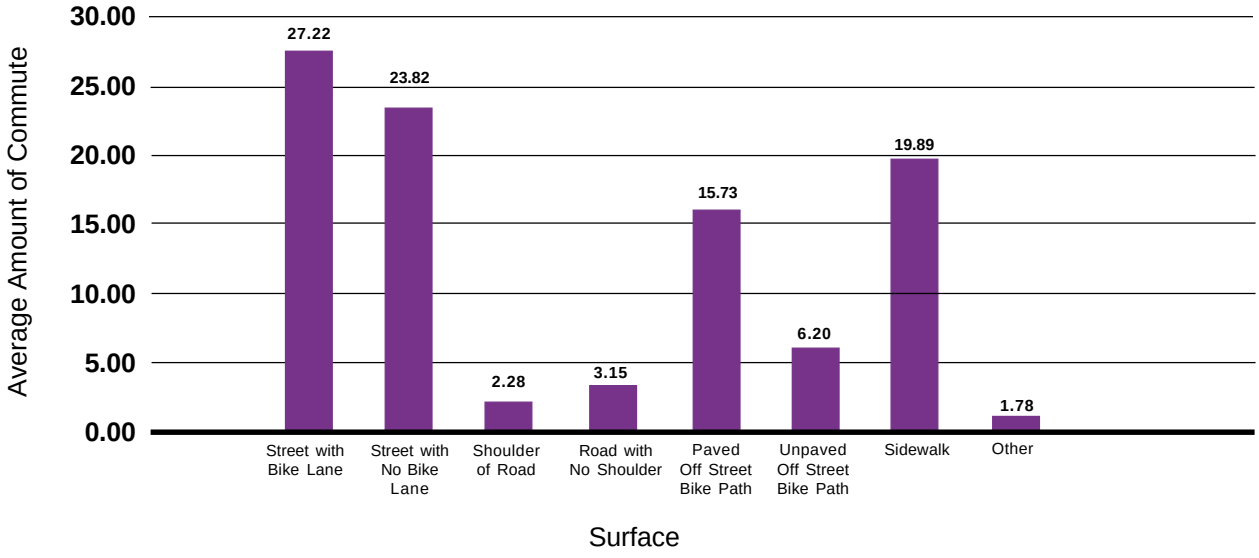
Table IB.2 The Frequency of the Use of Bicycle for Commuting to School

More than once per week	Once per week	2-3 times per week	Once per month	Less than once per month	Never
22%	2%	3%	9%	13%	50%

Surfaces Used by Bicycle Commuters

The distribution of surfaces on which an average trip to school takes place is displayed in Figure IB.8. Students who ride bicycles to school spend 27 percent of the rides on streets with bicycle lanes/shoulders; 24 percent of the rides are on streets with no bicycle lanes/shoulders. Twenty percent of the rides are on sidewalks, and sixteen percent are on paved off-street bicycle paths.

Figure IB.8 Average Amount of Bicycle Work Commute Ridden on Specific Surfaces

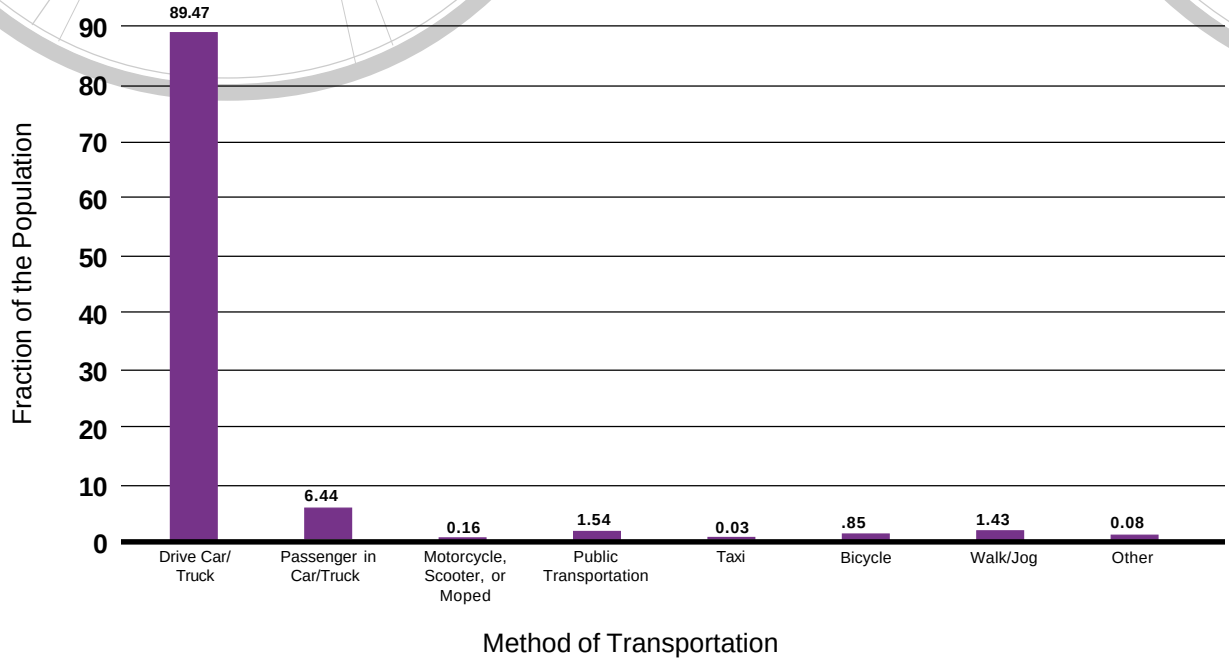


C. Utility Trips: Transportation for Errands

A utility trip is defined as travel to a particular destination (or destinations) for purposes other than work, school or recreation. Examples of these are trips to a friend's house or running errands.

Figure IC.1 presents the distribution of the primary method of transportation for utility trips. Almost 90 percent drive alone for utility trips.

Figure IC.1 Primary Method of Transportation for Most Utility Trips in Good Weather



Method of Transportation

Table IC.1 below presents the distribution of secondary method of commuting for utility trips by the primary method. For example, three percent of the population, for whom the primary method of commuting for utility trips is driving, use public transportation as their secondary method of transportation to school. Simple calculations reveal that more than 40 percent of the population who are 16 years of age and older drive alone in a car or truck on a utility trip as their only method of transportation. Nine percent of the individuals who are 16 years of age and older use a bicycle as either their primary or secondary means of on utility trips. Thirteen percent walk on a utility trip at least some of the time.

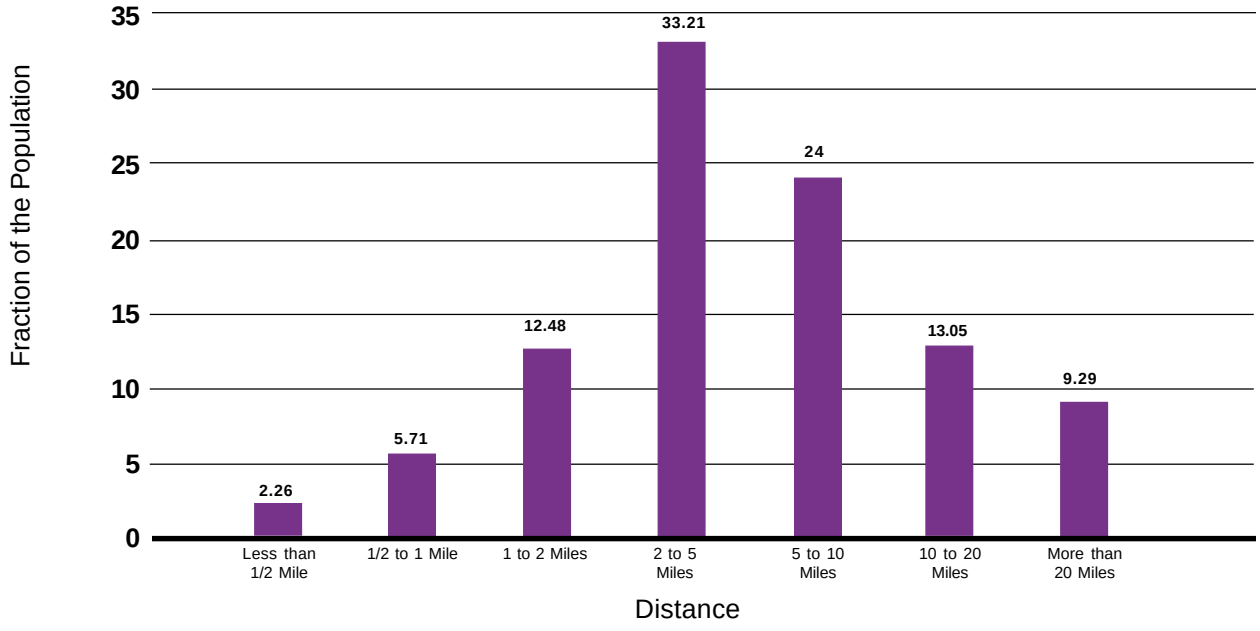
Table IC.1 Utility Trips

Primary Method	Secondary Method of Transportation						
	No Secondary Method	Drive Alone	Carpool	Motorcycle	Public Transport	Bicycle	Walk
Drive alone	46%	5%	23%	2%	3%	8%	12%
Public Transport	4%	12%	48%	0%	4%	3%	20%
Bicycle	1%	43%	34%	0%	3%	7%	10%
Walk	1%	31%	44%	0%	7%	16%	1%
Passenger in Car/Truck	26%	24%	15%	1%	12%	8%	13%

Travel Distance

Figure IC.2 shows the distribution of the travel distance (one-way) for utility trips. One-third of the utility trips are within 2-5 miles, 24 percent are within 5-10 miles. Twenty percent of utility trips are to locations which are two miles or less in distance; 22 percent are to destinations that are more than 10 miles away.

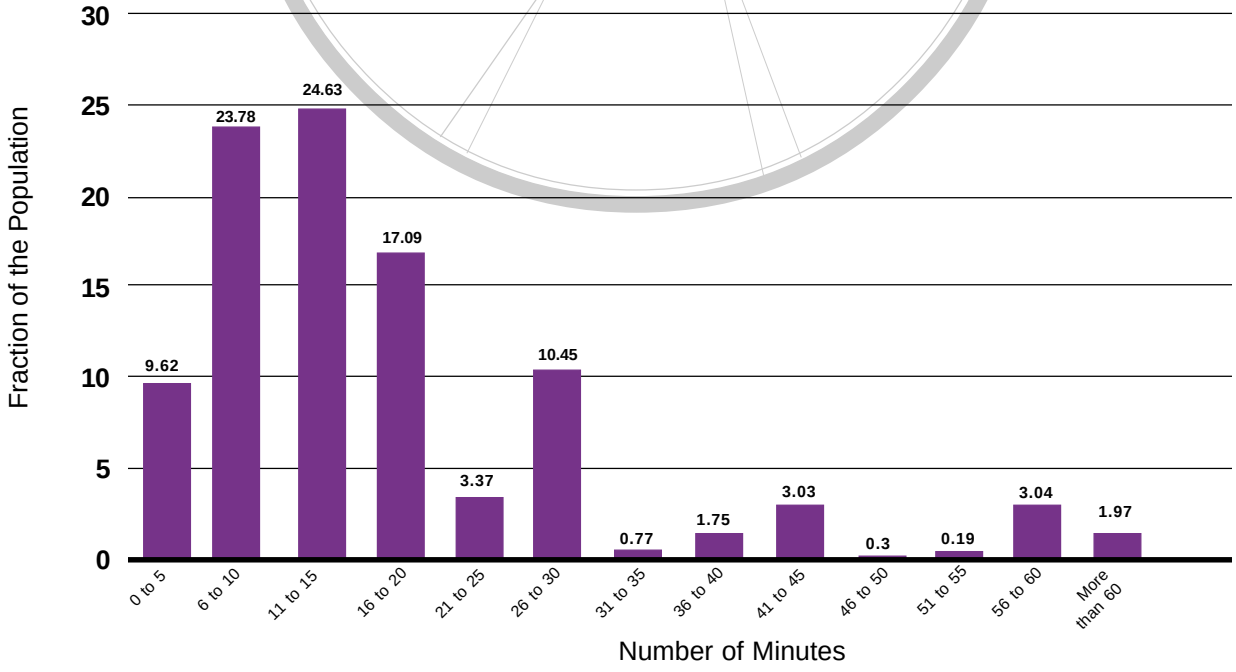
Figure IC.2 One-Way Travel Distance of Average Utility Trip



Travel Time

The distribution of the average travel time of utility trips (one-way) is depicted in Figure IC.3. Fifty-eight percent of the utility trips take 15 minutes or less, and 31 percent take between 15 minutes and half-an-hour.

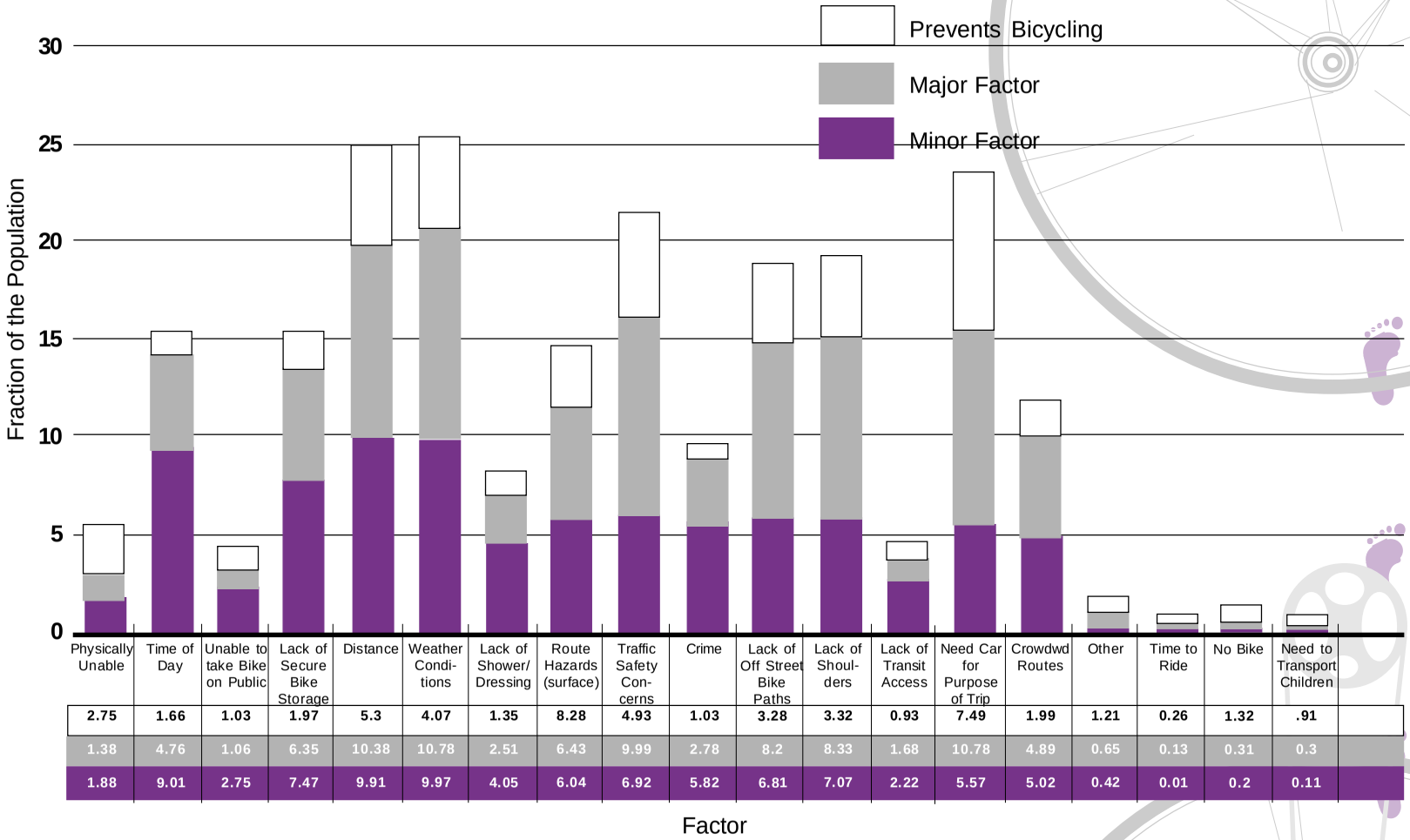
Figure IC.3 Average Travel Time (One Way) of Average Utility Trip



Obstacles to Bicycling

Fifty-eight percent of the population never considered using a bicycle for utility trips. For those who are inclined to use bicycles for utility trips, the factors that prevent them from doing so are presented in Figure IC.4. Weather conditions is the biggest factor, and "the need a car for the purpose of the trip" is a close second. Distance and traffic safety concerns are important determinants as well.

Figure IC.41 Factors that Prevent Using Bicycle for Utility Trips



	Physically Unable	Time of Day	Unable to take Bike on Public	Lack of Secure Bike Storage	Distance	Weather Condi-tions	Lack of Shower/ Dressing	Route Hazards (surface)	Traffic Safety Con-cerns	Crime	Lack of Off Street Bike Paths	Lack of Shoul-ders	Lack of Transit Access	Need Car for Purpose of Trip	Crowdwd Routes	Other	Time to Ride	No Bike	Need to Transport Children
Prevents Bicycling	2.75	1.66	1.03	1.97	5.3	4.07	1.35	8.28	4.93	1.03	3.28	3.32	0.93	7.49	1.99	1.21	0.26	1.32	.91
Major Factor	1.38	4.76	1.06	6.35	10.38	10.78	2.51	6.43	9.99	2.78	8.2	8.33	1.68	10.78	4.89	0.65	0.13	0.31	0.3
Minor Factor	1.88	9.01	2.75	7.47	9.91	9.97	4.05	6.04	6.92	5.82	6.81	7.07	2.22	5.57	5.02	0.42	0.01	0.2	0.11

Frequency of Bicycling for Utility Trips

For those who consider using bicycles for utility trips, the frequency of actual use is presented in Table IC.2.

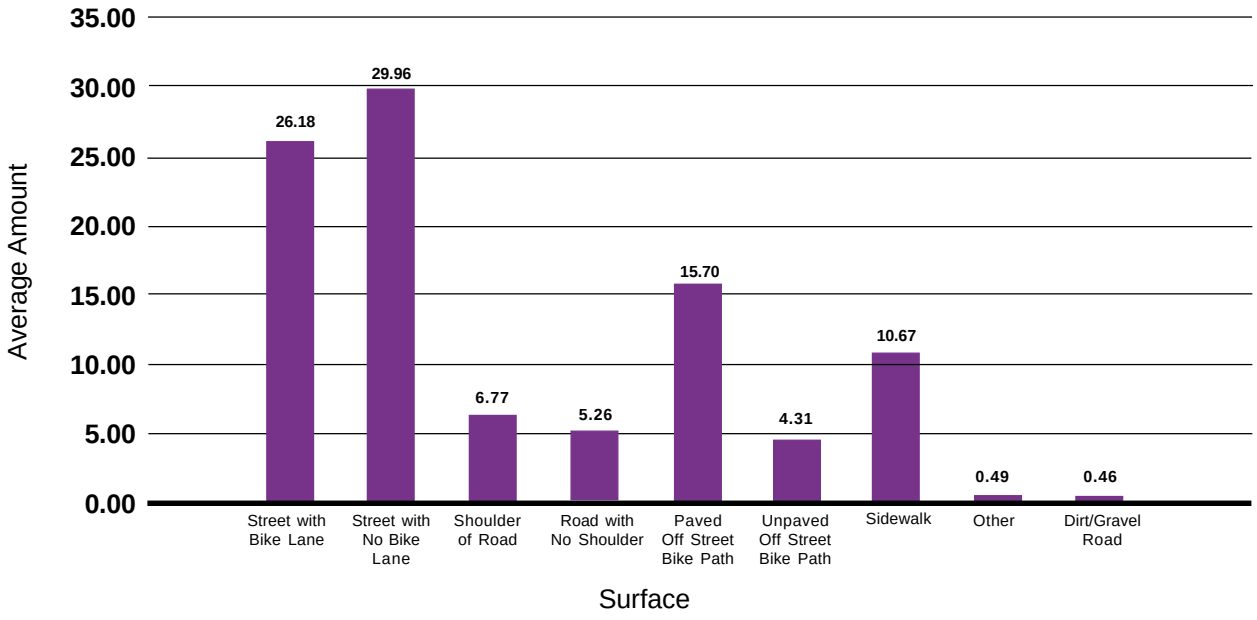
Table IC.2 Frequency of the Use of Bicycle for Utility Trip

More than once per week	Once per week	2-3 times per week	Once per month	Less than once per month	Never
8%	7%	10%	10%	21%	44%

Surfaces Used for Utility Trips

The distribution of the surfaces on which utility trips take place are given in Figure IC.5. Thirty percent of every utility trip takes place on streets with no bicycle lane/shoulder. Twenty-six percent on streets with bicycle lane/shoulders. Sixteen percent is on paved off-street bike paths, and 11 percent on sidewalks.

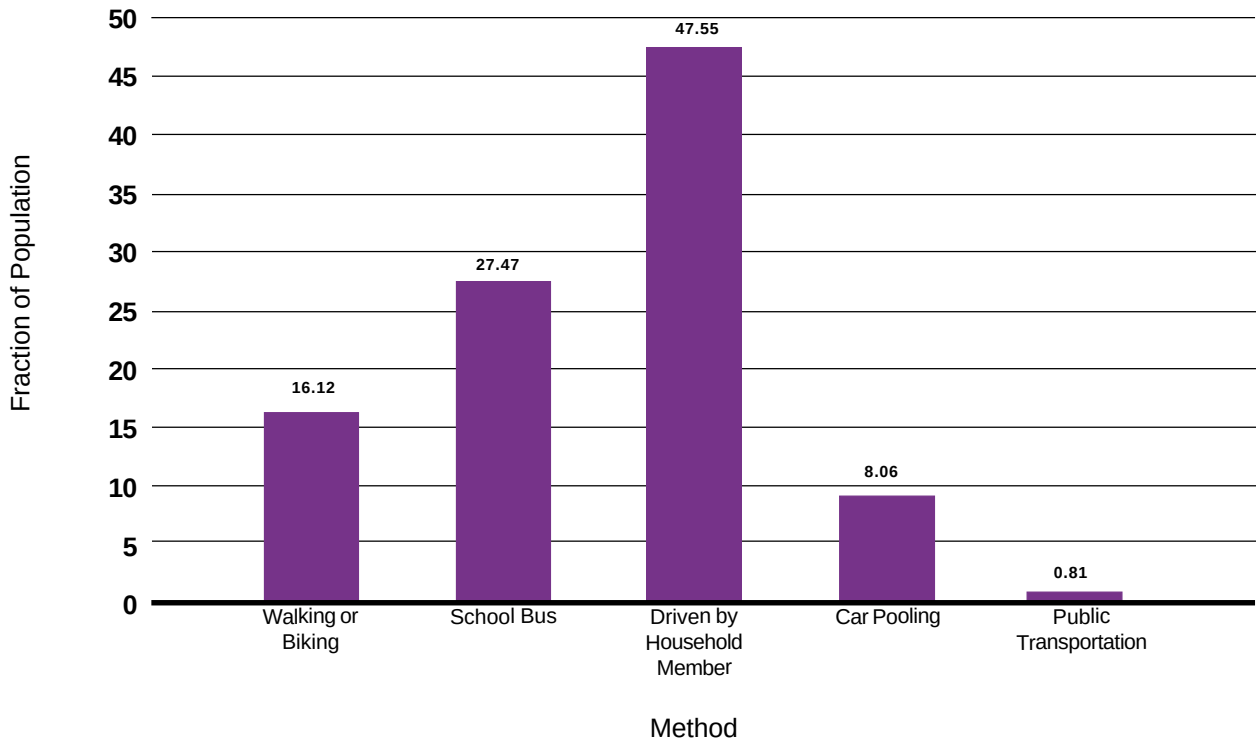
Figure IC.5 Average Amount of Utility Trip Ridden on Specific Surfaces



D. Transportation of Young Children

Twenty-five percent of the households surveyed reported having school-age children present in their household. These respondents were then asked about the method by which the youngest school-age child travels to and from school. Figure ID.1 presents the responses. Nearly half of these families drive the child to school. Children in 27 percent of the households ride a school bus, and 16 percent walk or bicycle to school. Car-pooling is the transportation method used by only 8 percent of these households. Public transportation is very uncommon statewide—less than one percent of the households indicated that their youngest school-age child used public transportation to get to school.

Figure ID.1 Primary Method of Transportation for Youngest School Age Child



Distance to Child's School

As shown in Figure ID2, just over half of these students travel 2 miles or less to get to their school. As shown in Table ID.1 below, children's transportation methods vary by the distance they must travel to school (also shown separately in figures ID3 - ID8). Seventy-six percent of those who live within 1/8 of a mile of the school walk or ride their bikes, although 17 percent of children living near the school are still driven by a family member. Predictably, the proportions walking or bicycling decline and the proportions who use other transportation methods increase as distance from school increases. Among those who live one to two miles from school, only 6 percent walk or bicycle, while 38 percent ride the school bus. Forty-seven percent of these households drive their child to school for the same distance.

Table ID.1 Transporting Children

	Primary Method of Transporting Youngest Child to School, by Distance from School.				
Distance from School	Walking or Bicycling	School Bus	Driven by Family Member	Car-Pool	Public Transportation
Within 1/8 mile	76%	6%	17%	1%	0%
1/8 to 1/4 mile	57%	3%	34%	4%	1%
1/4 to 1/2 mile	41%	11%	38%	10%	0%
1/2 to 1 mile	19%	23%	52%	6%	1%
1 to 2 miles	6%	38%	47%	7%	2%
more than 2 miles	1%	35%	54%	10%	1%

Figure ID.2 Distance to Youngest Childs School

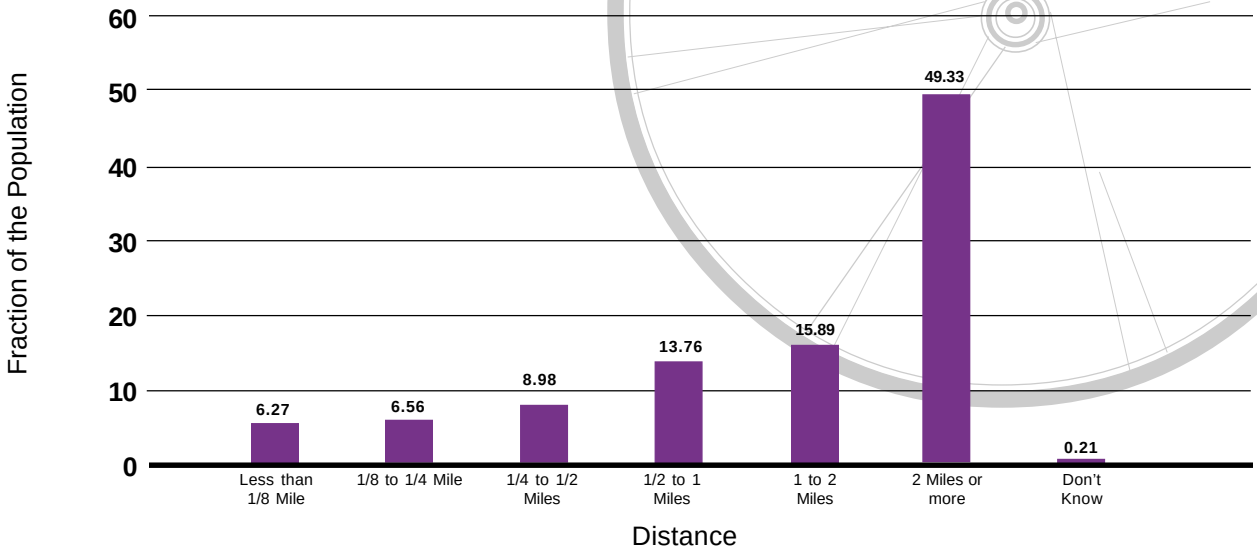


Figure ID.3 Primary Method of Transportation of Youngest Child for School Less Than 1/8 Mile

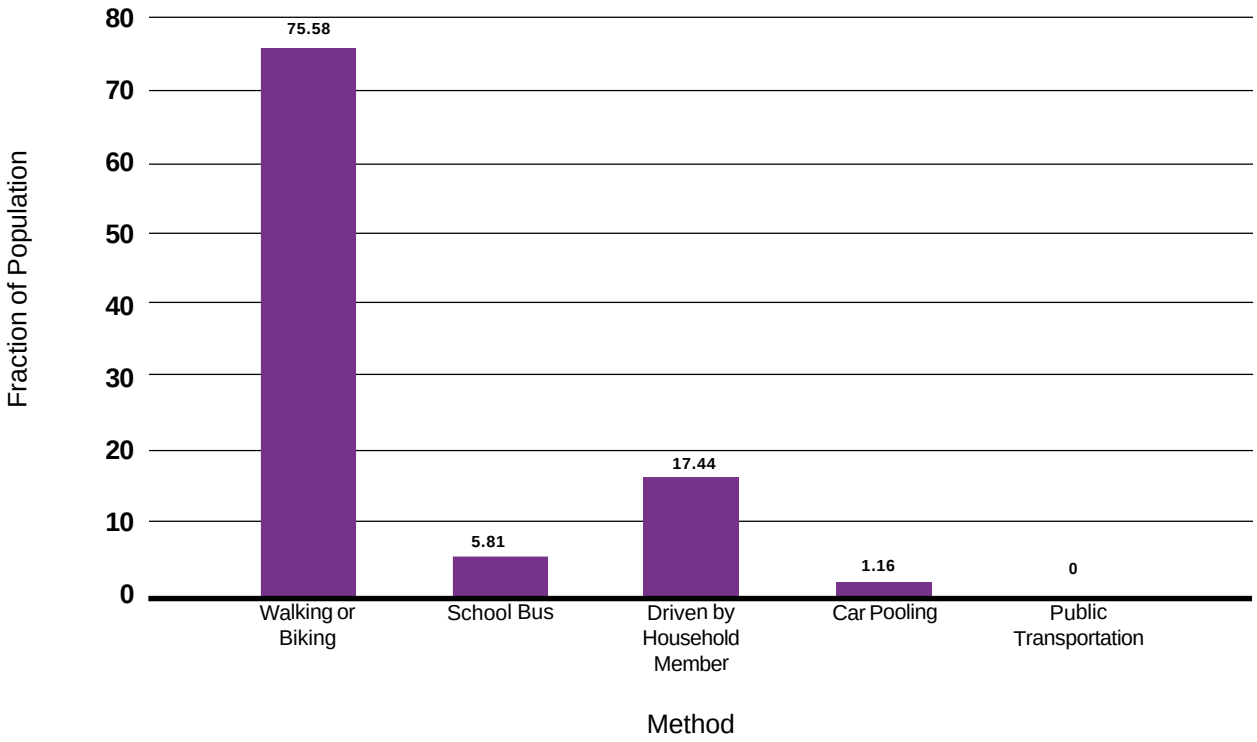


Figure ID.4 Primary Method of Transportation of Youngest Child for School 1/8 to 1/4 Mile Away

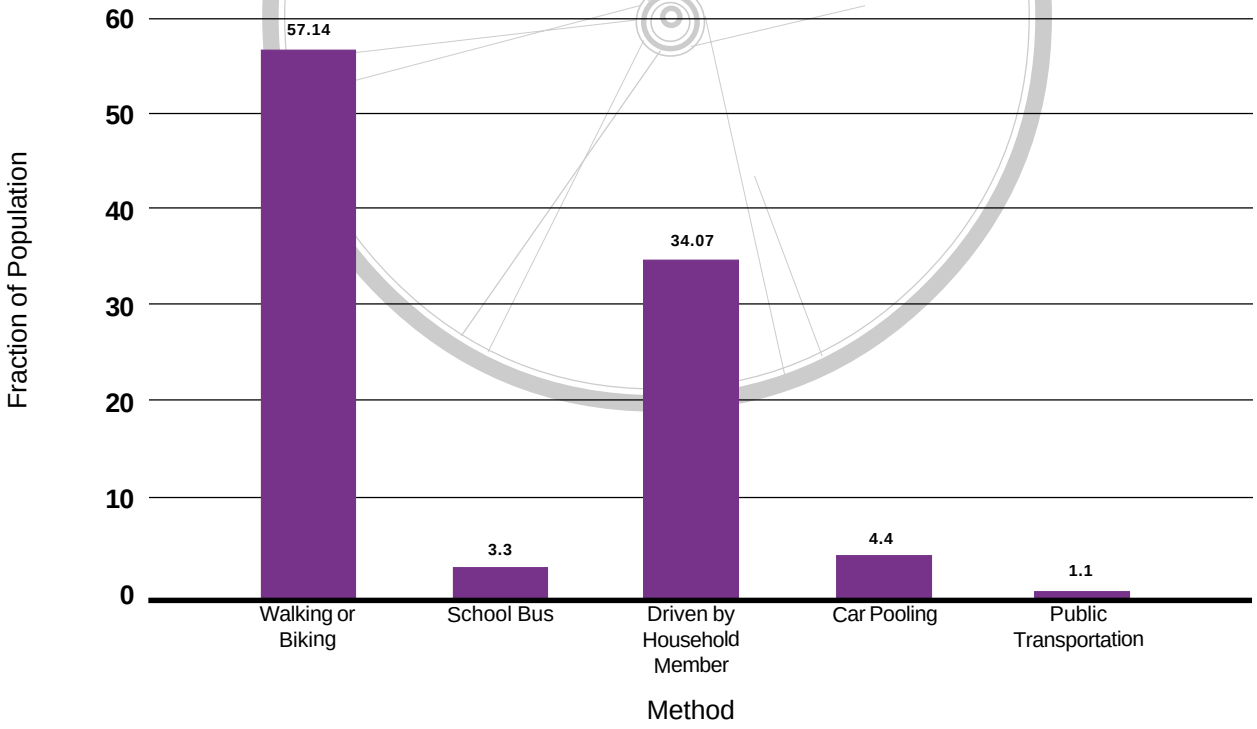


Figure ID.5 Primary Method of Transportation of Youngest Child for School 1/4 to 1/2 Mile Away

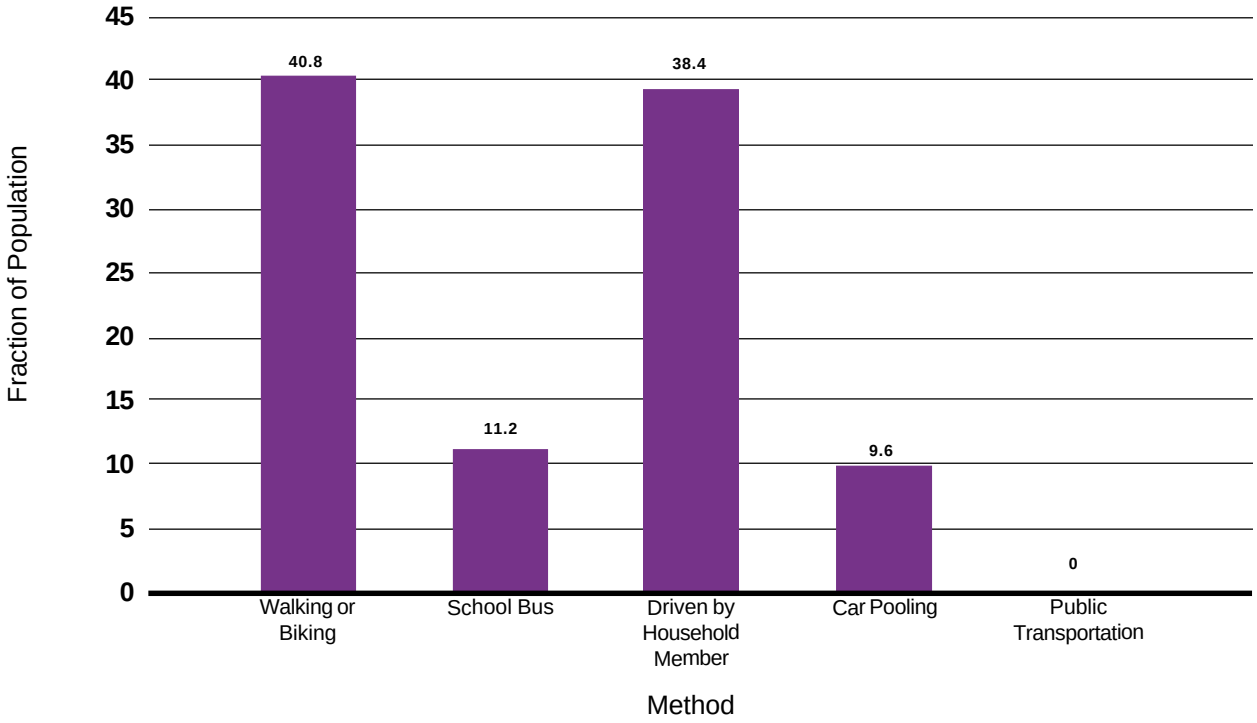


Figure ID.6 Primary Method of Transportation of Youngest Child for School 1/2 to 1 Mile Away

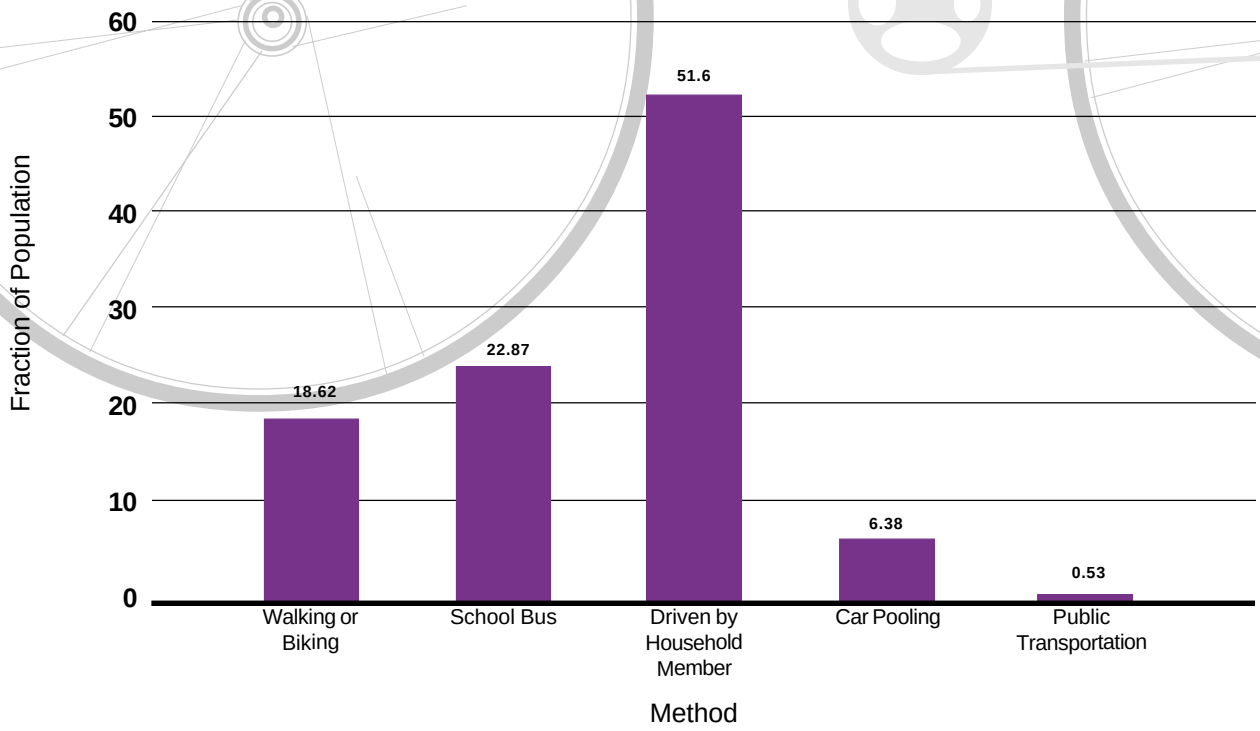


Figure ID.7 Primary Method of Transportation for Youngest School Aged Child

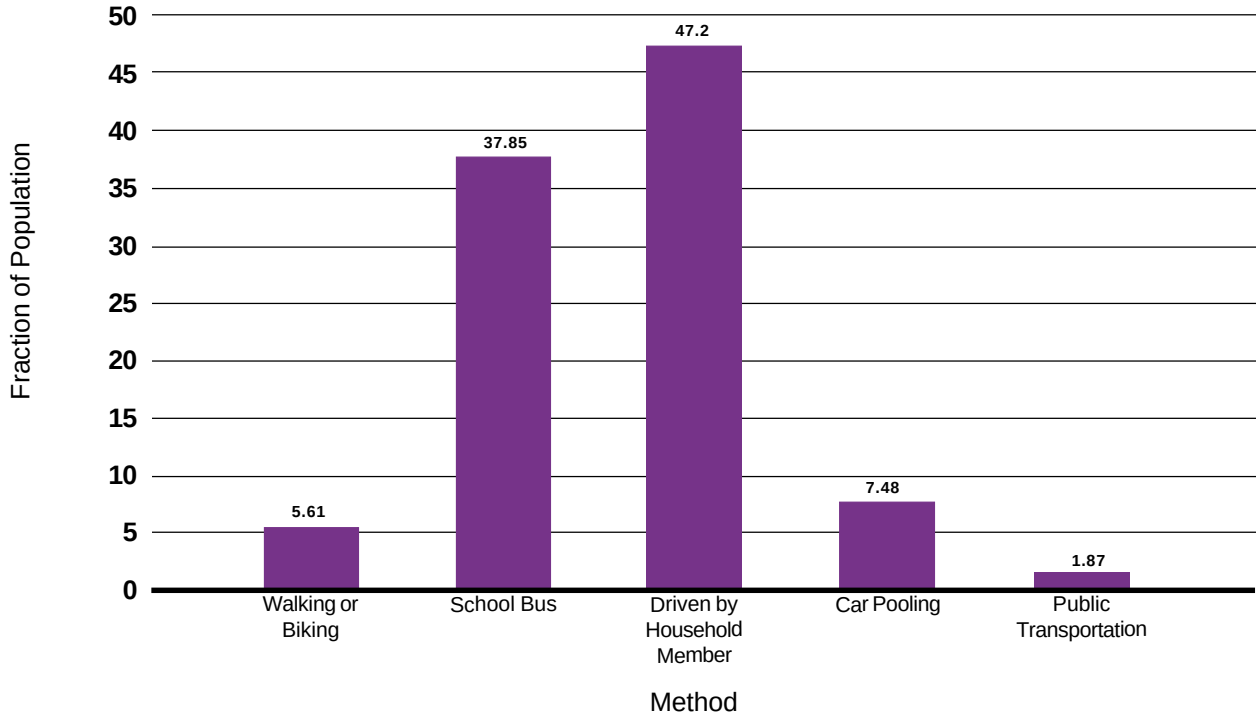
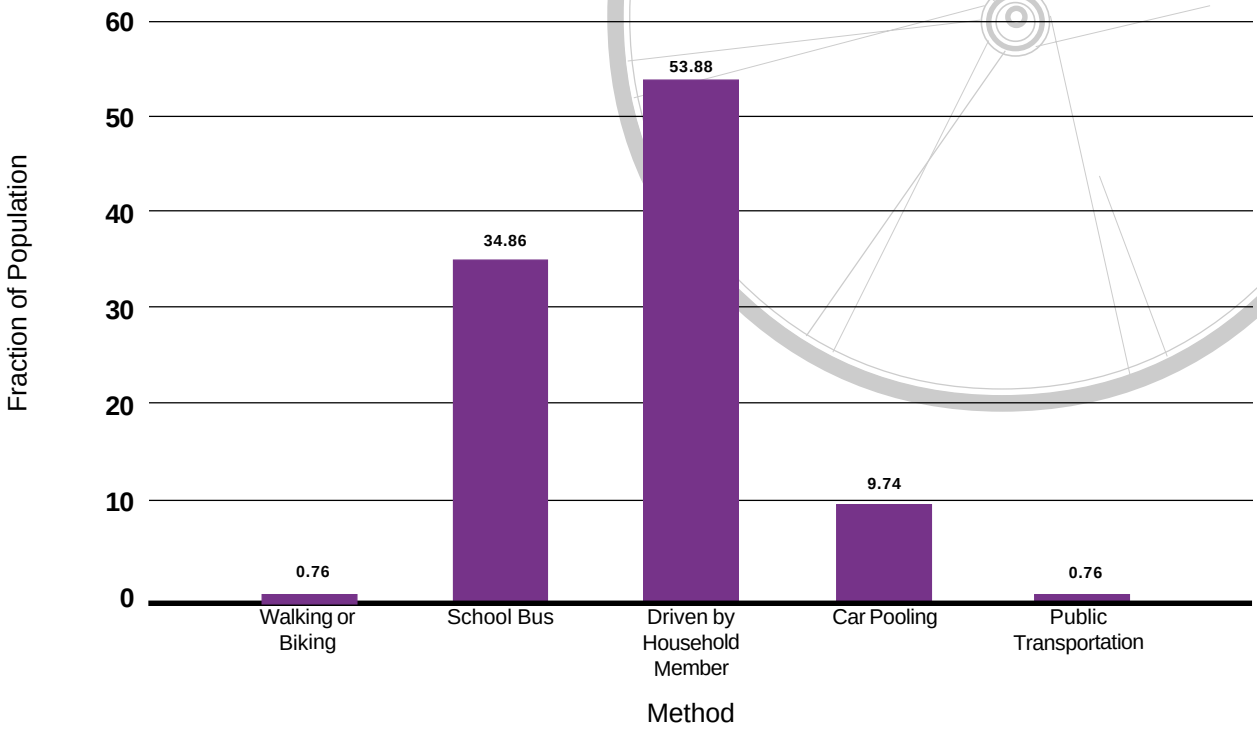


Figure ID.8 Primary Method of Transportation of Youngest Child for School 2 or More Miles Away

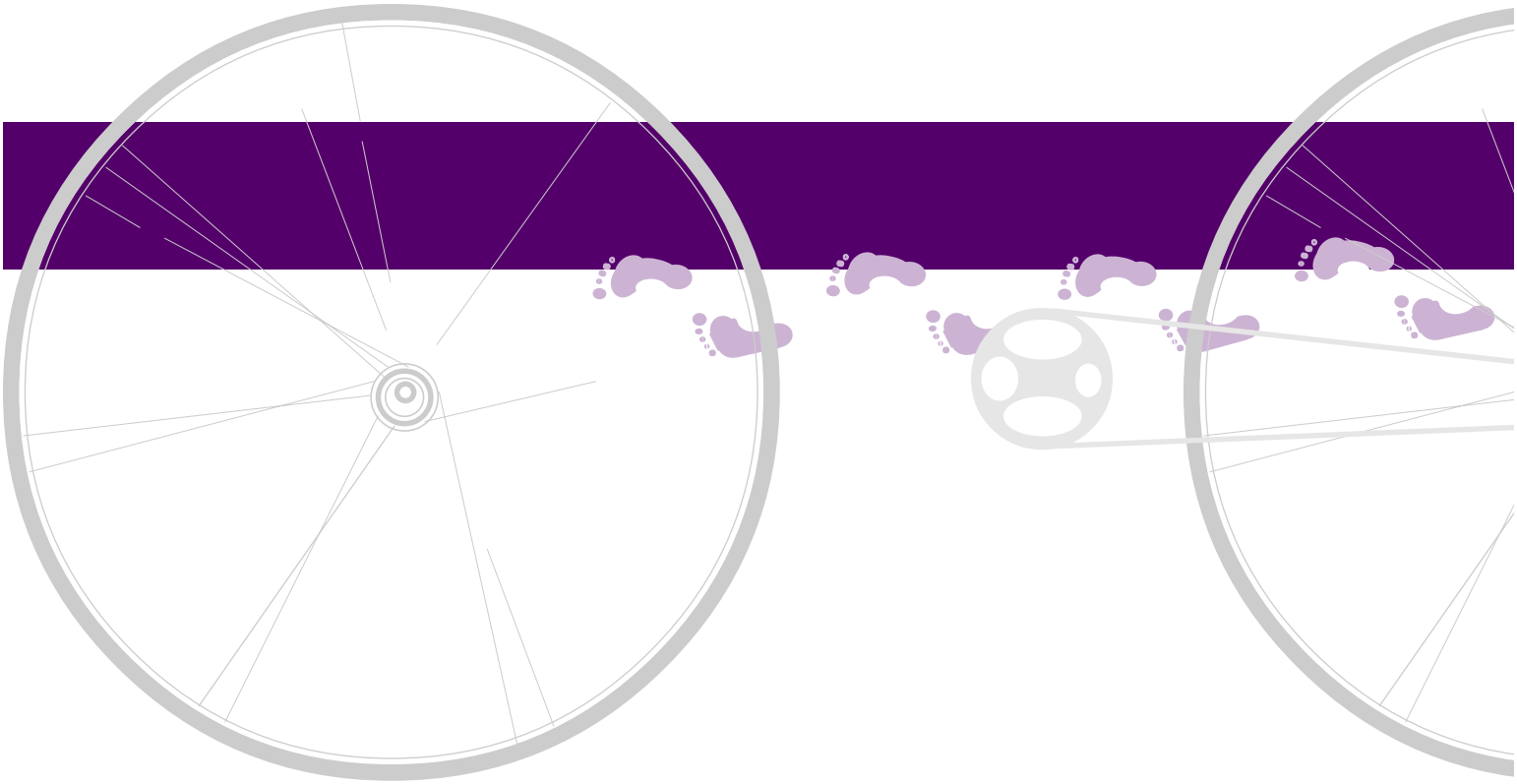


Use of Public Transportation

As the table above (Table ID.1) shows, public transportation is not the primary means of transporting children to school—less than 2 percent of Colorado households indicate that the youngest child uses public transportation. However, many of these children live in areas not serviced by public transportation. To get a better idea of the use of public transportation in transporting school children, we look at the transportation methods reported by households located in the urban areas with public transportation. These include households in Aurora, Arvada, Colorado Springs, Denver, Lakewood, Englewood, Northglenn, Thornton, and Westminster. For just this sample of households, the following table (Table ID.2) reports the primary method of transporting the youngest child to school. The proportion of families who have children that use public transportation is slightly higher in the urban areas, though still not a common method.

