Research Objectives

- Behavioral Data for Regional Travel Demand Modeling
  - Traditional 4-Step Model Update
  - Activity Based Modeling Transition
- Baseline Data for General Policy Analysis
  - Exposure to modes of active transportation
- Baseline Data & Initial Exploration of Local Links between Built Environment, Travel, & Health
  - Socio-economics, travel behaviors, area type, physical activity, eating behaviors, health outcomes
Regional Trends & Context for Study
Heavy Cross-County Commuting

WORK in Downtown Nashville, LIVE in.....
Transportation is Regional Issue

Live in Hendersonville/ Gallatin Area, WORK in.....
Resiliency in Urban Congestion

Congestion in Urban Areas Cannot Be Treated with Roadway Capacity Alone.

Daily Recurring Congestion on Major Roadways.
### Peak Period Travel Times

<table>
<thead>
<tr>
<th>City</th>
<th>Total Peak Travel Time</th>
<th>UMR Rank By Estimated Hours of Congestion</th>
<th>Difference in Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nashville-Davidson-Murfreesboro-Franklin TN</td>
<td>1</td>
<td>31</td>
<td>-30</td>
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<tr>
<td>Oklahoma City OK</td>
<td>2</td>
<td>38</td>
<td>-36</td>
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<tr>
<td>Birmingham-Hoover AL</td>
<td>3</td>
<td>34</td>
<td>-31</td>
</tr>
<tr>
<td>Richmond VA</td>
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<td>44</td>
<td>-40</td>
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<tr>
<td>Raleigh-Cary NC</td>
<td>5</td>
<td>33</td>
<td>-28</td>
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<tr>
<td>Memphis TN-MS-AR</td>
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<tr>
<td>Detroit-Warren-Livonia MI</td>
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<td>-2</td>
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<tr>
<td>Orlando-Kissimmee FL</td>
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<td>6</td>
<td>2</td>
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<tr>
<td>Kansas City MO-KS</td>
<td>9</td>
<td>47</td>
<td>-38</td>
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<tr>
<td>Louisville/Jefferson County KY-IN</td>
<td>10</td>
<td>28</td>
<td>-18</td>
</tr>
<tr>
<td>St. Louis MO-IL</td>
<td>11</td>
<td>40</td>
<td>-29</td>
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### Driven Apart vs. UMR

<table>
<thead>
<tr>
<th>City</th>
<th>Driven Apart: Rank By Total Peak Travel Time</th>
<th>UMR: Rank By Estimated Hours of Congestion</th>
<th>UMR Understates Hours of Travel (Negative Values)</th>
<th>UMR Overstates Hours of Travel (Positive Values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nashville-Davidson-Murfreesboro-Franklin TN</td>
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Source: Driven Apart (CEO for Cities)
On average, Americans spend about 18% of their household income on transportation-related expenses.
Tennessee Grades for Obesity

1st – adult inactivity
2nd highest overweight
3rd highest obese (32.8% of adults)
4th highest extreme obesity
5th highest – overweight or obese children ages 10-17 (36.5%)
Obesity

Diabetes

Heart Disease

Physical Inactivity
Active Transportation & Obesity Rates


Obesity Prevalence (%)

Walk + Bike + Transit Trips (%)

0 5 10 15 20 25 30

USA  Australia  Canada  Ireland  France  Denmark  Finland  Germany  Sweden  Spain  Netherlands  Switzerland

0 10 20 30 40 50 60 70

Sweden

Finland

Ireland

France

Denmark

Canada

Australia

USA
Transportation and Obesity

Obesity/Vehicle Miles Traveled in U.S.

