

Health Impact Assessment: Ortiz Avenue Road Widening

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Introduction

There is a growing applicability of Health Impact Assessment (HIA) studies to policy and projects within the United States and internationally (Perdue et al., 2012). This is largely due to the ability of the methodology to isolate various features of a project or policy from other political or financial considerations. HIAs are powerful tools to influence project changes to mitigate negative effects or enhance favorable outcomes. The goal of this Ortiz Avenue Expansion HIA Project is to 1) assess the health consequences of a planned road-widening project and 2) aid stakeholders and policy makers to make informed decisions about any potential alternatives as may be needed.

Transportation Projects: Assessing Health Using a Rapid HIA Approach

A "Rapid HIA" seeks to make an assessment of the project's health impact. It provides a detailed overview of potential health impacts through the use of existing data accompanied by input from experts and key stakeholders (Harris, Harris-Roxas, Harris, & Kemp, 2007).

Transportation related HIAs are becoming more popular, perhaps in part due to the significant consequences of 'getting it wrong' where bad design or policy can result serious injury or death. Examples of transportation HIA include; the Independent Bike Lane HIA completed on May 9th, 2012 which assessed the health impact of a newly adopted complete streets policy and the addition of bike lanes (Schlenk, Casey, & Nelson, 2012); the Lowry Corridor, Phases 1 and 2 HIA, which assessed the widening of Lowry Avenue in downtown Minneapolis, a project similar the planned Ortiz Avenue (Lezotte-Anderson, Boyd, & Nickolai, 2007); and another in Saint Paul, Minnesota, that assessed the health impact of public transit improvements and the increased accessibility to communities in varied income and ethnicity contexts (Malekafzali &

Bergstrom, 2011). An additional HIA was conducted in the Auckland Region, New Zealand to measure the health impacts of the Wairu/Tahoroto Corridor Road Widening Project. Like the Ortiz Avenue Widening, bike lanes and sidewalks were part of the Auckland Region road widening project (Quigley & Conland, 2006).

Project Overview

In 2010 Lee County Department of Transportation completed the design plans for Ortiz Avenue. These design plans identified a four-lane, divided road with a speed limit of 45 MPH. Currently, the SR 80 section is a two-lane road with a speed limit of 35 MPH. The project was proposed in two parts, State Road 80 (SR80) to Luckett Road and Luckett Road to State Road 82 (SR 82). At that time, the project was advanced in the county's capital improvement plan (CIP) for construction in its funding timeframe of 0-5 years. However, due to the severe funding crisis brought about by the economic downturn, construction for the project was shifted to a timeframe outside the CIP 5-year window. Right of way acquisition remained funded within the 5-year window. As a result, the project construction has been delayed for at least 6 years.

This funding shift provided the opportunity for this HIA to look into the health impacts related to the expansion of Ortiz Avenue. The analysis will assess the health impact as it relates to the proposed road design. The health impacts that will be assessed include physical safety, air quality, physical activity, and social and community cohesion. Due to the resources and timeframe constraining this analysis, the stakeholders selected the option of conducting a rapid HIA with the hopes of expanding the analysis at a future date, should it be needed.

Tice Community Data Profile

In order to better understand the context of the Ortiz Avenue project, the population and development characteristics of the community are summarized, including the major demographic, social and land use characteristics of the Tice community.

The Tice Historic Community lies within the Census Defined Place (CDP) of Tice as well as some portions of Census Tracts (CT) 4.01 and 5.04. The community has a total population of 4,470 residents with a median age of 28.8. The majority of residents are males with a total number of 2,529 male residents, which are mostly between 5 and 34 years old, with 29% of the total population being under 18 years of age (U.S. Census Bureau, 2010). Tice has a substantial population of Hispanic and Latino residents, amounting to 2,782 people, which accounts for 62% of its population (U.S. Census Bureau, 2010). The total number of households in Tice is 1,358, with nearly 65% being family households.

The percentage of households which fall below the national poverty threshold is 45.9% in the Tice CDP; 35.8% in CT 4.01; and 67.2% in CT 5.04. The average percentage of households that fall below the national poverty line is 49.63%.

