2019 UDOT RESEARCH PROBLEM STATEMENT

Title: Transportation—health impact modeling and scenario planning for Utah   **No. (Office Use):** 19.05.06

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Select <u>ONE</u> Subject Area   ☐ Materials/Pavements   ☐ Maintenance   ☐ Traffic Mgmt/Safety   ☐ Structures/Geotech
☒ Planning   ☐ Perf Mgmt/Data Analytics   ☐ Public Transportation   ☐ Other

1. Describe the problem to be addressed:

Better analytical linkages and decision support tools are necessary to quantify transportation's health impacts for improved project planning and scenario analysis. The transportation system directly affects public health in several ways: traffic crashes cause injuries and deaths; exposure to air pollution can cause respiratory illnesses; physical activity from walking and bicycling can reduce the risk of chronic diseases; etc. Transportation agencies such as UDOT and Utah's metropolitan planning organizations (MPOs) understand these relationships and seek to mitigate negative and promote positive health impacts when evaluating long-term planning scenarios and selecting projects. Existing tools—such as air quality models like MOVES or the Active Transportation Infrastructure Economic Benefits Calculator—are useful, but there is a need for more comprehensive analysis tools that express impacts in common human health units. Furthermore, public health agencies such as the Utah Department of Health and local public health departments conduct health impact assessments (HIAs)—including of transportation projects and plans—but there is a need for more robust quantitative health impact modeling tools. In short, these organizations seek tools and analytical methods to better quantify transportation–health linkages.

In recent years, new tools— including the Health Economic Assessment Tool (HEAT) and the Integrated Transport and Health Impact Modeling (ITHIM) tool—have been developed that utilize epidemiological research to quantify the human health impacts (in dollars or quality of life (years of life lost or with a disability)) of transportation projects and plans. Tools like ITHIM have been used to analyze the traffic safety, air quality, and physical activity impacts of regional transportation plan scenarios in California, Oregon, and elsewhere. Such tools could prove very useful to Utah transportation and health agencies, but they require the assembly of detailed transportation and other input data. The purpose of this research is to investigate the data needs of these health impact modeling tools and propose specific ways to link existing Utah health data and travel demand forecasting model outputs to these tools.

2. Write the project objective (25 words or less):

To develop methods and identify best practices for Utah transportation—health impact modeling and scenario planning utilizing existing data and travel demand forecasting model outputs.

3. Explain why this research is important:
(In response, consider addressing specific UDOT goals, applicability in Utah or other states, etc.)

This research will enrich the transportation planning process and contribute towards improved planning outcomes. Specifically, this work will enhance the health analysis capabilities of Utah MPOs' regional and UDOT's statewide long-range transportation planning processes, as well as the transportation analysis capabilities of the Utah Department of Health and local Utah departments of health. In this way, linking transportation planning models with a health impact model will provide a more robust decision support tool to assist elected officials and decision-makers, thus informing planning and investment choices. For example, scenarios and outputs from the Wasatch Front Regional Council or statewide travel demand models could be adapted and enriched with other data sources and used as inputs to the ITHIM health impact modeling tool. This could then provide an additional health dimension upon which elected officials and the public can assess desired future transportation and development directions. The proposed project also builds upon and strengthens institutional relationships between transportation and public health agencies.

Additionally, this research will support UDOT's mission of "enhancing quality of life," UDOT's strategic goal of "zero crashes, injuries, and fatalities," as well as Carlos' Top Ten goal of being "the safest DOT in the country." Public health is a major determinant of quality of life. Enhancing planning and decision-making capabilities surrounding transportation and public health can help to improve traffic safety and create a healthier future. Safety is an important component of public health, and this research will document a way to forecast (at a high level) the safety impacts of suites of transportation projects. Finally, this research supports UDOT's emphasis areas of "innovation" and "collaboration." Utah can become a national leader by taking strong steps to

coordinate and collaborate between transportation and public health agencies in the planning and forecasting process.

