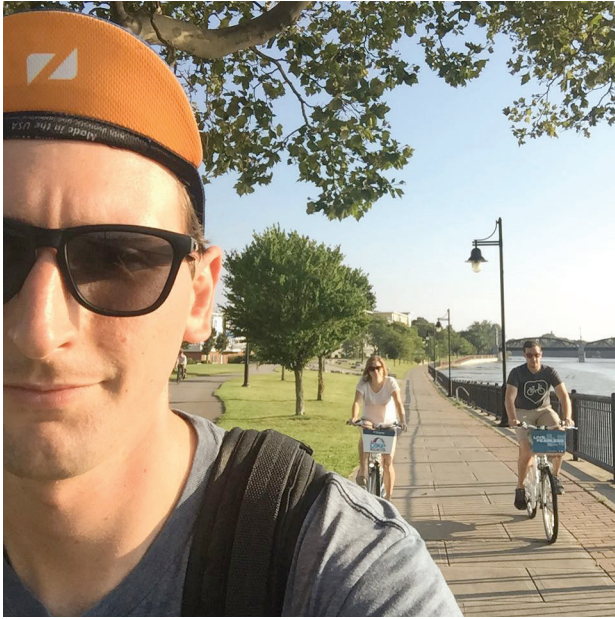


HEALTH IMPACT ASSESSMENT

The Rochester Bike Share



PREPARED BY: BENJAMIN WOELK, M.S. | JUNE 2018



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Executive Summary

The Rochester Bike Share program can play a more integral role in helping the city of Rochester become a healthier community and in helping city residents achieve better health outcomes.

The Rochester Bike Share grew out of a study designed to determine whether implementing a bike-share program would be feasible in Rochester. Following an analysis of population and employment trends, an evaluation of existing plans and regulations, a review of existing conditions, and a stakeholder and public engagement process, it was determined that a bike share in and around Rochester's Center City was viable.

When launched in 2017, the Rochester Bike Share exceeded its initial goal of 250 bicycles and 25 bike-share stations, to reach 340 bicycles via 46 bike stations, utilizing the more than 60 miles of on-street bike lanes currently available in Rochester.

The bike-share system is currently available seven days per week, 24 hours per day between April and November. It is operated solely by Zagster Incorporated, selected as the official provider based on the city's decision that the company had the best bike model and shared the city's vision for a system with access throughout city neighborhoods. As of April 1st, 2018 Zagster Inc. is rebranding the bike share here in Rochester as "Pace" (Zagster Inc., 2017).

The Rochester Bike Share (RBS) offers an active transportation network throughout Rochester. For residents who do not own a bicycle, or for those who want an alternative to an automobile, the Rochester Bike Share provides a means of increasing physical activity through recreation. It also offers potential for improving health through greater physical activity for those commuting from home to work, improved socialization among neighborhoods and improved access to food by creating efficient routes to grocery stores.

Some aspects of the program, however, may be unintentionally limiting its utilization and its potential positive impact on people's health – leading to health disparities. These include:

- Access to the bike-share program – and subsequently to more physical activity – is largely dependent on the geographic location of bike-share stations as they relate to the proximity to neighborhoods.
- Not all city residents can utilize the system, as Zagster Inc. current payment model requires users to have both a credit card and a smartphone with Bluetooth technology to unlock bikes.
- While the bike share may help to improve access to healthy-food options, including supermarkets and other public markets, no bike-share stations are located directly at supermarkets (as of the time of this report).

Common Ground Health and the Genesee Transportation Council (GTC) produced this Health Impact Assessment (HIA) as part of their efforts to advance health-informed transportation decision-making across the Genesee-Finger Lakes region. This report focuses on the RBS inaugural phase linked to health disparities and health outcomes within the city of Rochester. Conducted from 2016 to 2018, it is the result of extensive research and analysis, as well as guidance and feedback from an array of stakeholders from community health, transportation, planning and community engagement.

This HIA also seeks to identify any potential barriers to access, including where vulnerable populations such as those with health disparities may not yet have bike sharing available to them.

Four health determinants were identified for further analysis to assess the health disparities that may currently exist: physical activity, social cohesion (how well integrated and connected a community is socially), economic benefit and equitable access, and food access.

Following are a set of recommendations that can help increase Rochester Bike Share usage, and in the process, help improve people's health. The recommendations involve:

- Promoting more physical activity in Rochester by placing bike stations closer to grocery stores, farmers markets, parks and other community resources.
- Maximizing RBS utilization through improved bicycle facilities and infrastructure.
- Encouraging more community education about the RBS and its potential health impact, especially with vulnerable populations.
- Improving the payment system to reduce barriers for all populations and allow different membership options to reach low-income residents.

These suggested recommendations could increase bike-share utilization, help to overcome identified health disparities and foster improved health outcomes in the region.



Health Impact Assessment Recommendations

Physical Activity

Locate bike stations within 0.5 miles of community resources to improve health outcomes.

Specific Actions:

- Expand access to grocery stores, farmers markets, city parks, community centers, schools, and places of employment.

Encourage recreational cyclists, non-cyclists and pedestrians to be more physically active.

Specific Actions:

- Improve bicycle facilities/infrastructure, including bike lanes and new-station placement, which may increase opportunities for physical activity.

Establish baseline conditions and physical-activity goals for users.

Specific Actions:

- Integrate recorded Zagster Inc. data on total minutes of physical activity per trip.

Locate and prioritize bike stations in city-census tracts with high rates of chronic disease.

Specific Actions:

- Priority 1: Tracts 65, 92, 49, 15, 96.03
- Priority 2: Tracts 96.02, 52, 50, 93.01, 46.02
- Priority 3: Tracts 27, 80, 64, 79, 13

Social Cohesion

Encourage face-to-face communication and education around the bike share.

Specific Actions:

- Empower ambassadors/advocates of RBS at a neighborhood/census tract level
- Offer training courses through the City of Rochester or community partners to educate new users on how to utilize the bike-share system.
- Educate on New York State Department of Motor Vehicles safety policy and advocate that material on cyclists and bike share be included in driver-safety material.

Maximize communication on RBS health impacts, especially with vulnerable populations.

Specific Actions:

- Develop strong relationships with area health-based employers.
- Produce incentive-based promotional events through Zagster Inc. and local businesses to encourage the public to ride.

Increase overall social connectedness to the bike share.

Specific Actions:

- Connect bicycle paths and transit lines and streets via sidewalks.
- Enhance connection between neighborhood destinations. Make active transportation modes (walk, biking) easier to engage.

Determine where to locate future bike-share stations.

Specific Actions:

- Prioritize locations by health disparities or other barriers to access, including chronic-disease rates; low socioeconomic status; lack of access to reliable transportation; ethnicity; age; proximity to community resources/transit stops.

Ensure station placement maximizes safe locations and provides user guidance.

Specific Actions:

- Support station placement in areas with high visibility.
- Increase wayfinding signage to guide cyclists, increase engagement of riders and mitigate the potential for getting lost.
- Provide signage at stations with proximity to nearby destinations, including cultural institutions, parks, markets and area neighborhoods.

Economic Benefit & Equitable Access

Promote the integration of the bike share with other public-transportation options.

Specific Actions:

- Partner with public-transit providers to create mobility hubs across Rochester.
- Partner with ridesharing services such as Uber/Lyft.

Move away from individual station sponsorships to new models to support RBS overall.

Specific Actions:

- Explore methods to increase investment from public and nonprofit sectors.
- Partner with local institutions and organizations to provide subsidized memberships to low-income city residents.



Improve the bike-share payment system to reduce barriers to access for all populations.

Specific Actions:

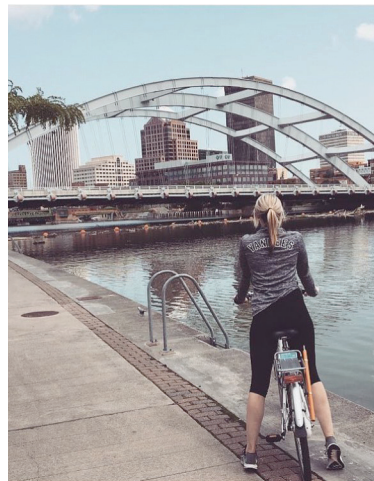
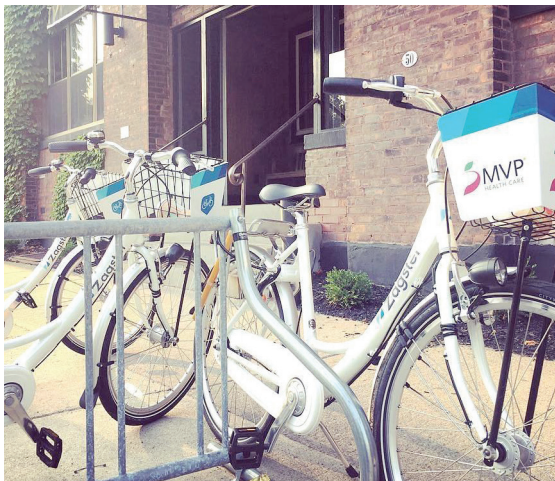
- Move away from a smartphone requirement and enable a cash-membership option.
- Allow different membership tiers such as subsidized annual options for low-income users.

Food Access

Increase food access and improve health.

Specific Actions:

- Partner with area food advocates and farmers markets to increase food access.
- Demonstrate health impacts of the bike share to food providers to enable stronger ties and foster food access as a stated goal of the RBS.



Section 1: Introduction

In August of 2016, Common Ground Health and the Genesee Transportation Council (GTC) jointly pursued a Memorandum of Understanding (MoU) to embark on an effort to advance health-informed, transportation decision-making across the Genesee-Finger Lakes region. The project blended Common Ground Health’s mission to, “bring focus to community health issues via data analysis, community engagement and solution implementation” with GTC’s ongoing efforts “to maximize the contribution of the transportation system to the social and economic vitality of the Genesee-Finger Lakes region.”

Regional experts were gathered to assist in the guidance and shared learning for two Health Impact Assessments (HIAs). Per the MoU, the first task within the Advancing Health-Informed Transportation Decision-Making project was to:

Convene a Steering Committee with representatives of key stakeholders in regional transportation, health and planning to build knowledge of regional transportation-health linkages and help guide the project, including HIA Learning Collaborative participants and GTC staff, regional and municipal planning agencies, Monroe County Health Department, and other organizations, as appropriate. Establish baseline understanding of where and how HIA has added value to transportation decision-making in other regions to inform subsequent project tasks.

Following a review of possible projects, the Genesee Valley Greenway and Rochester’s Bike Share program were selected for separate Health Impact Assessments. This report focuses on health disparities and outcomes of the Rochester Bike Share in an effort to study and report on health outcomes and health disparities that may be linked to the initial phasing of the Rochester Bike Share within the City of Rochester. Conducted from 2016 to 2018, the assessment is the culmination of extensive research and analysis, as well as guidance and feedback from a wide array of stakeholders in the realms of community health, transportation, planning and community engagement.



Section 2: The Rochester Bike Share and Health

2.1 THE ROCHESTER BIKE SHARE: HISTORY, COMPONENTS, AND ACTORS

History

The exploration into bike share for Rochester was first mentioned in the 2011 Rochester Bicycle Master Plan that was prepared for the City of Rochester. The first-ever master plan for bicycling in Rochester highlighted the rising popularity of bike share in cities across the United States, and examined several peer-cities and the performance of those programs. In Rochester, the plan focused on the increasing levels of bicycle activity locally and the need to identify long-range opportunities for improved bicycling infrastructure and services. The plan's stated accomplishments built the foundation of city-related bicycle infrastructure through identifying best practices, assessing the feasibility of local application, identifying appropriate locations for bicycle facilities and recommending bicycle-supporting policies at a citywide level (Sprinkle Consulting, 2011). As of the writing of this report, the city has more than 60 miles of on-street bike lanes in its network, with a stated goal of reaching 100 miles of bike-lane infrastructure by 2018 (Taddeo, 2016).

In January 2015, the Genesee Transportation Council commissioned the Rochester Area Bike Sharing Program Study to determine the feasibility of implementing a bike-share program in Rochester. The report, prepared for the New York State Energy Research and Development Authority (NYSERDA) and the New York State Department of Transportation (NYSDOT), included both policy and financial goals for the bike share and sought to identify program objectives. The policy goals focused on four different topics: mobility, equity, economics and bicycling. Based on the report's analysis of population and employment trends, an evaluation of existing plans and regulations, a review of existing conditions, and a stakeholder and public engagement process, it was determined that a bike share in and around the Center City Quadrant of Rochester was feasible (Toole Design Group, SRF Associates, 2015).

In the two years since the Rochester Area Bike Sharing Program Study was commissioned, the City of Rochester enacted the recommendations of the Rochester Area Bike Sharing Program Study to implement a bike-share program and moved forward with the selection of Zagster Inc. as the official bike-share provider. According to city officials, the city chose Zagster Inc. from a range of other bike-share providers because the company had the best bike model and shared the city's vision for equitable system access throughout city neighborhoods (Taddeo, 2016).

Components

To better understand how the bike-share system operates in Rochester, and how its initial phasing compares to the actual phasing implementation that has occurred, this report has outlined several facets of the program.

Overarching Features

Based on agreements with the City of Rochester, Zagster Inc. is responsible for the installation, ownership, operation and maintenance of the system. The city has indicated that it does not intend to fund the system and that, through Zagster Inc., the bike share will be “self-sustaining” through sponsorship and advertising. Initial community sponsors have included private businesses, nonprofits, the transportation sector and a local health organization. According to the mayor, the city has a two-year agreement with Zagster Inc. with an option to extend the contract for three additional one-year terms.

The bike-share system is currently available for use 24 hours a day, seven days a week from April through November. The bikes are removed during the winter months of December through March.

Zagster Inc. utilizes “smart bikes” that have locking technology directly on the bike, rather than on a bike rack or on their kiosks or stations. Users are able to lock the bikes to any bike rack (including non-Zagster Inc. racks) using an on-bike locking mechanism that connects to a user’s mobile phone. The system launched an hourly rate only, but an annual option has been discussed as a future possibility.

Initial Phasing (Planned)

The Rochester Area Program Feasibility study assisted in identifying how a bike-share program might be implemented and defined four different proposed phases of development. For its initial phasing, the study identified the Center City and the neighborhoods of Grove Place, East End, Neighborhood of the Arts, East Avenue, Park Avenue, Corn Hill, South Wedge, and parts of High Falls and Upper Falls as targets for bike-share stations. The study based its feasibility analysis on a program plan designed to reach a total capacity of 100 stations and 1,000 bicycles through four separate phases over the course of five years. In the initial phase, the program called for a focus on Central Rochester with a target of 25 stations and 250 bicycles. Each stage (Phases 1-4) was proposed to grow incrementally by 25 stations/250 bicycles to reach the 100 stations/1,000 bicycles target by the year 2022. Additional assessment per phase and at the conclusion of five years from the launch date will indicate whether those goals are achieved.

According to the Rochester Bike Share Program Feasibility Study, the culmination of all four proposed phases would represent a geographic area of 22.7 square miles, or just more than 52 percent of Rochester’s total square mileage, with 19 percent of the town of Brighton also being reached. The program has also stated it would then fully serve 236,000 Rochester residents. The system was also stated as being designed to serve a high proportion of minority and low-income communities, providing these residents with a new mobility option and an extension to existing transit service.



For additional context, we have integrated the original proposed station map as it was presented in the feasibility study:

How the bike share was initially planned, how its initial phase began – and any key differences between the two - are the primary focus of this HIA. This report has attempted to analyze the actual phasing implemented, as the corresponding assessment data will indicate. To better understand the initial program launch, it is first important to define the parameters of bikes and bike stations that were initiated.

Initial Phasing (Implemented)

The Rochester Area Bike Sharing Program Study’s initial planning phase proposed 250 bicycles via 25 stations; however, the inaugural phase actually reached 340 bicycles via 46 stations across Rochester. In addition to the expanded station quantity, the geographic region was also expanded beyond what was initially proposed, due, in part, to the amount of station sponsorship. At the time of this report, the bike share is still operating within its inaugural phase after a four-month-long operating season in 2017 from July to November. The bike share will enter a new season in spring 2018, and, as of winter 2018, no new station locations or placements have been announced. The map below offers an at-a-glance look at where the implemented phase stations were placed. Further detailed maps of the implemented phase are featured in this HIA’s assessment portions.

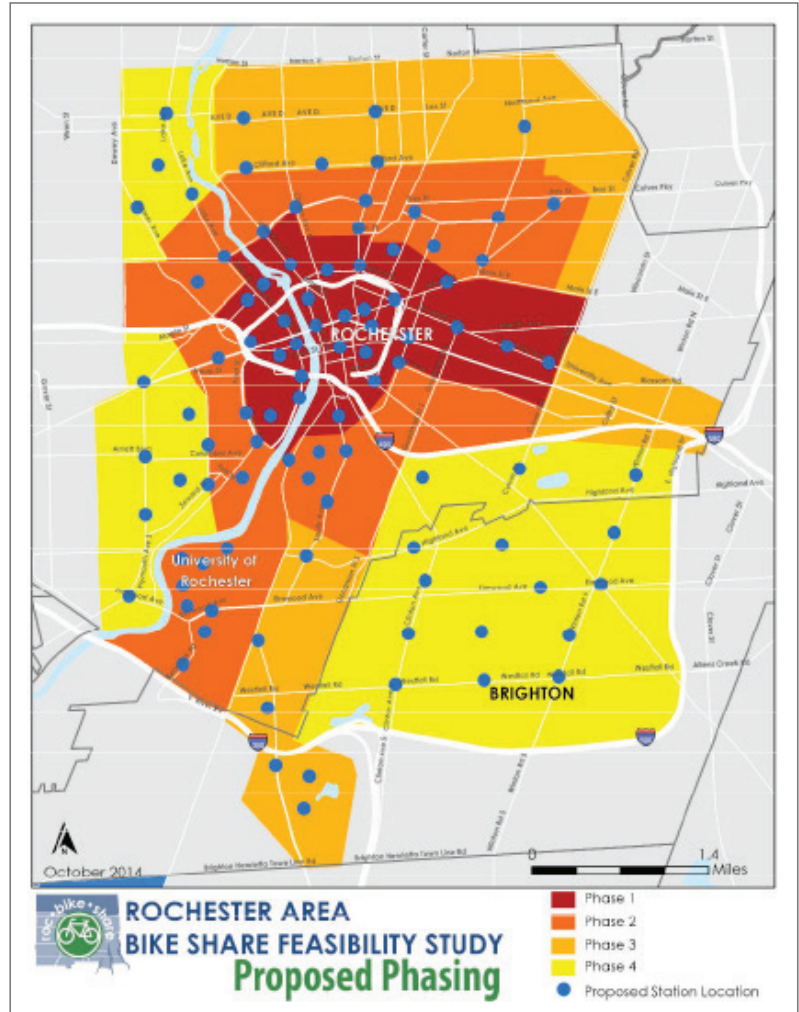


Figure 1 Proposed Phasing Map courtesy of Genesee Transportation Council.

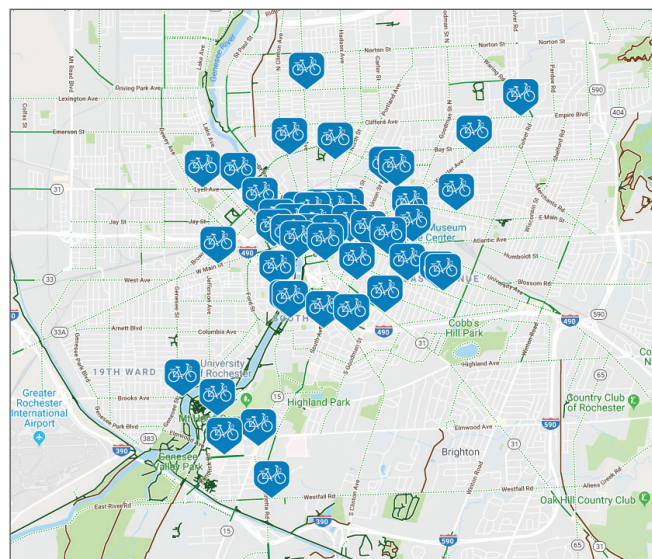


Figure 2 Implemented Phasing Map provided by Zagster Inc. - current bike-share station locations as of March 2018

ACTORS

The Genesee Transportation Council (GTC)

The U.S. Department of Transportation (USDOT) requires every metropolitan area with a population of more than 50,000 to have a designated Metropolitan Planning Organization (MPO) to qualify for the receipt of federal highway and transit funds. GTC is the designated MPO responsible for transportation policy, planning and investment decision-making in the Genesee-Finger Lakes region. To maintain the DOT's certified planning process required to receive federal transportation funding, GTC must, at a minimum, produce and maintain three major products: Long-Range Transportation Plan (LRTP), a Unified Planning Work Program (UPWP) and a Transportation Improvement Program (TIP). GTC also participates in several other technical fields, including bicycle and pedestrian planning, travel-demand modeling, intelligent transportation systems and more (Genesee Transportation Council, 2017).

City of Rochester

The City of Rochester served as the bike-share launch site, seeing its ability to provide a healthy and sustainable transportation option that could drive economic growth by making the city "a more attractive place to live, work and visit." The city also saw access to bicycles through a public bike-share system as a key component to further encouraging and facilitating cycling, while providing residents and visitors with a new, high-quality mobility option. The bike-share program is also seen as having benefits that include reduced car usage, increased transit-use rates, lower parking demand, increased sales for local small businesses and the overall improvement of public health. In fall 2016, the City of Rochester entered into an exclusive right-of-service agreement with Zagster Inc. to run the program (City of Rochester, NY, 2017).

Zagster Incorporated

Zagster Inc. is a bike-sharing company headquartered in Cambridge, MA. Founded in 2007, the company began its roots in consulting for bike shares and as a software provider that developed bike-sharing, fleet-management software. The company currently has more than 160 bike-share programs active across the U.S. On its website, Zagster Inc. boasts of being North America's leader in bike share with more than 500,000 trips logged to date (Zagster Inc., 2017). Zagster Inc. manages all aspects of Rochester's bike-sharing program, including hardware, software, maintenance, rider support and local promotion. Zagster Inc. rebranded Rochester's Bike Share program to Pace on April 1st, 2018.



2.2 WHAT IS HEALTH?

According to the World Health Organization (WHO), health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (World Health Organization, 2017). The range of personal, social, economic and environmental factors that influence health status are known as determinants of health. For the purpose of this report, we are utilizing the WHO's health definition, while also defining parameters of the social determinants of health that occur within the built environment and are relevant to this project. The social determinants of health are the conditions in which people are born, grow, live, work and age (World Health Organization, 2017).

