Transportation planners increasingly find themselves integrating public health into the transportation planning process. A holistic approach to planning includes serious consideration of the health impacts of transportation policies and decisions.
CHAPTER THIRTEEN

This chapter summarizes the relationship between health and transportation, how health is integrated into the PPACG planning process, and how various public agencies broadly address health and transportation planning issues. The relationship between the built environment and the physical, social, and mental health of the community is apparent. Because transportation has an impact on physical activity, quality of life, safety, and access to destinations, the connection between health and transportation is natural. The metropolitan planning organization is responsible for selecting transportation projects for funding in the near term. Those projects are listed in the Transportation Improvement Program. This chapter can help regional leaders make more-informed decisions on policies that could potentially impact desired public health outcomes.

Health impacts that can result from transportation include:

- Crashes
- Barriers to and lack of active transportation options
- Air pollution
- Noise and vibrations
- Access to opportunities for healthy lifestyles

Healthy people who are physically able generally have more of a desire to travel, walk, and bike. They also have less of the financial burden that is typically associated with poor health such as higher health insurance premiums, costly medical bills, and high rates of absenteeism, which means they have more opportunities to spend money on travel and leisure time activities.

The World Health Organization notes that “very good evidence shows that some transport policies bring benefits to health and the environment, while others are harmful...the urgency of the need to respond to this challenge is vividly demonstrated by the massive increases in motor vehicle traffic and by the strong public reaction against the noise, air pollutants and congestion that makes cities unlivable.” In their paper Transport, Environment, and Health the WHO explored the direct effect of transportation on a variety of human factors including mortality, respiratory and cardiovascular diseases, mental health, and overall wellbeing.

The National Association of Area Agencies on Aging’s report, A Blueprint for Action: Developing a Community for All Ages, discusses the importance of older Americans’ mobility, and how the physical environment impacts their quality of life as they become less able to drive and turn to other means of transportation.

The Centers for Disease Control and Prevention believe transportation policies and decisions have deep public health implications. The CDC supports multi-modal transportation systems because they believe “current U.S. transportation infrastructure focuses on motor vehicle travel and provides limited support for other transportation options.”

The CDC notes that transportation planning/funding is narrowly focused on motor vehicle movement results in a lack of active transportation options (contributing to rises in rates of obesity, diabetes, heart disease, stroke, and other chronic conditions), motor vehicle crashes as a leading cause of injury and death (pedestrians and cyclists are at an even greater risk of death from crashes), unsafe pedestrian and cycling infrastructure, and increased air pollution (contributes to adverse respiratory and cardiovascular health).

The CDC makes eight specific recommendations for looking at transportation issues with public health considerations:

- Reduce injuries associated with motor vehicle crashes
- Improve air quality
- Expand public transportation
- Promote active transportation
- Encourage healthy community design
- Design to minimize adverse health and safety consequences
- Require research and surveillance
- Support professional development and job creation

Developed by a coalition of national public health organizations, the National Physical Activity Plan was organized by eight societal sectors, one of which is transportation, land use, and community design. The NPAP identifies four strategies related to this sector, all of which involve transportation:

1. Ensure infrastructure supporting active transportation and other forms of physical activity.
2. Prioritize resources and provide incentives to increase active transportation and other physical activity through community design, infrastructure projects, systems, policies, and initiatives.
3. Integrate land-use, transportation, community design and economic development planning with public health planning to increase active transportation and other physical activity.
4. Increase connectivity and accessibility to essential community destinations to increase active transportation and other physical activity.

At least half of the Colorado Department of Public Health’s priorities can be impacted by improvements to the transportation system: clean air, clean water, injury prevention, mental health and substance abuse, and obesity.

The Federal Highway Administration developed a white paper titled Metropolitan Area Transportation Planning for Healthy Communities that describes a holistic approach to integrating health in transportation planning, and identifies four focus areas:

- Active transportation
- Safety
- Air pollution
- Access to opportunities for healthy lifestyles

PPACG has addressed active transportation in the Regional Nonmotorized Transportation System Plan, safety in Chapter 10, and air quality in Chapter 15. Opportunities for healthy lifestyles are discussed in this chapter.

