

Winona County Active Living Plan HIA



DRAFT

Minnesota Department of Health
Minnesota Climate & Health Program
625 Robert Street North
PO Box 64975
St. Paul, MN 55164-0975
651-201-4899
health.mn.gov/hia/

April 2015

This project is supported by a grant from the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts. The views expressed are those of the author(s) and do not necessarily reflect the views of The Pew Charitable Trusts or the Robert Wood Johnson Foundation.

TABLE OF CONTENTS

Table of Contents	2
Abstract	4
Objective:	4
Methods:	4
Results:	4
Conclusions:	5
Introduction	6
Winona County Active Living Plan	6
Health Impact Assessment	6
Methods	8
Data Collection and Analysis	8
Demographic and Socioeconomic Information	8
Health Outcome Data	8
Self-reported Health Conditions and Behaviors	9
Physical Health	9
Mental Health	9
Traffic Crash Data	10
Literature Review	10
Stakeholder Engagement	11
Results/ Findings of HIA	13
Heart Disease and Diabetes	13
Traffic and Pedestrian Safety	13
Mental Health	14
Education and Resources	15
Discussion	17
Recommendations	17
Recommendation 1: Formalize the Active Living Subcommittee and Broaden membership	17

Recommendation 2: Develop and promote community-wide messaging on the benefits of a healthy lifestyle 17

Recommendation 3: Collaborate with city, county and state to develop a safe, convenient system for bicyclists and pedestrians..... 18

Recommendation 4: Target Active Living activities towards those populations that would benefit the most 20

Recommendation 5: Worksite and Live-Site Wellness 20

Evaluation & Limitations..... 20

Conclusion 23

References..... 24

DRAFT

ABSTRACT

OBJECTIVE:

The objective of the Winona County Active Living Plan HIA is to assess the impact of the Winona County Active Living Plan on heart disease and diabetes, pedestrian and traffic safety, mental health, and education and resources for Winona County residents, and develop recommendations to mitigate negative impacts and promote positive impacts.

METHODS:

This study utilized health impact assessment (HIA) methodology to assess the health outcomes related to implementing the draft Winona County Active Living Plan. The HIA relied on stakeholder input, data analysis and literature review to determine how the implementation of the Active Living Plan would affect the community's health concerns, including heart disease and diabetes, pedestrian and traffic safety, mental health, and education and resources, compared to baseline conditions. The HIA utilized literature review, new and existing community surveys, focus groups, health outcome data, GIS analysis of traffic volumes and crash data, and an inventory of education opportunities and resources to develop a baseline and project how these outcomes would change if the Active Living Plan were implemented. An Advisory Committee of stakeholders used the findings to develop recommendations to improve the Active Living Plan to promote the positive outcomes.

RESULTS:

The Winona County Active Living Plan has the potential to decrease rates of obesity and heart disease by increasing physical activity. This will be done by implementing policies, infrastructure investments, education and programming that make active living a part of "daily routines, such as walking and bicycling for recreation, occupational, or purposeful transportation which replace inactive trips in vehicles" (draft Active Living Plan, May 2014).

The Active Living Plan aims to increase bicycle and pedestrian traffic by replacing some motor vehicle traffic with these more active modes of travel. Conflicts between motorized and non-motorized traffic may increase on routes designated for bicycles and pedestrians, but decrease on other routes due to the shift of bicycles and pedestrians to designated routes. Participants in focus groups shared concern over the increase in truck traffic in the city of Winona which has raised safety concerns for pedestrians and bicyclists. Proximity of trails and bike routes to residences and the equitable distribution of education and programming resources will impact trail and route usage and who uses the trails and routes.

Increases in physical activity will have a positive impact on mental health outcomes for active individuals in the community. It is unknown whether the Active Living Plan will significantly impact access to mental health services. Mental health benefits of physical activity can be promoted by nurses, physicians and psychiatrists as an intervention with multiple co-benefits.

The programming, education and communication objectives outlined in the Active Living Plan will likely increase residents' awareness of 1) the importance of physical activity, 2) opportunities to incorporate

active transportation and other healthy behaviors into their daily lives, and 3) safe travel behavior for motorists, pedestrians and bicyclists. The programming and increased awareness may result in positive behavior changes and health outcomes, such as reduced rates of heart disease, obesity, diabetes, improved mood and mental health outcomes, and reduced crash rates.

CONCLUSIONS:

Overall, the Winona County Active Living Plan will have positive impacts on heart disease and diabetes, pedestrian and traffic safety, mental health, and education and resources for Winona County residents, however there is always room for improvement. The Winona County Active Living Plan HIA Advisory Committee developed five recommendations for the Winona County Active Living Plan to improve the four key health concern areas. The recommendations included 1) formalizing the Active Living Subcommittee and broadening its membership; 2) developing and promoting consistent messaging on the benefits of healthy lifestyles; 3) developing a safe, convenient system for bicyclists and pedestrians; 4) targeting Active Living activities towards those populations that would benefit the most; and 5) promoting worksite and live-site wellness programs.

The HIA has already had a positive impact through both the process of conducting the HIA and its initial impact on the Active Living Plan and related activities. The HIA achieved the goals outlined by the HIA Advisory Committee during Scoping and brought knowledge and new capacity to the participating Advisory Committee members. The HIA recommendations were incorporated into the final draft of the Active Living Plan and many of the action items are already being implemented, such as work on creating a one-stop-shop of resources, a county-wide interactive bike map, expanding Active Living Advisory Committee participation, and incorporating health into future transportation planning projects.

INTRODUCTION

After cancer, the top leading causes of death in Winona County are heart disease (161.1 per 100,000) and unintentional injury, including motor-vehicle crashes (10.0 per 100,000) (MCHT, 2013). These outcomes are directly impacted by our reliance on motor-vehicles and the primacy we give them in our society, which lead to unnecessary crashes and sedentary lifestyles. Focus groups regularly mentioned the real and perceived safety concerns for pedestrians and bicyclists in the community, which affect physical activity levels, injuries and death.

Mental health conditions, such as anxiety and depression, affect over 20 percent of the population of Winona County. Mental health was identified as a top priority by the Winona Health Community Health Needs Assessment and was raised as a critical component of being “healthy” by a series of focus groups with Winona County residents. Despite the gravity and pervasiveness of the issue, there is less attention given to mental health than physical health and the field still carries a stigma that could inhibit the resources devoted to it.