Table ID.2 Transporting Children to School

	Primary Method of Transporting Youngest Child to School, by Distance from School for Households in the Urban Areas				
Distance from School	Walking or Bicycling	School Bus	Driven by Family Member	Car-Pool	Public Transportation
Within 1/8 mile	79%	2%	19%	0%	0%
1/8 to 1/4 mile	50%	0%	41%	7%	2%
1/4 to 1/2 mile	44%	11%	31%	15%	0%
1/2 to 1 mile	21%	18%	52%	9%	0%
1 to 2 miles	9%	33%	49%	6%	3%
more than 2 miles	0%	21%	62%	14%	1%



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II. RECREATIONAL BICYCLING

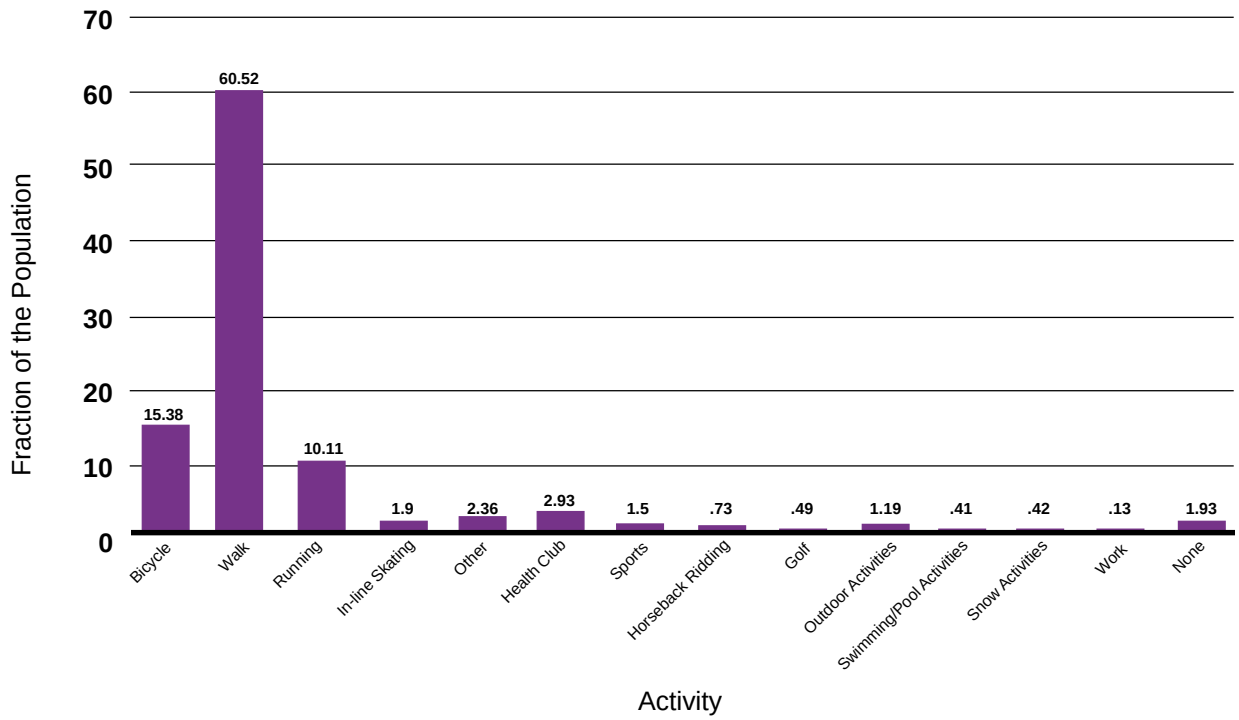
A. Recreational and Exercise Trips

Primary Recreation Activity

Respondents were asked about types of activities in which the primary purpose is recreation or exercise. If the activity is also used to run an errand or get to school or work, it should not be considered a recreation or exercise trip. These activities are ones that are originated from home, work or school. Examples would include roller-blading on your lunch hour from your office or walking to the park from your home for a picnic or game of tennis.

Figure IIA.1 portrays the types of the primary recreation and exercise activities and their frequency. Sixty-one percent of the population indicated that their primary recreation/exercise activity was walking, followed by bicycling with fifteen percent and running at 10 percent. Health club activities are at the 3 percent level.

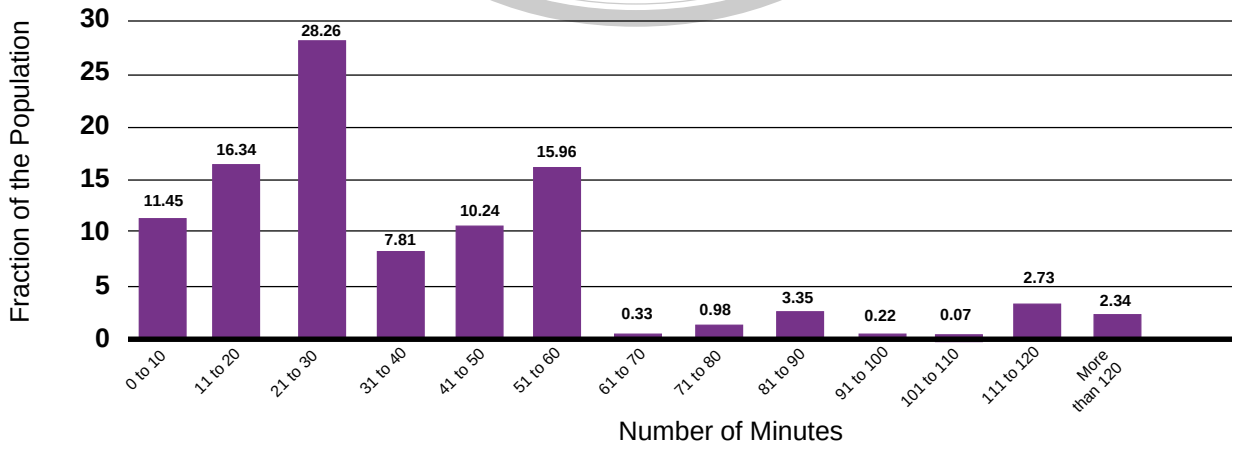
Figure IIA.1 Primary Recreation/Exercise Activity



Time Traveling to Recreation and Exercise Location

Figure IIA.2 displays the information about the time it takes to go to the location for the recreation/exercise activity (round-trip). Eleven percent indicated that it took ten minutes or less to go and come back to the location where the recreation/exercise activity takes place. Forty-five percent indicated that they spent between 11 and 30 minutes round-trip. It takes between half-an-hour and one hour for the thirty-four percent of the population to go and come back to their location of recreation/exercise activity.

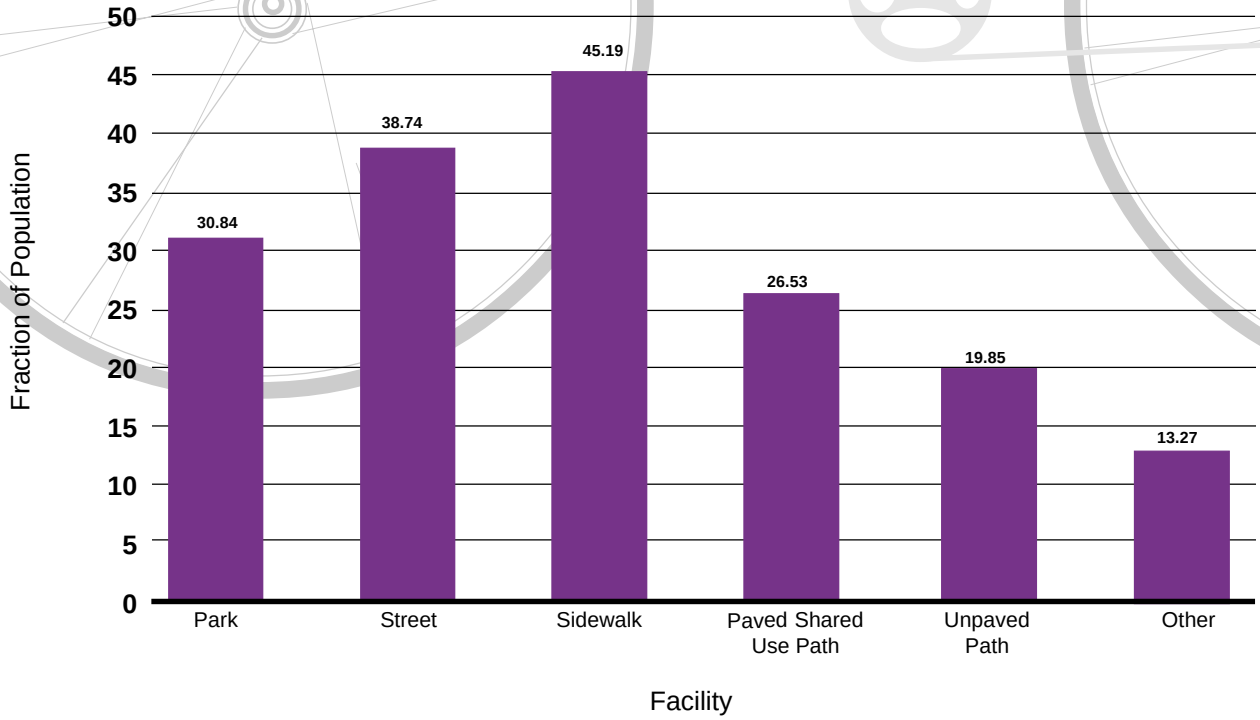
Figure IIA.2 Average Duration of Recreation Exercise Trip



Method of Transportation for Recreation and Exercise Trips

Figure IIA.3 presents the facilities used for primary recreation and exercise activities. Because the respondents are allowed to choose more than one facility, the proportions add to more than 100. Forty-five percent of the population use sidewalks; streets are used by 39 percent of the people for their primary recreation/exercise activities. Thirty-one percent use parks, and 27 percent use paved shared-use paths.

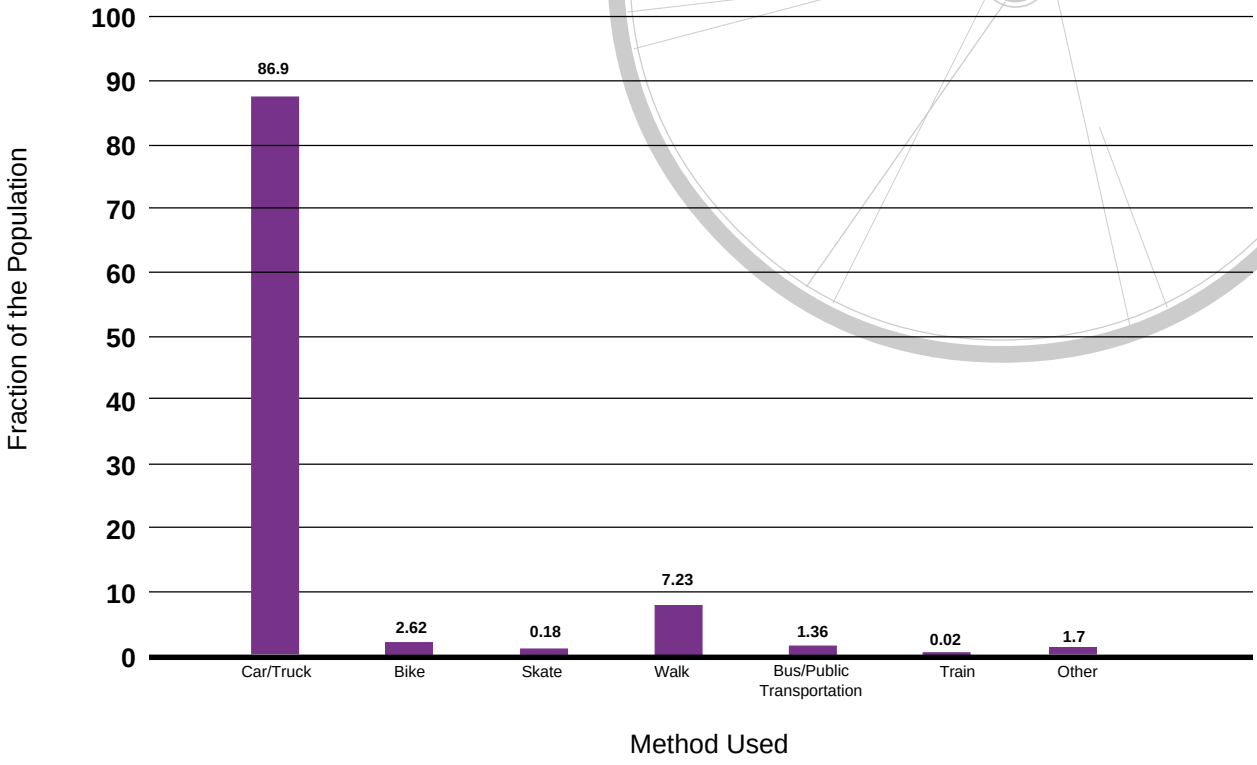
Figure IIA.3 Percentage of Population Using Specific Facilities for Recreation or Exercise



Recreation and Exercise Trips Involving Travel to Another Location

Some recreation/exercise activities require traveling to a remote location. An example is taking a bus or driving to the mountains to hike. Figure IIA.4 shows the methods of transportation and their prevalence for these trips. The overwhelming majority of the people (87 percent) drive a car or truck when traveling to a remote location to exercise. Seven percent walk, and three percent bicycle when making these trips.

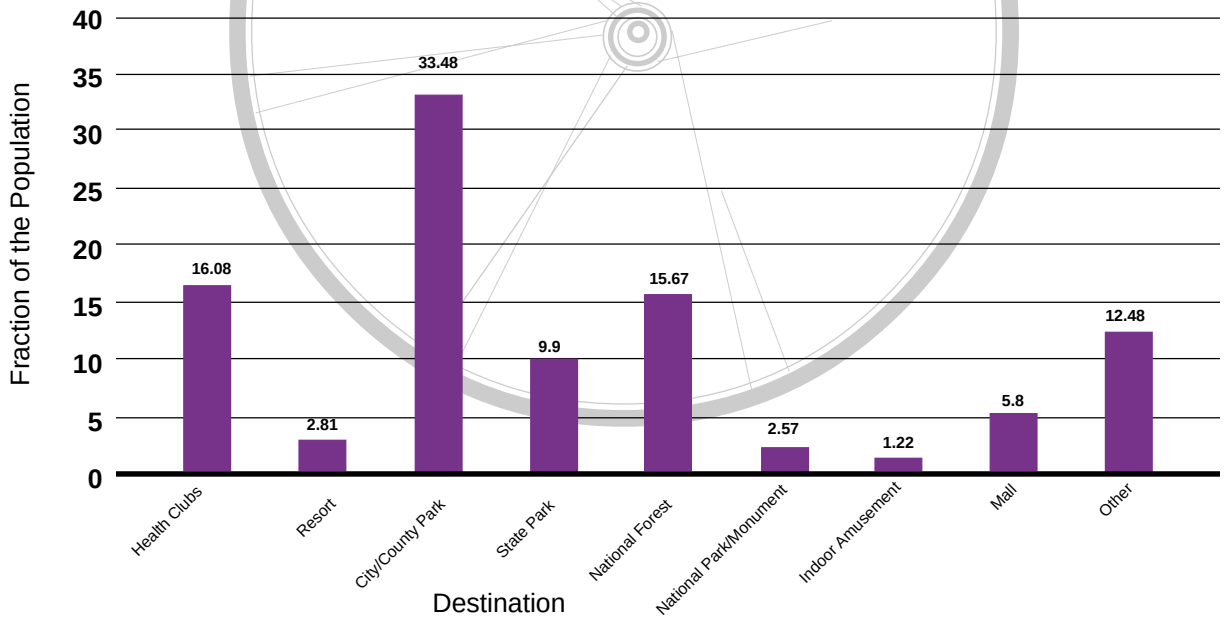
Figure IIA.4 Method of Transportation to Remote Location for Purposes of Recreation/ Exercise



Destination of Recreation and Exercise Trips

Figure IIA.5 shows the destinations for these trips. Thirty-three percent go to city or county parks or open spaces, 16 percent go to health clubs, and another 16 percent go to National Forests and 10 percent to State Parks.

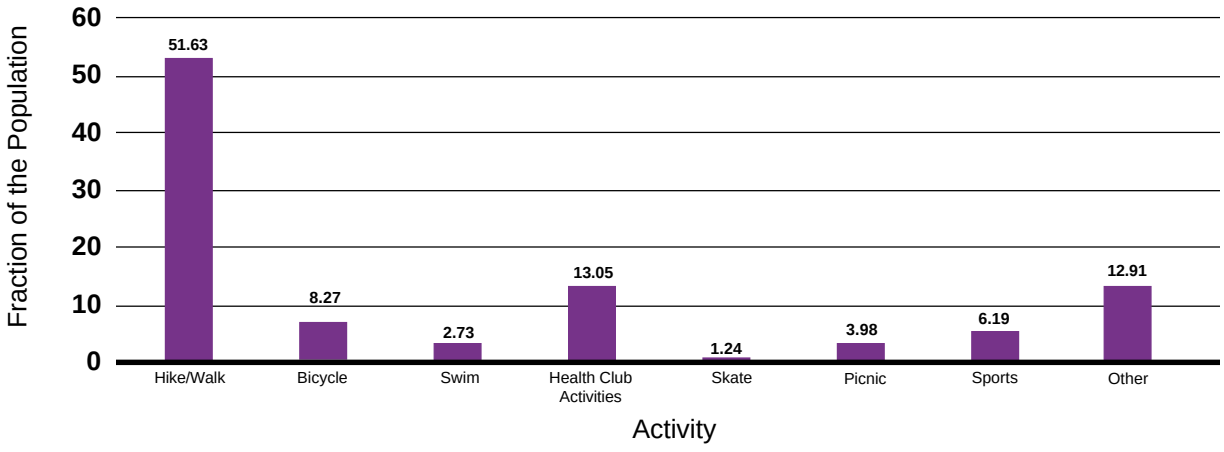
Figure IIA.5 Destination for Most Remote Recreation/Exercise Trips



Type of Recreation and Exercise Activity

The type of recreation and exercise activities and their frequency in remote locations are displayed in Figure IIA.6. Most of these activities take place outdoors. More than half (52 percent) hike or walk, thirteen percent engage in health club activities, eight percent bicycle, six percent engage in a sport, and four percent have a picnic.

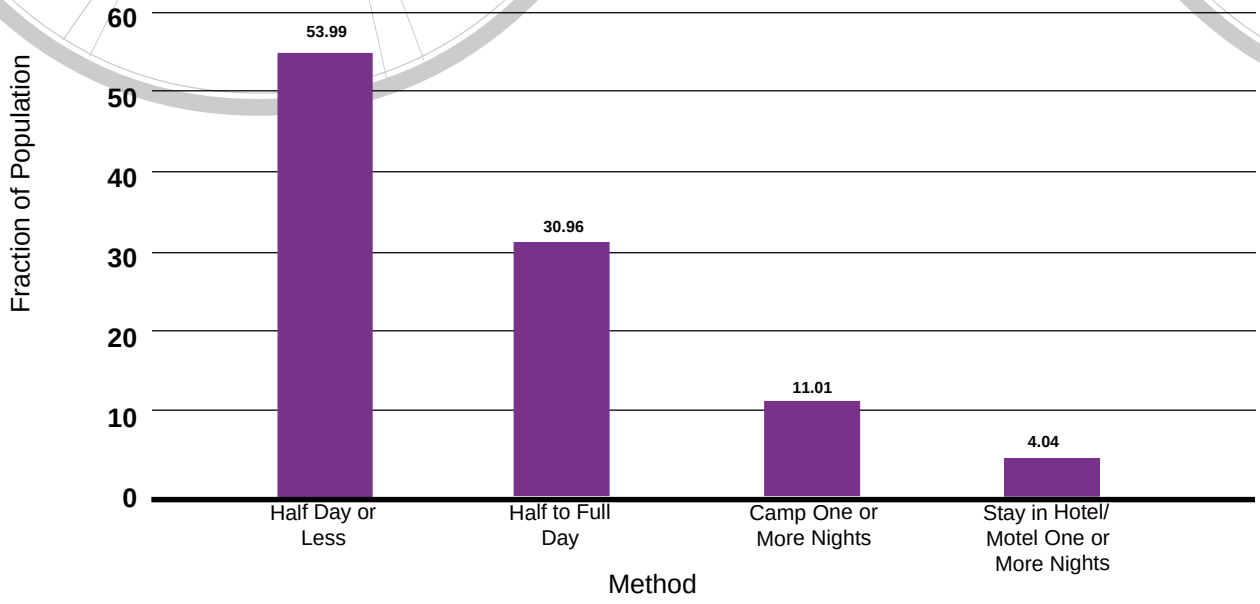
Figure IIA.6 Recreation/Exercise Activity Engaged in at Remote Location



Time Spent at Recreation and Exercise Destination

Figure IIA.7 shows the amount of time people typically spend at the remote locations. The majority (54 percent) spend half a day or less. Thirty-one percent spend between half-a-day and a full day. Eleven percent camp one or more nights, and four percent stay in a hotel or motel for one or more nights.

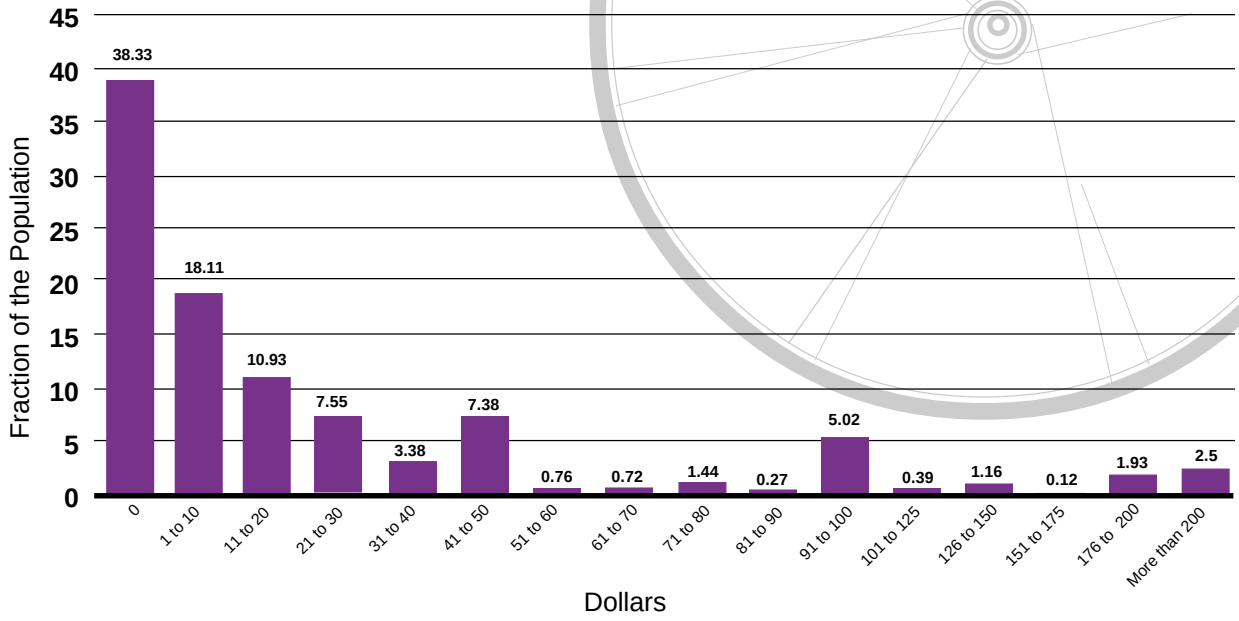
Figure IIA.7 Average Length of Stay at Remote Recreation/Exercise Location



Spending During Recreation and Exercise Trips

The amount of money typically spent at the remote location is presented in Figure IIA.8. Thirty-eight percent do not spend any money. Twenty-nine percent spend $20 or less, 18 percent spend between $21 and $50. Three percent spend between $51 and $90, 5 percent spend between $91-$100, and six percent spend more than $100.

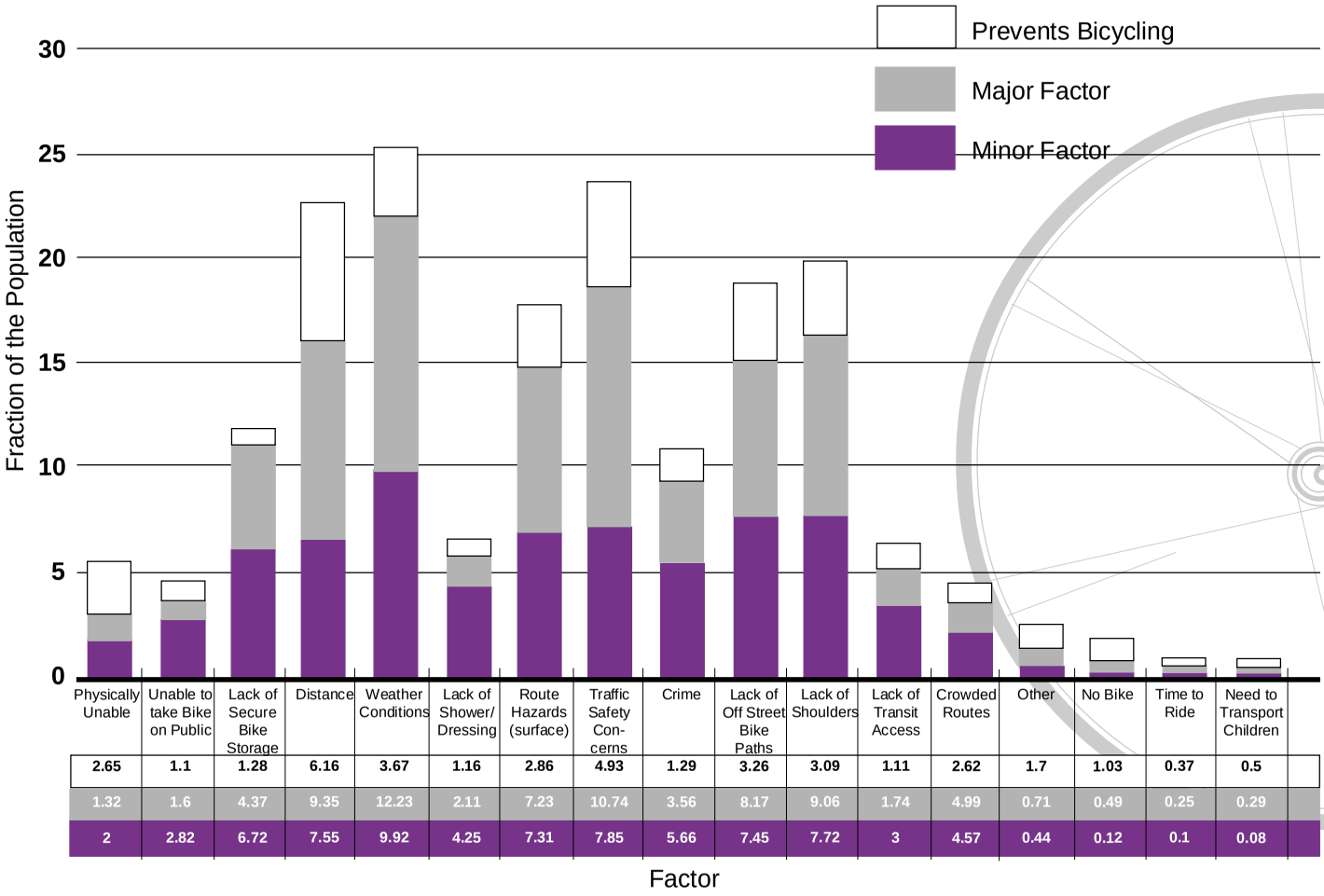
Figure IIA.8 Average Amount Spent at Remote Recreation/Exercise Location



Factors Influencing the Decision to Bicycle for Recreation and Exercise

Survey respondents were asked to identify factors that may prevent them from bicycling for recreational purposes. The survey listed thirteen factors that might affect their decision to bicycle, and each respondent was asked to indicate whether each: was not a factor, was a minor factor, was a major factor, or prevented them from bicycling completely. The first thirteen bars in Figure IIA.9 display the frequency of these responses. Respondents were also able to list one other factor that interfered with their ability to bicycle for recreation and exercise. The most frequently mentioned obstacles were: not having a bicycle, not having time to ride, and needing to transport children. The degree to which these prevented bicycling are shown in the last three bars in the figure. As was the case with work travel, school travel, and utility trips, weather conditions is the leading reason people give for not using bicycles for recreation/exercise purposes. Route hazards, lack of shoulders and paths, and traffic concerns are also important obstacles to riding for recreation purposes. Though some respondents mentioned the lack of shower and dressing facilities and the inability to take bicycles on public transportation, these were identified as obstacles to riding (even a minor one) by less than ten percent of respondents.

Figure IIA.9 Factors that Prevent Using Bicycle on Recreation/Exercise Trips

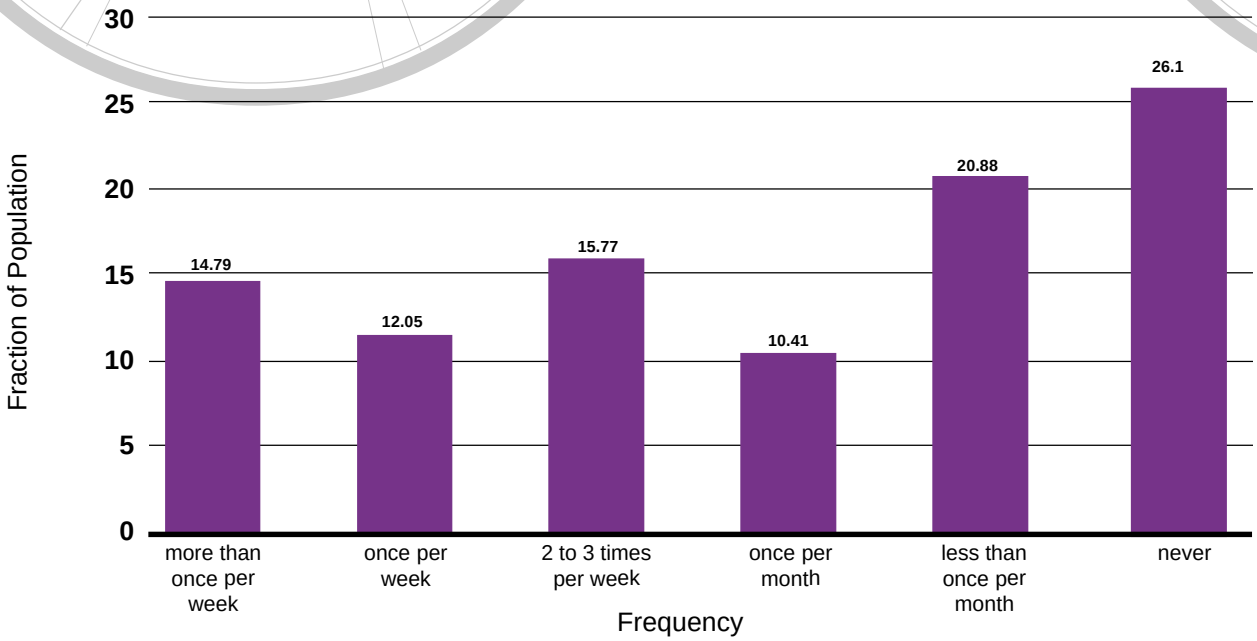


	Physically Unable	Unable to take Bike on Public	Lack of Secure Bike Storage	Distance	Weather Conditions	Lack of Shower/ Dressing	Route Hazards (surface)	Traffic Safety Con-cerns	Crime	Lack of Off Street Bike Paths	Lack of Shoulders	Lack of Transit Access	Crowded Routes	Other	No Bike	Time to Ride	Need to Transport Children
	2.65	1.1	1.28	6.16	3.67	1.16	2.86	4.93	1.29	3.26	3.09	1.11	2.62	1.7	1.03	0.37	0.5
	1.32	1.6	4.37	9.35	12.23	2.11	7.23	10.74	3.56	8.17	9.06	1.74	4.99	0.71	0.49	0.25	0.29
	2	2.82	6.72	7.55	9.92	4.25	7.31	7.85	5.66	7.45	7.72	3	4.57	0.44	0.12	0.1	0.08

Frequency of Bicycle Trips for Recreation and Exercise

Figure IIA.10 presents information regarding the frequency of recreation/exercise trips made by bicycle in good weather conditions. Fifteen percent make recreation or exercise trips by bicycle more than one a week, 12 percent do so once a week. Twenty-one percent make this type of a trip less than once a month, and 26 percent never use a bicycle for recreation/exercise trips.

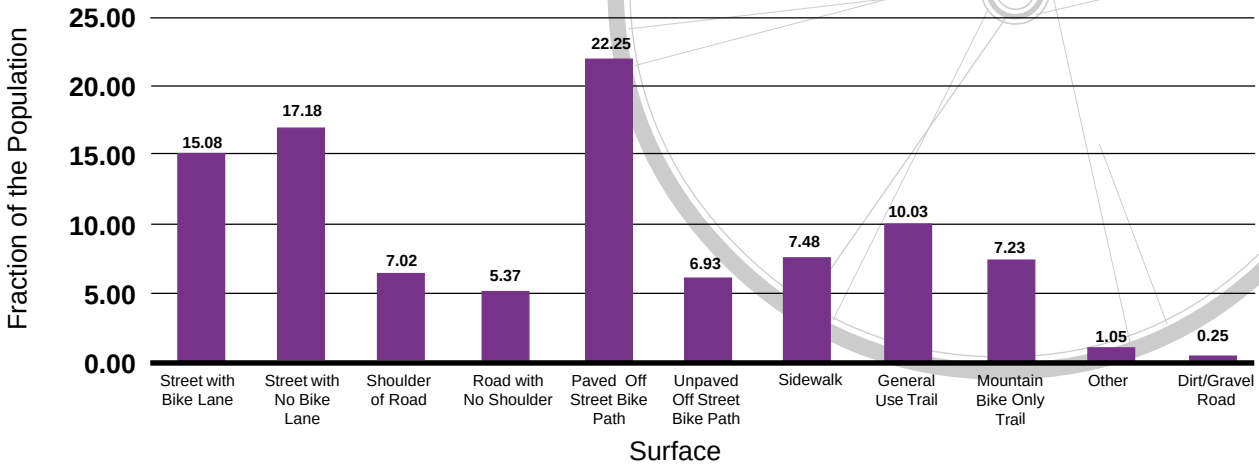
Figure IIA.10 Frequency of Bicycle Use for Recreation/Exercise Trip



Facilities Used for Bicycle Recreation and Exercise Activities

As Figure IIA.11 shows, paved off-street bicycle paths are most frequently used for recreation and exercise related bicycle trips, followed by city streets with no bicycle shoulders. Streets with bicycle lanes are the third most used surface for recreation or exercise related bicycling, and general use trails are the fourth.

Figure IIA.11 Average Amount of Recreation/Exercise Ride on Specific Surfaces



B. Bicycle-Related Vacations

We surveyed households to gather information on any vacations they take (both in-state and outside of Colorado). Nearly 10 percent of Colorado households indicated that they had taken a bicycle-related vacation within Colorado in the past 12 months. Among those households who did, the typical household spent $360 per vacation. Spending on bicycle-related vacations within Colorado totaled $47.8 million dollars over the past 12 months.

We also asked about any vacations involving bicycling in which they traveled outside of Colorado. Just under 5 percent said that they had taken such a vacation and, on average, spent $950 per trip. This means that total annual spending by Coloradans on out-of-state bicycle-related vacations totaled $60 million dollars.

III. BICYCLE AND PEDESTRIAN SAFETY

A. Bicycle Safety

Helmet Use

Fifty-nine percent of Colorado households with bicycles report owning bicycle helmets. The use of these helmets varies depending on the age of the cyclist and the type of surface. Survey respondents were asked to indicate the frequency of helmet use when riding on various surfaces. The frequency is indicated by selecting from a five point scale with one indicating that the rider "never wears a helmet" and five indicating that the rider "always wears a helmet."

Adult riders (over the age of 16) are most likely to either always wear a helmet or never wear a helmet as shown in Figures IIIA.1 – IIIA.4. Helmet use by this group is most common on mountain terrain (Figure IIIA.4). Just over half (51%) report that they always wear a helmet when riding in the mountains, but 37 percent report that they never do. Similar patterns of helmet use by adults (although at slightly lower levels) are reported for those riding on unpaved trails, streets and paved bike paths. Adult riders are least likely to wear helmets on paved paths where 38 percent report that they always wear a helmet and 42 percent never wear one (Figure IIIA.1).

Figure IIIA.1 Frequency of Helmet Use by Adults when Riding on a Paved Bicycle Path

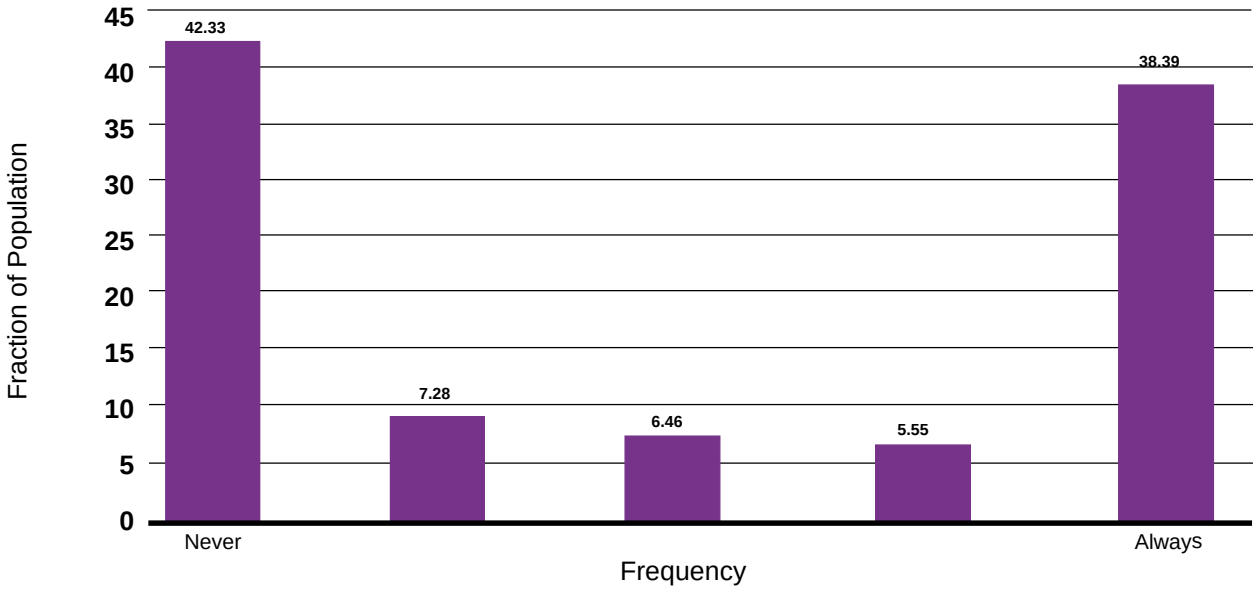


Figure IIIA.2 Frequency of Helmet Use by Adults when Riding on a Street

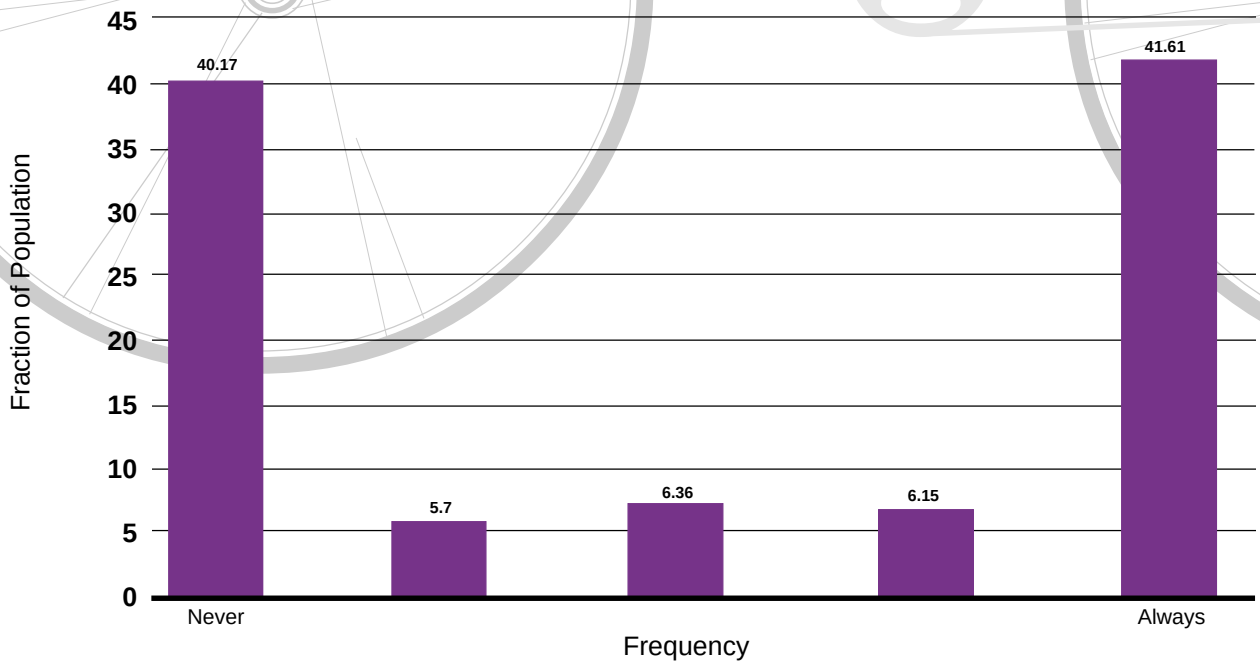


Figure IIIA.3 Frequency of Helmet Use by Adults when Riding on an Unpaved Trail

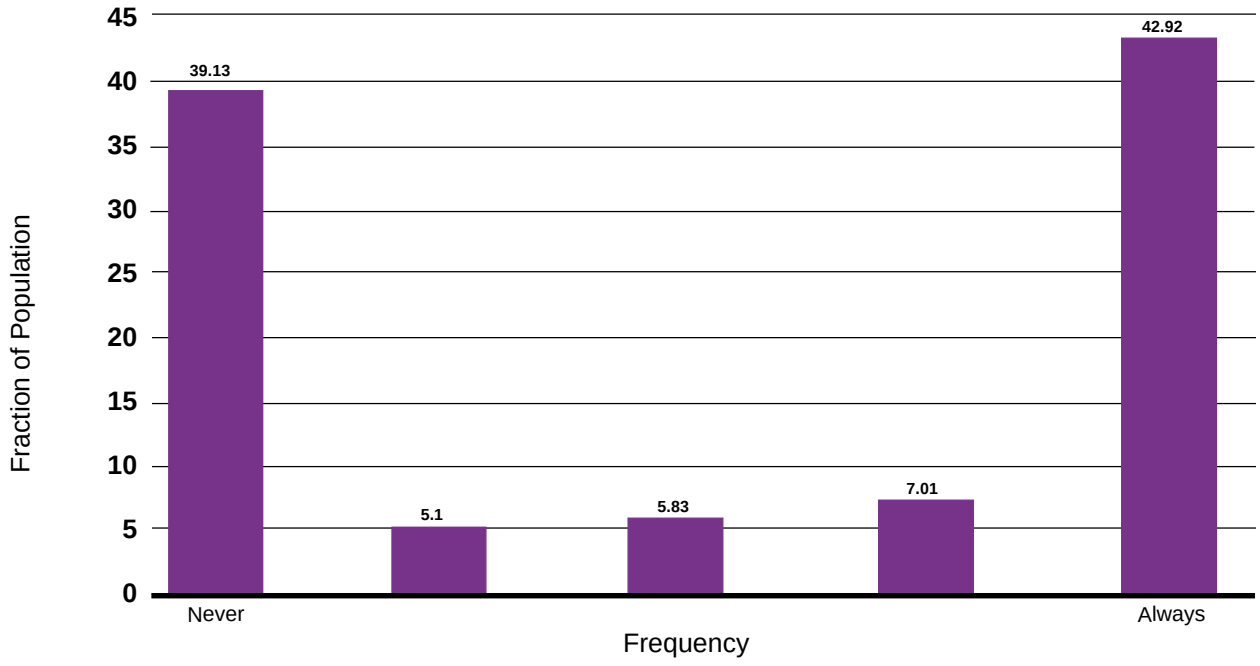
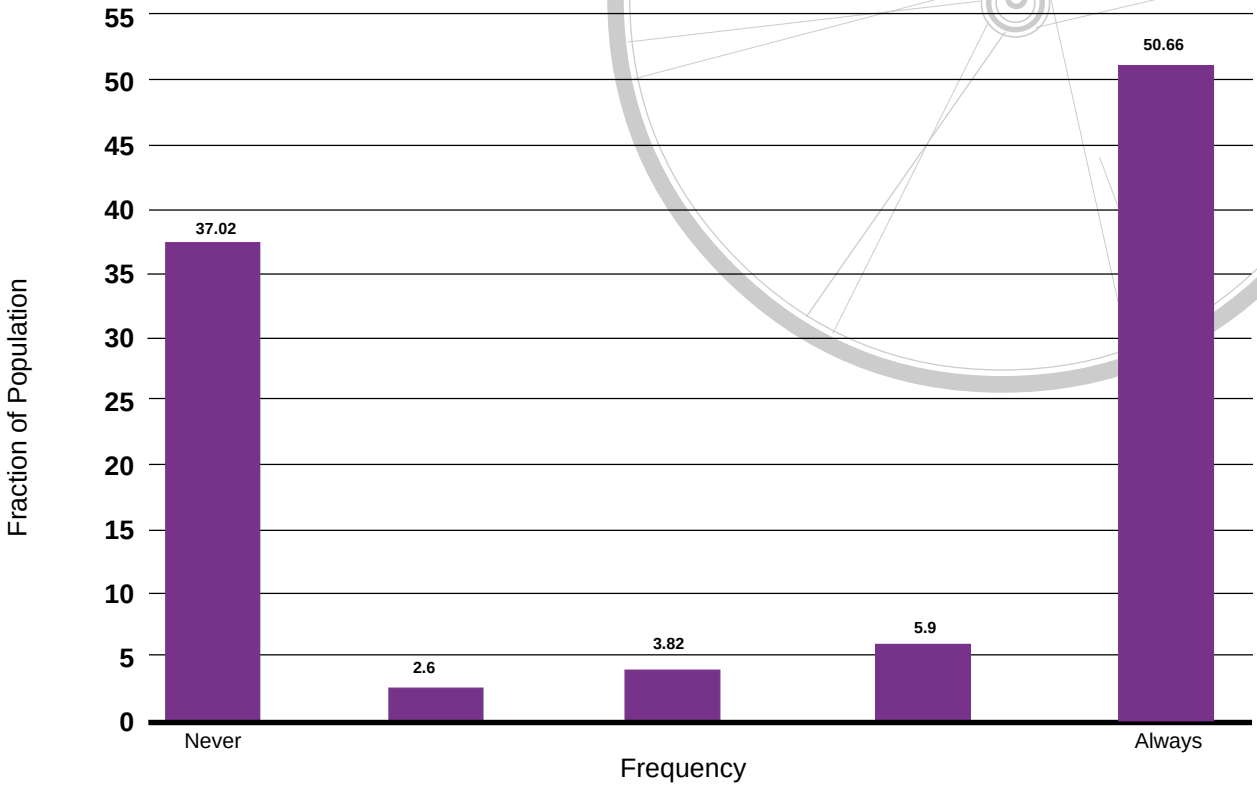


Figure IIIA.4 Frequency of Helmet Use by Adults when Riding on Mountain Terrain



Helmet Use by Children

As reported in Figures IIIA.5-IIIA.8, young children who ride bikes are much more likely than adults to wear helmets. Just under 70 percent of young children always wear helmets when riding on mountain terrain, although 16 percent never do. Fewer, 61 percent, of young children always wear a helmet when riding on the street. Just over 13 percent of children never wear a helmet when bicycling on streets.

