



HEALTH & TRANSPORTATION



Transportation Health Tool

Recently, the U.S. Department of Transportation (USDOT), the Centers for Disease Control and Prevention (CDC), and the American Public Health Association (APHA) developed a Transportation and Health Tool (THT) to provide practitioners an easy to use tool to identify the health impacts of the transportation system.

The THT uses data on 14 indicators to evaluate transportation and health connections based on three geographic scales - State, Metropolitan Statistical Areas, Urbanized Area.

The tool also provides strategies for practitioners to address transportation influences on public health in line with the "five primary pathways" identified by USDOT, CDC, APHA.

www.transportation.gov/transportation-health-tool

INDICATORS

- Alcohol-Impaired Fatalities
- Commute Mode Shares
- Complete Street Policies
- Housing and Transportation Affordability
- Land Use Mix
- Person Miles Traveled by Mode
- Physical Activity from Transportation
- Proximity to Major Roadways
- Public Transportation Trips per Capita
- Road Traffic Fatalities by Mode
- Seat Belt Use
- Use of Federal Funds for Bicycle and Pedestrian Efforts
- Vehicle Miles Traveled per Capita

FIVE PRIMARY PATHWAYS



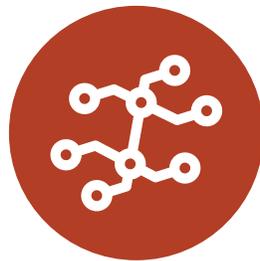
Active
Transportation



Safety



Cleaner Air



Connectivity

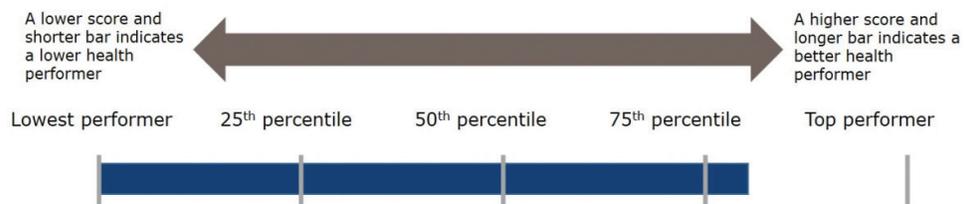


Equity

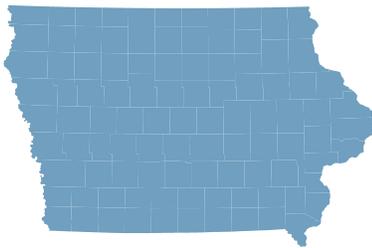
Scoring Methodology

The THT scores identified indicators for each of the three geographic areas - state, metropolitan statistical area, and urbanized area - on a scale of 0 to 100. Raw scores are standardized to adjust for outliers by determining the "z-score" based on comparing the state or regional value to the national average in terms of standard deviation. The z-scores are then converted into a percentile value and assigned to the state or region. Not all indicators are scored at each geographic area. The indicators for the State of Iowa, Des Moines-West Des Moines Metropolitan Area, and Des Moines Urbanized Area are shown below.

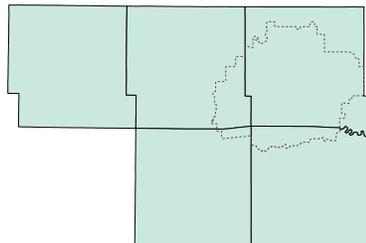
Overall performance for the geographic region examined shows a scale between "Lowest performer" and "Top performer." For each of the regions noted above, the overall performance was above the 75th percentile.



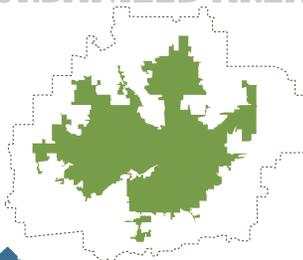
STATE OF IOWA



DES MOINES- WEST DES MOINES MSA



DES MOINES URBANIZED AREA



Indicators by Geographic Area

State

- Physical Activity from Transportation
- Person Miles of Travel by Private Vehicle
- Person Miles of Travel by Walking
- Seat Belt Use
- Use of Federal Funds for Bicycle and Pedestrian Efforts

