Tice Community Health Impact Assessment

Annotated Bibliography

Contents

Physical Safety

Federal Highway Administration. (2013). *Safety benefits of walkways, sidewalks, and paved shoulders.*
This document is written by the Federal Highway Administration division of the U.S. Department of Transportation and it provides a summary on the safety benefits of walkways, sidewalks, and paved shoulders such as increasing the number of trips made by walking or biking, and increasing physical activity. Furthermore, by providing these features, several benefits arise such as a reduction of numerous crash types, both between vehicles and pedestrians, and providing a system of maintenance for operations.

Ewing, R., & Dumbaugh, E. (2009). The built environment and traffic safety. *Journal of Planning Literature*, 347-367.
This article provides important evidence-based theories around the impact of the built environment as it relates to traffic safety. First, they find that the traffic environment of dense urban areas appear to be safer than the lower-volume environments of the suburbs, because fewer miles are driver per capita and driving is done at lower speeds. Second, in dense urban areas, less "forgiving" design treatments, such as narrower lanes, traffic-calming measures, and street trees appears to enhance a roadway's safety.

Dumbaugh, E., & Li, W. (2011). Designing for the safety of pedestrians, cyclists, and motorists in urban environments. *Journal of the American Planning Association*, 69-88.
This article attempts to explain the contention between road designs for the safety of pedestrians versus road design for the safety of motor users. The authors contend that most of the ongoing debate between pedestrian advocates and traffic engineers has focused on the relative desirability of designing urban roadways to be forgiving to random driver error. However, designs that balance the inherent tension between vehicle speeds and traffic conflicts can be used to enhance the safety of pedestrians, cyclists and motorists.

Wright, S., & Bricker, S. (2012). *Why we're stuck at high speed, and what we're going to do about it.* America WALKS
This article advocates for a shift in the mindset of developing roads for higher traffic speeds. Authors contend that building roads that maximize travel speed has been the central goal of transportation engineering, but they create both a traffic safety hazard, and an environment in which people are uncomfortable walking. The authors recommend that American roads be designed and built with the goal of setting design speeds equal to posted speed and operating speed which will allow for traffic flow while creating a safer and more welcoming environment for all roadway users.

Letourneau, D. (2011, May 24). Florida ranked most dangerous state for pedestrians. *Transportation for America*.

This article highlights the results of the 2011 Dangerous by Design report issued by the National Complete Streets Coalition which highlights pedestrian and bicyclist injuries and fatalities from 2000-2009. In this report, Lee County's pedestrian fatality rate was more than twice the national average, at 3.4 pedestrian fatalities per 100,000 people (the national average was 1.6 fatalities for 100,000 people). The article highlights initiatives within Lee County which attempt to ameliorate these high rates of fatalities.

Schmitt, A. (2013, January 18). The safety-in-numbers effect surfaces in Minneapolis bike crash data. *Streetsblog.net*.

This article highlights to assertion that safety improves dramatically as the overall number of bicyclists and pedestrians rise. It also further asserts that advocates should focus on increasing the number of bicyclists.

Aaron, B. (2013, January 18). Puran Thapa, 7, killed by motorist in Ridgewood; no charges filed. *Streetsblog New York City*.

The article highlights the contention between a death of a child and the responsibility of the driver to face criminal charges. It states that, as is the norm when a child killed in traffic is blamed for his or her own death, no mention is made of the motorist's speed. No criminal charges were brought to the motorist involved in the crash highlighted.

Howard, A. W. (2010). Keeping children safe: rethinking how we design our surroundings. *Canadian Medical Association Journal*.

The article asserts the following main points. Injury is the leading cause of death among children in the industrialized world, and often involves failure to negotiate a built environment. Safety should be considered when designing the built environment to substantially reduce injuries and fatalities. Perceived lack of safety is a major barrier to the use of active modes of transportation such as walking or cycling. A safer environment can lead to improved public health, physical activity levels and quality of life, and reduced pollution.

Morency, P., Gauvin, L., Plante, C., Fornier, M., & Morency, C. (2012). Neighborhood social inequalities in road traffic injuries: the influence of traffic volume and road design. *American Journal of Public Health*, 1112-1118.

The article examines the extent to which differential traffic volume and road geometry can explain social inequalities in pedestrian, cyclist, and motor vehicle occupant injuries across wealthy and poor urban areas. The article also explains that the physical environment has a strong influence on the likelihood of injuries. It was also found that road users in poorer neighborhoods have a higher exposure to traffic and, traffic volume being equal, a greater risk of injury because of the presence of more major roads and 4-legged intersections.

Walljasper, J. (2012, June 6). Green lanes: Welcome to the future of getting around. *Sharable.net*.

This short periodical/blog article highlights the importance and the effects of bike paths, clearly marked bike lanes, and pedestrian accommodations. The author utilized a summary approach

to explain the benefits, on which he relied off of existing conditions, and existing literature and research. The article summarizes "The Green Lane Project", which is an initiative to showcase these next-generation transportation improvements, and has been implemented in six U.S. cities. He concludes that bike lanes are important for improving safety and economic vitality in lower-income communities. Furthermore, it was asserted that bike lanes increase interactions between neighbors, and helps to ameliorate crime in neighborhoods.

Krieger, J., Rabkin, J., Sharify, D., & Song, L. (2009). High point walking for health: Creating built and social environments that support walking in a public housing community. *American Journal of Public Health*, 593-599.

The authors of this article implemented and evaluated multiple interventions to increase walking activity at a multicultural public housing site, including sponsoring walking groups, improving walking routes, providing information about walking options, and advocating for pedestrian safety. They found that, after intervention, self-reported walking activity increased among participants from 65 to 109 minutes per day. Conclusively the authors found that a multicomponent intervention developed through participatory methods has the highest degree of success in increasing walking activity in a multicultural public housing site. Furthermore, they assert that the built environment influences opportunities for physical activity, while the social environment affects physical activity through perceptions of community and pedestrian safety, social support, and access to recreational programs.

Tight, M. R., Kelly, C., Hodgson, F., & Page, M. (2004). Improving pedestrian accessibility and quality of life. *10th World Conference on Transport Research*.

The researchers of this article conducted an overview of the main pedestrian problems and the factors that influence both the decision to walk and routes taken, derived from a comprehensive literature search. Furthermore, the authors then examine results from a series of studies looking at methods for valuing different aspects of the pedestrian environment. They found that the problems faced by pedestrians included the following: road safety, air quality, personal security, inactivity, fear/intimidation/danger, severance, pedestrian delay, and land-use planning. They found that there were several factors that influenced the decision to walk, including: distance, time, security, road traffic, the built urban environment, the pedestrian environment, the effort required, and the weather.

Wright, S., & Bricker, S. (2012). *How communities are slowing down.* America Walks.

The authors of this report address the problem of speed on streets in a variety of ways. By conducting several case studies, along with a comprehensive literature search, the authors provide studies that provide examples of how approaches to speed problems are being used to increase the safety of all road users in American communities. The authors propose four ways to slow the roads: change the driver; change the street; change the posted speed; and change the laws that govern posted speed.

Dumbaugh, E. (2005). Safe streets, livable streets. *Journal of the American Planning Association*, 283-300.

In this study, the author examines the subject of livable streetscape treatments and finds compelling evidence that suggests they may actually enhance the safety of urban roadways. Concerns about their safety effects do not appear to be founded on empirical observations of crash performance, but instead on a design philosophy that discounts the important relationship between driver behavior and safety. This study traces the origin and evolution of this philosophy, and proposes an alternative that may better account for the dynamic relationships between road design, driver behavior, and transportation safety.

Dumbaugh, E. (2006). Design of safe urban roadsides: An empirical analysis. *Transportation Research Record: Journal of the Transportation Research Board*, 74-82.

To understand better the design of safe roadsides in urban environments, this study used negative binomial regression models to examine the safety effects of three roadside design strategies: widening paved shoulders, widening fixed-object offsets, and providing livable-street treatments. The model results indicated that of the three strategies, only the livable-streets variable was consistently and negatively associated with reductions in roadside and midblock crashes. Wider shoulders were found to increase roadside and midblock crashes, while unpaved fixed-object offsets had a mixed safety effect by decreasing roadside crashes but having a slightly positive effect on midblock crashes. Collectively, these findings suggest that most urban roadside crashes are not the result of random error but are instead systematically encoded into the design of the roadway.

Dekoster, J., & Schollaert, U. (1999). *Cycling: The way ahead for towns and cities.* European Communities.

Authors attempt to explain the prejudices associated with the use of the bicycle as a regular mode of transport in an urban environment. They also suggest some simple, inexpensive and popular measures to implement bicycle friendly community initiatives.

King, M. R. (2003). Pedestrian safety through a raised median and redesigned intersections. *Transportation Research Board*.

This paper documents the effect of a raised median, signalized and redesigned intersections, curbs, and sidewalks on vehicle speed, pedestrian exposure risk, driver predictability, and vehicle volume along a four lane suburban roadway in central New Jersey. The results are as follows: 85th percentile vehicle speed fell by two miles per hour; pedestrian exposure risk decreased by 28 percent; the median allows pedestrians to cross one direction of traffic at a time; signals, curbs, median, redesigned intersections and striping patterns work together to manage driver behavior; vehicle volumes were not affected; vehicle speeds acted independently of vehicle volumes.

Petritsch, T. A., Landis, B. W., McLeod, P. S., Huang, H. F., & Challa, S. (2004). *Level of service model for signalized intersections for pedestrians.* Tallahassee: Florida Department of Transportation.

This paper documents a Florida Department of Transportation sponsored study to develop a Level of Service (LOS) model that accurately represents pedestrians' perceptions crossings at signalized intersections. This model incorporates perceived safety/comfort (i.e., perceived exposure and conflicts) and operations (i.e., delay, and signalization). The study reveals that right-turn-on-red volumes for the street being crossed, permissive left turns from the street parallel to the crosswalk, motor vehicle volume on the street being crossed, midblock 85 percentile speed of the vehicles on the street being crossed, the number of lanes being crossed, and the pedestrian's delay, and the presence or absence of right-turn channelization islands are primary factors in the Pedestrian LOS model for intersections.

Potts, I. B., Harwood, D. W., & Richard, K. R. (2007). *Relationship of lane width to safety for urban and suburban arterials.* Transportation Review Board.
This research investigates the relationship between lane width and safety for roadway segments and intersection approaches on urban and suburban arterials. The research found no general indication that the use of lanes narrower than 3.6 m (12 ft.) on urban and suburban arterials increases crash frequencies. This finding suggests that geometric design policies should provide substantial flexibility for use of lane widths narrower than 3.6 m (12 ft.). Inconsistent results were found which suggested increased crash frequencies with narrower lanes in three specific design situations. Narrower lanes should be used cautiously in these three specific situations unless local experience indicates otherwise.