According to Healthy People 2020, health determinants are defined through five key sectors: policymaking, social factors, health services, individual behavior, and biology and genetics (United States - Office of Disease Prevention and Health Promotion, 2017).

To broadly understand the goals of an HIA, it is important to better understand the values that guide the process and how social determinants affect health outcomes. The International Association of Impact Assessment has identified the guiding values for Health Impact Assessment. The Rochester Bike Share HIA seeks to integrate these guiding values throughout this assessment and report on which of the social determinants may impact health determinants and lead to greater health outcomes. Each of the guiding values is further defined below:

Democracy – People have the right to participate in the formulation and decisions of proposals that affect their life, both directly and through elected decision-makers. In adhering to this value, the HIA method should involve the public and inform and influence decision-makers. A distinction should be made between those who take risks voluntarily and those who are exposed to risks involuntarily (World Health Organization, 2001).

Equity – The desire to reduce inequities that result from avoidable differences in health determinants and/or health status within and between different population groups. In adhering to this value, an HIA should consider the distribution of health impacts across the population, paying specific attention to vulnerable groups and recommend ways to improve the proposed development for affected groups.

Ethical use of evidence – Transparent and rigorous processes are used to synthesize and interpret evidence, best-available evidence from different disciplines and methodologies is utilized, all evidence is valued and recommendations are developed impartially. In adhering to this value, the HIA method should use evidence to judge impacts and inform recommendations. It should not set out to support or refute any proposal, and it should be rigorous and transparent.

Comprehensive approach to health – Physical, mental and social well-being is determined by a broad range of factors from all sectors of society (known as the wider determinants of health). In adhering to this value, the HIA method should be guided by the wider determinants of health (Human Impact Partners, 2011).

2.3 HOW MIGHT THE ROCHESTER BIKE SHARE IMPACT HEALTH?

The Rochester Bike Share represents the creation of an entirely new active-transportation network for the City of Rochester that may be utilized and engaged by both residents and visitors. For those who do not own a bicycle, or for those who wish to utilize a form of alternative transportation instead of an automobile, the Rochester Bike Share may enable a new method of engaging in physical activity through recreation or transit. Depending on the final configuration of bike-share stations, the bike share may also enable users to commute from home to work, improve interconnectivity among

neighborhoods and improve access to food by creating more efficient routes to full-service grocery stores than are currently enabled by public transportation.

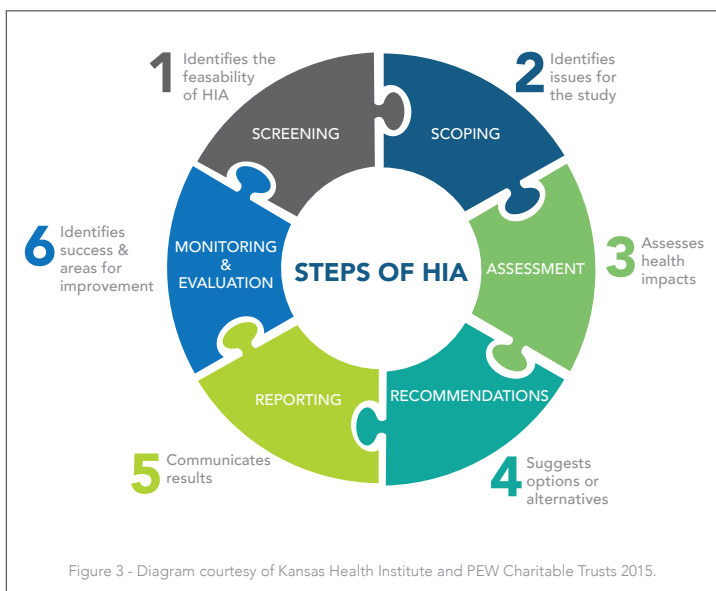
The range of access and barriers to physical activity is also largely dependent on the geographic location of bike-share stations as they relate to the proximity of different neighborhoods and also the program’s cost and engagement protocols. The City of Rochester recognized that of the many benefits bike share has to offer, overall public-health improvement was one key attribute that could be achieved. Positively impacting public health was also a defined policy goal and objective of the Rochester Area Bike Sharing Program Study, which also identified the need to focus on equity issues through the distribution of bike-share stations to minority and low socioeconomic populations.

2.4 WHAT IS A HEALTH IMPACT ASSESSMENT?

As defined by the National Research Council, “HIA is a systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA provides recommendations on monitoring and managing those effects” (National Research Council of the National Academies, 2017).

Currently, according to the Health Impact Project, there are nearly 420 completed or currently in-progress HIAs across the U.S. Addressing local, county, state and federal projects, HIAs evaluate a vast variety of topics impacting the built environment including transportation, land use, physical activity and more (The PEW Charitable Trusts, 2015). In New York state, we are aware of only three completed HIAs, two of which have been published to the Health Impact Project website, including one studying access to waterways here in Rochester, NY.

An HIA’s six steps are illustrated and summarized below. They also appear in this report as a section-by-section guide to illustrate how each step was applied to the Rochester Bike Share Health Impact Assessment.



- **Screening** - Determine whether an HIA is needed and likely to be useful.
- **Scoping** - In consultation with stakeholders, develop a plan for the HIA, including the identification of potential health risks and benefits.
- **Assessment** - Describe the baseline health of affected communities and assess the potential impacts of the decision.
- **Recommendations** - Develop practical solutions that can be implemented within the political, economic or technical limitations of the project or policy being assessed.
- **Reporting** - Disseminate the findings to decision makers, affected communities and other stakeholders.
- **Monitoring and Evaluation** - Monitor the changes in health or risk factors and evaluate the efficacy of measures that are implemented and the HIA process as a whole (PEW Charitable Trusts 2014).



2.5 WHY CONDUCT THE ROCHESTER BIKE SHARE HIA?

Bike share is in its infancy here in Rochester, having just launched in summer 2017 and having concluded its inaugural first season in November. The Zagster Inc. bike-share program represents the first citywide approach to offering a formal component of active transportation, outside of providing infrastructure, which facilitates bike use. There is an opportunity at this time to evaluate the populations at a census tract level, which were served during the first implementation phase of the bike share. In analyzing the initial phase already implemented, this HIA may assist in the guidance and the direction of where future program phasing should occur to benefit community health outcomes as bike share expands throughout the city in the coming years. To date, a health analysis of the Rochester Bike Share and the populations served has not been conducted and research on the bike share has focused primarily on the program's overall feasibility. In conducting an HIA on the Rochester Bike Share, we may better learn the populations affected and develop recommendations to overcome pre-existing health disparities by strategically improving health outcomes throughout Rochester.

This HIA also seeks to identify any potential barriers to access, including where vulnerable populations, such as those with health disparities, may not yet have bike share available to them. Furthermore, in identifying vulnerable populations that have low socioeconomic status, this HIA seeks to identify pathways for those populations to obtain access to the bike-share program. Zagster Inc.'s current payment method requires that a user have both a credit card and a smartphone with Bluetooth technology to unlock their bikes and an IOS- (iPhone) or Android- based smartphone to utilize its software application (Zagster Inc., 2017). This requirement may also be unique to Rochester, as Zagster Inc. mentions having a texting-access option for non-smartphones to access their bike share in other cities (Zagster Inc., 2017). Other programs that Zagster Inc. operates across the nation have an annual option. The unique pricing model introduced here in Rochester does not offer an annual-ridership option at this time, which means subsidized-membership options at an annual basis have not been offered. Instead, bike-share riders in Rochester pay \$1 per 30 minutes of riding (or \$2 per hour) with an additional option to pay \$1 to dock the bikes outside of Zagster Inc. docking stations.

Section 3: RBS HIA Methodology

3.1 HIA PROJECT TEAM

The HIA Project Team consisted of four Common Ground Health staff members:

Albert Blankley – Director of Research and Analytics

Benjamin Woelk – Health and Community Infrastructure Analyst

Deidre Reid – Health Planning Research Analyst

Kathi Lynch – Health Planning Research Analyst

3.2 STEERING COMMITTEE

A steering committee was established with experts from across Monroe and Livingston counties and the city of Rochester to assist in the guidance and shared learning of this HIA. Members included planners, community advocates, representatives from higher education, authors of previous HIAs, and transportation experts. Membership of the committee is listed below:

Angela Ellis - Planning Director, Livingston County

Erik Frisch - Active Transportation Specialist, City of Rochester

Fran Gotcsik – Senior Consultant, Parks and Trails New York

Jody Binnix - Program Manager, Genesee Transportation Council

Katrina Korfmacher, Ph.D. - Director of Community Outreach, Environmental Health Sciences Center, University of Rochester Medical Center

Kristine Uribe - State Park Manager, Genesee Valley Greenway State Park

Rochelle Bell - Environmental Planner, Monroe County

Theresa Bowick, R.N. – Cruise Captain, Conkey Cruisers

3.3 SCREENING

The purpose of screening is to determine the HIA's value and feasibility in a particular decision-making context. Screening starts with the identification of a specific decision or proposal (Bahtia, 2011).

An initial project list was vetted through the Steering Committee using a six-step Screening Exercise to determine which project may have the highest need for assessment and to demonstrate why the project was a viable candidate. From a list of nearly a dozen projects, two were selected for HIA, including the Rochester Bike Share. The six-step screening exercise in Appendix A further explains the rationale as to why the Rochester Bike Share was selected.



3.4 SCOPING

3.4.1 Parameters of the Assessment (Vision, Study Area)

Vision

In an effort to obtain stakeholder feedback on a range of social determinants of health, a detailed scoping exercise was conducted with the Steering Committee. A half-day scoping workshop was conducted at Common Ground Health and initially led to identifying four prioritized health determinants for future assessment: physical activity, social cohesion, economic benefit and equitable access, and food access. The scoping worksheets developed during the workshop are included in Appendix B of this report.

Study Area & Demographics

In addition to the prioritized health determinants, it was determined that this HIA should focus on the initial phase of the Rochester Bike Share. Based on that analysis, there are a total of 37 census tracts that define the area in close proximity of the bike-station locations. This area represents the majority of a total of 14 ZIP codes in the City of Rochester. The demographics in the area covered by this initial phase of the Zagster Inc. bike share somewhat differs from that of the surrounding areas. Both the area of the bike share and the area outside of the initial phase have a population with the majority falling in the age range of 25 to 34 years of age. The area of the bike share has a higher percentage of younger individuals than the rest of the City of Rochester. Sixty-two percent of individuals in the bike-share area are between the age of 18 and 44, whereas only 52 percent of individuals fall between those ages outside of the bike share area.

The most populated of the tracts that will be potentially affected by the bike share rollout is 38.05. This tract is largely populated due to the inclusion of the University of Rochester campus, a major educational institution in the area. The next largest tract is the Beechwood area (tract 58). This location is on the northeast side of the city and houses a total of 4,698 people and represents a majority of the 14609 ZIP code region. The area touched by the Zagster Inc. rollout houses a total of 104,607 people and is located in the heart of the City of Rochester and some of its neighboring area.

Across the 37 census tracts, the population ranges from 7,141 people to as low as 870 people. The Population Density Map below illustrates the distribution of those characteristics.

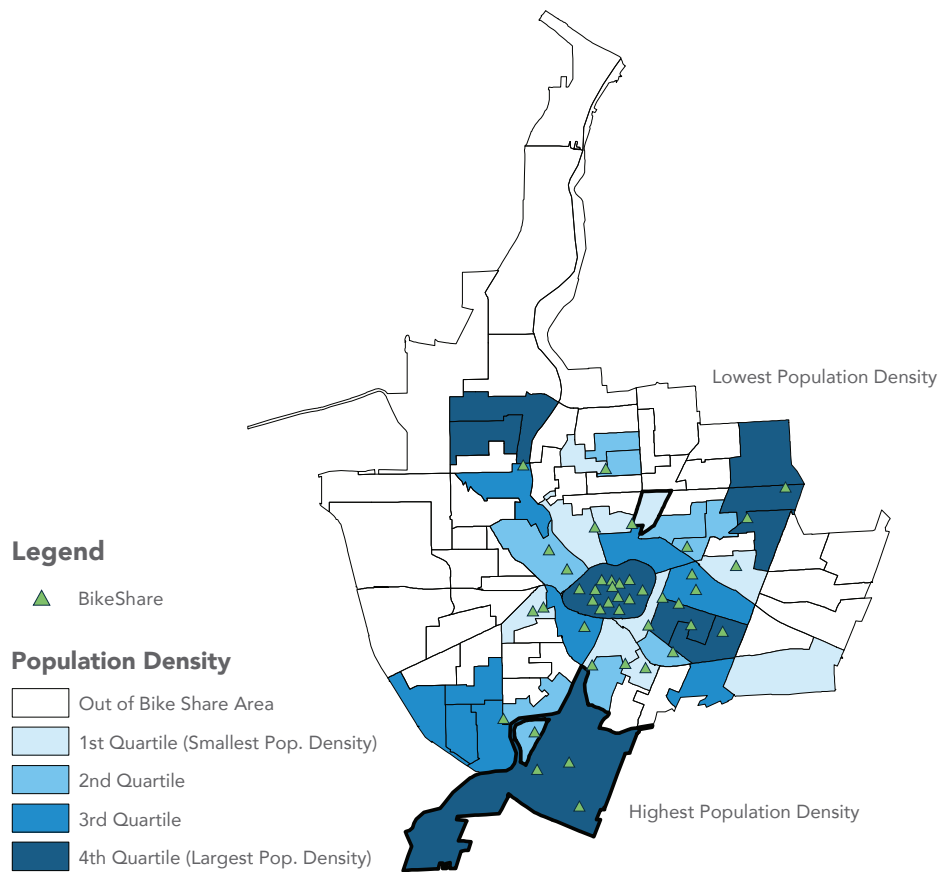


Figure 4 illustrates population density within the initial RBS implemented phase area; population density is the number of population per unit of total land area.

By further examining the local population we may better understand potential barriers to health and overall access to the Rochester Bike Share. The literature reviewed for this report links low socioeconomic status as a barrier to both physical- and mental-health outcomes and cites that disadvantaged populations may include women and minorities. Further analysis and literature on equitable access may be found throughout the prioritized health determinant sections of this report.

Population Demographics

The population in the Phase 1 area is spread across a number of tracts (37) and ZIP codes (14), as mentioned previously. A total of 40,671 (38.89%) people who live in this area are white alone, according to the American Community Survey. There are a total of 39,331 people that consider themselves black alone in this same area. These are the two races that represent the majority of the population in the Phase 1 area. Other races and ethnicities also are present: a total of 16,398 (15.68%) are Hispanic of any race and a total of 4,582 (4.38%) are Asian alone.

Across the tracts there is not much variation in age. Based on the average age of the tracts, the range is from 50.3 years of age in tract 78.02 to 19 years of age in tract 38.02. The two oldest tracts, on

average, are tract 78.02 and tract 33, which has an average age of 46.6 years. The youngest tracts are 38.02 as well as 13 and 93.01, which have average ages of 20.7 and 23.5 years of age.

In this Phase 1 area, the majority of the bikes are located in tract 94, which is located in the center city. This tract has an average age of 32.9, which falls in the middle of the range of expected riders. The total population of this tract is 4,200 people, making this tract the sixth-largest tract in the Phase 1 area, as illustrated in the table and corresponding map below.

TRACT	POP.	TRACT	POP.	TRACT	POP.	TRACT	POP.	TRACT	POP.
38.05	7,141	21	3,645	68	2,936	30	2,175	96.01	1,417
58	4,698	10	3,514	93.01	2,600	69	2,128	33	1,383
31	4,660	23	3,495	38.02	2,592	49	2,056	92	1,303
20	4,465	67	3,344	34	2,511	13	1,967	51	1,278
54	4,254	37	3,268	48	2,481	32	1,578	15	870
94	4,200	71	3,100	2	2,432	59	1,506		
29	4,087	95	3,046	56	2,401	93.02	1,500		
83.01	3,875	70	3,011	55	2,257	78.02	1,433		

U.S. Census Bureau 2010

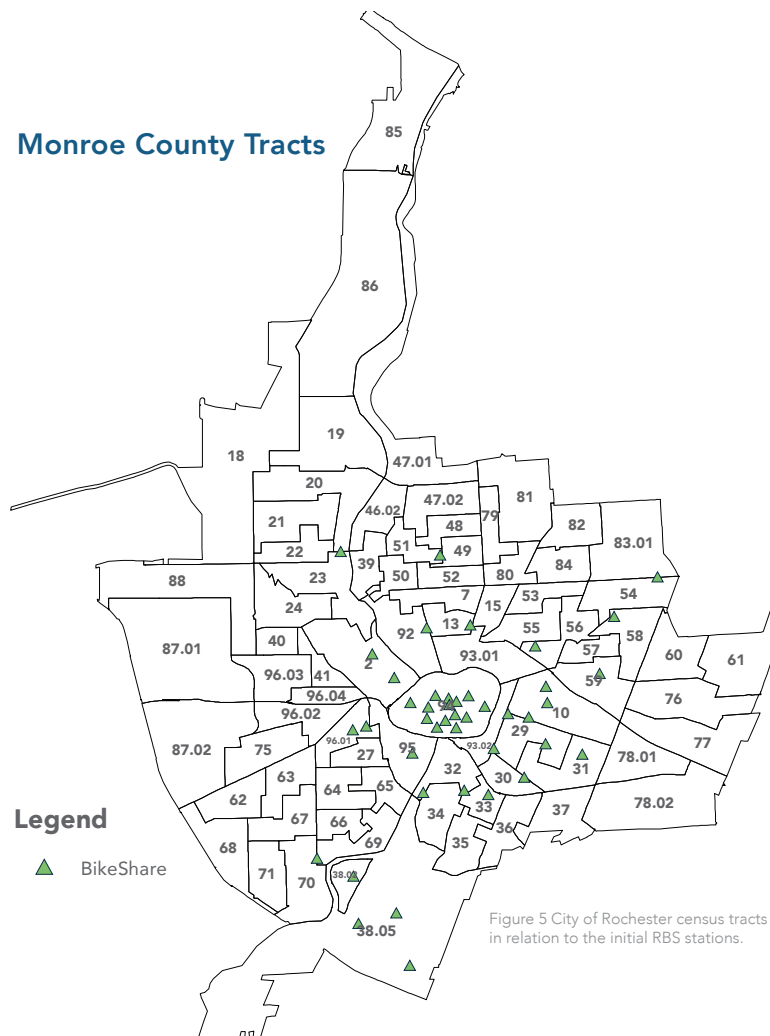


Figure 5 City of Rochester census tracts in relation to the initial RBS stations.

3.4.2 Affected and Most Vulnerable Populations

Equity was previously identified as being one of the five guiding values of Health Impact Assessment, and a primary goal for this report is to be considerate of those populations that may fall into categories of increased health disparities. This HIA integrates data that assists in helping to identify who the most affected and vulnerable populations among the City of Rochester may be, taking into consideration household incomes, minority populations and disparate health outcomes. Those populations are identified and cited within this report's scope in an effort to determine strategies and develop recommendations that may lead to increased engagement and an overall improvement of health outcomes.

3.4.3 Identification of Key Issues

Four health determinants were prioritized and selected for further analysis to assess the health disparities that may currently exist and for the exploration to reach improved health outcomes. The health determinants selected are:

- Physical activity
- Social cohesion
- Economic benefit and equitable access
- Food access

Section 4: Physical Activity

4.1 PHYSICAL ACTIVITY AND HEALTH LITERATURE REVIEW

The World Health Organization (WHO) defines physical activity as “any bodily movement produced by skeletal muscles that requires energy expenditure.” To prevent chronic disease and remain “sufficiently active,” the WHO recommends that adults should do at least 150 minutes of moderate-intensity physical activity (walking, cycling and sports) every week, or 75 minutes of vigorous-intensity activity (exercise). A balanced combination of moderate- to vigorous-intensity physical activity can also suffice to reach the recommend levels (World Health Organization, 2017).

Physical activity has significant health benefits and contributes to the prevention of non-communicable diseases, including reducing the risk of hypertension, coronary heart disease, stroke, diabetes and various types of cancer. Physical activity may also reduce depression. Regular physical activity is beneficial to people of all ages and walks of life, having positive effects on health, longevity and quality of life (United States Department of Health and Human Resources, 2017). Physical activity has also been found to improve self-image, self-esteem, physical and mental wellness, and overall health (Ross, 2007). It is reported that only 25 percent of all adults reach recommended physical activity levels across the nation. While achieving the recommended amount of physical activity can lead to positive health outcomes, insufficient physical activity can lead to significant health disparities such as cardiovascular diseases, cancers, diabetes and depression (Handy, 2005).

According to the Centers for Disease Control, one in three adults (36.5%) is obese (Center for Disease Control and Prevention, 2017). A lack of physical activity is one of the leading risk factors for death in adults (ages 18-64) worldwide. People who do not reach the proper recommended physical-activity levels have a 20 to 30 percent increased risk of death compared to those people who are sufficiently active (World Health Organization, 2017). Here in the U.S., it is estimated that 60 percent of the adult population is at risk for diseases associated with a lack of physical activity (National Institute on Aging, 2000). One study estimates that 234,000 premature deaths were linked to physical inactivity each year (US Burden of Disease Collaborators, 2013).

In 2000, infectious disease was replaced by chronic disease as the leading cause of death in the U.S. According to Schilling et al., chronic disease is the most prevalent and economically burdensome health disparity, but it is also preventable through healthy-behavior interventions such as improved nutrition and physical activity, which limit the effects of chronic diseases (Schilling & Linton, 2005). Chronic disease is becoming the most frequent and costly health issue in America, at one time it was estimated that approximately \$24 billion a year in health-care costs were attributed to lack of physical activity in the U.S. (Colditz, 1999). As of 2010, chronic disease had risen to 86 percent of the total cost of all U.S. health-care expenditures, totaling more than \$2.3 trillion spent that year (2010 Medical Expenditure Panel Survey Data, 2014). It should also be noted that according to Mueller et al., recent Health Impact Assessments focused on active transportation, demonstrate that changes in physical activity levels were the largest contributor to estimated health impacts (Mueller, et al., 2015).