Figure IIIA.5 Frequency of Helmet Use by Children when Riding on a Paved Bike Path

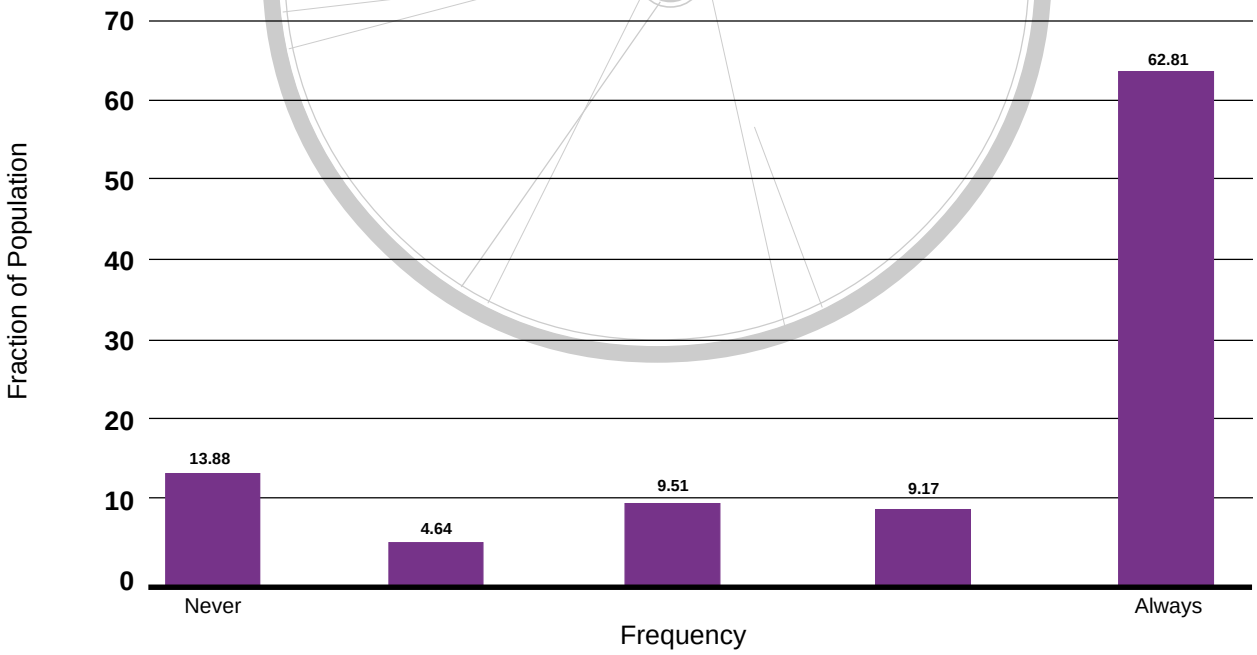


Figure IIIA.6 Frequency of Helmet Use by Children when Riding on Street

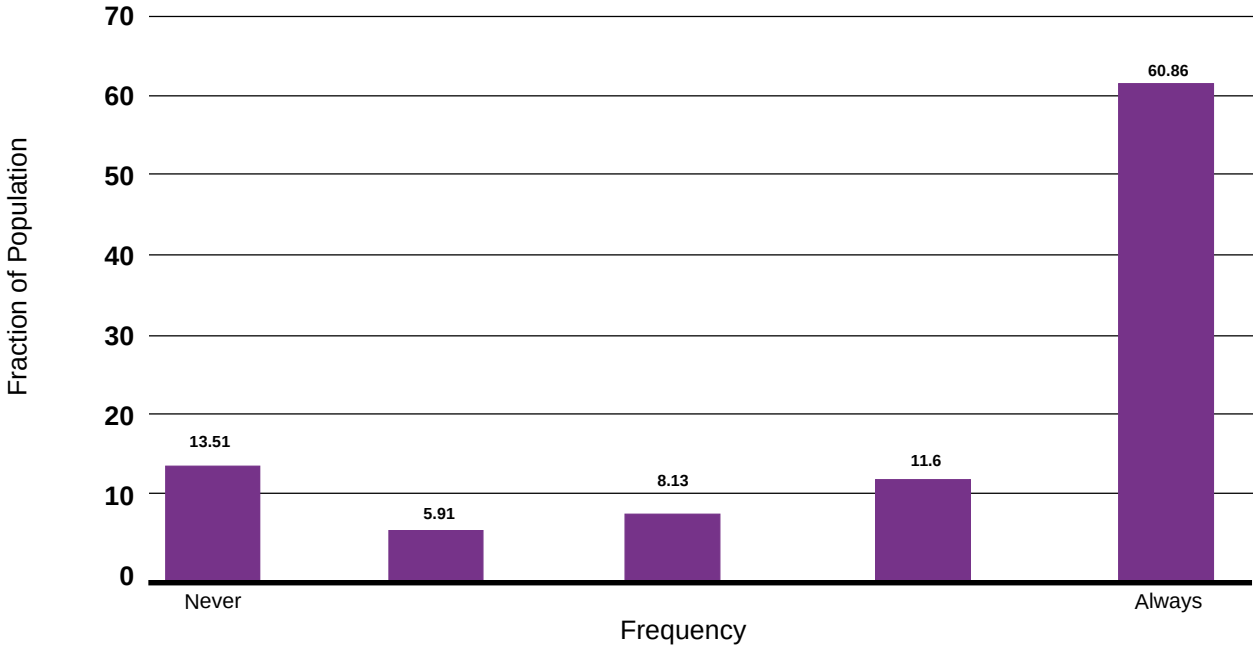


Figure IIIA.7 Frequency of Helmet Use by Children when Riding on Unpaved Trails

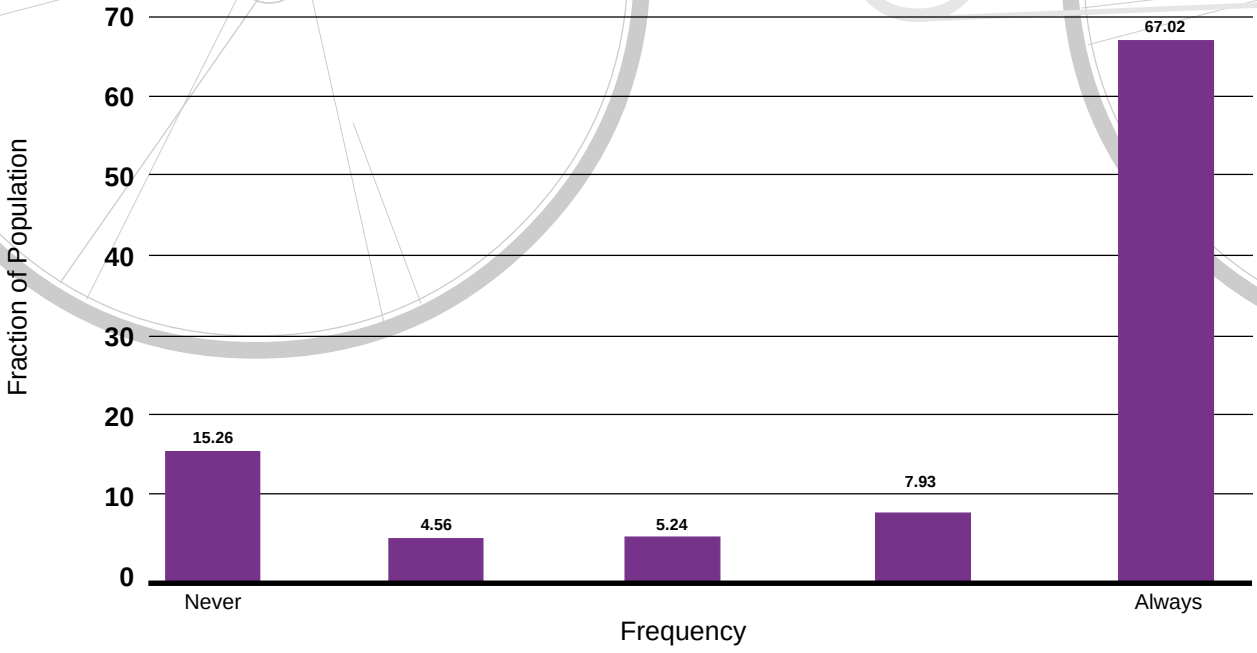
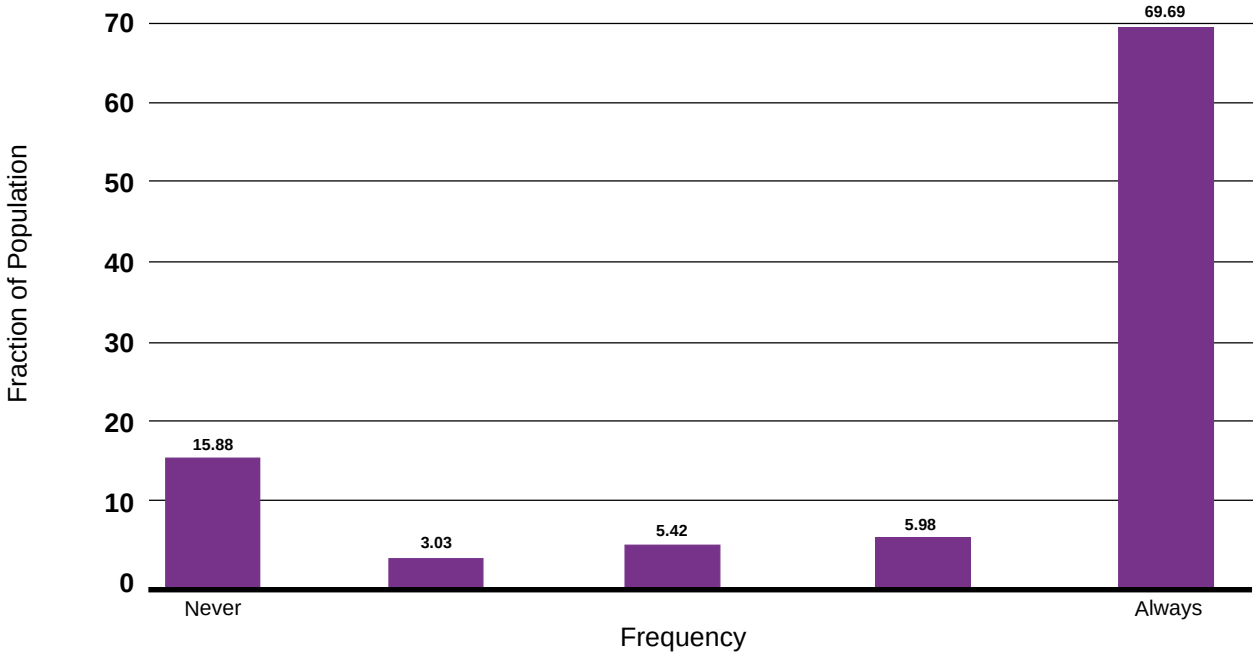


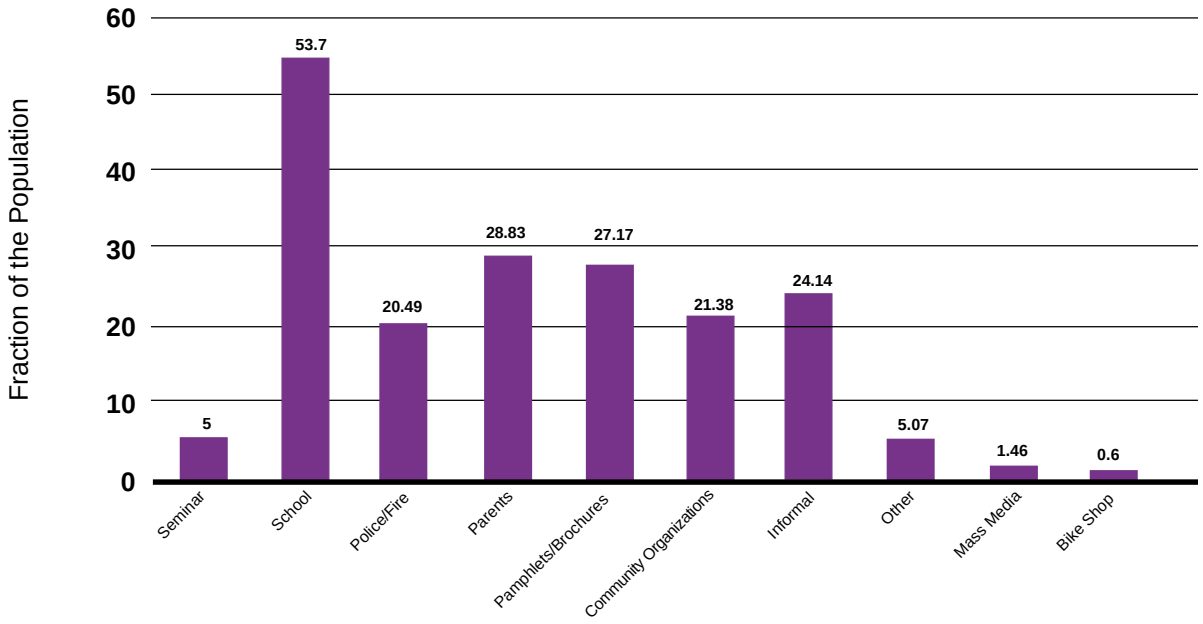
Figure IIIA.8 Frequency of Helmet Use by Children when Riding on Mountain Terrain



Bicycle Safety Instruction.

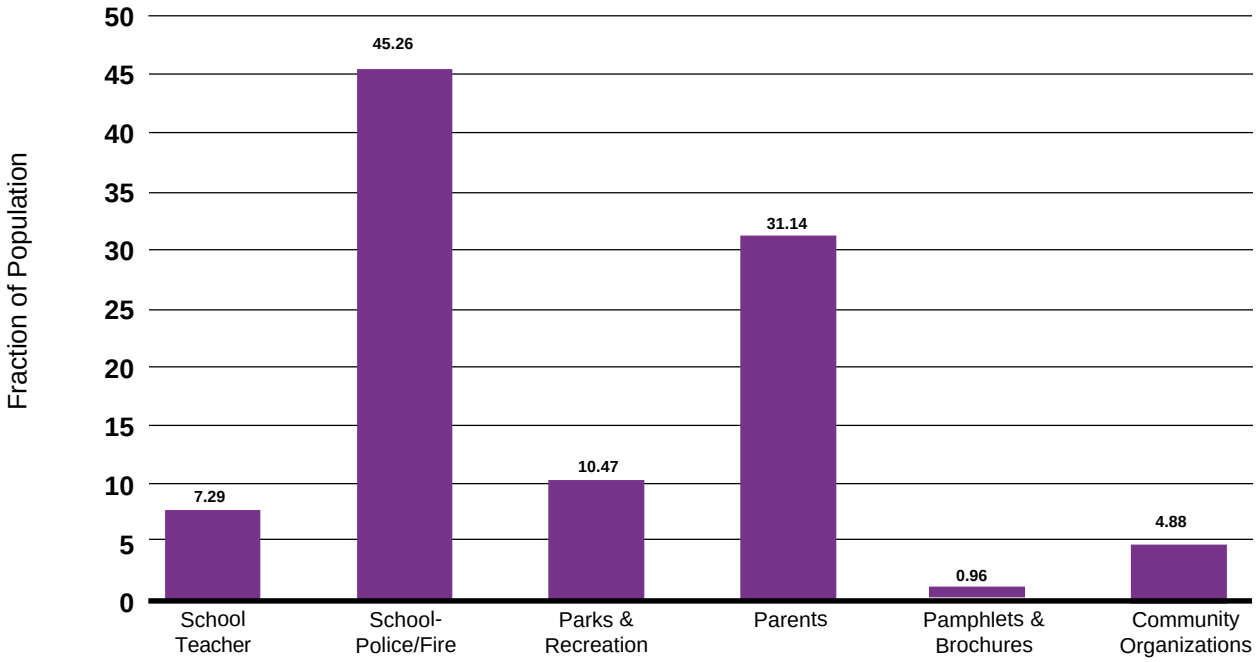
Just over 40 percent of Coloradans report having received some type of bicycle safety instruction. Respondents were asked to indicate all of the types of bicycle safety instruction they have received (many mentioned more than one type). Of those who received instruction, Figure IIIA.9 shows that more than half (54%) received some training at school. Other frequent sources of bicycle training instruction included parents, police and fire departments, community organizations, pamphlets and brochures and other informal sources.

Figure IIIA.9 Where Colorado Residents Received Bicycle Safety Instruction



The majority of Coloradans believe that the best place for children to receive bicycle safety training is in school (Figure IIIA.10). Forty-five percent think that the instruction should be provided by police or fire department personnel, and 7 percent believe that teachers should be providing safety information at schools. Almost a third (31%) think that parents should provide safety information. Smaller percentages feel that bicycle safety instruction should be provided by other organizations in the community--10 percent think that parks and recreation district personnel are best equipped to provide training to children and 5 percent think that it should be provided by community organizations. Although 27 percent of adults indicated that they had received some of their training from pamphlets and brochures, less than 1 percent of residents believe that this is the best way for children to learn about bicycle safety.

Figure IIIA.10 Where Colorado Residents Prefer Children Receive Bicycle Safety Instruction



Expectations Regarding Bicycle Crashes

Figures IIIA.11 – IIIA.14 present data regarding the expected severity of various types of bicycle crashes. Expected severity is ranked on a scale of one to five, where one represents an crash resulting in only minor injuries and five is a fatal crash. Bicycle crashes on streets (Figure IIIA.12) and mountain terrain (Figure IIIA.14) are expected to be the most severe. Sixty-three percent of all respondents rated the probable severity of a crash on the street in the two highest categories on our five point scale. In contrast, crashing on paved and unpaved bicycle paths (Figures IIIA.11 and IIIA.13) are expected to have less severe consequences. For example, only 12 percent thought that a crash on a paved bike trail would result in injuries in the two most severe categories.

Figure IIIA.11 Expected Severity of a Bicycle Crash on a Paved Bicycle Path

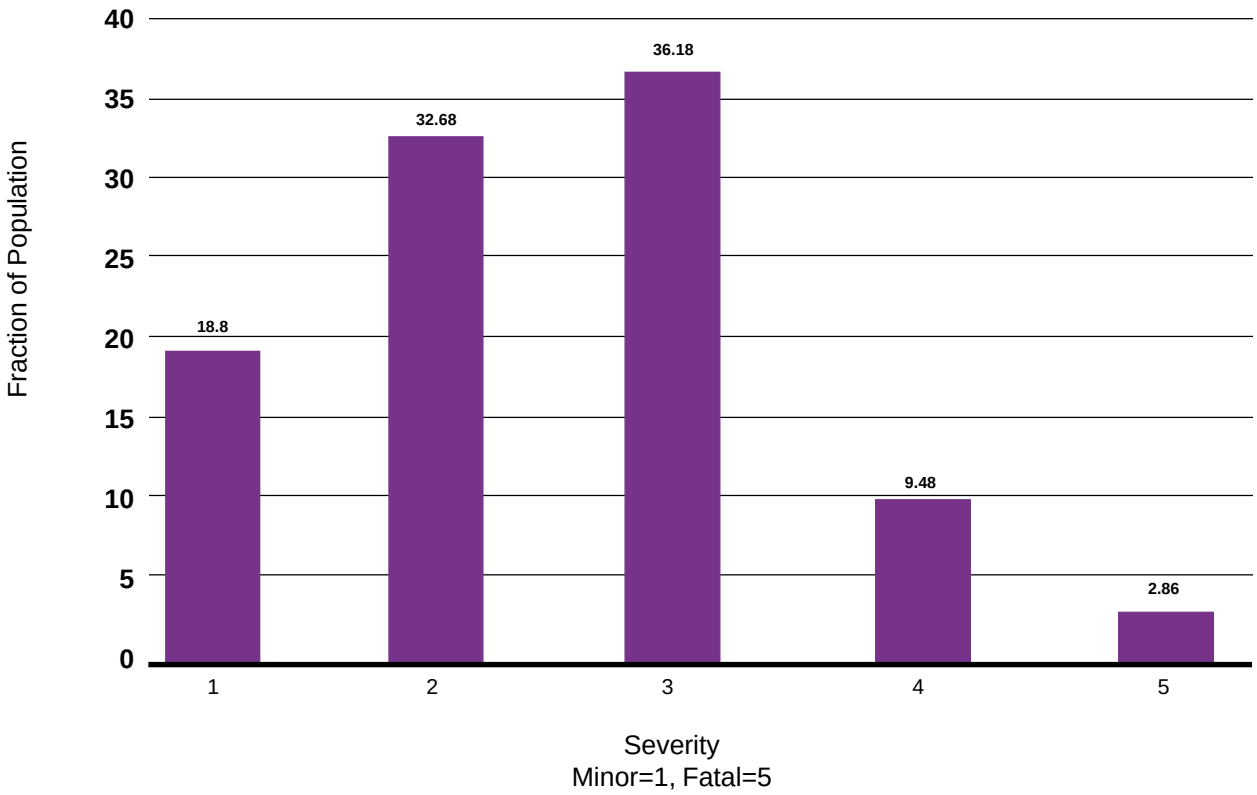


Figure IIIA.12 Expected Severity of a Bicycle Crash on Street

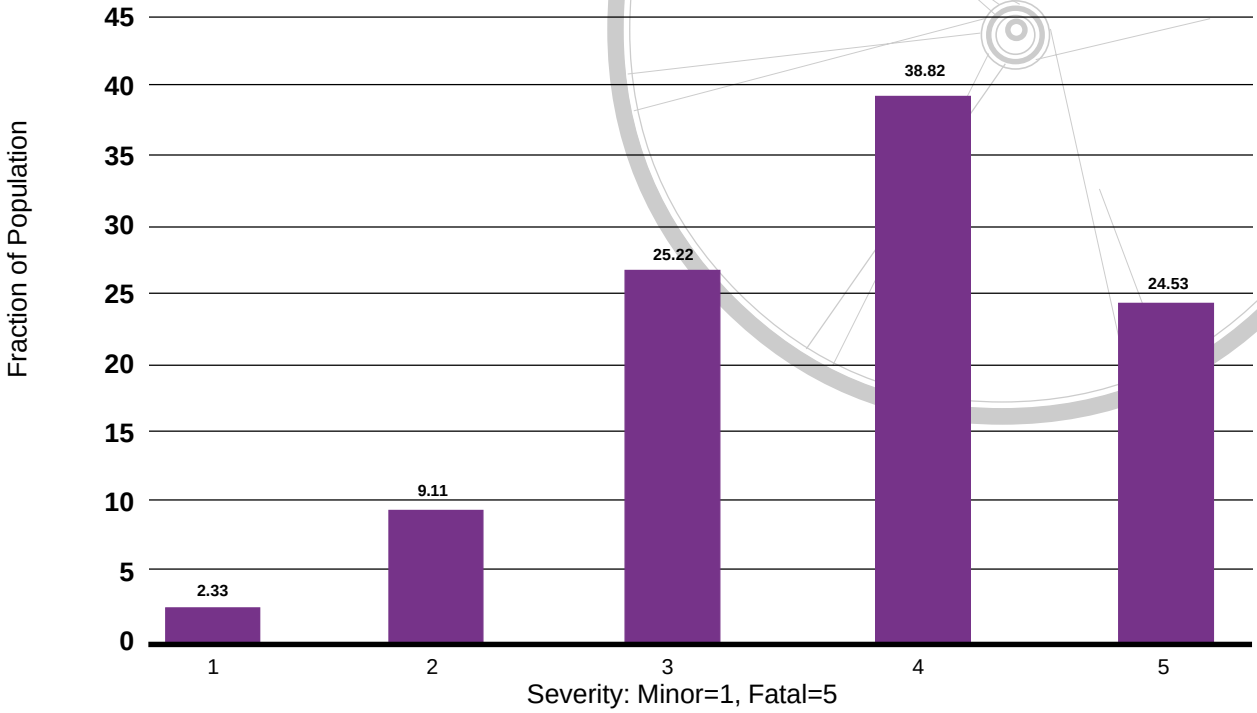


Figure IIIA.13 Expected Severity of a Bicycle Crash on an Unpaved Trail

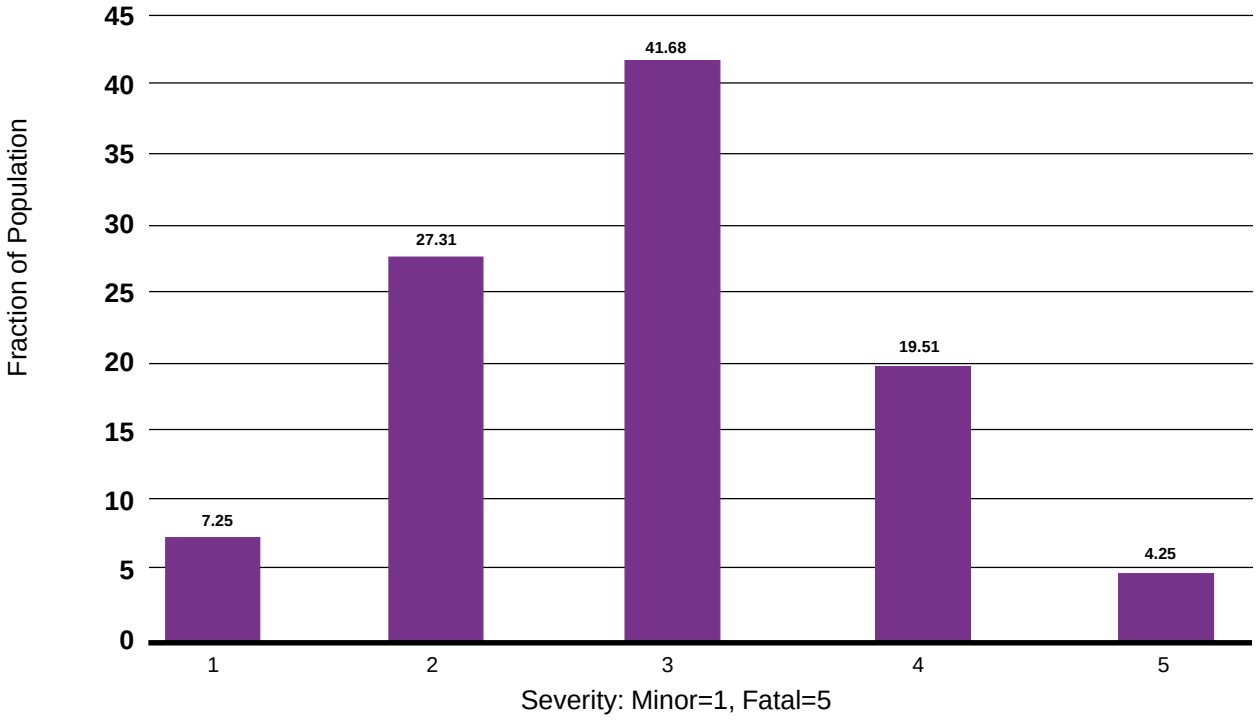
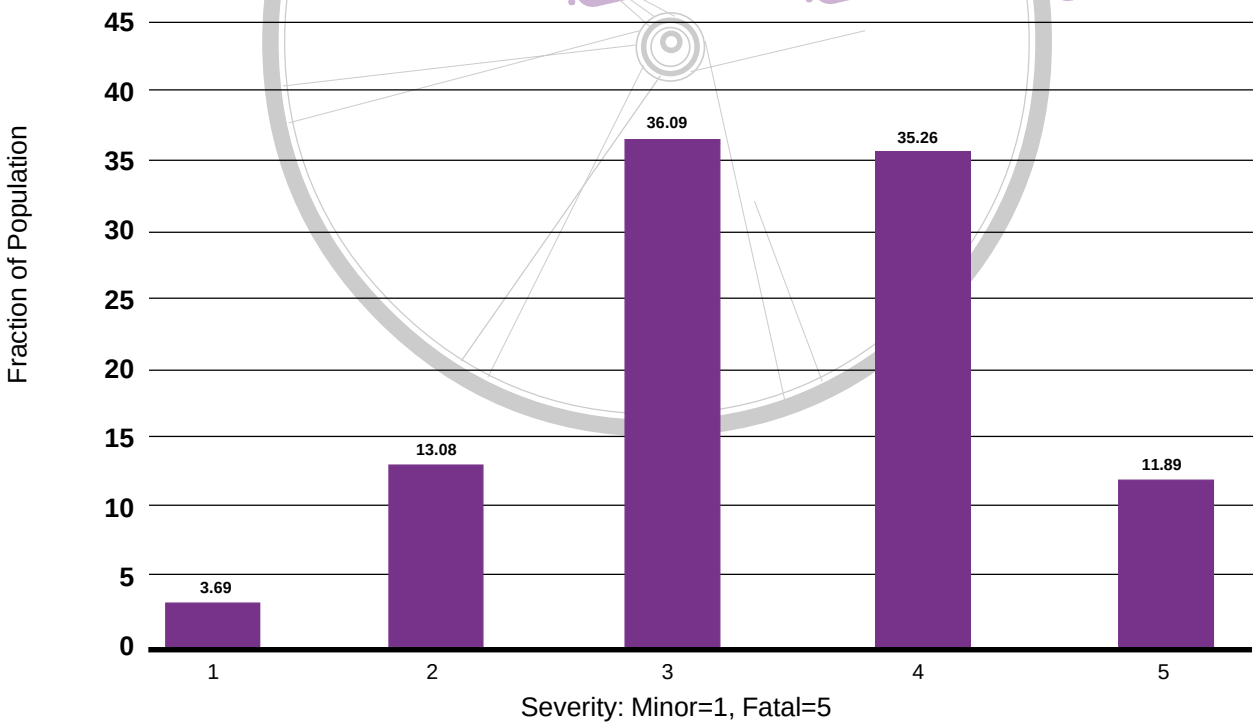


Figure IIIA.14 Expected Severity of a Bicycle Crash on Mountain Terrain



Figures IIIA.15 – IIIA.18 illustrate how respondents rated the likelihood that someone riding a bicycle would experience a crash. This is measured on a five-point scale that ranges from unlikely (1) to very likely (5). Coloradoans feel that crashes are least likely to happen on paved bike trails (Figure IIIA.15)--only 10 percent place the likelihood of a crash in the highest two categories. Street crashes are seen as more likely, probably due to the presence of automobiles and the increased activity (Figure IIIA.16). About one-third of all respondents place the likelihood of a street crash in the two highest categories. The most likely crashes are expected to occur on mountain terrain; half of all respondents chose the two highest categories (Figure IIIA.17).

Figure IIIA.15 Expected Likelihood of a Bicycle Crash on a Paved Bicycle Path

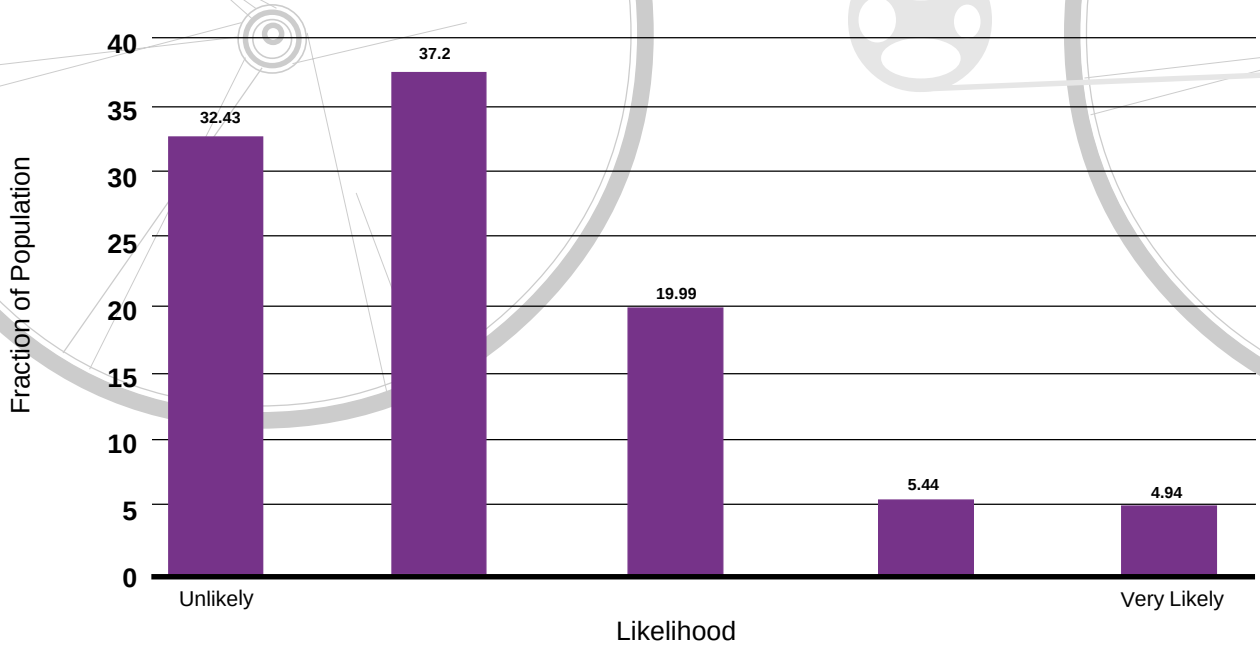


Figure IIIA.16 Expected Likelihood of a Bicycle Crash on a Street

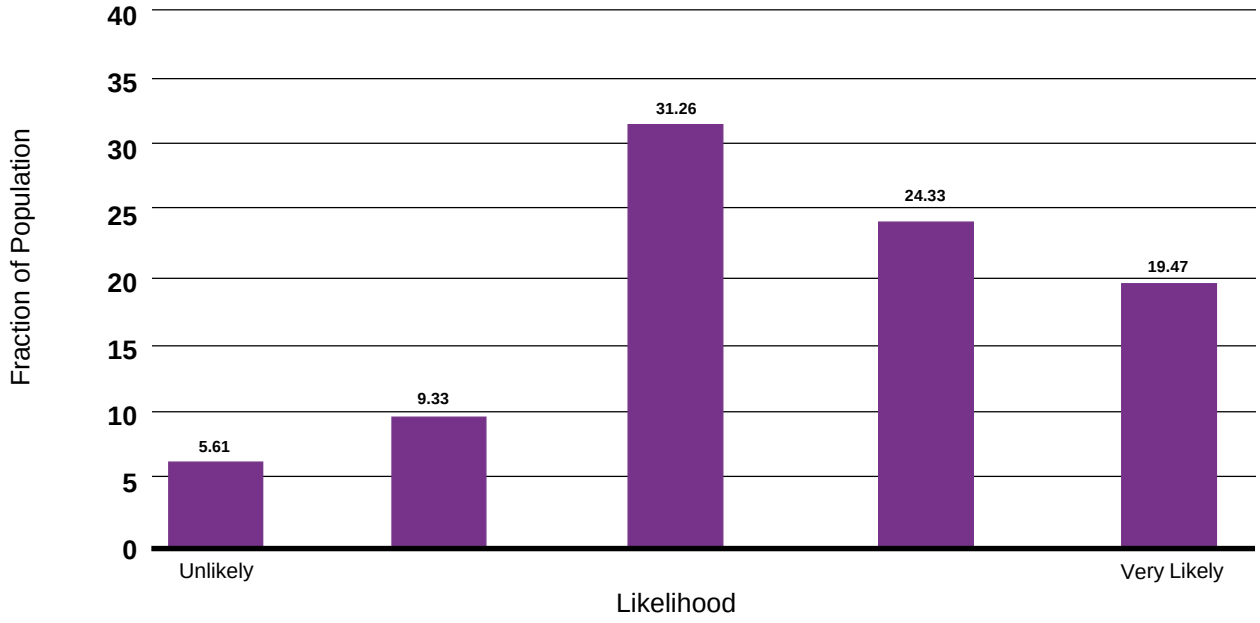


Figure IIIA.17 Expected Likelihood of a Bicycle Crash on an Unpaved Trail

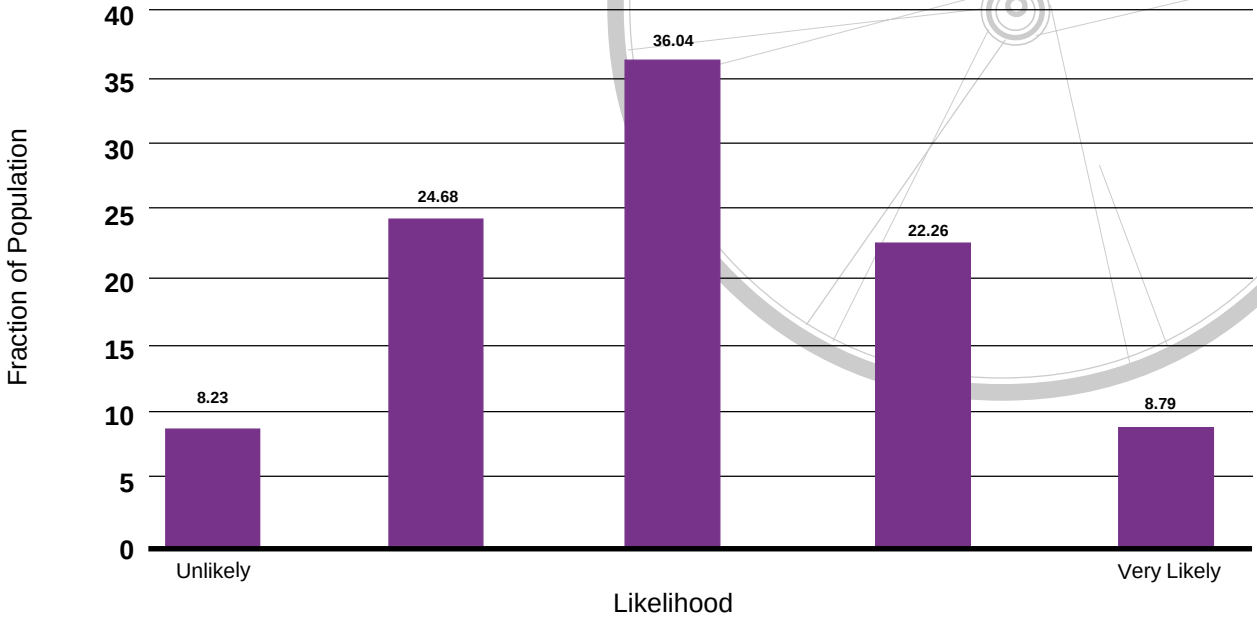
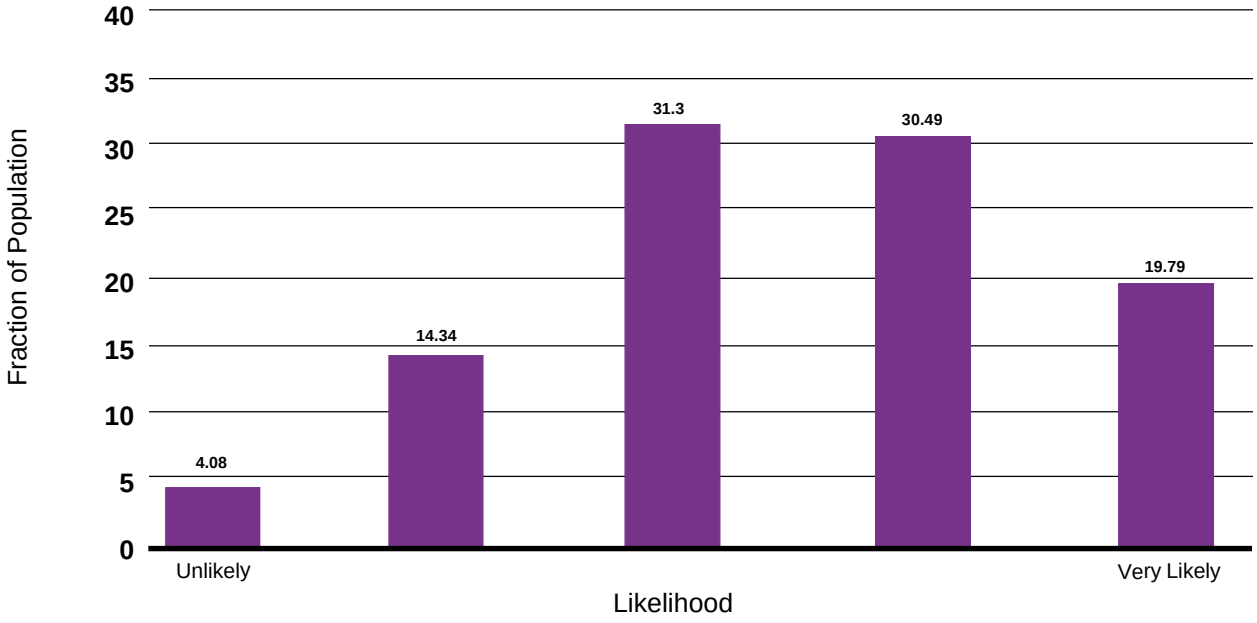


Figure IIIA.18 Expected Likelihood of a Bicycle Crash on Mountain Terrain

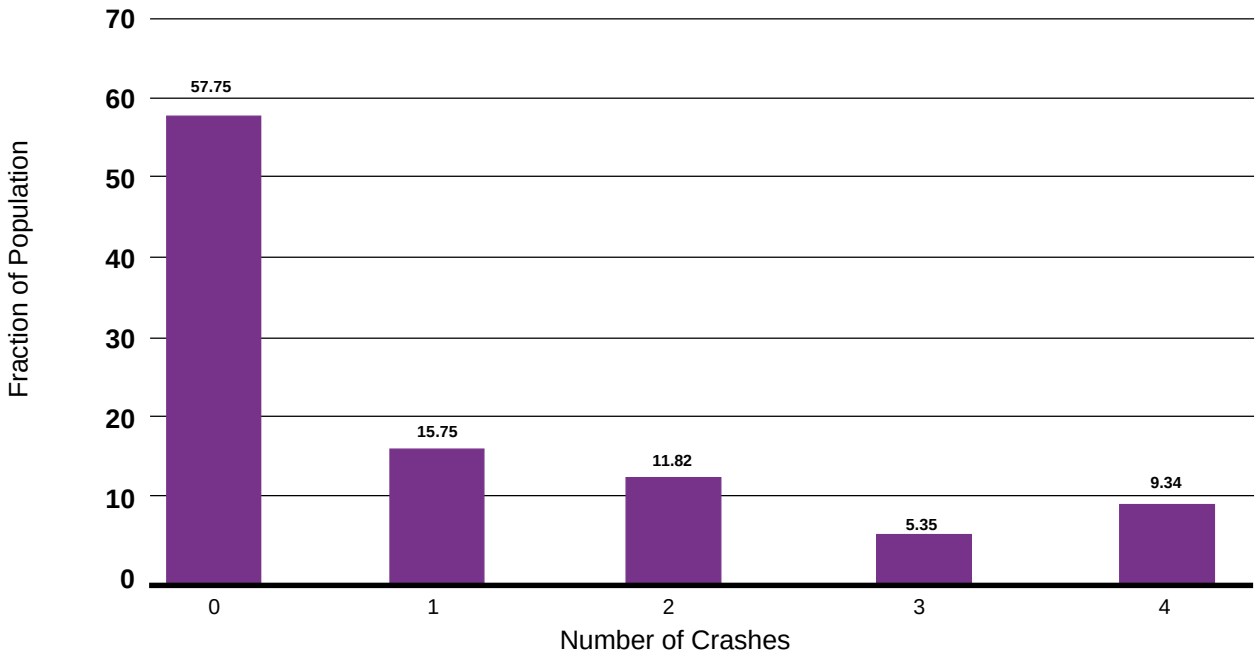


Bicycle Crashes on Unpaved Trails

In addition to their attitudes and expectations about bicycle crashes, survey respondents were asked about crashes that they have been involved in while riding a bicycle. Nearly half (46%) of all Colorado bicycle riders report having ever had a crash on an unpaved trail, and many riders (27%) have experienced more than one in the last twelve months (Figure IIIA.19).

The riders with the most experience, who ride most frequently are least likely to experience a crash. For example, 38 percent of those who bicycle more than one per week reported a crash on an unpaved trail, while almost 60 percent of those who bicycle less than once per month were in a crash.

Figure IIIA.19 Number of Bicycle Crashes in the last 12 Months on an Unpaved Trail Among Bicycle Riders



Though many Coloradoans have experienced a crash on an unpaved trail, the consequences typically are not severe. As shown in Figure IIIA.20, less than five percent indicated that their crash resulted in severe or worse injuries. Fourteen percent indicated that they received no injuries at all, and 67 percent reported only minor injuries. These reports are consistent with the expenses involved in a bicycle crash on an unpaved trail reported in Figure IIIA.21. Three-quarters of the riders who were involved in this type of crash incurred no expenses as a result. Only 5 percent incurred expenses greater than $100. The average amount spent per crash was $51.