Federal Highway Administration. (2003, November). *A review of pedestrian safety research in the United States and abroad.* Retrieved from United States Department of Transportation: http://www.fhwa.dot.gov/publications/research/safety/pedbike/03042/part3.cfm#marked
This report summarizes research on pedestrian safety in the United States with a focus on crash characteristics and the safety effects of various roadway features and traffic-control devices. Such features analyzed include crosswalks and alternative crossing treatments, signalization, signing, pedestrian refuge islands, provisions for pedestrians with disabilities, bus stop location, school crossing measures, traffic-calming measures, and sidewalks and paths. It is relevant to this HIA in that it provides statistical information regarding elements of the proposed connectivity plan on pedestrian health.

Teschke, K., Harris, A., Reynolds, C. C., Winters, M., Babul, S., Chipman, M., . . . Cripton, P. A. (2012). Route infrastructure and the risk of injuries to bicyclists: a case-crossover study. *American Journal of Public Health*.
This article compared cycling injury risks of 14 route types and other route infrastructure features in several Canadian cities. The researchers found that the lower risks on quiet streets and with bike-specific infrastructure along busy streets support the route-design approach used in many northern European countries. Transportation infrastructure with lower bicycling injury risks merits public health support to reduce injuries and promote cycling. The article is important to this HIA in that it supports the analysis of a connectivity plan in relation to a specific health effect.

Physical Activity

Center for Quality Growth and Regional Development. (n.d.). *Pathways to a healthy Decatur: a rapid health impact assessment of the City of Decatur.* Atlanta: Georgia Institute of Technology, College of Agriculture.

The rapid health impact assessment conducted in this study highlights the health effects of a transportation plan in the city of Decatur. The study analyzes the effects of a public transportation plan on physical activity, active living, universal design, access and affordability, environmental threats and social capital. It greatly benefits the research of this HIA because it provides sources for which to refer and analyzes similar health determinants. It is useful in providing a point of foundation.

Banyan, M., & Suguri, V. (2014). *Health Impact Assessment: Ortiz Avenue Road Widening.* Fort Myers: Florida Gulf Coast University.

This report analyzed the health effects of a road widening project on an area within the Tice Community. This health impact assessment was a rapid version, entailing the quick assessment of literature and few statistical assumptions. However, it provides a foundation for the current health impact assessment in question.

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Edwards, R. D. (2008). Public transit, obesity, and medical costs: assessing the magnitudes. *Preventive Medicine*, 14-21.

This paper assesses the potential benefits of increased walking and reduced obesity associated with taking public transit in terms of dollars of medical costs saved and disability avoided. The author found that taking public transit is associated with walking 8.3 more minutes per day on

average and that the additional walking associated with public transit could save $5500 per person in present value by reducing obesity-related medical costs.

Parker, K. M., Gustat, J., & Rice, J. C. (2011). Installation of bicycle lanes and icnreased ridership in an urban, mixed-income setting in New Orleans, Louisiana. *Journal of Physical Activity and Health*, 98-102.

The authors aimed at explaining the before and after effects of the installation of bike lanes in the Spring of 2008 in New Orleans. In November of 2007 and again in November 2008, the observers conducted manual counts of cyclists riding on a street in New Orleans, LA. The data collected included the number of men, women, adults, and children riding a bicycle with traffic, against traffic, and on sidewalks. Their data showed that there was a 57% increase in the number of riders per day after the bike lanes were installed. They conclusively asserted that bike lanes can have a positive impact in creating a healthy physical environment.

Holm, A. L., Glumer, C., & Diderichsen, F. (2012). Health impact assessment of increased cycling to place of work or education in Copenhagen. *BMJ Open*, 1-8.

This study illustrates how quantitative Health Impact Assessment can help clarify potential effects of policies. Increased cycling involves opposing effects from different outcomes but with the overall health effect being positive. This result illustrates the importance of designing policies that promote the health benefits and minimize the health risks related to cycling. Specifically, the authors found that if the number of people travelling to work or place of education by bicycle increase from 35% to 42% (in Copenhagen), the burden of disease in the study population would decrease due to rising levels of physical activity.

Walljasper, J. (2011, December 20). How to boost biking and walking even further in your city. *Shareable.net*.

The author of this periodical article explains how Minneapolis increased the number and bikers and walkers by 16% and recommended methods for other cities to do the same. The author contends that accurate bike and pedestrian counts are critical to the growth of biking and walking because policymakers act on hard evidence. It is believed that taking accurate counts translates a message to policymakers, which in turn encourages them to encourage such activity, and physical activity improves.

Litman, T. (2010, June 14). Victoria Transport Policy Institute. *Evaluating public transportation health benefits*.

This report investigates ways that public transportation affects human health, and ways to incorporate these impacts into transport policy and planning decisions. The authors found that public transit improvements and more transit oriented development can provide large but often overlooked health benefits, such as the reduction of traffic crashes and pollution emissions, increases in physical fitness and mental health, and providing access to medical care and healthy food. Conclusively, the author states that improving public transit can be one of the most cost

effective ways to achieve public health objectives, and public health improvements are among the largest benefits provided by high quality public transit and transit-oriented development.

Rader, M. (2009). *Health impact assessment on policies reducing vehicle miles traveled in Oregon metropolitan areas.* Portland: Upstream Public Health.
The author addresses the growing population concern in Oregon and how it relates to the volume of traffic and its affects such as air pollution, congestion, and car collisions. The HIA conducted analyzes the effects of the proposed statewide VMT (vehicle miles traveled) - reduction plan. The following three factors were analyzed: positive changes to the built environment; strengthening public transit; and increasing costs for driving individual vehicles. Researchers utilizing the following three indicators of public health: physical activity; air pollution; and land use patterns.

Besser, L. M., & Dannenberg, A. L. (2005). Walking to public transit: Steps to help meet physical activity recommendations. *American Journal of Preventive Medicine*, 273-280
The authors of this study attempted to estimate the total daily time spent walking to and from transit and the predictors of achieving 30 minutes of daily activity by doing so. Researchers found that respondents who use transit spend a median of 19 minutes daily walking to and from transit; people in high-density urban areas were more likely to spend more than or equal to 30 minutes walking to and from transit daily. Conclusively, walking to and from public transportation can help physically inactive populations, especially low-income and minority groups, attain the recommended level of daily physical activity.

Krieger, J., Rabkin, J., Sharify, D., & Song, L. (2009). High point walking for health: Creating built and social environments that support walking in a public housing community. *American Journal of Public Health*, 593-599.
The authors of this article implemented and evaluated multiple interventions to increase walking activity at a multicultural public housing site, including sponsoring walking groups, improving walking routes, providing information about walking options, and advocating for pedestrian safety. They found that, after intervention, self-reported walking activity increased among participants from 65 to 109 minutes per day. Conclusively the authors found that a multicomponent intervention developed through participatory methods has the highest degree of success in increasing walking activity in a multicultural public housing site. Furthermore, they assert that the built environment influences opportunities for physical activity, while the social environment affects physical activity through perceptions of community and pedestrian safety, social support, and access to recreational programs.

Tight, M. R., Kelly, C., Hodgson, F., & Page, M. (2004). Improving pedestrian accessibility and quality of life. *10th World Conference on Transport Research*.
The researchers of this article conducted an overview of the main pedestrian problems and the factors that influence both the decision to walk and routes taken, derived from a comprehensive literature search. Furthermore, the authors then examine results from a series of studies

looking at methods for valuing different aspects of the pedestrian environment. They found that the problems faced by pedestrians included the following: road safety, air quality, personal security, inactivity, fear/intimidation/danger, severance, pedestrian delay, and land-use planning. They found that there were several factors that influenced the decision to walk, including: distance, time, security, road traffic, the built urban environment, the pedestrian environment, the effort required, and the weather.

Smart Growth America. (2010). *Healthy Communities and People*. Retrieved from Smart Growth America: www.smartgrowthamerica.org/issues

This online periodical states the following premises: smart growth strategies make walking and bicycling easier; smart growth strategies reduce congestion and air pollution; smart growth strategies help protect drinking water; smart growth strategies ensure difficult development decisions are made inclusively; and smart growth strategies make streets safer for drivers and pedestrians.

America Walks. (2012). *Steps to a Walkable Community.* Schwartz Engineering.

In the report, Steps to a Walkable Community, the best and brightest strategies are provided to move communities toward a more walkable community. Authors have worked to capture both time-tested and new and innovative tactics that are realistic and achievable. Steps to a Walkable Community compiles multidisciplinary tactics that readers can assemble into custom strategies designed for their community's circumstances. The guide contains tactics for building or rebuilding cities and suburbs in ways that encourage walking. The guide is also about making walking in cities safer, and it provides traffic-engineering techniques to achieve that. Steps to a Walkable Community also describes methods of organizing advocacy to reach these goals.

Wright, S., & Bricker, S. (2012). *How communities are slowing down.* America Walks.

The authors of this report address the problem of speed on streets in a variety of ways. By conducting several case studies, along with a comprehensive literature search, the authors provide studies that provide examples of how approaches to speed problems are being used to increase the safety of all road users in American communities. The authors propose four ways to slow the roads: change the driver; change the street; change the posted speed; and change the laws that govern posted speed.

Sallis, J. F., Frank, L. D., Saelens, B. E., & Kraft, M. K. (2004). Active transportation and physical activity: Opportunities for collaboration on transportation and public health research. *Transportation Research Part A*, 249-268.

The authors of this article summarize the transportation and planning studies on the relationship between community design and non-motorized ("active") transport, and further, they interpret these studies from a health perspective. The researchers also summarize studies from health literature that examine the relationship between physical environment variables and physical activity that have relevance for transportation research. Lastly, the author

promote collaboration among transportation, planning, and health investigators by identifying opportunities for trans-disciplinary research.

Gustat, J., Rice, J., Parker, K. M., Becker, A. B., & Farley, T. A. (2012). Effect of changes to the neighborhood built environment on physical activity in a low-income African American neighborhood. *Preventing Chronic Disease*.
Researchers examined how changes in the built environment affected residents' physical activity levels in a low income, primarily, African American neighborhood in New Orleans by building a 6-block walking path and installing a school playground in an intervention neighborhood. Researchers found that the proportion of residents observed who were active increased significantly in the section of the intervention neighborhood with the path and playground. They conclusively say that changes to the built environment may increase neighborhood physical activity in relation to these demographics.