Sources: Centers for Disease Control – National Health and Nutrition Examination Survey/
#1
A Bold, New Vision for Mass Transit

#2
Support for Active Transportation & Walkable Communities

#3
Preservation & Enhancement of Strategic Roadways
A Bold, New Vision for Mass Transit

FUTURE REGIONAL CORRIDOR SERVICE
- Rapid Transit (BRT or LRT)
- Commuter Rail
- Express Coach Service

FUTURE LOCAL TRANSIT SERVICE
- Urban Core Fixed Route
- Large Urban Fixed Route
- Small Urban Fixed Route
- Emerging Urban Fixed-Route
- Suburban Circulator
Regional Geographies in Middle TN
MPOs in Tennessee

MPO/ TPO/ RPO Planning Areas

LEGEND

- MPO
- RPO

MPO - Metropolitan Planning Organization
TPO - Transportation Planning Organization
Research Design
Budget & General Scope

Budget approximately $1,200,000
Combined funding sources FHWA PL, SPR, FTA 5303, regional dues
Seeking health grants to expand sample size and/or conduct follow-up research
Co-Sponsors: Nashville & Clarksville MPOs, TDOT

General Scope of Work
- Model Development Consultation
- Research Design & Pretest
- 5,400 Traditional Survey Households
Research Team

Westat

Metropolitan Planning Organization

TDOT

PARSONS BRINCKERHOFF

CDC

RTA
Research Design - Sampling

Study Area
- 10 Middle Tennessee counties; 1 county in Kentucky

Sampling Frame
- Residential address within study area, excluding group quarters

6,000 Completed Household Interviews
- 200 from RPO area (2 counties)
- 1,000 from Clarksville MPO study area (2 counties)
- 4,800 from Nashville MPO study area (7 counties)

Sample Design Parameters
- Transit area oversample
- Sampling quotas for HH Types (e.g., Size, Vehicles, Workers)
- Health sample stratified by area type (e.g., urban, suburban, rural)
Research Design - Sampling

Transit Oversampling

Area Type Stratification
Research Design – Data Collection

Web
- Web-based questionnaires for recruitment, retrieval, and the health study

Telephone
- Trained interviewers/ computer-assisted
- Outbound and inbound calls

GPS Receiver (All adults in 10% of HHs)
- Passive collection of personal location and speed data

Accelerometer (One adult in 10% of HHs)
- Passive collection of personal physical activity data
Welcome! The Middle Tennessee Transportation and Health Study is sponsored by the Nashville Metropolitan Planning Organization, the Clarksville Urbanized Area Metropolitan Planning Organization, and the Tennessee Department of Transportation. If you have received a participation letter, please Start Here to begin the survey.

The Survey Area

Travel information is being collected from residents of ten Middle Tennessee counties, as well as neighboring Christian County, Kentucky.

* The ten counties in Tennessee included in this study are Cheatham, Davidson, Dickson, Henry, Montgomery, Robertson, Rutherford, Sumner, Williamson and Wilson.

News about the Study

- February 2011 - 200 households selected for pilot phase of survey
- October 2011 - Channel 4 WSMV Study to link physical activity, travel
- September 2011 - The Tennessean (Channel 10 WSMV) reported on the UT study on transportation health

Follow Us

- Twitter
- Facebook

General Information

Study Area Map

Traditional & Social Media Links
GPS/ Accelerometer Equipment
General Process
Survey Process – Advance Mailing

Household Address Selected from Sampling Frame

⇒ Advance Letter Sent from County Mayor

- Importance of Participation
- Incentive Offer
- Participant Code/Instructions

Dear Sumner County Resident:

Middle Tennessee is on the move, and we need your help to ensure that our transportation system keeps up with growing demands.

Cleveland officials like me are working closely with the Tennessee Department of Transportation and regional and local organizations to design the Nashville Metropolitan Planning Organization (MPO) to help improve Sumner County roads, public transit, schools, and sidewalks. Our goal is to increase safety and reliability while keeping pace with our community’s growth.

In order to reach these goals, the MPO is asking all households like yours to participate in a special study about how our communities travel.

Why should you participate?

Good transportation facilities and services help the people in your household enjoy jobs, schools, health care, and other important daily activities. To help us work smarter, we need data on how, when, where, and why you travel. This information is also used by local leaders making important decisions about how and where to invest your local and state tax dollars.