Figure IIIA.20 Severity of Injury in Last Bicycle Crash on an Unpaved Trail

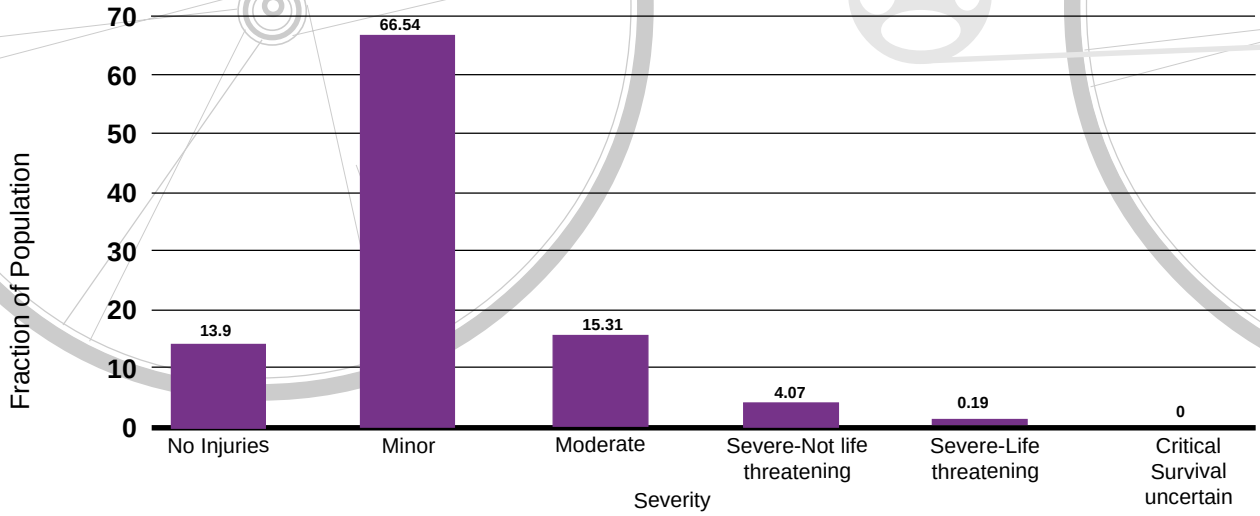
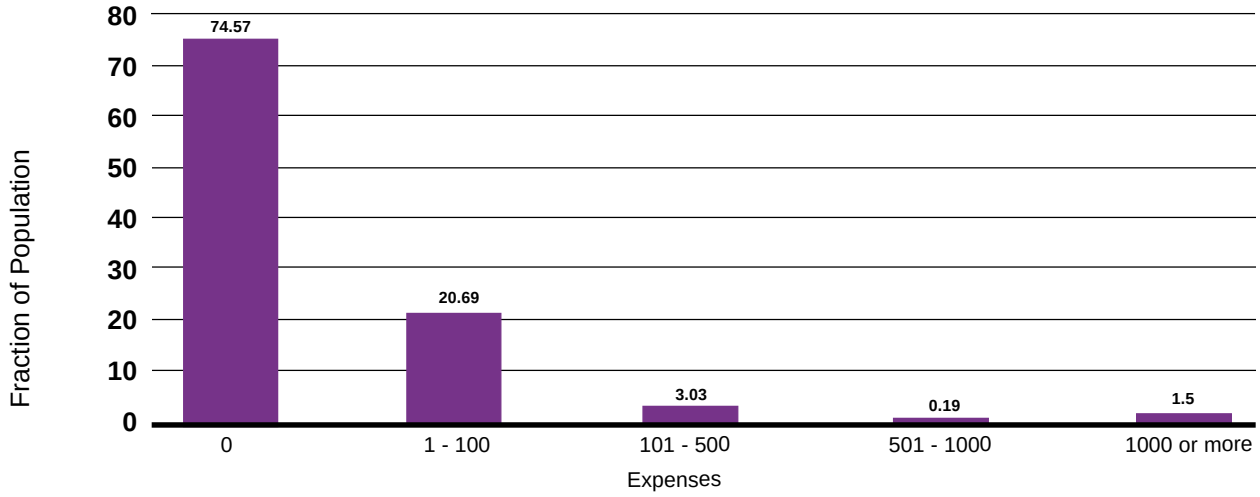


Figure IIIA.21 Total Expenses Incurred in Most Recent Bicycle Crash on Unpaved Trail

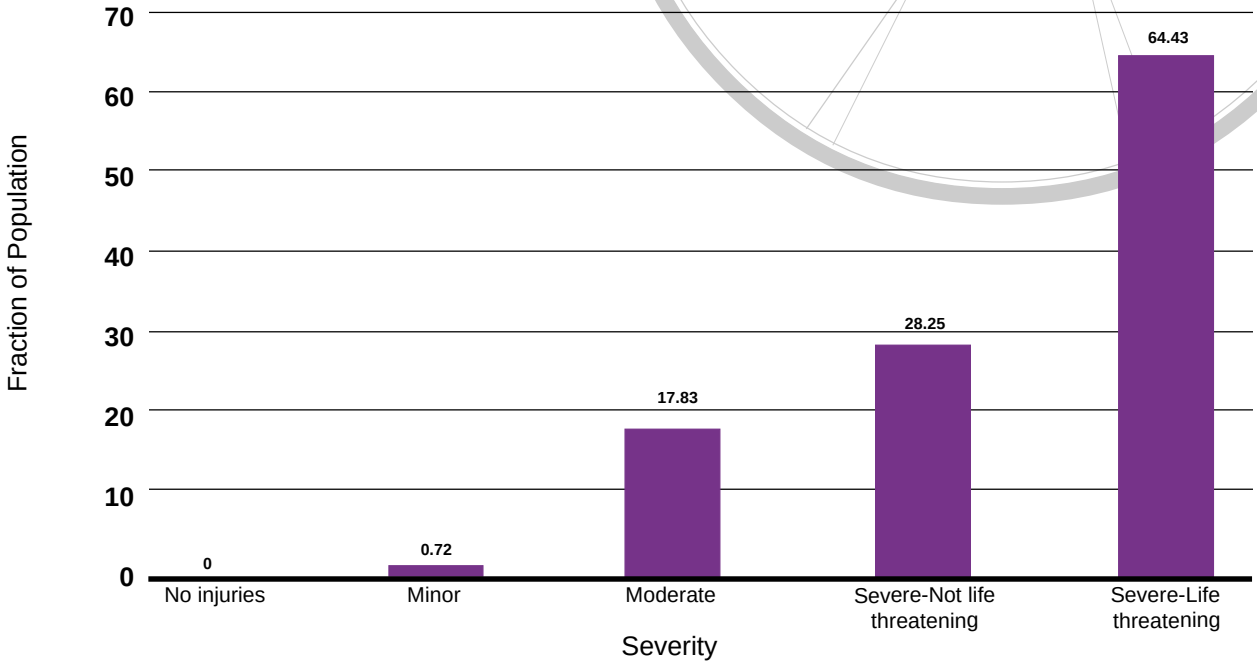


Crash Reporting

Bicyclists who experienced a crash on an unpaved trail were asked if they reported it to the authorities, including the police, park rangers and medical personnel. Predictably, the fraction of crash victims reporting their crash increased with the severity of the crash. As Figure IIIA.22 indicates, no one reported a crash on an unpaved trail that resulted in no injuries. One percent of those who had minor injuries reported their crash. Among those with moderate and severe, non-life-threatening-injuries, the reporting rates were 18% and 28% respectively. The highest reporting

rates were for those who had severe life-threatening injuries. Responses to this question are not available for those with critical injuries because the sample size is too small to report reliable estimates.

Figure IIIA.22 Fraction Reporting the Most Recent Bicycle Crash on an Unpaved Trail by Severity of Injuries



Bicycle Crashes on Paved Roads and Trails

Respondents were asked similar questions to those just above regarding crashes that occurred on a paved road or trail. Half of respondents reported that they had ever crashed on a paved road or trail. Within the last 12 months, 28 percent have experienced such a crash, with 10 percent involved in more than one crash (Figure IIIA.23). As detailed in Figure IIIA.24, most of these crashes were not serious, 74 percent resulted in either no injuries or only minor injuries. Less than one percent resulted in life-threatening or worse injuries. The average expense of the crash, among those involved in a crash on a paved surface was $123. However, as Figure IIIA.25 illustrates, 68 percent incurred no expenses, while 3 percent incurred expenses that exceeded $1000. As with crashes on unpaved surfaces, the fraction reporting their injuries is low. Nine percent of respondents experiencing a bicycle crash indicated that it was reported to authorities. Figure IIIA.26 demonstrates the same pattern that we found earlier, the more severe the injuries, the more likely that a report is made. Three percent of those with no injuries or only minor injuries are reported, but

nearly all, 91 percent, of crashes with severe-life threatening injuries are reported. (Again, there were too few individuals with critical injuries to calculate a reporting percentage for this group.)

Figure IIIA.23 Number of Bicycle Crashes on a Paved Road Among Bicycle Riders Within the Last 12 Months

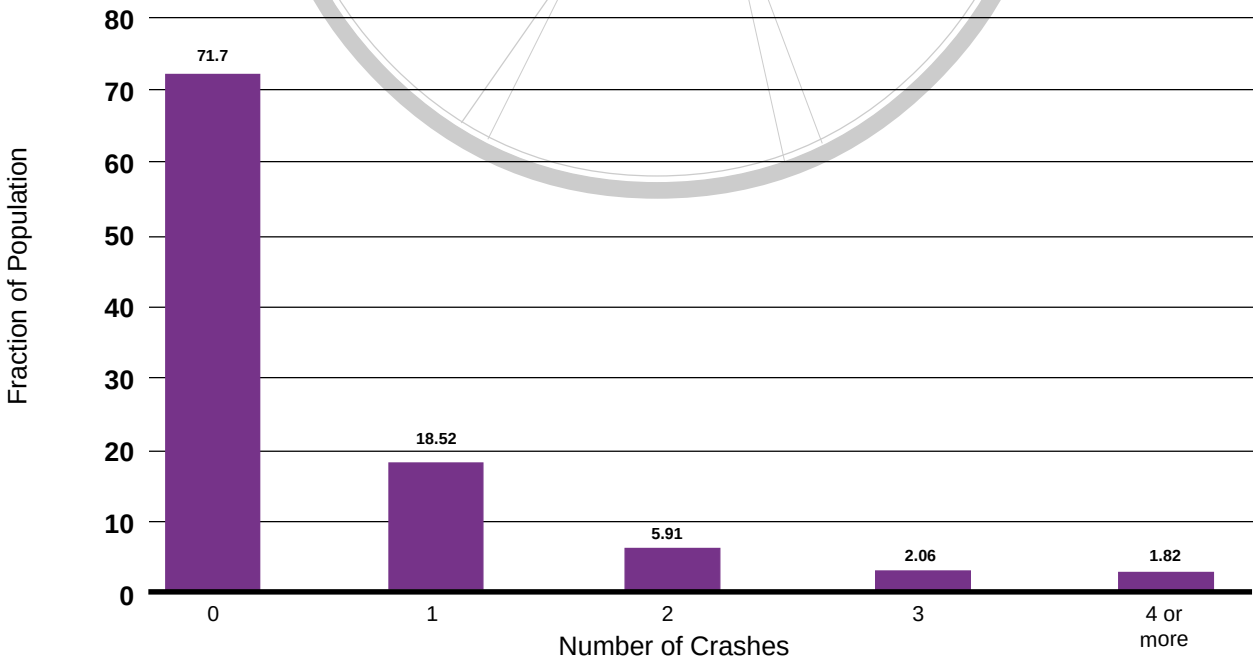


Figure IIIA.24 Severity of Injury in Last Bicycle Crash on a Paved Road

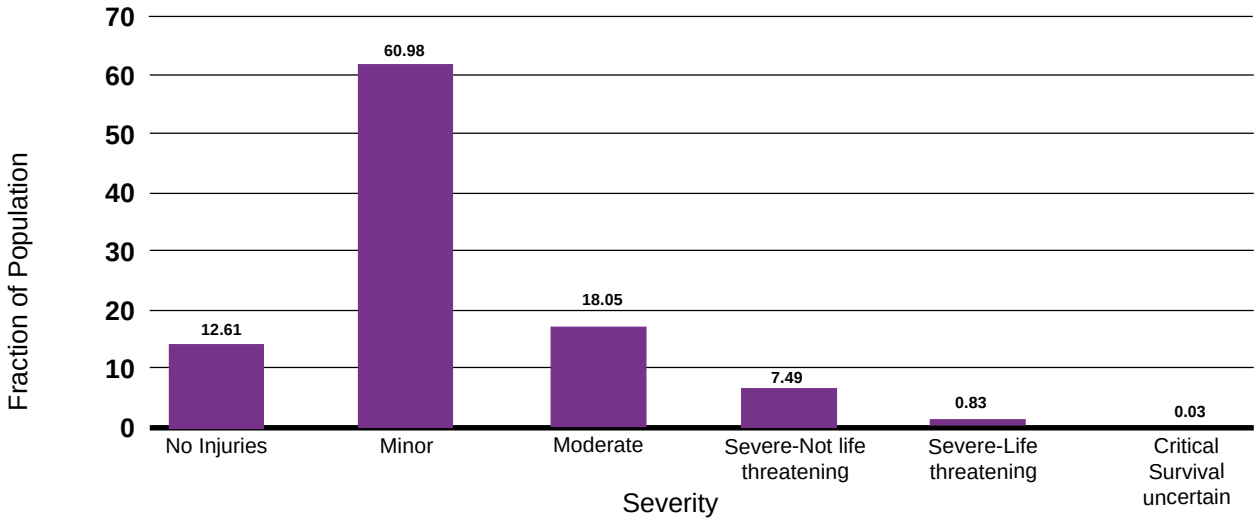


Figure IIIA.25 Total Expenses Incurred in Most Recent Bicycle Crash on Paved Road

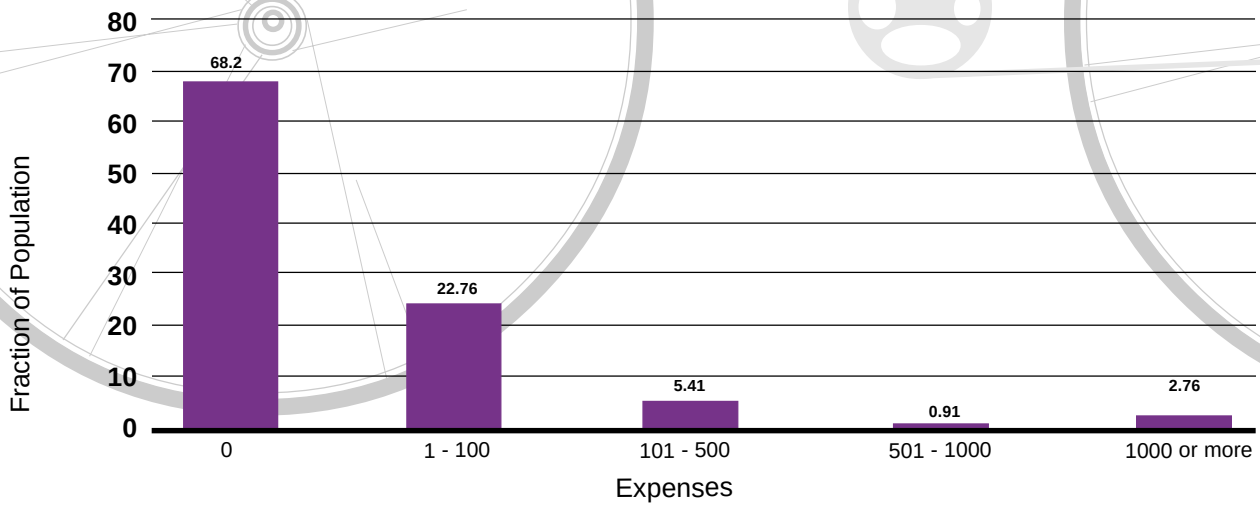
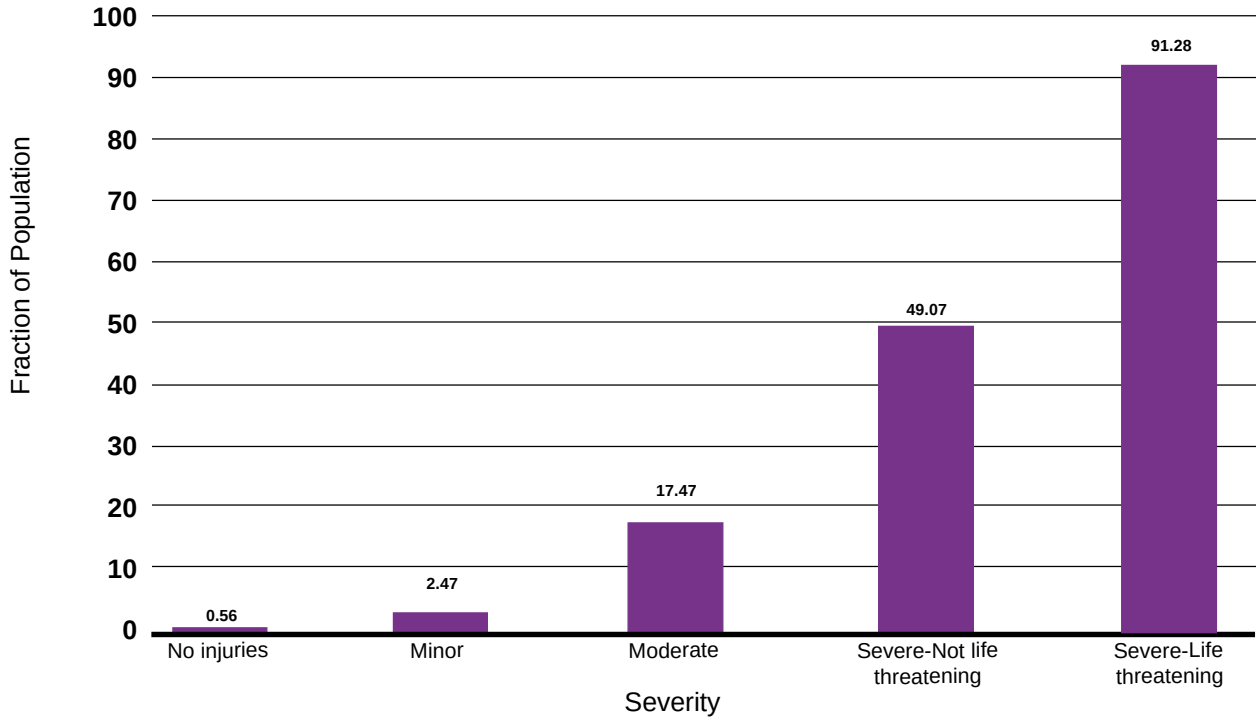


Figure IIIA.26 Fraction Reporting the Most Recent Bicycle Crash on a Paved Road by Severity of Injuries



B. Pedestrian Safety

Obstacles to Walking

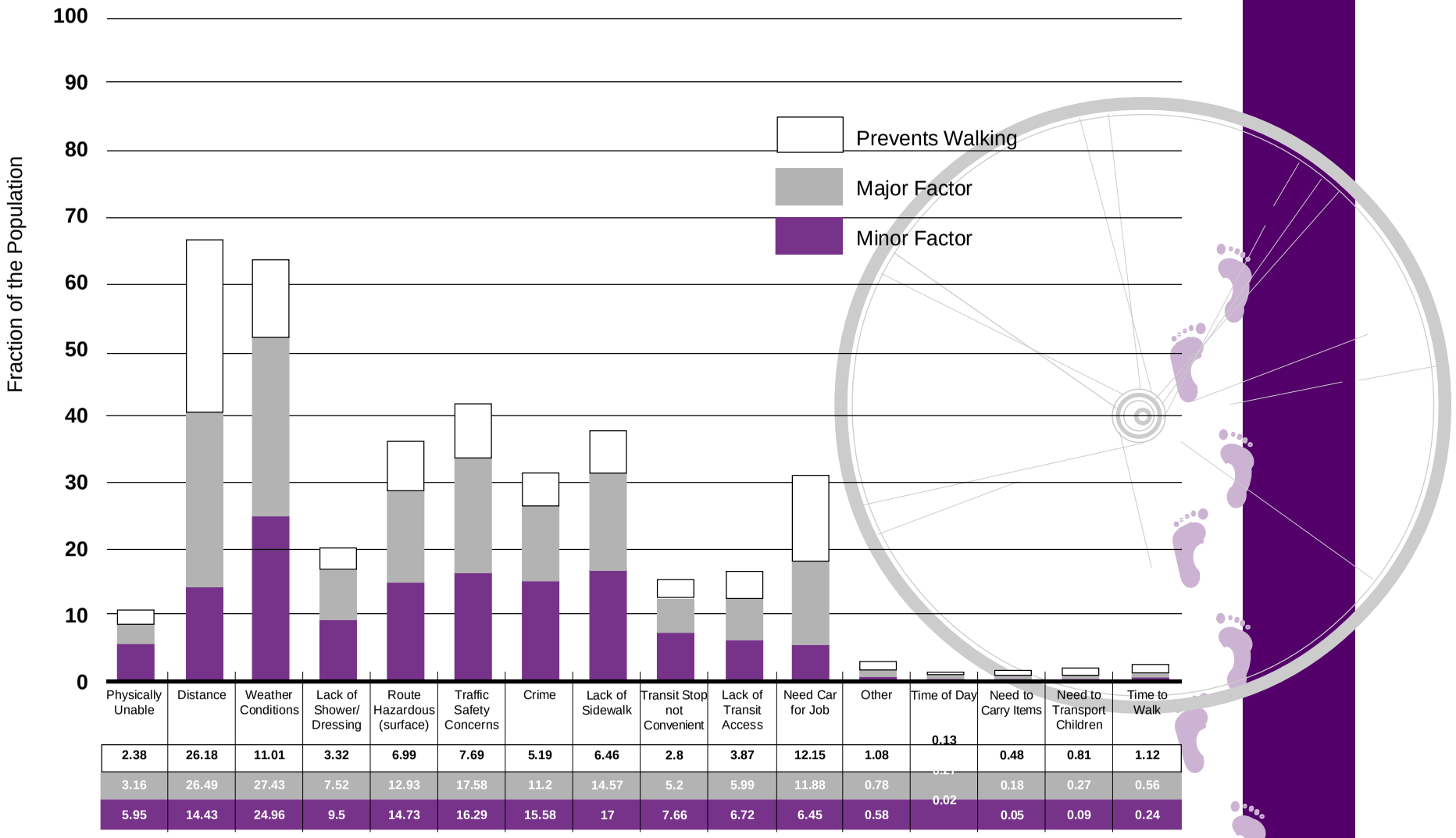
Respondents were asked if they ever considered walking for transportation to work or school, or for recreational purposes. Just under one-third (32 percent) indicated that they had never considered walking for these purposes. The remaining survey respondents who indicated that they would consider walking for transportation or recreation purposes were asked to indicate the factors that deter them from walking to work, school, for utility trips or as a recreational activity. Each factor could be identified as being one that either prevents the respondent from walking or is a major or minor factor in the decision not to walk. The responses to this question are illustrated in Figure IIIB.1.

Of those who would consider walking, just about two-thirds noted that the distance of the trip was a factor in their choosing not to walk. Twenty-six percent indicated that it prevented them from walking, another 26 percent said that it was a major factor and 14 percent indicated that it was a minor factor in their transportation choice. Sixty-three percent of respondents indicated that the weather conditions were an important factor in their decision not to walk. Although only 11 percent indicated that it prevented them from walking, over 50 percent said that it was either a major or minor factor in their decision not to walk.

Safety concerns were the next most important factors preventing pedestrian transportation. In order of the frequency that they were mentioned, traffic safety concerns (42 percent), lack of sidewalk (38 percent), hazardous route (35 percent) and fear of crime (32 percent) prevent Coloradoans from walking as often as they might like.

For some respondents (30 percent) walking to work is difficult since they need a car to perform some of the duties required at their job. An additional 11 percent are physically unable to walk (or to walk the necessary distances). About five percent cited other factors as preventing them from walking. These other factors include such considerations as: the time of day, the need to carry items or transport children or the length of time necessary to walk as affecting this transportation choice.

Figure IIIB.1 Obstacles to Walking as Transportation



	Physically Unable	Distance	Weather Conditions	Lack of Shower/ Dressing	Route Hazardous (surface)	Traffic Safety Concerns	Crime	Lack of Sidewalk	Transit Stop not Convenient	Lack of Transit Access	Need Car for Job	Other	Time of Day	Need to Carry Items	Need to Transport Children	Time to Walk
	2.38	26.18	11.01	3.32	6.99	7.69	5.19	6.46	2.8	3.87	12.15	1.08	0.13	0.48	0.81	1.12
	3.16	26.49	27.43	7.52	12.93	17.58	11.2	14.57	5.2	5.99	11.88	0.78	[illegible]	0.18	0.27	0.56
	5.95	14.43	24.96	9.5	14.73	16.29	15.58	17	7.66	6.72	6.45	0.58	0.02	0.05	0.09	0.24

Pedestrian Safety Instruction

Only one third of Coloradoans over the age of 16 reports having received any instruction regarding pedestrian safety. Of those who did, Figure IIIB.2 indicates all of the sources of pedestrian safety information. Most respondents received instruction at school (66%) and from their parents (42%). Other sources of information regarding pedestrian safety included police and fire departments, community organizations, pamphlets and brochures, and other informal sources.

Figure IIIB.3 illustrates where survey respondents think that children *should* receive such safety information. The majority of Coloradoans preferred that this instruction take place at school. They also strongly believe that the information should be taught by police and fire department personnel (47 percent) rather than by teachers (16 percent). Nearly 30 percent indicated that parents should be the primary source of pedestrian safety information.

Figure IIIB.2 Where Coloradans Receive Pedestrian Safety Instruction

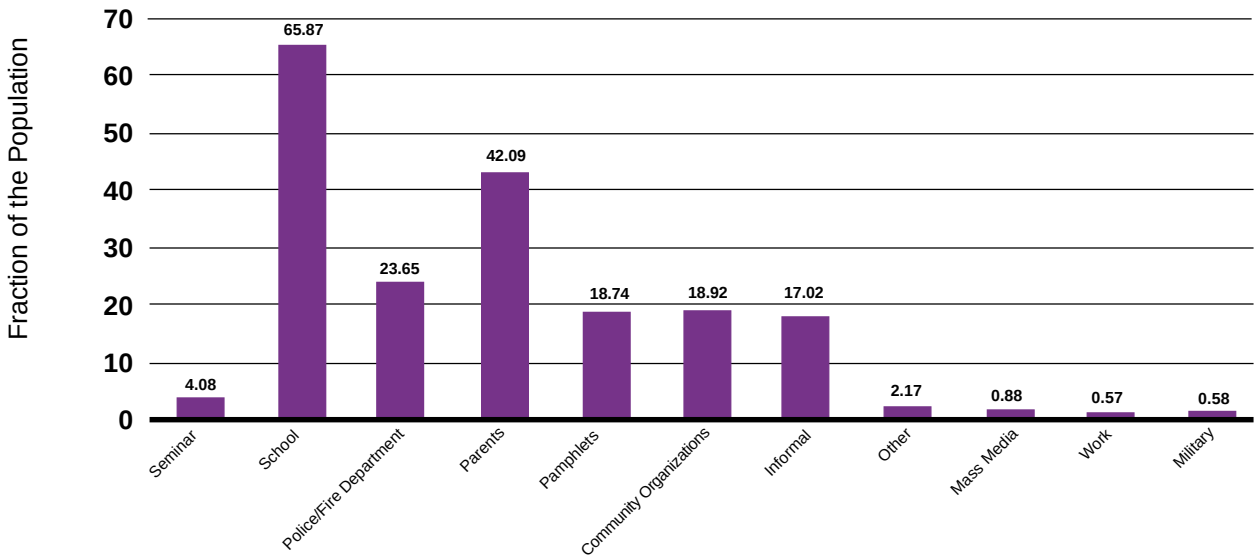
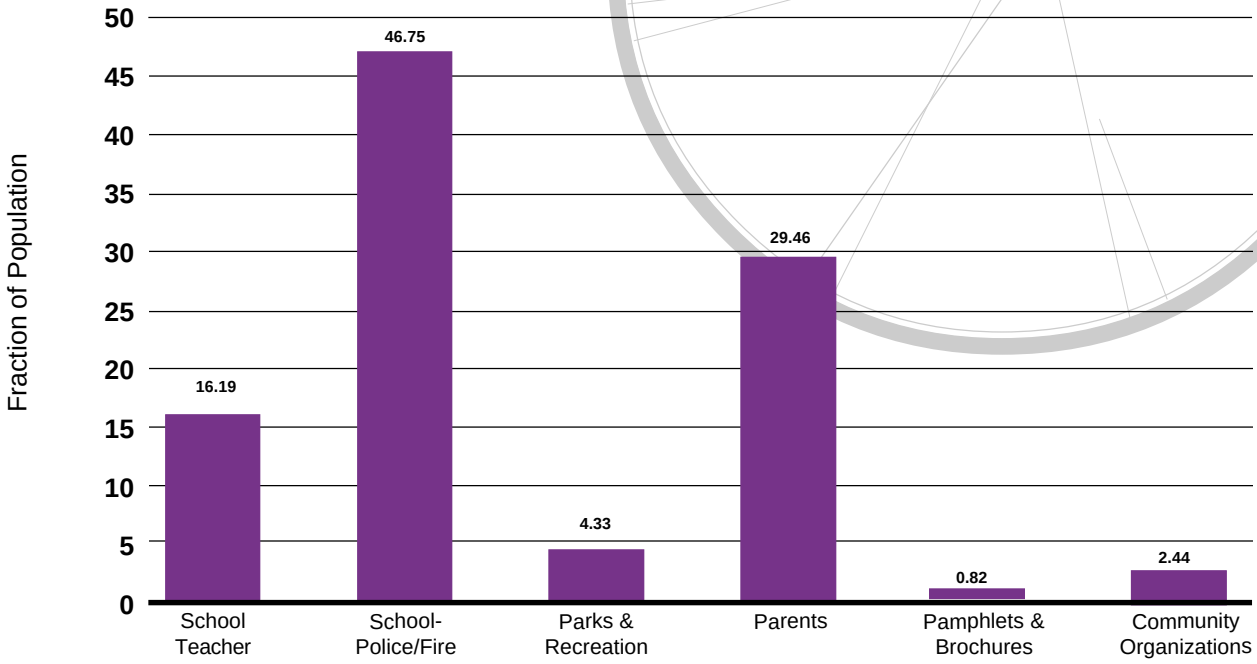


Figure IIIB.3 Where Colorado Residents Prefer Children Receive Pedestrian Safety Instruction

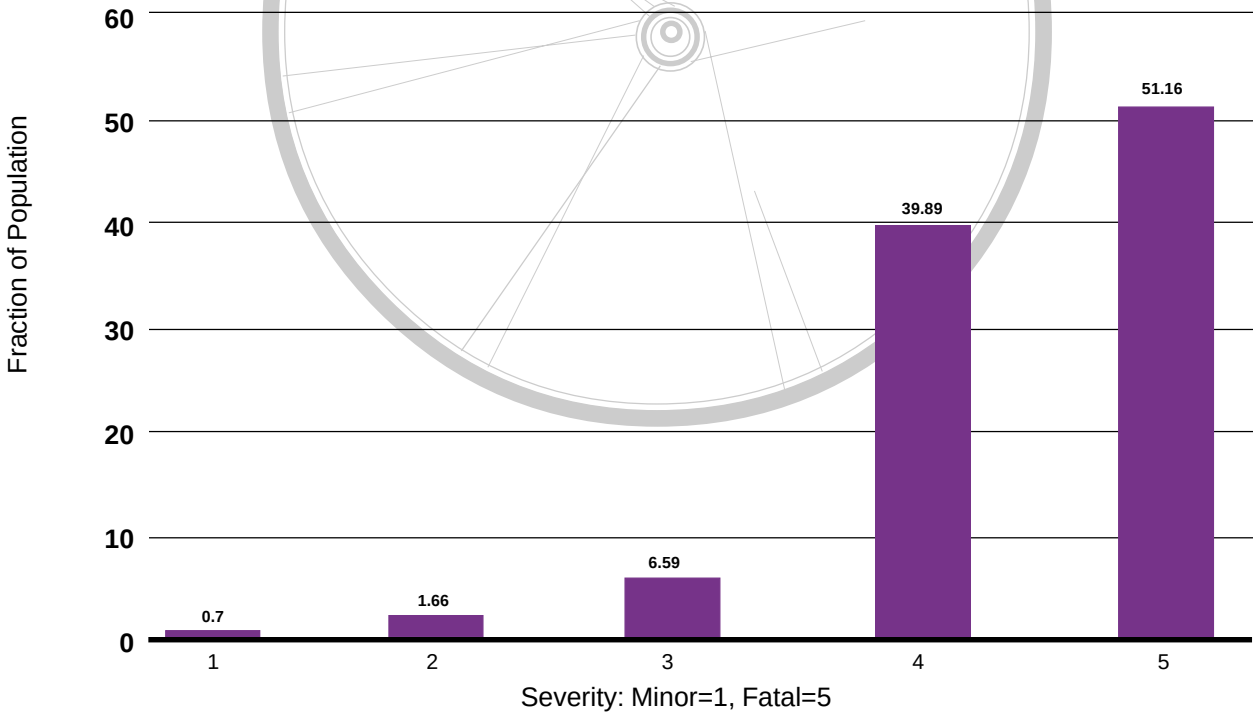


Expectations Regarding Pedestrian Crashes

Survey respondents were asked about the expected severity of various types of pedestrian crashes. They responded by selecting a number on a five-point scale where 1 is a minor crash and 5 is one that results in a fatality. Figures IIIB.4 – IIIB.6 detail their responses to these questions.

The vast majority expects a pedestrian/automobile incident to be fatal or very severe. Figure IIIB.4 illustrates that 91 percent of respondents ranked the expected injuries caused to a pedestrian by an automobile 4 or 5 on the five-point scale.

Figure IIIB.4 Expected Severity of a Pedestrian/Automobile Crash



Pedestrian crashes involving bicycles are most commonly rated a 3 on the same scale (Figure IIIB.5). Less than six percent indicated that they thought the consequences of a pedestrian/bicycle crash would be fatal. However, only than four percent thought that this type of crash was likely to result in only minor injuries. Hazardous surfaces are also thought to lead to injuries that are expected to be neither minor nor fatal (Figure IIIB.6).

Figure IIIB.5 Expected Severity of a Pedestrian/Bicycle Crash

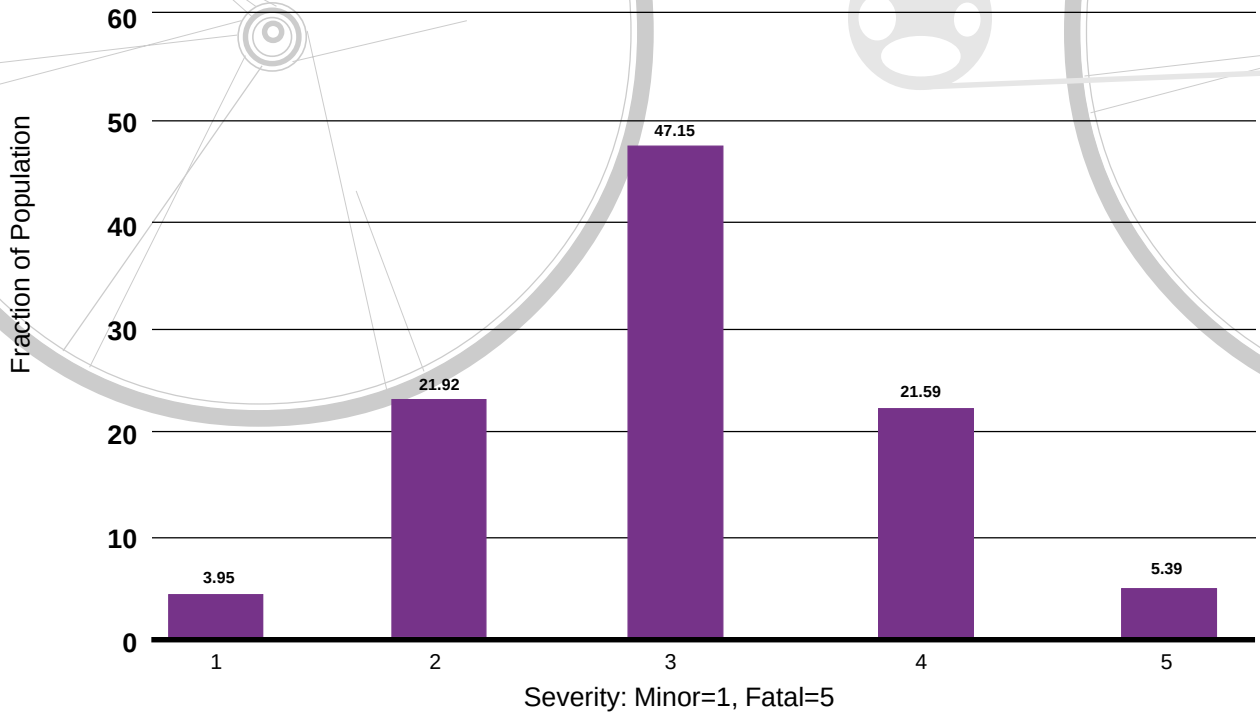
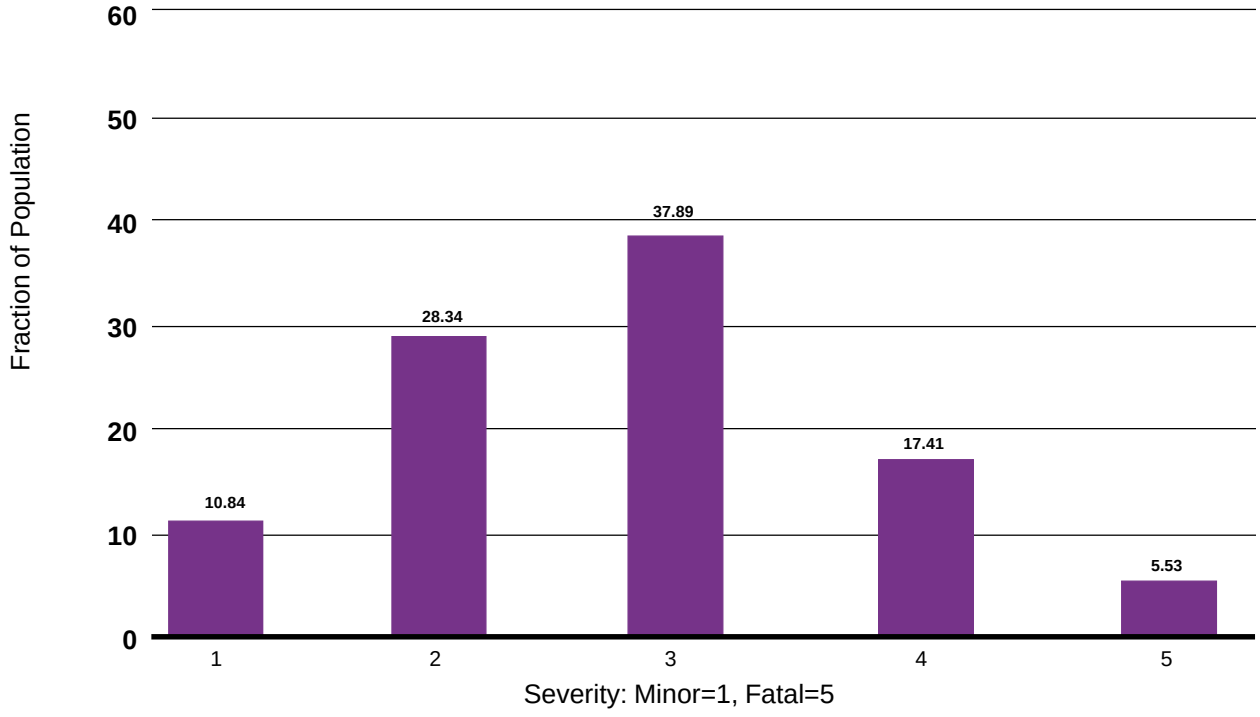


Figure IIIB.6 Expected Severity of a Pedestrian Crash Caused by Hazardous Surfaces



Pedestrian Crashes

Three percent of Coloradoans reported having been involved in a crash as a pedestrian in the last 12 months (about 1% more than once). Very few have had more than one pedestrian crash in the last year (Figure IIIB.7). Nearly 12 percent of Coloradoans indicated that they had *ever* been involved in a crash as a pedestrian. Among those who had ever been in a pedestrian crash, over 14 percent sustained no injuries in their last crash and 58 percent incurred only minor injuries as shown in Figure IIIB.8. The remainder sustained injuries that ranged from moderate to critical (obviously we were unable to capture fatalities in these data).

Figure IIIB.7 Frequency of Pedestrian Crashes in the Previous 12 Months

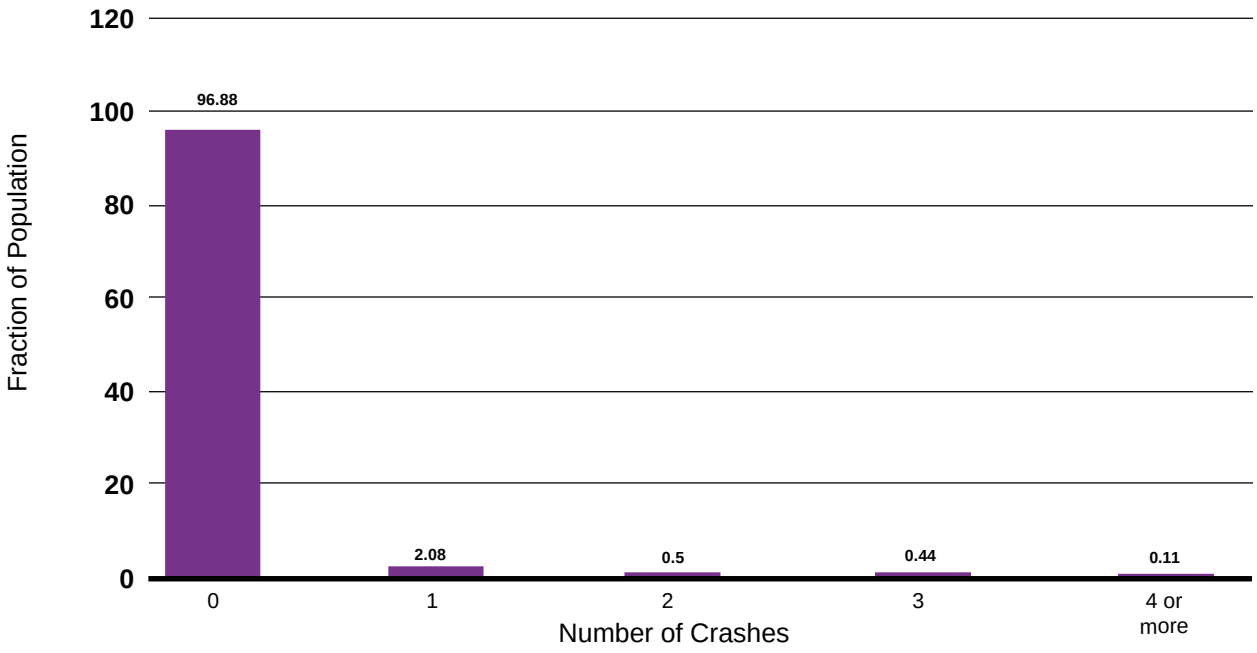
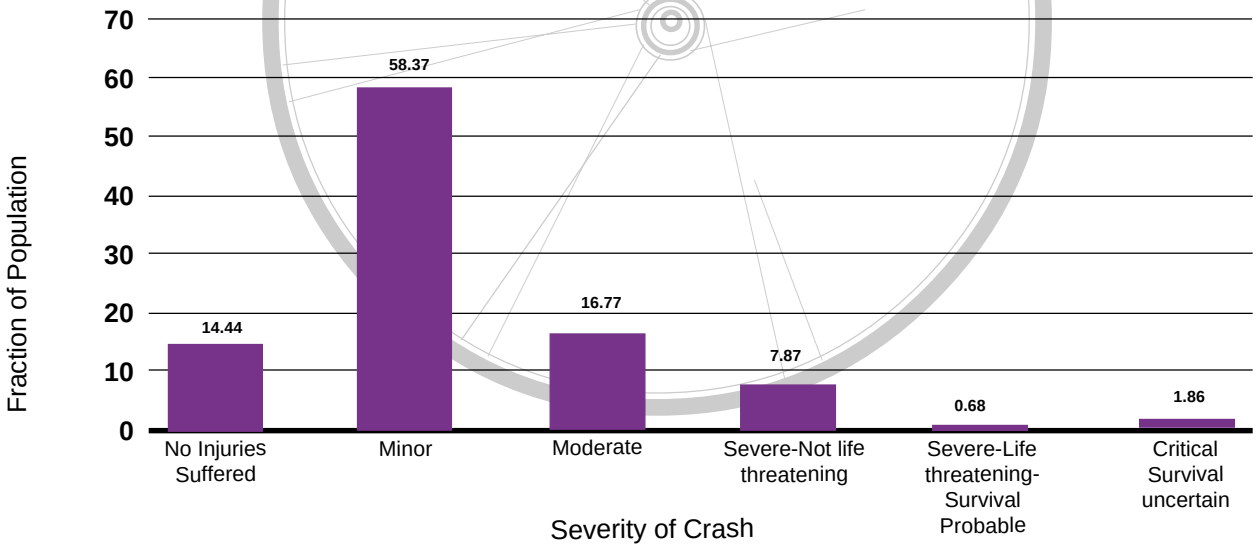


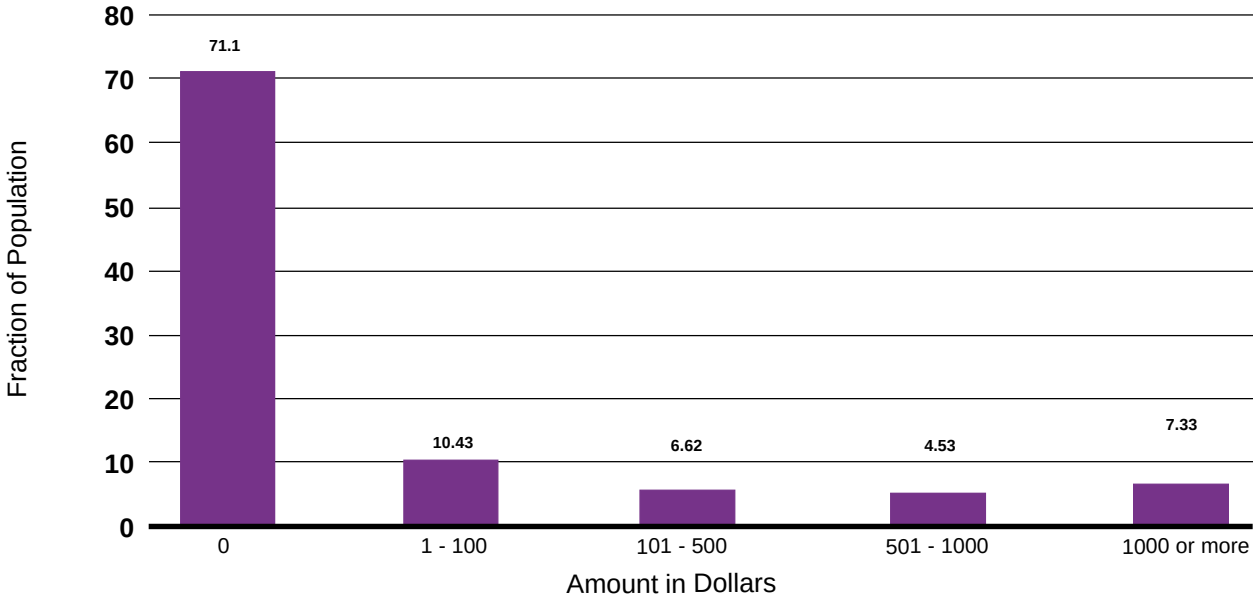
Figure IIIB.8 Severity of Most Recent Pedestrian Crash



Cost of Pedestrian Crashes

The average expense as a result of the most recent pedestrian crash within the last year was reported to be $149. As shown in Figure IIIB.9, 71 percent of all pedestrian crashes resulted in no expense. Just over 10 percent incurred costs of less than $100. Seven percent of those involved in a pedestrian crash incurred costs of over $1,000.

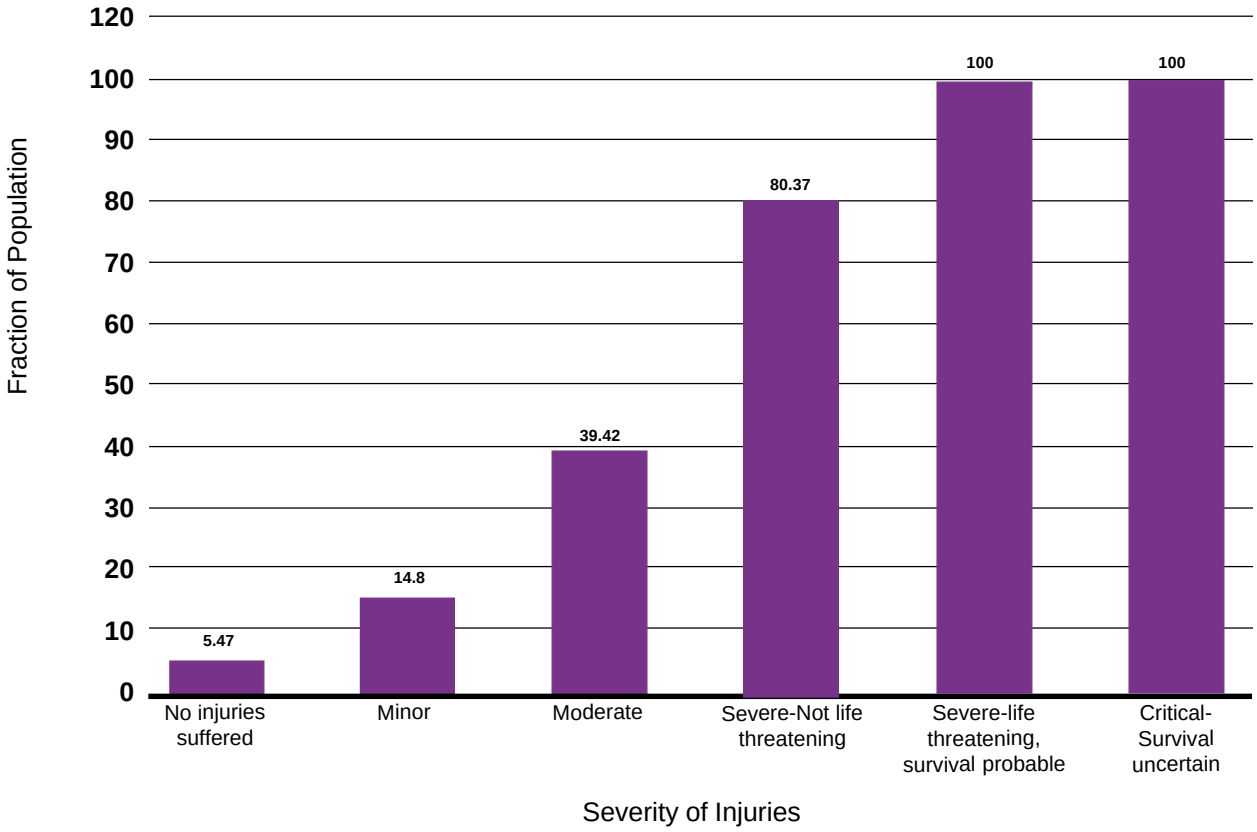
Figure IIIB.9 Total Expenses Incurred in Most Recent Pedestrian Crash



Reporting Pedestrian Crashes

Most (81%) non-fatal pedestrian crashes were not reported to authorities (e.g. police, park rangers, medical personnel). The likelihood that a crash is reported varies substantially by the severity of the crash as shown in Figure IIIB.10. Pedestrian crashes with no injuries and those with only minor injuries are most likely to go unreported. Only 5.5 percent and 14.8 percent, respectively, were reported. Pedestrian crashes with moderate injuries were reported nearly forty percent of the time. The more severe the injuries, the more likely it is that the crash is reported. All crashes in which the victim suffered severe life threatening or critical injuries are reported to authorities.