Evenson, K. R., Block, R., Roux, A. V., McGinn, A. P., Wen, F., & Rodríguez, D. A. (2012). Associations of adult physical activity with perceived safety and police-recorded crime: the multi-ethnic study of atherosclerosis. *International Journal of Behavioral Nutrition and Physical Activity*.
Due to the inconsistent findings of prior studies, the authors explored the association of perceived safety and police-recorded crime measures with physical activity. The study included 818 Chicago participants of the Multiethnic Study of Atherosclerosis 45 to 84 years of age. Questionnaire-assessed physical activity included a) transport walking; b) leisure walking; and c) non-walking leisure activities. Perceived safety was assessed through an interviewer-administered questionnaire. Police-recorded crime was assessed through 2-year counts of selected crimes (total and outdoor incivilities, criminal offenses, homicides) per 1000 population. Perceiving a safer neighborhood was positively associated with transport walking and perceiving lower violence was associated with leisure walking. Perceived and police-recorded measures had independent associations with walking and both should be considered in assessing the impact of neighborhood crime on physical activity.

de Nazelle, A., MJ, N., JM, A., Brauer, M., Briggs, D., Braun-Fahrlander, C., . . . Andersen, Z. (2011). Improving health through policies that promote active travel: a review of evidence to support integrated health impact assessment. *Environment International*, 766-777.
In the article, researchers review available literature regarding health impacts from policies that encourage active travel in the context of developing health impact assessment (HIA) models to help decision-makers propose better solutions for healthy environments. They identify important components of HIA models of modal shifts in active travel in response to transport policies and interventions. Policies that increase active travel are likely to generate large individual health benefits through increases in physical activity for active travelers. Smaller, but population-wide benefits could accrue through reductions in air and noise pollution.

Powell, K. E., Martin, L. M., & Chowdhury, P. P. (2003). Places to walk: convenience and regular physical activity. *American Journal of Public Health*, 1519-1521.

The availability and awareness of places conducive to physical activity are associated with higher levels of physical activity. To guide the efforts to promote regular physical activity, authors used the Georgia Behavioral Risk Factor Surveillance System to determine (1) whether adult Georgians were aware of safe and convenient places for walking, (2) what places they most commonly envisioned, and (3) whether the proximity of those places was associated with self-reported physical activity behaviors. In addition, a direct relation exists between the convenience of the place and meeting activity recommendations. Those able to walk to the place in less than 10 minutes are most likely to be active.

Sallis, J. F., Saelens, B. E., Frank, L. D., Conway, T. L., Slymen, D. J., Cain, K. L., . . . Kerr, J. (2009). Neighborhood built environment and income: examining multiple health outcomes. *Social Science Medicine*, 1285-1293.

The purpose of the present study was to test associations of neighborhood built environment and median income to multiple health outcomes and examine whether associations are similar for low- and high-income groups. Physical QoL was higher in high-income neighborhoods but unrelated to walkability. Adjustment for neighborhood self-selection produced minor changes. Researchers concluded that living in walkable neighborhoods was associated with more physical activity and lower overweight/obesity but not with other benefits. Lower- and higher-income groups benefited similarly from living in high-walkability neighborhoods. Adults in higher-income neighborhoods had lower BMI and higher physical QoL.

Boulange, C., & Armada, F. (2011). The effect of urban crime and percieved safety on urban levels of physical activity: a review. *International Conference on Urban Health.* World Health Organization Kobe Centre for Health Development.

This poster presented at the International Conference on Urban Health in 2011 highlights the effect that crime has on physical activity, and tests the hypothesis that crime is a significant barrier to active living. The authors conducted a comprehensive literature search and compiled the results. They found that crime and fear of crime inhibit physical activity, and increases the probability of sedentary lifestyles. Furthermore, due to socio-environmental factors, certain populations are more exposed to that threat. They also found that urban design matters, such as adequate lighting and safe access.

Brennan-Ramirez, L. K., Hoehner, C. M., Brownson, R. C., Cook, R., Orleans, C. T., Hollander, M., . . . Wilkinson, W. (2006). Indicators of activity-friendly communities: An evidence-based consensus process. *American Journal of Preventive Medicine*, 515-524.

Authors of this article utilized a systematic review process to identify key indicators of activity-friendly communities that can assess and improve opportunities for regular physical activity. Conclusively, they found that there were ten promising indicators of activity-friendly communities: land use environment, access to exercise facilities, transportation environment, aesthetics, travel patterns, social environment, land use economics, transportation economics, institutional and organizational policies, and promotion.

Dannenberg, A. L., Jackson, J., Frumkin, H., Schreiber, R. A., Pratt, M., Kochtitzky, C., & Tilson, H. H. (2003). The impact of community design and land-use choices on public health: a scientific research agenda. *American Journal of Public Health*, 0009-0036.

The Centers for Disease Control and Prevention hosted a workshop in May 2002 to help develop a scientific research agenda on these issues. This report describes the 37 questions in the resulting research agenda. The several aspects analyzed in the workshop included physical activity, obesity, and transportation choices; schools and children; unintentional injuries; and community design in relation to individuals with disabilities. Understanding the reasoning behind the developed questions will aid this HIA when determining research questions of the health determinants.

Stafford, M., Chandola, T., & Marmot, M. (2007). Association between fear of crime and mental health and physical functioning. *American Journal of Public Health*.

Studies have reported an inverse association between fear of crime and subjective mental and physical health. We investigated the direction of causality and the curtailment of physical and social activities as a possible mediating pathway. Researchers found that fear of crime was associated with poorer mental health, reduced physical functioning on objective and subjective indicators, and lower quality of life. Participants reporting greater fear were 1.93 times as likely to have depression as those reporting lower fear of crime and had lower mental health scores. Understanding the impact of fear of crime will be an important data source for this HIA.

Teschke, K., Harris, A., Reynolds, C. C., Winters, M., Babul, S., Chipman, M., . . . Cripton, P. A. (2012). Route infrastructure and the risk of injuries to bicyclists: a case-crossover study. *American Journal of Public Health*.

This article compared cycling injury risks of 14 route types and other route infrastructure features in several Canadian cities. The researchers found that the lower risks on quiet streets and with bike-specific infrastructure along busy streets support the route-design approach used in many northern European countries. Transportation infrastructure with lower bicycling injury risks merits public health support to reduce injuries and promote cycling. The article is important to this HIA in that it supports the analysis of a connectivity plan in relation to a specific health effect.

Health Care Access

Yang, D.-H., Goerge, R., & Mullner, R. (2006). Comparing GIS-based methods of measuring spatial accessibility to health services. *Journal of Medical Systems*, 23-32.

The article attempts to recognize the inequitable geographic distribution of health care resources in the United States. An equitable distribution of health care resources can achieve two main goals set for facility planning: 1) cost containment by decreasing oversupply; and 2) equity of access by increasing supply to underserved areas.

Ensor, T., & Cooper, S. (2004). Overcoming barriers to health service access: influencing the demand side. *Health and Policy Planning*, 69-79.

This article notes that while the supply side of health care is an important factor in access, demand-side barriers such as the physical and financial accessibility of services, knowledge of what providers offer, education about how to best utilize self- and practitioner-provided services, and cultural norms of the treatment also play a role. Demand side barriers also include the price of travel cost and lost work, quality of the healthcare, income of the patient, social and household characteristics, and education in general.

Rosero-Bixby, L. (2003). Spatial access to health care in Costa Rica and its equity: a GIS-based study. *Social Science and Medicine*, 1271-1284.

The study assesses the equity in access to health care by Costa Ricans and the impact on it by the ongoing reform of the health sector. It uses traditional measurements of access based on the distance to the closest facilities weighted by their size, proximity, and characteristics of both the population and the facility.

Lovett, A., Haynes, R., Sunnenberg, G., & Gale, S. (2002). Car travel time and accessibility by bus to general practitioner services: a study using patient registers and GIS. *Social Science and Medicine*, 97-111.

Poor physical accessibility is known to reduce the use of services, and perhaps it leads to poorer health outcomes. The study of a UK neighborhood showed that poorer neighborhoods with less access to General practitioner access also showed a higher need. Due to a lack of personal transportation, the accessibility of services also decreased.

Hutch, D. J., Bouye, K. E., SKillem, E., Lee, C., Whitehead, L., & Rashid, J. R. (2011). Potential strategies to eliminate built environment disparities for disadvantages and vulnerable communities. *American Journal of Public Health*, 587-595.

This article highlights the need for research, policies, and tools that help eliminate environmental factors that disproportionately contribute to disparities among disadvantaged and vulnerable communities. It also describes the association between the built environment and disparities in health outcomes and provides recommendations for policy research dissemination. The author describes several community factors including: transportation and business investments; access to food; access to health care; access to housing; air and water quality; sociocultural, psychosocial, and socioeconomic factors; and reduced residential segregation. It also addresses family and individual factors including active living; dietary intake and patterns; behavioral outcomes; social isolation and social cohesion; and family resources and socioeconomic status.

Edwards, R. D. (2008). Public transit, obesity, and medical costs: assessing the magnitudes. *Preventive Medicine*, 14-21.

This paper assesses the potential benefits of increased walking and reduced obesity associated with taking public transit in terms of dollars of medical costs saved and disability avoided. The

author found that taking public transit is associated with walking 8.3 more minutes per day on average and that the additional walking associated with public transit could save $5500 per person in present value by reducing obesity-related medical costs.

Litman, T. (2010, June 14). Victoria Transport Policy Institute. *Evaluating public transportation health benefits*.

This report investigates ways that public transportation affects human health, and ways to incorporate these impacts into transport policy and planning decisions. The authors found that public transit improvements and more transit oriented development can provide large but often overlooked health benefits, such as the reduction of traffic crashes and pollution emissions, increases in physical fitness and mental health, and providing access to medical care and healthy food. Conclusively, the author states that improving public transit can be one of the most cost effective ways to achieve public health objectives, and public health improvements are among the largest benefits provided by high quality public transit and transit-oriented development.

Traffic Volume

Ewing, R., & Dumbaugh, E. (2009). The built environment and traffic safety. *Journal of Planning Literature*, 347-367.

This article provides important evidence-based theories around the impact of the built environment as it relates to traffic safety. First, they find that the traffic environment of dense urban areas appear to be safer than the lower-volume environments of the suburbs, because fewer miles are driver per capita and driving is done at lower speeds. Second, in dense urban areas, less "forgiving" design treatments, such as narrower lanes, traffic-calming measures, and street trees appears to enhance a roadway's safety.

Wright, S., & Bricker, S. (2012). *Why we're stuck at high speed, and what we're going to do about it.* America WALKS.

This article advocates for a shift in the mindset of developing roads for higher traffic speeds. Authors contend that building roads that maximize travel speed has been the central goal of transportation engineering, but they create both a traffic safety hazard, and an environment in which people are uncomfortable walking. The author recommend that American roads be designed and built with the goal of setting design speeds equal to posted speed and operating speed which will allow for traffic flow while creating a safer and more welcoming environment for all roadway users.

Morency, P., Gauvin, L., Plante, C., Fornier, M., & Morency, C. (2012). Neighborhood social inequalities in road traffic injuries: the influence of traffic volume and road design. *American Journal of Public Health*, 1112-1118.

The article examines the extent to which differential traffic volume and road geometry can explain social inequalities in pedestrian, cyclist, and motor vehicle occupant injuries across wealthy and poor urban areas. The article also explains that the physical environment has a strong influence on the likelihood of injuries. It was also found that road users in poorer neighborhoods have a higher exposure to traffic and, traffic volume being equal, a greater risk of injury because of the presence of more major roads and 4-legged intersections.

Brown, M. A., Southworth, F., & Sarzynski, A. (2008). Shrinking the carbon footprint of metropolitan America. *Metropolitan Policy Program*, 1-15.

