

Grant Deliverables and Reporting Requirements for UTC Grants

UTC Project Information	
Project Title	Assessing Children’s Spatiotemporal Exposures to Transportation Pollutants in Near-Road Communities
University	The University of Texas at El Paso
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Funding Source(s) and Amounts Provided (by each agency or organization)	USDO: \$81,000 Local match: \$40,500
Total Project Cost	\$121,500
Agency ID or Contract Number	Sponsor Source: Federal Government CFDA #: 20.701 Agreement ID: 69A3551747119
Start and End Dates	Start date: 1/1/2018 End date: 7/31/2019
Brief Description of Research Project	<p>Children living in near-road communities are constantly exposed to traffic-related air pollutants. Their health could be severely impacted by these pollutants both chronically and acutely. Children’s health outcome research typically attempts to build associations between time-resolved pollutant concentrations and specific health outcomes measured at a specific time. The timeresolved concentration may mask the short-term effect of a pollutant on children’s health. A temporal and spatial characterization of children’s exposures would fill out the data gap between the exposure concentrations and health outcome measurements.</p> <p>This project will conduct air pollution measurements and air dispersion modeling in a near-road community defined as an area of 1.0 mile by 1.0 miles with an interstate highway and several arterial roads. The air quality measurements will be conducted at 3 locations, including at least 1 at a near-road elementary school and 1 at a community location. Emissions of traffic pollutants from all interstate highway, arterial roads, and frequently traveled surface roads will be estimated using the EPA’s</p>

	<p>MOVES emission model. Microscale concentration surfaces will be established and concentrations at discrete receptor locations will be quantified to study the total exposures for a number of (tentatively 23 children) asthmatic children attending the near-road elementary school using the AERMOD air dispersion model. Pollutant air concentrations will be used to calibrate the dispersion model and to apportion the contributions of emissions from interstate highway as well as arterial roads.</p> <p>Background concentrations for the study domain will be estimated from regional air quality monitors. The temporal concentration variation of three criteria pollutants (PM_{2.5}, NO₂, and ozone) will be developed for the model domain so that children’s exposures to the traffic pollutants can be documented spatially and temporally.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>This project developed spatial and temporal pollutant concentration variation patterns for PM_{2.5} in a near-road community. NO₂ and ozone were measured and reported for the community. These two pollutants were not modeled for community exposure due to their low impacts to the near-road community and uncertainties in the emission estimation and in the nitrogen dioxide photolytic cycle.</p> <p>Traffic inputs were obtained from the travel demand model, field measurements of traffic volumes, and combined with factors related to vehicle fleet information, roadway characteristics, and fuel and weather conditions to create emissions factors estimates for the roadways in the study area. A dispersion model was used to calculate the dispersion of these emissions in the atmosphere based on fate and transport properties of the pollutants, meteorological conditions, and land use characteristics. The results of this modeling framework were combined with air quality results obtained through field measurements. The total PM_{2.5} exposure in the community was assessed by adding the AERMOD modeled concentration estimates to the selected background concentrations. The air quality impact was apportioned between background concentrations and those contributed from major highways. Using the modeling framework, the dispersion model is used to assess percentage and distribution of emissions from highways and arterials in the study area. The model results show that the near-road sites experience approximately 88% of PM_{2.5} contributed from the highway.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>This study provides a methodology to estimate air quality impacts in near-road communities due to highway emissions.</p>

Web Links

- Reports
- Project website

<http://ctech.cce.cornell.edu/final-project-reports/>