Figure IIIB.10 Fraction Reporting the Most Recent Pedestrian Crash by Severity of Injuries



In order to attempt to identify the frequency of severe pedestrian crashes we asked respondents if anyone in their household had ever suffered a severe or worse crash as a pedestrian. Severe crashes were reported by 4.4 percent of households.

IV. BICYCLES IN COLORADO

A. Bicycle Ownership

Sixty-nine percent of Colorado households report owning at least one bicycle, and among households that do own bicycles, the average household contains 2.7 bicycles. This translates into a total of approximately 3 million bicycles in the state of Colorado, which includes ownership of children's bicycles and tricycles. Among the households who own bicycles, 59 percent report that they also own bicycle helmets. Table IV.1 reports the types of bicycles owned by Coloradoans.

Table IV.1 Types of Bicycles Owned by Coloradoans

Type of Bicycle	Percent of Bicycles
Standard Road Bicycles	31.4%
Mountain Bikes	43.5%
Touring/Lightweight Bicycles	7.9%
Child's Bicycles	9.0%
Other Bicycles (including tandem and tricycles)	8.2%

B. Bicycle Purchases

Respondents were queried about their purchases of bicycles, bicycle accessories and expenditures on repairs during the last 12 months. Results indicate that expenditures by Colorado households totaled just over $200 million dollars statewide. Of this total, $120 million was spent on the purchase of bicycles, nearly $25 million was reportedly spent on repair and maintenance, and the remaining $55 million was spent on bicycling accessories. Nearly 23 percent of all Colorado households report having bought a bicycle in the last 12 months.

Respondents were asked to indicate the source of their bicycle purchases from among the following options: general sporting goods stores and bicycle specialty shops, department stores, discount stores, toy stores, mail order or from friends. Among those who purchased bicycles, Table IV.2 reports the distribution of bicycle purchases from each source by percentage of bicycles purchased and by percentage of dollars spent. The average price of a bicycle purchased from each source is reported in column three.

Coloradoans are most likely to purchase a bicycle from sporting goods and bicycle specialty shops. Nearly half of all bicycles are purchased from these shops. The average price of these bicycles is higher than those purchased from other sources ($612), and therefore sporting goods and bicycle specialty shops account for 79 percent of total expenditures on bicycles. Discount stores

and department stores combined sold nearly 30 percent of all bicycles to Colorado households, but the average price of bicycles from these outlets is significantly lower ($120 and $95 per bicycle, respectively), and thus they received only 8 percent of the total dollars spent on bicycles. Small proportions of bicycles are purchased from toy stores (9 percent of bicycles sold, 2 percent of expenditures) and mail order sources (1 percent of bicycles representing over 3 percent of expenditures). Five percent of bicycles are purchased from friends, at an average price of $172 per bicycle (not including any bicycles received from a friend at no cost). The remaining 4 percent of bicycles were purchased from other sources including more informal sources such as classified advertisements, garage sales, and second-hand stores.

Table IV.2 Distribution of Bicycle Purchases by Type of Retail Outlet

Type of Retail Outlet	Fraction of Bicycles Sold	Fraction of Bicycle Expenditures	Average Bicycle Price
General Sporting Good Store/ Bicycle Specialty Shop	49.8%	79.0%	$619
Discount Store	16.6%	4.0%	$95
Department Store	13.2%	4.1%	$120
Toy Store	9.4%	1.9%	$79
Mail Order	1.4%	3.5%	$987
Friend	5.3%	2.3%	$172
Other	4.4%	5.1%	$448

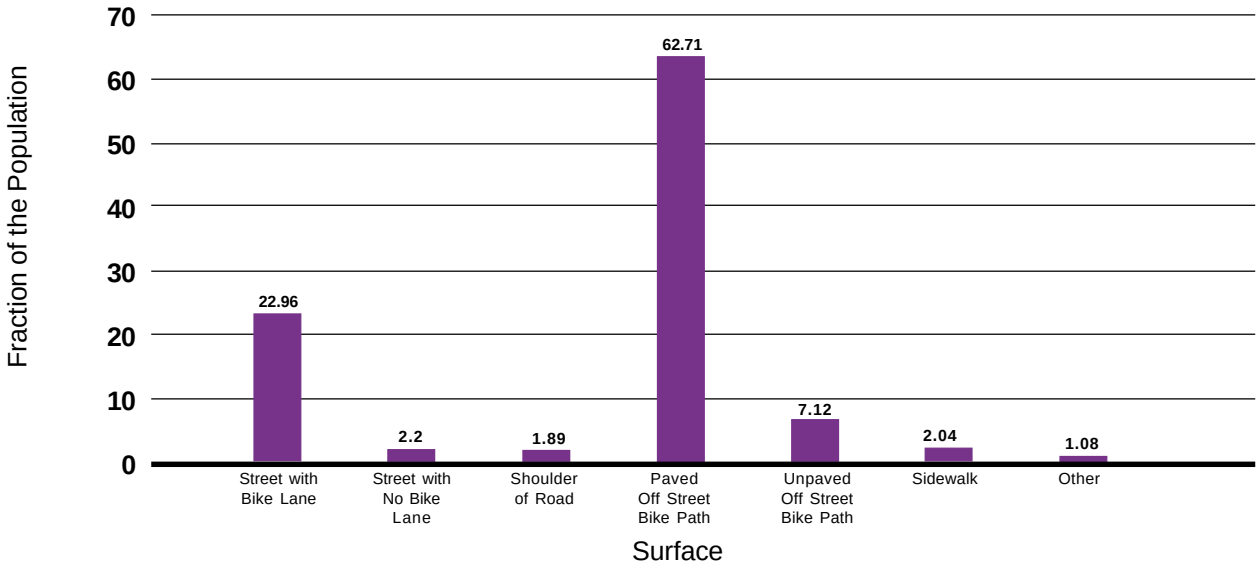
V. OPINIONS AND PREFERENCES REGARDING BICYCLING

Survey respondents who ride bicycles in Colorado were asked to answer a series of questions regarding their satisfaction with various aspects of their bicycling experiences. They also report the surfaces that they would prefer to ride on for transportation and recreation purposes. Finally, household respondents were asked how they would allocate public funds if they were earmarked for improvement of bicycle facilities. The responses to these three sets of questions are detailed in the following sections.

A. Preferred Surfaces for Bicycling

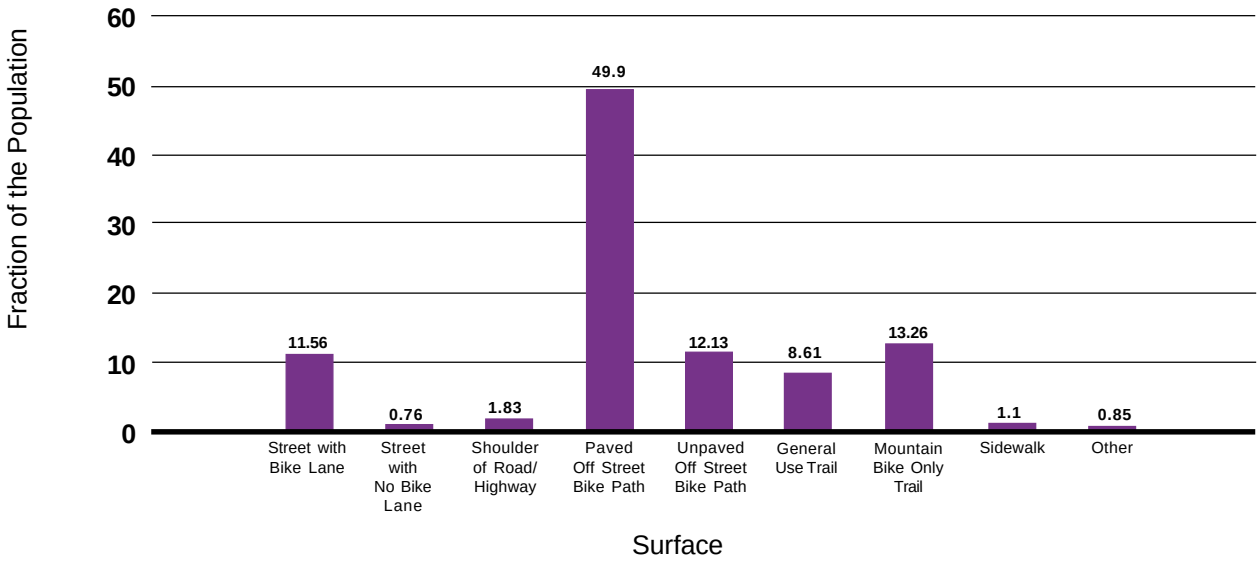
When asked about the riding surfaces they most preferred, bicyclists in Colorado left no doubt: paved off-street bicycle paths. Especially for transportation purposes, survey respondents overwhelmingly preferred this surface. As illustrated in Figure VA.1, nearly two-thirds (63 percent) of Colorado bicyclists prefer to ride on an off-street bike path when they are riding to work, school or for a utility trip. Twenty-three percent prefer riding on the street with a bike lane. An unpaved off-street bike path was the choice of 7 percent of bike riders, and only a few indicated that they preferred to ride on a street with no bike lane, the shoulder of a road or a sidewalk.

Figure VA.1 Prefered Surface for Work, School or Utility Trip



Respondents were also asked about the surface they preferred when riding for recreation and exercise, and the results are slightly different (Figure VA.2). Although the most popular surface was again paved off-street bike paths, other surfaces were viewed more favorably when riding for recreation. Half of the bicyclists indicated that they preferred paved bike paths. Thirteen percent preferred riding on a mountain bike trail, 12 percent preferred an unpaved off-street bike path and 12 percent most enjoyed riding on a street with a bike lane. A general use trail was preferred by 9 percent of the respondents. Less than 2 percent each indicated that they preferred to ride for recreational purposes on a street, road shoulder or sidewalk.

Figure VA.2 Preferred Surface for Recreation or Exercise Trip



B. Satisfaction with Bicycling in Colorado

Respondents were asked to rate the degree of satisfaction with 15 different aspects of their bicycling experiences within Colorado. These aspects include the courtesy of others, bicycle parking, and the physical condition of the surfaces on which they ride. They were to indicate their satisfaction on a scale from one to five, with five representing "very satisfied" and one representing "not satisfied."

Figures VB.1 – VB.15 indicate all of the responses to each of the questions. A summary of these figures is provided in the table below (Table VB.1). The features that generated the highest frequency of negative responses were: the courtesy of motorists, debris on the roads, conditions at road intersections and the condition and width of road shoulders. Nearly 30 percent were dissatisfied with the width of road shoulders. The section above (Figures VA.1 and VA.2) indicated that few people prefer to ride on the shoulder of a road, but those who ride on road shoulders are clearly not satisfied with their width, and are also not satisfied with their condition. Only 2 percent indicated they were very satisfied with the condition of road shoulder surfaces, while 19 percent indicated that they were not satisfied.

Table VB.1 Degree of Satisfaction with Various Aspects of Bicycling in Colorado

	Percent Very Satisfied	Percent Not Satisfied	Percent Not Applicable
Bicycle Parking at Work	12%	11%	52%
Bicycle Parking at School	8%	4%	67%
Bicycle Parking at Other Locations	3%	13%	26%
Courtesy of Motorists	1%	28%	9%
Courtesy of Other Cyclists	12%	5%	8%
Courtesy of Walkers, Runners and Skaters	7%	6%	7%
Crossings at Road Intersections	2%	13%	8%
Railroad Crossings	5%	7%	31%
Debris on Roads/Paths	4%	13%	9%
Speed Bumps and Drainage Grates on Roads	3%	10%	16%
Road Surface Conditions	3%	10%	7%
Bike Path Surface Conditions	12%	3%	9%
Road Shoulder Surface Conditions	2%	19%	13%
Road Shoulder Widths	1%	29%	12%
Signs/Travel Markers	4%	11%	12%

For the most part, bicyclists are satisfied with the parking availability at work and school (Figures VB.1 and VB.2). Twelve percent indicated that they were very satisfied with parking at

work and 8 were very satisfied with the parking at school. Only 11 and 4 percent indicated they were not satisfied with parking at work and school, respectively.

Figure VB.1 Degree of Satisfaction With Bicycle Parking at Work

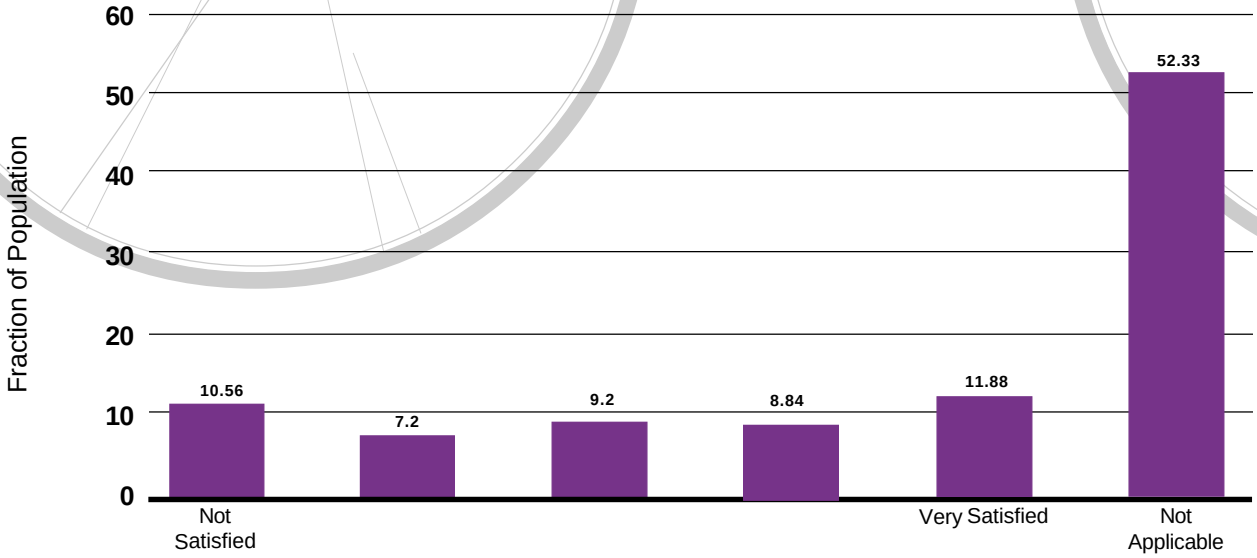


Figure VB.2 Degree of Satisfaction With Bicycle Parking at School

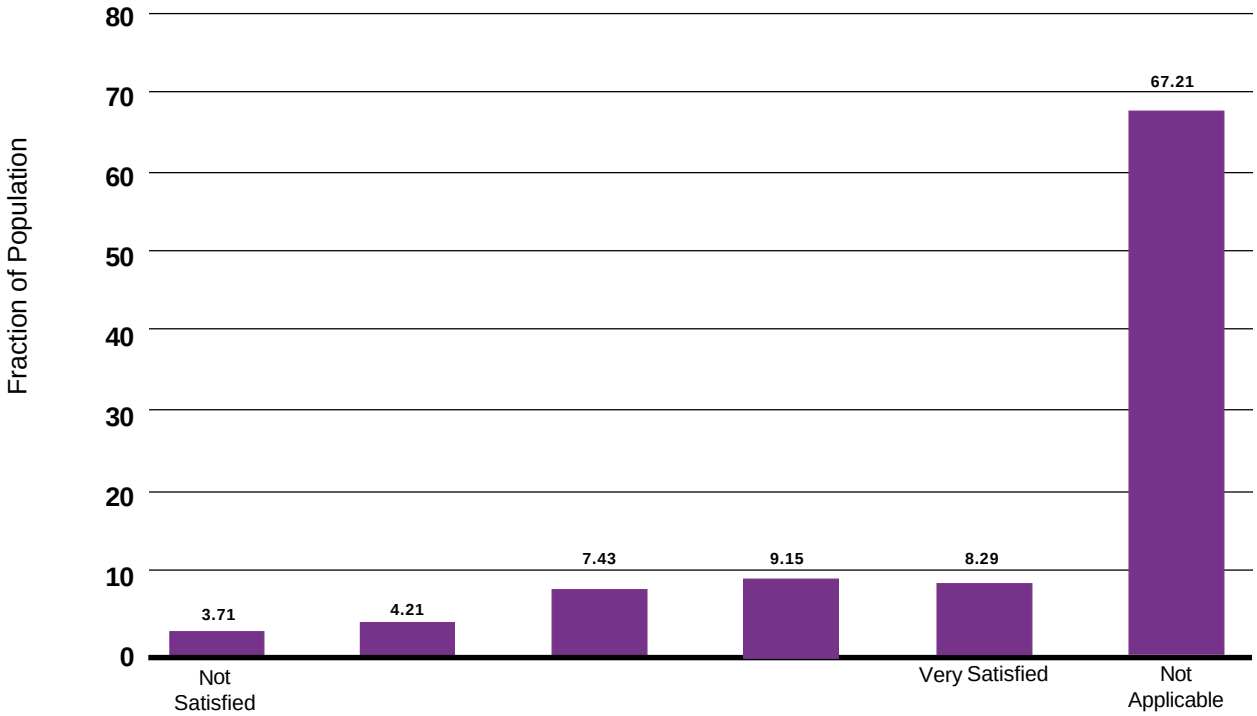
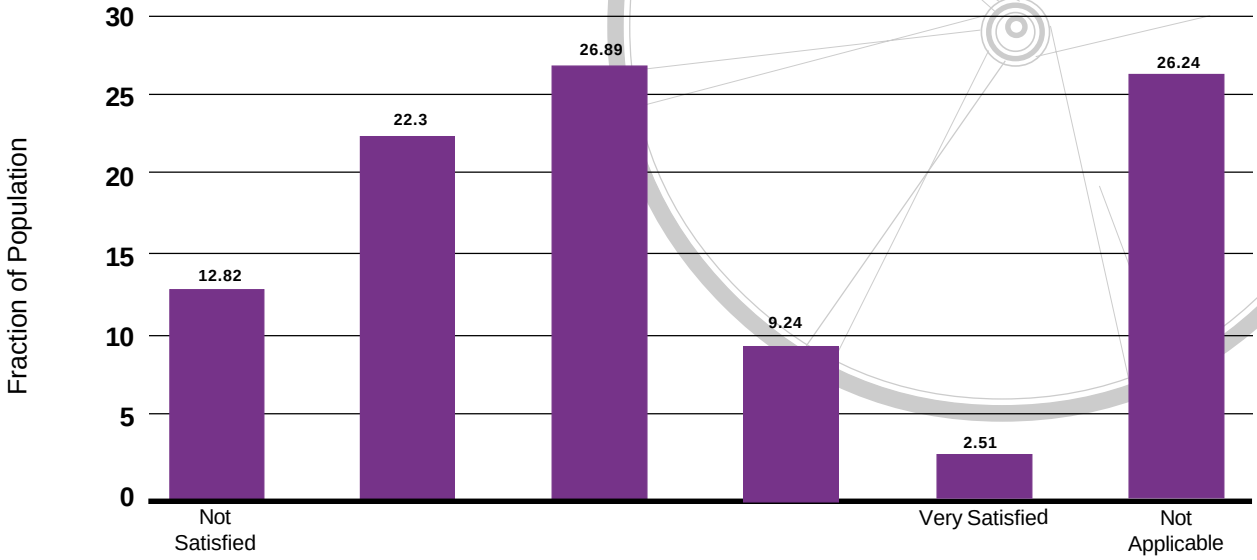


Figure VB.3 Degree of Satisfaction With Bicycle Parking at Other Places (Not School/Work)



Bicyclists in Colorado are very dissatisfied with the courtesy of motorists (Figure VB.4). While only 8 percent of riders rate their satisfaction with the courtesy of motorists in the two highest categories, more than half (56.1 percent) select the two lowest categories. Bicyclists rate favorably the courtesy of walkers, runners and skaters (Figure VB.6), and especially the courtesy of other bicycle riders (Figure VB.5).

Figure VB.4 Degree of Satisfaction With Courtesy of Motorists

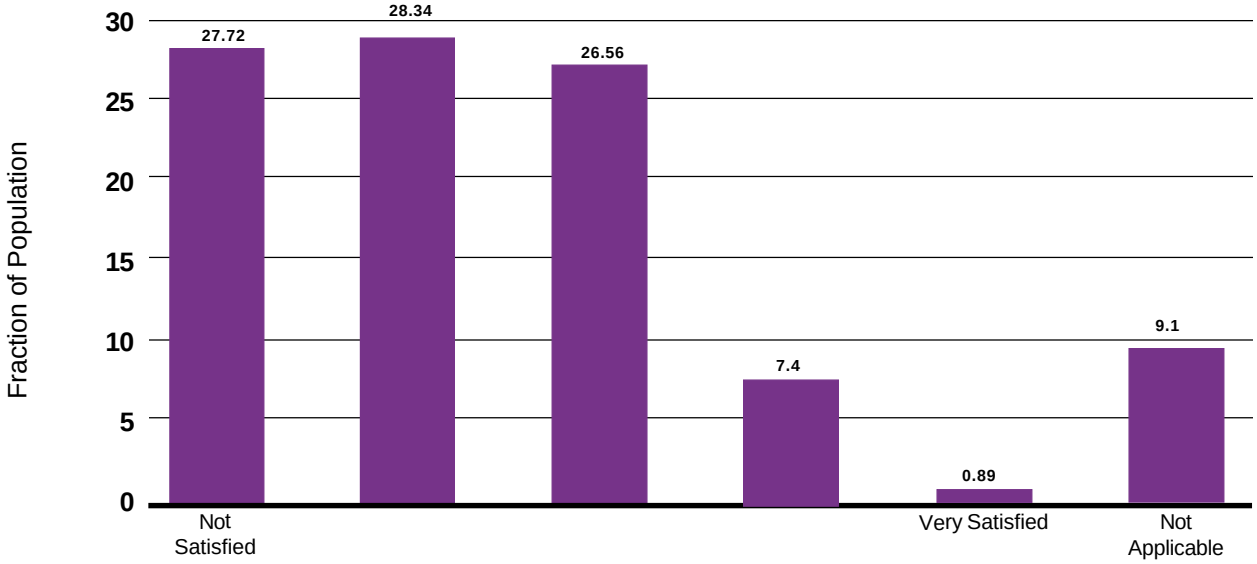


Figure VB.5 Degree of Satisfaction With Courtesy of Other Cyclists

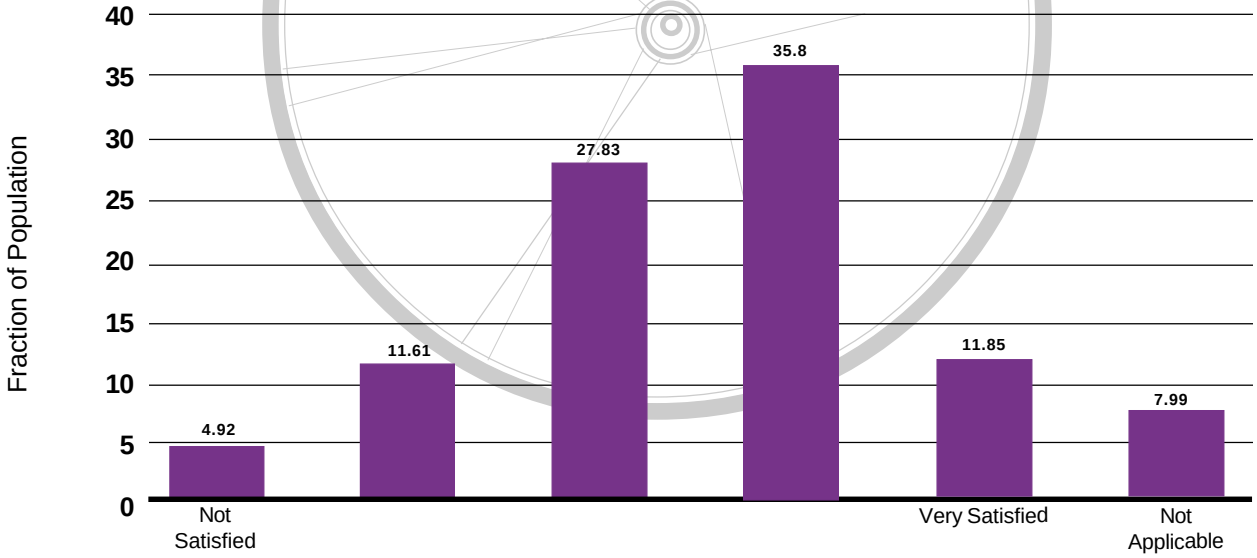
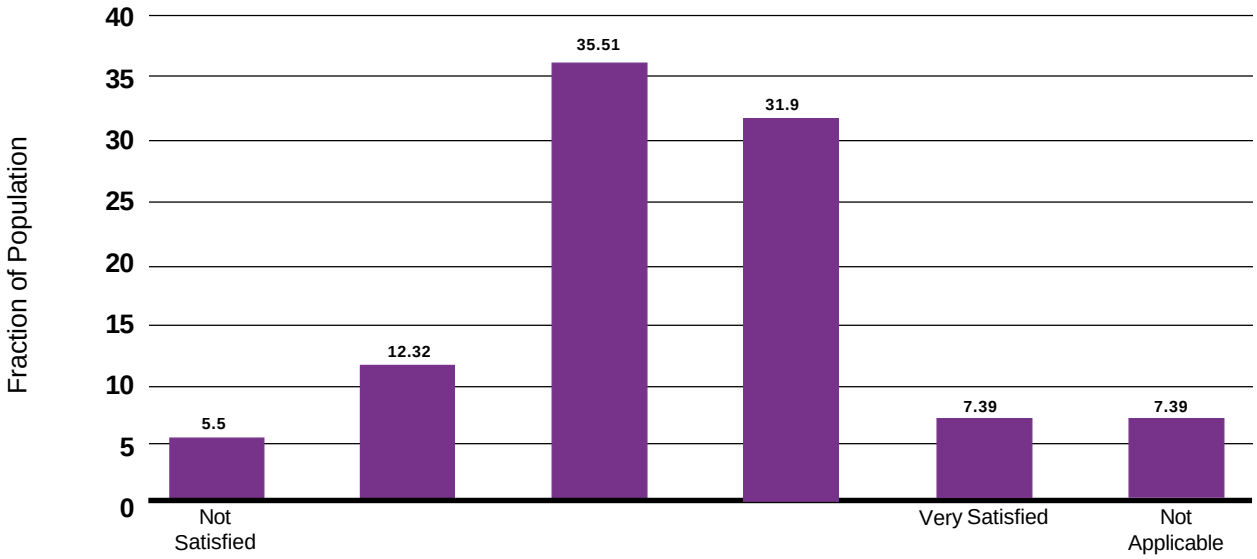


Figure VB.6 Degree of Satisfaction With Courtesy of Runners, Walkers and Skaters



Bicyclists are also more dissatisfied than satisfied with crossings at road intersections (Figure VB.7). Thirteen percent indicate that they are not satisfied and only 2 percent indicate that they are very satisfied. Similar dissatisfaction is reported with regard to debris littering roads and paths used by bicyclists (Figure VB.9) and the conditions of road surfaces in general (Figure VB.11).

Figure VB.7 Degree of Satisfaction With Crossings at Road Intersections

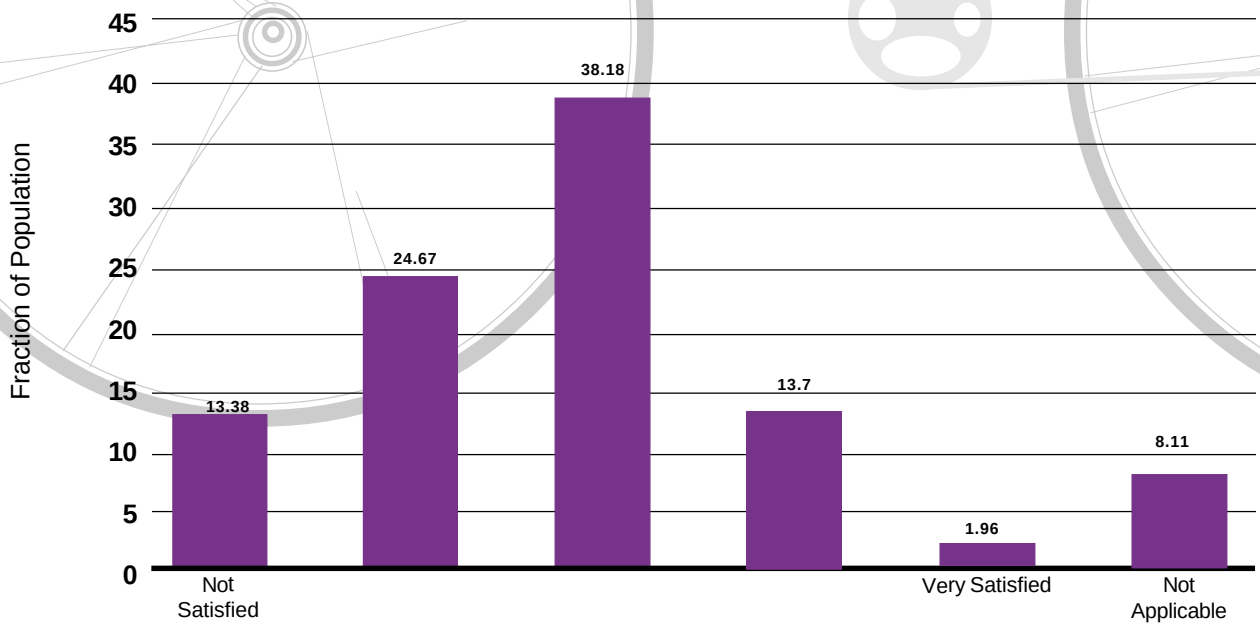


Figure VB.8 Degree of Satisfaction With Railroad Crossings

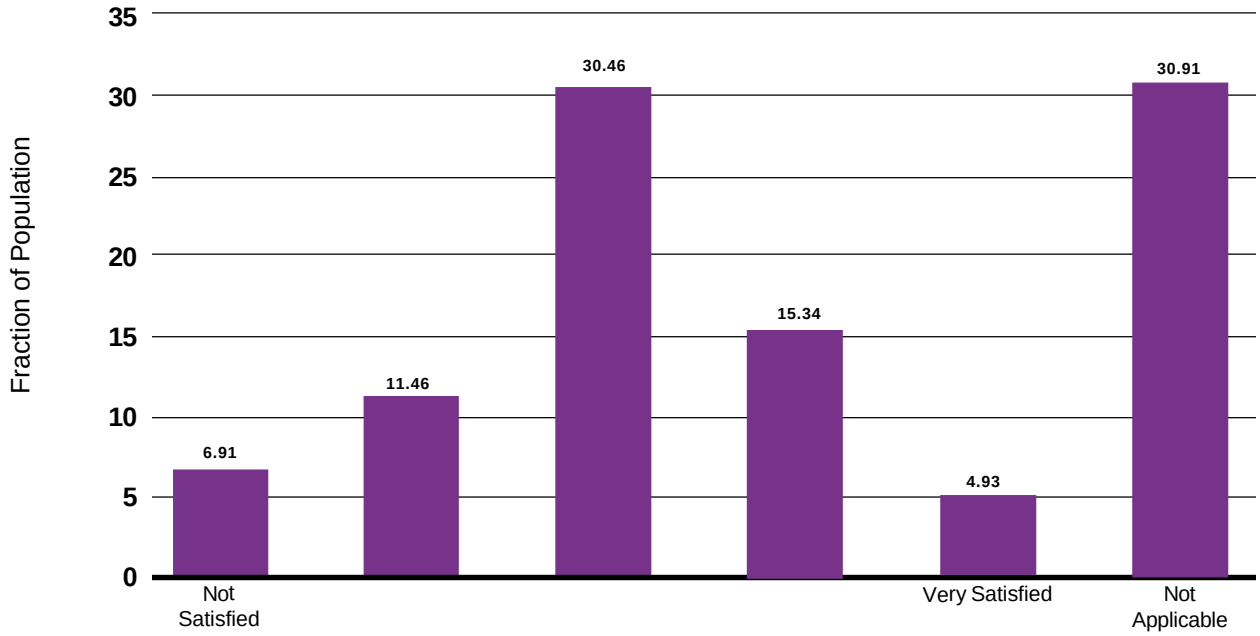


Figure VB.9 Degree of Satisfaction With Debris on Roads/Paths

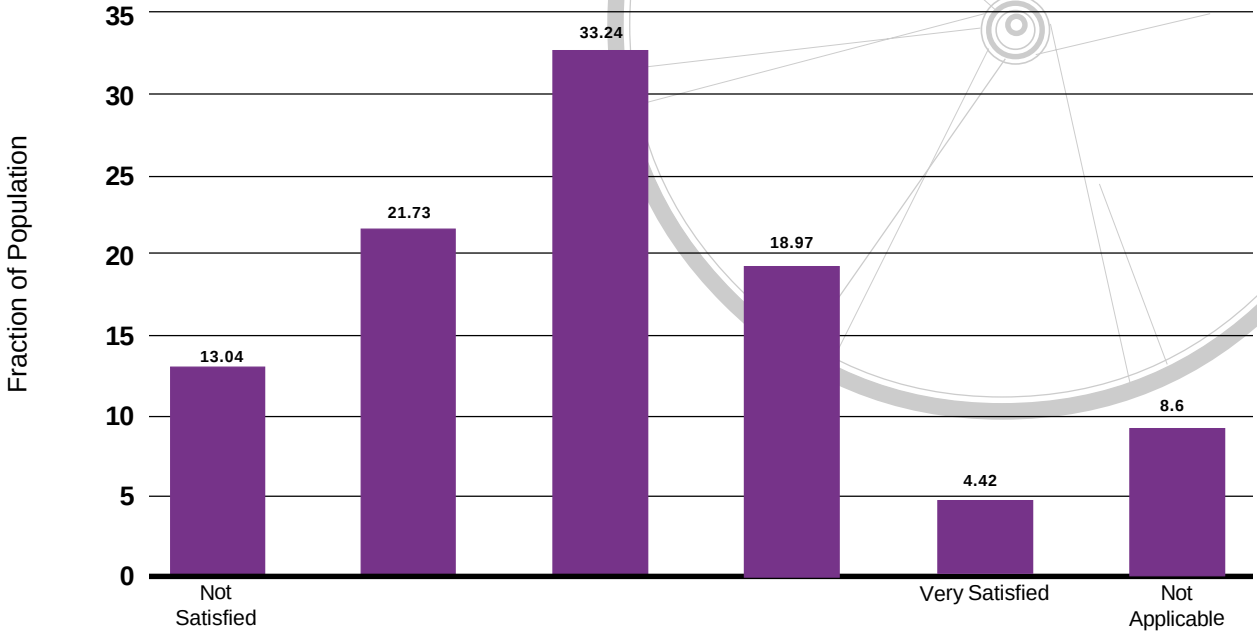


Figure VB.10 Degree of Satisfaction With Speed Bumps and Drainage Grates on Roads

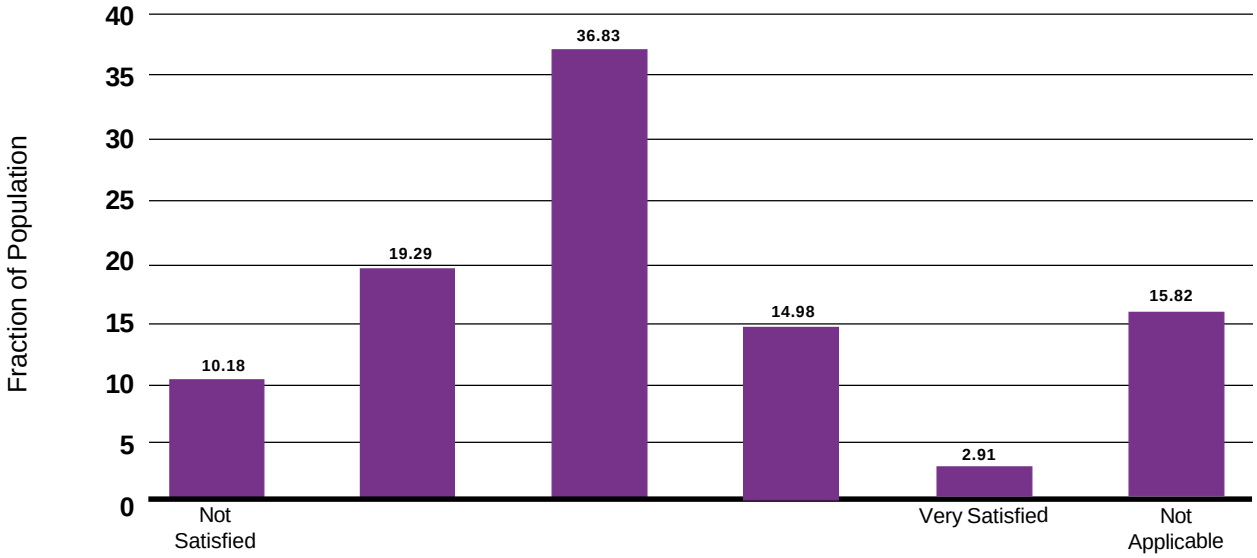
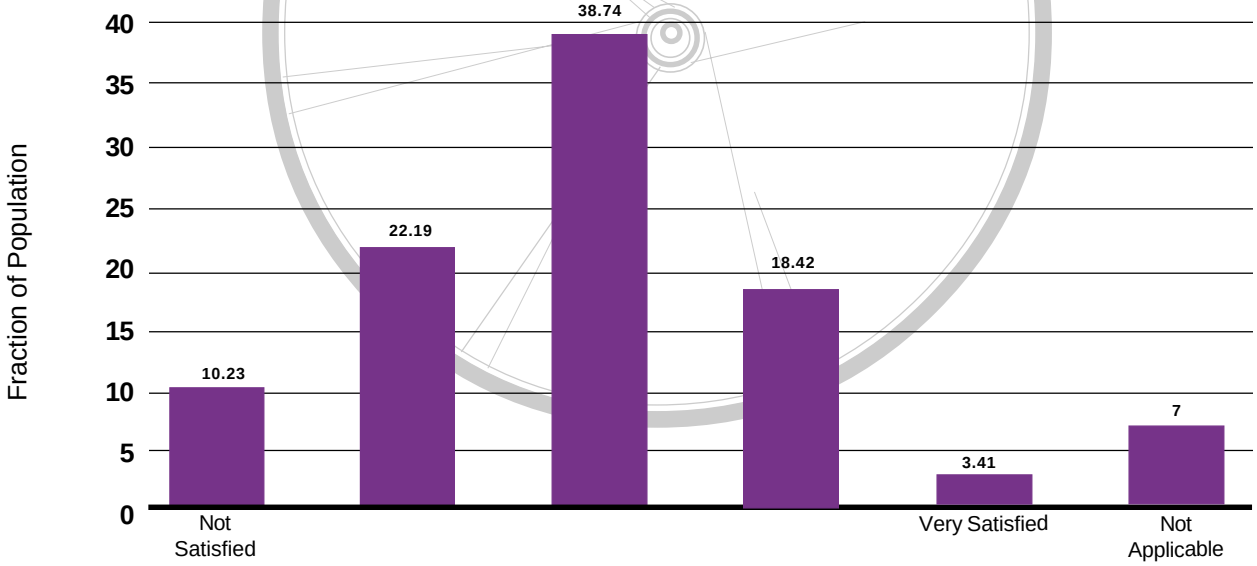


Figure VB.11 Degree of Satisfaction With Road Surface Conditions



There are a few items that bicyclists are satisfied with. In addition to the courtesy of bicyclists, walkers, runners and skaters mentioned earlier, respondents indicated that they are very satisfied with the conditions of existing bike paths. Forty-eight percent of bicyclists placed their satisfaction with the condition of bike path surfaces in the highest two categories (Figure VB.12). Just under thirteen percent chose either of the two lowest categories.

Figure VB.12 Degree of Satisfaction With Bike Path Surface Conditions

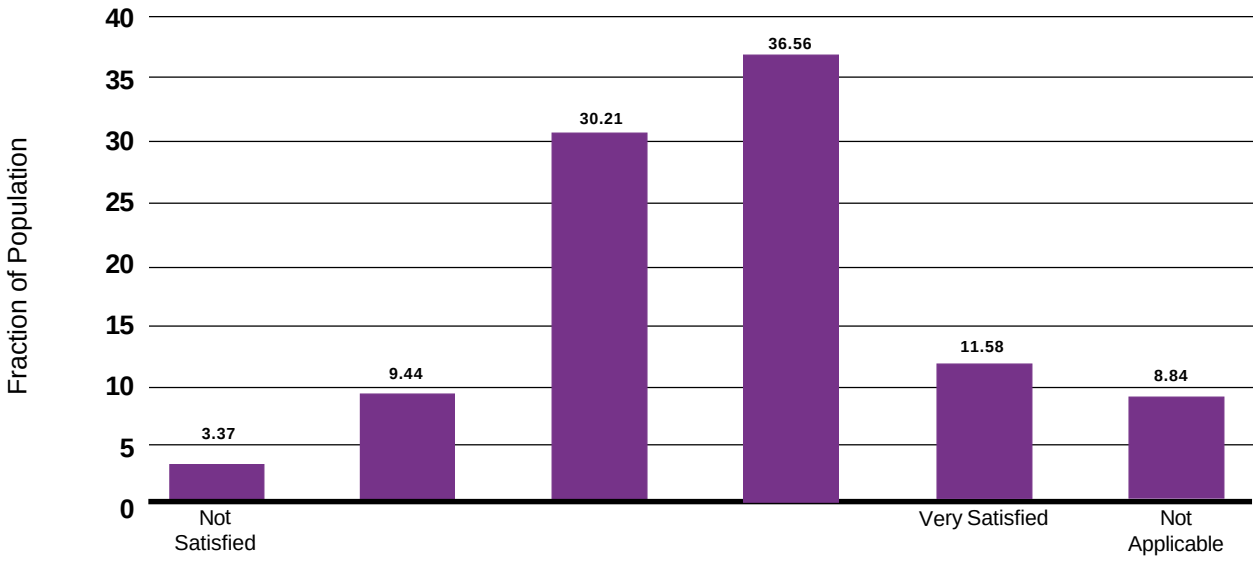


Figure VB.13 Degree of Satisfaction With Road Shoulder Surface Conditions

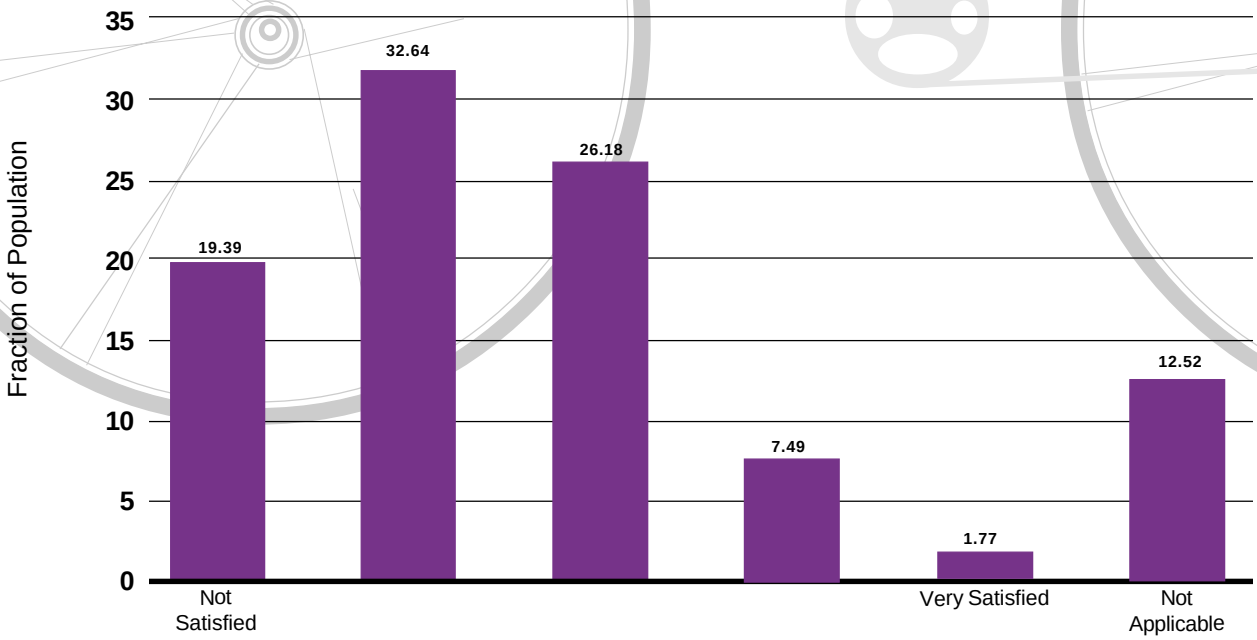


Figure VB.14 Degree of Satisfaction With Road Shoulder Widths

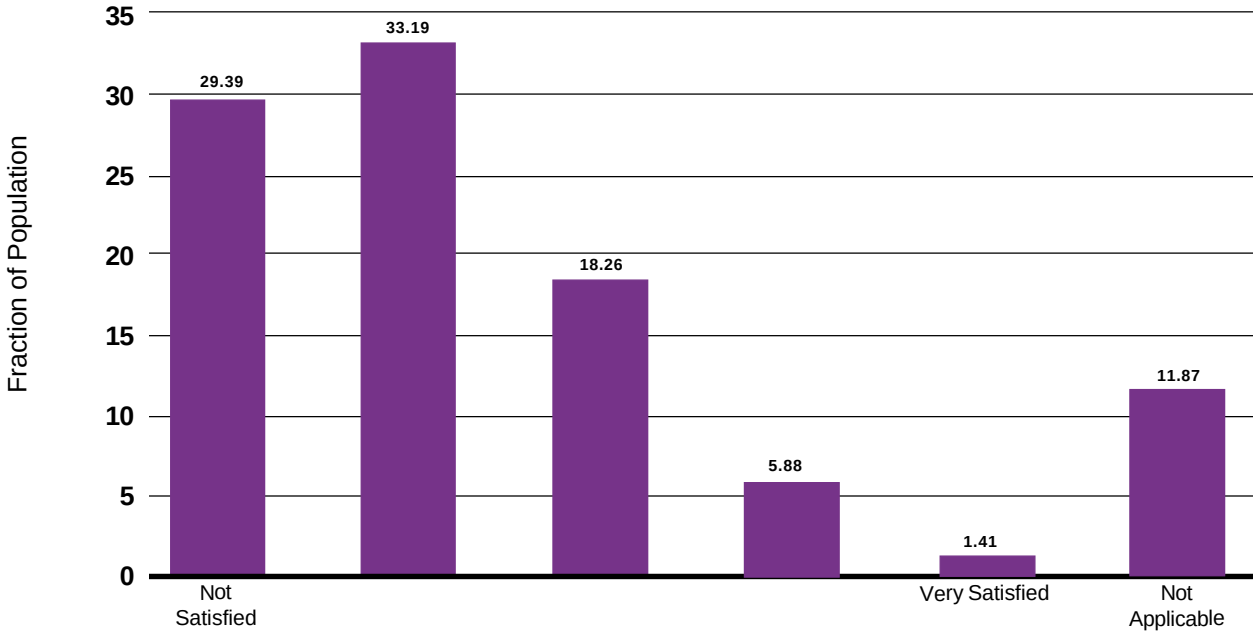
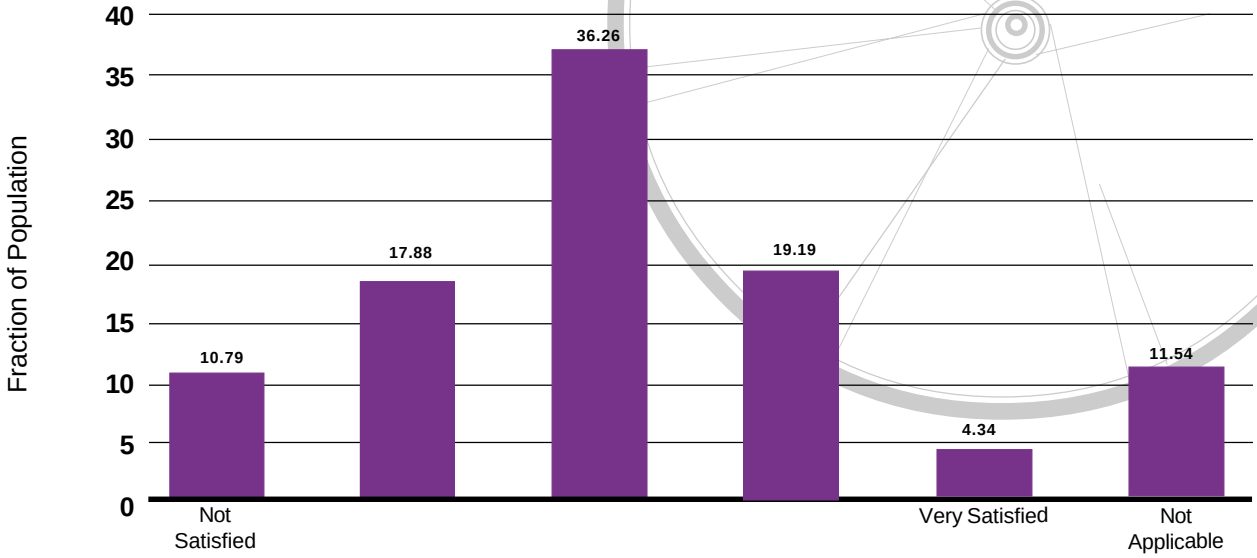


Figure VB.15 Degree of Satisfaction With Signs/Travel Markers



C. Preferences Regarding Bicycle-Related Public Expenditures

Respondents in Colorado households were asked if they would like to see improvements in conditions to encourage bicycling as a means of transportation. An overwhelming majority (79 percent) indicated that they would like to see such expenditures. Respondents then indicated their preferred funding method(s). Respondents could select from among the options presented in Table VC.1, and could select as many sources as they liked. Twelve percent did not indicate any preference. Clearly, the use of new taxes is not an attractive funding source. Only 6 percent indicated that they would like to use this funding option. The majority of survey respondents preferred to reallocate funds from other transportation projects. There was some support for using fees for trails and path use and bicycle registration and licensing revenue.

