

Motivation

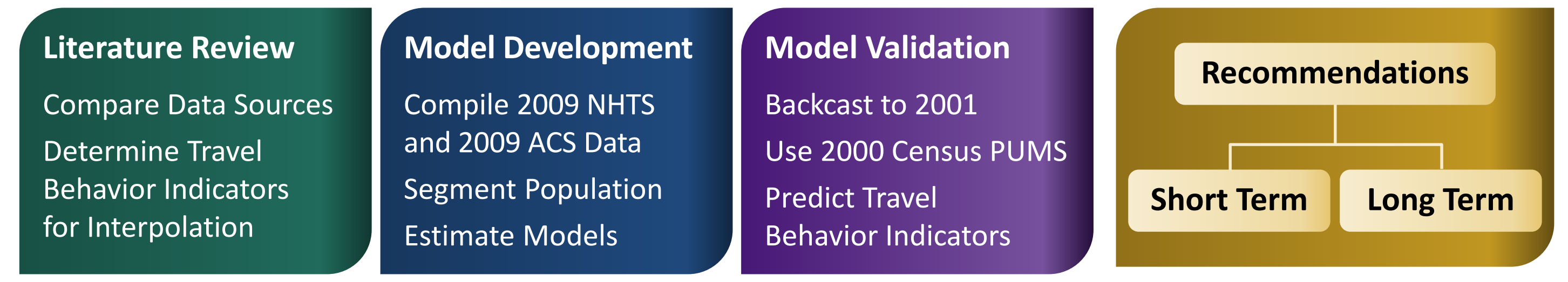
Understanding of the implications of travel behavior shifts and trends is limited by the available data!

Capturing recent demographic, behavioral, and technological trends that could be significant would require more frequent data than NHTS cycles!

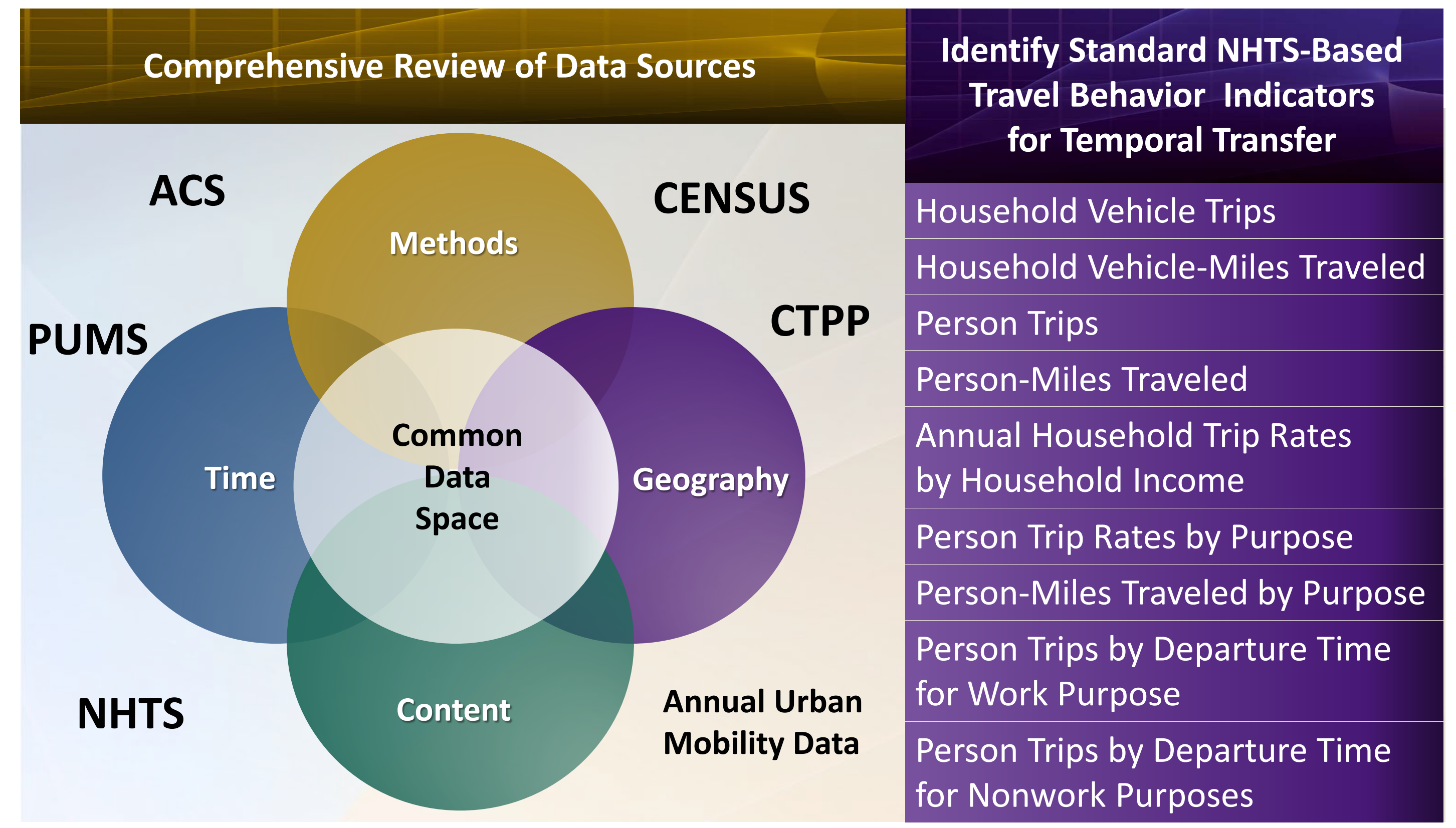
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Determine how it is possible to interpolate NHTS data for those time periods where only ACS data are available.