The FHWA identifies five opportunities for metropolitan planning organizations to address transportation and health issues:

1. Intermodal connectivity
2. Identification of and access to major regional activity centers and/or medical centers
3. Coordinated safety planning
4. Regional plans for nonmotorized trails, sidewalks, and bicycle lanes
5. Planning for transportation facilities with minimal impacts on environmental justice populations

PLANNING CONTEXT

Though the relationship between public health and transportation may not be traditional, public health and transportation goals work together to achieve a higher quality of life for all residents. In almost all public health agencies’ list of goals one can find injury prevention, reduction in motor vehicle injuries, re-
ducing obesity, and improving mental health. Though there is no one specific health-oriented goal in 2040 Moving Forward, there are several goals which address these focus areas. The plan’s vision addresses multimodal mobility and accessibility as important parts of the transportation system, both key parts of public health initiatives that increase physical activity, reduce obesity, and facilitate physical activity. The plan’s mission supports improved mobility, economic vitality, and quality of life in the Pikes Peak region. See the relationship between 2040 Moving Forward goals and public health emphasis areas in Table 13-1.

Annually, PPACG tracks several performance measures that are directly or indirectly related to transportation and public health:
- Nonmotorized system connectivity and accessibility index
- Transit ridership

Table 13-1. Moving Forward Goals and Public Health Emphasis Areas

<table>
<thead>
<tr>
<th></th>
<th>Obesity</th>
<th>Mental Health</th>
<th>Injury Prevention</th>
<th>Clean Water</th>
<th>Clean Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain or improve current infrastructure condition.</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve the operation of transportation systems and services to enhance emergency response, minimize travel times, and maximize service quality of all modes of commercial and private travel throughout the region.</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prioritize transportation funding towards those projects/programs that have the highest life-cycle cost-effectiveness.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve system connectivity within and between modes and accessibility for everyone.</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve safety for all travelers.</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase resiliency and redundancy of the transportation system.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensure transportation system investment benefits are equitably distributed to minorities, and citizens with disabilities, low incomes, and/or other special needs.</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce transportation-related adverse impacts to communities, neighborhoods, natural environments, and areas identified for cultural and/or historical preservation.</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve economic vitality and freight movement in the region by enhancing the transportation system.</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incentivize infill, and redevelopment of, existing communities.</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve, protect, and mitigate impacts to critical habitat and connecting corridors suitable for threatened, endangered, and imperiled species.</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimize the amount of stormwater runoff and transportation-associated pollutants that enter the region’s streams.</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce absolute greenhouse gas emissions and air criteria pollutant emissions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Colorado has a reputation for being a healthy place to live. It is the leanest state in the nation, and many residents who engage in physical activity and outdoor activities. However, recent statistics show emerging issues. For example, an increase in vehicle miles traveled statewide mirrors the upward trend in the increase in the obesity rate (see Figure 13-1).

When local entities submitted projects for inclusion in the 2040 Moving Forward plan, they were scored using several criteria related to public health:
- System connectivity
- Mobility improvement/congestion reduction
- Safety
- Environmental justice
- Adverse-impact reduction

See the relationship between 2040 Moving Forward goals and public health emphasis areas in Table 13-1.

The health of the Pikes Peak region has been recently measured in the El Paso County Public Health Department’s Community Health Improvement Plan, the Teller County Public Health Department’s 2013 Community Health Status Report and Public Health Improvement Plan, and the Pikes Peak United Way Quality of Life Indicators Report.

The Pikes Peak region is home to two Healthy Eating and Active Living (HEAL) cites: Manitou Springs and Colorado Springs.

The United States is experiencing an epidemic health crisis of diseases related to poor nutrition, inactivity, and lifestyle choices. The number of people, both children and adults, who are either overweight or obese is increasing at
an alarming rate. Obesity and other health conditions associated with being overweight, such as diabetes, heart disease, and many types of cancer, are the leading drivers in rising healthcare costs. The state and nationwide figures can be seen in Table 13-2.

In Teller County, 1 out of 2 adults are overweight, 1 out of 7 adults (around 14%) are obese; in El Paso County, 57% adults are overweight, 1 out of 5 adults (around 20%) are obese.

**Low-Income Households**

Low-income households spend a higher percentage of their income on transportation, so providing transportation options that are easily-accessible and affordable support these households in an important way. High transportation costs can impact employment prospects and economic self-sufficiency.

**In El Paso County:**

- **Prevalence of obesity** has more than doubled since 1995.
- The county identified obesity as its local public health priority area.
- 57% of adults are overweight, 1 out of 5 adults are obese.
- **Suicide rates** for 2004–2009 were significantly higher than the rest of the state.
- In 2010, the county had the highest number of vehicle fatalities out of all Colorado counties.
- **The total cost of all crashes** and fatalities in 2010 is estimated at over $277 million.
- More than 28% of children (ages 2 to 14) are at an unhealthy weight.