Businesses have left the community in large numbers: a major anchor grocery retailer, Publix, vacated the Morse Shores Plaza and the Billy Creek Commerce Center business park occupancy has dropped from 85% to 35% since 2007. The lack of commerce influences the rate of unemployment in the community, which is 9.1% for the average of the three census tracts. Unemployment is higher than the national average in these three tracts. At the time of this study the national unemployment average was 6.5%.ⁱ

HIA Stakeholder Involvement

The project involved several different groups and organizations in the community. The primary stakeholders consisted of the Tice Historic Community Planning Panel (THCPP) members. This group consists of Tice residents from different neighborhoods within the community boundary. Its role is to guide the development of the Tice Historic Community comprehensive plan and land development code within the boundaries identified by Lee County. In addition, BikeWalkLee, a community coalition to complete the streets in Lee County, was heavily involved in the HIA project. Several meetings involving stakeholders, community members, and public officials were held to conduct in-person assessments of the streets being affected by this project and to identify health determinants and measures.

The project stakeholders selected the SR 80 to Luckett road section as the subject of this HIA for several reasons. First, the SR 80 to Luckett section is located in a residential neighborhood with relatively high transit, bicycle, and pedestrian activity. The extent to which the widening would impact the health of non-automobile users was a primary concern. Project stakeholders expressed concern about the number of lanes, speed, and characteristics.ⁱⁱ The HIA project stakeholders were involved in the HIA by providing feedback on the assumptions, geographical limits, and recommendations.

In addition to the HIA project stakeholders, the researchers sought feedback from experts from the Lee County Department of Transportation, the Lee County Metropolitan Planning Organization, and the Lee County Department of Health.

HIA: Screening

Consistent with the steps outlines above relative to conducting an HIA, this step, screening, describes the proposal context, assumptions, and relationship to health. The researchers used a Screening Checklist developed by the University of New South Wales to determine the relative value of conducting an assessment (see Appendix 1).

Proposal Context. As described above, the Ortiz Avenue project entails the widening of Ortiz Avenue from SR-82 (MLK) to SR-80 (Palm Beach Blvd.) Lee County transportation planners consider Ortiz Avenue as an important parallel reliever road to I-75 and have classified the road as a minor arterial. The current segment from Luckett Road to SR-80 is a two lane road with a sidewalk on the east side. Among other elements, the project plans would: 1) widen Ortiz to a four lane road with additional lanes for right- and left-hand turns, 2) incorporate sidewalks and bike lanes on both sides of the street, and 3) raise the speed limit to 45mph. The existing stop light locations remain unchanged.

In addition to the proposed Ortiz plans, there are policies and provisions in Lee County that affect the project design and proposal. In 2009 Lee County adopted a nationally recognized Complete Streets Resolution that outlines the process for all streets to incorporate complete streets provisions into their plans. In addition, the Lee County Metropolitan Planning Organization (MPO)'s 2009 Resolution requesting the state DOT and local governments incorporate bicycle and pedestrian accommodations in their roadway designs. These policies, however, do not refer to user safety; nor do they dictate overall roadway design.

Effect of proposal on health determinants. The HIA screening proposes an assessment of the project for health determinants. The research identified a conceptual model to assess the

project that links the design of roadways to health. These included impacts to and individuals behavior, including the extent to which individuals choice to ride transit, bike, or walk would be affected; impacts to the physical environment (environmental), including the extent to which the road posed risks in the form of crashes or caused more or less air pollution; and impacts to the social life of the community, including the extent to which community cohesion and involvement would be affected by the change. These are outlined Table 1 below.

Table 1: Screening - Health Determinants

Health Determinant	Assumed Health Impact
Behavioral	Yes
Environmental	Yes
Social	Yes

Potential impact on health. There are several potential health impacts that the stakeholders considered important to consider as part of the widening project. Some of these impacts may be positive, while others may be negative. Based on an initial screening the impacts were to be assessed based on the relevant project features. Because several of the project’s features are not clearly positive or negative, the project’s features will be assessed based on their health determinants: behavioral, environmental, and social (see crosswalk in Table 2 below).