State/MSA

- Commute Mode Share - Bicycle/Auto/Transit/Walk
- Proximity to Major Roadways
- Alcohol-Impaired Fatalities per 100,000 Residents
- Road Traffic Fatalities per 100,000 Residents - Vehicle/Bicycle/Pedestrian
- Road Traffic Fatalities Exposure Rate - Vehicle/Bicycle/Pedestrian
- Complete Streets Policies

MSA

- Land Use Mix
- Housing and Transportation Affordability

State/Urbanized Area

- VMT per Capita
- Public Transit Trips per Capita



HOUSING & TRANSPORTATION AFFORDABILITY

Location Affordability Index

The THT evaluates the affordability of housing and transportation based on the Location Affordability Index (LAI). The LAI was developed for the U.S. Department of Housing and Urban Development, USDOT, and the Environmental Protection Agency to provide practitioners a tool to examine the two greatest costs to families - housing rents/mortgages and transportation.

The LAI models housing and transportation costs for 8 types of households. The THT utilizes the “regional typical” household in evaluating the housing and transportation affordability indicator.

Affordable Housing

Traditionally, households spending more than 30 percent of their income on housing fall into a “cost burdened” category.

85th

Percentile

Des Moines-West Des Moines MSA scored higher than 85% of MSAs in the United States for Housing & Transportation Affordability

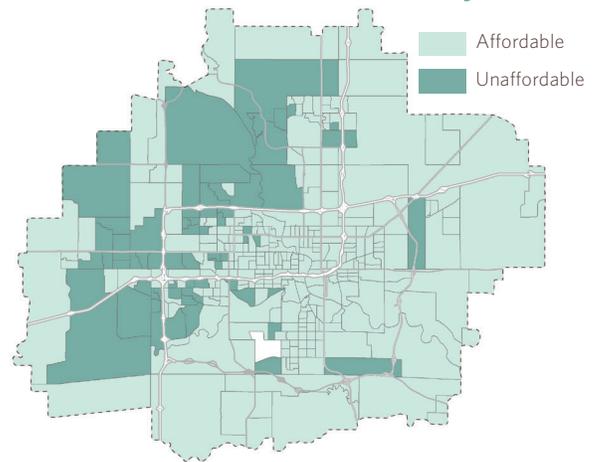
Transportation Affordability

Transportation affordability, or the cost for a household to commute and access basic goods, is typically below 20 percent of the household income.

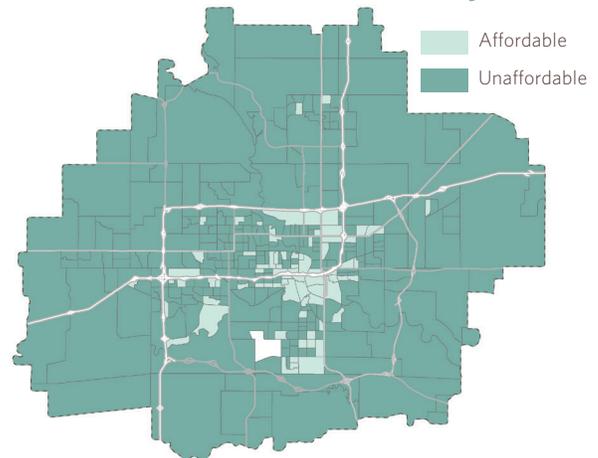
Housing & Transportation Affordability

Generally, the threshold for housing and transportation costs are considered affordable when the total costs do not exceed 45 percent of a households income.

Housing Cost Median-Income Family*



Housing & Transportation Cost Median-Income Family*



*Median-Income Family is defined as a four-person household with two commuters and a household income equal to the median income for the region (MSA)

Source: Location Affordability Portal, Version 2, www.locationaffordability.info/lai.aspx

Strategies to Improve Housing & Transportation Affordability

- Multimodal Network Improvements
- Ridesharing, Carsharing
- Telework
- Commute Trip Reduction Programs
- Transit Supportive Development
- Access Management
- Smart Growth