Built Environment/Neighborhood Conditions:

Over the last dozen years, public health and medical care have increasingly recognized the importance of the factors outside of medical care that strongly influence health and that can be shaped by the social determinants of health (Erwin & Scali, 2007). A wide array of research

has demonstrated strong linkages between built environment characteristics and the health of individuals (Booth, Pinkston, & Poston, 2005) (Ewing & Kreutzer, 2006) (Frank, 2004) (Frank, Andresen, & Schmid, 2004) (Hinde & Dixon, 2005). Evidence demonstrates that the built environment is associated with physical activity and active transportation (Ewing, Reid, & Cervero, 2010) (Freeman, et al., 2012) (McCormack & Shiell, 2013) (Ding & Gebel, 2012). Research indicates that the built environment influences participation in walking and biking and the overall physical-activity levels that relate to it (Ewing & Cervero, 2010) (Bauman, et al., 2012). The layout of cities and neighborhoods and their transportation infrastructure are important factors in whether people choose active transportation or driving as a means of transportation (Moudon, Hess, Snyder, & Stanilov, 1997) (Frank & Engelke, 2001). Here in the U.S., many communities are reportedly designed in ways that do not support walking and biking, which leads to low levels of physical activity. One study found a 6 percent increased risk for obesity for each additional hour an individual spent in a car per day (Lee, Ewing, & Sesso, 2009).

Neighborhoods' physical, service and social environments have been linked to mortality and overall general health status, including chronic- disease conditions, as well as mental health (Diez-Roux & Mair, 2010) (Braveman, Egerter, An, & William, 2011). As aforementioned, neighborhood conditions may have negative or positive impacts on levels of physical activity, for example perceived neighborhood safety has been linked with levels of physical activity (Lumeng, 2006) (Bennett, et al., 2007). Crime or fear of crime and personal safety are demonstrated obstacles to residents participating in physical activity. Safety concerns are often cited as a reason for not walking or visiting parks, reducing opportunities for physical activity and increasing the risk of chronic disease (International City/County Management Association, 2005). Neighborhoods with declining or dilapidated housing, vacant lots, litter, graffiti and vandalism can affect health if people feel their neighborhood is unsafe and fail to engage in outdoor physical activity (Lanvin, Higgins, Metcalfe, & Jordan, 2006). Studies have also indicated that the health benefits of physical activity outweigh the risks of bicycle-related accidents, while walking or bicycling to work is associated with higher levels of physical activity, lower rates of obesity and lower rates of diabetes (Hartog, Boogaard, Nijland, & Hoek, 2010) (Rojas-Rueda, Nazelle, Tainio, & Nieuwenhuijsen, 2011).

Infrastructure Improvements:

Community and street-design improvements can increase walking and bicycling opportunities and lead to increases in physical activity (U.S. Department of Health and Human Services, 2016). In a Community Transportation Plan in Decatur, GA, bike and pedestrian facilities were reported as having positive impacts on public health by increasing opportunities for physical activity, improving safety and providing better access to health-promoting goods and services (Center for Quality Growth and Regional Development). The presence of sidewalks, crosswalks and bicycle lanes has also been reported as having a positive impact on increased physical activity. The International Journal of Behavioral Nutrition and Physical Activity has also documented that designing communities for active living can foster economic revitalization, reduce crime rates, promote physical activity and support residents' health, happiness and well-being (Sallis, et al., 2015). Studies have also found that increasing cycling infrastructure leads to increased cycling (Dill & Carr, 2003). Cycling has been linked to improved cardiovascular fitness, reduced cancer risk and reduced risk of being obese (Oja, et al., 2011).

Regionally, the GTC's Long Range Transportation Plan (LRTP) indicated that "enabling bicycling and walking promotes active transportation that seeks to reverse the obesity epidemic that is one of the most critical public-health issues in the nation." The LRTP also draws attention to communities in the Genesee-Finger Lakes region that are continuing to develop active transportation plans to enhance quality of life, livability and economic opportunity, through "increased multi-modal options for all people regardless of age or ability" (Genesee Transportation Council, 2016). The LRTP also identified that in order to promote healthier communities through active transportation, bicycling and walking options must be convenient and safe transportation choices. The plan cited improving bicycle and pedestrian infrastructure as "critical to improving access to employment and services for individuals without private vehicles and expanding mobility for persons with disabilities," with the stated results leading to the creation of healthier communities, which would reduce the overall public expenditures on medical care. Communities seen as needing special consideration and attention included children, seniors, individuals with disabilities and those without ownership or access to an automobile (Ibid p. 56).

Bike Share:

In Topeka, KS, implementing bike share in combination with infrastructure, policies, programs and community outreach and engagement was linked to producing beneficial health outcomes (Hoppe, 2015). A Zagster Inc. publication based on a pilot program in Carmel, IN reported that bike-sharing programs are on the rise across the nation because they offer economic and public-health benefits to communities (Zagster Inc., 2017). In one particular five-year span (2007-2012), the number of bike-sharing programs in the U.S. increased eightfold (Ketzleben, 2013). According to one report, the rapid expansion of bike share was attributed to the desire of both users and municipal leaders to increase mobility options, reduce traffic congestion and improve public health. Bike-share programs have also been linked to improved population levels of bicycling and overall improved physical activity (Shaheen, Guzman, & Zhang, 2010). Bike share contributes to small increases in physical activity among populations that are already physically active or that own a bicycle (Pucher, Buehler, Bassett, & Dannenberg, 2010) (Gordon-Larsen, et al., 2009) (Andersen, Schnohr, Schroll, & Hein, 2000) (Fuller, Gauvin, & Kestens, 2013) (Andersen, L. B., Schnohr, P., Schroll, M., & Hein, H. O. 2000).

According to Fuller et al., improved access to goods, services and activities that promote health have been correlated with engagement in healthy behaviors. The study reports that bike share may also provide access to resources or services such as employment, education, food stores or other opportunities for being physically active (Fuller, Gauvin, & Kestens, 2013). Meanwhile, a case study with Citi Bike in the Brooklyn, NYC Bedford Stuyvesant neighborhood recognized that bike share could be utilized to address health disparities in the community where obesity and diabetes rates were much higher than New York City-wide averages (New York City Department of Health, 2015). Finally, with regards to barriers to physical activity and safety perceptions, it should be noted that bike share has an extremely impressive safety record (Toole Design Group, SRF Associates, 2015). As of June 2017, two people have died nationally out of tens of millions of logged bike-share rides (Newhouse, 2017).

4.2 PHYSICAL ACTIVITY AND THE ROCHESTER BIKE SHARE

The Zagster Inc. bike-share project in Rochester added a total of 340 bikes with 46 bike-share stations crossing a total of 37 census tracts. The literature indicates that the addition of this resource and infrastructure provides the potential for increased physical activity throughout the City of Rochester. A study conducted by the New York State Department of Health indicated that bike share may have a positive health impact on both Monroe County and Rochester. The study identified that approximately 63 percent of Monroe County’s adult population is obese or overweight and that bike share could be useful tool in addressing obesity (New York State Department of Health, 2013-2015). To better understand the populations that may be utilizing these stations, we reviewed (BRFSS) results that indicate the overall levels of indicated physical activity across the city. “No Leisure Time Physical Activity” is defined by the following BRFSS survey question: “During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening or walking for exercise?” (Center for Disease Control and Prevention, 2011). The following map indicates the areas with the highest and lowest reported percentage of users who were able to participate in No Leisure Time Physical Activity.

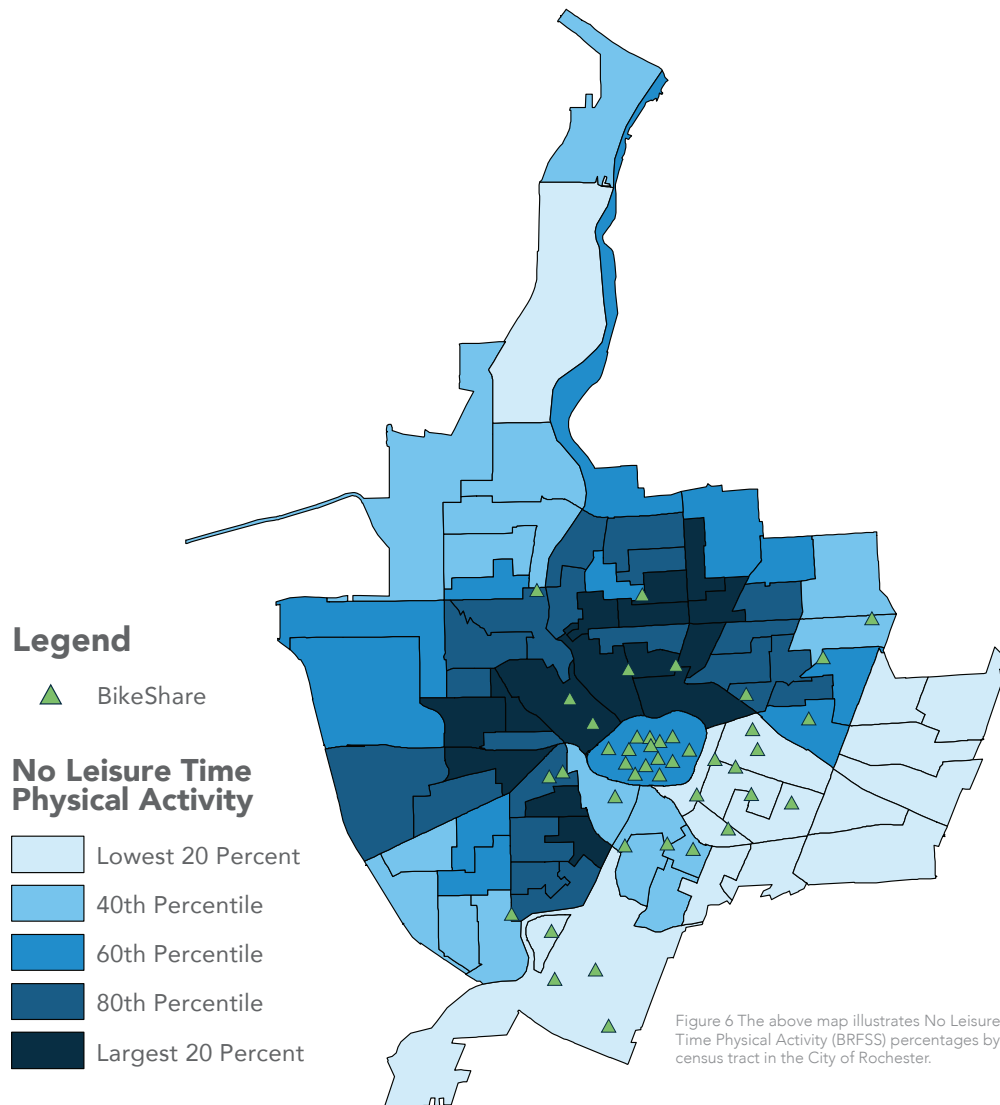


Figure 6 The above map illustrates No Leisure Time Physical Activity (BRFSS) percentages by census tract in the City of Rochester.

The chart below, provided by the Robert Wood Johnson Foundation, also indicates that the prevalence of active transportation leads to increased physical activity and indicates that, in countries where active transportation is not prevalent, obesity is documented at a higher rate. The chart shows that the U.S. is one of the lowest users of active transportation for commuting and that it has the highest recorded percentage of adults who are obese.

Countries with LOWER rates of obesity tend to have HIGHER rates of commuters who walk or bike to work.



ACTIVE COMMUTING AND OBESITY RATES BY COUNTRY

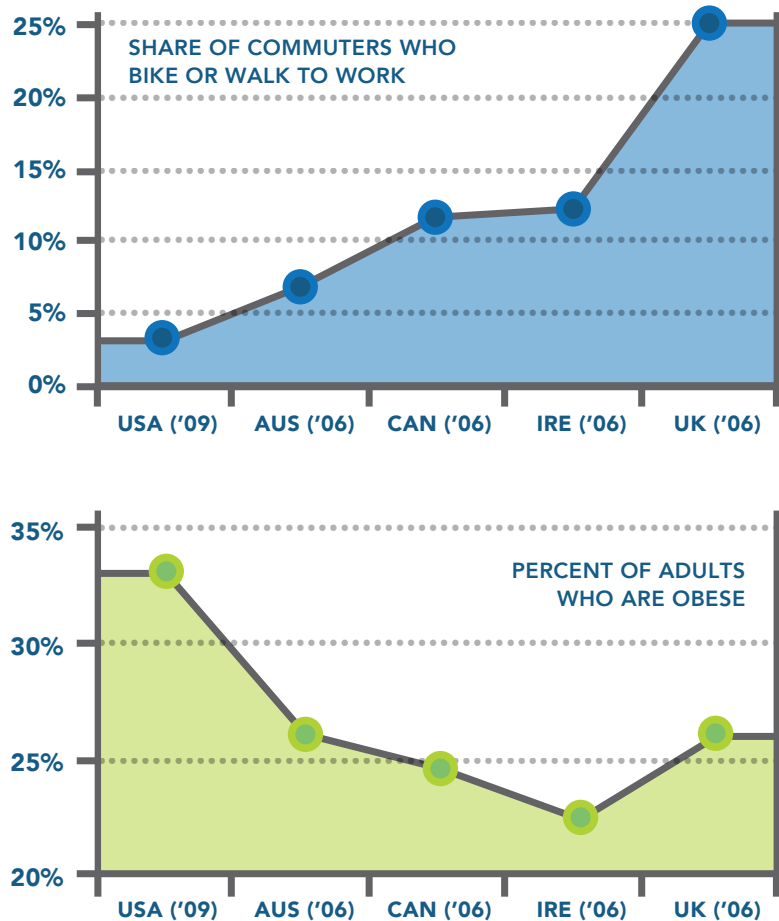


Figure 7 Commuting and obesity rate charts courtesy of Robert Wood Johnson Foundation.

4.2.3 Current Physical Activity Levels

The following map identifies areas of obesity prevalence and illustrates where the highest and lowest levels are found within the City of Rochester:

According to Active Living, links between regular physical activity and improved health have been established. Providing opportunities in urban areas for increased active transportation allows for increased physical activity. On a neighborhood scale, the bike share’s phasing and development will affect which neighborhoods have access to the program (Active Living Research, 2013). It is also important to note that some may be unable to utilize the bike share, ride a bicycle or engage in such physical activity because they lack ambulation - the ability to be mobile. In the Phase 1 area, there is an estimated total of 7,599 people who have a disability related to ambulation. Seventy-two percent of these individuals fall between the ages of 18 and 64, with the majority of them over the age of 34, and about 11 percent have an ambulatory disability. Without special modifications to the bike share, this population may be unable to engage in the program. However, Zagster Inc. has indicated that bikes accessible for people with disabilities may be introduced to the program as early as spring 2018.

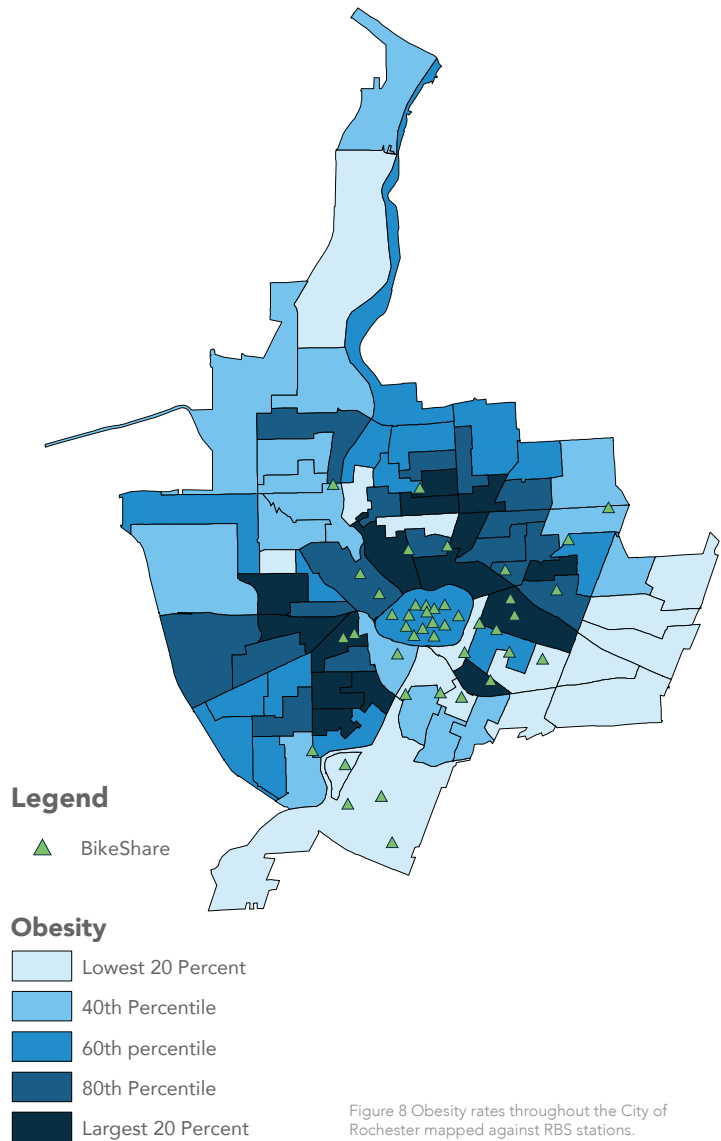


Figure 8 Obesity rates throughout the City of Rochester mapped against RBS stations.

As this report documents, Zagster Inc.’s bike share may limit availability/access to engage with the program and its correlated physical-activity benefits due to the limitations of its current payment requirements. As aforementioned in this report, the local Zagster Inc. bike-share program is dependent on smartphone and internet access. According to a 2014 survey conducted by PEW Research Center, only 50 percent of individuals with an income of less than \$30,000 per year own a smartphone (Smith, 2015). The pricing model rollout has differed substantially from what was initially proposed in the Rochester Area Bicycle Sharing Program Study, which suggested an \$85 annual fee or \$8 for 24-hour access. At the time of this report, Zagster Inc. does not include an annual membership option - and requires that a user has both a smartphone and credit card to utilize the program. The pricing model is currently set at \$1 per 30 minutes of usage. Those who cannot afford the bike share or do not have access to a credit card or smartphone will be unable to participate in the program, and they will be unable to benefit from improved physical activity levels (Zagster Inc., 2018).

As the literature reviewed for this HIA indicates, chronic disease may be directly correlated to issues of physical inactivity. In the Phase 1 area, there are a number of health concerns affecting individuals who could potentially use the bike share. The primary inpatient discharge diagnoses for men in the Phase 1 area is chronic ischemic heart disease and diastolic heart failure. For women, diastolic heart failure is the most common diagnosis outside of child birth or complications after pneumonia.

Populations with outlined conditions are based on ZIP codes that represent the majority of census tracts found in phase 1:

DISEASE	INPATIENT DISCHARGES	BED DAYS	AVERAGE LENGTH OF STAY
Asthma	394	1,383	3.51 days
Diabetes (Primary)	649	4,904	7.56 days
Hypertension (Primary)	227	1,145	5.04 days
Stroke	694	4,690	6.76 days
Heart Disease	2,444	14,270	5.84 days

* Statewide Planning and Research Cooperative System 2010-2014

Two other Rochester-based studies have sought to improve people's health outcomes through physical activity as it relates to bicycling in Rochester. The Rochester Bike Share Feasibility Study identifies the health benefits of cycling in helping to address preventable diseases such as obesity, heart disease and diabetes. It also links bike share to positive impacts on both physical and mental health.

The Rochester Bicycle Master Plan identifies long-range opportunities for improved bicycling infrastructure and services within the city. For the non-auto-owning population, and for those who choose to bicycle as a primary mode of transportation, safe and accessible bicycle facilities are of paramount concern. While the Plan covers many bicycling-related topics, its two main focus areas are a detailed evaluation of the city's existing on-street bicycle network and the creation of citywide recommendations to both enhance and promote bicycling in Rochester.

Finally, it should be noted that based on the smart-bicycle system Zagster Inc. utilizes, it is able to track the total amount of rides, distance and estimate calories burned. In Zagster Inc.'s first season, it documented an estimated total of almost 4 million burned calories (City of Rochester, 2018).

New Station Recommendations

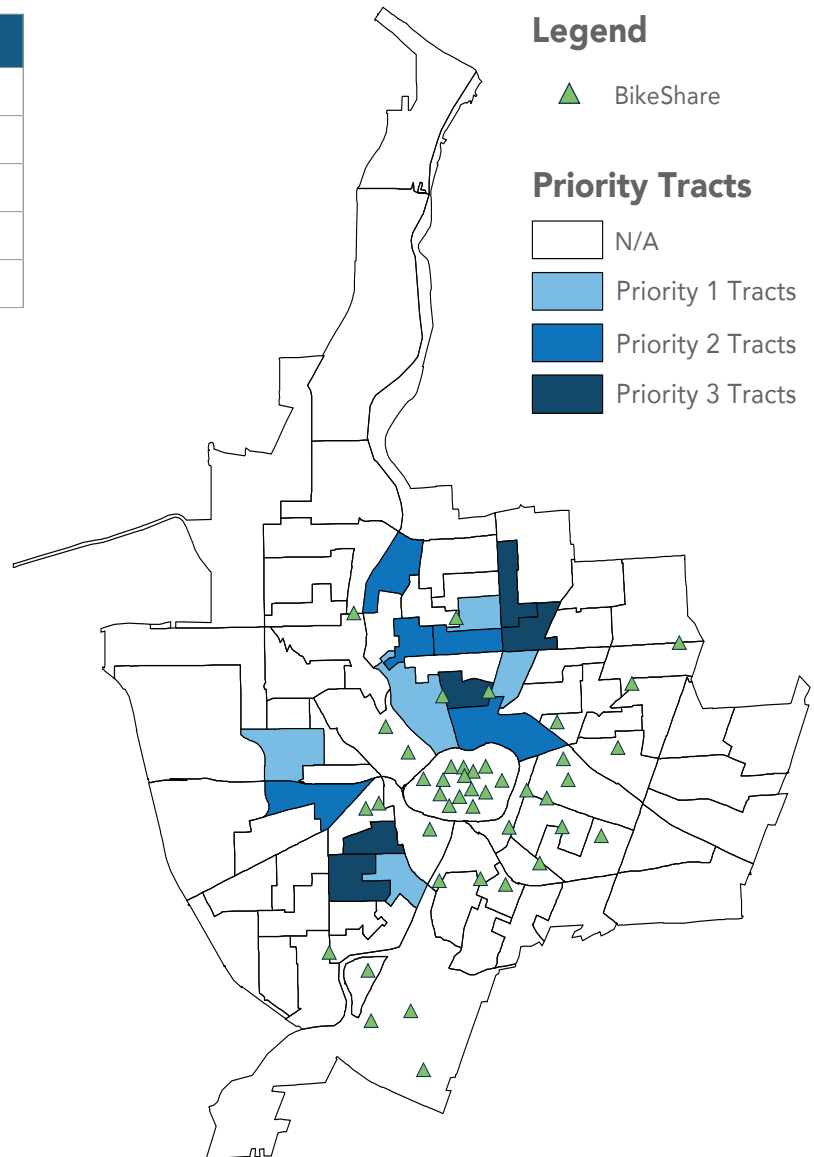
As a key element of this HIA, the data team sought to identify areas with pre-existing health disparities and determine if bike-share stations were placed in those areas. The analysis led to identifying a range of tracts with high levels of chronic disease that did not currently have bike-share stations placed within them. Based on the available census-tract-level data for the City of Rochester and available BRFSS Measures indicating health disparities, the following census tracts have been identified as having the greatest need for intervention to improve health outcomes. For additional context, this analysis has also been integrated within the Summary of Recommendations of this HIA.