Table 2: Project Feature by Health Determinant

Ortiz Widening Health Determinant	Environmental	Behavioral	Social
Increased traffic			
Widen lane width	X	X	X
Add additional lanes	X	X	X
Speed increase to 45 MPH	X		X
Add bicycle lanes		X	
Add wider sidewalks		X	
Add sidewalks on East and West side	X	X	

Nature and extent of the impacts on health. There are several health impacts that affect the population. Though the road was intended to primarily serve automobile commuters county wide, it is the non-automobile users who live in close proximity to the road that will primarily be affected from a health perspective. Given the community demographics, those that are most likely to be affected are lower income and racially diverse residents. In addition, those residents and visitors who rely on walking or biking as mean of transportation are the target for this assessment.

HIA: Scoping

As described above, the HIA scoping involved stakeholders in identifying the measures that were important to the community relative to the three identified health impacts. In addition, the project used the existing literature to scope those measures that would be applied to the health determinants. These are summarized in Table 3 below.

Table 3: Scoping - Health Impacts

Health Impacts	Measure
Environmental	<ul style="list-style-type: none"> • Physical Safety <ul style="list-style-type: none"> ○ Collisions ○ Fatalities • Air Quality
Behavioral	<ul style="list-style-type: none"> • Physical Activity
Social	<ul style="list-style-type: none"> • Social Cohesion

Further scoping for the project was conducted using the scoping checklist developed at the University of New South Wales (Harris et al., 2007). Project stakeholders addressed scoping questions in an effort to determine the relative value of conducting the HIA based on the measure that were identified (see Table 4 below). Several factors made the HIA an important and viable project. First, at the outset of the project during the Lee Department of Transportation planning process, there was not significant political or public attention. However, as the stakeholders began to consider the health ramifications it rose considerable higher on the agenda, both at the community and county level(s). Second, the HIA was viable because researchers at Florida Gulf Coast University (FGCU) had obtained an internal grant to fund a graduate student to develop the background research, work with stakeholders, and document drafts. In addition, FGCU faculty donated their time in-kind to the project.

Table 4: Scoping Checklist

Question	Response
Is the magnitude of the proposed construction project significant?	Yes
Are there significant potential health impacts of the project?	Yes
What is the level of political interest in this project?	High
What is the level of public interest?	High
How urgent is the completion of the HIA to influence decisions?	High Urgency
What funds are available for the HIA?	Yes - FGCU Grant
What data associated with the proposal is available? What is the health evidence base associated with the proposal?	Yes - Scientific Evidence

Results: HIA Assessment

As outlined in Table 3, the researchers in coordination with stakeholders considered three main categories of impacts for health: 1) environmental impacts that are related to changes in the physical environment. These consist of collisions, fatalities, and air quality; 2) behavioral impacts relating to the changes in individual behaviors as a result of the project – primarily physical activity changes; and 3) social and community impacts, which are primarily measured by changes in social cohesion or social networks.

Environment Impacts

Traffic Collisions and Fatalities. The introduction of more traffic, increased lane width, more travel lanes, increased motor vehicle speed, sidewalks, and bike lanes will have an impact on health. Some of these features will generate positive impacts, others negative for collision risk and fatalities.

Increased Traffic, Wider Lanes, Additional Lanes, and Increased Speed. The introduction of increased traffic traveling on wider and additional lanes at an increased speed will have an impact on collisions and fatalities. Several studies site that increased development generates higher traffic volumes, resulting in a higher risk of injury (or death) (Perdue et al., 2012; Shefer & P., 1997). Further, studies have concluded that wider lanes are associated with increased fatal crashes, due to increased speed limits and greater mobility within the lanes. These features are also shown to cause motorists to drive more aggressively (Ewing & Dumbaugh, 2009). The literature on physical safety related to transportation projects highlight the hazards of traffic accidents as a cause of death (Gorman, Douglas, Conway, Noble, & Hanlon, 2002; Perdue et al.,

2012). This is especially important for Lee County, as compelling evidence shows that Lee County's pedestrian fatality rate is a major health concern. At the time of this HIA the Transportation for America Dangerous by Design study noted that between 2000 and 2009 Lee County had 178 fatalities, 17% of which were pedestrian fatalities (Transportation for America, 2011). Nearly 20 fatalities occurred in the Tice Community, 4 of which were located along Ortiz Avenue (Transportation for America, 2011)..