The authors address the issue of growing populations as it relates to traffic volume. They assert that Americans are driving more, building more, consuming more energy, and emitting more carbon. They also conclude that metro area residents have smaller carbon footprints than the average American; however, per capita emissions vary substantially by metropolitan area, where metro areas in the West have smaller carbon footprints, whereas metro areas in the south and east (Florida) have larger carbon footprints. Cape Coral ranked 70th out of 100 on a scale of least amount of emissions per capita.

Wjst, M., Reitmeir, P., Dold, S., Wulff, A., Nicolai, T., Loeffelholz-Colberg, E. F., & vonMutius, E. (1993). Road traffic and adverse effects on respiratory health in children. *BMJ*, 596-600.
The authors attempted to examine whether road traffic in a big city has a direct effect on pulmonary function and respiratory symptoms in children. They conclusively found that high rates of road traffic diminish forced expiratory flow and increase respiratory symptoms in children.

Gunier, R. B., Hertz, A., vonBehren, J., & Reynolds, P. (2003). Traffic density in California: socioeconomic and ethnic differences among potentially exposed children. *Journal of Exposure Analysis and Environmental Epidemiology*, 240-246.
The authors of this article estimated neighborhood exposures to motor vehicle emissions from a road network with daily traffic counts using a geographic information system. They found that block groups with more than 500,000 vehicle miles of travel per square mile were defined as high traffic density, and more than 215,000 children live in these areas. Based on their analysis, low-income and children of color are more likely than White children and higher income children to live in block groups with high density traffic, and have higher potential exposure to vehicle emissions.

Lin, S., Munsie, J. P., Hwang, S.-A., Fitzgerald, E., & Cayo, M. R. (2002). Childhood asthma hospitalization and residential exposure to state route traffic. *Environmental Research*, 73-81.
This study investigated whether pediatric hospitalization for asthma was related to living near a road with heavy traffic. After adjustments for age and poverty level were made, children hospitalized for asthma were more likely to live on roads with the highest rate of vehicle miles traveled. This study ultimately suggests that exposure to high volumes of traffic/trucks within 200 meters of homes contributes to childhood asthma hospitalizations.

Venn, A. J., Lewis, S. A., Cooper, M., Hubbard, R., & Britton, J. (2001). Living near a main road and the risk of wheezing illness in children. *American Journal of Respiratory Critical Care Medicine*, 2177-2180.
The researchers of this article assert that increased exposure to vehicle exhaust emissions is likely to occur in those children who live, or spend a large proportion of time, within approximately 150 meters of a busy road. Conclusively they found that most of the increased risk was localized to within 90 meters of the roadside, and among primary school children, effects were stronger in girls than boys. Furthermore, living within approximately 90 meters of the main road is associated with proximity-related increase in the risk of wheezing illness in children.

Litman, T. (2010, June 14). Victoria Transport Policy Institute. *Evaluating public transportation health benefits*.
This report investigates ways that public transportation affects human health, and ways to incorporate these impacts into transport policy and planning decisions. The authors found that public transit improvements and more transit oriented development can provide large but often

overlooked health benefits, such as the reduction of traffic crashes and pollution emissions, increases in physical fitness and mental health, and providing access to medical care and healthy food. Conclusively, the author states that improving public transit can be one of the most cost effective ways to achieve public health objectives, and public health improvements are among the largest benefits provided by high quality public transit and transit-oriented development.

Rader, M. (2009). *Health impact assessment on policies reducing vehicle miles traveled in Oregon metropolitan areas.* Portland: Upstream Public Health.
The author addresses the growing population concern in Oregon and how it relates to the volume of traffic and its affects such as air pollution, congestion, and car collisions. The HIA conducted analyzes the effects of the proposed statewide VMT (vehicle miles traveled) - reduction plan. The following three factors were analyzed: positive changes to the built environment; strengthening public transit; and increasing costs for driving individual vehicles. Researchers utilizing the following three indicators of public health: physical activity; air pollution; and land use patterns.

Smart Growth America. (2010). *Healthy Communities and People*. Retrieved from Smart Growth America: www.smartgrowthamerica.org/issue
This online periodical states the following premises: smart growth strategies make walking and bicycling easier; smart growth strategies reduce congestion and air pollution; smart growth strategies help protect drinking water; smart growth strategies ensure difficult development decisions are made inclusively; and smart growth strategies make streets safer for drivers and pedestrians.

Perdue, L. A., Michael, Y. L., Harris, C., Heller, J., Livingston, C., Rader, M., & al., e. (2012). Rapid health impact assessment of policies to reduce vehicle miles traveled in Oregon. *Public Health*, 1063-1071.
The purpose of this rapid HIA was to inform the debate within a state legislature about the value of state policy and provide information for local planning agencies to better incorporate health considerations into planning activities. The benefits to this HIA are drawn from similar agendas and this it was advantageous to analyze successful processes.

Walkability

Banyan, M., & Suguri, V. (2014). *Health Impact Assessment: Ortiz Avenue Road Widening.* Fort Myers: Florida Gulf Coast University.

This report analyzed the health effects of a road widening project on an area within the Tice Community. This health impact assessment was a rapid version, entailing the quick assessment of literature and few statistical assumptions. However, it provides a foundation for the current health impact assessment in question.

Federal Highway Administration. (2013). *Safety benefits of walkways, sidewalks, and paved shoulders.*

This document is written by the Federal Highway Administration division of the U.S. Department of Transportation and it provides a summary on the safety benefits of walkways, sidewalks, and paved shoulders such as increasing the number of trips made by walking or biking, and increasing physical activity. Furthermore, by providing these features, several benefits arise such as a reduction of numerous crash types, both between vehicles and pedestrians, and providing a system of maintenance for operations.

Wright, S., & Bricker, S. (2012). *Why we're stuck at high speed, and what we're going to do about it.* America WALKS

This article advocates for a shift in the mindset of developing roads for higher traffic speeds. Authors contend that building roads that maximize travel speed has been the central goal of transportation engineering, but they create both a traffic safety hazard, and an environment in which people are uncomfortable walking. The authors recommend that American roads be designed and built with the goal of setting design speeds equal to posted speed and operating speed which will allow for traffic flow while creating a safer and more welcoming environment for all roadway users.

Howard, A. W. (2010). Keeping children safe: rethinking how we design our surroundings. *Canadian Medical Association Journal*.

The article asserts the following main points. Injury is the leading cause of death among children in the industrialized world, and often involves failure to negotiate a built environment. Safety should be considered when designing the build environment to substantially reduce injuries and fatalities. Perceived lack of safety is a major barrier to the use of active modes of transportation such as walking or cycling. A safer environment can lead to improved public health, physical activity levels and quality of life, and reduced pollution.

Hutch, D. J., Bouye, K. E., SKillem, E., Lee, C., Whitehead, L., & Rashid, J. R. (2011). Potential strategies to eliminate built environment disparities for disadvantages and vulnerable communities. *American Journal of Public Health*, 587-595.

This article highlights the need for research, policies, and tools that help eliminate environmental factors that disproportionately contribute to disparities among disadvantaged

and vulnerable communities. It also describes the association between the built environment and disparities in health outcomes and provides recommendations for policy research dissemination. The author describes several community factors including: transportation and business investments; access to food; access to health care; access to housing; air and water quality; sociocultural, psychosocial, and socioeconomic factors; and reduced residential segregation. It also addresses family and individual factors including active living; dietary intake and patterns; behavioral outcomes; social isolation and social cohesion; and family resources and socioeconomic status.

Edwards, R. D. (2008). Public transit, obesity, and medical costs: assessing the magnitudes. *Preventive Medicine*, 14-21.
This paper assesses the potential benefits of increased walking and reduced obesity associated with taking public transit in terms of dollars of medical costs saved and disability avoided. The author found that taking public transit is associated with walking 8.3 more minutes per day on average and that the additional walking associated with public transit could save $5500 per person in present value by reducing obesity-related medical costs.

Dill, J., & Carr, T. (2003). Bicycle commuting and facilities in major U.S. cities: If you build them, commuters will use them. *Transp. Res. Rec.*, 116-123.
Drawing upon past documented literature, the researchers which authored this article conducted a study on 35 large cities across the U.S. to determine if the built environment plays a role in the utilizing of bicycling as a means of transportation and recreation. They found that people commuting by bike was strongly associated with bike lanes per square mile. However, it was not strongly associated with spending on bicycle and pedestrian projects. In conclusion, the authors assert that higher levels of bicycle infrastructure are positively and significantly correlated with higher rates of bicycle commuting; however, bike lanes and paths alone are not likely to increase bicycle commuting, but instead need to connect popular origins and destinations; commuters should be educated about bicycling as an option; and commuters need safe and adequate parking at work.

Parker, K. M., Gustat, J., & Spriggs, A. (2012). Effect of bike lane infrastructure improvements on ridership in one New Orleans neighborhood. *Ann. Behav. Med.*, 101-107.
This study examined the impact of building new bike lanes in New Orleans to determine whether more people were cycling on the street and with the flow of traffic after bike lanes were built. Through direct observation of one intervention and two adjacent streets, observers counted cyclists riding on the street and sidewalk, with and against traffic, before and after installation of the lanes. They found that there was an increase in cyclists on all three streets after the installation of the bike lanes. They also found that riders cycling with the flow of traffic after bike lanes were clearly marked/striped.

Pucher, J., Dill, J., & Handy, S. (2010). Infrastructure, programs, and policies to increase bicycling: An international review. *Preventive Medicine*, 106-125.

The authors completed a comprehensive search of research on the built environment, programs, and policies, and their effects on bicycling. The authors found that many studies show positive associations between specific interventions and levels of bicycling and that almost all cities adopting comprehensive packages of interventions experienced large increases in the number of bicycle trips and number of people using their bicycle. The packages of interventions include infrastructure provision, pro-bicycle programs, supportive land use planning, and restrictions on car use. They also found that the role of public policy in encouraging bicycling plays a crucial role in its abundance.

Parker, K. M., Gustat, J., & Rice, J. C. (2011). Installation of bicycle lanes and icnreased ridership in an urban, mixed-income setting in New Orleans, Louisiana. *Journal of Physical Activity and Health*, 98-102.

The authors aimed at explaining the before and after effects of the installation of bike lanes in the Spring of 2008 in New Orleans. In November of 2007 and again in November 2008, the observers conducted manual counts of cyclists riding on a street in New Orleans, LA. The data collected included the number of men, women, adults, and children riding a bicycle with traffic, against traffic, and on sidewalks. Their data showed that there was a 57% increase in the number of riders per day after the bike lanes were installed. They conclusively asserted that bike lanes can have a positive impact in creating a healthy physical environment.

Walljasper, J. (2012, June 6). Green lanes: Welcome to the future of getting around. *Sharable.net*.