Starting healthy habits and behaviors at a young age is proven to influence life-long decisions. For example, adopting walking and biking as valid modes of transportation and incorporating regular physical activity as a young person increases the likelihood of continuing these behaviors as adults (Hankinson et al., 2010). While there has been an increase in “healthy” messaging from various sources, there lacks a concerted, consistent effort to make Winona County residents aware of the problem, the solution, and the resources that already exist in the community.

Comprehensive and safe infrastructure for pedestrians, bicyclists and other activities and awareness of available infrastructure and resources could have very positive impacts on physical activity levels, rates of crashes, and mental health outcomes.

WINONA COUNTY ACTIVE LIVING PLAN

In 2013, Winona County received funding from the Minnesota Department of Health (MDH) Statewide Health Improvement Program (SHIP) to complete an Active Living Plan. The purpose of an Active Living Plan is to improve health outcomes related to physical activity by providing direction on policies and practices to create active communities through non-motorized transportation (biking and walking) and access to community recreation facilities. The Active Living Plan effort was led by the Winona County SHIP coordinator and a working group of community organizations and agency representatives in the county.

HEALTH IMPACT ASSESSMENT

Health impact assessment (HIA) is a prescriptive methodology for assessing the potential health impacts, and distribution of impacts, of a proposed plan, policy, or project on a population and developing recommendations to promote the positive impacts and mitigate the negative ones. Steps include selecting a plan, policy or project (Screening), determining what health impacts to assess (Scoping), establishing an existing overview of the community and assessing how that will change if the policy, plan or project is implemented (Assessment), and developing recommendations to promote the positive impacts and mitigate the negative ones (Recommendations). The final step of HIA (Evaluation and

Monitoring) evaluates the process of conducting the HIA and establishes a plan for monitoring health outcomes following the implementation of the plan, policy or project.

The Winona County Active Living Plan was selected for an HIA for four main reasons:

- (1) Winona County is facing changes in demographics, including an aging population in rural communities with longer life expectancy than their forbearers; changes in economics, such as movement to more service and technology oriented industries (which may affect daily work routines and activities); and changes in services in declining rural areas (which may affect access to services or ability to walk to services). All of these changes will likely have significant impacts on the health of the population.
- (2) There was strong interest from Winona County staff to build capacity at the County to conduct HIA, and a relationship had been established with HIA practitioners at MDH
- (3) There was buy-in from the County Board and Community Health Board for an HIA on the Active Living Plan
- (4) The additional support (staff and resources) that the HIA could bring to the Active Living Plan would allow it to be more inclusive of community input and more comprehensive in policy areas that impact active living and related health outcomes.

DRAFT

METHODS

The HIA used a combination of data collection and analysis, literature review, and surveys and focus groups with community members to determine the most important health issues in the county and how they might be affected by the Active Living Plan.

DATA COLLECTION AND ANALYSIS

To understand the impact of the Active Living Plan on the health of the population, a baseline assessment of health status was conducted. Data collected for the baseline included demographic and socioeconomic information from the American Community Survey and Decennial Census; health outcome data from MDH; self-reported health conditions and behaviors from the 2013 Winona County Health Needs Assessment survey; and traffic crash data from the Minnesota Department of Transportation (MnDOT).

DEMOGRAPHIC AND SOCIOECONOMIC INFORMATION

Winona County had a median age lower than the state, but had a smaller percentage of children (less than 18 years old) and slightly greater percentage of older adults (65 years old and older) (American Community Survey 5-Year Estimates, 2007-2011). The median age is likely skewed by the high proportion of college students in the county. Winona County's population was less diverse overall than Minnesota, including race, ethnicity and people who speak a language other than English. However, some areas of Winona had greater percentages of diverse populations, including St. Charles and Hillsdale Township.

Winona County's median household income was lower than Minnesota's by \$14,000 (American Community Survey 5-Year Estimates, 2007-2011). A larger percentage of Winona County's population was in poverty than Minnesota, but a smaller percentage of children (less than 18) were in poverty. A smaller proportion of Winona County households received food stamps (SNAP) than Minnesota, and a smaller percentage of those households receiving food stamps were families with children. A slightly higher percentage of the households receiving food stamps were older adults (60 years older and older).

Regarding educational attainment, a greater percentage of Winona's population 18 to 24 years old had high school diplomas or more education than Minnesota (American Community Survey 5-Year Estimates, 2007-2011). However a smaller percentage of Winona's population 25 years older and older had a Bachelor's degree or more education.

The Winona County unemployment rate between May 2013 and April 2014 was similar to the state (DEED, 2014). Also similar to the state was the percentage of Winona County's population without insurance. A higher percentage of families in Winona County were two-parent headed households.

HEALTH OUTCOME DATA

In Winona County, cancer, heart disease and unintentional injury (including motor vehicle crashes) were the top three leading causes of death. However, despite higher mortality rates in cancer, heart disease and motor-vehicle crashes, Winona County had significantly lower rates of hospitalizations for asthma,

heart attacks¹ and chronic obstructive pulmonary disease (COPD)² than Minnesota, as well as unintentional injuries, assaults (homicides) and self-directed violence (suicides) (MCHT, 2013).

SELF-REPORTED HEALTH CONDITIONS AND BEHAVIORS

Physical Health

Based on self-reported conditions, more than 34 percent of the adult population had been told at some point in their lives by a health professional that they were overweight; nearly 28 percent had high cholesterol; and almost 26 percent had high blood pressure (2013 Winona County Health Needs Assessment). Based on self-reported height and weight, 34 percent of the adult population was overweight and 27 percent were obese at the time of the survey.

Less than 50 percent of adults achieved recommended levels of moderate or vigorous physical activity (2013 Winona County Health Needs Assessment). Physical activity was primarily achieved by using walking trails, bike paths and parks, playgrounds, community sports fields, or exercise at home. Only 21 percent of adults exercised at a health club and 10 percent exercised at a recreation center. Major barriers to being physically active included lack of time, cost, and lack of willpower.

Mental Health

Twenty-one percent of 2013 Winona County Health Needs Assessment Survey respondents said that they had been diagnosed with depression at some point in their lives. This compares to 17 percent for the state of Minnesota. Approximately 15 percent of Winona adults had been diagnosed with anxiety or panic attacks, and 5 percent with other mental health problems. The responses for depression, anxiety and other mental health problems were similar for the general population and immigrant population.

The 2013 Minnesota Student Survey for Winona County indicated that long-term (i.e., lasting 6 months or more) mental health, behavioral or emotional problems were a bigger issue for females than males, and increased with age, ranging from seven to eight percent in 5th grade males and females to up to 19 percent in high school females. Within the past year, approximately 15 percent of 9th and 11th grade females were treated for mental health, emotional or behavioral problems. The highest rates of depression, hopelessness, self-injury and suicidal thoughts and attempts occurred in females in the 9th grade.