Based on the collected and indexed data, and recognizing that organic growth alone may leave certain areas and populations behind, we recommend the following three tract tiers be prioritized for bike-share station placement.

For further rationale of our index and scoring, please see the Priority Tracts map and corresponding table below:

PRIORITY 1	PRIORITY 2	PRIORITY 3
Tract 65	Tract 96.02	Tract 27
Tract 92	Tract 52	Tract 80
Tract 49	Tract 50	Tract 64
Tract 15	Tract 93.01	Tract 79
Tract 96.03	Tract 46.02	Tract 13



Behavioral Risk Factor Surveillance System (BRFSS) Measures Used for Analysis

- Mental health not good for greater than 14 days among adults 18 years or older
- Chronic kidney disease among adults 18 years or older
- High cholesterol among adults 18 years or older
- Diagnosed diabetes among adults 18 years or older
- Chronic Obstructive Pulmonary Disease among adults 18 years or older
- Coronary heart disease among adults 18 years or older
- High blood pressure among adults 18 years or older
- Obesity among adults 18 years or older
- Lack of health insurance among adults 18 years or older
- Lack of leisure-time physical activity among adults 18 years or older

The stations were ranked according to the above BRFSS Measures data. Each measure relates to the health outcomes that we have identified as being impacted by the bike share and provides an idea of where potential stations could be placed and accessed to improve health outcomes. Each one was ranked on a 1-10 scale by equal intervals created by the max and min of each measure with 1 having the best outcome and 10 the worst. Scores were added together for all 10 measures for a maximum possible score of 100. Those with the highest score reflect the poorest health outcomes of each measure, while those with lower scores reflect better health outcomes for each measure. There was no scientific rationale for utilizing a scale of 1-10; however, based on the tracts researched and the collected range of the data, this approach enabled a ranked differentiation and assisted in identifying priority areas.

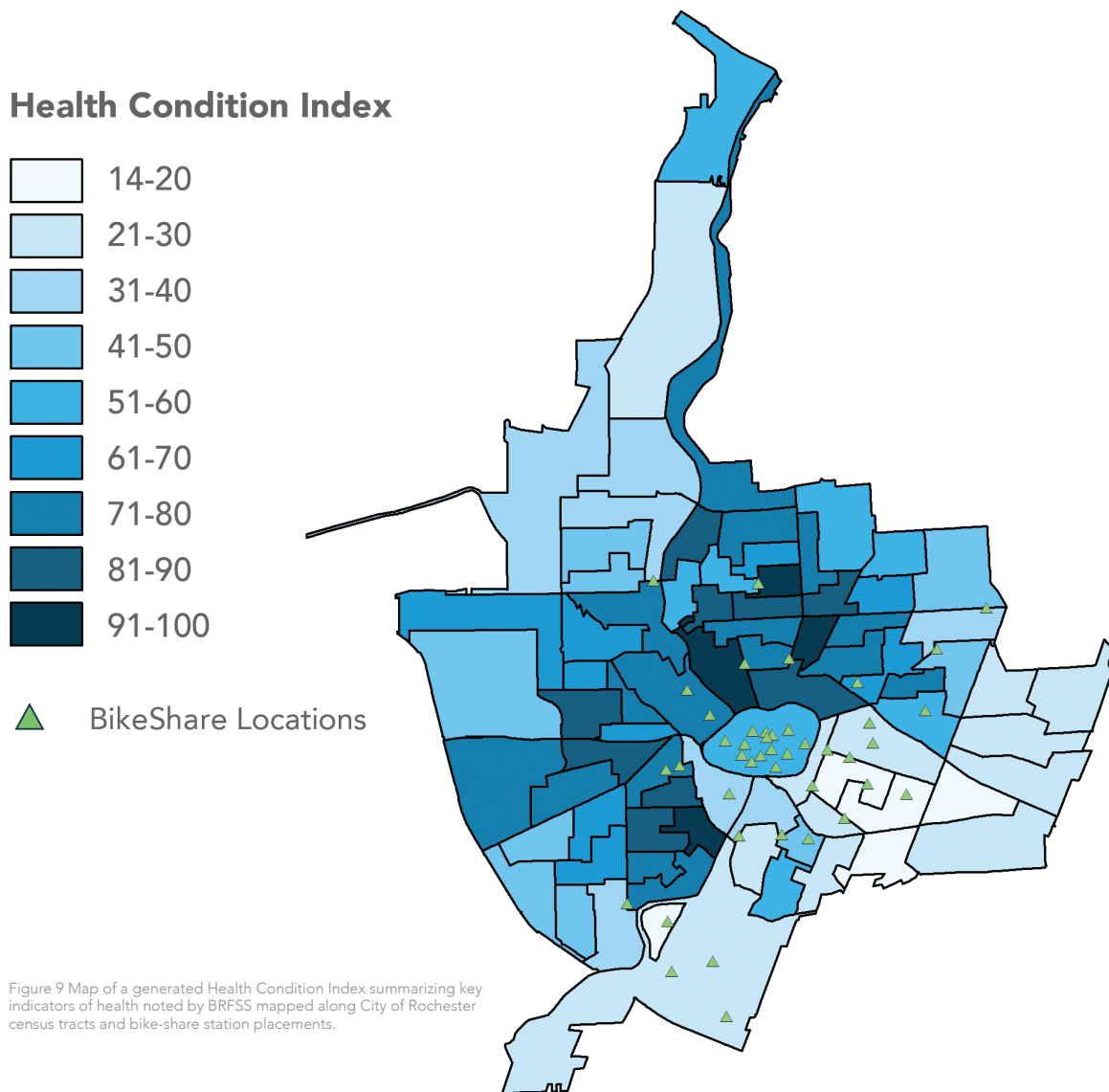


Figure 9 Map of a generated Health Condition Index summarizing key indicators of health noted by BRFSS mapped along City of Rochester census tracts and bike-share station placements.

4.3 PHYSICAL ACTIVITY RECOMMENDATIONS

Research further shows that chronic disease may be directly related to issues of physical inactivity, and a lack of physical activity is one of the leading risk factors for death in adults.

Conversely, increased physical activity can result in significant health benefits, such as reducing the risk of hypertension, coronary heart disease, stroke and various types of cancer. It also can improve self-image, self-esteem and mental wellness. Bicycling and walking, specifically, are associated with higher levels of physical activity and lower rates of obesity and diabetes.

Research for this HIA focused on identifying ways to potentially improve physical activity by improving the existing bike-share program. Based on the research and analysis, the following recommendations are proposed:

Physical Activity

Locate bike stations within 0.5 miles of community resources to improve health outcomes.

Specific Actions:

- Expand access to grocery stores, farmers markets, city parks, community centers, schools, and places of employment.

Encourage recreational cyclists, non-cyclists and pedestrians to be more physically active.

Specific Actions:

- Improve bicycle facilities/infrastructure including bike lanes and new station placement.
- Improving bicycle facilities may increase opportunities for physical activity.

Establish baseline conditions and physical activity goals for users.

Specific Actions:

- Integrate recorded data from Zagster Inc. on total minutes of physical activity per trip.

Locate and prioritize bike stations in city census tracts with high rates of chronic disease.

Specific Actions:

- **Priority 1:** Tracts 65, 92, 49, 15, 96.03
- **Priority 2:** Tracts 96.02, 52, 50, 93.01, 46.02
- **Priority 3:** Tracts 27, 80, 64, 79, 13



Section 5: Social Cohesion

5.1 SOCIAL COHESION AND HEALTH LITERATURE REVIEW

Social cohesion has been described as “the willingness of members of a society to cooperate with each other in order to survive and prosper” (Stanley, 2003). In an article published by the United Nations, social cohesion was stated as being the “glue that holds society together.” Societies with strong social cohesion help to protect people against life risks, have trust among neighbors and governmental institutions, and “work towards a better future for themselves and their families.” In addition, greater inclusiveness, more civic participation and creating opportunities for upward mobility were all cited as contributing factors to a socially cohesive society (United Nations Department of Economic and Social Affairs, 2012). Strong social environments have consistently been shown to impart significant health benefits across a range of health outcomes according to multiple studies (Berkman & Kawachi, 2000) (Sullivan, Kuo, & Depooter, 2004). In fact, some studies have prioritized socioeconomic factors over built-environment factors in the overall determination of an individual’s engagement of physical activity (Garrow, Meyer, Ross, & Bodea, 2006).

Communities with greater levels of social cohesion - along with participation in community activities, public affairs and community groups - have better health outcomes than those communities with low levels of social cohesion (Marmot, Michael, & Wilkinson, 2009) (Sampson, 2003). Other research has also examined strong linkages to the built environment and its effect on building social cohesion (Ewing & Kreutzer, 2006). People who are isolated and not integrated within social, political or economic “networks,” have increased risk of both poor physical and mental health (Kawachi, 1999) (Hawe, King, Noort, Jordens, & Lloyd, 2000). Negative “psychological” risk factors such as social isolation and stress can harm health, leading to stress and increased risk of heart disease, mental health problems and premature mortality (Berkman & Kawachi, 2000) (Kawachi & Kennedy, 1997). Residents of high-poverty neighborhoods have also been linked to low social cohesion and increased chronic stress (Steptoe & Feldman, 2001). Neighborhoods with strong social networks have also been linked to fostering healthy behaviors by better informing the community about available health-care services and establishing and communicating acceptable behavior, particularly related to lifestyle choices such as smoking, drinking and diet (Ellen, Mijanovich, & Dillman, 2001). Communities that are highly cohesive have even been shown to reduce incidents of violent crime (Ewing & Kreutzer, 2006) (Adler & Newman, 2002).

In creating active-living communities, one of the most powerful interventions in public health is to enable the community’s accessibility to engaging in physical activity by ensuring that communities offer safe, attractive and convenient places to be engaged with. There is a need to create motivational and educational programs to ultimately encourage the use of those places (Sallis, et al., 2006). The town of Davidson, NC conducted a Health Impact Assessment of their community and deemed that accessibility was a “crucial component” to promoting health equity and a healthy community (Town of Davidson, North Carolina, 2013). According to the Rochester Area Bike Sharing Program Study, cities across the U.S. are looking for effective ways to encourage active transportation and promote the benefits of walking and bicycling. Bike share has proven to be one of the most effective, efficient and affordable methods of introducing new riders to bicycling, fostering further investment in health-promoting active transportation (Toole Design Group, SRF Associates, 2015).

The United States Department of Transportation has also stated that promoting bicycle travel for utilitarian purposes is one of the main objectives of the National Bicycling and Walking Study. The study identified a goal to double the share of trips taken by active- transportation options (including bicycling or walking). Survey results also indicated that Americans would walk or ride a bicycle to work, or for errands, if it was safe and convenient to do so (United States Department of Transportation - Federal Highway Administration, 1994). Studies have found that there is a need to educate commuters about bicycling as an active transportation option and that bike infrastructure needs to connect to popular locations and destinations to be successful (Dill & Carr, 2003). The Rochester Bicycle Master Plan indicated that the most-received public comments focused on educating roadway users of both bicyclists and motorists, about the “rules of the road” and safe-bicycling habits for riders, while promoting bicycling as an active-transportation option throughout the community (Sprinkle Consulting, 2011, p. 63).

Research has also indicated that the higher number of bicyclists on the road makes cyclists more visible to motorists (Jacobsen, 2003). In Atlanta, GA, bicycle use was found to be lower where bike-share sites have been located in areas of lower density, in both population density and the number of accessible destinations. Sites located within range of the highest density of community resources likely will be used the most (Ross, 2007, p. 13). Another study indicated that, in order for the community to engage bike share over other modes of transportation and ensure higher rates of use and support the health of potential bike share riders, bike stations must be positioned densely enough for a person to walk between them (Freemark, 2010). Lanvin et al. discovered that higher-density neighborhoods generally have higher rates of physical activity (Lanvin, Higgins, Metcalfe, & Jordan, 2006). However, density is only one factor of many with demographic characteristics; low-income households must also be considered (Ewing & Kreutzer, 2006).

The Rochester Area Bike Sharing Program Study also highlighted several examples of community-building benefits that have occurred from bike-share programs across the nation. In the state of Minnesota, 95 percent of Nice Ride Minnesota users surveyed indicated that they believed bike share had made their city a “more enjoyable place to live (Nice Ride Minnesota, 2011). Eighty-five percent of those surveyed from Capital Bikeshare in Washington D.C. reported that bike share made it easier and faster to navigate the area (Capital Bikeshare , 2013). Here in Rochester, the program study indicated that bike share could help connect city neighborhoods that are currently isolated and that it could be a positive addition to existing transportation options (Toole Design Group, SRF Associates, 2015, p. 11). In New York City, the bike-share stations became places where the community began meeting and gathering, and where relationships were formed (New York City Department of City Planning, 2009).

To accomplish their goals and reflect the value of the community, bike share programs across the country have championed the idea of having a collaborative and inclusive process when planning the development of bike-share stations. In Rochester, for example, the Rochester Bicycle Master Plan cited that the City of Rochester should seek partnerships that provide the ability to distribute educational materials that “bridge cultural boundaries” and promote bicycling in underserved communities. Several hypothetical examples were designed to increase the social engagement and cohesion around cycling in Rochester, including reaching out to partners such as RocCity Coalition to locate volunteers for bicycle rodeos and bicycle-repair programs, and to promote bicycling to young adults. Another example included working with the Strong Museum of Play to promote bicycling among children and families. The City of Rochester Department of Recreational and Youth Services and Monroe County Office of Traffic Safety were also seen as entities that could promote educational material and promote overall cycling initiatives across the city. Educational focus was seen primarily as being health-promoting and traffic-safety oriented, and it included details like educating on bicycling in the evening, helmet usage and winter cycling (Sprinkle Consulting, 2011, p. 64).



A HIA on Atlanta's Bike Share indicated social cohesion protocols in its community outreach phase of the official program launch and operations. These protocols stated that engaging the public may give community members who are experiencing health disparities a voice in the bike share planning, implementation and evaluation processes. Community involvement was seen as impacting the policy and decision-making aspects of the bike share, while also empowering its potential or realized bike share members to take ownership of their individual health and the community's health as a whole (Ross, 2007, p. 9). The Health Impact Assessment ultimately recommended that health-disparate populations be involved in the planning process and that meetings be hosted in low-income areas to solicit feedback from vulnerable populations. Ideas to increase social cohesion and overall engagement with the bike share included hosting classes in neighborhoods across Atlanta that covered topics that described the linkages of bike share to individual's health and overall well-being (Ross, 2007, p. 11).

5.2 SOCIAL COHESION AND THE RBS

5.2.1 Current trends in Social Cohesion

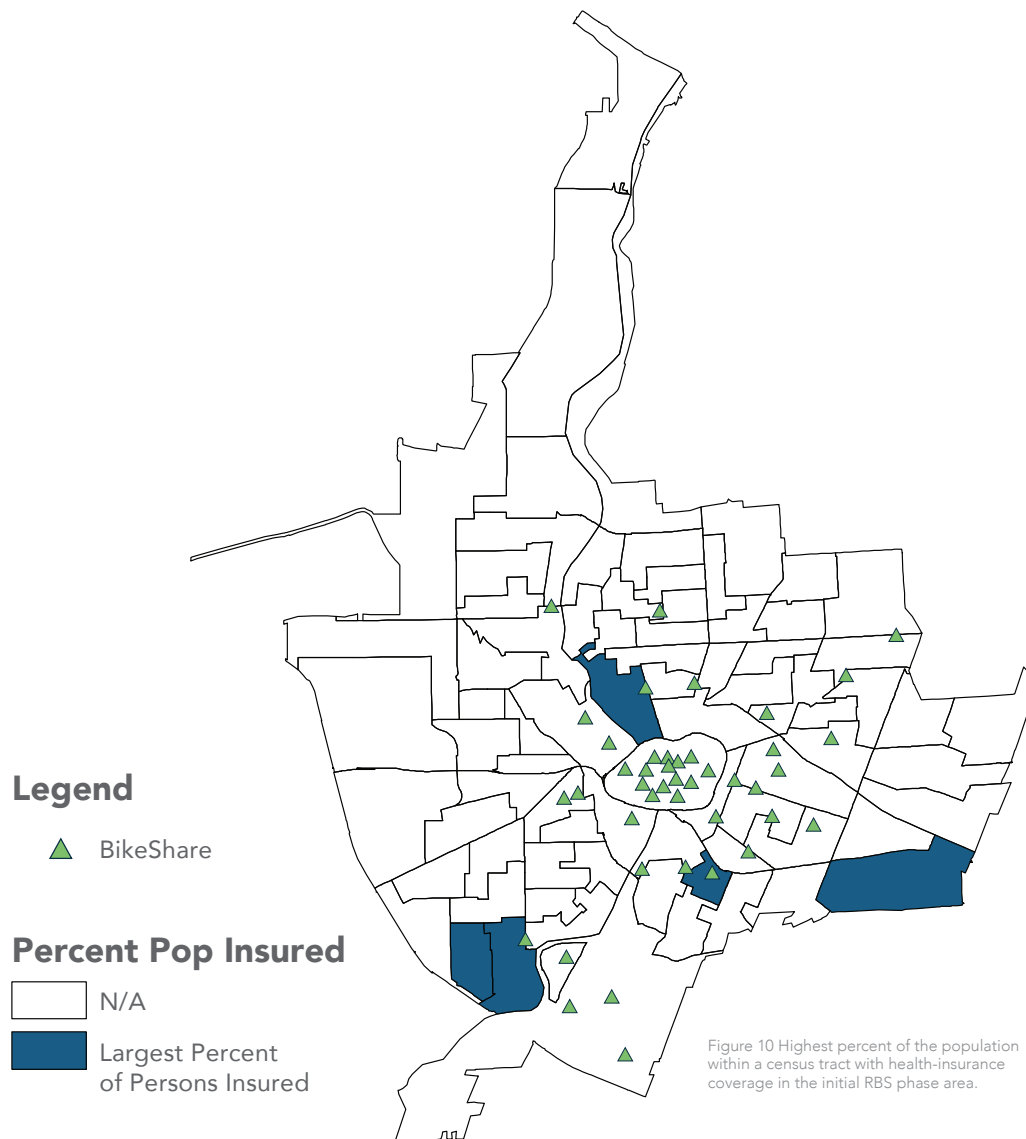
To assess the current trends in social cohesion, we have studied various characteristics of the neighborhoods in the Phase 1 area including, but not limited to, health-insurance and housing-occupancy rates. Studies have illustrated that access to health insurance can help hold a community together socially, and lack of it can contribute to the fraying of neighborhood cohesion (McKay & Timmermans, 2017). While another study indicated that those who were home owners had high rates of social cohesion, renting (of any type) was negatively associated with most of the variables indicating social connectedness at a neighborhood level. Those variables included attachment to area, neighborhood trust and cooperation, shared neighborhood and identification with local area, compared with home owners/purchasers. Vacant and dilapidated homes were also identified as contributing to a feeling of negative social cohesion (Stone & Hulse, 2007).

Health Insurance Rates

In the Phase 1 area, there are a total of 69,853 people over the age of 18 who have health insurance, or 85.79 percent of the total Phase 1 population. That means that roughly 10,413 people, or 15 percent of the Phase 1 population, are not insured - almost one out of every six persons. To better display the data, we have provided a map of percent uninsured people within the City of Rochester.

The corresponding information below the map details the findings of the analysis.

The tract with the most insured persons is the tract that includes the University of Rochester (tract 38.05), which has a total of 97.4 percent insured. This rate may be linked to a student population that may have insurance from their parents or through the university. However, the largest groups of insured individuals are found in tracts 31, 29, 20, 94, and 10. Each tract has a total of 3,926 (76.17 percent), 3,300 (84.25 percent), 3,074 (88.05 percent), 2,868 (71.97 percent), and 2,677 (80.71 percent) persons, respectively. In the Phase 1 area, there are a total of 9,410 individuals between the ages



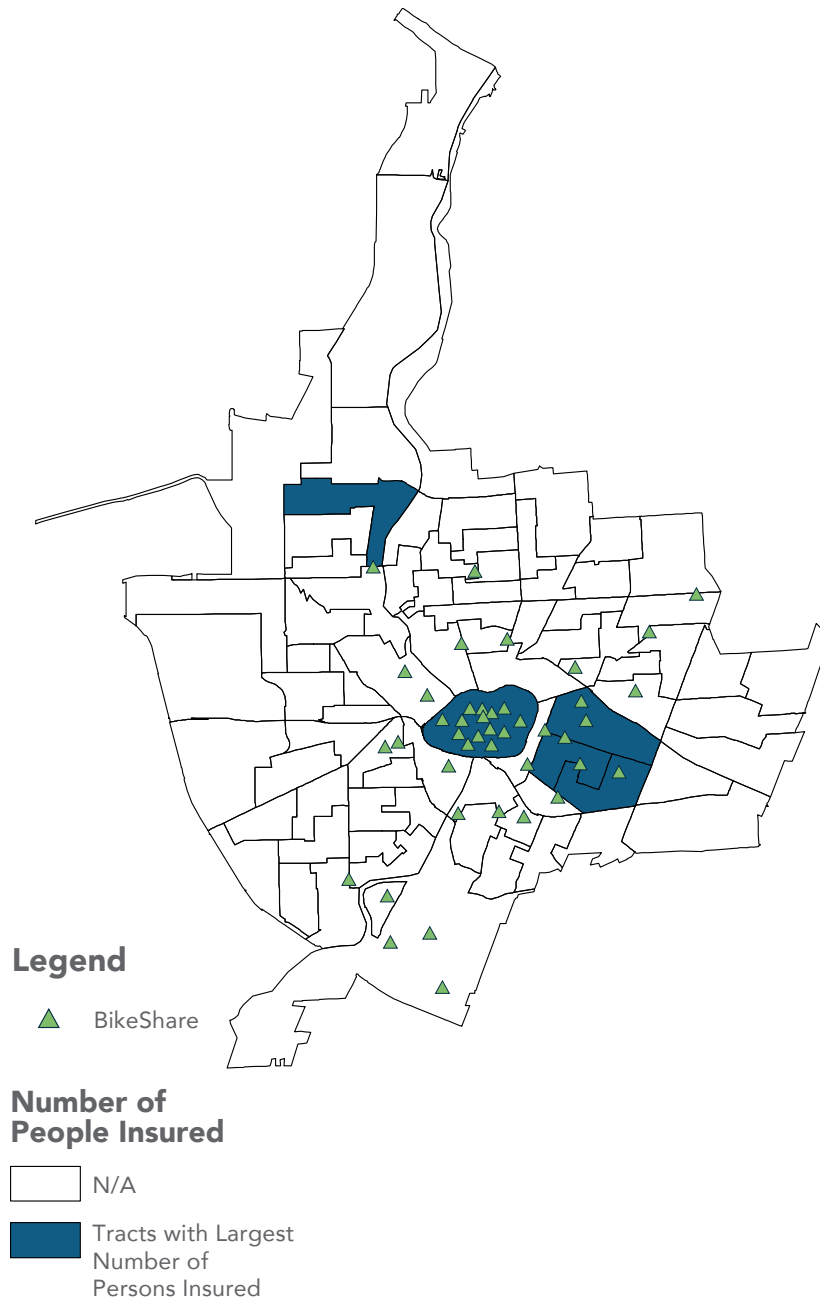


Figure 11 Highest number of people within a census tract with health-insurance coverage in the initial RBS phase area.

of 18 and 64 who are not insured. Thirteen percent of the Phase 1 population falls in this age bracket. We see that there is a higher likelihood of not having insurance in the younger population. Of those between the ages of 18 and 34, there are a total of 5,737 individuals who are not insured. Almost 1 in 6 persons in this age range do not have health insurance.