This short periodical/blog article highlights the importance and the effects of bike paths, clearly marked bike lanes, and pedestrian accommodations. The author utilized a summary approach to explain the benefits, on which he relied off of existing conditions, and existing literature and research. The article summarizes “The Green Lane Project”, which is an initiative to showcase these next-generation transportation improvements, and has been implemented in six U.S. cities. He concludes that bike lanes are important for improving safety and economic vitality in lower-income communities. Furthermore, it was asserted that bike lanes increase interactions between neighbors, and helps to ameliorate crime in neighborhoods.

Walljasper, J. (2011, December 20). How to boost biking and walking even further in your city. *Shareable.net*.

The author of this periodical article explains how Minneapolis increased the number and bikers and walkers by 16% and recommended methods for other cities to do the same. The author contends that accurate bike and pedestrian counts are critical to the growth of biking and walking because policymakers act on hard evidence. It is believed that taking accurate counts translates a message to policymakers, which in turn encourages them to encourage such activity, and physical activity improves.

Burbidge, S. K. (2010). Merging long range transportation planning with public health: A case study from Utah's Wasatch Front. *Preventive Medicine*, 6-8.

The authors summarize the point that US transportation systems have been identified as a problem for public health as they encourage automobile transportation and discourage physical activity. This case study provides an example of what transportation planners at Utah's metropolitan planning organization are doing to encourage physical activity through transportation. They found that the MPO recommends ten policy initiatives: require complete streets for all modes of transportation; require adequate links to new transit; incorporate bicycle parking and storage; etc.

Rader, M. (2009). *Health impact assessment on policies reducing vehicle miles traveled in Oregon metropolitan areas.* Portland: Upstream Public Health.

The author addresses the growing population concern in Oregon and how it relates to the volume of traffic and its affects such as air pollution, congestion, and car collisions. The HIA conducted analyzes the effects of the proposed statewide VMT (vehicle miles traveled) - reduction plan. The following three factors were analyzed: positive changes to the built environment; strengthening public transit; and increasing costs for driving individual vehicles. Researchers utilizing the following three indicators of public health: physical activity; air pollution; and land use patterns.

Smith, K. R., Brown, B. B., Yamada, I., Kowaleski-Jones, L., Zick, C. D., & Fan, J. X. (2008). Walkability and body mass index: Density, design, and new diversity measures. *American Journal of Preventive Medicine*, 237-244.

This study is an attempt to relate neighborhood walkability- density, pedestrian-friendly design, and two novel measures of land-use diversity- to residents' excess weight. The researchers found that increasing the levels of walkability through the means described above decreases the risk of excess weight. As it relates to connectivity, researchers found that the more numerous the intersections around the home within a .25 mile, the lower the risk of overweight and obesity for men, and the lower the risk of overweight for women. Conclusively, they found that pedestrian-friendly design, neighborhood age, and walking to work is associated with a reduction in BMI.

Ferdinand, A. O., Sen, B., Rahurkar, S., Engler, S., & Menachemi, N. (2012). The relationship between built environments and physical activity: A systematic review. *American Journal of Public Health*, 7-12.

The authors of this article conducted a systematic review of the literature examining the relationship between built environments (parks, trails, and sidewalks) and physical activity or obesity rates. They included 169 articles in their analysis and found that 89.2% of existing research reported beneficial relationships. However articles focusing on children in community settings, those examining direct measures of obesity, and those with an academic first author were less likely to find a beneficial relationship. The authors recommend that policymakers at federal and local levels should encourage more rigorous scientific research to determine whether altered built environments will result in increased physical activity, and decreased obesity rates.

Besser, L. M., & Dannenberg, A. L. (2005). Walking to public transit: Steps to help meet physical activity recommendations. *American Journal of Preventive Medicine*, 273-280.

The authors of this study attempted to estimate the total daily time spent walking to and from transit and the predictors of achieving 30 minutes of daily activity by doing so. Researchers found that respondents who use transit spend a median of 19 minutes daily walking to and from transit; people in high-density urban areas were more likely to spend more than or equal to 30 minutes walking to and from transit daily. Conclusively, walking to and from public transportation can help physically inactive populations, especially low-income and minority groups, attain the recommended level of daily physical activity.

Krieger, J., Rabkin, J., Sharify, D., & Song, L. (2009). High point walking for health: Creating built and social environments that support walking in a public housing community. *American Journal of Public Health*, 593-599.

The authors of this article implemented and evaluated multiple interventions to increase walking activity at a multicultural public housing site, including sponsoring walking groups, improving walking routes, providing information about walking options, and advocating for pedestrian safety. They found that, after intervention, self-reported walking activity increased among participants from 65 to 109 minutes per day. Conclusively the authors found that a multicomponent intervention developed through participatory methods has the highest degree of success in increasing walking activity in a multicultural public housing site. Furthermore, they assert that the built environment influences opportunities for physical activity, while the social environment affects physical activity through perceptions of community and pedestrian safety, social support, and access to recreational programs.

Leslie, E., Saelens, B., Frank, L., Owen, N., Bauman, A., Coffee, N., & Graeme. (2005). Residents' perceptions of walkabiliy attributes in objectively different neighbourhoods: A pilot study. *Health & Place*, 227-236.

Researchers used a modified version of the Neighborhood Environment Walkability Scale to compare residents' perceptions of the attributes of two neighborhoods that differed on measures derived from Geographic Information System databases. Residents of walkable neighborhoods rated density, land-use mix, and street connectivity higher than residents of low walkable neighborhoods. However, traffic safety and safety from crime perceptions did not differ.

Tight, M. R., Kelly, C., Hodgson, F., & Page, M. (2004). Improving pedestrian accessibility and quality of life. *10th World Conference on Transport Research*.

The researchers of this article conducted an overview of the main pedestrian problems and the factors that influence both the decision to walk and routes taken, derived from a comprehensive literature search. Furthermore, the authors then examine results from a series of studies looking at methods for valuing different aspects of the pedestrian environment. They found that the problems faced by pedestrians included the following: road safety, air quality, personal

security, inactivity, fear/intimidation/danger, severance, pedestrian delay, and land-use planning. They found that there were several factors that influenced the decision to walk, including: distance, time, security, road traffic, the built urban environment, the pedestrian environment, the effort required, and the weather.

Smart Growth America. (2010). *Healthy Communities and People*. Retrieved from Smart Growth America: www.smartgrowthamerica.org/issues
This online periodical states the following premises: smart growth strategies make walking and bicycling easier; smart growth strategies reduce congestion and air pollution; smart growth strategies help protect drinking water; smart growth strategies ensure difficult development decisions are made inclusively; and smart growth strategies make streets safer for drivers and pedestrians.

Gustat, J., Rice, J., Parker, K. M., Becker, A. B., & Farley, T. A. (2012). Effect of changes to the neighborhood built environment on physical activity in a low-income African American neighborhood. *Preventing Chronic Disease*.
Researchers examined how changes in the built environment affected residents' physical activity levels in a low income, primarily, African American neighborhood in New Orleans by building a 6-block walking path and installing a school playground in an intervention neighborhood. Researchers found that the proportion of residents observed who were active increased significantly in the section of the intervention neighborhood with the path and playground. They conclusively say that changes to the built environment may increase neighborhood physical activity in relation to these demographics.

Dumbaugh, E. (2005). Safe streets, livable streets. *Journal of the American Planning Association*, 283-300.
In this study, the author examines the subject of livable streetscape treatments and finds compelling evidence that suggests they may actually enhance the safety of urban roadways. Concerns about their safety effects do not appear to be founded on empirical observations of crash performance, but instead on a design philosophy that discounts the important relationship between driver behavior and safety. This study traces the origin and evolution of this philosophy, and proposes an alternative that may better account for the dynamic relationships between road design, driver behavior, and transportation safety.

Fitzpatrick, K., Carlson, P., Brewer, M., & Wooldridge, M. (2000). Design factors that affect driver speed on suburban streets. *Transportation Research Record*, 18-25.
Driver behavior is affected by many roadway factors. This project investigated geometric, roadside, and traffic control device variables that may affect driver behavior on four-lane suburban arterials. This project illustrates that certain variables, such as the presence of medians, can affect operating speeds. This project also demonstrates that more investigation of speed choice is needed to better understand what influences drivers on suburban arterials. The

influence could be the complex interaction of combinations of variables; the overall environment, including off-road conditions; or primarily a function of drivers' characteristics.

King, M. R. (2003). Pedestrian safety through a raised median and redesigned intersections. *Transportation Research Board*.
This paper documents the effect of a raised median, signalized and redesigned intersections, curbs, and sidewalks on vehicle speed, pedestrian exposure risk, driver predictability, and vehicle volume along a four lane suburban roadway in central New Jersey. The results are as follows: 85th percentile vehicle speed fell by two miles per hour; pedestrian exposure risk decreased by 28 percent; the median allows pedestrians to cross one direction of traffic at a time; signals, curbs, median, redesigned intersections and striping patterns work together to manage driver behavior; vehicle volumes were not affected; vehicle speeds acted independently of vehicle volumes.

Petritsch, T. A., Landis, B. W., McLeod, P. S., Huang, H. F., & Challa, S. (2004). *Level of service model for signalized intersections for pedestrians.* Tallahassee: Florida Department of Transportation.
This paper documents a Florida Department of Transportation sponsored study to develop a Level of Service (LOS) model that accurately represents pedestrians' perceptions crossings at signalized intersections. This model incorporates perceived safety/comfort (i.e., perceived exposure and conflicts) and operations (i.e., delay, and signalization). The study reveals that right-turn-on-red volumes for the street being crossed, permissive left turns from the street parallel to the crosswalk, motor vehicle volume on the street being crossed, midblock 85 percentile speed of the vehicles on the street being crossed, the number of lanes being crossed, and the pedestrian's delay, and the presence or absence of right-turn channelization islands are primary factors in the Pedestrian LOS model for intersections.

Powell, K. E., Martin, L. M., & Chowdhury, P. P. (2003). Places to walk: convenience and regular physical activity. *American Journal of Public Health*, 1519-1521.
The availability and awareness of places conducive to physical activity are associated with higher levels of physical activity. To guide the efforts to promote regular physical activity, authors used the Georgia Behavioral Risk Factor Surveillance System to determine (1) whether adult Georgians were aware of safe and convenient places for walking, (2) what places they most commonly envisioned, and (3) whether the proximity of those places was associated with self-reported physical activity behaviors. In addition, a direct relation exists between the convenience of the place and meeting activity recommendations. Those able to walk to the place in less than 10 minutes are most likely to be active.

Sallis, J. F., Saelens, B. E., Frank, L. D., Conway, T. L., Slymen, D. J., Cain, K. L., . . . Kerr, J. (2009). Neighborhood built environment and income: examining multiple health outcomes. *Social Science Medicine*, 1285-1293.
The purpose of the present study was to test associations of neighborhood built environment and median income to multiple health outcomes and examine whether associations are similar

for low- and high-income groups. Physical QoL was higher in high-income neighborhoods but unrelated to walkability. Adjustment for neighborhood self-selection produced minor changes. Researchers concluded that living in walkable neighborhoods was associated with more physical activity and lower overweight/obesity but not with other benefits. Lower- and higher-income groups benefited similarly from living in high-walkability neighborhoods. Adults in higher-income neighborhoods had lower BMI and higher physical QoL.