The incarcerated population is often not included in population statistics, but this group of people can experience worse health outcomes. Statewide, approximately 25% of the people in Minnesota prisons have a mental illness, with the percentage jumping to 60% in Minnesota jails (NAMI-MN, 2009).

Winona County does have a number of counseling and mental health service providers, as well as support groups for chemical abuse and other conditions. However, surveys, focus groups and one-on-one conversations reveal that the quantity and quality of services may not be sufficient for the population. The lived experience in Winona County would indicate that there is an insufficient level of mental health

¹ for population 35 years of age and older

² for population 45 years of age and older

services for the community, with patients experiencing long wait times, having to call multiple times to schedule an initial appointment, and issues with access and transportation to appointments.

Traffic Crash Data

Locations of motor vehicle crashes, annual average daily traffic volumes and locations and counts of bicyclists and pedestrians were analyzed using geographic information systems (GIS) to tease out patterns. Motor vehicle crashes were mostly likely to occur on roads with the highest average annual daily traffic (AADT), major highways and interstates, and within cities with larger populations and greater proportions of vulnerable populations. Bicycle crashes occurred more frequently within cities with larger populations, on lower traffic roads and on designated bicycle routes, specifically routes that are in traffic including bike lane, bike route or striped shoulder. Pedestrian crashes occurred more frequently in cities with larger populations, however crashes did not appear to occur on the high traffic volume roads nor was there any obvious relationship with the presence of bike routes or trails. Pedestrians and bicyclists were involved in a combined two percent of crashes, however they accounted for 23 percent of fatalities (MnDOT, 2014).

Pedestrian and bicycle counts were available for the city of Winona only. The intersections with the highest pedestrian and bicycle counts are located in the heart of downtown Winona where the most pedestrian and bicyclist crashes have occurred between 2011 and 2013 (MnDOT, 2014). In general, the areas with the highest motor vehicle traffic volumes have moderate levels of pedestrian and bicycle traffic, and areas with the highest pedestrian and bicycle traffic have moderate levels of motor vehicle traffic. The results indicate that there are some areas of potential conflict³ between motorists and pedestrians and bicyclists, especially at major intersections and in the downtown core.

LITERATURE REVIEW

In addition to data collection and analysis, the HIA relied on peer reviewed literature and previously published HIAs on similar topics to determine how the policies proposed in the draft Winona County Active Living Plan would affect health outcomes, specifically related to heart disease and diabetes, traffic and pedestrian safety, mental health, and education/resources. Literature was discovered using keyword searches in online repositories, including PubMed, Active Living Research, and Google Scholar.

Previous HIAs that were relevant to this one and used for guidance and background material included the Aberdeen Pedestrian Transportation Plan HIA, the Bernalillo County Pedestrian and Bicyclist Safety Action Plan HIA, the Clark County Bicycle and Pedestrian Master Plan HIA, Davidson Walks & Rolls: Active Transportation Master Plan HIA, the East Lansing Non-Motorized Transportation Plan and Climate Stability Plan Recommendations HIA, Washington County's Active Transportation Policies HIA, and the Pedestrian and Bicycle Information Center's white paper *Using Health Impact Assessments to Evaluate Bicycle and Pedestrian Plans*.

³ A "conflict" between a pedestrian and motorist or bicyclist and motorist is a point where two roadway users (in this case of different travel modes) must share a space, such as an intersection, that could result in contact (i.e., a crash).

STAKEHOLDER ENGAGEMENT

Stakeholder participation is an important component of effective, equitable, and ethical decision making. It is a critical part of the HIA process and supports the core values of HIA, including: democracy, equity, sustainable development, and ethical use of evidence (SOPHIA, 2010). The Winona County Active Living Plan HIA developed a stakeholder engagement plan to guide the process of conducting the HIA. Key components of the plan included an Advisory Committee, a County Livability Survey, a series of focus groups, and additional one-on-one interviews with stakeholders.

The HIA Advisory Committee was designed to include stakeholders from a broad set of interest groups so that it would be representative of the community at large and the most vulnerable stakeholders, such as the elderly and impoverished. Organizations represented on the Advisory Committee included Winona Volunteer Services, Project FINE, The Friendship Center, local schools, senior living, Winona State University (WSU), and health care providers. The Advisory Committee received additional support and participation from county staff and elected officials, including: the Director of Planning and Environmental Services, the Director of Community Services, the Public Health/Community Services Supervisor, and two County Commissioners. The HIA Advisory Committee was the ultimate decision-making entity for the HIA. Committee members decided who should participate and how. They reviewed proposed survey and focus group questions and approved the final selection. They disseminated the survey and recruited focus group participants. They selected the final health determinants and approved the research plan. They reviewed baseline county data and impact assessment findings, made suggestions for additional areas of analysis, and developed final recommendations.

The Livability Survey asked respondents to 1) rate their access to specific stores and services, 2) rank the priority of issues for Winona County to address, 3) list their favorite thing about Winona County, 4) list what they would like to see changed in Winona County, and 5) to share anything else they would like about the county. The survey was available in English and Spanish and was distributed to community-based-organizations, local schools, local governments, and service providers between April and June 2014. A total of 730 surveys were completed either online or in paper format.

Survey respondents were mostly from the city of Winona (62 percent), with representation from St. Charles (eight percent), Goodview (five percent), Lewiston (four percent), Minnesota City (two percent), and other places throughout the County. Generally, responses indicated that stores and services were accessible. 'Restaurants that are both healthy and affordable' and 'good jobs or job training centers' had the fewest 'easily accessible' responses, and more 'sometimes', or 'rarely' accessible responses. Crime prevention, water quality, air quality, and access to jobs/employment received the most 'high priority' responses. The most common response to the question about the favorite part of living in Winona was the beauty/scenery and natural resources (bluffs, lakes, river, and parks). There was no overwhelming theme to what respondents wanted to see changed. More restaurants, job opportunities/ higher wages, and road improvements/ intersection safety were the most common (noted by at least 10% of responses).

The HIA project team and HIA Advisory Committee hosted four focus groups to obtain community members' perceptions and concerns related to health and quality of life. Each focus group had a different

target population, including older adults, college students, and young families. The focus groups were coordinated with community based organizations and institutions including, the Winona Friendship Center, Winona State University, the Learning Club, and Winona Early Childhood Family Education (ECFE). The focus groups were held between April and June 2014. While there was a wide spread of ages of participants in the focus groups, participants were mostly white and female.