Table VC.1 Preferred Funding Sources for Improvement of Bicycling Conditions

Funding Source	Percent of Households
New Tax	6.2%
User Fees for Trails and Paths	20.9%
Bicycle Registration and Licensing Fees	35.5%
Reallocating Funds from Other Transportation Projects	51.3%

Note: Percentages sum to more than 100% since respondents can select more than one funding source.

Respondents who bicycle in Colorado were also asked about how they would allocate $100 among various uses to improve their bicycling experiences if they were traveling to work or for a utility trip. The questions listed ten possible uses for the money, and if the $100 were simply split equally between the ten possible uses, each would receive $10. Figure VC.1 illustrates which projects were most frequently mentioned by survey respondents and Figure VC.2 illustrates the amount of money they would chose to allocate to each project. (It should be noted that the question did not ask if they would like to see any money spent on improving bicycling, but rather, if $100 were to be spent, where they would like to see the improvements.) Not surprisingly, giving the fact that most bicycle riders indicated that they preferred riding on paved off-street bike paths, the most popular expenditure was to create new paved off-street bicycle paths. Figure VC.1 indicates that just over two-thirds of the bike riders (68 percent) would choose to allocate some money for this use, and from Figure VC.2 we can tell that they would choose to spend $36 out of the $100 for the creation of new paved paths. Then second most frequently mentioned project was to link existing paved paths. Forty-seven percent of respondents also chose this project. The average desired expenditure was $18 of the $100. Other projects receiving support include spending to create recreational unpaved paths, better maintain existing routes and construct and improve road shoulders. Out of a budget of $100 Bicyclists supported smaller expenditures on education and enforcement ($6.13), reconstructing on-street routes ($5.24) and striping bike lanes ($4.70). Supplemental bike facilities and improving signs were mentioned less often.

D. Summary

The opinions of bicycles riders presented in this section paint a very clear picture. Bicyclists in Colorado overwhelmingly prefer to ride on bicycle paths compared to roads. Their preferences are related to their satisfaction with the condition of bike paths and their dissatisfaction with the condition of roads and the courtesy of drivers. Reinforcing these preferences, bicyclists prefer to see additional spending be focused on the construction of new off-street paths and projects linking existing paved paths.

Figure VC.1 Public Bicycling Expenditure Preference

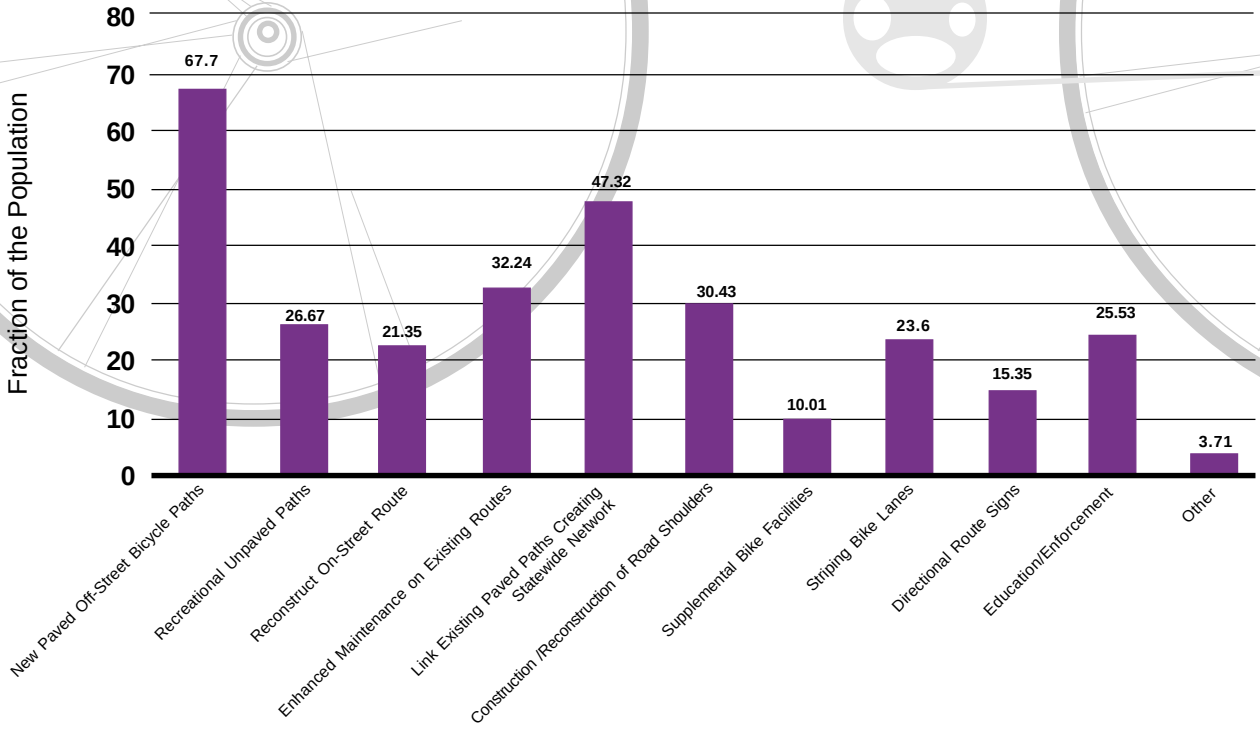
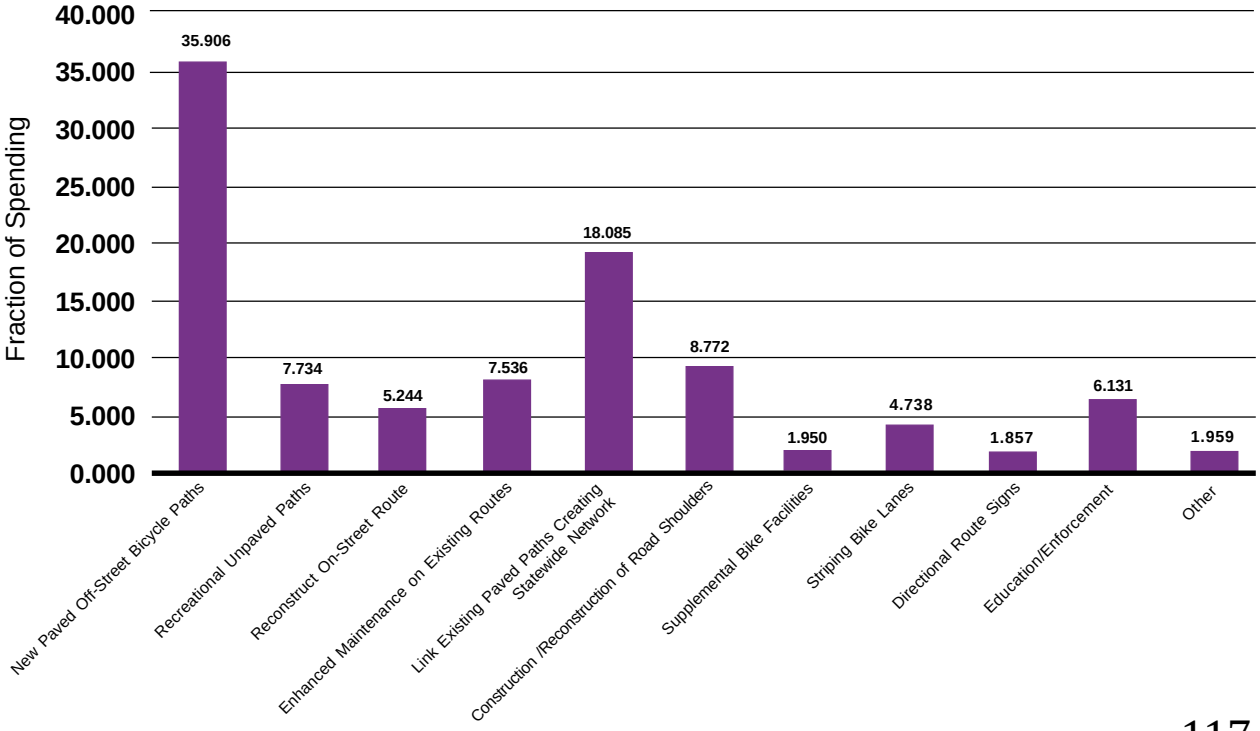
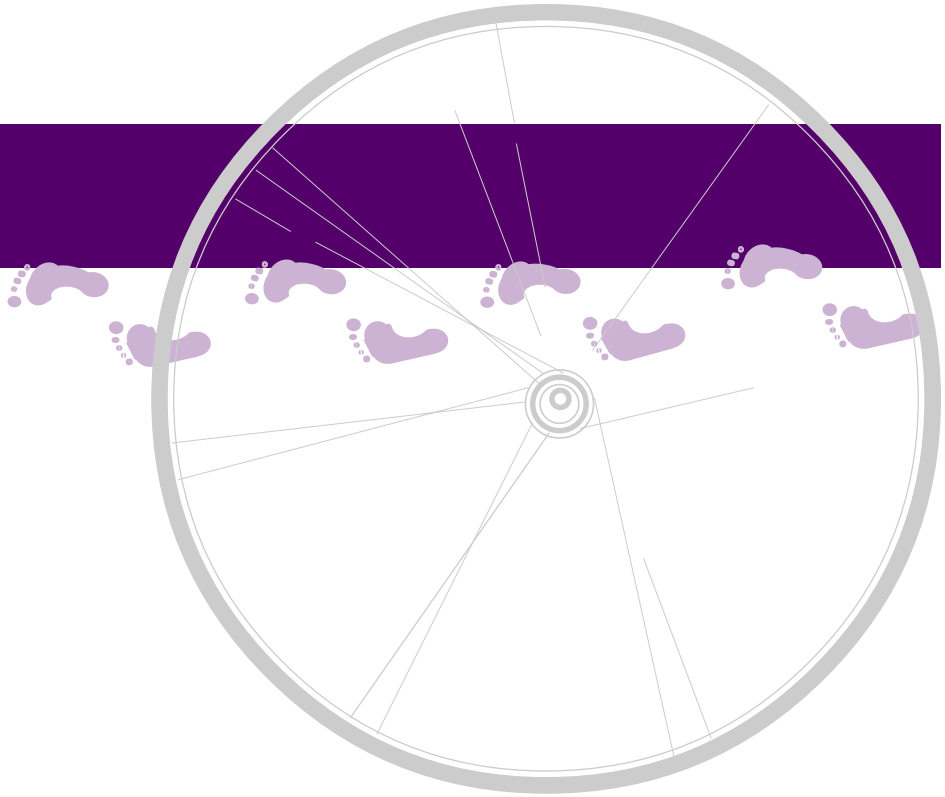


Figure VC.2 Desired Spending of Public Bicycling Expenditure





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VI. The Investigation of the Determinants of Bicycling in Colorado

Using the data described earlier in this report, statistical analyses are performed to identify the factors that influence the propensity to use bicycles for work, school and utility trips. The statistical framework can be summarized as follows.

The decision to bicycle (to work, to school, or for utility trips) is a binary one. That is, individuals decide on whether or not to bicycle for a particular purpose, and as a result, two outcomes of this decision are observed. B = 1 if the person bicycles, and B = 0 if he/she does not. A number of explanatory variables, such as age, race, gender, education and work history can impact the observed binary decision. These variables are potentially important determinants of the bicycling decision as they capture the tastes of the individual as well as individual-specific circumstances that may influence the bicycling decision. In addition, the environment in which the transportation decision is made is important. The condition of the roads, the availability of bicycle storage facilities, and traffic safety concerns are examples of variables that are characteristics of the bicycling environment. Within this framework, the decision to bicycle can be described as follows.

(1) $I_i = X_i \forall + Y_i \exists + ,_{1i}$,

where I_i stands for the latent variable, which captures the propensity to bicycle for the *i*th individual. X_i represents individual characteristics (such as age, education, gender), Y_i stands for bicycling conditions which can be altered. Examples include the availability of off-street bike paths, the availability of shoulders and the presence of route hazards, such as gravel and potholes. " and $ are the coefficients, and $,_{1i}$ is a white noise error term that captures unobservable individual-specific factors that have an impact on the propensity to bicycle.

Without loss of generality, a dichotomous variable B_i is defined as $B_i = 1$ (the person is bicycling) if $I_i > 0$.

This indicates that the probability of bicycling, Prob($B_i = 1$), can be written as

(2) $\text{Prob}(B_i = 1) = M(Z_i ($),

where M stands for standard normal distribution, Z is the vector of variables, including X and Y, and (is the vector of coefficients.

The details of these binary choice models can be found in Greene (1997)[1], and Maddala

[1] Greene, William H., 1997, Econometric Analysis, New Jersey: Prentice Hall.

(1983)[2]. Examples of recent applications include Mocan and Rees (1999)[3]; Mocan, Tekin and Zax (2000)[4]; Manning, Blumberg and Moulton (1995)[5].

For individuals who bicycle (those with $B_i = 1$), the frequency of bicycling, F, can be explained by a set of explanatory variables K, such as

(3) $F_i = K^* + \varepsilon_{2i}$.

Workers

The analysis of the determinants of using a bicycle for commuting to work is conducted based on the data presented in Appendix I using a sample of individuals who work outside their homes (workers). A dichotomous dependent variable is created which takes the value of one if the worker uses a bicycle as a primary or secondary means of transportation to work, and zero otherwise.

Using Equation (2) described above, a probit model is estimated, where the probability of using a bicycle for a work commute is explained by the age, gender, race, marital status, education, occupation, salary of the individual, as well as the household income. Household income is measured by a set of four dichotomous variables. HHINC1 is equal to 1 if the household income is less than or equal to $20,000, and zero otherwise. HHINC2 is a dichotomous variable, equal to 1 if household income is between $20,001 and $40,000; and zero otherwise. HHINC3 is equal to 1 if household income is between $40,001 and $60,000, and zero otherwise. Similarly, HHINC4 takes the value one if the household income is between $60,001 and $100,000; and zero otherwise. Inclusion of these four household income variables in the regression models indicates that the left-out category is the one where household income is greater than $100,000.

An important set of explanatory variables is the one which pertains to the bicycling environment, depicted by Y in Equation (1) above. The respondents to this survey were asked to evaluate various variables in this group on a scale from zero to three to measure the degree to which these variables create obstacles for bicycling. In this group are PUBLIC TRANSP, which stands for inability to take

[2] Maddala, G. S., 1983, Limited Dependent and Qualitative Variables in Econometrics, New York: Cambridge University Press.

[3] Mocan, H. Naci, and Daniel I. Rees, 1999, "Economic Conditions, Deterrence and Juvenile Crime: Evidence from Micro Data," NBER Working Paper 7405.

[4] Mocan, H. Naci, Erdal Tekin, and Jeffrey S. Zax, 2000, "The Demand for Medical Care in Urban China," NBER Working Paper 7673.

[5] Manning, Willard G., Linda Blumberg, and Lawrence H. Moulton, 1995, "The Demand for Alcohol: The Differential Response to Price," Journal of Health Economics, 14: 123-148.

the bicycle on public transportation, BIKE STORAGE, which stands for lack of secure bike storage at the destination, SHOWER , which stands for lack of shower or dressing facilities at the destination, ROAD HAZARD, which stands for hazardous road conditions, such as gravel and potholes; TRAFFIC SAFETY, which stands for traffic safety concerns; CRIME, which stands for lack of personal security (crime); BIKE PATHS, which stands for off-street bike paths; SHOULDERS, which is lack of shoulders to ride on; TRANSIT, which stands for lack of transit connections; CONGESTED ROUTE, which stands for having no alternative to congested routes. The range of these variables is 0 to 3; 0 indicating not a factor, 1 stands for minor factor, 2 is major factor, and 3 prevents the individual from bicycling.

Table VI.1 presents the descriptive statistics of the sample of workers used in the analysis. We identified the individuals who have a high distaste for bicycling, and dropped them from the estimating sample. Question 23 of the survey asks for various factors that may impact the propensity to bicycle to work. If a respondent to the survey indicated that none of these items was a factor in his/her decision to bicycle, and if he/she did not bicycle, this suggests a distaste for bicycling (a high negative value for , in Equation 1). Thus, individuals who indicated that none of the listed items in Question 23 was a factor in their bicycling decision and who nevertheless did not bicycle, were not used in estimation. The proportion of this group, however, is helpful information in making the simulations described below.

The results of the probit model of bicycling to work are reported in Table VI.2. The coefficients reported are the marginal effects; that is they demonstrate the impact on the probability of bicycling to work of a one unit change in the corresponding variable. The estimated standard errors are also reported. Marginal effects which are statistically significantly different from zero at the 5 percent level or less are denoted by a star.

All else the same females are almost seven percent less likely to bicycle to work than males. Married and divorced or widowed individuals are seven and eight percent less likely, respectively, to bicycle to work in comparison to singles.

Individuals are categorized into the following racial and ethnic groups: Hispanic, Black-non-Hispanic, Native American, Asian and White. Because there were no Asians, or black-non-Hispanics in the sample who bicycled to work, they could not be included in the analysis. Thus, we included three race categories: HISPANIC, NATIVE AMERICAN, and OTHERRACE. The omitted category is White, Asian, and Black-non-Hispanic. According to the results of Table VI.2, there is no statistically significant difference between Hispanic, Native Americans and Whites (as well as Asians and Blacks). However, individuals who identified themselves as belonging to some “other

race" are 24 percent more likely to bicycle to work.

Individuals who have an associate degree are eight percent less likely to bicycle to work in comparison to those who are high school graduates (the left-out category). Individuals with a Ph.D. are 18 percent more likely to commute to work on their bicycles.

Occupation and industry affiliation have no impact on the propensity to bicycle to work. On the other hand, household income is a significant determinant. For example, the coefficient of HHINC1 is 0.18, and it is statistically significantly different from zero. This indicates that individuals from households with household incomes of less than or equal to $20,000 are18 percent more likely to bicycle to work in comparison to persons with the same characteristics, but household income in excess of $100,000. This may reflect the cost savings of bicycling. Similar results are obtained for other household income categories (see Table VI.2).

The bottom of Table VI.2 contains the variables that represent bicycling environment, which can be altered by policy. Three variables in this group are statistically significant. They are SHOWER, TRAFFIC SAFETY and BIKE PATHS. For example, the coefficient of BIKE PATHS indicates that if the rating of satisfaction with shower and dressing facilities at work improves by one point (e.g., if it goes down from being from minor factor to not a factor), this would increase the probability of bicycling to work by 5 percentage points.

The results reported in Table VI.2 are based on a sample of workers, some of whom are students. To investigate the behavior of the non-student workers, individuals who identified themselves as working students are dropped from the sample, and the model is re-estimated. The results are reported in Table VI.3 are virtually the same as the one reported in Table VI.2

Using the estimated parameters of Table VI.3 simulations can be performed to determine the increase in the number of individuals who bicycle to work as a reaction to an improvement in the bicycling environment. The 1998 population estimates from the State Demographer's Office indicates that there are 2.26 million workers in Colorado between the ages 16 and 55. Using the information obtained from our survey, 9.08 percent of these individuals attend school, implying that there are approximately 2,053,000 non-student workers between the ages of 16 and 55. In our data set, it was found that 58% of the individuals in this group have a dislike for bicycling. Thus, the remaining 42 percent (862,000 individuals) constitute the group which is prone to bicycling. Eighteen percent of this group bicycles to work, indicating that 155,000 non-student workers bicycle to work in Colorado.

The average value of the TRAFFIC SAFETY question for non-student workers is 1.52, where 1 stands for traffic safety being a minor factor, and 2 indicates that traffic safety is a major factor. Thus, a policy that would reduce the average rating of traffic safety to a minor factor (a 0.52

point decline from 1.52 to 1.00) increases the propensity to bicycle to work by 2.2 percentage points. This increases the number of people who bicycle to work by 18,800.

BIKE PATHS is another statistically significant factor that determines the propensity to bicycle to work. The mean value of this particular question is 1.30. Thus, an improvement in the availability of bike paths to the extent that on average its rating goes down to a being a minor factor translates into a 0.30 point decline. Using the estimated parameter of BIKE PATHS in Table VI.3, this improvement generates a 1.4 percentage point increase in the probability of bicycling to work, which translates into an increase of 12,000 workers who bicycle to work.

The coefficient of SHOWER is statistically significant in the regression. However, the mean value of the rating of this variable is 1.01 indicating that on average people rate this aspect of the bicycling environment as a minor factor.

Our data indicate that given that the individual decides to bicycle to work the probability of doing so for less than once a month is 41 percent. The probability of bicycling to work once a month is 7.8 percent. The probabilities for bicycling to work 2-3 times a month, once per week and more than once per week are 13.9, 10.9, and 26.4 percent, respectively.

The average distance traveled in a month can be found by multiplying the distance between home and work and the frequency of the bicycle trips in a month. If the individual bicycles to work less than once a month, he/she is assumed to travel 0.5 times a month. If he/she travels more than once per week, it is assumed that he/she bicycles twice a week (8 times per month). Using this algorithm, we found that the average distance bicycled between work and home is 8 miles for those who bike to work for less than once per month, 12 miles for those who bicycle once per month, 36 miles for those who bicycle 2-3 times per month, 44 miles for those who bicycle once per week, and 84 miles per month for those who bicycle more than once per week.

Using the frequency distribution of the bicycle trips to work, and assuming that that distribution will be relevant for those who start bicycling following a change in bicycling environment the following inference can be made. Of the 19,000 people who will start bicycling to work following an improvement in traffic safety concerns (enough to reduce the average rating to 1), 41 percent (7,800 individuals) will bicycle less than once per month, 1,482 (7.8 percent) will bicycle once a month, 2,641 will bicycle 2-3 times per month, 2,062 will bicycle once per week, and 5,024 will bicycle more than once per week. Using the twice the one-way travel miles between home and work reported above, this indicates that 680,000 miles will be bicycled by the new participants per month.

The frequency distribution of bicycling to work and the associated work-home distance indicates that 12,000 individuals who would bicycle to work if the availability of bike paths improved to such a level that it became a "minor factor," this would have generated 434,000 additional miles traveled by workers each month.

For those individuals who already bicycle to work, the determinants of the frequency of bicycling can be investigated using the model depicted by Equation (3). For this analysis, the frequency of the trips in the sample of workers who bicycle to work is analyzed using question 24 of the survey (see Appendix II for the survey instrument). The responses are categorized as: less than once per month, once per month, 2-3 times per month, once a week, and more than once per week. An ordered-probit model is estimated which examines the probabilities of moving to different frequency categories as a function of personal characteristics and the degree of satisfaction with various bicycling environment conditions as revealed by bicyclists. These variables are captured by question 88 of the survey. For consistency between work, school and utility trips, the mean value of the satisfaction with bicycle parking at work, school and other places (PARKING) is used in the regressions. The scale of these variables is from 1 to 5, a five indicating being very satisfied. The vector of explanatory variables Z and K in equations (2) and (3) are not identical, which facilitates identification of the parameters.[6]

The policy variables included as explanatory variables, in addition to satisfaction with parking, are the degree of satisfaction with the following aspects of the bicycling environment: courtesy of the motorists; courtesy of other cyclists; courtesy of runners, walkers and skaters; crossing at road intersections; debris on roads and paths; speed bumps and drainage grates on roads; road surface conditions; bike path surface conditions; road shoulder surface conditions; road shoulder widths; and signs and travel markers. The results, which are presented in Table VI.4, demonstrate that the satisfaction with parking conditions is the only policy variable that significantly influences the frequency of bicycling to work. The average value of satisfaction with bicycle parking is 3.08 on a scale from 1 to 5, where 5 stands for very satisfied. The calculation of the probabilities of each bicycling frequency reveals that a one unit increase in the parking satisfaction (from 3.08 to 4.08) reduces the probability of bicycling to work less than once per month by 7 percent. It reduces the probability of making the work trip by a bicycle once a month by 0.3 percent. The probability of bicycling to work 2-3 times a month increases by 0.5 percent; the probability of bicycling to work

[6] For a non-technical discussion of identification see: Corman, Hope, and H. Naci Mocan, 1998, "An Economic Analysis of Drug Use and Crime," Journal of Drug Issues, 28(3): 613-629.

once a week increases 1.4 percent, and the probability of bicycling more than once a week increases by 5.3 percent.

Using this information, and noting that the number of workers who bicycle to work is 155,000, it is straightforward to calculate that a one unit improvement in the average parking satisfaction (from the current average of 3.08 to 4.00) generates an additional 663,000 miles bicycled for work travel.

Students

The analysis of the probability of bicycling to school is presented in Table VI.5. It should be noted that this analysis includes all students, regardless of their work status. The data set does not contain a large enough number of students to perform the analysis separately for working students and non-working students. Along the same lines, the analysis of the determinants of the frequency of school trips cannot be done for students because of the small sample size regarding students who bicycle to school.

According to the data obtained from the Colorado Department of Education and from the Colorado Commission on Higher Education, there are 350,000 students who are 16 years of age and older in Colorado. Using the information obtained from our data, 70 percent of the student sample is not prone to bicycling. Of the remaining 30 percent, 39.6 percent use bicycles as a primary or secondary mean of transportation to school, implying that there are 41,500 students who bicycle to school at some frequency. This figure is consistent with the raw 12 percent we reported in Section 1B. That is, 12 percent of 350,000 students generates 42,000 students who bicycle.

Table VI.5 shows that the only variable that is significant is TRAFFIC SAFETY. The mean value of this variable is 1.22, which indicates that to reduce the traffic issues to a "minor concern" would involve a reduction of 0.22 units. Using the estimated coefficient of TRAFFIC SAFETY, this implies a 7.4 percentage point increase in the probability of bicycling to school, which translates into 7,700 additional students.

The analysis of the frequency of student travel reveals that 24.2 percent of the students bicycle to school for less than once a month; 8.1 percent do so once a month; 9.7 percent bicycle 2-3 times a month; 4.2 percent bicycle once a week; and 50 percent bicycle to school more than once a week. Converting the "less than once per month" to 0.5 trips per month, and "more than one trip per week" to two trips a week, and using the reported home-school distances, it is found that those who bicycle to school less than once a month have an average trip length of 4 miles per month. Those who bicycle once a month travel an average of 10 miles between home and school. Students who

bicycle to school 2-3 times per month, travel an average of 46 miles per month; and students who travel once per week, travel 72 miles per month. Those who use their bicycles for school travel for more than once per week travel an average of 46 miles per month between home and school. This implies that an additional 7,700 students would travel if average traffic safety concerns were to go down to a "minor concern," and this would generate an additional 270,000 miles per month traveled by these students.

Utility Trips

Of the 2.4 million people who are ages 16 to 55 in Colorado, 63.3 percent have no propensity to use a bicycle for utility trips. Of the remaining 36.7 percent, 27.4 percent use a bicycle a primary or secondary method for utility trips, implying 241,000 individuals bicycle for utility trips. As Table VI.6 demonstrates, road hazards and the availability of bike paths are two statistically significant determinants of bicycling for utility trips. The mean value of route hazards is 0.93, indicating that on average, individuals think road hazards as a minor factor that impact bicycling for utility trips. On the other hand, the mean value of the rating for lack of off-street bike paths is 1.11. Thus improving the availability of off-street bike paths such that it becomes a minor concern (a reduction of 0.11) would generate a 0.8 percentage point increase in the number of utility bicyclists, which implies an additional 7,170 individuals.

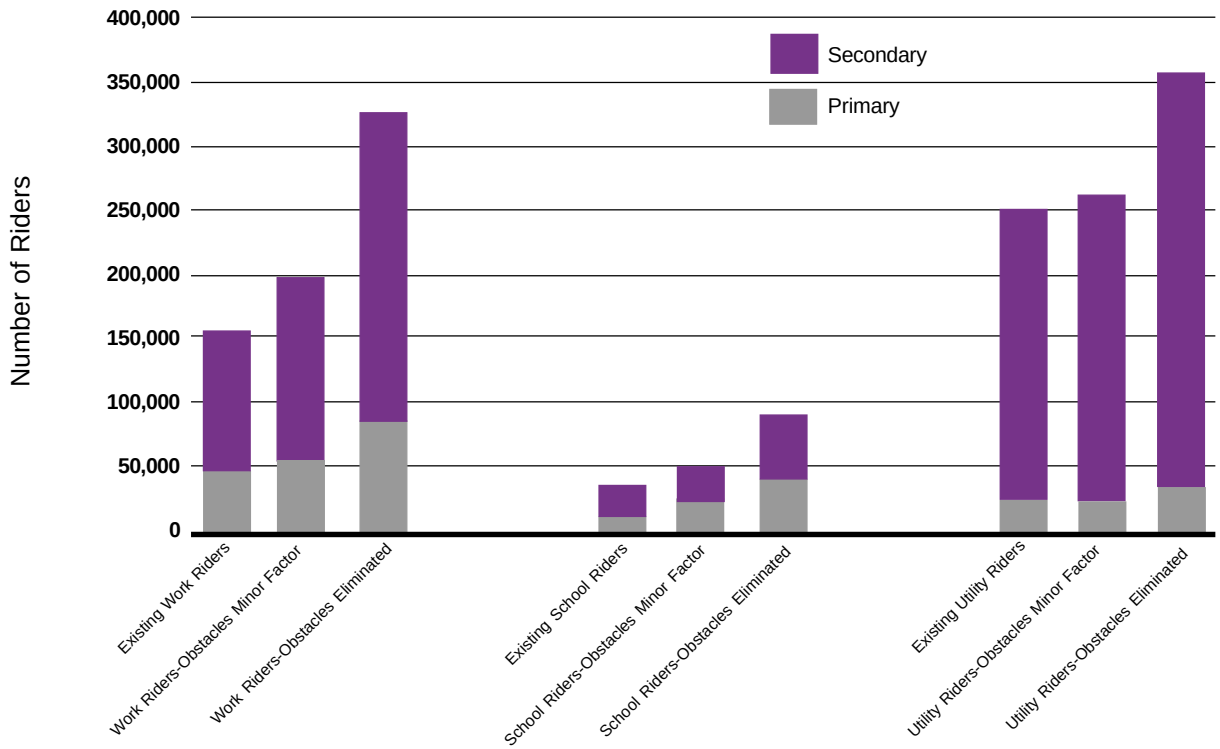
Our data reveal that of the individuals who bicycle for utility trips 39.6 percent do so less than once a month, 15.5 percent do so once a month. 19.2 percent use a bicycle for a utility trip 2-3 times a month, 13.9 percent does so once per week, and 11.8 percent does so more than once a month. The average monthly miles for those use bicycle less than once per month for a utility trip is 6. It is 10 for those who bicycle once a month, 26 for those who do so 2-3 times a month, 28 for those who bicycle once a week, and 68 for those who bicycle more than once a week. Using the same algorithm as described above, this implies that an additional 159,000 miles would be bicycled per month for utility trips following the improvement in off-street bike paths as described above.

The ordered probit model presented in Table VI.7 indicates that for those who are bicycling for utility trips, satisfaction with the courtesy of the cyclists, bike path surface conditions and signs and travel markers are statistically significant determinants. The average rating of the satisfaction with the courtesy of other cyclists is 3.5 (out of 5), the rating of bike path surface conditions is 3.6, and the average rating of the satisfaction with signs and travel markers is 3.1. A one unit increase in the average satisfaction with the courtesy of other bicyclists would decrease the probability of bicycling less than once a month by 13.8 percent, and the probability of bicycling once a month by

0.6 percent. It would increase the probability of bicycling 2-3 times a month by 4.7 percent, the probability of bicycling once a week by 4.1 percent, and the probability of bicycling more than once a week by 5.6 percent. The corresponding probabilities are –11 percent, -0.5 percent, 4 percent, 3.3 percent, and 4.4 percent, respectively, for bike path surface conditions, and –17 percent, -0.8 percent, 5.9 percent, 5 percent and 6.9 percent for signs and travel markers (see Table VI.7). This indicates that if the satisfaction level with cyclist courtesy would go up to 4.0 (from the current average of 3.5), this would generate an additional 684,000 bicycle miles per month for utility trips. Similarly, an improvement in bike surface conditions so that the average rating of the bicyclists would go up to 4.0 would generate an additional 435,000 bicycle miles per month for utility trips. An increase to 4.0 in the satisfaction with signs and markers would increase utility bicycle miles by 1,520,000 per month.

The information regarding the increase in the number of bicyclists and the miles bicycled for different trips are summarized in Figures VI.1 to VI.4. Figure VI.1 displays the number of individuals who currently bicycle to work, to school and for utility trips (existing riders). The figure also displays

Figure VI.1 Number of New Riders



the number of bicyclists one would observe if the factors that matter in bicycling decisions were reduced to being a "minor factor" in each commute category (work, school and utility trips). These include traffic safety concerns, the availability of bike paths and shower facilities for work trips; traffic safety concerns for school trips; and road hazards and bike paths for utility trips. Also presented is the number of individuals who would bicycle for work, school and utility trips when the obstacles mentioned above were eliminated entirely. This corresponds to a reduction in the average obstacle rating to zero, or obstacles being "not a factor." This represents a scenario which produces the upper-bound of the number of riders. The figure also displays the number of individuals who use bicycles as their primary and secondary means of transportation within each category. For example, in Figure VI.1, the number of existing riders is 155,000 for work trips, and around 28 percent do so as their primary means of transportation to work. A decrease in the obstacles such that they constitute only a "minor concern" would increase the number of individuals who bicycle to work by 36,000 to 191,000.

Figures VI.2 and VI.3 display the miles bicycled per month for different trips. In addition, they present the number of miles bicycled per month if the satisfaction of the current riders increased to 4.0 on a scale from 0 to 5 for various conditions. More specifically, availability of parking is the only factor that impacts the frequency of bicycling for individuals who currently bicycle to work. Thus, the middle bar in the "work" category demonstrates the number of bicycle miles per month that would result in reaction to an increase in satisfaction with parking to 4.0 from the current average of 3.08. The third bar under work travel demonstrates the monthly number of miles traveled due to an increase in travel frequency of the existing riders plus the number of new riders who decide to bicycle due to an improvement in various obstacles. These obstacles are denoted in the legend of the figure.

Figure VI.2 Monthly Miles Commuted by Current and New Bicyclists Due to Factors Becoming "Minor Factors" and Satisfaction Raised to 4 on Five Point Scale

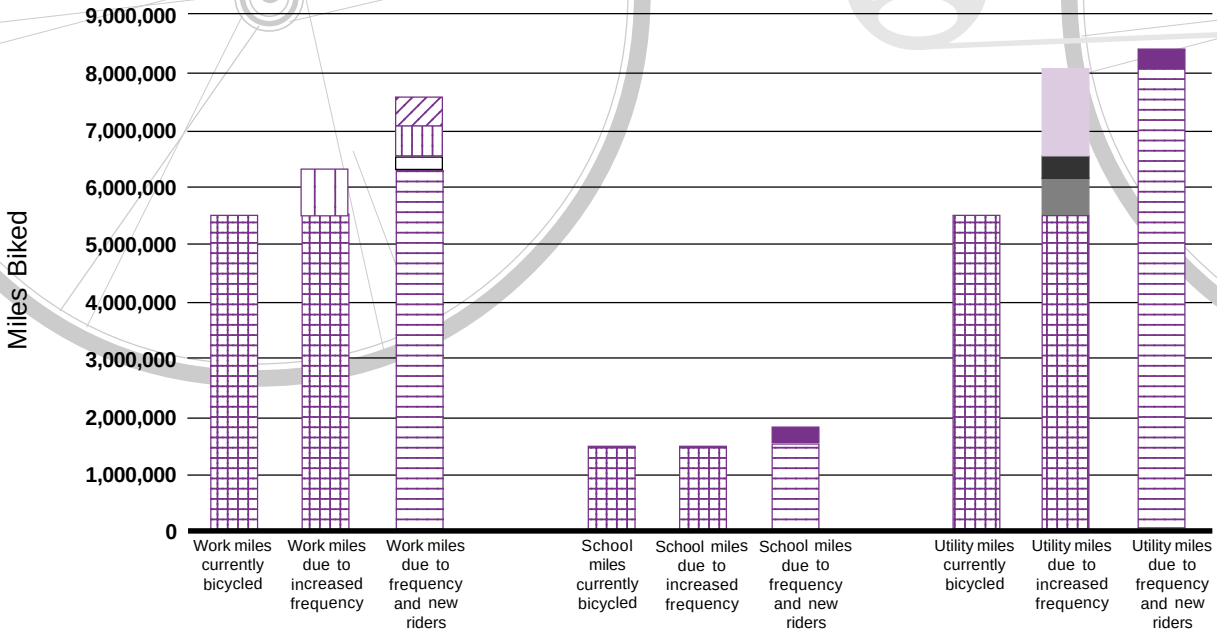
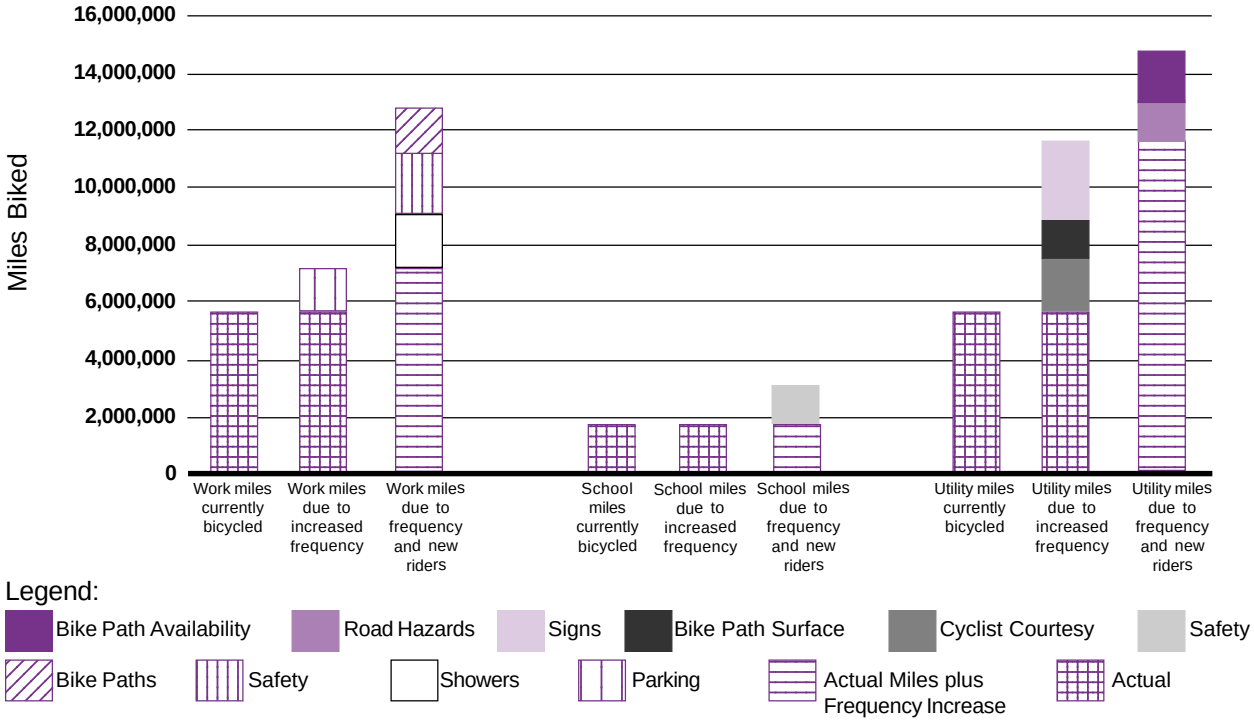


Figure VI.3 Monthly Miles Commuted by Current and New Bicyclists Due to Factors Becoming "Not a Factor" and Satisfaction Raised to 4 on Five Point Scale



It should be noted that the analysis of the determinants of the frequency of school rides could not be performed because of the small sample size of the students who bicycle. Therefore, the middle and left-hand bars in the school category are the same height.

Figure VI.3 is similar to Figure VI.2, with the exception that it represents the upper-bound scenario in which the obstacles are eliminated entirely. Finally, Figure VI.4 displays the total number of miles bicycled per month for work, school and utility trips. Along with the actual miles bicycled currently (the bar on the left), the number of miles that would be observed if the obstacles were reduced to a "minor concern" and if satisfaction with various bicycling conditions were increased to 4.0 are presented by the middle bar. Finally, the bar on the right represents the number of miles that would be traveled per month under the scenario of the elimination of all obstacles that matter, and the increase in the satisfaction to the maximum (to 5.0). Specifically, if all obstacles to bicycling were eliminated, as shown in the third bar, the maximum number of miles bicycled monthly for all types of trip would be 30.5 million miles.