America Walks. (2012). *Steps to a Walkable Community.* Schwartz Engineering.
The report, Steps to a Walkable Community, the best and brightest strategies are provided to move communities toward a more walkable community. Authors have worked to capture both time-tested and new and innovative tactics that are realistic and achievable. Steps to a Walkable Community compiles multidisciplinary tactics that readers can assemble into custom strategies designed for their community's circumstances. The guide contains tactics for building or rebuilding cities and suburbs in ways that encourage walking. The guide is also about making walking in cities safer, and it provides traffic-engineering techniques to achieve that. Steps to a Walkable Community also describes methods of organizing advocacy to reach these goals.

Brennan-Ramirez, L. K., Hoehner, C. M., Brownson, R. C., Cook, R., Orleans, C. T., Hollander, M., . . . Wilkinson, W. (2006). Indicators of activity-friendly communities: An evidence-based consensus process. *American Journal of Preventive Medicine*, 515-524.
Authors of this article utilized a systematic review process to identify key indicators of activity-friendly communities that can assess and improve opportunities for regular physical activity. Conclusively, they found that there were ten promising indicators of activity-friendly communities: land use environment, access to exercise facilities, transportation environment, aesthetics, travel patterns, social environment, land use economics, transportation economics, institutional and organizational policies, and promotion.

Dannenberg, A. L., Jackson, J., Frumkin, H., Schreiber, R. A., Pratt, M., Kochtitzky, C., & Tilson, H. H. (2003). The impact of community design and land-use choices on public health: a scientific research agenda. *American Journal of Public Health*, 0009-0036.
The Centers for Disease Control and Prevention hosted a workshop in May 2002 to help develop a scientific research agenda on these issues. This report describes the 37 questions in the resulting research agenda. The several aspects analyzed in the workshop included physical activity, obesity, and transportation choices; schools and children; unintentional injuries; and community design in relation to individuals with disabilities. Understanding the reasoning behind the developed questions will aid this HIA when determining research questions of the health determinants.

Federal Highway Administration. (1987). *Investigation of exposure-based pedestrian accident areas: crosswalks, sidewalks, local streets, and major arterials.* Washington, D.C.: United States Department of Transportation.

Previous FHWA research on pedestrian exposure identified four problem areas as promising candidates for accident reduction: intersections without marked pedestrian crosswalks, major arterial streets, local streets, and locations lacking sidewalks or pedestrian pathways. This report describes the results of a project undertaken to examine those four problem areas. The results explained several safety issued concerned with the four problem areas and provides information for this HIA when examining such elements.

Federal Highway Administration. (2003, November). *A review of pedestrian safety research in the United States and abroad.* Retrieved from United States Department of Transportation: http://www.fhwa.dot.gov/publications/research/safety/pedbike/03042/part3.cfm#marked
This report summarizes research on pedestrian safety in the United States with a focus on crash characteristics and the safety effects of various roadway features and traffic-control devices. Such features analyzed include crosswalks and alternative crossing treatments, signalization, signing, pedestrian refuge islands, provisions for pedestrians with disabilities, bus stop location, school crossing measures, traffic-calming measures, and sidewalks and paths. It is relevant to this HIA in that it provides statistical information regarding elements of the proposed connectivity plan on pedestrian health.

Teschke, K., Harris, A., Reynolds, C. C., Winters, M., Babul, S., Chipman, M., . . . Cripton, P. A. (2012). Route infrastructure and the risk of injuries to bicyclists: a case-crossover study. *American Journal of Public Health*.
This article compared cycling injury risks of 14 route types and other route infrastructure features in several Canadian cities. The researchers found that the lower risks on quiet streets and with bike-specific infrastructure along busy streets support the route-design approach used in many northern European countries. Transportation infrastructure with lower bicycling injury risks merits public health support to reduce injuries and promote cycling. The article is important to this HIA in that it supports the analysis of a connectivity plan in relation to a specific health effect.

Emergency Response Time

Burden, D., & Zykofsky, P. (2000). *Emergency Response: Traffic Calming and Traditional Neighborhood Streets.* Sacramento, CA: Local Government Commission Center for Livable Communities.
This manual provides a description of the effects of traffic slowing and traffic calming measures on emergency response teams. Several of the elements analyzed in this report include increased utilization of stops signs, speed humps, roundabouts, and medians. From the analysis, the author provides statistically backed delays or advantages of traffic calming measures on emergency response times. This article is beneficial to the current HIA because elements of the plan being analyzed include traffic calming measures, where

Trowbridge, M., Gurka, M. K., & O'Connor, R. E. (2007). Urban sprawl and delayed ambulance arrival in the U.S. *American Journal of Preventive Medicine*, 428-432.

The potential influence of built environment features, such as urban sprawl, on EMS performance is often not considered. This study measures the association between urban sprawl and EMS response time to test the hypothesis that features of sprawling development increase the probability of delayed ambulance arrival. Researchers found that urban sprawl is significantly associated with increased EMS response time and a higher probability of delayed ambulance arrival following motor-vehicle crashes in the U.S. the results of this study suggest that promotion of community design and development that follows smart-growth principles and regulates urban sprawl may improve EMS performance and reliability.

The Congress for the New Urbanism. (2009). *Emergency response and street design.*

The Congress for the New Urbanisn, U.S. Environmental Protection Agency, and fire marshals from across the country have partnered together on an Emergency Response & Street Design Initiative. The initiative is aimed at reconciling the growing desire for appropriately-sized and connected streets with emergency responders' access needs. The authors propose that streets in connected networks can improve emergency response times by providing several reoutes to any given address; and are safer for pedestrians and emergency responders since they calm traffic below speeds that more likely result in fatal or serious injury collisions.

Social Capital/Civic Engagement

Hutch, D. J., Bouye, K. E., SKillem, E., Lee, C., Whitehead, L., & Rashid, J. R. (2011). Potential strategies to eliminate built environment disparities for disadvantages and vulnerable communities. *American Journal of Public Health*, 587-595.

This article highlights the need for research, policies, and tools that help eliminate environmental factors that disproportionately contribute to disparities among disadvantaged and vulnerable communities. It also describes the association between the built environment and disparities in health outcomes and provides recommendations for policy research dissemination. The author describes several community factors including: transportation and business investments; access to food; access to health care; access to housing; air and water quality; sociocultural, psychosocial, and socioeconomic factors; and reduced residential segregation. It also addresses family and individual factors including active living; dietary intake and patterns; behavioral outcomes; social isolation and social cohesion; and family resources and socioeconomic status.

Srinivasan, S., O'Fallon, L. R., & Dearry, A. (2003). Creating healthy communities, healthy homes, healthy people: initiating a research agenda on the built environment and public health. *American Journal of Public Health*, 1446-1450.

The authors first identify the definitions of the built environment and environmental health. The environmental health definition has shifted from past assumptions to the broad concept of the effects on human health of the physical and social environment, which includes issues related to urban and rural development, appropriate uses of land, pesticide use, public transportation systems, and industrial development. Researchers also found the connections between the built environment and health has largely focused on housing, transportation, and neighborhood characteristics. Specifically, the burden of illness in the built environment has been greater on lower socioeconomic strata and minority populations.

Link, B. G., & Phelan, J. C. (2002). McKeown and the idea that social conditions are fundamental causes of disease. *American Journal of Public Health*, 730-732.

The authors summarize research conducted by McKeown, which asserts that reductions in mortality over the past two centuries were due to improved socioeconomic conditions rather than to medical or public health interventions. The first element discussed is the importance of resources. First, resources shape individual health behaviors by influencing whether people know about, have access to, can afford, and are supported in their efforts to engage in health-enhancing behaviors. Second, resources shape access to broad contexts such as neighborhoods, occupations, and social networks. The authors also contend that socioeconomic factors have in the past played a role in health determinations, and also play a role today.

Bashir, S. A. (2002). Home is where the harm is: inadequate housing as a public health crisis. *American Journal of Public Health*, 733-738.

The author summarizes the notion that overcrowding and poor-quality housing have a direct relationship to poor mental health, developmental delay, heart disease, and short stature. Substandard and deteriorating housing contributes to a variety of ailments, from respiratory disease and neurological disorders, to psychological and behavior dysfunction. The population most largely affected by the housing/health relationship are low-income, inner-city families of color.

Kawachi, I. (1999). *Social capital and community effects on population and individual health.*
The author summarizes the following premise in his report: Social capital refers to those features of social relationships--such as levels of interpersonal trust and norms of reciprocity and mutual aid--that facilitate collective action for mutual benefit. Social capital is believed to play an important role in the functioning of community life across a variety of domains, ranging from the prevention of juvenile delinquency and crime, the promotion of successful youth development, and the enhancement of schooling and education to the encouragement of political participation. More recently, researchers have begun to apply the concept to explain variations in health status across geographic localities. In preliminary analyses, the higher the stocks of social capital (as indicated by measures of trust and reciprocity in social surveys), the higher appear to be the health achievement of a given area. Strengthening the social capital within communities may provide an important avenue for reducing socioeconomic disparities in health.

Hawe, P., & Shiell, A. (2000). Social capital and health promotion: a review. *Social Science and Medicine*, 871-885.
The authors of this article examine the relationship between social capital and economic factors and health. They found that it is well-documented that people in lower socio-economic status groups tend to suffer the worst health. The authors comprehensively review literature that has been documented by others regarding the relationship between social capital and health. They conclude that the concept of social capital may add little and may perhaps act to dilute the social health initiatives already in place.

Hood, E. (2005). Dwelling disparities: how poor housing leads to poor health. *Environmental Health Perspectives*, 311-317.
The author found that various aspects of the built environment can have profound, directly measurable effects on both physical and mental health outcomes, particularly adding to the burden of illness among ethnic minority populations and low-income communities. He also found that lack of sidewalks, bike paths, and recreations areas in communities discourages physical activity and contributes to obesity. Primarily, however, the author summarizes that the built environment, inadequate housing, and socioeconomic status play a large role in health disparities, and that housing should become a forefront concern in health science.

Krieger, J., Rabkin, J., Sharify, D., & Song, L. (2009). High point walking for health: Creating built and social environments that support walking in a public housing community. *American Journal of Public Health*, 593-599.

The authors of this article implemented and evaluated multiple interventions to increase walking activity at a multicultural public housing site, including sponsoring walking groups, improving walking routes, providing information about walking options, and advocating for pedestrian safety. They found that, after intervention, self-reported walking activity increased among participants from 65 to 109 minutes per day. Conclusively the authors found that a multicomponent intervention developed through participatory methods has the highest degree of success in increasing walking activity in a multicultural public housing site. Furthermore, they assert that the built environment influence opportunities for physical activity, while the social environment affects physical activity through perceptions of community and pedestrian safety, social support, and access to recreational programs.