4. List the major tasks:

1. Assemble and meet with an advisory panel of travel demand modeling and health professionals from UDOT, the Utah Department of Health, MPOs, and local health departments. Refine the scope, timeline, and deliverables of this research. Meet with the advisory panel at critical decision points throughout the project for feedback and input.

2. Select a health impact modeling tool (such as ITHIM) and determine input data requirements. Conduct a literature review of health impact modeling of transportation plans and scenarios. Create a matrix of tools, their pros/cons, their analysis capabilities, and their data needs.

3. Identify and assess potential data sources that could be used as input data to the health model. Data sources will likely include population estimates, transportation and health surveys, travel demand forecasting model outputs, and other resources. Determine any data transformations or enrichments that may be necessary.

4. Develop a basic example application of using travel demand model outputs for health impact modeling in one Utah region. For example, the methods could be applied to scenarios from the Wasatch Front Regional Council's Regional Transportation Plan. Assemble and prepare data inputs, develop scripts and other analysis methods, and create an interactive website summarizing and visualizing the outputs from the example application.

5. Prepare a guidebook and other training materials for implementing the methods identified. Prepare a final report, presentation, and webinar summarizing the project.

5. List the expected deliverables (reports, manual, specification, design method, training, etc.):

1. Final project report and guidebook, detailing the health tool, data sources and methods, and the example application.

2. Website, summarizing the project and providing an interactive visualization of the example application.

3. Presentation and recorded webinar, summarizing the project.

6. Describe how the research results will be implemented:
(In response, consider addressing UDOT leader support, process or standard improvement, etc.)

This research will immediately implement the findings of this research by developing an example application of the transportation—health impact modeling tool to one sample transportation plan. Future implementations and applications will require additional work on the part of transportation and public health agency staff but will be greatly eased by tasks conducted as part of this research.

Specifically, this project will yield a guidebook detailing the steps needed to assemble the required transportation and other data for use in heath impact modeling tools, as well as a presentation walking through each of these steps. This process can be followed by UDOT or Utah Department of Health employees, MPO or health department staff, or consultants, such as when preparing to perform a health analysis of scenarios as part of a long-range transportation planning process or conducting a health impact assessment of a suite of transportation projects. The health impact modeling tool will build upon and supplement existing tools such as MOVES or the Active Transportation Infrastructure Economic Benefits Calculator to provide an additional dimension upon which assess and compare transportation investments.

The project will create a website that includes an interactive visualization of the example application. This can be used as a prototype for implementing future visualization, communication, and public involvement platforms investigating the health impacts of transportation plans and scenarios.

The project report will also include recommendations for additional work or data collection that could improve the linkages between travel demand forecasting and health impact modeling. UDOT Research and other staff can use these recommendations when planning for and prioritizing future research projects or work plans.

This research is broadly implementable to state, regional, and local transportation and public health agencies in all geographic areas of Utah, including in all UDOT regions. It may also have relevance to agencies in other states, depending upon the characteristics and availability of travel demand model outputs and public health data in Utah versus in other states.

7. Requested from UDOT: $50,000   **Other/Matching Funds:** $7,500 (Utah Department of Health, in-kind (staff time, data resources, etc.))   **Total Cost:** $57,500

    (or UTA for Public Transportation)

8. Outline the proposed schedule, including start and major event dates:

This research is anticipated to take approximately 13 months to complete, according to the following schedule:

2019	Jul–Aug:	Assemble and meet with the advisory panel to refine scope, timeline, and deliverables.
	Sep–Dec:	Select a health impact assessment tool and determine input data requirements. Identify and assess potential data sources that could be used as input data to the health model.
2020	Jan:	Prepare status report and meet with advisory panel to share and receive feedback.
	Jan–Apr:	Gather and assemble necessary transportation and other data. Develop a basic example application of using travel demand model outputs for health impact assessment in one Utah region.
	May–Jun:	Prepare a draft report, website, guidebook, and presentation summarizing the project's results and the example application.
	Jul:	Meet with advisory panel to receive feedback on draft materials.
	Jul–Aug:	Revise and submit final project report and guidebook, website, presentation, and recorded webinar.