Bicycle Lanes and Sidewalks. Despite that the road will pose some safety hazards, additional design features will decrease risk. The addition of bicycle lanes, especially protected lanes, to the project has been shown to cut the risk to physical injury (Teschke et al., 2012). Bike lanes are superior to sidewalk riding, due to the risk associated with collisions from right-hand turns (Moritz, 1998). Similarly, the addition of sidewalks increases actual (and perceived) safety of pedestrians (Federal Highway Administration, 1987). As a result, we would expect positive health impacts from incorporation of these features.

Air Quality. This project assumes that additional lane capacity will generate increased traffic. As a result of increased traffic, air quality will be impacted. Studies have shown that transportation is a major contributor to air pollution, which includes nitrogen oxide, sulfur dioxide, and ozone (Lin, Munsie, Hwang, Fitzgerald, & Cayo, 2002). As a result, the increased road development may impact respiratory and cardiovascular diseases as well as the development of cancers (Gorman et al., 2002). Air quality is particularly dangerous for infants, as studies have found an association between traffic air pollution and respiratory problems, such as asthma, infections, and allergies on infants during their first 8 years of life (Gehring et al., 2010). Among the most affected children are those who live, or spend most of their time within close proximity to a busy road (Lin et al., 2002; Venn, Lewis, Cooper, Hubbard, & Britton,

2001). As a result, this HIA assumes negative health impacts resulting from the road widening for air quality. The strength of impacts to air quality and health may be somewhat mitigated by the flat topography and sea breeze winds that tend to more quickly disperse pollutants.

Behavioral Impacts

Physical Activity. Physical activity can be heavily influenced by the built environment. A considerable number of studies have shown that increasing the presence of sidewalks and bike lanes, encourage people to walk and bike more. These include a wide variety of trips to school, work, grocery stores, and other establishments as part of their daily physical activities (Emerine & Feldman, 2005; Perdue et al., 2012; Schlenk et al., 2012). The increase of physical activities into everyday life can offset chronic diseases such as cardiovascular diseases and obesity (Besser & Dannenberg, 2005; Ferdinand, Sen, Rahurkar, Engler, & Menachemi, 2012; Holm, Glumer, & Diderichsen, 2012; Schlenk et al., 2012). According to the Center for Disease Control and Prevention an average person can see positive health impacts by getting at least thirty minutes of moderate physical activity a day (Satcher, Lee, Joyner, & McMillen, 1999), which can be in the form of walking, one of the most common adult physical activity (Leslie et al., 2005). This HIA estimates the addition of sidewalks and bike lanes as a positive outcome related to the project.

Social Impacts

Social & Community Cohesion. This HIA also assesses the social and community cohesion of the community as a result of the Ortiz Avenue widening. This HIA assesses social cohesion due to the established link between health and community. For example, the researcher Ichiro Kawachi concluded in his research that social cohesion and the improvement of social capital (i.e. interaction with neighbors, memberships, group activities, etc.) has a positive impact

on people's health (Kawachi, 1999). Further, studies have linked the built environment with social and community cohesion (Hutch et al., 2011; Srinivasan, O'Fallon, & Dearry, 2003). Finally, community isolation may cause lack of social networks and diminished social capital (Srinivasan et al., 2003). Other research on social and community cohesion point out a relationship between heavy traffic road and lower social cohesion, and vice-versa. In communities surrounding light traffic roads, there was a higher chance of social networks being built, reducing the risk of chronic diseases and depression (Gorman et al., 2002). The increased size and speed of the road will have the effect of isolating the east and west sides of the community and thereby have a negative impact on social cohesion.

On the other hand, the perceived increases in safe walking conditions may enhance social cohesion due to additional activity on the road. Ernie Hood's research finds that in low income and ethnic minority neighborhoods the lack of sidewalks, bike paths, and recreational areas discourages physical activity and increases crime rates, thus keeping people inside their homes (Bashir, 2002; Hood, 2005). We would expect to find that the addition of bike paths and sidewalks would have a positive impact on social cohesion.

Assessment Conclusion(s)

The overall assessment of the Ortiz Widening is presented in Table 5.