Table 13-2. Obesity Rates (Adults and Children)

<table>
<thead>
<tr>
<th>Year</th>
<th>Colorado</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>6.90%</td>
<td>11.60%</td>
</tr>
<tr>
<td>1995</td>
<td>10.80%</td>
<td>14.40%</td>
</tr>
<tr>
<td>2000</td>
<td>14.90%</td>
<td>19.60%</td>
</tr>
<tr>
<td>2005</td>
<td>16.80%</td>
<td>23.20%</td>
</tr>
<tr>
<td>2010</td>
<td>19.00%</td>
<td>26.90%</td>
</tr>
</tbody>
</table>

**Zero Vehicle Households**

Households without vehicles encounter issues when accessing basic services like healthy food outlets, doctors, etc. According to the 2008–2012 American Community Survey, approximately 5.1 percent of the households in our region are zero-car households, and 1 out of every 3 households has 1 vehicle or less. These households are dependent on transit and nonmotorized modes to move about the region.

According to a 2013 Onboard Survey from Mountain Metropolitan Transit, “vehicle ownership for households and the ability to drive play key roles” in the choice to use transit. 58 percent of respondents indicated they lived in a zero-vehicle household. Three out of 4 riders had a household income of less than $30,000, and 90 percent of respondents were transit-dependent.

**Figure 13-2** shows Traffic Analysis Zones (TAZs) that are home to a high-er-than-average percentage of households with zero vehicles.

**Figure 13-4** shows Traffic Analysis Zones (TAZs) that are home to a higher-than-average percentage of households with zero vehicles.

**Aging Population**

Colorado and the Pikes Peak region are experiencing a dramatic increase of aging citizens. Though Colorado has the 4th smallest share of its population over the age of 65 in the nation, its over-65 population is growing 4th fastest in the nation. The implications of this growing population are yet to be seen, but will most likely require well-coordinated long-term planning in health and transportation to adequately address the mobility and health needs of the population. The percentage of the 65+ population in our two-county region is shown in Figure 13-5.

By 2040, it is projected that 16.4 percent of the region’s population will be 65 or over (Table 13-3). It is important to plan the transportation system with them in mind.

**OPPORTUNITIES AND CHALLENGES**

The effect of the lack of active transportation opportunities due to existing land use and transportation policies hasn’t been quantified, but it has been proven that “the effect of sedentary lifestyles on heart disease is similar to that of tobacco... [and that] one could therefore speculate that barriers to physical activity might have the greatest impact of all traffic-related health risks.” Outlined below are 10 focus areas that present unique opportunities and/or challenges in terms of regional transportation planning in the Pikes Peak region.

**Safety**

One of the most visible links between public health and transportation is transportation safety. This focus area is extensively analyzed in Chapter 10: Safety.

**Obesity**

As discussed earlier in this chapter, obesity is a major threat to the health of people worldwide. Several ways to address obesity via transportation systems are:
health as “more than the absence of physical health burdens and includes such things as having social support, being free from threats of violence, not being anxious or fearful, being in a good temper and feeling empowered.”

Though noise will be discussed later in the chapter, it is important to note that traffic noise “has been shown to induce nervousness, depression, sleeplessness and undue irritability, but other aspects of transport also cause irritation and frustration.” Other transportation factors leading to poor mental health include congestion, perceived safety, barriers (sleep grade, lack of crosswalks, etc.), aggressive drivers, and transit-related stressors (missed connections, late buses, crowded buses, etc.).

Additionally, automobiles and continued development at the urban periphery have encouraged the low-density and suburban nature of American cities. The once close-knit, walkable communities of urban centers have turned into suburban development that is auto-dependent and isolated. This low-density peripheral development results in neighborhoods with fewer social interactions and increased social isolation. This kind of development has impacts that deter people from establishing social-support networks, and low levels of social support are tied to increased mortality rates.

Mental health benefits that come with active transportation are discussed below.

**Access to Healthy Foods**

Increasing the accessibility to healthy food for low-income and/or low-access residents is important because food insecurity results in skipped meals, limited portions, and/or poor-quality food. Increasing access to healthy foods is not going to solve all public health issues, but it does reduce obesity and chronic diseases. The Centers for Disease Control believes that without access to healthy food outlets, people cannot make positive changes to their diets.