It should also be noted that there is not a clear relationship between the amount of money that a person makes and his or her insurance status. Those living in the lowest income bracket, under \$25,000 per year, have the second-highest percentage of insurance, at 90.43 percent. The highest percentage of insured individuals is found in the highest income bracket, those making more than \$100,000 annually.

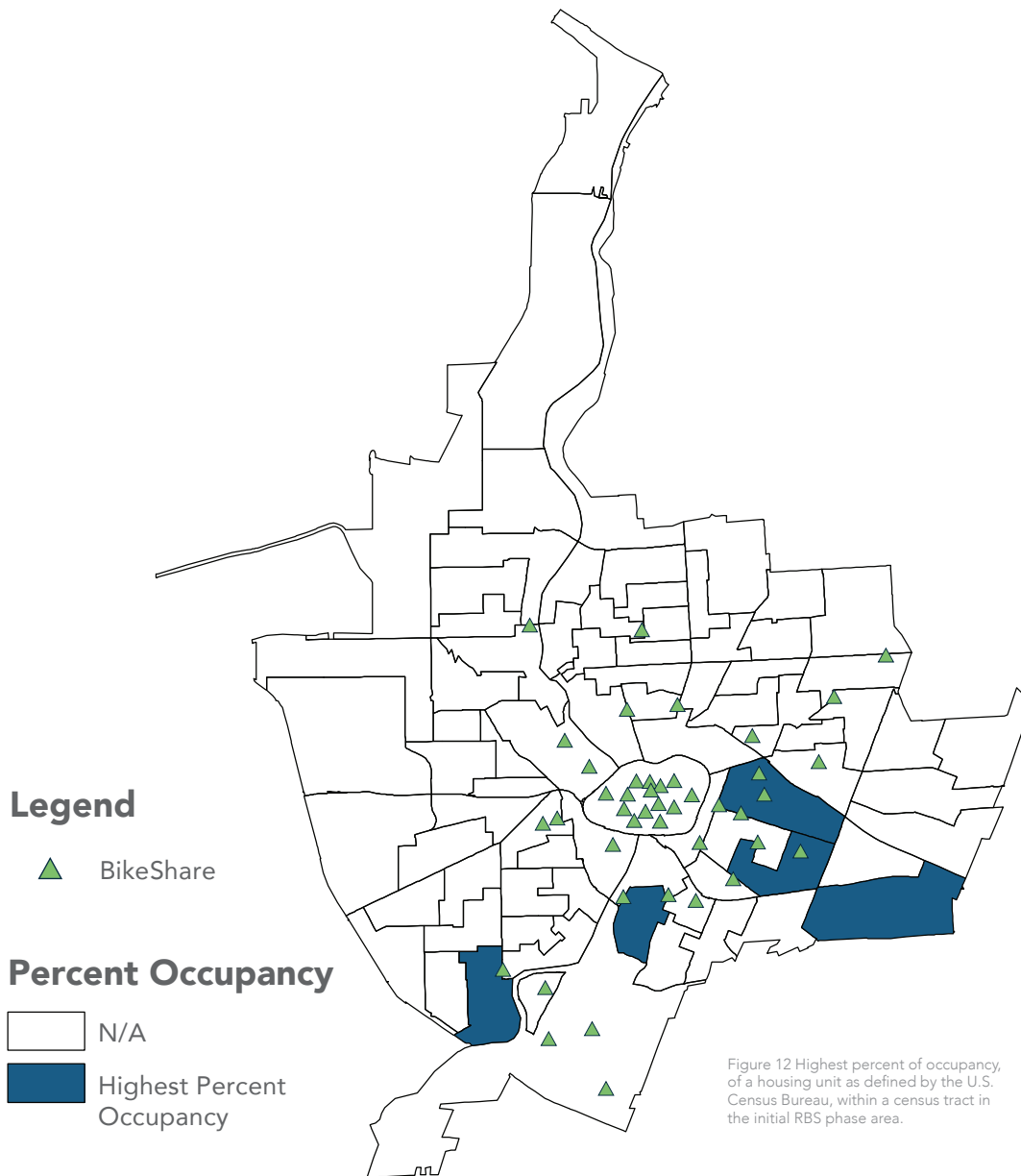
Occupied Housing

There are a total of 49,212 housing units in the Phase 1 area. A housing unit is defined as “a house, an apartment, a mobile home, a group of rooms or a single room that is occupied (or, if vacant, intended for occupancy) as separate living quarters” (United States Census Bureau, 1999). These units are found in 36 of the 37 tracts. Tract 38.05, which includes the University of Rochester, does not contain housing units by definition.

The tracts that have the highest percentage of occupancy are tracts 31 (97.02 percent), 34 (95.27 percent), 78.02 (94.4 percent), 10 (93.57 percent), and 70 (93.07 percent). In the Phase 1 area, there are a total of 29,939 rented units. This is almost 70 percent of units in this area.

Vacancy Rates

Vacancy rates represents the unoccupied housing units that are currently offered for rent or for sale. As the research indicates, high vacancy rates are attributed to negative social cohesion effects, which may limit physical activity levels. Further information on the criteria of how vacancy rates are calculated are available through the American Community Survey (Social Explorer, 2012). The tracts with the largest number of vacancies are tracts 15 (32.73 percent), 96.01 (26.65 percent), 59



(25.78 percent), 23 (24.1 percent), and 94 (23.14 percent). The area with the highest number of vacant housing is the tract found in the center of the Phase 1 area, in tract 94. In this area, the vacancy rate is 17.4 per 100 persons. In 32 tracts of the Phase 1 area, there are some amount of vacancies. These tracts in the Phase 1 area have rates that fall between 17.4 to 1.4 per 100 persons, while the median vacancy rate for this area is 6.4 per 100 persons.

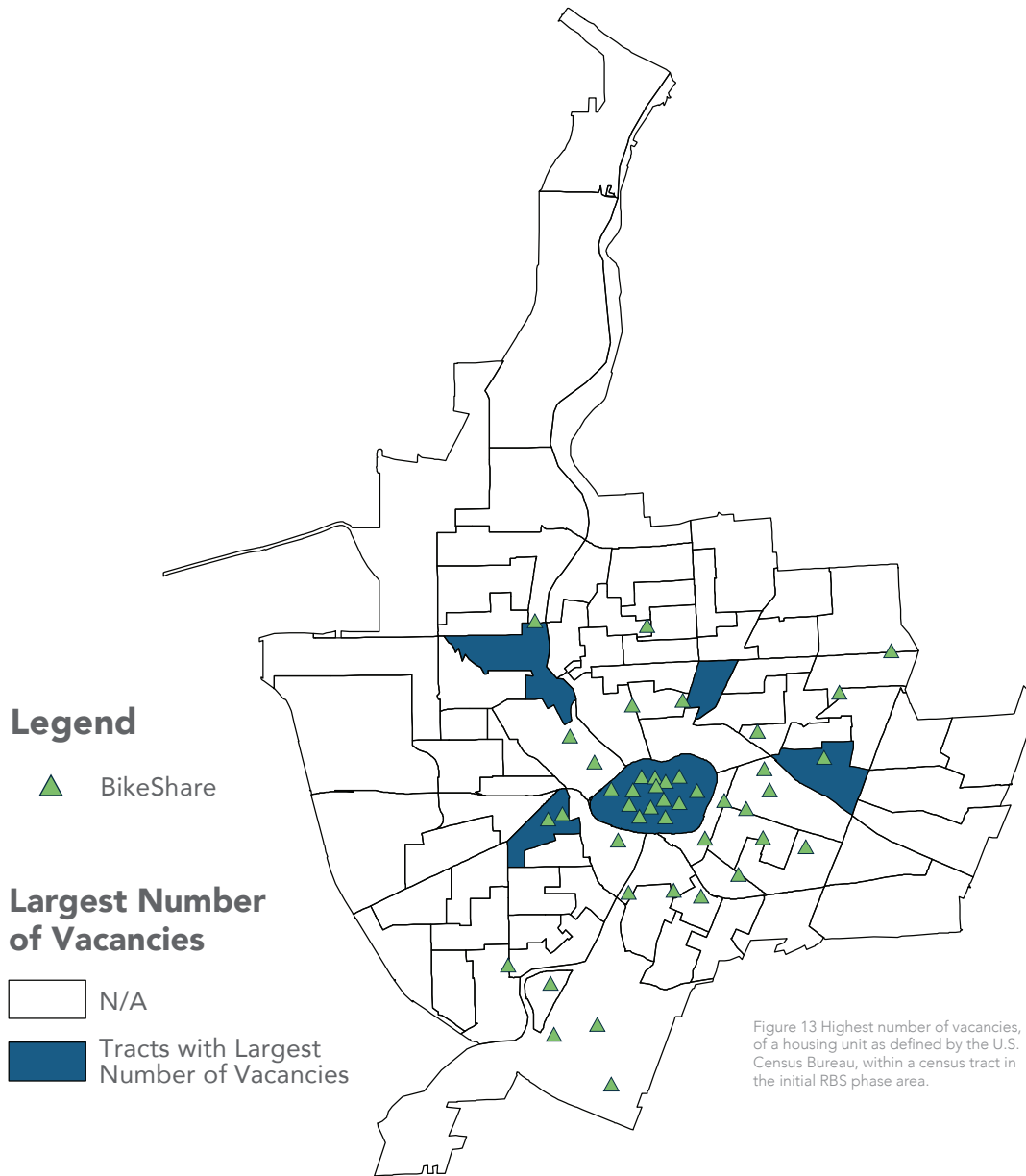


Figure 13 Highest number of vacancies, of a housing unit as defined by the U.S. Census Bureau, within a census tract in the initial RBS phase area.

5.2.2. Existing Programs Related to Social Cohesion

Promotion and programming are core methods to increase social cohesion. We are currently aware of several organizations and existing programs that the Rochester Bike Share is benefiting from to encourage the overall engagement of bicycling and bike share in the City of Rochester. The organizations and their related programming initiatives are as follows:

Conkey Cruisers “Voyage Vision”- Neighbors will inspire neighbors to stay active, make healthy food choices, decrease obesity rates and create a positive image of their neighborhood. Conkey Cruisers serves populations between the ages of 2-55 in the 14621 neighborhoods/El Camino Trail.

R Community Bikes (RCB) is a grassroots, 501(c)3 organization, staffed entirely by volunteers, that collects and repairs used bicycles for distribution, free of charge, to Rochester’s most needy children and adults. It gives away more than 2,000 bicycles every year and conducts more than 3,000 repairs for its clients, many of whom depend on bicycles as their main source of transportation. R Community Bikes serves all ages and is headquartered at 226 Hudson Ave. in Rochester (14605), with satellite stations at the following locations:

- St Joseph’s House-Hospitality (14620)
- Cameron Community Ministries (14606)
- Westside Farmers Market
- St. Monica Church (14611)
- Asbury First United Methodist Church (14607)

Reconnect Rochester is a 501(c)3, non-profit. Whether by bus, by rail, on bike, or on foot, Reconnect Rochester champions transportation choices that enable a more vibrant and equitable community. It envisions a community connected by a robust transportation network that makes it easy for everyone—regardless of physical or economic ability—to get around.

The **Rochester Bicycling Club** is Rochester’s recreational cycling source dedicated to promoting cycling for sport, recreation, health and transportation.

Rochester Cycling Alliance - The mission of the Rochester Cycling Alliance is to bring together cycling enthusiasts and cycling clubs in the Rochester metropolitan region. It currently serves residents of all ages to achieve several objectives, including promoting the use of bicycles for transportation, sport, recreation and health; fostering the development of cycling roads and trails; facilitating the exchange of information on bicycle safety, active transportation and cycling in general; and providing input on government activities and legislation affecting cycling.

5.3 Social Cohesion Recommendations

For this HIA, researchers looked at factors affecting social and neighborhood connectedness, including health-insurance rates, occupied housing, home-vacancy rates and existing programs designed to encourage the overall engagement of bicycling and bike share.

Studies revealed that a lack of health insurance can contribute to the fraying of neighborhood cohesion. In addition, those who were home owners had high rates of social cohesion, while renting had a more negative impact on social connectedness at a neighborhood level.

Based on the research and analysis, the following recommendations are proposed:

Social Cohesion

Encourage face-to-face communication and education around the Bike Share.

Specific Actions:

- Empower ambassadors/advocates of RBS at a neighborhood/census tract level
- Offer training courses through the City of Rochester or community partners to educate new users on how to utilize the bike share system.
- Educate on NYSDMV safety policy and advocate that material on cyclists and bike share be included in driver safety material.

Maximize communication on RBS health impacts, especially with vulnerable populations.

Specific Actions:

- Develop strong relationships with health based employers in the area.
- Produce incentive-based promotional events through Zagster Inc. and local businesses to encourage the public to ride.

Increase overall social connectedness to the Bike Share.

Specific Actions:

- Connect bicycle paths and transit lines and streets via sidewalks.
- Enhance connection between neighborhood destinations. Make active transportation modes (walk, biking) easier to engage.

Create an annual ridership survey on ridership demographics and to survey non-riders.

Specific Actions:

- Use survey data to investigate barriers that hinder engagement with the RBS, especially among vulnerable populations.

Determine where to locate future bike share stations.

Specific Actions:

- Prioritize locations by health disparities or other barriers to access associated including: chronic disease rates; low SES; lack of access to reliable transportation; ethnicity; age; proximity to community resources/transit stops.

Ensure station placement maximizes safe locations and provides user guidance

Specific Actions:

- Support station placement in areas with high visibility.
- Increase wayfinding signage to guide cyclists, increase engagement of riders, and mitigate the potential of getting lost.
- Provide signage at stations with proximity to nearby destinations, including cultural institutions, parks, and markets and area neighborhoods.

Section 6: Economic Benefit and Equitable Access

6.1 ECONOMIC BENEFIT AND EQUITABLE ACCESS LITERATURE REVIEW

Economic Benefit

The effects of active transportation and, particularly, cycling have demonstrated economic benefits of both personal-cost savings and an overall economic impact on the community. The Rochester Area Bike Sharing Program Study identified that bike share may offer economic benefits at a community, business or individual level. In the summary of economic benefits, the study identified that a community-level bike share may attract or retain workforce talent and enable visitors to better engage or experience the city. Business economic benefit was tied to studies that indicated that bike-share riders spend more money at local businesses, while individual economic benefits focused on the reduction of the overall transportation and health-care costs (Toole Design Group, SRF Associates, 2015, p. 12). Further research has demonstrated that the initial investment of upfront costs towards active-transportation infrastructure can be overcome by the projected benefit-cost ratios of projects that link economic benefits to health including the cost benefits of avoided disease and premature mortality (Mansfield & Gibson, 2015).

In a Health Impact Assessment of a bicycle path in Dublin, Ireland, for example, it was demonstrated that the estimated benefit-cost ratio had as high a return as 2.2-11.8 times beyond the initial dollar amount spent (Deenihan & Caulfield, 2014). In Portland, OR, planned investments in bicycle infrastructure throughout the city estimated economic benefits from the corresponding increase in physical activity at a benefit-cost ratio ranging from 20 to 53 times beyond the initial infrastructure expenditure per dollar (Gotschi, 2011). Braveman et al. also identified that improving the health of communities also may contribute to overall economic development (Braveman & Egerter, 2013). Studies have continued to build strong evidence that built-environment improvements meaningfully impact health outcomes and often yield economic benefits (Mansfield & Gibson, 2015). Those who remain physically active also require less-costly medical care (Lubitz, Cai, Kramarow, & Lentzner, 2003).

When identifying the economic benefits of bike share to individuals, reduced household expenditure on transportation and health care was cited as positive examples and anticipated outcomes for individuals in Rochester based on the creation of a bike share program. The Rochester Area Bike Share Program Study also identified that the U.S. Department of Labor has reported that 22 percent of annual-average household expenditure is on transportation in the U.S. (or roughly \$800 per year). Bike share was reported as being one way to save on personal-transportation costs, with most programs costing between \$50 and \$100 per year to operate (at the time of this report Zagster Inc. has yet to offer an annual option so accurate comparisons could not be made on a local level). The transportation cost in comparison to automobile ownership, however, does not represent the same financial responsibility. According to the American Automobile Association (AAA), for vehicles driven 15,000 miles a year, average ownership costs added up to approximately \$706 a month or \$8,469 a year in 2017 (U.S. Department of Labor, 2010) (Reed & Arata, 2017) (Toole Design Group, SRF Associates, 2015, p. 19). Another study puts those

numbers at an even higher number of total household expenditure, according to an article published by Policy Link and the Prevention Institute. U.S. households earning \$20,000 to \$35,000, and living far from employment centers, spend on average 37 percent of their income on transportation. According to the report, this takes away from income available for food and health care, among other expenses (Prevention Institute, 2009). According to U.S. Census data, the City of Rochester has a per-capita income of approximately \$18,000, well below the national average, making a lack of choice regarding transportation options a factor that impacts quality of life for many of its residents (Genesee Transportation Council, 2016, p. 72).

Numerous studies have also examined the linkages to bike share and cyclists' abilities to benefit local businesses and the economy. Research has suggested those who cycle typically spend money at higher levels than those who drive. According to Clifton et al., though bicycle users spent less per trip than automobile users in the results of the study, they comprised frequent store visits per person and "made up a larger share of overall per-person spending" (Clifton, Morrissey, & Ritter, 2012). A study of the Bloor Street commercial corridor in Toronto, Canada showed that people who either biked or walked to the area spent more money than those who drove on a monthly basis (Flusche, 2012). Among businesses along Victoria Street in San Francisco, a 60-percent increase in sales occurred due to the installation of a new bike lane (Smart Growth America, 2012). In Portland, OR, bike corrals offering on-street bike parking were considered to be a "pro-business amenity." Local businesses indicated that they felt the facilities enhanced the street and neighborhood identity and increased the visibility of the businesses from the street (Flusche, 2012). In Washington, D.C., Capital Bike Share conducted a survey that showed that 73 percent of users indicated that they used the bike share as a faster way to get to their destination, and 25 percent indicated that they use the bike share to save money (Capital Bikeshare, 2013, p. 13). The survey also found that bike-share users traveled to spending destinations and that spending would typically occur within four blocks of the bicycle station. Half of those surveyed said they planned to return to the neighborhood (to spend) on a daily or weekly basis, indicating repeated economic impact (Capital Bikeshare, 2013) (Capital Bikeshare, 2013, p. 25). The impact of Capital Bikeshare in the Dupont Circle neighborhood of Washington, D.C. indicated that 11 percent of businesses observed an increase in daily traffic and 13 percent perceived a positive impact on sales (Losapio, 2013). Another study on those users found that 66 percent of users reported traveling to spending destinations, and of those, 63 percent planned on spending between \$10-\$49 (Buehler & Hamre, 2013). This led the Metropolitan Washington Council of Governments to conclude that cycling investments make "good economic sense as a cost-effective way to enhance shopping districts and communities, generate tourism and support business."

The Rochester Area Bike Share Program Study also identified increased sales at local businesses. It referenced a case study of the Nice Ride Minnesota bike-share system in Minneapolis, which identified that bike-share users spent an additional \$150,000 at local businesses "over the course of one bike share season compared to the year before bike share was implemented" (Nice Ride Minnesota, 2011). The Rochester Area Bike Sharing Program Study identified sponsorships and promotions as strategies to increase economic benefits within the local business community and targeted the potential impact of the health-care industry sponsoring components of a bike-share system through free/discounted memberships as a "wellness strategy" (Toole Design Group, SRF Associates, 2015, pp. 12-13). Richter et al. indicated that adding health as a key rationale for community development may raise overall public interest (Richter, 2009) while Fleming et al (Fleming, Karasz, & Wysen, 2011) found that stimulating greater community engagement may attract investment from hospitals and health-focused foundations. Of seven U.S. bike share programs with information on user trip characteristics, the most popular reasons given for using the bike share included commuting to and from work, biking to a restaurant or other meal destination, running errands and biking to entertainment (Hoppe, 2015, p. 20).

Equitable Access

Numerous studies have illustrated the challenge of living within poverty and its related effects on health. Socioeconomic status is the result of multiple variables such as educational level, occupation and income. Higher income has been correlated to better health outcomes, while there is evidence of increased risks for mortality, morbidity and unhealthy behaviors for those with lower incomes (Lindahl, 2005) (Rehkopf, Berkman, Coull, & Krieger, 2008). Extensive research shows that low-income and minority neighborhoods are more likely to experience harmful conditions and to lack health-promoting conditions (UCSF Center on Social Disparities in Health; Robert Wood Johnson Foundation; Build Healthy Places Network, 2005). Bhatia et al. found that residents of high-poverty neighborhoods live, on average, eight years less than residents of more affluent neighborhoods (Bhatia, Rivard, & Seto, 2006). Individuals with average-annual incomes of \$15,000 to \$20,000 are three times more likely to die prematurely than those from families with incomes greater than \$70,000 (Yen & Bhatia, 2002). Drewnowski et al. found that there is a higher prevalence of obesity and type II diabetes among those with the lowest levels of income and education (Drewnowski, 2009). Residents of low-income neighborhoods are less likely to report favorable neighborhood appearance, pedestrian/biking facilities, safety from traffic and crime, and access to recreation facilities than residents of higher-income areas (Sallis, et al., 2011). This may explain why individuals who lived in the most socioeconomically disadvantaged neighborhoods based on income, education and occupational status were more likely to develop heart disease than individuals who were socioeconomically similar, but who lived in the most “advantaged neighborhoods” (Marmot, Rose, Shipley, & Hamilton, 1978) (Kaplan, Haan, Syme, Minkler, & Winkleby, 1987) (Diex-Roux, et al., 2001). According to Sallis et al., residents of low-income neighborhoods are less likely to report satisfactory pedestrian/biking facilities, safety from traffic and crime, and access to recreational facilities than residents of higher-income areas (Sallis, et al., 2011).