Leyden, K. M. (2003). Social capital and the built environment: the importance of walkable neighborhoods. *American Journal of Public Health*.

The author sought to examine whether pedestrian-oriented, mixed-use neighborhoods encourage enhanced levels of social and community engagement. The study investigated the relationship between neighborhood design and individual levels of social capital. Data were obtained from a household survey that measured the social capital of citizens living in neighborhoods that ranged from traditional, mixed-use, pedestrian-oriented designs to modern, car-dependent suburban subdivisions. The author concludes that that persons living in walkable, mixed-use neighborhoods have higher levels of social capital compared with those living in car-oriented suburbs. Utilizing knowledge of what influences social interactions, and related health benefits of social capital, will allow researchers of this HIA to draw upon important conclusions.

Lund, H. (2002). Pedestrian environments and sense of community. *Journal of Planning Education and Research*, 301-312.

This study explores how objective and subjective qualities of the pedestrian environment influence residents' sense of community, both directly and indirectly through their effects on pedestrian travel. Surveys conducted in one pedestrian-oriented neighborhood and one automobile-oriented neighborhood in Portland, Oregon, support the hypotheses that (1) sense of community will be greater in the traditional neighborhood and (2) pedestrian environment factors will significantly influence sense of community, controlling for various demographic influences. Utilizing knowledge of what influences social interactions, and related health benefits of social capital, will allow researchers of this HIA to draw upon important conclusions.

Mehta, V. (2007). Lively streets: determining environmental characteristics to support social behavior. *Journal of Planning Education and Research*, 165-187.

This article is an empirical examination of behavioral responses of people to the environmental quality of neighborhood commercial streets. Eleven land use and physical characteristics of buildings and the street are identified based on the literature review and extensive observations. These are measured and tested to understand which characteristics support stationary, lingering, and social activities. The findings reveal that people are equally concerned with the social, land use, and physical aspects of the street. This study is important to this HIA in that it assesses which environmental or built characteristics attract social interaction. Related, researchers can identify health effects of these interactions.

Smith, K. P., & Christakis, N. A. (2008). Social networks and health. *Annual Review of Sociology*, 405-418.
The article reviews prominent findings from literature regarding the impacts of social networks on health. It was concluded that the existence of social networks means that people's health is inter-dependent and that health and healthcare can transcend the individual in ways that patients, doctors, policy makers, and researchers should care about. This article strongly benefits this HIA in that there is relatively little literature available regarding the impacts of social networks on health and it lends to evidence that social interaction plays a role in health outcomes.

Traffic Safety

Federal Highway Administration. (2013). *Safety benefits of walkways, sidewalks, and paved shoulders.*
This document is written by the Federal Highway Administration division of the U.S. Department of Transportation and it provides a summary on the safety benefits of walkways, sidewalks, and paved shoulders such as increasing the number of trips made by walking or biking, and increasing physical activity. Furthermore, by providing these features, several benefits arise such as a reduction of numerous crash types, both between vehicles and pedestrians, and providing a system of maintenance for operations.

Ewing, R., & Dumbaugh, E. (2009). The built environment and traffic safety. *Journal of Planning Literature*, 347-367.
This article provides important evidence-based theories around the impact of the built environment as it relates to traffic safety. First, they find that the traffic environment of dense urban areas appear to be safer than the lower-volume environments of the suburbs, because fewer miles are driver per capita and driving is done at lower speeds. Second, in dense urban areas, less "forgiving" design treatments, such as narrower lanes, traffic-calming measures, and street trees appears to enhance a roadway's safety.

Dumbaugh, E., & Li, W. (2011). Designing for the safety of pedestrians, cyclists, and motorists in urban environments. *Journal of the American Planning Association*, 69-88.
This article attempts to explain the contention between road designs for the safety of pedestrians versus road design for the safety of motor users. The authors contend that most of the ongoing debate between pedestrian advocates and traffic engineers has focused on the relative desirability of designing urban roadways to be forgiving to random driver error. However, designs that balance the inherent tension between vehicle speeds and traffic conflicts can be used to enhance the safety of pedestrians, cyclists and motorists.

Wright, S., & Bricker, S. (2012). *Why we're stuck at high speed, and what we're going to do about it.* America WALKS.
This article advocates for a shift in the mindset of developing road for higher traffic speeds. Authors contend that building roads that maximize travel speed has been the central goal of transportation engineering, but they create both a traffic safety hazard, and an environment in which people are uncomfortable walking. The author recommend that American roads be designed and built with the goal of setting design speeds equal to posted speed and operating speed which will allow for traffic flow while creating a safer and more welcoming environment for all roadway users.

Morency, P., Gauvin, L., Plante, C., Fornier, M., & Morency, C. (2012). Neighborhood social inequalities in road traffic injuries: the influence of traffic volume and road design. *American Journal of Public Health*, 1112-1118.

The article examines the extent to which differential traffic volume and road geometry can explain social inequalities in pedestrian, cyclist, and motor vehicle occupant injuries across wealthy and poor urban areas. The article also explains that the physical environment has a strong influence on the likelihood of injuries. It was also found that road users in poorer neighborhoods have a higher exposure to traffic and, traffic volume being equal, a greater risk of injury because of the presence of more major roads and 4-legged intersections.

McDonald, N., & Trowbridge, M. (2009). Does the built environment affect when American teens become drivers? *Journal of Safety Research*, 177-183.

The authors speculate on the notion that motor vehicle crashes are the most common cause of death for American adolescents. From this, they determine which built environments, if any, cause teens to begin driving sooner, and thus increasing their risk for crash related injuries. The article found that teens living in less dense and more sprawling communities initiate driving at a younger age than comparable teens in compact areas. Teens in less dense and sprawling areas are more at risk for crash related injuries based on the distance of travel; built environment factors such as density should be considered when designing future teen driver safety programs.

Wright, S., & Bricker, S. (2012). *How communities are slowing down.* America Walks.

The authors of this report address the problem of speed on streets in a variety of ways. By conducting several case studies, along with a comprehensive literature search, the authors provide studies that provide examples of how approaches to speed problems are being used to increase the safety of all road users in American communities. The authors propose four ways to slow the roads: change the driver; change the street; change the posted speed; and change the laws that govern posted speed.

Dumbaugh, E. (2005). Safe streets, livable streets. *Journal of the American Planning Association*, 283-300.

In this study, the author examines the subject of livable streetscape treatments and finds compelling evidence that suggests they may actually enhance the safety of urban roadways. Concerns about their safety effects do not appear to be founded on empirical observations of crash performance, but instead on a design philosophy that discounts the important relationship between driver behavior and safety. This study traces the origin and evolution of this philosophy, and proposes an alternative that may better account for the dynamic relationships between road design, driver behavior, and transportation safety.

Fitzpatrick, K., Carlson, P., Brewer, M., & Wooldridge, M. (2000). Design factors that affect driver speed on suburban streets. *Transportation Research Record*, 18-25.

Driver behavior is affected by many roadway factors. This project investigated geometric, roadside, and traffic control device variables that may affect driver behavior on four-lane suburban arterials. This project illustrates that certain variables, such as the presence of medians, can affect operating speeds. This project also demonstrates that more investigation of

speed choice is needed to better understand what influences drivers on suburban arterials. The influence could be the complex interaction of combinations of variables; the overall environment, including off-road conditions; or primarily a function of drivers' characteristics.

Federal Highway Administration. (1987). *Investigation of exposure-based pedestrian accident areas: crosswalks, sidewalks, local streets, and major arterials.* Washington, D.C.: United States Department of Transportation.
Previous FHWA research on pedestrian exposure identified four problem areas as promising candidates for accident reduction: intersections without marked pedestrian crosswalks, major arterial streets, local streets, and locations lacking sidewalks or pedestrian pathways. This report describes the results of a project undertaken to examine those four problem areas. The results explained several safety issued concerned with the four problem areas and provides information for this HIA when examining such elements.

Federal Highway Administration. (2003, November). *A review of pedestrian safety research in the United States and abroad.* Retrieved from United States Department of Transportation: http://www.fhwa.dot.gov/publications/research/safety/pedbike/03042/part3.cfm#marked
This report summarizes research on pedestrian safety in the United States with a focus on crash characteristics and the safety effects of various roadway features and traffic-control devices. Such features analyzed include crosswalks and alternative crossing treatments, signalization, signing, pedestrian refuge islands, provisions for pedestrians with disabilities, bus stop location, school crossing measures, traffic-calming measures, and sidewalks and paths. It is relevant to this HIA in that it provides statistical information regarding elements of the proposed connectivity plan on pedestrian health.

Noyce, D., Talada, V., & Gates, T. (2006, June). *Safety and operational characteristics of two-way left-turn lanes.* Retrieved from University of Wisconsin-Madison, Traffic Operations and Safety Laboratory: http://www.lrrb.org/media/reports/200625.pdf
The purpose of this research was to evaluate the safety and operational characteristics of two-way left-turn lanes (TWLTLs) compared to four-lane undivided roadways in Minnesota. Research tasks to achieve this purpose consisted of a comprehensive literature review, data collection from the identified study sites, and statistical data analysis. The results of this research show that safety characteristics of a roadway are improved when a four-lane undivided roadway is converted to a three-lane roadway with a TWLTL when daily traffic volumes are less than 17,500 vehicles per day. This HIA analyzes the effects of converting a 2-lane road to a four-lane road and its related health effects. Therefore, this article provides support in relation to safety and lane width.

Criminal Activity

Aaron, B. (2013, January 18). Puran Thapa, 7, killed by motorist in Ridgewood; no charges filed. *Streetsblog New York City*.

The article highlights the contention between a death of a child and the responsibility of the driver to face criminal charges. It states that, as is the norm when a child killed in traffic is blamed for his or her own death, no mention is made of the motorist's speed. No criminal charges were brought to the motorist involved in the crash highlighted.

Walljasper, J. (2012, June 6). Green lanes: Welcome to the future of getting around. *Sharable.net*.

This short periodical/blog article highlights the importance and the effects of bike paths, clearly marked bike lanes, and pedestrian accommodations. The author utilized a summary approach to explain the benefits, on which he relied off of existing conditions, and existing literature and research. The article summarizes "The Green Lane Project", which is an initiative to showcase these next-generation transportation improvements, and has been implemented in six U.S. cities. He concludes that bike lanes are important for improving safety and economic vitality in lower-income communities. Furthermore, it was asserted that bike lanes increase interactions between neighbors, and helps to ameliorate crime in neighborhoods.

Evenson, K. R., Block, R., Roux, A. V., McGinn, A. P., Wen, F., & Rodríguez, D. A. (2012). Associations of adult physical activity with perceived safety and police-recorded crime: the multi-ethnic study of atherosclerosis. *International Journal of Behavioral Nutrition and Physical Activity*.