Themes that came out of the focus groups included the need for better communication and advertising of community services and events. Participants liked the natural beauty, the size of the community, the recreational amenities, the friendliness, the culture of volunteering, the number of events and arts/culture, and the presence of academic institutions. They disliked traffic congestion and safety issues, road conditions, cold winters, physician turnover, access to activities and goods and services if you didn't own a car, and the limited amounts of specialty items (services and goods), as well as jobs. When asked to describe what 'healthy' meant, all groups touched on physical activity, access to healthy food, and access to health care and services. Three of the groups mentioned the importance of mental and social health.

Additional stakeholder engagement included one-on-one communication with stakeholders in Winona County including a pre-school teacher living in St. Charles who was sight impaired and provided very constructive feedback on areas of the Assessment and draft Recommendations that did not reflect rural residents or negatively impacted sight-impaired individuals, and an older woman who worked for the St. Charles Resource Center and provided feedback on behalf of the rural isolated and elderly populations. Additionally, when the final recommendations were completed by the HIA Advisory Committee they were sent to the County Livability Survey respondents who had provided their contact information and focus group organizers and attendees for their review and comments.

RESULTS/ FINDINGS OF HIA

The HIA Assessment has demonstrated the potential impacts of the Winona County Active Living Plan on four key health determinants: 1) lifestyle choices that affect heart disease and obesity, 2) traffic and pedestrian safety, 3) mental health, and 4) education and resources. This section will briefly summarize each focus area.

HEART DISEASE AND DIABETES

Heart disease, stroke and obesity are clearly linked to lifestyle. Behavioral risk factors are responsible for about 80 percent of coronary heart disease and cerebrovascular disease (WHO, 2011). Heart disease can be prevented by addressing risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity, high blood pressure, diabetes and raised lipids (WHO, 2014). Heart disease also is a major concern for health equity. Over 80 percent of the world's deaths from cardiovascular disease occur in low- and middle-income countries (WHO, 2014). This is likely the result of lack of opportunities for lower income persons to afford healthy foods and achieve recommended levels of physical activity, compounded by reduced access to health care services.

Lifestyle patterns are very difficult to change. Policies that create conducive environments for making healthy choices affordable and available are essential for motivating people to adopt and sustain healthy behavior. Successful interventions can include incentives and programs provided through employers, worksites and health plans; physical activity provided by educators and schools; community-wide campaigns; and street-scale design and land-use policies and practices, such as street lighting, infrastructure projects to increase safety of street crossing, and use of traffic calming approaches, and proximity to destinations (Kottke et al., 2013). A broad based, community-wide approach is needed to alter lifestyle choices and the culture of an area.

The Winona County Active Living Plan has the potential to decrease rates of obesity and heart disease by promoting healthy lifestyles, specifically increasing physical activity, through fostering a culture of an active living community in the Winona County area, which will be done by making active living a part of “daily routines, such as walking and bicycling for recreation, occupational, or purposeful transportation which replace inactive trips in vehicles” (draft Active Living Plan, May 2014). Specifically, the draft Active Living Plan includes a Complete Streets policy to plan for pedestrians and bicyclists in future roadway design, community-wide challenges and events, and development of education and resources to promote active living across the county.

TRAFFIC AND PEDESTRIAN SAFETY

Traffic and pedestrian safety is improved through supportive policies, design of roadways and bicycle and pedestrian infrastructure, and education. Regarding policies and the design of roadways and bicycle and pedestrian infrastructure, the Active Living Plan proposes a Complete Streets policy to plan for pedestrians and bicyclists in future roadway design, as well as promoting the use of time tested and new innovative tactics to create walkable/bikeable communities. While no specific tactics are identified, some tactics that the Active Living Plan may consider include: road diets (reducing four lanes to two lanes and a middle turn lane), narrower streets with lower design speeds, cycle tracks (also known as “separated” or

“protected” bike lanes) alongside major streets, on-street bike routes, off-street bike paths, sharrows (shared car / bike lanes), and traffic circles.

Studies have shown that implementation of many of these tactics increase the number of bicyclists and safety of bicyclists (Thomas and DeRobertis, 2013), with the exception of sharrows and traffic circles, which can increase risk (Teschke et al., 2012; Harris et al. 2013; Reynolds et al, 2009). The most effective approach for the Active Living Plan may be to combine physical segregation on arterial roads (with intersection treatments) and low speed, bicycle-friendly local streets (Macmillan et al, 2014). Using data from the National Safety Council on comprehensive injury costs, Winona County could save \$32.5M over three years if they achieved a 40 percent reduction in crashes/injuries from implementing area-wide comprehensive traffic calming measures. This estimate does not include benefits related to increased physical activity and related health outcomes from lower obesity/diabetes rates.

Successful implementation of the Active Living Plan objectives, specifically the Complete Streets policy, inclusive bike lanes, and creation of bikeable/walkable communities, will likely increase bicycle and pedestrian traffic across the county. Some studies show that increasing the number of bicyclists and pedestrians may lead to enhanced overall safety for all road users (Garrick & Marshall, 2011). Cities with high rates of bicycling have lower risk of fatal and severe crashes for all road users due to reduce vehicle speeds as a result of street network design (more specifically street network density than connectivity) and the presence of a large number of bicyclists (Garrick & Marshall, 2011).

On the other hand, increasing the number of bike lanes on roads and the number of pedestrians crossing curb-cuts and intersections could potentially have negative impacts on traffic conflicts. Providing infrastructure for bicyclists has been shown to redirect new and existing bicycle traffic to the routes with designated infrastructure and off of other routes (Parker et al, 2013). While this may reduce conflicts on many routes, it may increase traffic conflicts between motorists and bicyclists on the roads with bike lanes. Additionally, increases in overall bicycling activity may increase the total number of crashes but reduce the actual rate of crashes per bicyclists.

In addition to the policy and design objectives that support bicycle and pedestrian infrastructure, the Active Living Plan includes objectives for various programming and educational activities to increase awareness in the community around active living. Objectives include community-wide events, county-wide challenges, institutionalized active living programs, and formal and informal education on both the benefits of active living and public safety laws. High visibility activities and campaigns have been found to not only increase active transportation/physical activity, but also have a lasting impact on public perception and decision makers' political will (Deehr and Shumann, 2009). Additionally, high profile events and educational activities increase drivers' awareness of pedestrians and bicyclists, as well as encourage travelers of all modes to be safer by following the rules of the road.

MENTAL HEALTH

In addition to positive physical health benefits, physical activity has been shown to have positive mental health benefits as well, including relieving symptoms of depression and anxiety and improving mood (CDC, 1999). The Active Living Plan objectives to implement a Complete Streets policy, create inclusive

bike lanes, and create walkable/bikeable communities are likely to increase physical activity levels through active transportation. Increases in physical activity level will have positive impacts on mental health for active individuals in the community.