Figure VI.4 Total Monthly Miles Bicycled Under Various Conditions

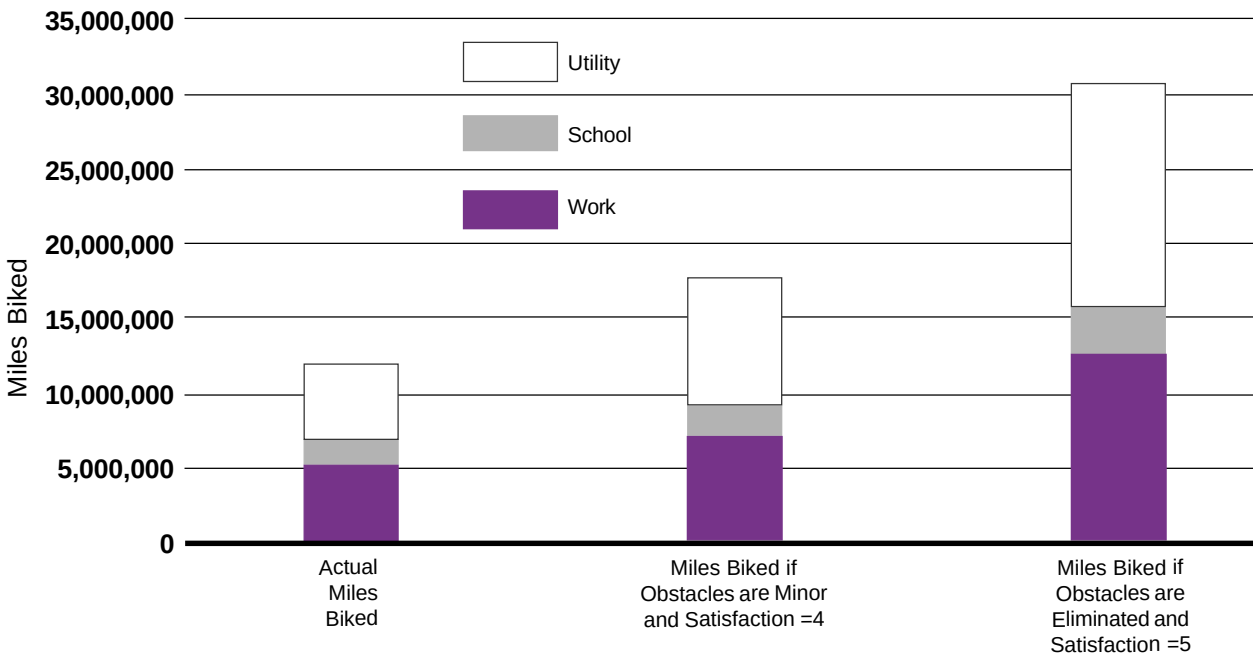


Table VI.1 Summary Statistics

Variable	N	Mean	Std. Error
PRIMARY BIKE	986	0.035497	0.185126
SECONDARY BIKE	978	0.156442	0.36346
BIKE AT ALL	988	0.189271	0.391922
HOW OFTEN BIKE	966	0.856108	1.589147
BIKE	966	0.303313	0.459927
BIKE IN COLO	981	0.902141	0.297276
AGE	988	34.75405	6.92449
FEMALE	985	0.484264	0.500006
MARRIED	988	0.614373	0.48699
DIVORCED/WIDOWED	988	0.069838	0.255003
HISPANIC	988	0.040486	0.197196
BLACK	988	0.010122	0.100146
ASIAN	988	0.010122	0.100146
NATIVE AMERICAN	988	0.009109	0.095055
OTHER RACE	988	0.018219	0.133809
NONSMOKER	985	0.91066	0.285379
NO HIGH SCHOOL	988	0.016194	0.126286
ASSOCIATES DEGREE	988	0.12753	0.333735
BACHELORS DEGREE	988	0.3917	0.488378
MASTERS DEGREE	988	0.198381	0.398982
PHD	988	0.064777	0.246257
MINING	988	0.004049	0.063532
CONSTRUCTION	988	0.051619	0.22137
MANUFACTURING	988	0.075911	0.26499
TRANSPORTATION	988	0.086032	0.280554
WHOLESALE	988	0.022267	0.147626
RETAIL	988	0.07085	0.256704
FINANCE	988	0.088057	0.283521
SERVICE IND	988	0.470648	0.499391
PUBLIC ADMINISTRATION	988	0.015182	0.122339
GOVERNMENT	988	0.08502	0.279053

Table VI.1 Summary Statistics (continued)

Variable	N	Mean	Std. Error
PROFESSIONAL	988	0.408907	0.491881
TECHNICAL	988	0.089069	0.284987
SALES	988	0.062753	0.242641
ADMINISTRATION	988	0.060729	0.238953
PROTECTIVE SERVICES	988	0.011134	0.10498
SERVICE	988	0.061741	0.240806
MECHANICAL	988	0.012146	0.109592
OTHER OCCUPATION	988	0.112348	0.315954
SALARY	901	37630.14	37036.96
HHINC	927	5.239482	2.191392
PUBLIC TRANSP	988	0.212551	0.610084
BIKE STORAGE	988	0.473684	0.811715
SHOWER	988	1.011134	1.105791
ROAD HAZARD	988	1.038462	1.078734
TRAFFIC SAFETY	988	1.465587	1.045001
CRIME	988	0.45749	0.77526
BIKE PATHS	987	1.29382	1.084088
SHOULDERS	988	1.304656	1.075328
TRANSIT	988	0.336032	0.760231
CONGESTED ROUTE	988	0.800607	1.070806
HHINC1	988	0.048583	0.215104
HHINC2	988	0.176113	0.38111
HHINC3	988	0.244939	0.430269
HHINC4	988	0.308705	0.462193

Table VI.2 Decision to Bicycle for All Workers

Variable	Marginal Effects	Std. Error
AGE	0.016	(0.016)
AGESQ	0	(0)
FEMALE	-0.067**	(0.024)
MARRIED	-0.066*	(0.028)
DIVORCED/WIDOWED	-0.08*	(0.026)
HISPANIC	-0.055	(0.041)
NATIVE AMERICAN	0.192	(0.177)
OTHER RACE	0.24*	(0.131)
NONSMOKER	0.007	(0.042)
NO HIGH SCHOOL	-0.02	(0.093)
ASSOCIATES DEGREE	-0.077*	(0.027)
BACHELORS DEGREE	-0.021	(0.031)
MASTERS DEGREE	-0.014	(0.036)
PHD	0.18**	(0.084)
CONSTRUCTION	0.054	(0.095)
MANUFACTURING	0.062	(0.089)
TRANSPORTATION	-0.069	(0.046)
WHOLESALE	0.02	(0.106)
RETAIL	0.015	(0.078)
FINANCE	-0.033	(0.059)
SERVICE IND	-0.021	(0.061)
PUBLIC ADMINISTRATION	0.01	(0.115)
GOVERNMENT	-0.028	(0.061)
PROFESSIONAL	0.041	(0.034)
TECHNICAL	-0.02	(0.042)
SALES	0.023	(0.058)
ADMINISTRATION	0.004	(0.058)
PROTECTIVE SERVICES	-0.049	(0.069)
SERVICE	0.043	(0.062)
OTHER OCCUPATION	-0.03	(0.04)
HHINC1	0.184*	(0.1)

Table VI.2 Decision to Bicycle for All Workers (continued)

Variable	Marginal Effects	Std. Error
HHINC2	0.133**	(0.055)
HHINC3	0.088*	(0.043)
HHINC4	0.114**	(0.039)
PUBLIC TRANSP	0.001	(0.024)
BIKE STORAGE	-0.003	(0.017)
SHOWER	-0.072**	(0.012)
ROAD HAZARD	-0.012	(0.014)
TRAFFIC SAFETY	-0.049**	(0.015)
CRIME	0.001	(0.021)
BIKE PATHS	-0.048**	(0.015)
SHOULDERS	-0.009	(0.016)
TRANSIT	-0.043	(0.025)
CONGESTED ROUTE	-0.005	(0.015)
N = 948		
Log Likelihood = -355.15393		

* indicates statistical significance at the 5% level

**indicates statistical significance at the 1% level or better

Table VI.3 Decision to Bicycle for Non-Student Workers

Variable	Marginal Effects	Std. Error
AGE	0.027	(0.023)
AGESQ	0	(0)
FEMALE	-0.082**	(0.025)
MARRIED	-0.056*	(0.03)
DIVORCED/WIDOWED	-0.089*	(0.025)
HISPANIC	-0.029	(0.053)
NATIVE AMERICAN	0.144	(0.2)
OTHER RACE	0.235	(0.163)
NONSMOKER	-0.025	(0.054)
NO HIGH SCHOOL	0.128	(0.228)
ASSOCIATES DEGREE	-0.073*	(0.029)
BACHELORS DEGREE	-0.032	(0.034)
MASTERS DEGREE	-0.024	(0.037)
PHD	0.18*	(0.089)
CONSTRUCTION	0.038	(0.095)
MANUFACTURING	0.063	(0.095)
TRANSPORTATION	-0.069	(0.047)
WHOLESALE	0.031	(0.114)
RETAIL	0.039	(0.096)
FINANCE	-0.022	(0.067)
SERVICE IND	-0.041	(0.065)
PUBLIC ADMINISTRATION	-0.087	(0.052)
GOVERNMENT	-0.019	(0.068)
PROFESSIONAL	0.039	(0.035)
TECHNICAL	-0.01	(0.047)
SALES	0.008	(0.057)
ADMINISTRATION	0.007	(0.064)
PROTECTIVE SERVICES	-0.026	(0.087)
SERVICE	-0.02	(0.054)
OTHER OCCUPATION	-0.008	(0.048)
HHINC1	0.252*	(0.138)

Table VI.3 Decision to Bicycle for Non-Student Workers (continued)

Variable	Marginal Effects	Std. Error
HHINC2	0.137**	(0.062)
HHINC3	0.111**	(0.048)
HHINC4	0.123**	(0.042)
PUBLIC TRANSP	-0.015	(0.025)
BIKE STORAGE	0.01	(0.018)
SHOWER	-0.066**	(0.012)
ROAD HAZARD	-0.015	(0.015)
TRAFFIC SAFETY	-0.042**	(0.016)
CRIME	0.013	(0.023)
BIKE PATHS	-0.046**	(0.016)
SHOULDERS	-0.013	(0.017)
TRANSIT	-0.047	(0.027)
CONGESTED ROUTE	-0.009	(0.016)
N = 816		
Log Likelihood = -300.66578		

* indicates statistical significance at the 5% level

**indicates statistical significance at the 1% level or better

Table VI.4 Decision of Bicycling Frequency for Non-Student Workers

Variable	Coeff.	Std. Error
AGE	-0.396	(0.206)
AGESQ	0.005	(0.003)
FEMALE	-0.151	(0.2)
MARRIED	-0.176	(0.206)
DIVORCED/WIDOWED	0.296	(0.451)
HISPANIC	0.64	(0.586)
BLACK	8.175	(3527252)
NATIVE AMERICAN	0.87	(0.965)
OTHER RACE	-0.131	(0.587)
NONSMOKER	-0.166	(0.451)
NO HIGH SCHOOL	8.301	(3527252)
ASSOCIATES DEGREE	0.577	(0.396)
BACHELORS DEGREE	-0.219	(0.279)
MASTERS DEGREE	-0.224	(0.325)
PHD	-0.177	(0.388)
CONSTRUCTION	-1.162	(0.627)
MANUFACTURING	-0.761	(0.595)
TRANSPORTATION	-0.756	(0.64)
WHOLESALE	-2.331*	(0.99)
RETAIL	0.102	(0.649)
FINANCE	-0.696	(0.614)
SERVICE IND	-0.919	(0.539)
PUBLIC ADMINISTRATION	-0.831	(0.895)
GOVERNMENT	-1.251*	(0.606)
PROFESSIONAL	0.068	(0.263)
TECHNICAL	0.382	(0.386)
SALES	0.201	(0.47)
ADMINISTRATION	-0.693	(0.488)
PROTECTIVE SERVICES	-0.018	(0.771)
SERVICE	0.278	(0.518)
MECHANICAL	-10.687	(2681226)

Table VI.4 Decision of Bicycling Frequency for Non-Student Workers (continued)

Variable	Coeff.	Std. Error
OTHER OCCUPATION	0.501	(0.401)
HHINC1	0.515	(0.518)
HHINC2	0.377	(0.358)
HHINC3	0.579	(0.296)
HHINC4	0.23	(0.244)
PARK	0.179*	(0.083)
MOTORIST COURTESY	-0.202	(0.122)
CYCLIST COURTESY	0.05	(0.116)
PEDESTRIAN COURTESY	-0.06	(0.126)
ROAD CROSSINGS	-0.077	(0.119)
ROAD/PATH DEBRIS	0.044	(0.116)
GRATES/SPEED BUMPS	-0.064	(0.128)
ROAD SURFACE	0.166	(0.135)
BIKE PATH SURFACE	-0.103	(0.114)
SHOULDER SURFACE	0.061	(0.134)
SHOULDER WIDTH	-0.1	(0.132)
SIGNS	-0.029	(0.108)
N = 209		
Log Likelihood = -263.94475		

* indicates statistical significance at the 5% level

**indicates statistical significance at the 1% level or better

Table VI.4b Marginal Effects for Decision of Bicycling Frequency for Non-Student Workers

Variable	Less than once a month	Once per month	2-3 times per month	Once per week	More than once per week
AGE	0.1506	0.0074	-0.0099	-0.0318	-0.1164
AGESQ	-0.002	-0.0001	0.0001	0.0004	0.0016
FEMALE	0.0575	0.0028	-0.0038	-0.0121	-0.0444
MARRIED	0.0671	0.0033	-0.0044	-0.0142	-0.0518
DIVORCED/WIDOWED	-0.1126	-0.0055	0.0074	0.0238	0.087
HISPANIC	-0.2435	-0.012	0.0159	0.0515	0.1881
BLACK	-3.1379	-0.1544	0.2054	0.663	2.4238
NATIVE AMERICAN	-0.3307	-0.0163	0.0217	0.0699	0.2554
OTHER RACE	0.0498	0.0025	-0.0033	-0.0105	-0.0385
NONSMOKER	0.0631	0.0031	-0.0041	-0.0133	-0.0487
NO HIGH SCHOOL	-3.7991	-0.1869	0.2487	0.8027	2.9345
ASSOCIATES DEGREE	-0.2195	-0.0108	0.0144	0.0464	0.1695
BACHELORS DEGREE	0.0835	0.0041	-0.0055	-0.0176	-0.0645
MASTERS DEGREE	0.085	0.0042	-0.0056	-0.018	-0.0657
PHD	0.0674	0.0033	-0.0044	-0.0142	-0.0521
CONSTRUCTION	0.4419	0.0217	-0.0289	-0.0934	-0.3414
MANUFACTURING	0.2892	0.0142	-0.0189	-0.0611	-0.2234
TRANSPORTATION	0.2874	0.0141	-0.0188	-0.0607	-0.222
WHOLESALE	0.8864	0.0436	-0.058	-0.1873	-0.6847
RETAIL	-0.0388	-0.0019	0.0025	0.0082	0.03
FINANCE	0.2646	0.013	-0.0173	-0.0559	-0.2044
SERVICE IND	0.3495	0.0172	-0.0229	-0.0738	-0.27
PUBLIC ADMINISTRATION	0.316	0.0156	-0.0207	-0.0668	-0.2441
GOVERNMENT	0.4758	0.0234	-0.0312	-0.1005	-0.3675
PROFESSIONAL	-0.0259	-0.0013	0.0017	0.0055	0.02
TECHNICAL	-0.1454	-0.0072	0.0095	0.0307	0.1123
SALES	-0.0762	-0.0038	0.005	0.0161	0.0589
ADMINISTRATION	0.2634	0.013	-0.0172	-0.0557	-0.2035
PROTECTIVE SERVICES	0.0069	0.0003	-0.0005	-0.0015	-0.0053

Table VI.4b Marginal Effects for Decision of Bicycling Frequency for Non-Student Workers (continued)

Variable	Less than once a month	Once per month	2-3 times per month	Once per week	More than once per week
SERVICE	-0.1058	-0.0052	0.0069	0.0224	0.0817
MECHANICAL	3.7577	0.1849	-0.246	-0.794	-2.9026
OTHER OCCUPATION	-0.1906	-0.0094	0.0125	0.0403	0.1472
HHINC1	-0.1959	-0.0096	0.0128	0.0414	0.1513
HHINC2	-0.1435	-0.0071	0.0094	0.0303	0.1109
HHINC3	-0.2201	-0.0108	0.0144	0.0465	0.17
HHINC4	-0.0876	-0.0043	0.0057	0.0185	0.0676
PARK	-0.068	-0.0033	0.0045	0.0144	0.0525
MOTORIST COURTESY	0.077	0.0038	-0.005	-0.0163	-0.0594
CYCLIST COURTESY	-0.0192	-0.0009	0.0013	0.0041	0.0148
PEDESTRIAN COURTESY	0.0229	0.0011	-0.0015	-0.0048	-0.0177
ROAD CROSSINGS	0.0294	0.0014	-0.0019	-0.0062	-0.0227
ROAD/PATH DEBRIS	-0.0166	-0.0008	0.0011	0.0035	0.0129
GRATES/SPEED BUMPS	0.0244	0.0012	-0.0016	-0.0052	-0.0188
ROAD SURFACE	-0.063	-0.0031	0.0041	0.0133	0.0486
BIKE PATH SURFACE	0.0392	0.0019	-0.0026	-0.0083	-0.0303
SHOULDER SURFACE	-0.0233	-0.0011	0.0015	0.0049	0.018
SHOULDER WIDTH	0.0381	0.0019	-0.0025	-0.0081	-0.0294
SIGNS	0.0111	0.0005	-0.0007	-0.0023	-0.0086

Table VI.5 Decision to Bicycle for Students

Variable	Marginal Effect	Std. Error
AGE	0.066	(0.099)
AGESQ	-0.001	(0.002)
FEMALE	-0.182	(0.169)
NONSMOKER	-0.393	(0.405)
NO HIGH SCHOOL	0.597	(0.533)
ASSOCIATES DEGREE	0.96*	(0.071)
BACHELORS DEGREE	0.284	(0.283)
MASTERS DEGREE	-0.082	(0.168)
RETAIL	0.981	(0.029)
FINANCE	0.477	(0.714)
SERVICE IND	0.11	(0.25)
PUBLIC ADMINISTRATION	-0.091	(0.184)
GOVERNMENT	-0.044	(0.258)
PROFESSIONAL	0.025	(0.238)
TECHNICAL	0.869*	(0.153)
SALES	-0.309**	(0.226)
ADMINISTRATION	0.089	(0.403)
SERVICE	-0.169	(0.134)
OTHER OCCUPATION	-0.099	(0.139)
HHINC1	0.894	(0.199)
HHINC2	0.369	(0.399)
HHINC3	0.093	(0.32)
HHINC4	0.482	(0.368)
PUBLIC TRANSP	-0.369	(0.268)
BIKE STORAGE	-0.096	(0.097)
SHOWER	0.042	(0.069)
ROAD HAZARD	-0.168	(0.117)
TRAFFIC SAFETY	-0.335**	(0.247)
CRIME	-0.072	(0.096)
BIKE PATHS	0.099	(0.159)
SHOULDERS	-0.229	(0.151)

Table VI.5 Decision to Bicycle for Students (continued)

Variable	Marginal Effect	Std. Error
TRANSIT	0.048	(0.186)
NEED CAR	0.038	(0.092)
CONGESTED ROUTE	0.059	(0.082)
N = 107		
Log Likelihood = -24.687939		

* indicates statistical significance at the 5% level

**indicates statistical significance at the 1% level or better

Table VI.6 Decision to Bicycle on Utility Trip

Variable	Marginal Effects	Std. Error
AGE	0.004	(0.003)
FEMALE	-0.141**	(0.033)
MARRIED	-0.126**	(0.038)
DIVORCED/WIDOWED	-0.059	(0.062)
HISPANIC	-0.047	(0.082)
NATIVE AMERICAN	-0.047	(0.158)
OTHER RACE	0.23*	(0.111)
NONSMOKER	0.149**	(0.044)
NO HIGH SCHOOL	0.165	(0.128)
ASSOCIATES DEGREE	-0.03	(0.057)
BACHELORS DEGREE	-0.022	(0.046)
MASTERS DEGREE	0.022	(0.058)
PHD	0.064	(0.082)
CONSTRUCTION	0.106	(0.089)
MANUFACTURING	0.109	(0.086)
TRANSPORTATION	-0.138	(0.063)
WHOLESALE	0.205	(0.13)
RETAIL	0.168	(0.097)
FINANCE	0.043	(0.082)
SERVICE IND	0.028	(0.058)
PUBLIC ADMINISTRATION	-0.078	(0.162)
GOVERNMENT	-0.112	(0.065)
PROFESSIONAL	0.031	(0.046)
TECHNICAL	-0.019	(0.065)
SALES	-0.03	(0.071)
ADMINISTRATION	0.026	(0.084)
PROTECTIVE SERVICES	0.155	(0.199)
SERVICE	0.059	(0.082)
MECHANICAL	0.112	(0.182)
OTHER OCCUPATION	0.043	(0.06)
HHINC1	0.143	(0.092)

Table VI.6 Decision to Bicycle on Utility Trip (continued)

Variable	Marginal Effects	Std. Error
HHINC2	0.136*	(0.059)
HHINC3	0.084	(0.051)
HHINC4	0.045	(0.045)
PUBLIC TRANSPORT	0.025	(0.029)
BIKE STORAGE	-0.036	(0.019)
SHOWER	-0.034	(0.024)
ROAD HAZARD	-0.047*	(0.021)
TRAFFIC SAFETY	-0.027	(0.022)
CRIME	0.005	(0.026)
BIKE PATHS	-0.074**	(0.024)
SHOULDERS	0.047	(0.025)
TRANSIT	0.02	(0.028)
CONGESTED ROUTE	0.009	(0.021)
N = 922		
Log Likelihood = -491.19851		

* indicates statistical significance at the 5% level

**indicates statistical significance at the 1% level or better

Table VI.7 Decision of Bicycling Frequency for Utility Trips

Variable	Coeff.	Std. Error
AGE	-0.033	(0.168)
AGESQ	0.001	(0.002)
FEMALE	0.204	(0.264)
MARRIED	-0.611	(0.321)
DIVORCED/WIDOWED	0.278	(0.577)
HISPANIC	0.907	(0.781)
BLACK	-11.515	(6109157)
NATIVE AMERICAN	0.645	(0.971)
OTHER RACE	-1.302**	(0.497)
NONSMOKER	-0.976*	(0.426)
NO HIGH SCHOOL	-0.442	(1.055)
ASSOCIATES DEGREE	0.942	(0.484)
BACHELORS DEGREE	1.105**	(0.372)
MASTERS DEGREE	0.822	(0.474)
PHD	0.911	(0.579)
CONSTRUCTION	1.692*	(0.782)
MANUFACTURING	0.145	(0.606)
TRANSPORTATION	1.158	(0.722)
WHOLESALE	3.714**	(1.387)
RETAIL	0.995	(0.723)
FINANCE	-0.098	(0.683)
SERVICE IND	0.909	(0.543)
PUBLIC ADMINISTRATION	2.586**	(1.001)
GOVERNMENT	0.177	(0.726)
PROFESSIONAL	-1.134**	(0.409)
TECHNICAL	0.229	(0.468)
SALES	-1.029	(0.642)
ADMINISTRATION	-1.652*	(0.809)
PROTECTIVE SERVICES	1.941	(1.34)
SERVICE	-0.995	(0.624)
MECHANICAL	1.596	(1.278)

Table VI.7 Decision of Bicycling Frequency for Utility Trips (continued)

Variable	Coeff.	Std. Error
OTHER OCCUPATION	-0.084	(0.458)
HHINC1	0.838	(0.536)
HHINC2	0.49	(0.428)
HHINC3	0.106	(0.427)
HHINC4	0.718	(0.38)
PARK	-0.095	(0.123)
MOTORIST COURTESY	-0.067	(0.153)
CYCLIST COURTESY	0.378*	(0.164)
PEDESTRIAN COURTESY	-0.229	(0.155)
ROAD CROSSINGS	-0.014	(0.155)
ROAD/PATH DEBRIS	0.229	(0.132)
GRATES/SPEED BUMPS	-0.194	(0.157)
ROAD SURFACE	0.11	(0.181)
BIKE PATH SURFACE	0.301*	(0.147)
SHOULDER SURFACE	0.096	(0.196)
SHOULDER WIDTH	-0.235	(0.188)
SIGNS	0.467**	(0.144)
N = 134		
Log Likelihood = -169.09839		

* indicates statistical significance at the 5% level

**indicates statistical significance at the 1% level or better

Table VI.7b Marginal Effects Decision of Bicycling Frequency for Utility Trips

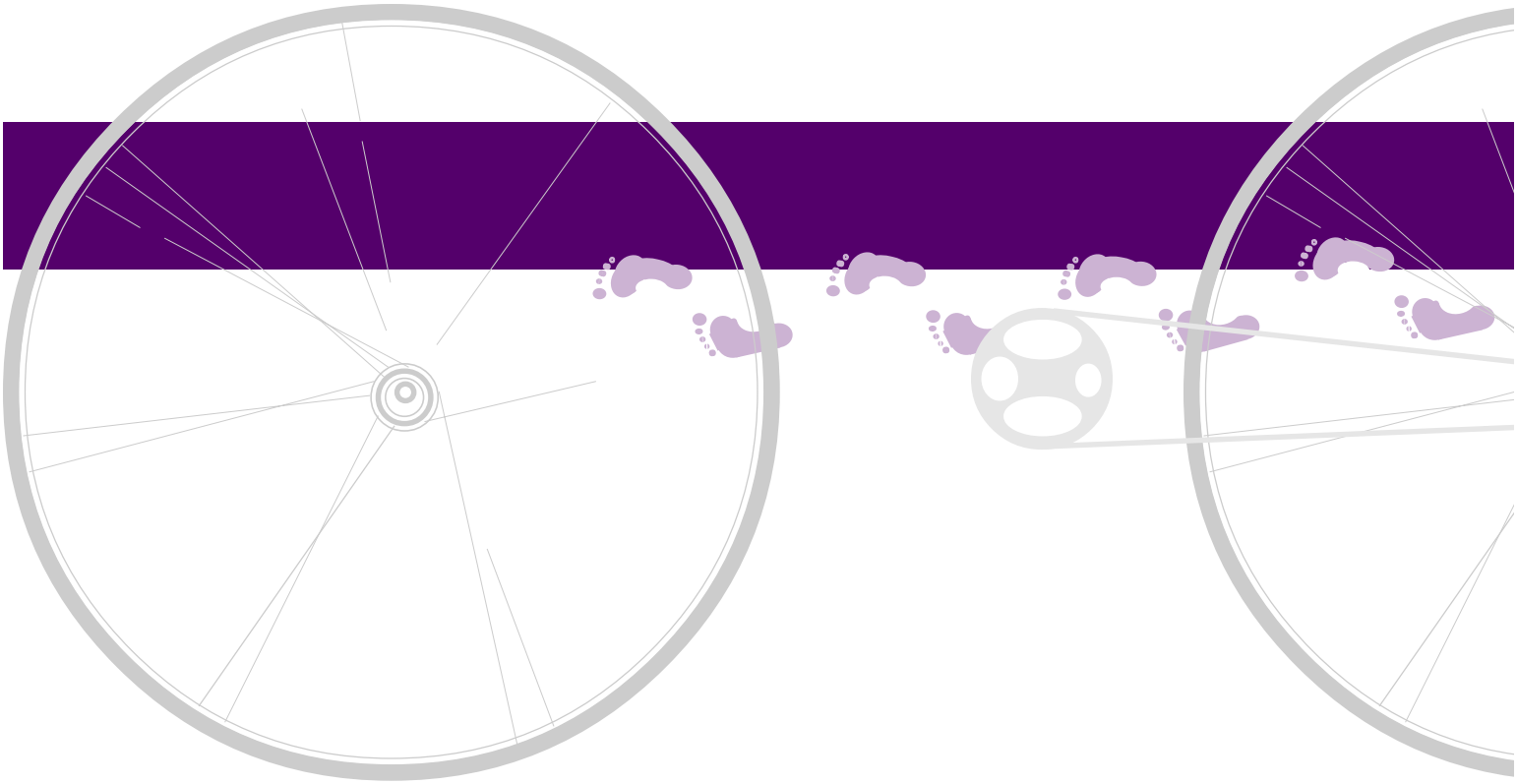
Variable	Less than once a month	Once per month	2-3 times per month	Once per week	More than once per week
AGE	0.0119	0.0006	-0.0041	-0.0035	-0.0048
AGESQ	-0.0003	0	0.0001	0.0001	0.0001
FEMALE	-0.0742	-0.0035	0.0256	0.0221	0.03
MARRIED	0.222	0.0105	-0.0766	-0.0661	-0.0897
DIVORCED/WIDOWED	-0.101	-0.0048	0.0349	0.0301	0.0408
HISPANIC	-0.3297	-0.0156	0.1138	0.0981	0.1333
BLACK	3.785	0.1786	-1.3068	-1.1264	-1.5304
NATIVE AMERICAN	-0.2346	-0.0111	0.081	0.0698	0.0948
OTHER RACE	0.4733	0.0223	-0.1634	-0.1409	-0.1914
NONSMOKER	0.3549	0.0167	-0.1225	-0.1056	-0.1435
NO HIGH SCHOOL	0.1606	0.0076	-0.0555	-0.0478	-0.0649
ASSOCIATES DEGREE	-0.3426	-0.0162	0.1183	0.102	0.1385
BACHELORS DEGREE	-0.4019	-0.019	0.1388	0.1196	0.1625
MASTERS DEGREE	-0.2987	-0.0141	0.1031	0.0889	0.1208
PHD	-0.3312	-0.0156	0.1143	0.0985	0.1339
CONSTRUCTION	-0.6153	-0.029	0.2124	0.1831	0.2488
MANUFACTURING	-0.0527	-0.0025	0.0182	0.0157	0.0213
TRANSPORTATION	-0.4209	-0.0199	0.1453	0.1252	0.1702
WHOLESALE	-1.3502	-0.0637	0.4662	0.4018	0.5459
RETAIL	-0.362	-0.0171	0.125	0.1077	0.1463
FINANCE	0.0358	0.0017	-0.0123	-0.0106	-0.0145
SERVICE IND	-0.3305	-0.0156	0.1141	0.0984	0.1336
PUBLIC ADMINISTRATION	-0.9403	-0.0444	0.3247	0.2798	0.3802
GOVERNMENT	-0.0644	-0.003	0.0222	0.0192	0.026
PROFESSIONAL	0.4124	0.0195	-0.1424	-0.1227	-0.1667
TECHNICAL	-0.0832	-0.0039	0.0287	0.0248	0.0337
SALES	0.3741	0.0177	-0.1292	-0.1113	-0.1513
ADMINISTRATION	0.6007	0.0283	-0.2074	-0.1787	-0.2429
PROTECTIVE SERVICES	-0.7058	-0.0333	0.2437	0.21	0.2854

Table VI.7b Marginal Effects Decision of Bicycling Frequency for Utility Trips (continued)

Variable	Less than once a month	Once per month	2-3 times per month	Once per week	More than once per week
SERVICE	0.3619	0.0171	-0.1249	-0.1077	-0.1463
MECHANICAL	-0.5803	-0.0274	0.2003	0.1727	0.2346
OTHER OCCUPATION	0.0307	0.0014	-0.0106	-0.0091	-0.0124
HHINC1	-0.3048	-0.0144	0.1053	0.0907	0.1233
HHINC2	-0.1783	-0.0084	0.0616	0.0531	0.0721
HHINC3	-0.0385	-0.0018	0.0133	0.0114	0.0155
HHINC4	-0.2612	-0.0123	0.0902	0.0777	0.1056
PARK	0.0346	0.0016	-0.0119	-0.0103	-0.014
MOTORIST COURTESY	0.0245	0.0012	-0.0084	-0.0073	-0.0099
CYCLIST COURTESY	-0.1375	-0.0065	0.0475	0.0409	0.0556
PEDESTRIAN COURTESY	0.0831	0.0039	-0.0287	-0.0247	-0.0336
ROAD CROSSINGS	0.0051	0.0002	-0.0018	-0.0015	-0.0021
ROAD/PATH DEBRIS	-0.0834	-0.0039	0.0288	0.0248	0.0337
GRATES/SPEED BUMPS	0.0704	0.0033	-0.0243	-0.021	-0.0285
ROAD SURFACE	-0.0399	-0.0019	0.0138	0.0119	0.0161
BIKE PATH SURFACE	-0.1093	-0.0052	0.0377	0.0325	0.0442
SHOULDER SURFACE	-0.035	-0.0017	0.0121	0.0104	0.0142
SHOULDER WIDTH	0.0855	0.004	-0.0295	-0.0254	-0.0346
SIGNS	-0.1697	-0.008	0.0586	0.0505	0.0686

Appendix I

Sample Selection, Sample Weights and Household Characteristics



Sample Selection

In Spring 1999, 35,912 surveys are mailed out to randomly selected Colorado households. The survey contained 117 questions pertaining to personal and household characteristics and the travel arrangements of the individuals. The addresses are compiled using a variety of data sources, including motor vehicle registrations, voter registrations, telephone directories (white pages), county real estate deeds, direct marketing companies' customer files and from households that make purchases from catalogs. The random sample consisted of the entire state of Colorado. We asked that the survey be completed by the member of the household at least 16 years old and whose birthday is the closest to January 1. We received back 5,771 surveys, which implies a response rate of 16 percent.

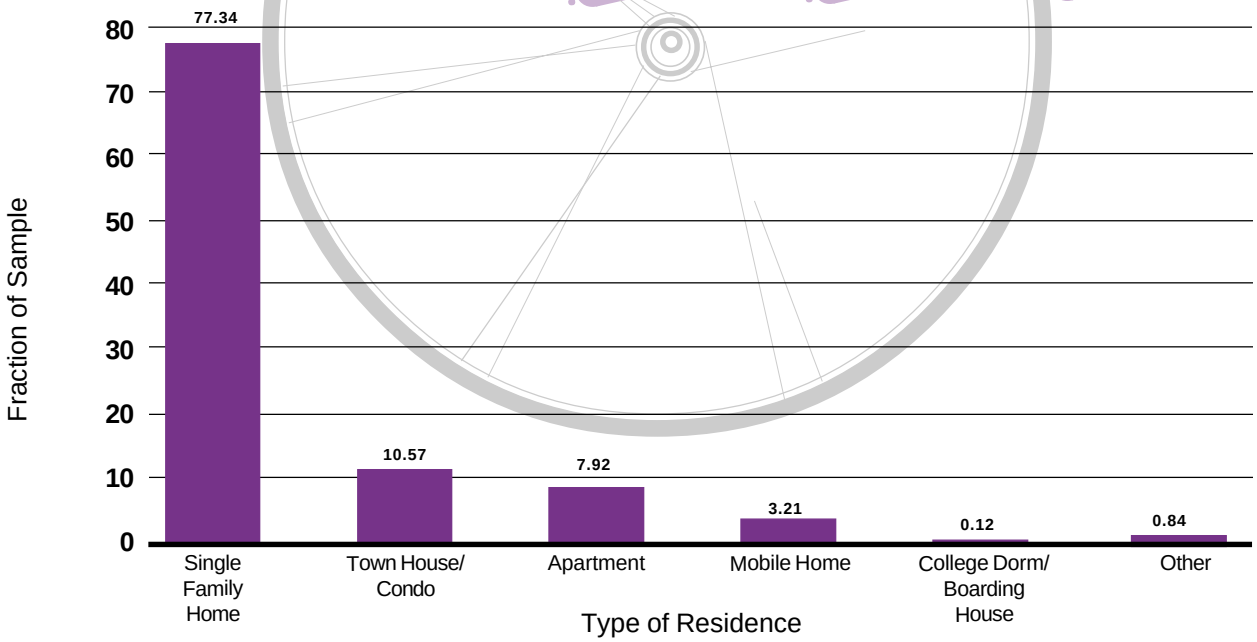
Sample Weights

Sixteen percent of the randomly selected households returned their surveys. To assess the representativeness of the returned surveys, we created frequency tables by race (white-nonHispanic, black-nonHispanic, Hispanic, Asian and other), age and gender. These frequencies were compared with similar frequencies created from data of the 1998 Colorado population provided by the Colorado State Demographers Office. From this comparison we created race/age/gender cell weights that convert the survey sample into one that is representative of the state population. The actual cell sizes used were the smallest cells that could be generated given the survey data and the data from the Colorado State Demographers Office. Specifically, respondents over the age of 50 were over represented in our sample compared to the actual proportion of state residents over the age of 50. The weight for each observation in this group is less than one. In contrast, young respondents, between the ages of 16 and 24 were less likely to respond to the survey, and the weight for each observation in this group exceeds one. In the remainder of this appendix,

0. HOUSEHOLD CHARACTERISTICS

Over three-quarters of households surveyed live in single family homes. Approximately 11 percent live in town houses or condominiums, and about 8 percent live in apartments. Mobile homes, college dormitories, boarding houses and other arrangements constitute four percent of all housing arrangements (see Figure 0.1).

Figure O.1 Type of Residence



The average size of the households surveyed is 2.45 persons. Figure 0.2 displays information about the distribution of the household size. Two-member households constitute 44 percent of all households in the survey. Single-member households comprise 21 percent of all households in the sample, while three-member households comprise 16 percent. Fourteen percent of the surveyed households have four members. Households with five or more members constitute around 7 percent of all households in the sample (see Figure 0.2).

Figure O.2 Number of People Residing in Household

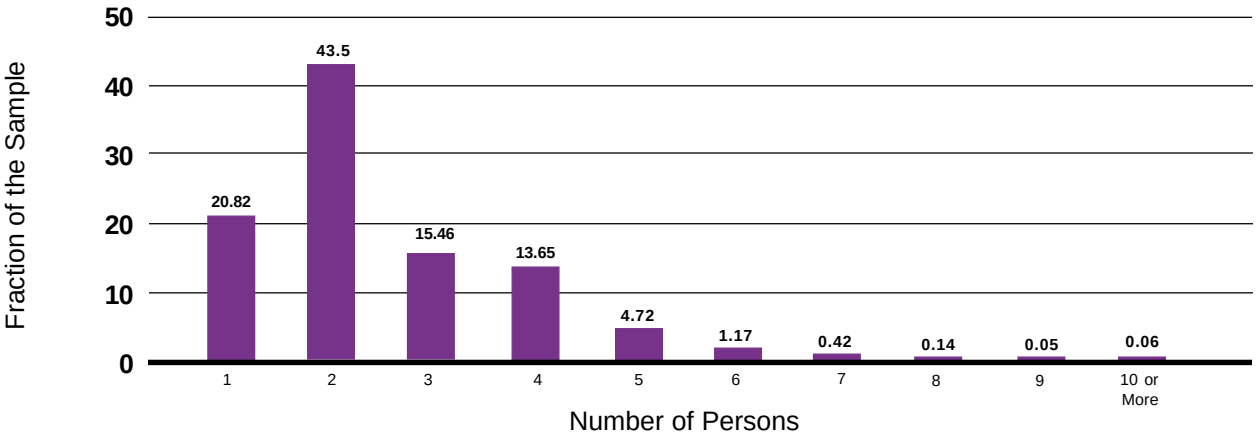


Figure 0.3 shows the frequency distribution of households with children ages 0-4. Ninety percent of the households in the sample have no children ages 0-4, and 8 percent of the households have one child in that age group. Less than two-and-a-half percent of the households surveyed have two or more children ages 0 to 4. By contrast, Figure 0.4 demonstrates that 16 percent of the households have a single member ages 31-40, and 10 percent of the households have two members in the same age interval.

Figure O.3 Distribution of Households with Children Ages 0-4

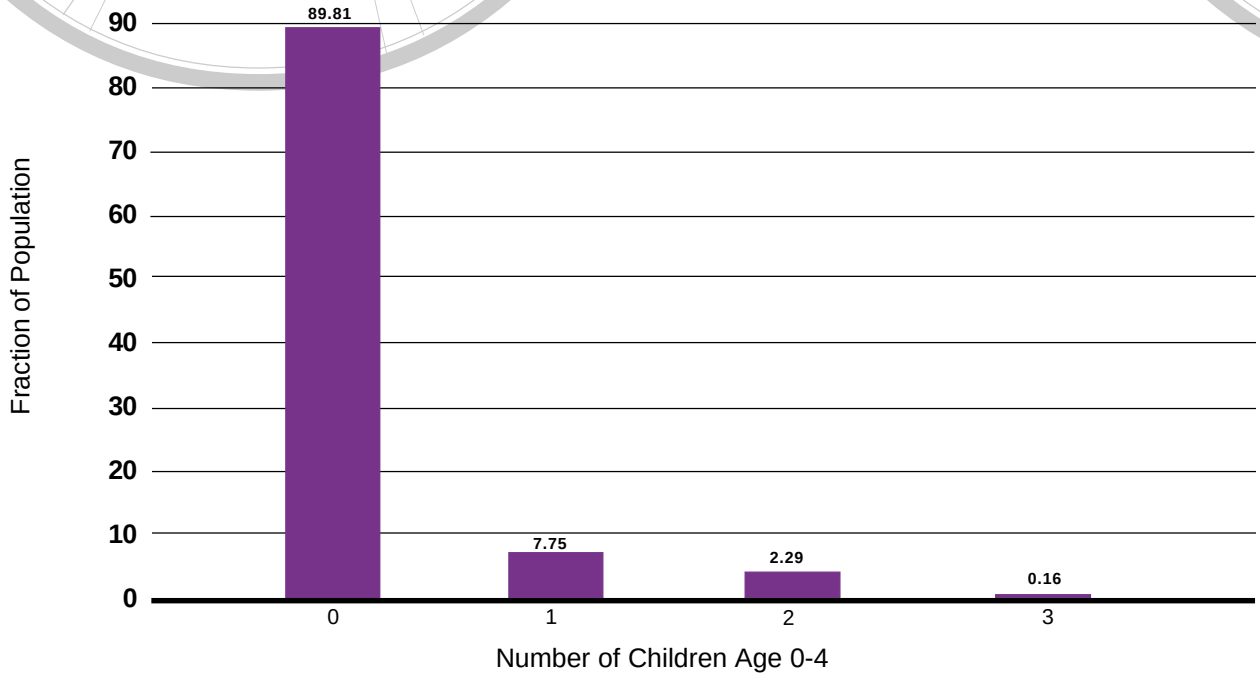
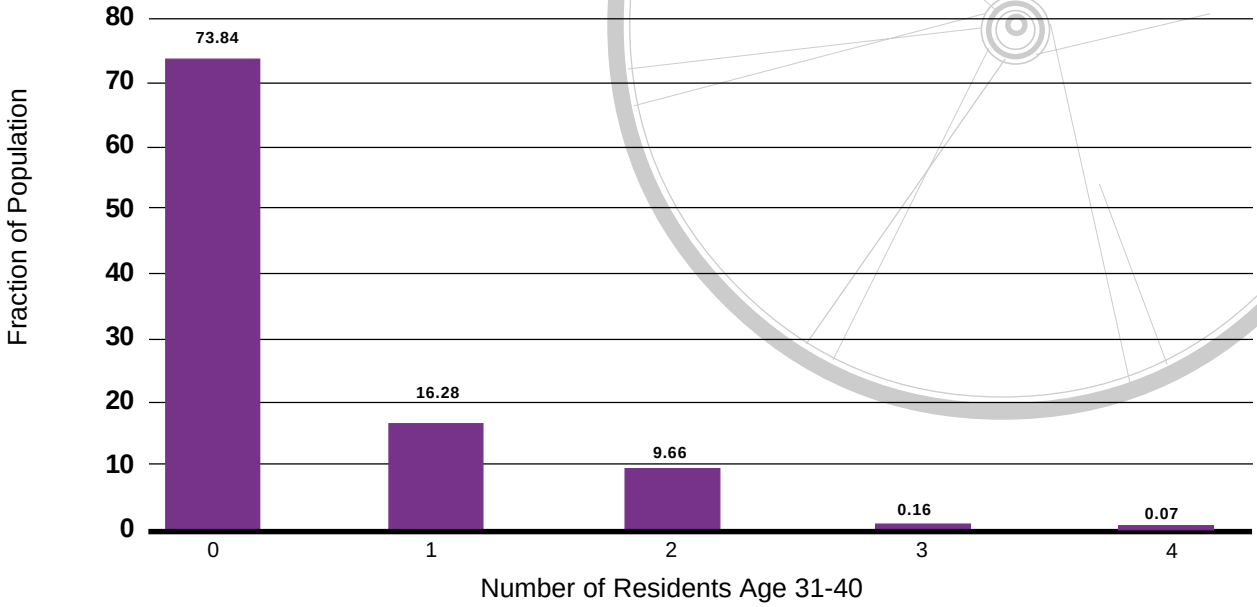
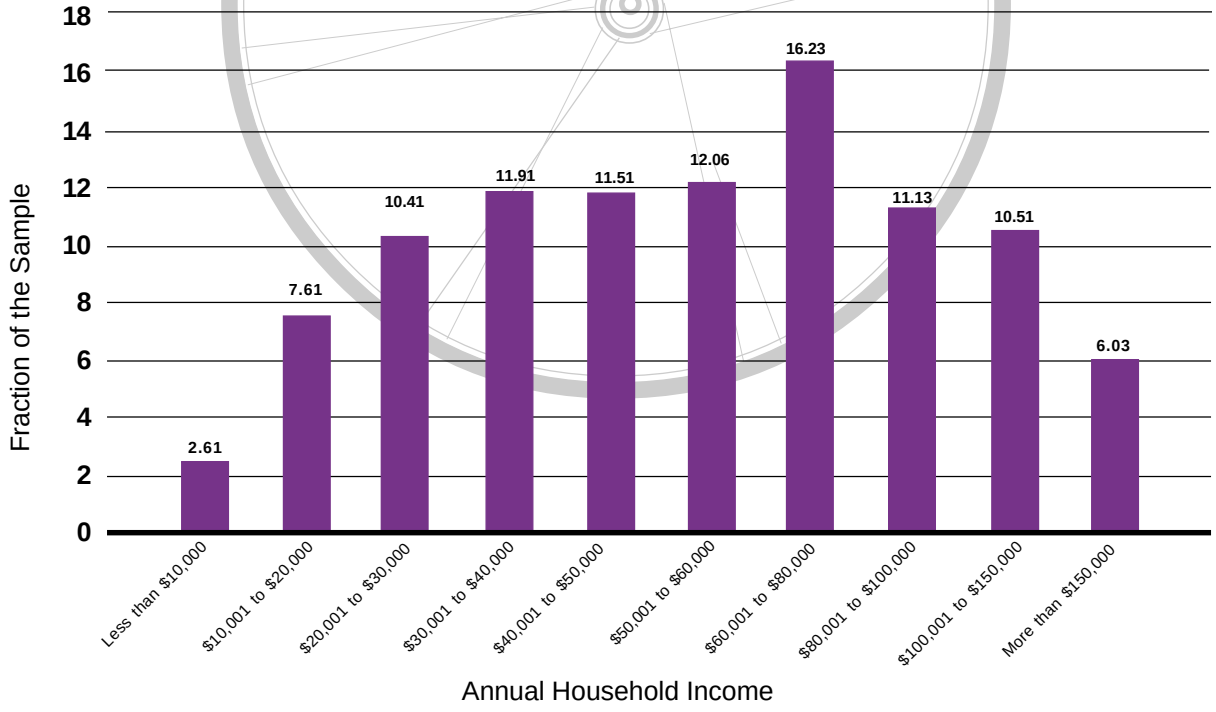


Figure O.4 Distribution of Households with Residents Ages 31-40



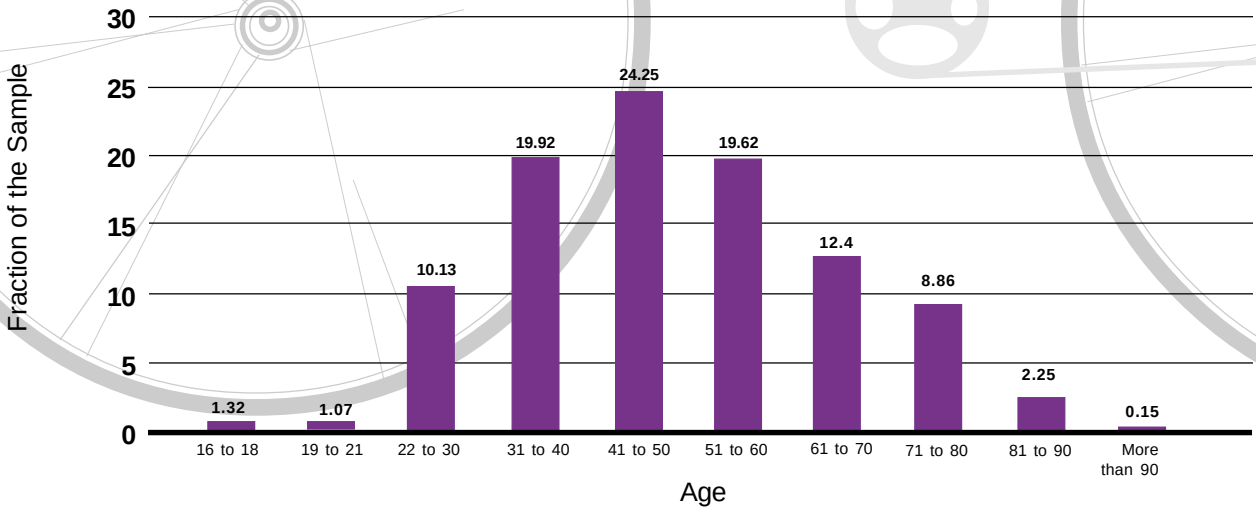
As Figure 0.5 illustrates, 16 percent of the households surveyed have a household income of $60,001 to $80,000 per year. Annual household incomes of $30,001 to $40,000, $40,001 to $50,000 and $50,001 to $60,000 each comprise about 12 percent of surveyed households. Eleven percent of the sampled households have an annual household income of $20,000 or less. Annual household incomes of $80,001 to $100,000 and $100,001 to $150,000 comprise 11 percent of the sample each. Six percent of the households surveyed have an annual household income over $150,000.

Figure O.5 Distribution of Annual Household Income



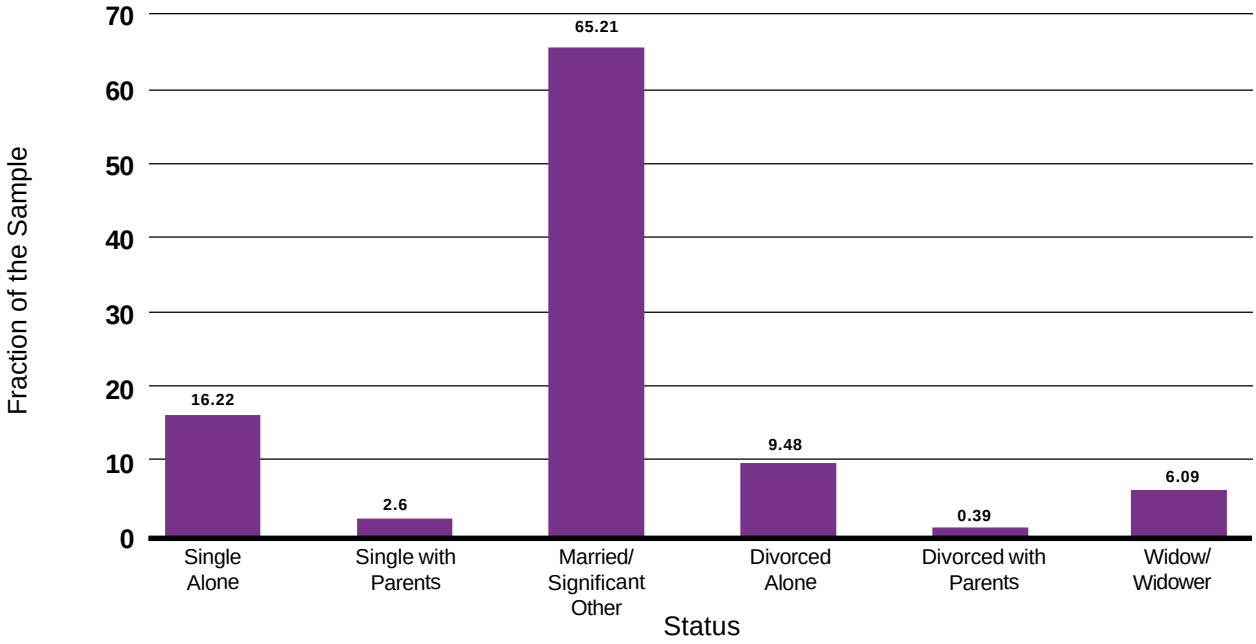
Forty-nine percent of the individuals surveyed are female. The survey is designed such that the minimum age of the respondents is 16. The average age in the sample is 49 years. Figure 0.6 illustrates the distribution of age within the sample. Respondents aged 22 to 30 years comprise 10 percent of the sample. Twenty percent of the sample are aged 31 to 40, while another twenty percent are aged 51 to 60. The largest category were persons aged 41 to 50 which represent 24 percent of the sample. Individuals aged 61 to 70 years make up 12 percent of the sample. Nine percent of the sample are aged 71 to 80. Two percent of the sample is comprised of persons aged 81 or older. Older respondents were most likely to respond to our survey, and younger respondents were the least likely. To account for this, we construct sample weights to represent the race/age/gender composition of the state. (See appendix for details.)

Figure O.6 Age Distribution of Sample



The large majority of individuals (65 percent) in the sample are married or living with a significant other as can be seen in Figure 0.7. Single individuals comprise 19 percent of the sample with about 14 percent of these individuals living with parents. Divorced persons make up 10 percent of the sample, with about 4 percent of those who are divorced living with parents. Six percent of the sample are widows or widowers.

Figure O.7 Martial Status of Sample



A vast majority of the sample (91 percent) are Non-Hispanic Whites. White Hispanics make up about 4 percent of the sample. Around one percent of the sample consists of Native Americans with less than one percent of the sample being Hispanic African Americans. Non-Hispanic African Americans comprise one percent of the sample. Figure 0.8 provides the distribution of the sample by race/ethnicity.