Methodology



Literature Survey



Model Development

- To predict number of household or person trips, and amount of person and vehicle travel, linear regression models were developed.
- To predict travel behavior for different portions of the population, the models for the entire population were fully segmented.
- To predict departure times, multinomial logit models were estimated.
- 2009 NHTS data were used in estimation.
- Independent variables with significant explanatory power included the following:
 - » Household (HH) size
 - » Vehicles in the HH
 - » Workers in the HH
 - » Household income
 - » Gender
 - » Age (65+)
 - » Education
 - » Employment status
 - » Retired HH member
 - » Licensed driver
 - » Population density
 - » Urban/rural
 - » Availability of heavy rail
- For every main model, its predictive capability was tested by a cross-validation step:
 - » Data were split into estimation (two-thirds) and application (one-third) samples randomly; and
 - » Observed versus predicted values were compared for key population segments.

Dependent Variables	2009 NHTS Summary Travel Trends Report	Goodness of Fit (R-Square)	Cross Validation Performance (Percent Predicted)
Household Vehicle Trips	Table 1	0.26	96.0-106.3
Household Vehicle-Miles Traveled		0.40	96.7-109.4
Person Trips		0.07	95.9-103.4
Person-Miles Traveled	Table 29	0.07	98.0-100.8
Person Trips by Departure Time for Work Purpose		0.01	94.5-105.7
Person Trips by Departure Time for Nonwork Purposes		0.01	95.6-104.5
Annual Household Trip Rates by Household Income	Table 8	0.03-0.10	
Person Trip Rates by Purpose	Table 11	0.01-0.03	
Person-Miles Traveled by Purpose		0.01-0.02	