What is the MPO asking of you? (These simple steps:)

1. Log on to www.sumner-metro.org and complete the Household Questionnaire. Your household is 5% of [total].

2. Send the survey to each member of your household for 3 days in a row to collect your individual travel data that the MPO needs.

3. Provide the completed questionnaire to the MPO on the cover page:

All households participating in this study will be mailed two $50 grocery gift cards that will be given away after the study period ends. All households invited to participate that complete the questionnaire will receive a $25 check. If you do not have internet access or would prefer to fill out the MPO’s highly trained interviewers, you may call them toll-free at 1-800-990-3731.

The health and physical activity survey:

Your household may also be selected to participate in the physical activity and health portion of the study. If you are selected, the MPO will ask you to follow three steps outlined above and to agree to any and other rules in your household. This will include a written survey about diet and a physical activity monitor and follow additional instructions.
Survey Process – Reminder Card

Households not responding within expected timeframe are sent reminder notices.

Phone numbers are matched to addresses to actively recruit non-responding households.

There’s still time...

...for you to help the Nashville Area Metropolitan Planning Organization, Clarksville Urbanized Area Metropolitan Planning Organization and TDOE improve roads, public transit, sidewalks and bicycle routes in your community.

Your participation in the Middle Tennessee Transportation and Health Study will help us understand transportation needs as our community continues to grow.

A few weeks ago, we sent you a letter asking for your participation in this important study. If you have already responded to our survey thank you! If not, there’s still time for you to be part of this important study! Please visit our study website at www.middleTNstudy.com and enter your PIN <8888> to begin the survey.

Questions? Want to talk with one of our interviewers?
¿Alguna pregunta? ¿Desea hablar con uno de nuestros entrevistadores?
1-888-648-1756

Sponsored by Metropolitan Planning Organization
Survey Process – Recruitment

Households given option to respond either by toll-free hotline or by visiting the project website.

Once in contact, the household completes the initial "recruitment" interview and is assigned a travel day.
Households are mailed a diary packet which includes instructions and personalized travel logs for each member of the household age 5 and older. Households selected for the Health Study are also sent a personal GPS device for each adult member and one accelerometer for the adult selected for the physical activity study. HHs also can download extra copies of the materials from the project website.
### Middle Tennessee Transportation and Health Study

**Study sponsored by:**
Nashville Area MPO
Clarksville Urbanized Area MPO
Tennessee Department of Transportation

**Toll-free hotline:** 1-888-648-1756

---

**Travel Log For:**

- **Name:**
- **Travel Date:**
- **PIN:**

---

**FOR EACH PLACE YOU VISIT:**

- **What is this PLACE?**
  - If it is an "Other Place" or "Transit Stop," tell us the:
    1. Place Name
    2. Address and City - provide what you can.
    *Record each bus stop and train station as its own PLACE.

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<table>
<thead>
<tr>
<th>PLACE 1</th>
<th>Place Name</th>
<th>Address</th>
<th>City</th>
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<table>
<thead>
<tr>
<th>PLACE 2</th>
<th>Place Name</th>
<th>Address</th>
<th>City</th>
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<table>
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<th>Place Name</th>
<th>Address</th>
<th>City</th>
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<table>
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<th>Place Name</th>
<th>Address</th>
<th>City</th>
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<table>
<thead>
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<th>Place Name</th>
<th>Address</th>
<th>City</th>
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<table>
<thead>
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<th>Place Name</th>
<th>Address</th>
<th>City</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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**What TIME did you ARRIVE?**

**How did you GET there?**

**IF AUTO/TRUCK: How much did you PAY to park?**

**IF BUS/TRAIN: How did you PAY for the trip?**

**Other than yourself, HOW MANY people traveled with you?**

**What did you DO?**

- For transit stops or carpool/vanpool meeting places: please record your activity as "Transferred."