Figure O.8 Race Distribution of Sample

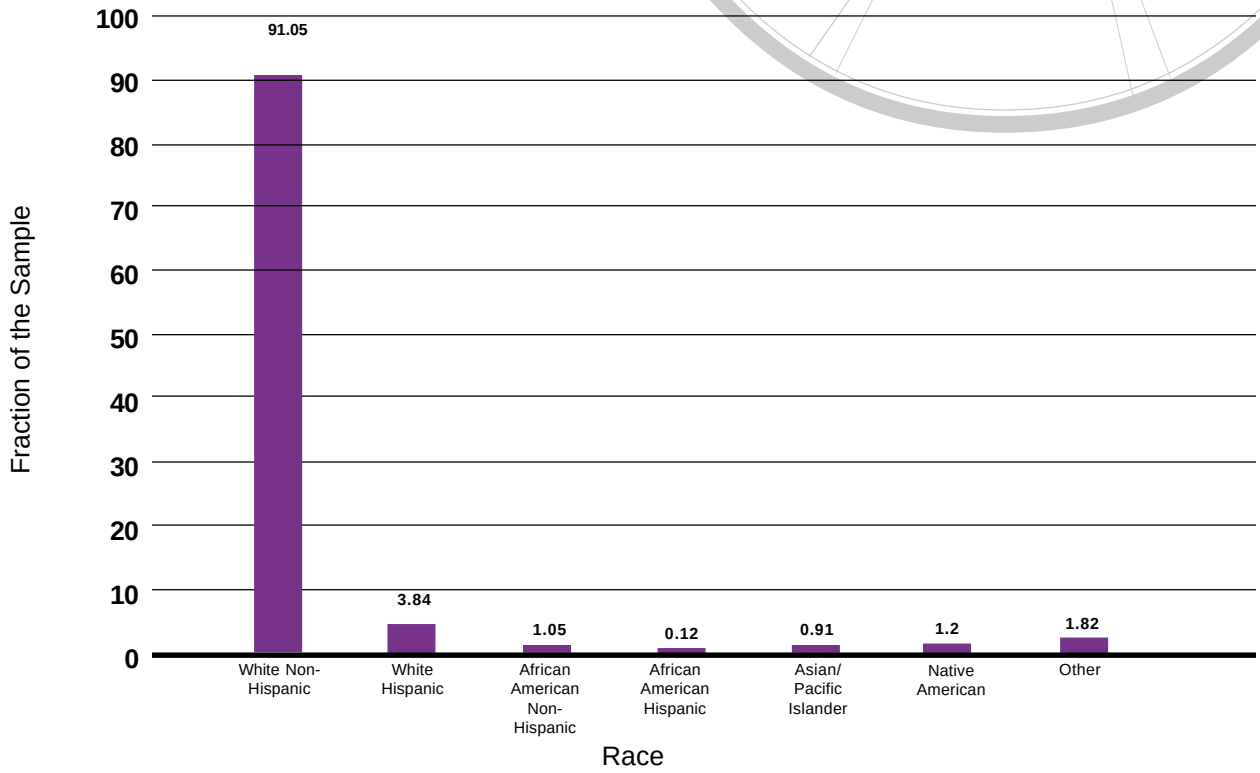
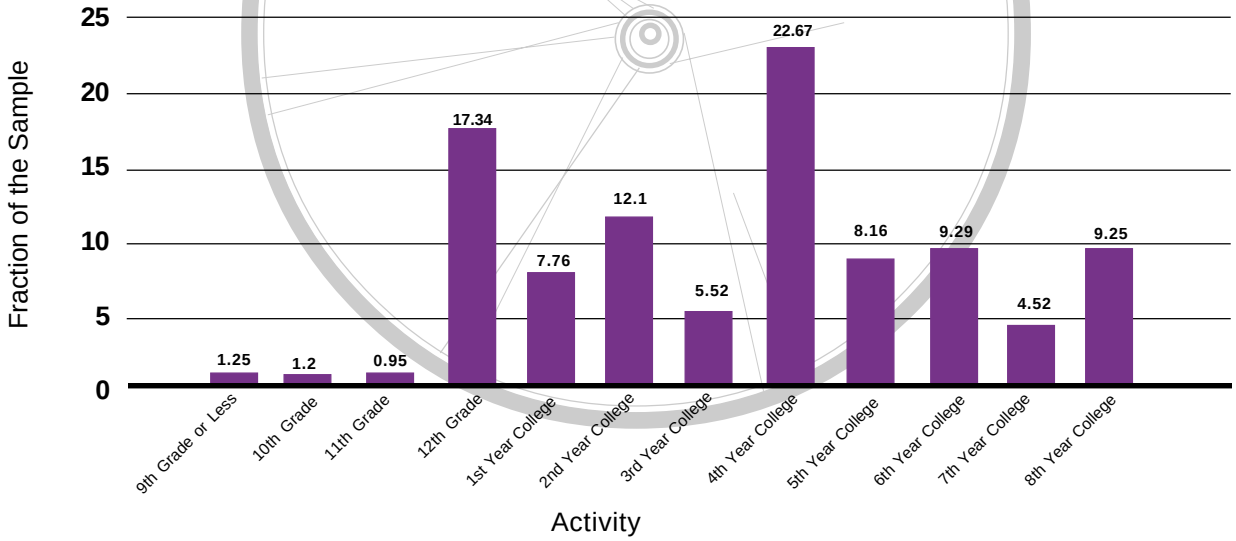


Figure 0.9 illustrates the highest grade completed by respondents in the sample. Only one percent of respondents completed 9th grade or less. Nineteen percent of the sample attended high school but did not graduate. In the sample, 79 percent have completed at least one year of college. Those who completed only one, two and three years of college are 8, 12 and 6 percent of the sample respectively. Individuals having completed four years of college comprise 23 percent of the sample. Thirty-one percent of the sample have completed 5 or more years of college.

Figure O.9 Highest Grade Complete of the Sample Respondents



As might be expected from the previous figures, only 3 percent of individuals in the sample do not have a high school diploma as Figure 0.10 illustrates. Thirty-one percent of the sample have received a high school diploma as their highest degree. The highest degree received by 13 percent of the population is an associate degree. For thirty-one percent of the sample the highest degree is a bachelor's degree. The highest degree received is a master's degree and a doctorate for 17 and 6 percent of the sample, respectively.

Figure O.10 Highest Degree Received by Sample Respondents

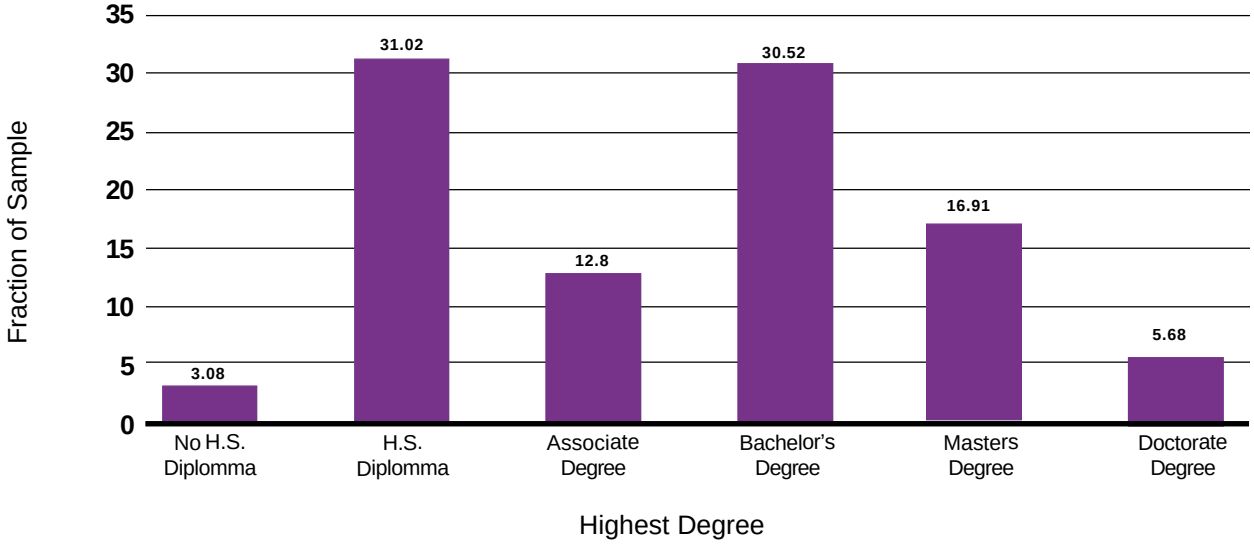
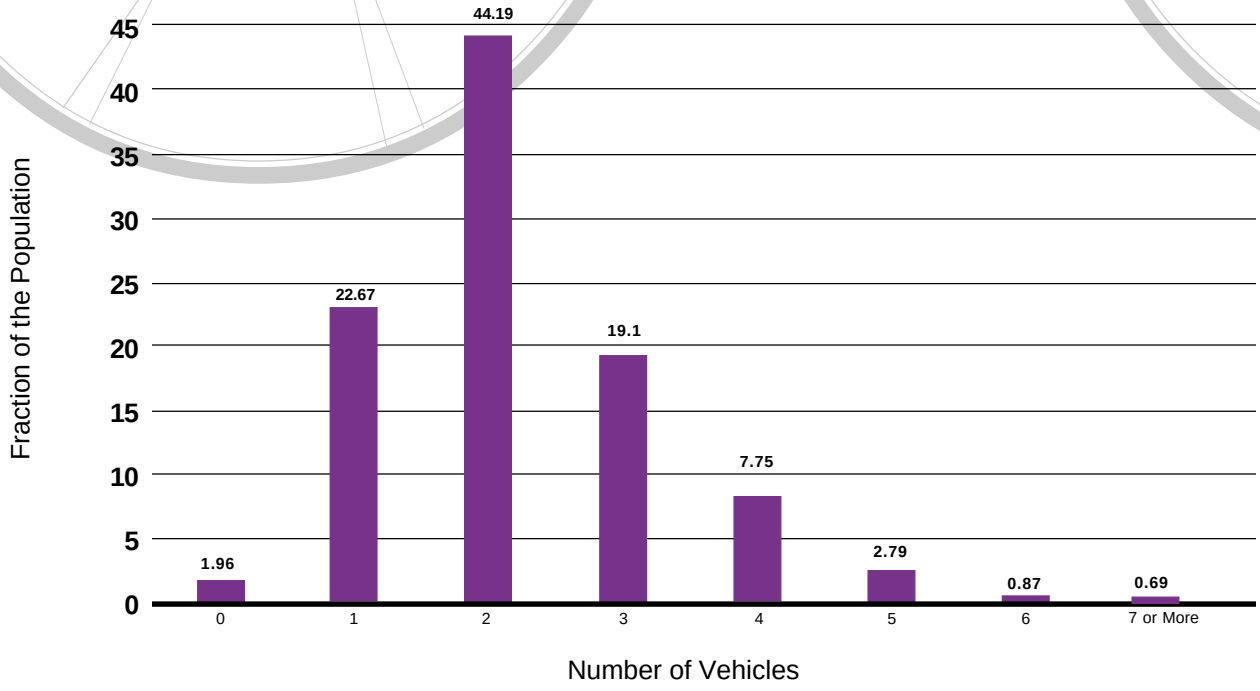


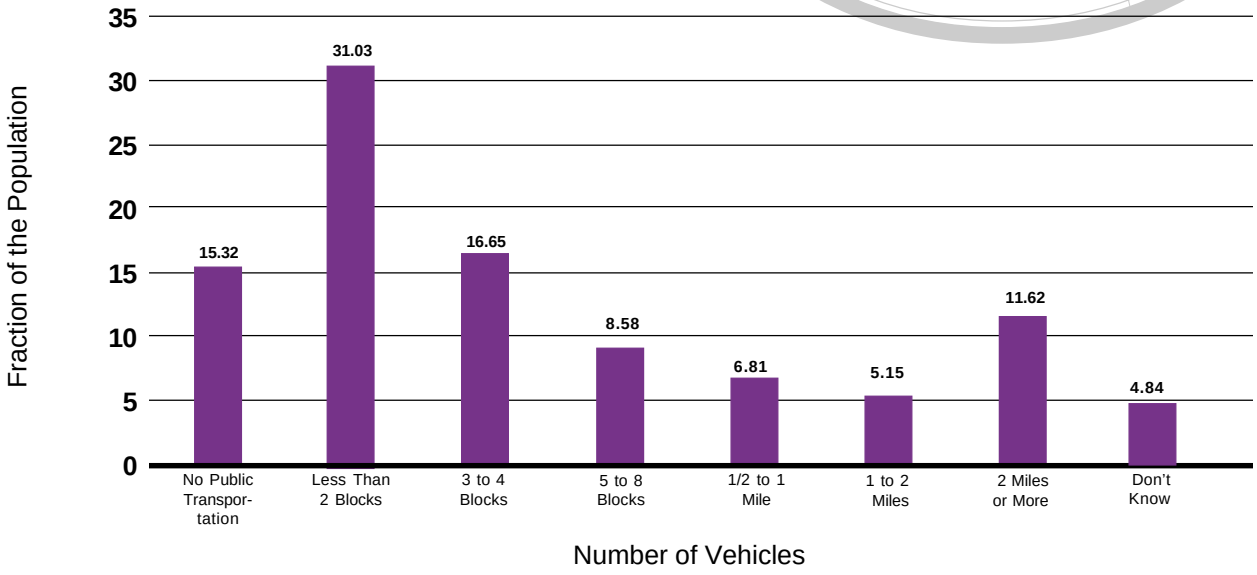
Figure 0.11 displays that 44 percent of the households surveyed have 2 motor vehicles (cars, pickup trucks, motorcycles, etc.). Twenty-three percent have 1 motor vehicle, and 19 percent have three motor vehicles. Only two percent of all households in the sample do not own a motor vehicle, and a little over four percent of the households have five or more motor vehicles.

Figure O.11 Number of Motor Vehicles in Household

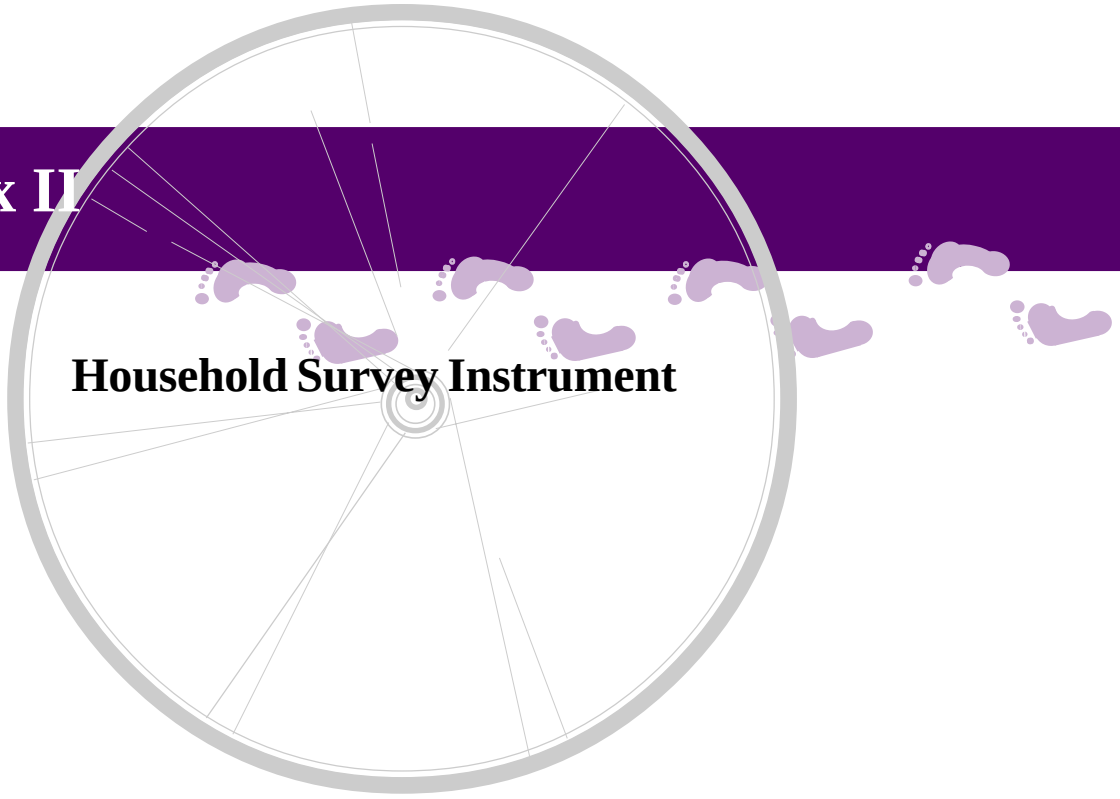


The information on the distance between home and the nearest public transportation (e.g. bus stop, light rail station) is presented in Figure 0.12. Over 15 percent of the households in the survey have no access to any public transportation. Thirty-one percent of the surveyed households live within two blocks to public transportation, and seventeen percent live within 3-4 blocks. Thus, it can be said that almost half (48 percent) of the sample are within walking distance of transportation. Nine percent of the households live within 5-8 blocks to public transportation; almost 12 percent are between ½ and 2 miles away from public transportation, and 12 percent are at least two miles away.

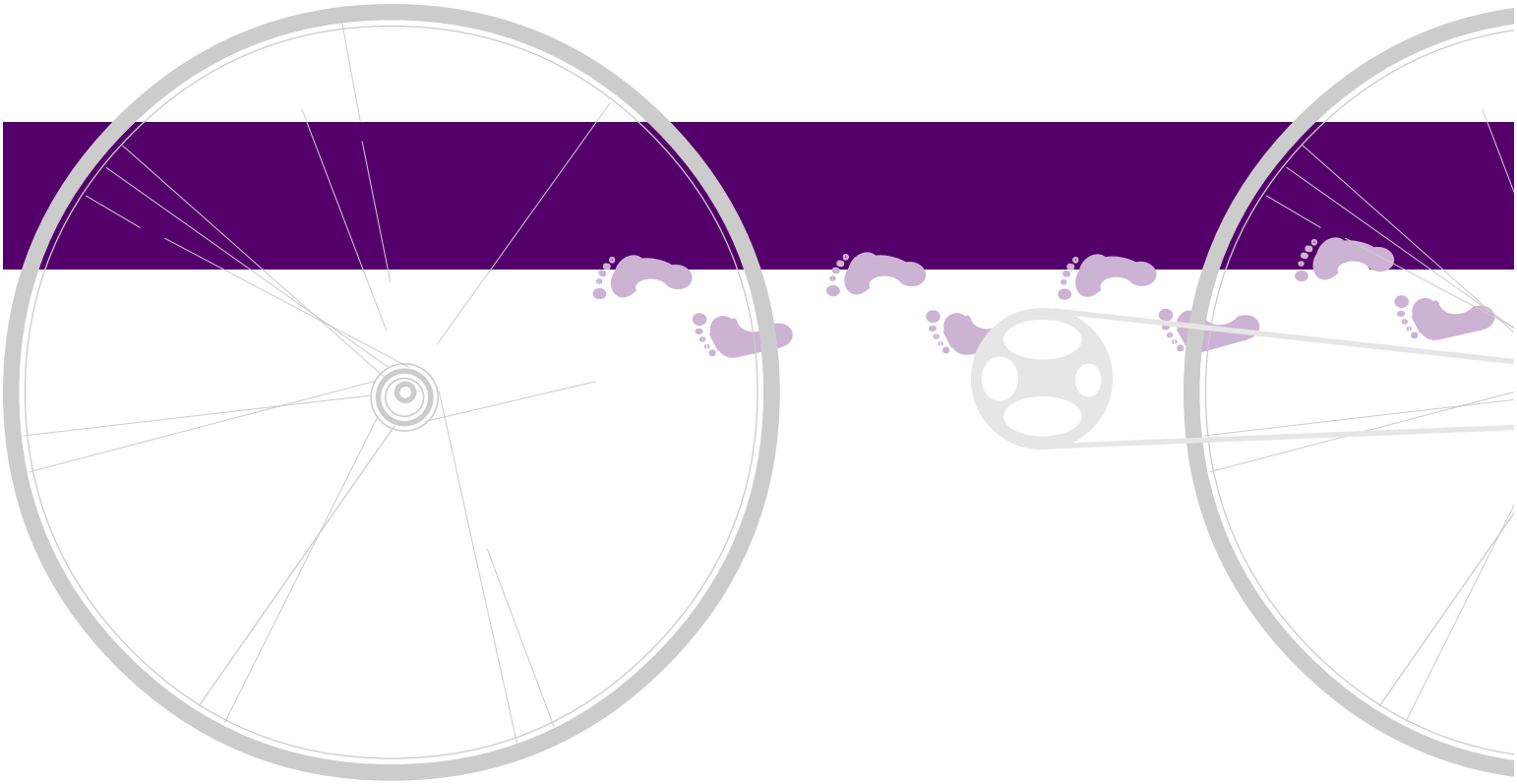
Figure O.12 The Distance from Residence to the Nearest Public Transportation



Appendix II



Household Survey Instrument



I. GENERAL INFORMATION

1. What is the town or city in which you currently reside?

   _____

2. What is the county in which you currently reside?

   _____

3. What is your ZIP code?

   _____

4. In what type of residence do you reside?

   _____ single family home
   _____ town house/condo
   _____ apartment
   _____ mobile home
   _____ college dorm/boarding house
   _____ other (describe):_____

5. Including yourself how many persons live in your household?

   _____ persons

6. Please indicate the number of household members in each category:

Numbers should add to the total number of household members given in Question 5.

   _____ ages 0-4
   _____ ages 5-15
   _____ ages 16-20
   _____ ages 21-30
   _____ ages 31-40
   _____ ages 41-50
   _____ ages 51-60
   _____ ages 61-70
   _____ ages 71+

7. How many registered motor vehicles (cars, pickup trucks, motorcycles, etc.) that can be used for commuting purposes are owned by members of your household?

   _____ motor vehicles

8. Do you have a driver's license? (*Circle one*)

   1. Yes
   2. No

9. How far is it from your home to the nearest public transportation (bus stop, light rail station, etc.)? (*Circle one*)

   1. No Public Transportation
   2. 0-2 blocks (less than 1/8 mile)
   3. 3-4 blocks (1/8 to ¼ mile)
   4. 5-8 blocks (¼ to ½ mile)
   5. Between ½ and 1 mile
   6. Between 1 and 2 miles
   7. 2 miles or more
   8. Don't know

II. WORK TRAVEL

10. Are you currently employed (do any work for pay or profit)? (*Circle one*)

    1. Yes
    2. No à if "No" go to "Question 26."

11. Are you self employed?

    1. Yes
    2. No

12. On average, how many *days per week* do you work?

    _____ days per week

13. On average, how many paid *hours per week* do you work?

    _____ hours per week

14. How frequently do you telecommute (use a telephone or computer to work from home)?

    1. Never
    2. Sometimes, but less than 4 days per month
    3. One day per week
    4. 2-3 days per week
    5. 5 or more days per week

15. Do you work outside your home?

    1. Yes
    2. No à if "No" go to "Question 26."

16. Approximately, at what time do leave home for work?

    _____:_____ am / pm

17. Approximately, at what time do you leave work?

    _____:_____ am / pm

18. How far is your place of work from where you live? (one way) (*Circle one*)

    1. Less than ½ mile
    2. Between ½ mile and 1 mile
    3. Between 1 mile and 2 miles
    4. Between 2 miles and 5 miles
    5. Between 5 miles and 10 miles
    6. Between 10 miles and 20 miles
    7. More than 20 miles

19. What is your primary method of transportation for your trips to work during a typical "*good weather*" week?

Circle one. The primary method of transportation is that which you used most frequently.

    1. Drive alone in car or truck
    2. Drive car/truck with passenger(s)
    3. Passenger in car or truck
    4. Motorcycle, scooter, or moped
    5. Public transportation (bus, light rail)
    6. Taxi
    7. Bicycle
    8. Walk
    9. Other (describe) _____

20. About how much time is usually needed to make this trip? (one way)

    _____ minutes

21. How much is your monthly out-of-pocket spending for commuting to work? (including bus fare, gas, parking, etc.)

    $_____ per month

22. What secondary method of transportation, if any, do you use for your trips to work?

Circle one. Secondary method of transportation is the second most frequently used method of transportation.

    1. No secondary method used
    3. Drive alone in car or truck
    4. Drive car/truck with passenger(s)
    5. Passenger in car or truck
    6. Motorcycle, scooter or moped
    7. Public transportation (bus, light rail)
    8. Taxi
    9. Bicycle
    10. Walk
    11. Other (describe): _____

23. If you have ever considered using your *bicycle* for **work** trips, what factors prevent you from doing so or doing as much as you would like? Write a number in the blank:

    0 = not a factor,
    1 = minor factor,
    2 = major factor,
    3 = prevents me from using my bicycle.

    q Never considered using my bike for work trips. à if so, go to "Question 26."

    _____ Physically unable
    _____ Time of day
    _____ Unable to take bike on public transportation
    _____ Lack of secure bike storage at destination
    _____ Distance
    _____ Weather conditions
    _____ Lack of shower/dressing facilities at destination
    _____ Hazardous route (gravel, potholes, etc.)
    _____ Traffic safety concerns
    _____ Lack of personal security (crime)
    _____ Lack of off-street bike paths
    _____ Lack of shoulders to ride on
    _____ Lack of transit connections

_____ Need a car for job
_____ No alternative to congested routes
_____ Other (describe):_____

24. In *good weather* conditions about how often do you make a **work** trip by *bicycle*? (*Circle one*)

1. More than once per week
2. Once per week
3. 2-3 times per month
4. Once per month
5. Less than once per month
6. Never à if "Never" go to "Question 26."

25. Please indicate approximately what percentage of an average *bicycle* **work** trip you ride on the following surfaces:

On a city street with bike lane/ shoulder…….	____%
On a city street with no bike lane/ shoulder…….	____%
On the shoulder of a road/ highway.……	____%
On a road/highway with no shoulder…….	____%
On paved off-street bike path…	____%
On unpaved off-street bike path	____%
On sidewalk……...	____%
Other (describe):_____	____%
Total……...	100%

q Not applicable

III. SCHOOL TRAVEL

26. Are you a student?

1. Yes
2. No à if "No," please skip to "Section IV Utility Trips " on next page.

27. Do you attend school full or part time?

1. Full time
2. Part time

28. How many days per week do you usually attend school/class?

_____ days per week

29. Approximately, at what time do you go to school?

_____:_____ am / pm

30. Approximately, at what time do you leave school?

_____:_____ am / pm

31. Approximately how far do you usually travel to attend school/class? (one way)

1. Less than ½ mile
2. Between ½ mile and 1 mile
3. Between 1 mile and 2 miles
4. Between 2 miles and 5 miles
5. Between 5 miles and 10 miles
6. Between 10 miles and 20 miles
7. More than 20 miles

32. What is your primary transportation for most of your trips to school during a typical "*good weather*" week?

Circle one. The primary method of transportation is that which you used most frequently.

1. Drive alone in car or truck
2. Drive car/truck with passenger(s)
3. Passenger in car or truck
4. Motorcycle, scooter or moped
5. Public transportation (bus, light rail)
6. School bus
7. Taxi
8. Bicycle
9. Walk
10. Other (describe):_____

33. About how much time is usually needed to make this trip? (one way)

_____ minutes

34. How much is your weekly out-of-pocket spending for commuting to school? (including bus fare, gas, parking, etc)

$_____ per week

35. What secondary method of transportation, if any, do you use for your trips to school?

Circle one. Secondary method of transportation is the second most frequently used method of transportation.

1. No secondary method used
2. Drive alone in car or truck
3. Drive car/truck with passenger(s)
4. Passenger in car or truck
5. Motorcycle, scooter or moped
6. Public transportation (bus, light rail)
7. School bus
8. Taxi
9. Bicycle
10. Walk
11. Other (describe): _____

36. If you have ever considered using your *bicycle* for **school** trips, what factors prevent you from doing so or doing as much as you would like? Write a number in the blank:

0 = not a factor,
1 = minor factor,
2 = major factor,
3 = prevents me from using my bicycle.

Never considered using my bike for school trips. à if so, please go to "Section IV, Utility Trips."

_____ Physically unable
_____ Time of day
_____ Unable to take bike on public transportation
_____ Lack of secure bike storage at destination
_____ Distance
_____ Weather conditions
_____ Lack of shower/dressing facilities at destination
_____ Hazardous route (gravel, potholes, etc.)
_____ Traffic safety concerns
_____ Lack of personal security (crime)
_____ Lack of off-street bike paths
_____ Lack of shoulders to ride on
_____ Lack of transit connections
_____ Need a car for job/school
_____ No alternative to congested routes
_____ Other (describe):_____

37. In *good weather* conditions about how often do you make a **school** trip by *bicycle*? (*Circle one*)

1. More than once per week
2. Once per week
3. 2-3 times per month
4. Once per month
5. Less than once per month
6. Never à if "Never" please go to "Section IV, Utility Trips."

38. Please indicate approximately what percentage of an average *bicycle* **school** trip you ride on the following surfaces:

On a city street with bike lane/ shoulder…….	____%
On a city street with no bike lane/ shoulder…….	____%
On the shoulder of a road/ highway……	____%
On a road/highway with no shoulder……	____%
On paved off-street bike path…	____%
On unpaved off-street bike path	____%
On sidewalk……...	____%
Other (describe):_____	____%
Total……...	100%

q Not applicable

IV. UTILITY TRIPS

A **utility trip** is one in which you travel to a particular destination (or destinations) for purposes other than work, school or recreation. Examples of these might include trips to a friend's house or running errands. *If you combine a utility trip with a work commute, that entire trip should be considered a work commute*.

For most of the **utility trips** that you made in *good weather*:

39. What was your primary means of travel?

Circle one. The primary method of transportation is that which you used most frequently.

1. Drove car or truck
2. Passenger in car or truck
3. Motorcycle, scooter or moped
4. Public transportation (bus, light rail)
5. Taxi
6. Bicycle
7. Walk/jog
8. Other (describe):_____

40. What secondary method of transportation, if any, did you use for most of the **utility trips** that you made in *good weather*?

Circle one. Secondary method of transportation is the second most frequently used method of transportation.

1. No secondary method used
3. Drove alone in car or truck
4. Drove car/truck with passenger(s)
5. Passenger in car or truck
6. Motorcycle, scooter or moped
7. Public transportation (bus, light rail)
8. Taxi
9. Bicycle
10. Walk
11. Other (describe): _____

41. On average, how far did you travel for a typical utility trip? (one-way distance from your starting point or last stopping place to the destination)

1. Less than ½ mile
2. Between ½ mile and 1 mile
3. Between 1 mile and 2 miles
4. Between 2 miles and 5 miles
5. Between 5 miles and 10 miles
6. Between 10 miles and 20 miles
7. More than 20 miles

42. What is the average *travel time* of a typical utility trip? (one way)

_____ minutes

43. If you have ever considered using your *bicycle* for **utility** trips, what factors prevent you from doing so or doing as much as you would like? Write a number in the blank:

0 = not a factor,
1 = minor factor,
2 = major factor,
3 = prevents me from using my bicycle.

q Never considered using my bike for utility trips. à if so, go to "Question 46."

_____ Physically unable
_____ Time of day
_____ Unable to take bike on public transportation
_____ Lack of secure bike storage at destination
_____ Distance
_____ Weather conditions
_____ Lack of shower/dressing facilities at destination
_____ Hazardous route (gravel, potholes, etc.)
_____ Traffic safety concerns
_____ Lack of personal security (crime)
_____ Lack of off-street bike paths
_____ Lack of shoulders to ride on
_____ Lack of transit connections
_____ Need a car for purpose of trip
_____ No alternative to congested routes
_____ Other (describe):_____

44. In *good weather* conditions about how often do you make a **utility** trip by *bicycle*? (*Circle one*)

1. More than once per week
2. Once per week
3. 2-3 times per month
4. Once per month
5. Less than once per month
6. Never à if "never," go to "Question 46."

45. Please indicate approximately what percentage of an average bicycle **utility** trip you ride on the following surfaces:

On a city street with bike lane/ shoulder…….	____%
On a city street with no bike lane/ shoulder…….	____%
On the shoulder of a road/ highway…….	____%
On a road/highway with no shoulder……	____%
On paved off-street bike path…	____%
On unpaved off-street bike path	____%
On sidewalk……...	____%
Other (describe):_____	____%
Total……...	100%

q Not applicable

V. TRANSPORTING CHILDREN

46. Do you have school age children living with you?

1. Yes
2. No à if "No" go to "Section VI, Recreational / Exercise Trips."

47. What is the primary method of transportation by which your youngest child commutes to school?

1. Walking or biking
2. School Bus
3. Driven by household member
4. Car pooling
5. Public transportation

48. How far is it from your home to your youngest child's school?

1. 1-2 blocks (less than 1/8 mile)
2. 3-4 blocks (1/8 to 1/4 mile)
3. 5-8 blocks (1/4 to 1/2 mile)
4. Between 1/2 and 1 mile
5. Between 1 and 2 miles
6. 2 miles or more
7. Don't know

VI. RECREATIONAL/EXERCISE TRIPS

Some **Recreational/Exercise** activities begin from home, work or school and do not involve first traveling to another location. These include all activities that do not involve driving or using public transportation. An example would be roller-blading during your lunch hour from your office, or walking to the park from your home for an activity. Many times these activities may include utility trips or commutes as well. In that case, the ride should be considered a utility trip or a work or school commute.

Considering your most frequent **recreational/ exercise activity *where the activity itself originated from home, work or school*** in *good weather*:

49. What was your primary recreation/exercise activity? (*Circle one*)

1. Bicycle
2. Walk
3. Running
4. In-line skating
5. Other (describe): _____

50. On average, how much time does this trip take? (round trip)

_____ minutes

51. What facility do you use? (circle all that apply)

1. Park
2. Street
3. Sidewalk
4. Paved shared use path
5. Unpaved path
6. Other: _____

Other **recreation/exercise** activities involve first traveling to a remote location. An example would be if you took a bus into the mountains to hike.

(Continued on Next Page)

For most of the ***trips to a location for recreation/ exercise activities*** in *good weather* conditions:

52. What means did you use to get to the location of the recreational or exercise activity?

    1. Car/truck
    2. Bike
    3. Skate
    4. Walk
    5. Bus/public transportation
    6. Train
    7. Other (describe):_____

53. Where do you typically go for these trips?

    1. Health club
    2. Resort
    3. City or county open space/park
    4. State park
    5. National forest
    6. National park/monument
    7. Indoor amusement (e.g. arcade, etc.)
    8. Mall
    9. Other (describe):_____

54. What recreational/exercise activity do you typically engage in when you arrive at the destination of these trips?

    1. Hike/Walk
    2. Bicycle
    3. Swim
    4. Health club activities
    5. Skate
    6. Picnic
    7. Sports
    8. Other (describe):_____

55. At the remote location do you typically:

    1. Spend half a day or less
    2. Spend between a half a day and a full day
    3. Camp for one night or more
    4. Stay in a hotel/motel for one night or more

56. How much money do you typically spend at the remote location?

    $ _____

57. If you have ever considered using your *bicycle* for any kind of **recreation/exercise** activity that began at home, or for an activity that included trips to a location, what factors prevent you from doing so or doing as much as you would like? Write a number in the blank:
    0 = not a factor,
    1 = minor factor,
    2 = major factor,
    3 = prevents me from using my bicycle.

    q Never considered using my bicycle for recreation/exercise trips. à if so, go to "Question 60."

    _____ Physically unable
    _____ Unable to take bike on public transportation
    _____ Lack of secure bike storage at destination
    _____ Distance
    _____ Weather conditions
    _____ Lack of shower/dressing facilities at destination
    _____ Hazardous route (gravel, potholes, etc.)
    _____ Traffic safety concerns
    _____ Lack of personal security (crime)
    _____ Lack of off-street bike paths
    _____ Lack of shoulders to ride on
    _____ Lack of transit connections
    _____ No alternative to congested routes
    _____ Other (describe):_____

58. In *good weather* conditions about how often do you make a **recreation/exercise** trip by bicycle? (*Circle one*)

    1. More than once per week
    2. Once per week
    3. 2-3 times per month
    4. Once per month
    5. Less than once per month
    6. Never à if "Never," go to "Question 60."

59. Please indicate approximately what percentage of an average *bicycle* **recreation/exercise** trip you ride on the following surfaces:

On a city street with bike lane/ shoulder……. ____%
On a city street with no bike lane/ shoulder……. ____%
On the shoulder of a road/ highway.…… ____%
On a road/highway with no shoulder……. ____%
On paved off-street bike path… ____%
On unpaved off-street bike path ____%
On sidewalk……... ____%
On a general use trail……. ____%
On a mountain bike only trail… ____%
Other (describe):_____ ____%
Total……... 100%

q Not applicable

VII. BICYCLE SAFETY

60. If you have young children, how often do they wear a bicycle helmet when they ride their bicycles?

q I do not have young children

	Never	ß	à		Always	N/A
Paved Bike Path	1	2	3	4	5	q
Street	1	2	3	4	5	q
Unpaved Trail	1	2	3	4	5	q
Mountain Terrain	1	2	3	4	5	q

61. Have you ever received any instruction/ education on bicycling safety?

1. Yes
2. Noà if "No" go to "Question 63" below.

62. Where did you receive your bicycle safety training? (*Circle all that apply*)

1. Seminar
2. School
3. Police/fire department
4. Parents
5. Pamphlets and brochures
6. Community organizations (e.g. Boy/Girl Scouts)
7. Informal (talking to friends, etc.)
8. Other (describe):_____

63. Where would you most prefer *children* receive their bicycle safety training? (*Circle one*)

1. School by teacher
2. School by police/fire department
3. Parks and recreation district
4. Parents
5. Pamphlets and brochures
6. Community organizations (e.g. Boy/Girl Scouts)

64. What do you believe the severity of a typical bicycle crash on the following surfaces is likely to be?

	Minor	ß	à		Fatal
Paved bike path	1	2	3	4	5
Street	1	2	3	4	5
Unpaved Trail	1	2	3	4	5
Mountain terrain	1	2	3	4	5

65. How likely do you think a bicycle accident is on the following surfaces (on any given ride)?

	Unlikely	ß	à		Likely
Paved bike path	1	2	3	4	5
Street	1	2	3	4	5
Unpaved Trail	1	2	3	4	5
Mountain terrain	1	2	3	4	5

66. Has anyone in your household suffered a "severe" or worse injury due to a bicycle crash?

1. Yes
2. No

67. How often do you wear a bicycle helmet when riding on the following terrain?

	Never	ß	à		Always
Paved Bike Path	1	2	3	4	5
Street	1	2	3	4	5
Unpaved Trail	1	2	3	4	5
Mountain Terrain	1	2	3	4	5

q I never bicycle à go to "Question 78."

68. Have you ever crashed or fallen off your bicycle on an *unpaved* trail?

1. Yes
2. No à if "No," go to "Question 73."

69. How many times have you crashed or fallen off your bicycle while riding on an *unpaved* trail during the last 12 months?

_____ times

70. What was the severity of the injury suffered as a result of the last crash or fall from a bicycle on an *unpaved* trail, if any?

1. Minor
2. Moderate
3. Severe (not life threatening)
4. Severe (life threatening, survival probable)
5. Critical (survival uncertain)
6. No injuries suffered

71. What was the total cost of the most recent bicycle crash on an *unpaved trail* ? (including damage to the bike and medical expenses)

$_____

q Never crashed or fallen on unpaved trail

72. Was the accident in the previous question reported to any authority (e.g. police, park rangers, hospital emergency room, etc.) by either you or another person?

1. Yes
2. No

73. Have you ever crashed or fallen off your bicycle on a *paved road or path*?

1. Yes
2. No à if "No" go to "Question 78."

74. How many times have you crashed or fallen off your bicycle on while riding on *a paved road or path* during the last 12 months?

_____ times

75. What was the severity of the injury suffered as a result of the last crash or fall from a bicycle while riding on a *paved road or path*, if any?

1. Minor
2. Moderate
3. Severe (not life threatening)
4. Severe (life threatening, survival probable)
5. Critical (survival uncertain)
6. No injuries suffered

76. What was the total cost of the most recent bicycle crash on a *paved road or path* ? (including damage to the bike and medical expenses)

$_____

q Never crashed or fallen on a paved road or path

77. Was the accident in the previous question reported to any authority (e.g. police, park rangers, hospital emergency room, etc.) by either you or another person?

1. Yes
2. No

VIII. BICYCLE SPENDING

78. How many usable bicycles of the types listed and bicycle helmets are presently owned by *your household*?

_____ # standard road bicycles
_____ # mountain bicycles
_____ # touring/light weight bicycles
_____ # tandem (built for two)
_____ # sidewalk/child's bicycles
_____ # tri-wheelers or tricycles
_____ # other bicycles
_____ # bicycle helmets

79. If *your household* has purchased any bicycles in the last 12 months, please indicate the price and where it was purchased below.
q None purchased à go to "Question 80."

1st Bicycle — Price: $_____

Where purchased: (*Circle one*)
a. Specialty bike shop b. Toy store
c. Department store d. Discount store
e. Sporting goods store f. Mail order
g. Classified ad h. Friend
i. Other (describe): _____

2nd Bicycle — Price: $_____

Where purchased: (*Circle one*)
a. Specialty bike shop b. Toy store
c. Department store d. Discount store
e. Sporting goods store f. Mail order
g. Classified ad h. Friend
i. Other (describe): _____

3rd Bicycle — Price: $_____

Where purchased: (*Circle one*)
a. Specialty bike shop b. Toy store
c. Department store d. Discount store
e. Sporting goods store f. Mail order
g. Classified ad h. Friend
i. Other (describe): _____

If your household has purchased more than three bicycles in the last 12 months, please indicate the total cost for the other bicycles purchased that have not been listed above.

$_____

80. How much was spent by all members of your household purchasing **bicycle accessories** in the last 12 months?

$_____

81. How much was spent by all members of your household on **bicycle repair or maintenance** in the last 12 months?

$_____

82. How much was spent by all members of your household on bicycle related vacations (including weekends) during the last 12 months **in Colorado**?

$_____

83. How much was spent by all members of your household on bicycle related vacations in the last 12 months **outside Colorado**?

$_____

84. If you were to rent a home or apartment, how much more would you be willing to pay per month if it were located within walking distance from a trail?

$ _____

IX. BICYCLING IN COLORADO

85. Do you ever ride a bicycle in Colorado?
1. Yes
2. No à if "No" go to "Question 91."

86. *Ideally*, what type of surface would you like to make your average bicycle **work/school/utility** trip on? (*Circle one*)

1. Street with bike lane
2. Street with no bike lane
3. Shoulder of a road
4. Paved off-street bike path
5. Unpaved off-street bike path
6. Sidewalk
7. Other (describe):_____

87. Ideally, what type of surface would you like to make your average bicycle **recreation/exercise** trip on? (*Circle one*)

1. Street with bike lane
2. Street with no bike lane
3. Shoulder of a road/highway
4. Paved off-street bike path
5. Unpaved off-street bike path
6. General use trail
7. Mountain bike only trail
8. Sidewalk
9. Other (describe):_____

88. Please circle your degree of satisfaction with the following as it pertains to your bicycling **in Colorado**.

Bicycle parking at work
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Bicycle parking at school
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Bicycle parking at other places (not school/work)
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Courtesy of motorists
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Courtesy of other cyclists
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Courtesy of runners, walkers and skaters
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Crossings at road intersections
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Railroad crossings
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Debris on roads/paths
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Speed bumps and drainage grates on roads
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Road surface conditions
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Bike path surface conditions
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Road shoulder surface conditions
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Road shoulder widths
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

Signs/travel markers
5 4 3 2 1 q
Very satisfied ↔ Not satisfied Not Applicable

89. If you were given $100 to spend in order to improve bicycling on **work and utility** trips, please indicate how you like to see the money divided between the following options:

Option	Amount
New paved off-street bicycle paths	$_____
Recreational unpaved paths	$_____
Reconstruct on-street routes	$_____
Enhanced maintenance on existing routes	$_____
Link existing paved paths creating state wide network	$_____
Construction/reconstruction of road shoulders	$_____
Supplemental bike facilities (e.g. showers, etc.)	$_____
Striping bike lanes	$_____
Directional/route signs	$_____
Education/enforcement	$_____
Other:_____	
_____	
_____	$_____
Total	$100

90. What local project would improve your bicycling experience?

_____
_____
_____
_____
_____
_____
_____
_____
_____

X. WALKING

91. If you have ever considered walking to work, school, or for utility or recreation/exercise trips, what factors prevent you from doing so or doing so as much as you would like? Write a number in the blank:

    0 = not a factor,
    1 = minor factor,
    2 = major factor,
    3 = prevents me from walking.

    q Never considered walking to work, school, utility or for recreation/exercise trips.

    _____ Physically unable
    _____ Distance
    _____ Weather conditions
    _____ Lack of shower/dressing facilities at destination
    _____ Hazardous route (condition of sidewalk or path)
    _____ Traffic safety concerns
    _____ Lack of personal security (crime)
    _____ Lack of sidewalk
    _____ Transit stop not convenient
    _____ Lack of transit connections
    _____ Need a car for job
    _____ Other (describe):_____

92. Have you ever received any instruction/ education on pedestrian safety?

    1. Yes
    2. Noà if "No" go to "Question 94" below.

93. Where did you receive your pedestrian safety training? (*Circle all that apply*)

    1. Seminar
    2. School
    3. Police/fire department
    4. Parents
    5. Pamphlets and brochures
    6. Community organizations (e.g. Boy/Girl Scouts)
    6. Informal (talking to friends, etc.)
    7. Other (describe):_____

94. Where would you most prefer *children* receive their pedestrian safety training?

    1. School by teacher
    2. School by police/fire department
    3. Parks and recreation district
    4. Parents
    5. Pamphlets and brochures
    6. Community organizations (e.g Boy/Girl Scouts

95. What do you believe the severity of a typical pedestrian accident under the following conditions to be?

	Minor	ß	à	Fatal
With a motor vehicle	1 2	3	4	5
With a bicycle	1 2	3	4	5
Resulting from a hazardous surface (e.g. ice, etc.)	1 2	3	4	5

96. How many times have you been involved in an accident, *as a pedestrian*, during the last 12 months?

    _____ times

97. What was the severity of the injury suffered as a result of the last accident you were involved in, *as a pedestrian*, if any?

    1. Minor
    2. Moderate
    3. Severe (not life threatening)
    4. Severe (life threatening, survival probable)
    5. Critical (survival uncertain)
    6. No injuries suffered
    7. Never been involved in an accident as a pedestrian à skip to "Question 100."

98. What was the total cost of the accident? (including medical expenses)

    $ _____

99. Was the accident in the previous question reported to any authority (e.g. police, park rangers, hospital emergency room, etc.) by either you or another person?

1. Yes
2. No

100. Has anyone in your household suffered a "severe" or worse injury due to an accident *as a pedestrian*?

1. Yes
2. No

XI. ADDITIONAL INFORMATION

101. Would you like to see improvements of conditions to encourage bicycling as a means of transportation?

1. Yes
2. No

102. Where would you most prefer to see funding for improvements of *bicycling* in Colorado come from? *(circle as many as apply*)

1. New tax
2. User fees for trails and paths
3. Bike registration/licensing fees
4. Reallocating funds from other transportation projects.

103. What is your age? _____

104. Your sex? (*Circle one*)

1. Male
2. Female

105. What is your marital status?

1. Single living alone or with room- mate
2. Single living with parent(s)
3. Married, or living with a significant other
4. Divorced or separated living alone or with roommate
5. Divorced or separated living with parents
6. Widow or widower

106. How do you identify yourself?

1. White, Non-Hispanic
2. White Hispanic/Latino
3. African American, Non-Hispanic
4. African American, Hispanic/Latino
5. Asian/Pacific Islander
6. Native American
7. Other (describe):_____

107. How many children (birth, adopted, foster or stepchildren) under 18 years old live with you full or part time?

_____

108. Do you smoke?

1. Yes
2. No

109. What is the highest grade you have completed? (*Circle one*)

1. 9th grade or less
2. 10th grade
3. 11th grade
4. 12th grade
5. 1st year of college
6. 2nd year of college
7. 3rd year of college
8. 4th year of college
9. 5th year of college
10. 6th year of college
11. 7th year of college
12. 8 or more years of college

110. What is the highest **degree** that you have earned?

1. No high school diploma
2. High school diploma (or GED)
3. Associates degree (or equivalent)
4. Bachelor's degree (or equivalent)
5. Master's degree (or equivalent)
6. Doctorate degree (or equivalent)

111. Do you have a personal computer at home?

1. Yes
2. No

112. How many *hours per week*, on average, do you access the internet?

From work: _____

From home: _____

113. In what industry do you currently work?

1. Agriculture, forestry or fishing
2. Mining
3. Construction
4. Manufacturing
5. Transportation, communication or public utilities
6. Wholesale trade
7. Retail trade
8. Finance, insurance or real estate
9. Services/Education/Technology
10. Public administration
11. Government
12. Not currently employed/Retired

114. What is your occupation?

1. Manager
2. Professional
3. Technician
4. Sales
5. Administrative
6. Protective services
7. Services
8. Mechanic/Repair
9. Other
10. Not currently employed/Retired

115. How many employees are there at your place of work?

1. 1
2. 2 – 9
3. 10 – 24
4. 25 – 50
5. 51 – 100
6. 101 – 249
7. 250 – 499
8. 500 or more

116. What is your hourly wage or annual salary before taxes are deducted?

$_____ per hour, or

$_____ per year

117. What is the your annual household income for all household members from all sources?

1. Less than $10,000
2. $10,001 - $20,000
3. $20,001 - $30,000
4. $30,001 - $40,000
5. $40,001 - $50,000
6. $50,001 - $60,000
7. $60,001 - $80,000
8. $80,001 - $100,000
9. $101,000 - $150,000
10. More than $150,000

Thank you! Please put tape on the open sides of this survey and drop it in the mail.