Mental health benefits of physical activity have been studied at a variety of age levels. Older adults have better mental health the more active they are and in turn are more physically active when they have good mental health (Steinmo et al, 2014; Griffiths et al., 2014). The effects of physical activity on mental health are greater with social rather than individual physical activity (Mortazavi, 2013). Similarly, college students who were more physically active reported better mental health outcomes than those who were not, and saw even greater outcomes when the physical activity involved socializing (Vankim and Nelson, 2013). Children who began and maintained physical activity levels into young adulthood had better mental health outcomes than children who were inactive or those who did not maintain physical activity levels (Rangul et al, 2012). For women specifically, physical activity promoted positive mental health outcomes even after adjustments for socio-demographic, work-related and lifestyle factors, health and body mass index (Griffiths et al., 2014).

Three of the objectives outlined in the Active Living Plan are about programming, including programs with government agencies, institutions, and private organizations, or community events to engage residents in physical activity in fun or competitive ways. Bringing community members together for celebration around a shared focus can build community cohesion and social networks. People with higher levels of perceived social connectedness have lower levels of stress hormones (Uchino et al., 1996) and less severe symptoms of depression (Ferris, 2012). Additionally, the Active Living Plan could increase residents' access to transportation alternatives, which is a critical issue for isolated elderly to ensure they can participate in social lives, which in turn promote mental health and wellbeing.

The Active Living Plan is unlikely to have a direct impact on the number of mental health services provided in Winona County. Implementation of a Complete Streets policy and inclusive bike lanes on county roads, as well as enforcement of public safety laws may increase accessibility of existing mental health services by increasing options for alternative modes of transportation.

While the Active Living Plan may not affect access to mental health care for Winona County residents, mental health care professionals and patients can benefit from increased awareness and programming for active transportation. There is a clear and important relationship between physical activity and mental health. Mental health nurses are well positioned to encourage and assist consumers to engage in physical activity, although they might lack the educational preparation to perform this role effectively (Happell et al, 2011). One study found that the optimal physical activity threshold volume for mental health benefits was of 2.5 to 7.5 hours of weekly physical activity. Though the associations varied by gender, age, and physical health status, individuals who engaged in the optimal amount of physical activity were more likely to have reported better mental health (Kim et al., 2012).

EDUCATION AND RESOURCES

One of the common themes that came out of the focus groups was the need for increased awareness around what resources and opportunities already exist for active transportation, community centers,

physical activity, and recreation. Research shows that increasing knowledge about the benefits and opportunities for physical activity may increase rates of physical activity, however, these strategies are more effective when combined with other components, such as support groups, risk factor screening and education, community events, targeted campaigns, marketing, and informational workplace programs (Reed et al., 2004; Task Force, 2002; Maiback et al., 2009).

The Active Living Plan objectives around programming community-wide events and competitions will increase the number and type of programs and resources for active living and active transportation. The Active Living Plan objectives around education and communication will increase community members' awareness of the additional programs and resources. Together, these strategies should be effective at increasing physical activity through active living and transportation.

It is important to note that not all community members receive information the same way or are motivated by the same messages. Advertising to those who are most at-risk or would obtain the greatest benefit from knowing about the resources may have the greatest impact on community health outcomes. More at-risk populations may include families with young children, college students, older adults (especially those living alone and/or not currently connected to the Friendship Center programs), lower income persons, and immigrants. Communication materials that are prepared for each audience to address their needs; that use language that speaks to specific audiences; and that are offered in a medium audiences prefer to work with (e.g., social media for college students, flyers and mailings for older adults, etc.) can increase the effectiveness of the marketing and education strategies.

DISCUSSION

RECOMMENDATIONS

The Winona County Active Living Plan HIA Advisory Committee developed five recommendations in response to the areas of concern selected through Scoping and the findings of the Assessment to promote the positive health impacts and mitigate the negative health impacts of the Winona County Active Living Plan. These recommendations included 1) formalizing the Active Living Subcommittee and broadening its membership; 2) developing and promoting consistent messaging on the benefits of healthy lifestyles; 3) developing a safe, convenient system for bicyclists and pedestrians; 4) targeting Active Living activities towards those populations that would benefit the most; and 5) promoting worksite and live-site wellness programs.

Recommendation 1: Formalize the Active Living Subcommittee and Broaden membership

The Winona County Active Living Subcommittee should 1) become the official working group to implement the Active Living Plan and advance the work around healthy lifestyles in Winona County and 2) pool resources and broaden participation, including but not limited to interested members from the Winona County Active Living Plan HIA Advisory Committee and the Active Living Plan working group, participants from district and parochial schools, colleges and universities, representatives from across the county, and participants representing a youth perspective.

Action 1: By January 31, 2015, the Active Living Subcommittee should meet to assess current membership and ensure that 25 percent of participants are from outside the city of Winona.

Action 2: By March 31, 2015, the Active Living Subcommittee should investigate the possibility of adding a youth member to the Subcommittee, and invite new members from across the county.

Recommendation 2: Develop and promote community-wide messaging on the benefits of a healthy lifestyle

The Winona County Active Living Subcommittee should collaborate with Winona County, Winona Health, LiveWell Winona, and other appropriate existing organizations and partners to 1) develop consistent messaging on the benefits of a healthy lifestyle, including mental health benefits, 2) create a Dissemination and Evaluation plan for the message, and 3) create one-stop-shop of active living resources for the public and providers.

Action 1 - Craft the Message: By October 31, 2015, the Active Living Subcommittee and partners will develop consistent messaging on healthy lifestyles and wellness. The message(s) will include how active living and physical activity affect mental health.

Action 2 – Disseminate and Evaluate the Message: By October 31, 2015, the Active Living Subcommittee and partners will develop a Dissemination and Evaluation Plan and starting November 1, 2015, they will begin to disseminate the healthy living and wellness messaging using this Plan.

Dissemination: The Plan will identify the audiences who receive the message, the strategies and tactics for disseminating the message, and the parties responsible for disseminating the message, such as the

county staff working in public health and other departments, the Active Living Subcommittee, WSU staff and students, the Chamber of Commerce and local businesses and employers, clinics and health care providers, etc. Key audiences for messages include the more vulnerable groups in the community; for example, high school freshman girls are a key audience for mental health messaging due to their higher rates of mental health issues than students of other grade levels and genders.