Table 5: HIA Assessment Results

Measure	Positive Health Impacts	Negative Health Impacts
Increased traffic		<ul style="list-style-type: none"> • Increased collisions • Decreased air quality • Decreased physical activity
Widen lane width		<ul style="list-style-type: none"> • Increased collisions • Decreased air quality • Decreased social cohesion
Add additional lanes		<ul style="list-style-type: none"> • Increased collisions • Decreased social cohesion
Speed increase to 45 MPH		<ul style="list-style-type: none"> • Increased collisions • Increased fatalities • Decreased social cohesion
Add bicycle lanes	<ul style="list-style-type: none"> • Increased physical activity 	<ul style="list-style-type: none"> • Increased collisions
Add wider Sidewalks	<ul style="list-style-type: none"> • Increased physical activity • Increased social cohesion 	
Sidewalks on East and West side	<ul style="list-style-type: none"> • Increased physical activity 	

Environmental Impacts

Physical Safety: Mixed Mostly Negative Impact. The most concerning health impacts related to the Ortiz Widening are the serious health risks related to traffic, roadway width, number of lanes, and speed. In addition to the increases in collisions, the seriousness of the injury or fatality also rises along with speed (Ewing & Dumbaugh, 2009). However, the addition of sidewalks and bike lanes increases safety and produces a positive impact.

Air Quality: Negative. Based on the literature review, the impacts associated with air quality are negative. According to Lin et. al., (2002) as traffic becomes denser as a result of wider lanes, emissions increase. As a result, pollutants can become a health hazard for the people living next to Ortiz Avenue. Mostly affected will be young children (Gehring et al., 2010; Lin et al., 2002).

Physical activity: Mixed Most Negative Impact. Based on the literature review, there are several negative impacts that are related to wider roads and higher speeds. As cited above, Ewing and Dumbaugh (2009) show that wider and faster roads are related to greater fear of engaging in physical activity. In addition, the increased speed limit has also been shown to have a negative impact on physical activity (Dumbaugh & Li, 2011; Perdue et al., 2012). Still, the negative impacts are somewhat mitigated by the incorporation of bike lanes and sidewalks. According to Emerine et. al (2005), the addition of bike lanes and sidewalks encourages physical activity. However, the positive impacts may be muted because bike lanes on higher speed roadways do not necessarily encourage physical activity (Mid-Ohio Planning Commission, 2005).

Social and Community Cohesion: Mixed Impact. According to the literature review, the project is likely to cause some negative impacts on the community. Gorman et. al. (2002) have showed that higher density traffic roads can lead to less social networks and a higher risk of chronic diseases and depression. Hood (2005) and Bashir (2002) have pointed out that more developed roads can discourage people from physical activity and encourage them to stay inside.

On the other hand, the project is proposed to add sidewalks and bike lanes. As Wang and Dietz (2002), Srinivasan, et. al (2003), and Kawachi (1999) have shown, sidewalks and bike

lanes will have some positive impacts. Communities with accessible sidewalks, bike lanes, and recreational areas enjoy better social networks and increased social capital.

HIA: Recommendation

Reduce Physical Safety Risks. Even though the statistics are alarming, there are ways to mitigate this health impact and ensure physical safety for pedestrians, bicyclists, and motorists. Studies on traffic safety and urban design have reached solutions that balance “the inherent tension between vehicle speeds and traffic conflicts can be used to enhance the safety of pedestrians, cyclists, and motorists alike” (Dumbaugh & Li, 2011, p. 69). Reducing the speed limit on Ortiz will have the effect of reducing fatalities considerably. This is the case because lower speeds reduce the time it takes for a motorist to stop and reduces injuries in case of a collision (Ewing & Dumbaugh, 2009). Even though higher speed limits may be desirable by drivers, it increases the chances of fatal accidents.

Enhance the Walking and Bicycling Environment. The impacts associated with the addition of sidewalks and bike lanes to Ortiz Avenue are all positive, according to the literature. Yet, with the possible growth in the number of pedestrians and cyclists on Ortiz Avenue, it is important to ensure their safety. As mentioned previously in the literature, some measures can increase safety. These include lowering speed limits, incorporating crosswalks, and adding signalization for major crossings (Dumbaugh & Li, 2011; Emerine & Feldman, 2005).