Land Use Mix

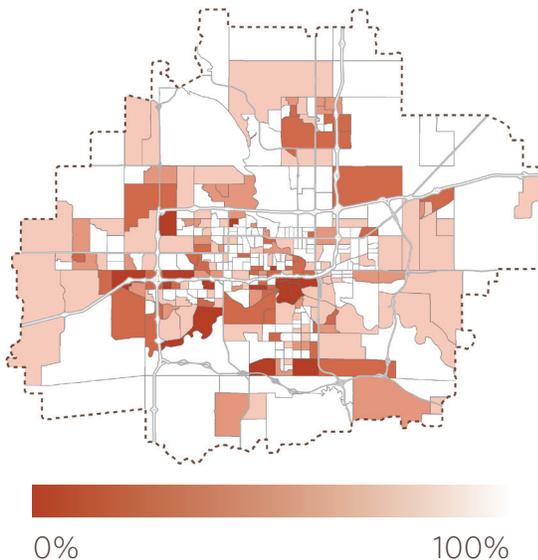
The THT measures land use mix based on the “average neighborhood-level diversity of destinations across a metropolitan area based on the mix of eight different employment types (office, retail, industrial, service, entertainment, education, health, and public sector) within each block group in the metropolitan area.”

Scores for a metropolitan area are based on a 0 to 1 scale, with a value closer to 1 indicating that block groups in the metropolitan area offer convenient access to a wide range of jobs and services.

Additional attributes included in the Location Affordability Index identify the percentage of housing stock classified as single family detached homes. While not included as indicator for the THT, evaluating the mix of housing is essential to understanding how people move about the region.

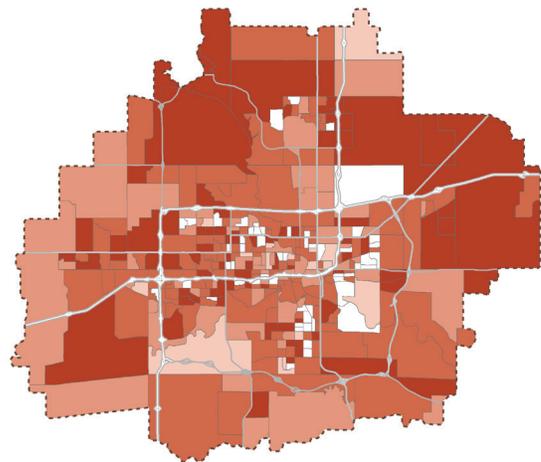
88th
 Percentile
 Des Moines-West Des Moines
 MSA scored higher than 88%
 of MSAs in the United States
 for Land Use Mix

Percent of Housing: Single Detached



Source: U.S. EPA, Smart Location Database,
www.epa.gov/smartgrowth/smart-location-mapping;
 Location Affordability Portal, Version 2,
www.locationaffordability.info/lai.aspx

Employment Mix



Not Diverse (0) Diverse (1)

Studies have found connections between land use mix and the amount of physical activity among residents. The Transportation and Health Tool provides several studies as references for practitioners.

www.transportation.gov/mission/health/land-use-mix

Related Strategies

- Complete Streets
- Encourage, Promote, and Expand Opportunities for Biking and Walking
- Health Impact Assessment (HIA)
- Promote Connectivity
- Safe Routes to School
- Traffic Calming



THE MISSING MIDDLE

Changing demographics raise a need for communities to provide a variety of housing that supports walking and transit. One way to ensure a variety of housing exists is to build “missing middle” housing types. These housing types include cottages, townhouses, duplexes, triplexes, fourplexes, small apartment buildings, mansion apartments, live-work units, and apartments above

shops. These building types have actual densities ranging from 16 to 35 dwelling units per acre, but their perceived density is much lower. The lower perceived density of these buildings makes them generally more acceptable to most people while allowing for the required density to make walking and transit available.



COTTAGE HOUSING



TOWNHOUSE



DUPLEX



TRIPLEX



FOURPLEX



SMALL APARTMENT



MANSION APARTMENT



LIVE-WORK UNIT



MIXED-USE APARTMENT



STACKED TOWNHOUSE

PLANNING AHEAD

With a large portion of the housing stock in the region being a cost burden to residents, planning for affordable housing has become a critical need. *Mobilizing Tomorrow*, the region’s Long-Range Transportation Plan, lays out four main goals, three of which relate closely to affordable housing. The first goal compliments the issue of housing and transportation affordability by providing more travel options in new and existing locations, thereby reducing transportation costs in areas where enhancements are being made. Goals 2 and 4 focus on optimizing existing infrastructure and bettering the

quality of life for residents, in part through providing more transportation options throughout the region.