Evaluation: The Plan will assess whether the message gets out and if it is effective. Evaluation will use the Community Health Needs Assessment survey results as a baseline and then evaluate if there has been change in behavior and awareness using results from subsequent surveys, which are conducted every three years. The evaluation will also assess whether the county has implemented health-promoting policies and whether it needs new health-promoting policies.

Action 3 – Develop and Market One-Stop-Shop for Resources: Starting in January 2015, Winona County and the Active Living Subcommittee will work with Live Well Winona to create a one-stop-shop for all Active Living related resources, events, educational opportunities, etc.

First, the partners will conduct an audit of the Live Well Winona website to determine resources that need to be added and how easy it is to access those resources. The one-stop-shop can build off of the resources and calendar that Live Well Winona already provides to ensure information is complete for all activities, resources, events, educational opportunities, etc. in the community and that it is reaching all audiences (e.g., seniors, college students, families, etc.) by various forms of media (e.g., print, electronic, social media sites, apps, etc.).

Second, resources will be added to appropriate places on the Live Well Winona website on an on-going basis. Resources may include Park and Recreation mailings, Community Education offerings, YMCA activities, Winona Health events, bike route maps, ski, paddle boat and other outdoor sports rentals, and events, such as runs, walks, and bike events. One area identified for reorganization and additional resources is mental health: Live Well Winona should build out mental health resources following the inventory of the Live Well Winona website and consider reorganizing the mental health resources (currently housed under spiritual health resources) and/or link mental health resources to physical health and other areas.

Finally, the bigger piece of Action 3 is making people and organizations aware of the one-stop-shop of resources. The Live Well Winona website and resources should be marketed as part of the messaging developed and disseminated in Actions 1 and 2. To track effectiveness, by June 2015 the Active Living Subcommittee should use the number of Live Well Winona website hits, Live Well Winona Facebook page “likes,” and number of people who request additional information to establish a baseline of current activity and goals for annual increases in activity going forward (e.g., 20% increase in website hits).

Recommendation 3: Collaborate with city, county and state to develop a safe, convenient system for bicyclists and pedestrians

The first piece of this recommendation is a language clarification. The Active Living Plan includes a strategy that says, “Designate program dollars for the Winona County Trail plan to create inclusive bike lanes on county roads that are 8’ wide and paved.” The strategy should be clarified to read, “Designate

program dollars for the Winona County Trail plan to create inclusive bike lanes on existing county roads that currently have 8' wide shoulders that are paved. The County Engineer should refer to AASTHO standards for safety when designing the inclusive bike lanes." The Active Living Plan should note that there are very few county roads with 8' wide shoulders and they are almost exclusively within city boundaries.

The second part of this recommendation is for the Active Living Subcommittee to collaborate with planners and engineers from all jurisdictions (city, county and state) to develop a safe, convenient system for bicyclists and pedestrians in Winona County. There are four steps to take in order to develop such a system.

Action 1: Document the existing system and conduct an analysis of gaps. By June 2015, the Active Living Subcommittee will complete a map of the bicycle system in Winona County that is currently under development. By September 2015, Winona County GIS Department will partner with the cities to develop a countywide sidewalk inventory.

Action 2: By September 2015, the Active Living subcommittee and Winona County engineer/public works/planning will identify where there may be pedestrian safety concerns or unsafe biking conditions, such as heavier vehicular traffic, frequent driveways, high travel speeds, crash locations, condition of streets (potholes, metal plates, debris), etc. The HIA Technical Assessment⁴ provides a list of locations of bicycle crashes and pedestrian crashes in the city of Winona, and areas of concern for both bicycles and pedestrians that were identified in the survey responses and focus groups across Winona County. Additionally, the Winona County GIS Department will develop a mobile application (app) for users to report poor or unsafe conditions to augment the infrastructure inventory and crash data.

Action 3: By October 31, 2015 the Active Living subcommittee and Winona County engineer/public works/planning will use the bicycle and pedestrian infrastructure inventory and assessment of unsafe conditions to select streets that need sidewalk improvements or on- and off-road bicycle facilities and determine the best management practices that should be implemented on those selected areas. The HIA project team developed a list of possible strategies to promote the safety and comfort of pedestrians and bicyclists that is available upon request. Additionally, starting in 2016, the Active Living Subcommittee should participate in the annual review of the Capital Improvement Plan (CIP), which is the five-year plan that allocates funding to various infrastructure projects, and develop a toolbox of alternative sources of funding for bicycle and pedestrian infrastructure.

Action 4: To institutionalize safe and convenient bicycle and pedestrian infrastructure in future roadway design and construction, starting after October 31, 2015, the County should investigate developing countywide design guidelines for County roads that incorporate Complete Streets concepts and best practices when updating and constructing roads. The County should consider coordinating with the cities to develop complementary guidelines that accommodate bicyclists and pedestrians.

⁴ [HIA Technical Assessment \(www.health.state.mn.us/divs/hia/winona.html\)](http://www.health.state.mn.us/divs/hia/winona.html)

Recommendation 4: Target Active Living activities towards those populations that would benefit the most

Winona County should target programming, resources (i.e., funding), appropriate messaging (i.e., translation), and Policy-Systems-Environmental (PSE) change around healthy lifestyles towards those persons that would benefit the most. By June 1, 2015, the Active Living Subcommittee will use the Community Health Needs Assessment and Project Fine focus group results to establish a baseline of at least five different ways of evaluating access and behavior of disadvantaged groups (e.g., consumption of healthy foods, physical activity rates or access to health insurance by race/ethnicity, income or language). This baseline data will be used for crafting and disseminating healthy living messages outlined in Recommendation 2 and for monitoring progress every three years using updates to the Community Health Needs Assessment.

Recommendation 5: Worksite and Live-Site Wellness

Worksite and live-site (or home-based) wellness initiatives have been proven effective in changing behaviors for active living/healthy lifestyles. While outside of the purview of the Active Living Plan, the HIA Advisory Committee makes the following recommendations:

Action 1: The Winona County Wellness Committee should meet by January 31, 2015 to establish the current number of Winona County employees participating in the worksite wellness program (baseline) that can be tracked going forward and assess best practices established by Winona Health and Johnson & Johnson to incorporate into the County's program and participating worksites. Worksite Wellness best practices should be promoted through targeted messaging (Recommendation 2) to increase awareness and interest and expand programs to "live-sites," such as assisted living homes, or other group-living facilities.

Action 2: The Active Living Subcommittee should collaborate with interested worksites to establish their own Worksite Wellness participation baseline and voluntary measures for evaluation going forward. The worksites currently participating in Worksite Wellness programs are starting goal setting processes and will have established plans with goals and evaluation metrics by October 31, 2015.