Conditions in high-poverty neighborhoods have also been proven to lead to factors which may damage health, including dangerous streets, pervasive advertising that promotes harmful substances, limited options for healthy food and safe leisure physical activity, as well as fewer opportunities for education and high-quality employment (UCSF Center on Social Disparities in Health; Robert Wood Johnson Foundation; Build Healthy Places Network, 2005). Research also indicates that minorities are affected by poverty at a disproportionate rate than whites. Older adults and people of color struggle with activity-related health issues. Those with annual incomes below \$15,000 are three times more likely to live a lifestyle with low physical-activity levels (Center for Quality Growth and Regional Development, p. 11). According to a brief published by PolicyLink and the Prevention Institute, people of color have mobility challenges, including limited access to cars: 19 percent of African Americans, 13.7 percent of Latinos, and 4.6 percent of whites lack access to automobiles. Poverty increases the problem, with 33 percent of poor African Americans, 25 percent of poor Latinos, and 12.1 percent of poor whites lacking access to an automobile (Prevention Institute, 2009). It is important to note that bike share has been linked to spontaneous trips and cycling in the U.S. but to date has been a mode particular to Caucasian males who are traditionally already more physically active than other demographic segments (Davis, et al., 2011).

According to the Rochester Area Community Foundation’s Poverty and the Concentration of Poverty in the Nine-County Greater Rochester Area report, the City of Rochester has one of the highest concentrations of persons living in poverty compared to similar-sized cities. Over a third of blacks and Hispanics live in poverty, compared to just 10 percent of whites (Genesee Transportation Council, 2016, p. 31). The Rochester Area Bike Sharing Program Study outlined several major policy goals in an effort to guide the success of a bike-sharing program locally. Increasing mobility and equitable and affordable access to public transportation were key goals, while also improving the economy and increasing the bicycling rate across the city (Toole Design Group, SRF Associates,

2015, p. ES1). The program study also indicated that one of the biggest opportunities for bike share in the City of Rochester was targeting “diverse income levels and significant minority populations with an opportunity to make bike share accessible to these populations and improve access to jobs and services,” as well as creating “strong community groups for partnerships” (Toole Design Group, SRF Associates, 2015, pp. ES2-ES3). As such, the stakeholder and public-engagement process emphasized that Rochester should serve a large cross-section outside of the initial Center City core, which was the first phase of the bike share. To achieve greater equity and improve access the study called for “locating stations in lower-income, minority and non-English-speaking communities, as well as providing subsidized discounted memberships, increasing access to those without credit cards, and dedicating a budget for outreach and identifying community organization as patterns in the program.” According to the initial program study, 70 percent of Phase 1 stations were to be located in these areas and 50 percent were planned for in corresponding phases beyond the initial launch in Center City (Toole Design Group, SRF Associates, 2015, pp. ES7-ES8).

Bike-sharing systems have emerged in recent years as a low-cost way to increase urban mobility (Vogel & Mattfeld, 2011). Several other national case studies on bike shares have indicated that equity was a key focal point. In Minnesota, for example, the Cloquet Comprehensive Plan sought to achieve equitable outcomes for identified vulnerable populations when incorporating new bike and pedestrian infrastructure (Arrowhead Regional Development Commission, 2014). In Portland, Maine a bike share Health Impact Assessment concluded that bike share could naturally work to increase physical-activity rates for those with low income because of the low-cost nature of bike share in comparison to automobile ownership (Anderson, 2015). In Washington, D.C., the effects of pricing on bike share noted that pricing bike shares too high could create a financial barrier and missed opportunities for the public to engage, while pricing bike share correctly could increase ridership and overall revenue (Lucas, 2015). In Atlanta, GA, it was indicated that high-priority locations for their bike-share stations should include low-income areas where there was often a high prevalence of chronic diseases (Ross, 2007, p. 12). In Topeka, KS, implementing bike share in combination with other factors, including bike and pedestrian infrastructure, policies and community outreach, was shown to produce beneficial health outcomes. However, it was concluded that bike share alone is unlikely to produce large increases in population-level physical activity, access to resources or quality of life. Additional work and research was called for to engage women, racial and ethnic minorities, low-income and low-education groups and older generations in bike share, cycling and active transport. It was recognized that the overall inclusion of these groups presents an opportunity to increase physical activity, access to resources and overall quality of life within the Topeka community (Hoppe, 2015, p. 36).

The Minnesota Department of Health’s (DOH) report on a bike-share program discussed some of the challenges of involving vulnerable populations, including strategies that were not effective in engaging those communities in the actual bike-share programs (Lindsey, Hankey, Wang, & Chen, 2013). In its experience, very few community members took advantage of the discounted memberships. The report cited the possibility that community members considered even the discounted membership price as too expensive. Minnesota DOH also had challenges utilizing bike-share program ambassadors. Neighborhood ambassadors were given 200 coupons for free bike share subscriptions to promote the bike share in their represented neighborhood, but they were not successful as only two membership vouchers were redeemed during the program (Ross, 2007, p. 11).

6.2 ECONOMIC BENEFIT & EQUITABLE ACCESS AND THE ROCHESTER BIKE SHARE

A bike share system can help a community attract and retain residents. Many communities see bike share as part of a revitalization effort for their downtown or other areas. In addition, it provides a new and different way for tourists to engage with and traverse a city, helping attract more tourists and their spending power to communities. A bike share system also creates a small number of local jobs to operate and maintain the system. (Toole Design Group, SRF Associates, 2015) In other cities, businesses located near bike share stations have seen an economic uplift. A recent study of the Nice Ride Minnesota bike share system in the cities of Minneapolis/St. Paul found that bike share users spent an additional \$150,000 at local businesses over the course of one bike share season compared to the prior year, before bike share was implemented. Increased sales in the bike-retail sector can also be expected. Although there is limited U.S. data available, in Paris, citywide bicycle sales increased 39 percent following the launch of Velib (Ibid). Despite a bike share's potential in creating a small number of operation and maintenance jobs, Zagster Inc. has identified few jobs, if any, being created locally.

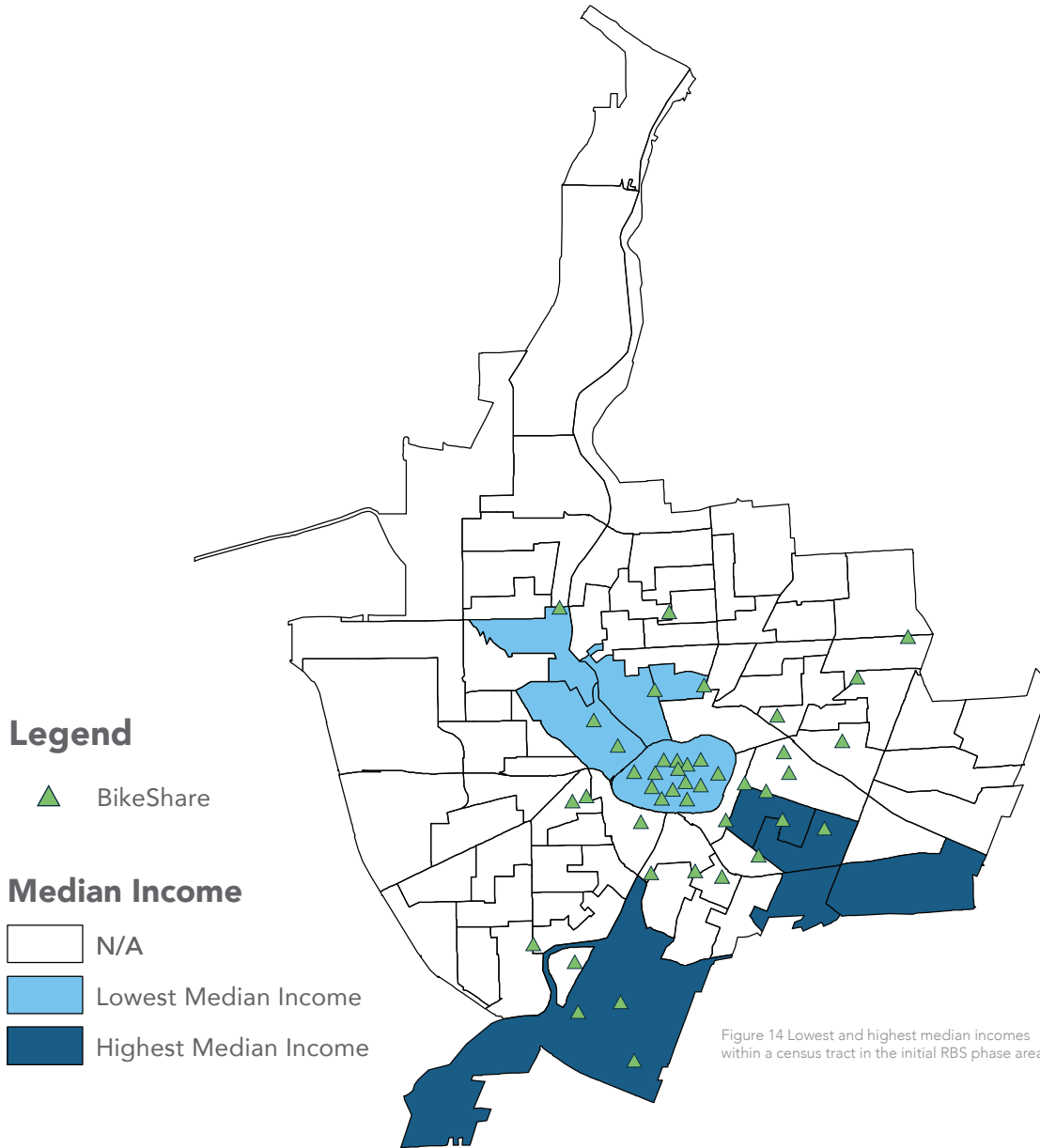
There are documented cost savings between the ownership of automobiles when compared to cars. The city of Rochester has a total of 61,855 vehicles used for commuting (U.S. Census Bureau , 2015). The American Community Survey results indicate city residents drive alone 81.52 percent of the time, and only 2.41 percent indicated that they walked when commuting. There is opportunity to increase the physically active component of community based on an analysis of the Phase 1 bike share. All bike share stations are located within five miles, of a pharmacy, clinic or hospital within Rochester's city limits.

Income

To better understand the current and potential users of the Rochester Bike Share, baseline income and employment statistics have been researched. The overall income of the Phase 1 study area indicates that more than 50 percent of households have an income of less than \$35,000, with the highest number of people earning annual incomes between \$15,000 and \$24,999. It should be noted that Center City, which was the initial planned target for Phase 1 of the Rochester Bike Share, has a poverty rate of 38.8 percent, the highest rate in the City of Rochester (City of Rochester, 2016). The second-highest unemployment rate - 12.8 percent - is also in the Center City at. (Ibid) Sixteen tracts (43.24 percent) have a household-median income low enough to qualify for public assistance (U.S. Census Bureau, 2015). In addition, 50 percent of the households in the Phase 1 tracts qualify for Supplemental Nutrition Assistance Program (SNAP) benefits based on household size and income. The mean income ranges from \$22,609 to \$134,864 per family. The largest median income per family is found in the following tracts: Tract 78.02 (\$121,458), Tract 31 (\$107,500), tract 37 (\$58,542), tract 29 (\$56,627) and tract 38.05 (\$51,250). The lowest median income per family is found in the following tracts: Tract 2 (\$13,811), tract 94 (\$15,406), tract 92 (\$15,568), tract 23 (\$17,237) and tract 13 (\$18,512). Tract 2 (\$13,811), tract 94 (\$15,406), tract 92 (\$15,568), tract 23 (\$17,237) and tract 13 (\$18,512).



For further context, please view the map below listing both the highest and lowest median income per family:



Workforce

The term workforce is representative of civilians who are employed that are ages 16 and older. Building on the potential of commuting options via the bike share represents potential to increase physical activity. Furthermore, as the literature reviewed for this HIA indicates, a lack of employment may contribute to a loss of income and related health disparities. In an attempt to analyze current opportunities and challenges, this HIA analyzed the workforce within the City of Rochester. Because employment is typically the primary source of income for most residents, a high unemployment rate is an indicator of limited economic opportunity. The workforce is made up of 84,354 people and includes non-city residents. Center City, the central focus for Phase 1 of the Rochester Bike Share, has a lower labor force participation rate (55.2 percent) than both the city (59.2 percent) and the national average (62.6 percent). (City of Rochester, 2016) The largest workforce is in tract 31 (3,609) followed by 38.05 (3,531); 29 (3,241); 10 (2,520); and 20 (2,288). It has been mapped below:

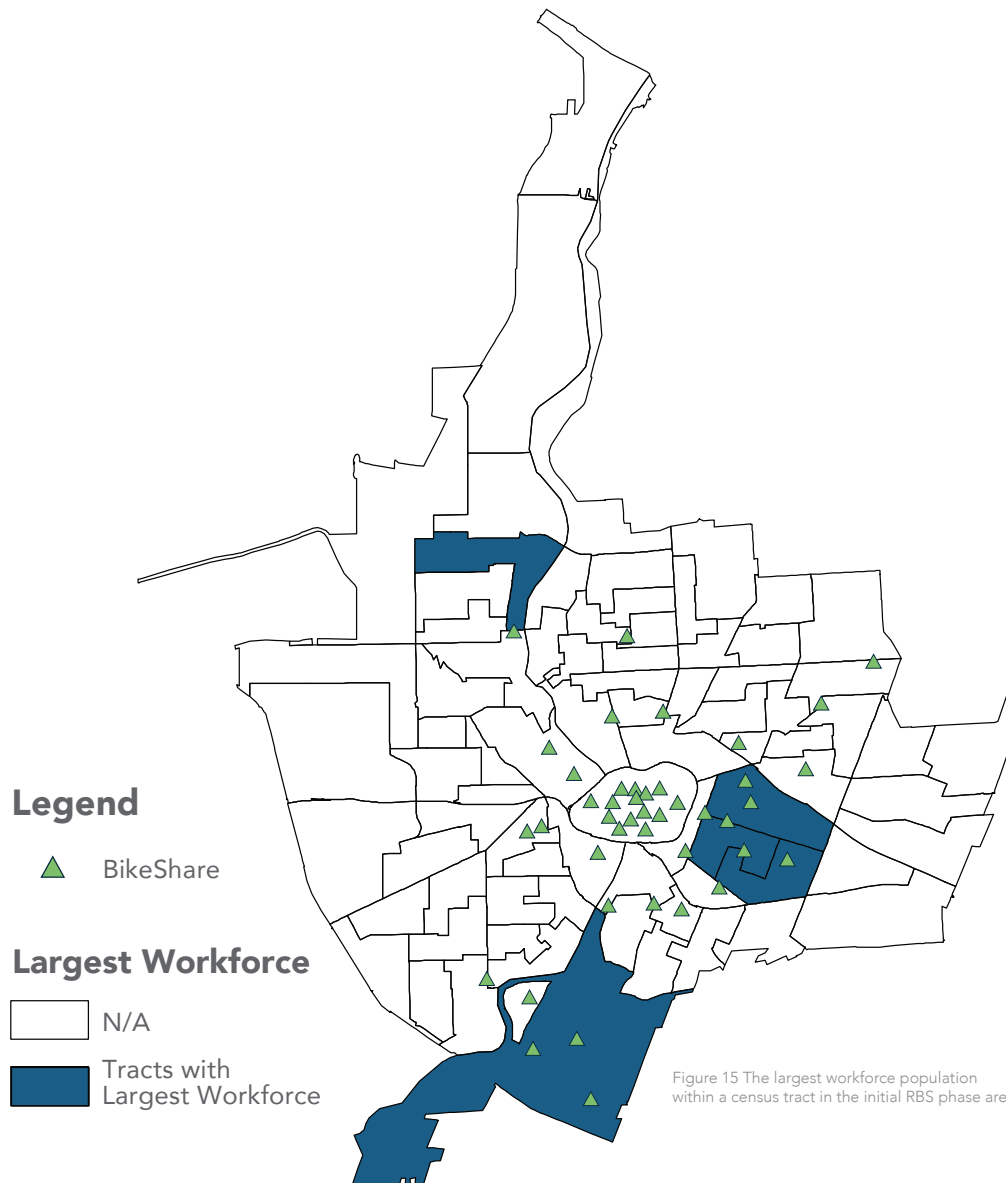
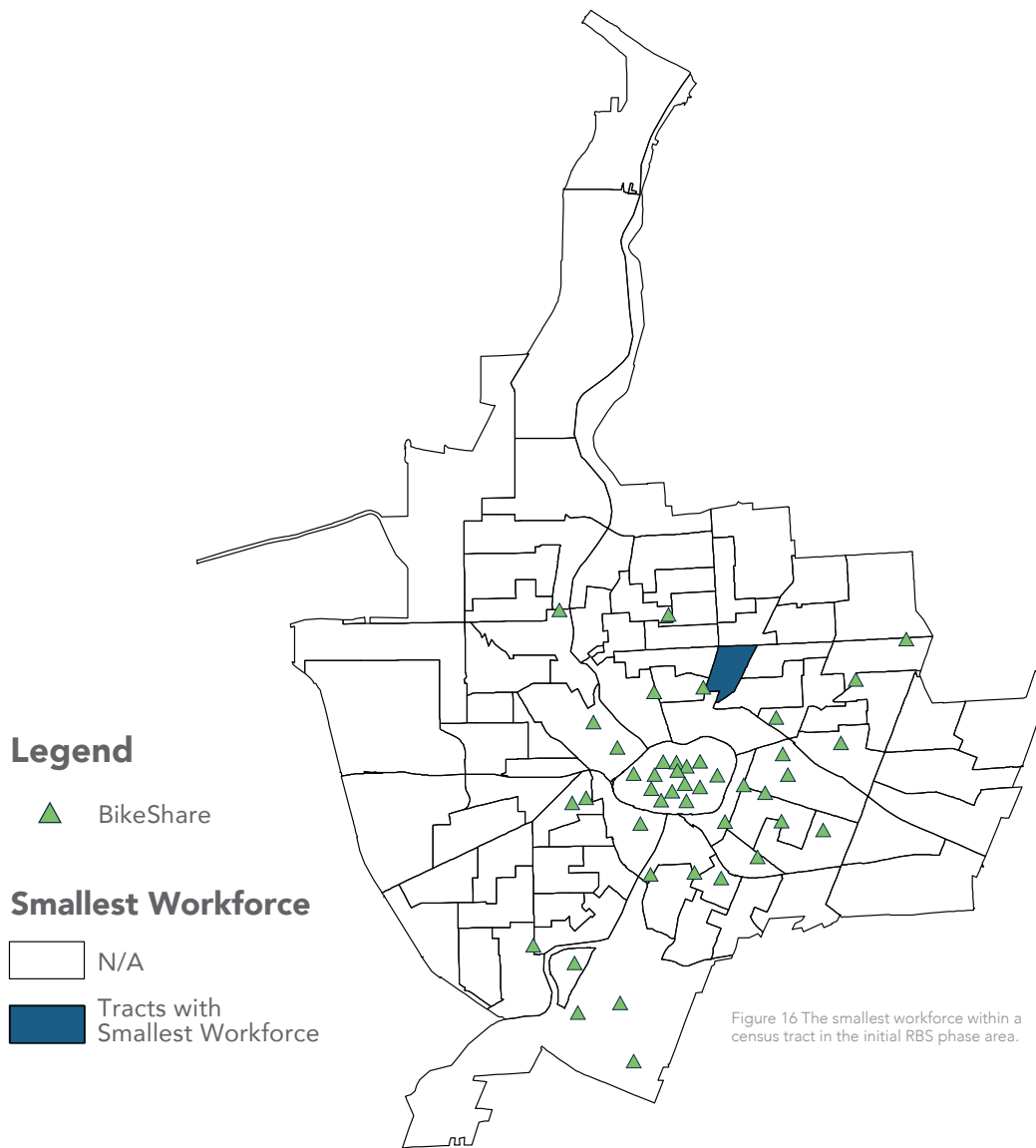


Figure 15 The largest workforce population within a census tract in the initial RBS phase area.

The smallest workforce is located in tract 15 with 307 people recorded. It has been mapped below:



Bike Share Subsidies

Low socioeconomic status can be related to health disparities and can be a barrier to accessing bike share. In a national study of bike share programs, it was reported that 24 percent of all bike shares have a subsidy-membership program. AccessPass provides \$5-per-month memberships to Philadelphians who use Electronic Benefits Transfer (EBT) cards payable with either a credit/debit card or cash (<https://www.rideindego.com/portal/access-pass/>). As indicated previously, Zagster Inc. may be unintentionally creating barriers to access for these communities due to their credit-card and smartphone requirements to use the system.

6.3 ECONOMIC BENEFIT & EQUITABLE ACCESS RECOMMENDATIONS

To develop recommendations for determining the potential economic benefits and creating equitable access, researchers looked at the experiences of other communities' bike share programs. Community-level bike shares were shown to have potential in attracting or retaining workforce talent and enabling visitors to better engage or experience a city. Businesses benefited from higher foot traffic and more visitor dollars spent. Communities experienced reduced transportation and health-care costs. Interestingly, research also suggested that bicyclists typically spend money at higher levels than motorists.

With regard to equitable access, research showed that residents of low-income neighborhoods are less likely to report satisfactory pedestrian/biking facilities, safety from traffic and crime, and access to recreation facilities than residents of higher-income areas. Bike sharing has proven to be a low-cost way to increase urban mobility.

The following recommendations focus on increasing public and private investment in the RBS and in enhancing the current payment system to increase access and usage:

Economic Benefit & Equitable Access

Promote the integration of Bike Share with other public transportation options.

Specific Actions:

- Partner with public transit providers to create mobility hubs across Rochester.
- Partner with ridesharing services such as Uber/Lyft.

Move away from individual station sponsorships to new models to support RBS overall.

Specific Actions:

- Explore methods to increase investment from public and non-profit sectors.
- Partner with local institutions and organizations to provide subsidized memberships to low-income city residents.