Validation

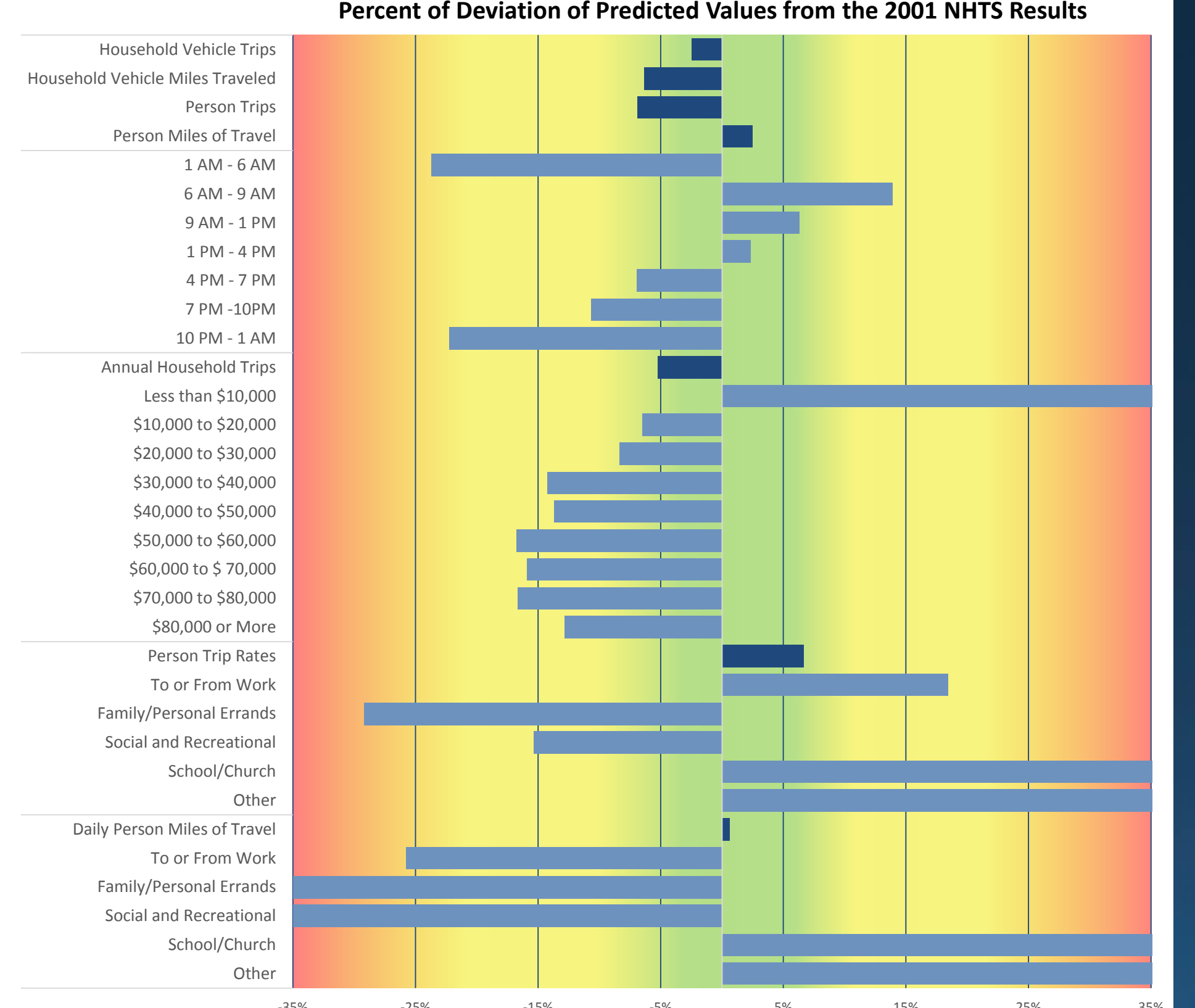
Input Prepare Demographic Profiles using 2000 PUMS data

Model Apply Models to Backcast Travel Behavior Measures to 2001


Predict Compare Predictions to 2001 NHTS Estimates

Linear models are recommended for the aggregate measures.

Segmented models should be considered as experimental: further development is needed.



Recommendations

- Short Term**
- Adjust the 2001 targets by removing outliers in the 2001 NHTS dataset.
 - Apply models using 2001 NHTS demographics to isolate the impact of differences between ACS and NHTS.
 - Test the revised models with the 2016 NHTS data.
- Longer Term**
- Synthesize population for more accurate joint distributions of demographics and land use.
 - New studies that would uncover changes in travel behavior in various population segments:
 - » Segment the population into distinct groups with respect to life cycle, land use, and vehicle ownership to explore causal relationships.
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¹ The study has been completed while the author was affiliated with the Texas Transportation Institute.
² The study has been completed while the author was affiliated with the Federal Highway Administration.