EVALUATION & LIMITATIONS

The Winona County Active Living Plan HIA process evaluation took a combined approach that included both a self-assessment and a discussion with participants and stakeholders. The process evaluation assessed whether the HIA met the Goals established during Scoping; input from participants and stakeholders on their experience being involved in the HIA, including what they learned during the process, their satisfaction with the process, and any barriers or challenges they see with this HIA or others in the future; and additional challenges or barriers identified by the HIA project staff during the HIA process.

The HIA met the majority of the goals established during Scoping, including completing the scope of work, engaging and involving constituents/community members in the HIA, seeking consensus around the proposal and its health impacts, and creating awareness about Health Impact Assessment. The only goal

not yet complete is informing the County Board vote, which will eventually be accomplished when the date is set for the County Board presentation.

MDH administered a survey evaluation with the HIA Advisory Committee to gather input on the HIA process. The survey was administered at the midpoint of the HIA process in August 2014 and again at the end of the process in February 2015. The responses indicated that the HIA process was a positive, if challenging and time consuming, experience for most Advisory Committee members. They gained knowledge on the HIA process and health initiatives taking place in the community, felt that the HIA added value around engaging additional stakeholders, and plan to use what they learned in future personal and work endeavors. Some challenges included the time commitment for the HIA process, staying within the scope of the HIA, political acceptance of the HIA and recommendations, and having limited resources on the proven effectiveness of HIA and difficulty in documenting HIA impact on health outcomes.

Overall, the process of conducting the HIA on the Active Living Plan went very smoothly. Working directly with Winona County staff ensured that the HIA was continuously tracking the progress of the Plan, had the information necessary to conduct the assessment, and had the opportunity to inform the final draft of the Plan. The members of the HIA Advisory Committee were engaged and active participants, providing invaluable input on each step of the process, using their connections to increase outreach and engagement, and committing to see the Plan and HIA implemented following the completion of deliverables.

There were a few barriers or challenges to the HIA process. The first was some initial reluctance from the Winona County Board to approve a project for the HIA. Eventually, the Board signed a grant agreement with MDH to conduct the HIA on the Active Living Plan and two County Commissioners regularly attending meetings on the Active Living Plan HIA, which provided additional perspective and helped engender political acceptance of the HIA process.

The second challenge with the HIA process was a challenge that many HIAs face: trying to convey the prescriptive steps of the HIA process while ensuring that it is flexible enough to meet the needs of the project and participating stakeholders. HIA does have a fairly steep learning curve and for stakeholders who are participating in their first HIA, the process can be confusing, burdensome, and constricting. There were growing pains with the Winona County Active Living Plan HIA. One particular issue included staying within the Scope of the HIA, such as not adding new health determinants or research questions that were unrelated and keeping the assessment and recommendations focused on the Active Living Plan itself, rather than general actions or policies that partners or the County could take to improve livability.

A third challenges with the HIA process was issues with the scale and availability of data. Data on health outcomes, health behaviors, demographics and socioeconomic characteristics were not available at neighborhood-level geographies. If this data were available, additional finer analysis could have been done on the location of crashes, the proximity of bicycle and pedestrian infrastructure and population-based data to provide more location-based and nuanced recommendations for the Active Living Plan objectives.

Finally, the last challenge with the HIA was recognizing and trying to overcome the City-centered bias of the HIA. Most Advisory Committee members lived and/or worked in the city of Winona, more survey respondents and most focus group participants lived and/or worked in the city of Winona, and most data was available for the city of Winona. It would have taken considerable more resources to hold additional focus groups in the smaller cities and rural areas of Winona County.

DRAFT

CONCLUSION

The HIA on the Winona County Active Living Plan found that if the policies proposed in the Active Living Plan are implemented, overall there would be a positive impact on physical activity levels which would reduce negative physical health outcomes, such as obesity, diabetes and heart disease, and promote positive mental health outcomes. Implementation of the Active Living Plan policies may have a positive or negative impact on traffic and pedestrian safety, potentially increasing the number of pedestrian and bicyclist crashes but decreasing the overall rate of crashes and potentially the severity. There is evidence that would also support a decrease in total crashes. The Active Living Plan will increase education and resource for active living, which in turn will promote rates of active transportation and the positive physical and mental health outcomes.

The recommendations developed by the HIA Advisory Committee were incorporated into the final Winona County Active Living Plan, laying out specific action steps and timelines for promoting the positive health outcomes related to active living activities.

The HIA project team will continue to monitor the implementation of the Active Living Plan objectives and long term health outcomes in Winona County. Already, many of the HIA recommendations are being implemented ahead of formal approval of the Plan. Action steps have included bringing the draft Plan to townships and cities in Winona County to get their support for the Plan, working on the countywide interactive bicycle map, adding youth representation to the Committee (two high school students), and meeting with the hospital and LiveWell Winona on website updates for the one-stop shop of resources. Additionally, Winona County has become involved in a main street corridors project in the City of Winona, advocating for the inclusion of pedestrian and bicycle changes. A representative from the Active Living Advisory Committee will be assigned to the project's committee.

This study shows the co-benefits of implementing active transportation policies in a relatively rural county in southeastern Minnesota.