Improve the bike share payment system to reduce barriers to access for all populations.

Specific Actions:

- Move away from smart phone requirement and enable a cash membership option.
- Allow different membership tiers such as subsidized annual options for low income users.



Section 7: Food Access

7.1 FOOD ACCESS AND HEALTH LITERATURE REVIEW

Access to healthy-food choices and a safe environment for physical activity are important to providing an environment that promotes health (Hill, et al., 2010). In low socioeconomic communities where there are often a high number of racial minorities, a lack of access has created a barrier to allowing families to consume healthy and nutritious foods. Researchers have found that lack of access to healthy foods is a key factor in obesity rates, and statistics show that minority children and children from low-income families are twice as likely to be overweight compared to children from higher socioeconomic standings (Hagey, Rice, & Flournoy, 2012). Low socioeconomic neighborhoods tend to have more convenience stores and smaller grocery stores that don't stock fresh, healthy food items (Treuhaft & Karpyn, 2010). Neighborhoods with poor supermarket access have also been identified as overwhelmingly low-income (Hendrickson & Eikenberry, 2006). Healthy items, such as fruits and vegetables, may also be cost-dependent, and therefore, individuals in lower-income areas tend to consume lower-cost and lower-quality food, which can lead to obesity and diabetes (Committee on Health Impact Assessment, National Research Council, 2011). Areas that have a higher density of fast food and convenience stores have a higher risk for obesity, while a closer proximity to supermarkets is linked to a reduced rate of obesity due to the availability of healthier foods (Epstein, et al., 2012). Studies have also indicated that predominantly black neighborhoods have a higher concentration of fast-food establishments than predominantly white neighborhoods, which studies have linked to increased obesity (Block, Scribner, & DeSalvo, 2004) (Moore & Diez-Roux, 2006) (Romley, Cohen, Ringel, & Sturm, 2007) (Truong & Sturm, 2009). Poor supermarket access has also been linked to increased health disparities, such as diabetes, cardiovascular disease and obesity when compared to neighborhoods that have supermarkets (Cotterill & Franklin, 1995) (Powell, Auld, Chaloupka, O'Malley, & Johnston, 2007). In general, low access to "healthy food resources" but ample access to "un-healthy food resources" may be linked to negative health outcomes, particularly in low-income populations (Boone-Heinonen, Kiefe, Shikany, Lewis, & Popkan, 2011) (Reitzel, et al., 2013). Residents in communities with "food deserts" - large geographic areas with no grocery stores within reasonable proximity - have more health problems and higher premature mortality than residents of otherwise similar areas with a higher frequency of grocery stores (Gallagher, 2006).

Increasing access to healthy foods, such as fruits and vegetables, could increase consumption and improve nutrition. A study conducted in four states concluded that there are more than three times as many supermarkets located in wealthy communities as compared to poorer neighborhoods, and supermarkets are four times more likely to be found in predominantly white neighborhoods (Ross, 2007). Placing a farmers market in vulnerable communities can lead to an increase in access and consumption of fruits and vegetables (Pitts, et al., 2014). There are currently 8,687 farmers markets registered with the USDA in the U.S (USDA Agricultural Marketing Service, 2017). In order to make farmers markets available to individuals from different income levels, the USDA has provided some farmers markets with equipment to take payments from Supplemental Nutrition Assistance Program (SNAP) (Wasserman, et al., 2010). The market would also allow for economic benefits to the vendors and could provide upward mobility for the residents in the neighborhood that wish to sell produce. A farmers market could increase social cohesion by providing opportunities for neighborhood interaction and for educating people about healthy food (Flournoy, 2011).

One solution for areas lacking proximity to grocery stores may be adding community gardens and farmers markets. The creation of community gardens can lead to several public-health benefits, including an increase in healthy food, an increase in physical activity, a decrease in obesity, an increase in social relationships among neighbors, and an improvement in mental health (County Health Rankings & Roadmaps) (Center for Disease Control and Prevention, 2017) (International City/County Management Association (ICMA), 2006).

Farmers markets can also be used as a source for fresh, healthy and affordable food in areas that lack grocery stores. Farmers markets can range in size and, unlike grocery stores, are not confined by strict land-use requirements. Therefore, they can be easily constructed and altered to fit the needs of a specific community (Flournoy, 2011) (International City/County Management Association (ICMA), 2006).

Several examples of bike share programs around the nation indicated bike share as a method to improve mobility and overall accessibility to amenities that included healthy-food access. The Atlanta Bike Share recommended placing bike stations within a walking radius of .5 miles of community resources to expand access to grocery stores among other amenities (Ross, 2007, p. 2). A case study of the Nice Ride Bike Share Stations in Minnesota showed that activity increases with the number of food-related businesses within a 1/8 mile walk of bike share stations (Schoner, Harrison, & Wang, 2012).

The National Association of Transportation Officials identified in a report on bicycle-share utilization from 2010-2016 that organizations like Bedford Stuyvesant Restoration Corporation in New York City were partnering with bike-share providers like Citi Bike to address food-access issues at the neighborhood levels and other associated health issues. The partnership resulted in increased membership by 56 percent among blacks and tripled the overall ridership among whites, with overall ridership increasing by 40 percent. In Philadelphia, PA, a strategic business plan directly linked bike share with opportunities to create improved food access across the city.

Here in our region, the GTC's Long Range Transportation Plan identifies the regional food system as one of the "emerging issues and opportunities" and also links accessibility and mobility options for low-income households in urban and rural areas and low-mobility neighborhoods to healthy, affordable foods (Thomann, Kased, & Zorn, 2016). The plan also highlights the citywide Rochester Public Market, which has a long history and was voted number one in the 2010 America's Favorite Farmers Market. It is estimated that, every Saturday, as many as 40,000 customers visit the market. The City of Rochester has also been undergoing an \$8 million dollar Public Market renovation and expansion project, which includes a new winter shed, a new outdoor shed, and upgraded food stands (Genesee Transportation Council, 2016, p. 26). The Finger Lakes Regional Sustainability Plan also indicated that one of the goals was to develop creative strategies to enhance the access and availability of farmers markets and small local markets to provide access to affordable and healthy goods (Thomann, Kased, & Zorn, 2016, p. 2). The Genesee Finger Lakes Region Planning Council published a report on transportation and food systems in the region. It identified a need to comprehensively examine barriers faced by residents and to determine how they were or were not able to access healthy food stores as a priority, along with other community-based ride sharing systems to ultimately improve transportation to healthy food sources (Thomann, Kased, & Zorn, 2016, p. 27). The University of Rochester Medical Center has also created a Redevelopment and Community Health Toolkit that identifies food-access initiatives that occur across the city. These initiatives include advocating for and supporting new full-service grocery stores, encouraging corner stores to add more healthy food, the creation of new farmers markets, food trucks or stands, the support of community gardens and urban farms, and improving transportation to increase access to healthy-food options (University of Rochester Environmental Health Center, 2015).

7.2 FOOD ACCESS AND THE ROCHESTER BIKE SHARE

To better understand community food-access issues and barriers, this HIA has researched where potential limitations in food access may be occurring in the City of Rochester. It is believed that the bike share may help to improve access to healthier food options including supermarkets and other public markets. Zagster Inc. has located several bike-share stations within the Rochester Public Market; however, at the time of this report, we are not aware of any bike-share stations located directly at supermarkets.

In the map below, tracts in blue represent low-income areas. Tracts in green are those in which more than a third of residents live more than one-half mile from a grocery store. Overlapping areas are considered food deserts. All blue areas on this food desert map overlap a green area (<https://www.ers.usda.gov/data-products/food-access-research-atlas/go-to-the-atlas/>).

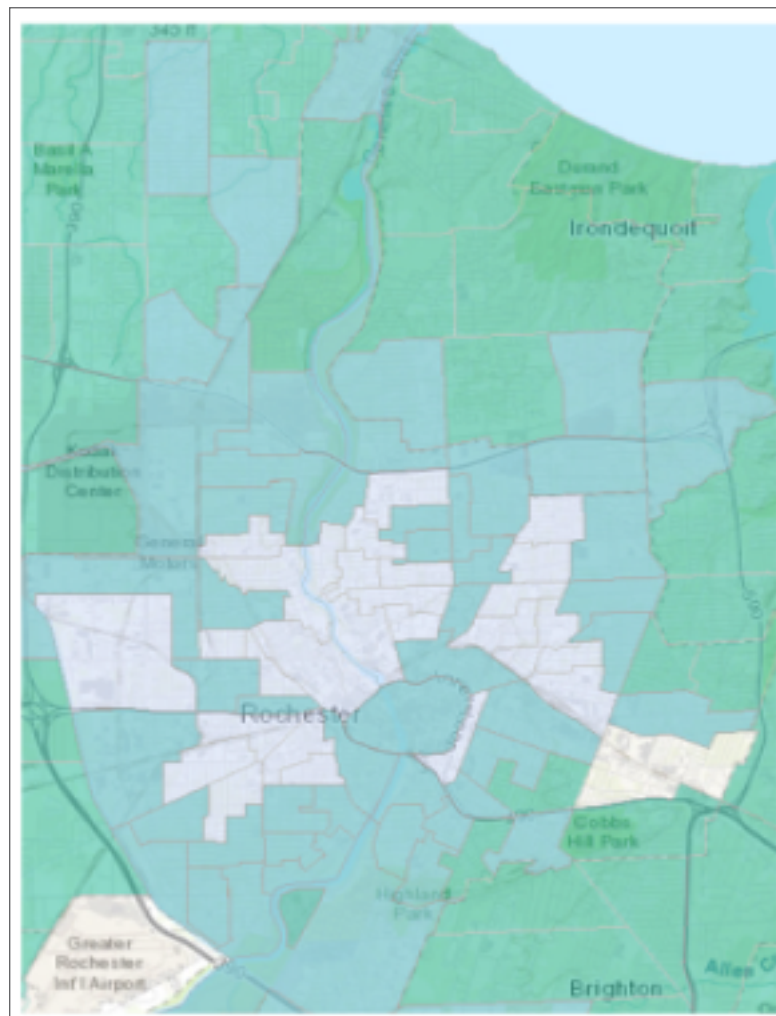


Figure 17 Areas designated as low Income, low access, or as a food desert by census tract in the City of Rochester and neighboring areas.

Most bike-share stations are located less than 5 miles from the nearest major grocery store, farmers market or pantry/community cupboard. Two stations are within one mile of a grocery store, which could help address the food desert/food insecurity issue. Additionally, bike share stations are located along Regional Transit Service bus routes and may facilitate access to and from grocery stores. When analyzing other potential routes to increase food access, it was identified that the Genesee Riverway Trail may be utilized to access farmers markets located throughout the city. Several other existing programs may also help assist in increasing food access via the bike share. The City of Rochester Department of Neighborhood and Business Development supports efforts to bring new businesses into the city, including food stores and their locations. The Market Token Program, a SNAP-benefit-redemption program, allows SNAP recipients to convert their benefit to wooden tokens at farmers markets across the city. In 2015, Rochester had more SNAP-benefit redemptions than all the combined participating farmers markets in 43 of the 50 states (City of Rochester Public Market, 2016). Horticultural and environmental programming may also support community-garden efforts in neighborhoods across the city.

7.3 FOOD ACCESS RECOMMENDATIONS

Research shows that a lack of access to healthy foods is a key factor in obesity rates, and that children from low-income families and minority populations are more likely to be overweight compared to children from higher socioeconomic levels. By increasing access to healthy foods, a community can increase consumption and improve nutrition.

Bike-share programs studied across the U.S. were proven as a successful way to increase overall accessibility to healthy foods and other amenities. In the Rochester and Finger Lakes region, the GTC's Long Range Transportation Plan linked accessibility and mobility options for low-income households and low-mobility neighborhoods to healthy, affordable foods.

The following recommendation focuses on efforts to increase access to healthy food and to improve health:

Food Access

Increase food access and improve health.

Specific Actions:

- Partner with area food advocates and farmers markets to increase food access.
- Demonstrate health impacts of bike share to food providers to enable stronger ties and foster food access as a stated goal of the RBS.



Section 8: Summary of Recommendations

The summary of recommendations represents the span of all synthesized recommendations within the four prioritized health determinants found within this HIA. Further analysis on the recommendations themselves, as well as prior research on other region's HIA recommendations, assisted in the identification of four overarching categories that the recommendations represent. The six categories of recommendations submitted in this report were identified as the following: Outreach/Orientation, Bike-Share Integration, Planning and Design, Data Collection, Wayfinding and Station Placement, and Economic Viability.

This section further identifies each recommendation made and provides rationale as to why the recommendation was justified and why it was assigned to one of the six corresponding categories.

The summary report of those findings is below:

ROCHESTER BIKE SHARE RECOMMENDATIONS

Outreach/Orientation

1. Encourage face-to-face communication and education around the Bike Share. (Social Cohesion)

- a. Empower ambassadors/advocates of the bike share program at a neighborhood/census tract level.
- b. Offer training courses on bike share through the City of Rochester or other area community partners to educate new users on how to utilize the bike share system.
- c. Educate on NYSDMV safety policy and advocate that material on cyclists and bike share be included in driver safety material.

2. Maximize communication around the potential health impacts of bike share, especially among vulnerable populations. (Social Cohesion)

- a. Develop strong relationships with health based employers in the area.
- b. Produce incentive-based promotional events through Zagster Inc. and local businesses to encourage the public to ride.

Rationale: Currently, the majority of homes in the RBS-implemented phasing area are rented (69.49%), and vacancy rates of housing units range from 17.4 to 1.4, with a median rate of 6.4. This gives us a snapshot of the level of social cohesion in the community.

Research suggests that increased numbers of vacancies and rented property are a sign of lack of cohesion. Building social cohesion in a community has the potential to increase feelings of safety that would allow people to feel more comfortable in enjoying their community. In the Rochester area, we see low home ownership in many areas, high levels of transient living, and increased levels of crime. Increasing social cohesion will help to alleviate these issues.



The above recommendations (1-2) focus on the programmatic- and educational-outreach efforts to build social cohesion and expand user engagement of the bike share. The recommendations were provided directly from the Steering Committee and City of Rochester representation, and they build upon other bike share HIA recommendations that involve campaigns to promote physical activity and build social cohesion around bike events (Topeka Bike Share, City of Decatur).

BIKE SHARE INTEGRATION

3. Increase overall social connectedness to the Bike Share. (Social Cohesion)

- a. Connect bicycle paths and transit lines and streets via sidewalks.
- b. Enhance connection between neighborhood destinations. Make active transportation modes (walk, biking) easier to engage with.

4. Promote the integration of Bike Share with other public transportation options. (Economic Benefit & Equitable Access)

- a. Partner with public transit providers such as Regional Transit Services (RTS) to create mobility hubs across the City of Rochester.
- b. Partner with ridesharing services such as Uber/Lyft.

5. Locate bike share stations within a walking radius of 0.5 miles of community resources that may lead to improved health outcomes. (Physical Activity)

- a. Expand access to grocery stores, farmers markets, city parks, community centers, schools, and places of employment.

6. Increase food access and improve health. (Food Access)

- a. Partner with area food advocates and farmers markets/mobile markets (such as Foodlink Inc.) to increase food access.
- b. Demonstrate the health impacts of bike share to food providers to enable stronger ties and foster food access as a stated goal of the bike share program.

Rationale: Relatively high average lengths of stay in the hospital for conditions that are scientifically associated with physical activity that occur within Rochester include hypertension and heart disease.

The average length of stay in the hospital ranges from 5 to 7.5 days. Increasing access to healthy-food options has the potential to decrease the levels of health conditions associated with unhealthy-eating habits, such as diabetes. It is also important to note that many of the families in the City of Rochester live below the poverty line or with limited disposable income. Roughly 40 percent of the tracts in the bike-share area, based on average income and household size, would qualify for, or be on the cusp of, public assistance. More than 50 percent of people in the area earn an income under \$35,000 per year.

The above recommendations involve planning the bike share to build connections to target populations in a variety of ways in the short-term, including expanding and engaging the bike share



program within the City of Rochester. Particular aspects of planning include enhancing food access through informed design based on demographic information (on a census-tract level), with an emphasis on identifying low-income populations. (7, 8) Those recommendations are supported in HIAs in other urban areas as well (Transit Oriented Development, City of Decatur, Atlanta Bike Share, and Portland Bike Share).

PLANNING AND DESIGN

7. Encourage recreational cyclists, non-cyclists and pedestrians to be more physically active. (Physical Activity)

- a. Improve bicycle facilities and infrastructure for all people including bike lanes and new station placement. Available evidence suggests that improving bicycle and pedestrian facilities may increase opportunities for physical activity
-

Rationale: The above recommendations focus on planning and design efforts to enhance and guide the long-term development and utilization of the bike share, citing the initial approach of the Rochester Bike Share Feasibility Program Study and building on equity issues addressed in bike share HIAs in the city of Decatur, the Atlanta Bike Share and the Portland (Maine) bike share.

DATA COLLECTION

8. Create an annual ridership survey to obtain information on both ridership demographics and to survey non-riders. (Social Cohesion)

- a. Use survey data to investigate what barriers may exist that hinder engagement with the bike share program, especially among vulnerable populations.

9. Determine where to locate future bike share stations. (Social Cohesion)

- a. Prioritize locations overwhelmed by health disparities or other barriers to access associated with by not limited to chronic disease rates; low Socioeconomic status (SES); lack of access to reliable transportation; ethnicity; age; proximity to community resources or transit stops.
-

Rationale: Limited local data exists for many of the determinants purported to be impacted by the bike share. Collecting additional data will allow planners to determine the program's impact and make changes to maximize its impact on health outcomes.

The above recommendations change the nature of the current metrics of the bike share by focusing on ways to utilize data collection in decision-making to more broadly influence the community and enable the bike share to grow more naturally. These data-collection methods are supported in several bike share HIAs, including the Atlanta Bike Share and Portland Bike Share. The City of Rochester has also expressed interest in conducting an annual survey to determine ridership demographics.

WAYFINDING & STATION PLACEMENT

10. Ensure station placement maximizes safe locations and provides user guidance. (Social Cohesion)

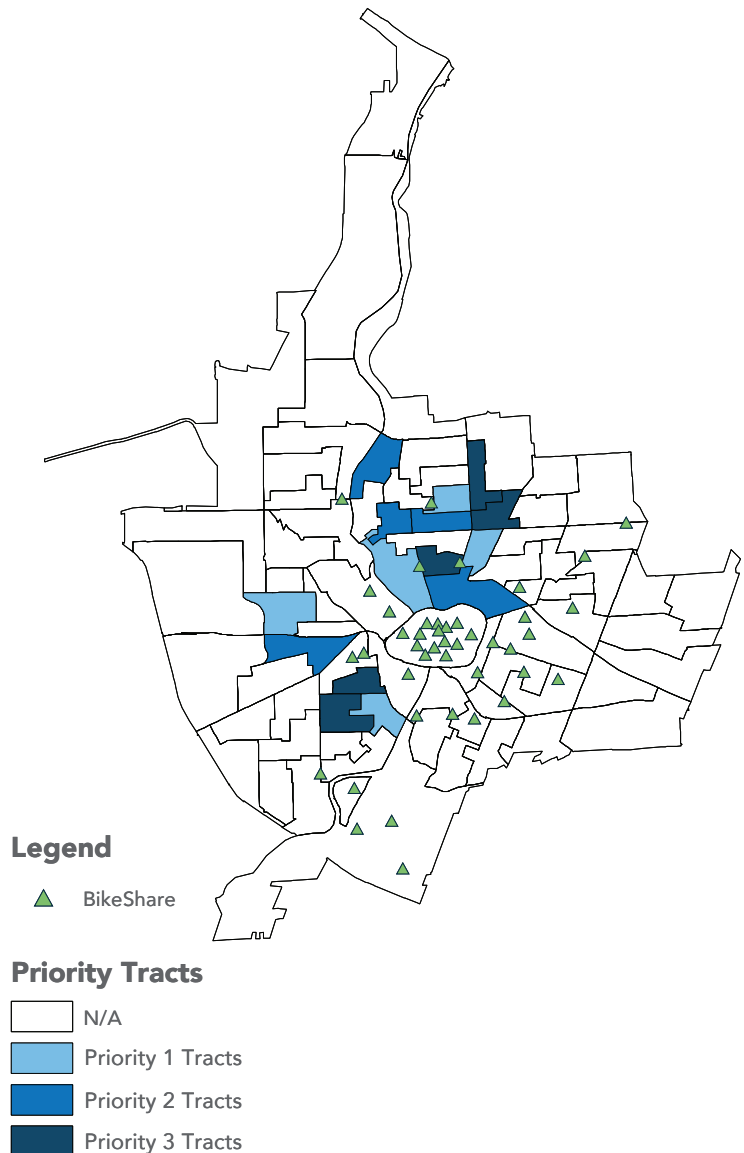
- a. Support station placement in areas with high visibility
- b. Increase wayfinding signage to guide cyclists, increasing engagement of riders and mitigate the potential of getting lost.
- c. Provide signage at stations with proximity to nearby destinations, including but not limited to cultural institutions, parks, and markets and area neighborhoods.

11. Establish baseline conditions and physical activity goals for users. (Physical Activity)

- a. Integrate recorded data from Zagster Inc. on total minutes of physical activity per trip.