Mobilizing Tomorrow Goals:

1. Enhance Multimodal Transportation Options
2. Manage and Optimize Transportation Infrastructure + Services
3. Improve the Region’s Environmental Health
4. Further the Health, Safety, + Well-Being of All Residents in the Region

APPLICATIONS FOR USE

Planners

- Corridor selection analysis for BRT route planning
- Measures of livability for comprehensive planning
- Identification of areas for redevelopment to become more affordable

Housing Professionals

- Custom tools to estimate H+T costs and compare household information with neighborhoods
- Helping prospective homeowners evaluate where to live
- Increase awareness to establish an affordable housing fund

Policy Makers

- Screening and prioritizing public investments based on housing and transportation affordability
- Establish benchmark affordability costs to adopt standards for city funding and policy decisions

Proximity to Major Roadway

Proximity to major roadways affects public health in two major ways: noise and air pollutants. The THT evaluates the impact on public health within a MSA by estimating the percentage of people living within 200 meters (approximately 650 feet) of “high traffic roadways,” or roadways that carry over 125,000 vehicles per day as reported in the National Transportation Atlas Database.

The THT cites multiple studies linking respiratory and cardiovascular disease to traffic-related pollution. Two conclusions noted by the THT are that living near a major road has been associated with decreased lung function in adults with asthma¹ and increasing the distance from the road by nearly 500 feet might decrease concentrations of some air pollutants by at least 50 percent.²

The Des Moines-West Des Moines MSA does not include any roadways exceeding the 125,000 vehicles per day threshold. The MSA therefore scores in the 100th percentile for proximity to major roadways.

Integrated Transport and Health Impact Modeling Tool (ITHIM)

ITHIM was developed at the University of Cambridge and has been used in transportation and health applications worldwide including by the California Department of Public Health and the Oregon Health Authority. At its core, ITHIM is a comprehensive health impact model that models the health effects of transportation policies through the changes in physical activity, road traffic injury risk, and exposure to fine particulate matter (PM2.5) air pollution. ITHIM is being used in research and by health and transportation professionals to estimate the health impacts of scenarios, compare the impact of travel patterns in different places, and model the impact of policy changes.

ITHIM models exposure to physical activity by comparing distributions of weekly physical activity under different scenarios. Walking, cycling and other types of physical activity are combined as MET hours per week of activity. Outcomes affected by physical activity include various cardiovascular diseases, depression, dementia, diabetes, breast cancer, and colon cancer. ITHIM also models health changes through the all-cause mortality. A comparative risk assessment method is used to estimate how changes in population physical activity result in changes in the health burden.

Road traffic injuries are modelled using a risk, distance and speed based model. Differences in risk by gender and age are also included. This approach allows ITHIM to look at how absolute numbers of injuries and injury risks could change for different transportation modes as travel distances between modes changed.

Fine particulate matter (PM2.5) air pollution risks are calculated for the general population (background rates) as well as mode specific rates for different transportation modes. The exposure changes for population are based on comparison of local generated PM2.5 emissions and concentrations in the study area.

ITHIM allows policymakers to quantify potential health care benefits, in terms of dollars, of proposed policy changes or infrastructure improvements. Integrating ITHIM into transportation planning provides a tool to evaluate potential health outcomes from the connections between public health and transportation.

Source: Center for Diet and Activity Research, “Integrated Transport and Health Impact Modeling Tool (ITHIM),” <http://www.cedar.iph.cam.ac.uk/research/modelling/ithim/>

¹ Balmes JR, Earnest G, Katz PP, Yelin EH, Eisner MD, Chen H, Trupin L, Lurmann F, Blanc PD. Exposure to traffic: Lung function and health status in adults with asthma. *Journal of Allergy and Clinical Immunology* 2009;123:626-31. <http://www.jacionline.org/article/S0091-6749%2808%2902360-9/abstract>

² Karner AA, Eisinger DS, Niemeier DA. Near-roadway air quality: synthesizing the findings from real-world data. *Environmental Science and Technology* 2010;15:5334-44. <http://pubs.acs.org/doi/abs/10.1021/es100008x>