**What TIME did you LEAVE?**

---

**Tell us WHAT you DID at PLACE 1 and what TIME you LEFT:**

**List ALL the activities you did at this PLACE:**

- [ ] am
- [ ] pm

**List ALL the activities you did at this PLACE:**

- [ ] am
- [ ] pm

---

**Continue with PLACES 7 - 13 on back**
After you return your GPS and pedometer like devices we will contact you again to complete a brief health survey. As part of the survey we will ask you about the meals and snacks that you ate just on the days that you were wearing the equipment that we sent you. To make recalling that information easier we are including this card and ask that at the end of each day, you complete this general food diary card.

**Keep this card handy for when it’s time to complete the health survey.**

<table>
<thead>
<tr>
<th></th>
<th>DAY 1</th>
<th>DAY 2</th>
<th>DAY 3</th>
<th>DAY 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of meals you ate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of meals you ate that were prepared at home</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of meals you ate that were prepared at a fast food restaurant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of snacks you ate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of meals or snacks that contained fruits or vegetables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Survey Process – Travel Day

On the assigned travel day, respondents record general trip details in the travel log for easier and more accurate recall during the follow-up interview. HPA HHs will wear the GPS/accelerometer devices as instructed on the travel day and the following three days.
Survey Process – Retrieval

Following the travel day, respondents may call the toll-free hotline or visit the project website to enter travel details for each person in the household. Households participating by web are mailed a $20 check after the completion of the retrieval interview.
Survey Process – Health Study

HPA households are asked to return the equipment after the 4-day observation period.

At the conclusion of the 4-day period, the designated accelerometer respondent completes the health questionnaire via phone or web.

HHs completing the HPA study are mailed an additional $20 check after equipment has been returned and verified as used.
Data
Key Variables – Main Survey

Basic Household Characteristics
- Housing Type & Ownership
- Household Income
- Household Size
- Auto Availability
- Bicycle Availability

Person-Level Characteristics
- Age, Gender, Race/Ethnicity, Disability, Relationship to HH Members, Driver’s License, Educational Attainment
- Employment, School, and Volunteer Status, Locations,
- Habitual Travel Behaviors, Employer-Provided Transportation Benefits
- Frequency of Transit Use, Walking, & Bicycling
Key Variables – Main Survey

Vehicle Characteristics
- Year, Make, Model
- Body Type
- Fuel Type
- Ownership

Travel Day Trip Details
- Location & Place Name
- Activity/ Trip Purpose
- Arrival & Departure Times
- Mode, Occupancy
- Parking Location & Costs, Transit Fare
- Transit Access/Egress
Key Variables – Main Survey

Health Indicators (All HHs, Person-Level)

- Height
- Weight
- Average Daily Sitting Time
- General Level of Daily Physical Activity
- Overall Diet Quality Self Assessment
- Overall Health Self Assessment

Future Research

- Permission to recontact for future studies
Key Variables – Health Study

Perception of Safety when Walking in Neighborhood
- Daytime versus Nighttime
- Reason for feeling unsafe (open-ended)

Eating Behaviors (4-Day Observation Period)
- Number of Meals
- Number of Meals Prepared at Home
- Number of Fast Food Meals
- Number of Snacks
- Number of Meals or Snacks Containing Fruits or Vegetables
- Factors contributing to healthier eating
Key Variables – Health Study

Food Access (Respondent Only)
- Enough Food to Eat
- Quality/Variety of Foods

Physical Activity (Respondent Only)
- Average daily time spent in physical activity during the last 7 days
- Average daily time sitting/inactive during the last 7 days
- Average daily time spent traveling during the last 7 days
- Average daily time spent walking and bicycling

Health Outcomes (Household Members)
- Number of days in past month in bad physical health, mental health
- Number of days where bad health impacted activities
- Medical conditions – high blood pressure, heart attack, coronary disease,
Schedule

Clarksville study area interviews completed this Spring
Nashville study area interviews completed this Fall

Nashville MPO will be updating the existing 4-step model for the 2040 Plan during 2012 and 2013 while beginning the development of a core activity-based model for special studies and subsequent plan updates
Questions