REFERENCES

- Centers for Disease Control and Prevention (CDC). 1999. Physical Activity and Health. A Report of the Surgeon General. Available at <http://www.cdc.gov/nccdphp/sgr/index.htm>
- Deehr RC, Sumann A. 2009. Active Seattle: achieving walkability in diverse neighborhoods. *Am J Prev Med*. 2009 Dec;37(6 Suppl 2):S403-11. Doi 10.1016/j.amepre.2009.09.036.
- Ferris M. 2012. Social Connectedness and Health. Wilder Research. Available at <http://www.wilder.org/Wilder-Research/Publications/Studies/Social%20Connectedness%20and%20Health/Social%20Connectedness%20and%20Health.pdf>
- Garrick N, Marshall W. 2011. Evidence on Why Bike-Friendly Cities Are Safer for All Road Users. *Environmental Practice*, Version 13, Number 1: 16-27.
- Griffiths A, Kouvonon A, Pentti J, Oksanen T, Virtanen M, Salo P, Vaananen A, Kivimaki M, Vahtera J. 2014. Association of physical activity with future mental health in older, mid-life and younger women. *Eur J Public Health*. 2014 Oct;24(5):813-8. doi: 10.1093/eurpub/ckt199. Epub 2014 Feb 14.
- Hankinson AL, Daviglius ML, Bouchard C, Carnethon M, Lewis CE, Schreiner PJ, Liu K, Sidney S. 2010. Maintaining a high physical activity level over 20 years and weight gain. *JAMA*. 2010 Dec 15;304(23):2603-10. doi: 10.1001/jama.2010.1843.
- Happell B, Platania-Phung C, Scott D. 2011. Placing physical activity in mental health care: a leadership role for mental health nurses. *Int J Ment Health Nurs*. 2011. Oct;20(5):310-8. Doi 10.1111/j.1447-0349.2010.00732.x. Epub 2011 Feb 22.
- Harris et al. 2013. Comparing the effects of infrastructure on bicycling injury at intersections and non-intersections using a case-crossover design. *Inj Prev*. 2013 Oct;19(5):303-10. Doi: 10.1136/injuryprev-2012-0406561. Epub 2013 Feb 14.
- Kim YS, Park YS, Allegrante JP, Marks R, Ok H, Ok Cho K, Garber CE. 2012. Relationship between physical activity and general mental health. *Prev Med* 2012 Nov;55(5):458-63. Doi: 10.1016/j.yjpm.2012.08.021. Epub 2012 Sep 7.
- Kottke T, Baechler C, Canterbury M, Danner C, Erickson K, Hayes R, Marshall M, O'Connor P, Sanford M, Schloenleber M, Shimotsu S, Straub R, Wilkinson J. Institute for Clinical Systems Improvement. *Healthy Lifestyles*. Updated May 2013. Available at https://www.icsi.org/_asset/4qjdnr/HealthyLifestyles.pdf
- Maibach E, Steg L, Anable J. 2009. Promoting Physical Activity and Reducing Climate Change: Opportunities to Replace Short Car Trips with Active Transportation. *Preventative Medicine*. Available at http://aura.abdn.ac.uk/bitstream/2164/3265/1/Maibach_et_al_promoting_PA_reducing_CC_final.pdf
- Minnesota County Health Tables (MCHT) 2013, Minnesota Department of Health. Accessed August 14, 2014. Available at <http://www.health.state.mn.us/divs/chs/countyttables/profiles2013/index.html>
- Minnesota Department of Employment and Economic Development (DEED). 2014. Local Area Unemployment Statistics (LAUS), Accessed September 2014. Available at <http://mn.gov/deed/data/data-tools/laus.jsp>
- Minnesota Department of Transportation (MnDOT). 2014. Winona County Crash Data 2011-2013. Provided by Nathan Drews on July 25, 2014.

Mortazavi SS, Shati M, Ardebili HE, Mohammad K, Beni RD, Keshteli AH. 2013. Comparing the Effects of Group and Home-based Physical Activity on Mental Health in the Elderly. *Int J Prev Med*. 2013 Nov;4(11):1282-9. PMID: 24404363 [PubMed]

National Alliance on Mental Illness – Minnesota (NAMI-MN). 2009. Advocating for People with Mental Illness in the Minnesota Criminal Justice System. Available at <http://www.namihelps.org/advocatingbooklet2.pdf>

Parker K, Rice J, Gustat J, Ruley J, Spriggs A, Johnson C. 2013. Effect of Bike Lane Infrastructure Improvements on Ridership in One New Orleans Neighborhood. *The Society of Behavioral Medicine*; (2013) 45 (Suppl 1):S101–S107.

Rangul V, Bauman A, Holmen TL, Midthjell K. 2012. Is physical activity maintenance from adolescence to young adulthood associated with reduced CVD risk factors, improved mental health and satisfaction with life: the HUNT Study, Norway. *Int J Behav Nutr Phys Act*. 2012 Dec 14;9:144. doi: 10.1186/1479-5868-9-144.

Reed, J.A., Ainsworth, B.E., Wilson, D.K., Mixon, G., & Cook, A. (2004). Awareness and Use of Community Walking Trails. *Preventive Medicine*, 39(5), 903-908.

Reynolds C, Harris A, Teschke K, Cripton P, Winters M. 2009. The impact of transportation infrastructure on bicycling injuries & crashes: a review of the evidence. University of British Columbia Centre for Health and Environmental Research. Available at http://cyclingincities.spph.ubc.ca/files/2011/10/infrastructure_cycling.pdf

Society of Practitioners of Health Impact Assessment (SOPHIA). 2010. North American HIA Practice Standards Working Group (Bhatia R, Branscomb J, Farhang L, Lee M, Orenstein M, Richardson M). Minimum Elements and Practice Standards for Health Impact Assessment, Version 2. North American HIA Practice Standards Working Group. Oakland, CA: November 2010.

Steinmo S, Hagger-Johnson G, Shahab L. 2014. Bidirectional association between mental health and physical activity in older adults: Whitehall II prospective cohort study. *Prev Med*. 2014 Sep;66:74-9. doi: 10.1016/j.ypmed.2014.06.005. Epub 2014 Jun 16.

Task Force on Community Preventative Services (“Task Force”). 2002. Recommendations to Increase Physical Activity in Communities. *Am J Prev Med* 2002;22(4S):67–72. Available at <http://www.thecommunityguide.org/pa/pa-ajpm-recs.pdf>

Teschke K, Harris A, Reynolds C, Winters M, Babul S, Chipman M, Cusimano M, Brubacher J, Hunte G, Friedman S, Monro M, Shen H, Vernich L, Cripton P. 2012. Route Infrastructure and Risk of Injuries to Bicyclists: A Case-Crossover Study. *Am J Public Health*. December 2012, Vol 102, No. 12. <http://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.2012.300762>

Thomas B, DeRobertis M. 2013. The safety of urban cycle tracks: a review of the literature. *Accid Anal Prev*. 2013 Mar;52:219-27. doi: 10.1016/j.aap.2012.12.017. Epub 2013 Feb 7.

Uchino, B., Cacioppo, J., & Kiecolt-Glaser, J. 1996. The relationship between social support and physiological processes: A review with emphasis on underlying mechanisms and implications for health. *Psychological Bulletin*, 119 (3), 488-531.

Vankim NA, Nelson TF. 2013. Vigorous physical activity, mental health, perceived stress, and socializing among college students. *Am J Health Promot*. 2013 Sep-Oct;28(1):7-15. doi: 10.4278/ajhp.111101-QUAN-395. Epub 2013 Mar 7.

World Health Organization (WHO). 2011. Global status report on noncommunicable diseases 2010. Geneva. Available at http://www.who.int/nmh/publications/ncd_report_full_en.pdf

World Health Organization (WHO). 2014. Cardiovascular diseases (CVDs). Website. Available at <http://www.who.int/mediacentre/factsheets/fs317/en/>

DRAFT