12. Based on the available census tract level data for the City of Rochester, and available BRFSS Measures indicating health disparities, the following census tracts have been identified as having the greatest need for intervention to improve health outcomes. Based on the collected and indexed data and recognizing that organic growth alone may leave certain areas and populations behind, we recommend the following three tract tiers be prioritized for bike share station placement. For further rationale of our index and scoring please see the Priority Tracts Map:

PRIORITY 1	PRIORITY 2	PRIORITY 3
Tract 65	Tract 96.02	Tract 27
Tract 92	Tract 52	Tract 80
Tract 49	Tract 50	Tract 64
Tract 15	Tract 93.01	Tract 79



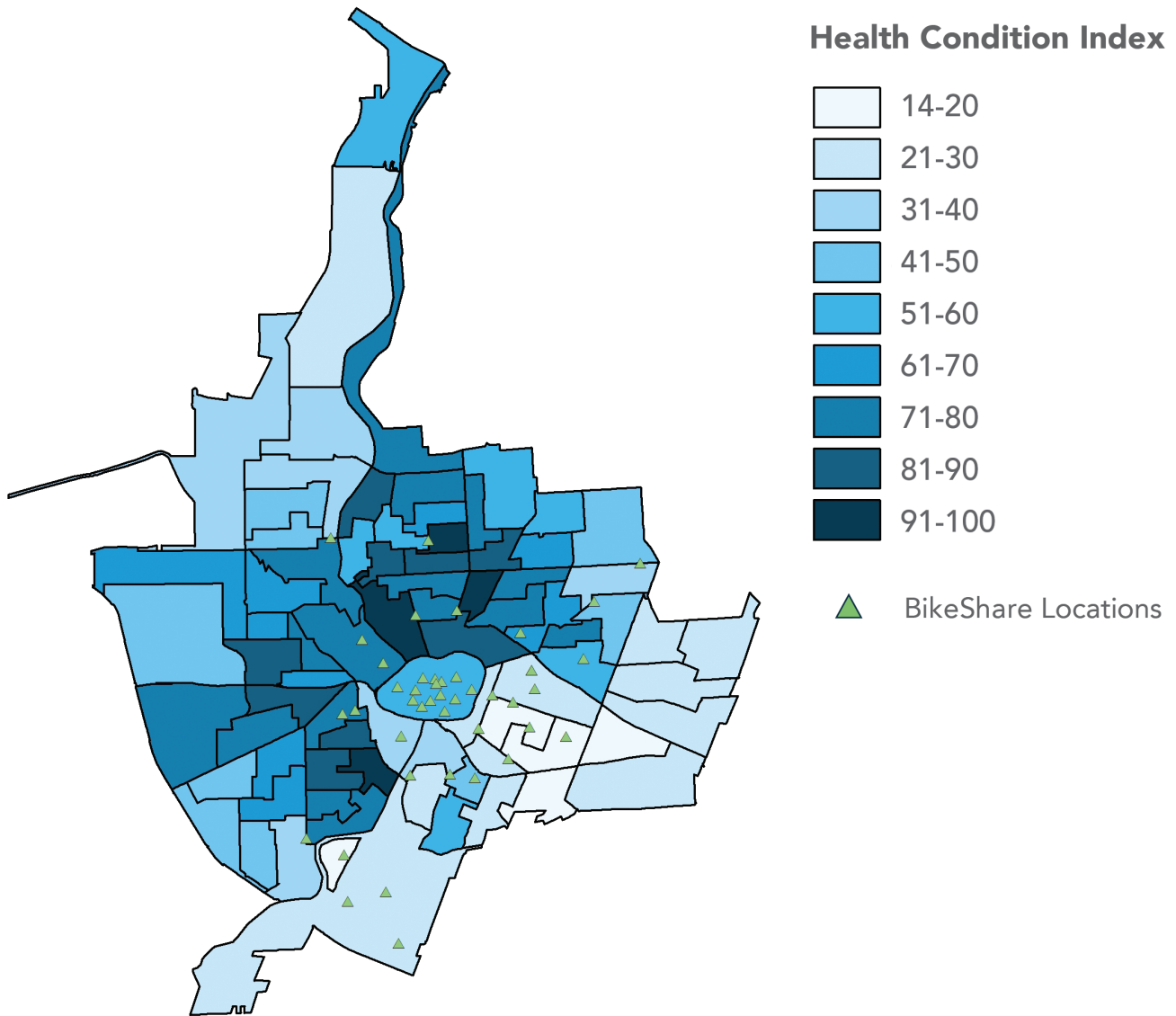
BRFSS Measures Used for Analysis

- Mental Health not good for greater than 14 days among adults 18 years or more
- Chronic Kidney Disease among adults 18 years or more
- High Cholesterol among adults 18 years or more
- Diagnosed Diabetes among adults 18 years or more
- Chronic Obstructive Pulmonary Disease among adults 18 years or more
- Coronary Heart Disease among adults 18 years or more
- High Blood Pressure among adults 18 years or more
- Obesity among adults 18 years or more
- Lack of health insurance among adults 18 years or more
- Lack of leisure-time physical activity among adults 18 years or more

Rationale: The above recommendations focus on methods to ensure that bike stations are placed in areas where they will be the most utilized by connecting them to amenities, bolstering the bike share's long-term viability through strategic-planning efforts. Stations with low visibility or within parks may be subject to vandalism and may discourage ridership. The city of Decatur HIA cites this tactic as something that may reduce stress for bicyclists and increase usage of novice riders. The city surveyed members to learn that connectivity was deemed "crucial" between neighborhoods and destinations.

Rationale on Bike Share Station Recommendations: The stations were ranked according to BRFSS Measures data above. Each of these measures relates to the health outcomes identified as being impacted by the bike share and help suggest where potential stations could be placed and accessed to improve health outcomes. Each recommendation was ranked 1-10 by equal intervals created by the maximum and minimum of each measure, with 1 having the best outcome and 10 the worst. Scores were added together for all 10 measures for a maximum possible score of 100. Those with the highest score reflect the poorest health outcomes of each measure, while those with lower scores reflect better health outcomes for each measure. There was no scientific rationale for utilizing a scale of 1-10; however, based on the amount of tracts researched and the collected data range, this approach enabled a ranked differentiation and assisted in identifying priority areas. Please see the summary map below for further analysis of the recommended station placements and corresponding census tract health outcomes rankings.

Map 1. Generated Health Condition Index summarizing key indicators of health noted by BRFSS mapped along City of Rochester census tracts and bike share station placements.



ECONOMIC VIABILITY

13. Move away from individual station sponsorships to new models of sponsorship to support the program as a whole. (Economic Impact)

- a. Explore methods to increase investment from public and non-profit sectors.
- b. Partner with local institutions and organizations to provide subsidized memberships to low-income city residents.

14. Improve the bike share payment system to reduce barriers to access for all populations. (Economic Impact)

- a. Move away from smart phone requirement and enable a cash membership option.
- b. Allow different tiers of membership including a subsidized annual option for lower income users.

Rationale: In the Rochester area, there are existing programs that aid the community in enabling access to robust transportation options and recreational bicycle use. Collaboration can help to further promote the use of bicycles, foster the development of cycling infrastructure and better facilitate the exchange of information within the community on such topics as improving bike safety and healthier lifestyle pursuits. Ultimately, working collaboratively may provide better input to government policy and provide cyclists a public voice.

The above recommendations focus on economic development. The first recommendation was submitted directly by the Steering Committee to encourage new models of sponsorship and partnerships to enable the bike-share program to expand on a more holistic basis than station-by-station sponsorship. The second recommendation focuses on ways to impact personal economics, and specifically, barriers to use the bike share due to the current bike-share provider (Zagster Inc.) requirement of needing to have a smartphone and credit card to use the program. This option may include a change in the membership tier as well to enable annual-based memberships that could become subsidized. The bike-share HIA in Portland, Maine called for the availability of both cash and credit to improve access.

Section 9: Monitoring & Evaluation

9.1 PROCESS EVALUATION

In the early days of this project, the scope was expanded from a Desktop HIA to an Intermediate HIA. Desktop HIAs traditionally do not involve aspects of primary research beyond existing data or stakeholder engagement, but the convening of a Steering Committee enabled the HIA's scope and depth to broaden. In expanding the HIA's scope, we were able to incorporate primary research on the populations being served by the Rochester Bike Share. This HIA also enabled us to better study chronic disease and other health disparities at a census-tract level across the city. That research was a key component in recommending the placement of new bike share stations based on areas in need of health-impact interventions.

The Steering Committee provided guidance on the total scope and parameters of our study and were representative of populations found in those areas. Throughout the 18-month project, the Steering Committee prioritized health determinants to analyze and synthesized new recommendations to increase health impacts and overcome health disparities. A project team consisting of four Common Ground Health staff members facilitated Steering Committee meetings, captured stakeholder feedback, collected research and authored this HIA.

9.2 IMPACT & OUTCOME EVALUATION

Over the next four years, Common Ground Health will monitor any policy or programmatic changes made to the Rochester Bike Share that align with the recommendations herein. We strongly encourage all decision-makers associated with the Rochester Bike Share to consider these recommendations in all decisions going forward and to collect data associated with health impacts as an evaluator component of any projects.

9.3 MONITORING PLAN

The health indicators identified throughout this document provide a basis for further understanding the health impacts of the RBS and the suggested recommendations. Several recommendations indicate a need to collect more data, including how to engage vulnerable populations, metrics on where the bike share expands in future phases and the populations utilizing the bike share. This data may lead to an annual basis review to guide further development and to align with the goals and objectives set forth by the Rochester Area Bike Sharing Program Study.



It was beyond the scope of this HIA to fully examine all health impacts or disparities associated with the Rochester Bike Share. Further study and research may lead to a more comprehensive knowledge of the health determinants prioritized in this study. Additionally other social determinants of health beyond the scope of this study may be further examined. Based on this HIA's scope, other ideas for further study may include:

- A feasibility study based on the sponsorship and support of health care or insurance providers in the region.
- A study on the integration with college campuses and other bike share-systems in the area.
- The development of an annual-ridership survey to obtain information on both ridership demographics and to survey non-riders.
- The development of educational campaigns and programs to better equip riders and educate automobile drivers on the rules of the road as they pertain to bicycle safety.
- If new bike share station placements are developed based on the recommendations of this HIA, monitoring the health behaviors and outcomes of those affected populations over time should occur.



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Appendix A - Screening Exercise

SCREENING CRITERIA	GENESEE VALLEY GREENWAY STATE PARK	ROCHESTER AREA BICYCLE SHARING
<p>1. Is there a DECISION regarding a policy, plan, or project, CURRENTLY UNDER CONSIDERATION whose outcomes are likely to impact health?</p>	<p>Identifying sustainable NYS funding for state-designated parks and trails (NYS Legislature approves NYS Parks budget; budget allocation at NYS state parks regional level)</p> <p>The revenue/support model at a state level could be changed from its currently based park admission fees to incorporate the value of health outcomes.</p> <p>(Greenway admission is free.)</p> <p>Stakeholders: Friends of Genesee Valley Greenway, New York State Parks, Monroe County, Livingston County, Wyoming County, Alleghany County.</p> <p>Integration and engagement of active transportation policies at the county/ municipal level in communities within close proximity to the Greenway.</p> <p>Public safety</p> <p>Regional integration to other trail systems/parks (NYS Parks, NYS DEC, Monroe County, City of Rochester)</p> <p>Announcement of Empire State Trail, 750-mile trail traversing NYS (January 2017)</p> <p>Transportation Alternative Program (TAP, NYSDOT) (active transportation) – federal funding (Greenway trail enhancement between Rochester, NY and Scottsville, NY 12 miles.)</p> <p>Regional economic development. Could be making funding decisions about how they might connect businesses to the greenway.</p> <p>(LRTP 2040) Tourism is linked to economic development and then, in turn, linked to health.</p>	<p>Implementation of program through Phase 1 with potential projection through Phase 4:</p> <ul style="list-style-type: none"> - Locations of bike docks, - Cost - Linkages to municipal active transportation networks - Provision of safety equipment - How will program be funded (advertising, public/private sources) - Timeline for program expansion - Location of future phases - Use of other trail systems - Public safety <p>Other transportation policies related to the bike share program: Are bikes allowed on public buses?</p> <p>What are the policies that incentivize or hinder bike infrastructure (worksite wellness, universities, green certification)?</p> <p>Are there programs or resources to support children biking?</p> <p>Are there options for different types of bikes, tricycles, senior friendly?</p> <p>Learning from other municipal bike share programs on issues related to equity and health disparities.</p>



SCREENING CRITERIA	GENESEE VALLEY GREENWAY STATE PARK	ROCHESTER AREA BICYCLE SHARING
2. Does the decision-making PROCESS allow for input from an HIA?	May be interest at state level (NYS Parks) in engagement in HIA process. The HIA may raise awareness of the Greenway and potential health outcomes in nearby municipal population centers.	More information on key project stakeholders and decision-makers needed.
3. Would the HIA bring NEW INFORMATION to the decision-making process? Is HEALTH already a part of the discussion?	<p>Health outcomes are not currently part of the conversation/evaluation regarding the Greenway.</p> <p>An HIA would help reframe the discussion to include health and bring new info re: rates of physical activity and the impact on the populations in close proximity to the trail. To date, no studies on neighborhoods close to trail and how they do or do not connect to and use it.</p> <p>One outcome would be to systematically document the value of the Greenway in terms of health as, has been documented in other multi-use trail reports and HIAs.</p>	<p>The HIA may raise awareness of equity and health disparities related to Phase 1 implementation.</p> <p>Highlight equity implications of funding, locations, etc. May highlight nuances in tradeoffs for health (traffic safety, physical activity, air quality improvement)</p> <p>HIA could connect economic development and health implications (or perhaps was already considered and just not explicitly stated as health)</p>
4. Can the HIA be completed within the TIMELINE for the decision, and with the RESOURCES available?	<p>Yes, depending on decision.</p> <p>Ex: Annual budget for NYS Parks via NYS Legislature.</p>	Dependent upon how the bike share is phased and related to what equity and health disparities are identified.
5. What is the likelihood that the HIA findings and recommendations will RECEIVE CONSIDERATION by decision-makers?	Likely. NY Parks, Monroe County, municipalities would be open to recommendations.	<p>Likely. The City of Rochester may implement new policies/procedures because of related health outcome data.</p> <p>Other municipalities with active transportation plans must have appropriate infrastructure prior to integration into the Rochester Area Bike Share program.</p>
6. Is there the potential for VULNERABLE POPULATIONS to be more adversely affected than others?	Potentially. There may be equity issues associated with varying levels of access to the trails and recreational opportunities.	There are likely to be equity issues around location and cost.



Appendix B - Scoping Worksheets

PROJECT:		ROCHESTER BIKE SHARE		
Health Determinant:	Physical Activity			
Priority:	1 of 4 (identified health determinant)			
Geographic Scope:	City of Rochester, Monroe County			
Existing Conditions Research Questions	Framing	Indicators	Data Sources	Notes
How do demographics of populations living near Bike Share stations compare to people living elsewhere?	What population centers are in close proximity to the bike-share stations in Phases 1-4? What are the makeup of those populations?	Population by census tract, racial/ethnic makeup, household income	U.S. Census - American Fact Finder, 2015 ACS 5- year Population Estimate, GTC Bike Share Feasibility Study	Are there unhealthier populations that can take advantage of new infrastructure that supports physical activity?
What are the existing health conditions of those living in proximity to the newly proposed Bike Share (Phases 1-4)?	How would the population be impacted by increased physical activity? What are the current baseline chronic diseases?	Chronic disease (obesity, diabetes, asthma, CHD, stroke, HTN) sickle cell	SPARCS, BRFSS, other HIAs	How will the change in physical-activity levels be measured over time? How will membership numbers and trends be tracked?
Does alternative/ active transportation have an impact on health outcomes?	Will projected changes in access/ exposure positively impact people? How will people with social or economic vulnerabilities be impacted?	Chronic disease (obesity, diabetes, asthma, CHD, stroke, HTN)	SPARCS, BRFSS, County Health Profiles - Common Ground Health, U.S. Census	What proximity standard will we utilize for projected engagement?
What decisions are currently being made that may impact Physical Activity levels by the Rochester Bike Share?	How does the identified Phasing of the project affect access to physical activity? Are there barriers to physical activity through the bike share? Do proposed bike-station locations prioritize neighborhood/ populations with health disparities? Do City or County policies align with the promotion of improved health outcomes?	Bike station proposed placement (map), chronic disease rates, comprehensive/ master plans.	GTC Bike Share Feasibility Study, Rochester 4.0 Comprehensive Master Plan, Monroe County Master Plan, City of Rochester Bicycle Master Plan.	Do national policies/ trends utilize bike-share to impact health outcomes?



PROJECT:	ROCHESTER BIKE SHARE			
Health Determinant:	Physical Activity			
Priority:	2 of 4 (identified health determinant)			
Geographic Scope:	City of Rochester, Monroe County			
Existing Conditions Research Questions	Framing	Indicators	Data Sources	Notes
What is the existing population in proximity to the identified bike- share stations (Phases 1-4)?	What population centers are in close proximity to the bike- share stations in Phases 1-4? What are the makeup of those populations? What is the population density of targeted neighborhoods?	Population by census tract, racial/ethnic makeup, household income	U.S. Census - American Fact Finder, 2015 ACS 5- year Population Estimate, GTC Bike Share Feasibility Study, ArcGIS	A repeat question reframed in the efforts to draw attention to social cohesion. - Baseline demographic and population information may still be needed.
What are the current trends in social cohesion in the proposed bike station phase neighborhoods?	What are current crime rates in the neighborhoods? Is there basic access to healthcare? What are home ownership/ security rates? Do residents feel their neighborhood is suitable for walking and physical activity?	Home ownership/ security rates, % that feel is suitable for walking and physical activity.	SPARCS, BRFSS, other HIAs, Monroe County Adolescent Health Report Card, MCAHS, Monroe County Youth Risk Behavior	Chronic disease, mental health, substance abuse are all identifiable health disparities within social cohesion. PEW Charitable Trusts also cites cancer as an affected health outcome of social cohesion.
	Are there other bike shares around the nation that have implemented programs to increase access and users within bike shares? Are there barriers to increased social cohesion occurring?	Reports from cities with successful bike-share programs, economic, social, or political factors.	Other HIAs, BRFSS, Bernard's typology of social cohesion	https://www.oecd.org/dev/pgd/46839973.pdf
What are examples of positive health outcomes that occur from increased social cohesion?	Are there identifiable issues of mental health? What are chronic-disease levels as they pertain to physical activity?	Chronic disease (obesity, diabetes, CHD, Stroke, HTN) mental health - including substance abuse (drug-related hospitalizations), stress, suicide mortality rates.	SPARCS, BRFSS, other HIAs, Monroe County Adolescent Health Report Card, MCAHS, Monroe County Youth Risk Behavior	
Are there any existing programs that are encouraging social cohesion in targeted neighborhoods here in Rochester/Monroe County?	What are these programs and how have they impacted social cohesion? What populations are these programs affecting?	Increased engagement, population demographics, increased physical activity, increased health outcomes.	Conkey Cruisers, Community Centers, YMCA, YWCA, RCA, R Community Bikes, NACTO, GTC, City of Rochester Bicycle Master Plan	Should national social cohesion efforts focused on bike share usage be integrated into this HIA?

PROJECT:		ROCHESTER BIKE SHARE		
Health Determinant:	Physical Activity			
Priority:	3 of 4 (identified health determinant)			
Geographic Scope:	City of Rochester, Monroe County			
Existing Conditions Research Questions	Framing	Indicators	Data Sources	Notes
What are the current socioeconomic conditions in the target neighborhoods?	What are the rates of poverty? What are the unemployment rates? What are the primary demographics of those affected in that group? Are certain targeted neighborhoods considered distressed?	Population by census tract, racial/ethnic makeup, household income	U.S. Census - American Fact Finder, 2015 ACS 5- year Population Estimate, GTC Bike Share Feasibility Study, ArcGIS, Quadrant Profiles	Are there other data sources including the BRFSS that capture issues of economic hardship/joblessness? (Fix margin)
What is the projected economic impact of the Rochester Bike Share?	Will the bike share improve neighborhoods? Is there a baseline for the bike shares' projected economic impact on businesses?	Analyses by other cities of economic impact of bike share. User/membership rate changes over time, user rate charges over time.	Rochester Area Bike Share Program Feasibility Study (p.12-13)	https://ntl.bts.gov/lib/51000/51900/51965/VT-2013-06.pdf
Will jobs be created as a result of the Rochester Bike Share?	Has Zagster Inc. identified new jobs that may be created to enable the bike share program to operate locally?	Reports from cities with bike shares on whether they have generated new jobs.	Rochester Bike Share Feasibility Study	
How will the bike share affect transportation and health-related costs for individuals?	What cost savings come from using alternative transportation and engaging in active transportation?	Economic data on health costs of active transportation/cycling, average costs of owning/maintaining a vehicle versus bike-share utilization.	Rochester Area Bike Share Program Feasibility Study (p.12-13), Zagster Inc., Rochester Bicycle Master Plan	
What programs have been implemented nationally to assist with increasing bike share membership among economically vulnerable populations? Could those programs be implemented in Rochester?	What percentage of national bike shares have an income-based subsidy intact? What is the criteria to receive a subsidy? How can barriers such as credit cards be overcome for membership/access?	Bike- share feasibility studies, bike share HIAs, NACTO	NACTO Bike Share Statistics	http://nacto.org/bike-share-statistics-2016/

PROJECT:		ROCHESTER BIKE SHARE		
Health Determinant:	Physical Activity			
Priority:	4 of 4 (identified health determinant)			
Geographic Scope:	City of Rochester, Monroe County			
Existing Conditions Research Questions	Framing	Indicators	Data Sources	Notes
Is the proposed distribution of bike share stations balanced across the City of Rochester?	Are the distribution of bike- share stations distributed equally amongst populations above and below the federal poverty level? Is access to employment impacted?	Population by census tract, racial/ethnic makeup, household income, Rochester Bike Share Feasibility Study.	U.S. Census - American Fact Finder, 2015 ACS 5- year Population Estimate, GTC Bike Share Feasibility Study, Quadrant Profiles, RDDC/GRE	
Are there food deserts in Monroe County and the City of Rochester? If so, where are they located and will the bike share help address this issue?	Will the bike share help improve access to healthier food options, such as supermarkets or other public markets?	Food insecurity rates (self-reported), proposed bike- station locations (are they in or near identified food deserts?)	Food Farms Health data, BRFSS, GIS, GTC Bike Share Feasibility Study, City of Rochester Renaissance Plan, Food Access Research Atlas - USDA	Food Farm Health Presentation
What are the current locations of full-service grocery stores in locations targeted for bike-share stations?	Are bike-share stations a reasonable distance from grocery stores? Are there proposed stations near farmers' markets or community gardens?	# of grocery stores/ markets near bike share stations; average distance from bike-share locations to grocery stores in Rochester that provide fresh produce.	Rochester Area Bike Share Program Feasibility Study, GIS, Rochester Bicycle Master Plan	Should metrics other than "full-service" grocery stores be included? (Corner stores with fresh food, farmers markets/ stands etc.)
What existing active transportation infrastructure or land use (parks, trails) have connections to existing grocery stores?	What key trails, parks or bicycle lanes connect to grocery stores in the city of Rochester? What proposed new bicycle infrastructure may improve food access?	Trail maps, bike-lane maps, parks in proximity to grocery stores.	Rochester Area Bike Share Program Feasibility Study, GIS, Rochester Bicycle Master Plan	Do we want to include public transportation that augments bike-share access to grocery stores/ markets?
What are existing policies or programs in Rochester or Monroe County regarding food access?	How can the bike share integrate with these previously existing programs?	City or Rochester, Monroe County Plans, academic/nonprofit reporting, food trucks.	Healthy Food Access Initiatives in Rochester report, Partners through Food case study (Tops), Foodlink	http://www.rochesterenvironment.com/PDF%20files/healthy%20food%20access%20initiatives%20in%20rochester%20042915.pdf



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