Transportation-related barriers such as mileage, lack of adequate pedestrian or bicycle facilities, or lack of transit service often bar people from full-service grocery outlets, leaving them access only to fast food or gas or convenience stores with limited healthy, fresh food. Because many low-income areas are also low-access (one or no vehicles per household), ensuring adequate transport is critical. In addition, the number of supermarkets in low-income communities is 30 percent less than the number of stores in high-income communities.

The Colorado Health Foundation reported that many low-income, carless residents use taxis to transport themselves and their groceries to and from the grocery store because fixed route transit doesn’t always provide seamless service. This adds an additional financial burden to these residents trying to access healthy food.

In 2008, Congress directed the United States Department of Agriculture to research several food environment factors, one of which was to measure and understand the consequences of food deserts, defined as “a census tract with a substantial share of residents who live in low-income areas that have low levels of access to a grocery store or healthy, affordable food retail outlet.” Low access means at least 500 persons and/or at least 33 percent of the tract’s population lives more than one mile from a supermarket or large grocery store, or 10 miles in the case of non-metropolitan census tracts. The USDA estimates that around 23.5 million people nationwide live in food deserts, and more than half are low-income, defined as:

- A poverty rate of 20 percent or greater
- A median family income at or below 80 percent of the area median family income

In the Pikes Peak region, Census Tracts identified as low-income and low-access food deserts can be seen in Figure 13-6.

**Access to Opportunities for Healthy Lifestyles**

Community design and transportation systems impact the opportunity for residents to make healthy choices. Access to health-related destinations is important for vulnerable populations (the elderly and children) and Environmental Justice communities, especially because these populations generally have a low vehicle-ownership rate, and/or depend on transit.

**Active Transportation**

Many Americans would use nonmotorized transportation (walking, biking, etc.) if physical infrastructure supported these modes in a safer way. Sometimes sidewalks are in poor condition, curb cuts are absent, or roads don’t have pedestrian crossings. These are all barriers to adults and children alike, and promote communities that are automobile-dependent.

Active transportation is one way to help improve public health. Benefits include:

- Reduction in heart disease
- Reduction in adult diabetes

### Table 13-3. 65+ Population in 2010 + 2040

<table>
<thead>
<tr>
<th>Year</th>
<th>El Paso</th>
<th>Teller</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>62,836</td>
<td>3,088</td>
<td>65,924</td>
</tr>
<tr>
<td>2040</td>
<td>159,766</td>
<td>5,726</td>
<td>165,492</td>
</tr>
</tbody>
</table>

### Figure 13-3. Regional Vehicle Ownership by Household

1 in 3 households have one or no vehicles available
Figure 13-4. TAZs with Higher than Average Households without Vehicles
There is growing evidence linking noise pollution to:

- Communication
- School performance
- Sleep
- Temper
- Elevated hormone levels
- Psychological problems
- Heart disease and hypertension
- Hearing impairment

Low-noise road surfaces, sound walls, noise barriers, traffic calming, and rail tracks are all potential mitigation strategies. At the planning level, regulating residential development close to busy roadways, railways, and/or airports is an option while playing attention to the orientation and acoustics.

Air Quality

Serious health effects occur because of exposure to air pollutants, which largely occurs in urban areas and is generated by road traffic. The elderly are one of the most susceptible populations to the effects of air pollution. Read more in Chapter 15: Air Quality.

Water Quality

Transportation-associated pollutants can affect water quality. Each motorized vehicle leaves rubber, oil, and other pollutants on roadways; with rain, these pollutants wash off the road and enter drainage systems. With increased roadway comes increased impervious surface area, increasing runoff and leaving less soft, pervious ground for the water to soak into.

MOVING FORWARD

Data and Tools

Data Collection

PPACG collects data to support research and analysis during the development of the Regional Transportation Plan. Much of that data can be used to support public health initiatives in addition to the application in transportation planning. PPACG’s transportation program collects demographic data, which can be used to demonstrate the presence of vulnerable populations to health impacts. Also collected is car ownership and transit-use data, both proxy measures to identify populations with limited access to healthy food or recreation.
Figure 13-6. USDA Food Desert by Census Tract
chapter thirteen. public health + transportation

Travel behavior is accounted for in the transportation planning process, and can indicate which residents or employees choose active transportation. There is a gap in the process: translation between transportation planning and public health planning doesn’t presently occur. Additional partnerships with public health organizations could bring about a more robust collection of meaningful data, and perhaps help local agencies in the development of local health impact assessments, which do not currently include local data on traffic-related air pollution, noise, or vibration analysis.