Due to the inconsistent findings of prior studies, the authors explored the association of perceived safety and police-recorded crime measures with physical activity. The study included 818 Chicago participants of the Multiethnic Study of Atherosclerosis 45 to 84 years of age. Questionnaire-assessed physical activity included a) transport walking; b) leisure walking; and c) non-walking leisure activities. Perceived safety was assessed through an interviewer-administered questionnaire. Police-recorded crime was assessed through 2-year counts of selected crimes (total and outdoor incivilities, criminal offenses, homicides) per 1000 population. Perceiving a safer neighborhood was positively associated with transport walking and perceiving lower violence was associated with leisure walking. Perceived and police-recorded measures had independent associations with walking and both should be considered in assessing the impact of neighborhood crime on physical activity.

Farrington, D. P., & Welsh, B. C. (2002). *Effects of improved sstreet lighting on crime: A systematic review.* London: Home Office Research, Development and Statistics Directorate.

This review summarizes the findings of previous studies from both the USA and Britain on the effectiveness of improved street lighting on crime. Rigorous criteria were set for the inclusion of studies. These criteria were: that improvements in street lighting were the main intervention studied; that there was an outcome measure of crime; that crime levels before and after the intervention were measured; and that the studies included a comparable control area. A meta-

analysis of the eligible studies found that improved street lighting led to significant reductions in crime and with an overall reduction in recorded crime of 20 percent across all the experimental areas. The review assesses why street lighting has this impact on crime. The authors conclude that lighting increases community pride and confidence and strengthens informal social control and that this explains the recorded impacts, rather than increased surveillance or deterrent effects. The authors, however, suggest that these explanatory theories need to be tested more explicitly in future research and that there need to be further assessments of the impacts of different levels of illumination on crime. The authors conclude that improvements in street lighting offer a cost-effective crime reduction measure and should be considered an important element in situational crime reduction programs

Boulange, C., & Armada, F. (2011). The effect of urban crime and percieved safety on urban levels of physical activity: a review. *International Conference on Urban Health.* World Health Organization Kobe Centre for Health Development.

This poster presented at the International Conference on Urban Health in 2011 highlights the effect that crime has on physical activity, and tests the hypothesis that crime is a significant barrier to active living. The authors conducted a comprehensive literature search and compiled the results. They found that crime and fear of crime inhibit physical activity, and increases the probability of sedentary lifestyles. Furthermore, due to socio-environmental factors, certain populations are more exposed to that threat. They also found that urban design matters, such as adequate lighting and safe access.

Crowe, T. D., & Zahm, D. L. (1994). Crime prevention through environmental design. *Land Development*, 22-27.

Crime prevention through environmental design derives from a variety of disciplines concerned with the interactions between people and the physical environment. The article highlights elements of environmental design which play into the prevalence of crime as well as perceptions of crime within a community. Several of these element included neighborhood design, safe and unsafe activities, crime and traffic, and essential barriers to crime. It is beneficial in the sense of this HIA because it directly analyzes a stated health determinant of our study.

Sundquist, K., Theobald, H., Yang, M., Li, X., Johansson, S., & Sundquist, J. (2006). Neighborhood violent crime and unemployment increase the risk of coronary heart disease: a multilevel study in an urban setting. *Social Science & Medicine*.

This study used the theoretical frameworks of the Chicago school and the Stirling County group in order to analyze the impact of neighborhood violent crime and neighborhood unemployment on CHD in an urban setting. Researchers found that Public safety and social stability in socially disorganized neighborhoods need to be improved in order to promote cardiovascular health. They also found that when neighborhood violent crime and neighborhood unemployment increased, the risk of CHD increased among both women and men. This article lends

importance to this HIA in that it analyzes a specific health determinant and its related health effect.

Stafford, M., Chandola, T., & Marmot, M. (2007). Association between fear of crime and mental health and physical functioning. *American Journal of Public Health*.
Studies have reported an inverse association between fear of crime and subjective mental and physical health. We investigated the direction of causality and the curtailment of physical and social activities as a possible mediating pathway. Researchers found that fear of crime was associated with poorer mental health, reduced physical functioning on objective and subjective indicators, and lower quality of life. Participants reporting greater fear were 1.93 times as likely to have depression as those reporting lower fear of crime and had lower mental health scores. Understanding the impact of fear of crime will be an important data source for this HIA.

Economic Impact

Hutch, D. J., Bouye, K. E., SKillem, E., Lee, C., Whitehead, L., & Rashid, J. R. (2011). Potential strategies to eliminate built environment disparities for disadvantages and vulnerable communities. *American Journal of Public Health*, 587-595.
This article highlights the need for research, policies, and tools that help eliminate environmental factors that disproportionately contribute to disparities among disadvantaged and vulnerable communities. It also describes the association between the built environment and disparities in health outcomes and provides recommendations for policy research dissemination. The author describes several community factors including: transportation and business investments; access to food; access to health care; access to housing; air and water quality; sociocultural, psychosocial, and socioeconomic factors; and reduced residential segregation. It also addresses family and individual factors including active living; dietary intake and patterns; behavioral outcomes; social isolation and social cohesion; and family resources and socioeconomic status.

Dor, A., Ferguson, C., Langwith, C., & Tan, E. (2010). *A heavy burden: The individual costs of being overweight and obese in the United States.* The George Washington University School of Public Health.
In this report, researchers have provided estimates of annual, incremental costs of overweight and obesity from the individual perspective. However, in addition to the individual, employers, and to some extent, the government, bear some of the costs. Among the items discussed in this review, overweight or obese individuals bear the full burden for some costs, such as the value of lost life, lost wages, gasoline costs, and, when applicable, life insurance. Employers and employees share the burden for many other costs, including direct medical costs, short-term disability, disability pension insurance, absenteeism, and productivity losses. Employers directly pick up the costs for many of these expenditures. However, employees indirectly share part of this burden through lower wages. In addition, through publicly funded programs such as

Medicare and Medicaid, the government pays a significant portion of direct medical costs for their beneficiaries.

Public Transportation

Center for Quality Growth and Regional Development. (n.d.). *Pathways to a healthy Decatur: a rapid health impact assessment of the City of Decatur.* Atlanta: Georgia Institute of Technology, College of Agriculture.

The rapid health impact assessment conducted in this study highlights the health effects of a transportation plan in the city of Decatur. The study analyzes the effects of a public transportation plan on physical activity, active living, universal design, access and affordability, environmental threats and social capital. It greatly benefits the research of this HIA because it provides sources for which to refer and analyzes similar health determinants. It is useful in providing a point of foundation.

Litman, T. (2010, June 14). Victoria Transport Policy Institute. *Evaluating public transportation health benefits*.

This report investigates ways that public transportation affects human health, and ways to incorporate these impacts into transport policy and planning decisions. The authors found that public transit improvements and more transit oriented development can provide large but often overlooked health benefits, such as the reduction of traffic crashes and pollution emissions, increases in physical fitness and mental health, and providing access to medical care and healthy food. Conclusively, the author states that improving public transit can be one of the most cost effective ways to achieve public health objectives, and public health improvements are among the largest benefits provided by high quality public transit and transit-oriented development.

Burbidge, S. K. (2010). Merging long range transportation planning with public health: A case study from Utah's Wasatch Front. *Preventive Medicine*, 6-8.

The authors summarize the point that US transportation systems have been identified as a problem for public health as they encourage automobile transportation and discourage physical activity. This case study provides an example of what transportation planners at Utah's metropolitan planning organization are doing to encourage physical activity through transportation. They found that the MPO recommends ten policy initiatives: require complete streets for all modes of transportation; require adequate links to new transit; incorporate bicycle parking and storage; etc.

Abbott, S., Habeeb, N., Alhashem, H., Li, Z., Frank, I., Bhargava, A., . . . Mandiwala, R. (2011). *A health impact assessment for proposed Marion County transportation expansion.* Indianapolis: Indiana University.

The authors of this HIA conducted the research based on the notion that the metropolitan city of Indianapolis is not coherently transport oriented. The city suffers from disconnected neighborhoods, employment fragmented from employees, and declining health; however, city planners have recently made transport a priority through the expansion of trails, and enhancing the bikeability of the downtown area. The researchers measured on neighborhood safety, street connectivity, and access to public transportation and walkability. Based on the findings from the Marion neighborhood, they found that communities of disadvantaged populations had higher numbers of bicyclists and pedestrians, and transportation expansion was necessitated to increase ridership, physical activity, and walkability, amongst other outcomes.

Rader, M. (2009). *Health impact assessment on policies reducing vehicle miles traveled in Oregon metropolitan areas.* Portland: Upstream Public Health.
The author addresses the growing population concern in Oregon and how it relates to the volume of traffic and its affects such as air pollution, congestion, and car collisions. The HIA conducted analyzes the effects of the proposed statewide VMT (vehicle miles traveled) - reduction plan. The following three factors were analyzed: positive changes to the built environment; strengthening public transit; and increasing costs for driving individual vehicles. Researchers utilizing the following three indicators of public health: physical activity; air pollution; and land use patterns.

Besser, L. M., & Dannenberg, A. L. (2005). Walking to public transit: Steps to help meet physical activity recommendations. *American Journal of Preventive Medicine*, 273-280.
The authors of this study attempted to estimate the total daily time spent walking to and from transit and the predictors of achieving 30 minutes of daily activity by doing so. Researchers found that respondents who use transit spend a median of 19 minutes daily walking to and from transit; people in high-density urban areas were more likely to spend more than or equal to 30 minutes walking to and from transit daily. Conclusively, walking to and from public transportation can help physically inactive populations, especially low-income and minority groups, attain the recommended level of daily physical activity.

Dannenberg, A. L., Jackson, J., Frumkin, H., Schreiber, R. A., Pratt, M., Kochtitzky, C., & Tilson, H. H. (2003). The impact of community design and land-use choices on public health: a scientific research agenda. *American Journal of Public Health*, 0009-0036.
The Centers for Disease Control and Prevention hosted a workshop in May 2002 to help develop a scientific research agenda on these issues. This report describes the 37 questions in the resulting research agenda. The several aspects analyzed in the workshop included physical activity, obesity, and transportation choices; schools and children; unintentional injuries; and community design in relation to individuals with disabilities. Understanding the reasoning behind the developed questions will aid this HIA when determining research questions of the health determinants.

Gorman, D., Douglas, M. J., Conway, L., Noble, P., & Hanlon, P. (2002). Transport policy and health inequalities: a health impact assessment of Edinburgh's transport policy. *Public Health*, 15-24.

This HIA of Edinburgh's transport policy demonstrates how HIA can examine how different transport policies can affect different population groupings to varying degrees. The HIA suggested that greater spend on public transport and supporting sustainable modes of transport was beneficial to health, and offered scope to reduce inequalities. It has a great degree of relevance to the HIA being conducted in that it provides a foundation from which to begin health determinant research.

Complete Source List

Aaron, B. (2013, January 18). Puran Thapa, 7, killed by motorist in Ridgewood; no charges filed. *Streetsblog New York City*.

Abbott, S., Habeeb, N., Alhashem, H., Li, Z., Frank, I., Bhargava, A., . . . Mandiwala, R. (2011). *A health impact assessment for proposed Marion County transportation expansion.* Indianapolis: Indiana University.

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