Enhance Community Connectivity by Reducing Roadway Width and Incorporating Green Space. In order to avoid the negative impacts of social isolation and the health problems aggregated with it, there are alternatives to mitigate the problem and ensure a healthy

community. Studies on social isolation offer as solutions the creation of green spaces, including the creation of pedestrian and cyclist pathways (Heller, Gordon, & Bhatia, 2007; Srinivasan et al., 2003). The creation of pedestrian and cyclist pathways are one of the ways in which neighborhoods can increase their relationships, improving social capital (Gorman et al., 2002; Kawachi, 1999). Reducing the segregation of various elements of the community would reduce social isolation (Hutch et al., 2011)..

Rethink Design. The research shows considerable safety risks associated with roadway design. Rethinking the roadway design width, number of lanes, and speed would mitigate these risks. The project should retain the positive impacts to health and mitigate the negatives. This could mean rethinking the need to move traffic through the community quickly, increasing the traffic grid network, and incorporating additional greenspace or low impact development in the already purchased right of way. These would all work to encourage positive impacts on walking and bicycling behavior as well as increase social cohesion.

Reporting

The results of this HIA will be distributed to various stakeholder groups, including the Tice Historic Community Planning Panel, Lee County government, Lee County elected officials, and the Lee County Health Department. It will also be available electronically on various HIA best practices sites as allowed. This is intended to include the Robert Wood Johnson Foundation's HIA best practices site and on various community advocacy web sites. The researcher's hopes is that these results will inform future decisions about the design of this road section as well as others that are planned in Lee County or the United States.

Appendix 1: Screening Checklist (Harris et al., 2007)

Answers Favoring Doing a HIA	To Your Knowledge	Answers Favoring Not Doing a HIA
Health Impacts		
Yes	Does the project affect health directly?	
Yes	Does the project affect health indirectly?	
Yes	Are there any potentially serious negative health impacts that you currently know of?	
Yes	Is further investigation necessary because more information is required on the potential health impacts?	
Yes	Are the potential health impacts well known and is it straightforward to suggest effective ways in which beneficial effects are maximized and harmful effects minimized?	
No	Are the potential health impacts identified judged to be minor?	
Community		
Yes	Is the population affected by the project at large?	
Yes	Are there any socially excluded, vulnerable, disadvantaged groups likely to be affected?	
Yes	Are there any community concerns about any potential health impacts?	
Project		
Yes	Is the size of the project large?	
Yes	Is the cost of the project high?	
Yes	Is the nature and extent of the disruption to the affected population likely to be major?	
Organization		
Yes	Is the project a high priority/important for the organization/partnership	
Yes	Is there potential to change the proposal?	
Favoring HIA = 14	Total Score	Against HIA = 0

Type of HIA: Favoring Rapid HIA		
Yes	Is there only limited time in which to conduct the HIA?	
Yes	Is there only limited opportunity to influence the decision?	
Yes	Is the time frame for the decision-making process set by external factors beyond your control?	
Yes	Are there only very limited resources available to conduct the HIA?	
Assessors		
Yes	Do personnel in the organization or partnership have the necessary skills and expertise to conduct the HIA?	
Yes	Do personnel in the organization or partnership have the time to conduct the HIA?	

Appendix 2: Scoping Checklist (Harris et al., 2007)

Scoping Checklist		
Question	Response to Question	Impact Description
Is the magnitude of the proposed construction project significant?	Yes	
Are there significant potential health impacts of the project?	Yes	
What is the level of political interest in this project?	High	
What is the level of public interest?	High	
How urgent is the completion of the HIA to influence decisions?	High Urgency	
What funds are available for the HIA?	Yes	Funds were provided by the Florida Gulf Coast University Office of Research and Sponsored Programs internal grant program to support a graduate student to conduct this research
What data associated with the proposal is available and accessible? What is the health evidence base associated with the proposal?	Primary Data Secondary data Scientific evidence	

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EndNotes

ⁱ Unemployment averages for Tice CDP were as follows: CDP Tice at 7.5%; CT 4.01 at 13.7%; and CT 5.04 at 6.1%, respectively.

ⁱⁱ Dr. Margaret Banyan is also a member of the Tice Historical Community Planning Panel and has advocated for the redesign of Ortiz Avenue in other venues. Considerable effort was made to maintain neutrality in this assessment.