Geospatial Analysis

Geographic Information Systems give PPACG the capability to analyze data spatially. Already, PPACG maps planned and/or proposed infrastructure relative to spatial data (city limits, environmental resources, etc.), but there is an opportunity to bring in another level of analysis and begin to map proximity and connectivity of access to healthy food, access to recreational opportunities, and access to active transportation infrastructure. The ability to adapt existing GIS tools to look at public health impacts of the transportation system would allow a greater integration of the connection between public health and transportation. GIS tools can help identify areas in the region that have higher proportions of elderly, children, and/or transit-dependent populations and identify gaps in our current transportation infrastructure that could potentially increase the connectivity between these populations to healthy food outlets, parks, and even medical practices.

Modeling

PPACG is required to project future demand on the transportation network as part of the 2040 Moving Forward plan. PPACG first completed the 2040 Small Area Forecast, and then used the outputs of the forecast as input to the travel demand model to project transportation demand out to 2040. This model predicts where and when congestion will occur. Perhaps, in the future, integrating travel behavior is accounted for in the transportation planning process, and can indicate which residents or employees choose active transportation.

Performance Measurement

MAP-21, the federal transportation legislation, created a performance-based and multi-modal program to enhance the transportation system. Performance-based planning increases accountability, improves transparency, and allows close monitoring of projects and systems in an effort to make the most of dwindling transportation funding. By linking performance to planning and programming, not only is coordination increased, but funds are targeted toward the most effective projects and programs. PPACG has identified specific region-wide performance measures that will establish baselines for active transportation in and around the region and track these indicators each year. The collection and analysis of this data in a performance-based system will be crucial in securing funds for projects in coming years. For the Moving Forward 2040 Plan, these system-wide performance measures are:

- Nonmotorized System Connectivity and Accessibility Index
- Percent transit ridership increase annually over 5-year moving average
- Total number of revenue service miles for transit passenger service
- Total number serious injuries and fatalities (and per capita)
- Number of projects in urban and urbanizing areas
- Percent nonmotorized share of all trips

As data becomes available, PPACG will be able to measure the effectiveness of active transportation projects. In future years, evaluating impacts and opportunities will be easier, and funds can target the parts of the regional nonmotorized system that will be most effective in improving active transportation. In the future, working with local public health agencies to develop performance measures that help them in the development of their health impact assessments may streamline the data-collection and sharing process. Perhaps incorporating traditionally non-transportation performance measures, like percent of the adult population that is overweight and/or obese, would assist in furthering the link between public health and transportation.

Health and Transportation: Costs and Benefits

Calculating the amount of spending directed towards active transportation would allow PPACG to track investment geared towards integrating health and transportation. Additional analyses that look at the health costs and benefits of transportation investment in the region would provide the region with a tangible metric and may increase awareness of the health-transportation connection.

Because cost-benefit analysis is already part of the transportation planning process for project selection, integrating health valuations would prove valuable. During project scoring, there are two criteria that include valuation of health impacts: economic vitality and cost-effectiveness. For the economic vitality score, an analysis that includes safety and impacts specific to nonmotorized projects (cost of the trails themselves and direct medical benefit of trail usage) is completed. This score is also used as an input into the cost-effectiveness score. Currently, the health-related variables integrated into the cost-effectiveness analysis are safety and emissions, but the undervaluation of the health impacts caused by air pollution, active transportation accessibility, social isolation, food deserts, noise, and vibration might at some point be brought into these analyses. Several of these factors do not currently have regional data associated with them.

Active Transportation Equity

According to the World Health Organization, “the health effects of transport fall disproportionately heavily on certain groups of the population. The areas they live, work or travel in may have traffic of higher volumes or speeds, or specific geographical, topographical or settlement characteristics that intensify levels of air pollutants and noise, and increase the risk of accidents.” In most cases, these populations are exposed to more health risks caused by transportation than other communities, including traffic, noise pollution, air pollution, and barriers to healthy food and lifestyles. Incorporating health impacts into the environmental justice analysis and establishing a baseline condition would allow measurable progress. Additionally, monitoring and evaluating indicators to identify areas where intervention is necessary could potentially provide mitigation and/or solutions. Attention to transportation improvements and potential gentrification could also be an issue when planning.

Regional Food Policy Council

Several MPOs around the nation have food policy councils that discuss a variety of interests, from food production to distribution and from accessibility to healthy food outlets to food deserts. These councils are a forum for communities to discuss agriculture, economic development, education, natural environment, equity, health, and policy to make their communities healthier and more resilient.