

CTPP RESEARCH

Applying Census Data for Transportation *50 Years of Transportation Planning Data Progress*



**Crowne Plaza Kansas City Downtown
Kansas City, MO**

November 14–16, 2017

WHAT RESEARCH DO WE DO?

- CTPP has many services it provides such as (Outreach and Training) and (Technical Support) for the users.
- As with most programs **RESEARCH** is an integral part of improvement.
- CTPP board members and staff create problem statements on a regular basis to seek out research on a wide variety of topics on **CTPP and other travel data**.
- CTPP leverages available research mechanisms but also funds its own research efforts.
- CTPP also supports conferences like this one to share ideas and solutions. Additionally Irvine conference in 2011.

WHO ARE WE?

RESEARCH SUBCOMMITTEE MEMBERS

- Phil Mescher – Chair, Iowa DOT
- Jonathan Lupton, Metroplan, Little Rock, AR
- Steve Polzin, CUTR
- Ed Christopher, Independent Consultant
- MaryAnn Waldinger, COMPASS, Boise, ID
- Guy Rousseau, ARC, Atlanta, GA
- Soheila Khoii, CalTrans
- Erik Sabina, CODOT
- Joseph Hausman, FHWA
- Arash Mirzaei, NCTCOG
- Penelope Weinberger, AASHTO
- JJ Zang, Cambridge Systematics



TRACKING RESEARCH IDEAS


- The CTPP Research Subcommittee continually collects research ideas and problem statements we may choose to support.
- The Subcommittee works to prioritize the problem statements and pick the ones most likely to meet some immediate need and that we feel will be successful.



IDEA

RESEARCH TOPIC LIST

- With all the research ideas that arise we keep a comprehensive list we use to assist us with prioritization.
- Currently the list has over 30 research project ideas.

					
Number	Rank	Project	Description	Status	
		General			
1		Investigating the Utility of the American Community Survey	Assess the usability of ACS data in meeting transportation planning application needs.	Update to 588	Ed
2		Application of Synthetic Data	Determine capabilities and issues of using perturbed CTPP data in transportation planning applications.		Part of #17
3		Application of Perturbation Techniques to the ACS (Online Tools)	Develop statistically reliable techniques for eliminating risks of disclosure and avoiding the suppression of census data because of Census Bureau disclosure avoidance rules.		
4		Sources for High Quality and Accurately Located Employment Data	Compare and contrast the different sources of information available on employment, e.g. LEHD, Bureau of Labor Statistics, ACS and CTPP with particular emphasis on how employment locations are identified.	Underway/TRB	
5		Do MOE's Really Matter	Assess how large margins of error impact usability and reliability in traditional transportation planning applications.	Underway/TRB (sort of, it's "dealing with large MOE's")	
6		Combining ACS with Administrative Records for ODI Matrices			
7		Synthesis of how PUMS Data is being used	Conduct a synthesis of users to assess the state of the practice in using PUMS data to address transportation planning questions.		Part of #1 (ACS Utility?)
8		Data Improvements			
9		Contextual Variables to improve link to ACS and PUMS	Adding characteristics such as land use, neighborhood characteristics, transit accessibility to ACS microdata records, and then use those variables in CTPP tabulations.		
10		Develop viable methods for aggregating ACS data (multiple block groups)	Investigate statistical methods for aggregating already perturbed and sometimes averaged data in ways that do not significantly compromise reliability.		
11		Identify optimal methods for calculating ACS household size	Work with the user community to refine small area data needs for variables that frequently have high MOEs and Standard Errors to gauge the extent to which moving to larger area geographies with lower MOEs would have value for small area transportation planning applications.		
12		Refine small area geography needs and gauge community readiness to move toward more use of TAD or larger geographic area data			
13		Data Alternatives -- JOURNEY TO WORK			
14		Document Experience of Transitioning to New Data Sources	Survey and document user experiences in using and applying new data sources.		
15		Alternatives to ACS and CTPP (Flow of Trips Focus)	Explore the applicability and usability of alternatives for obtaining flow data (e.g. cell phone data and data from other private sector applications)		nchrp 08-95 cell phone data
16		Understand the pros and cons of using alternative sources of employment data (e.g., InfoUSA, Dunn and Bradstreet, LODES, NHFS)	Similar to # 5 and #19?		
17		Data Alternatives -- NON-WORK Trips			
18		Investigate sources for the Non-journey to work trip	Commuting accounts for less than 17% of trips. Assess opportunities for integrating information from multiple public and private sources to provide a broader picture of what is happening with overall travel.		
19		Investigate Effectiveness and Application of using GPS/Cell Data for Real-time Traffic Flow	Similar to #13 above?		
20		Conduct a synthesis on best practices on procuring, partnering and using private sector data from emerging technologies to supplement or validate traditional sources of data	Similar to #13, 14, 15 and maybe #6?		
21		Identify the pros and cons of using GPS and telematics data as a supplement for traditional data	Similar to #14 and 15?		
22		Multimodal Planning			
23		Outline the opportunities and challenges in using census data (e.g. LEHD, ACS, standard tabs) for rural transit planning	?		
24		Determine the extent to which census data products can be used to understand non-motorized modes (bike, walk)	?		
25		Data Reporting and Visualization			
26		Develop a guidebook on methods for strengthening the dissemination, analysis, presentation and reporting of census data	Identify best practices and case studies in effectively using, applying, reporting and presenting census data for different types of transportation planning applications.		
27		Best practices in using visualization techniques for reporting and presenting census data	Identify best practices and case studies in effectively using, applying, reporting and presenting census data with an emphasis on how GIS and other visualization tools are being used to more effectively communicate and share results with the decision makers and the public.		There is an NCHRP visualization tools effort underway, but this may be more specific to us.
28		Travel Behavior Analysis			
29		Investigate the decline in carpooling	Why has carpooling declined?		Part of #37 below?
30			Analyze the socio-demographics of Workers-at-home, and the		

ESTABLISHED RESEARCH PRIORITIES

- **New Research priority #1**
 - Census Data Guidebook on Analysis, Reporting, Presentation and Dissemination of CTPP data.
- **New Research priority #2**
 - Investigate sources for the Non-Journey-To-Work Trip
- **New Research priority #3**
 - Investigate Combining ACS with Administrative Records to develop OD Matrices
- **New Research priority #4**
 - Archive 1980 Urban Transportation Planning Package

NEW PROJECT IDEAS

- Income spent on Housing crossed with Transportation Variables
- Vehicle Sufficiency data crossed with other variables
- Use of PUMS data and CTPP crosses at PUMA level.
- Primary Work Role – Student or worker?
- “Work at Home” estimates
- Poverty data at 2x the poverty level. Is it possible to get at any geography?
- Disability data

RESEARCH MECHANISMS

- Transportation Research Board
 - National Cooperative Highway Research Council
 - NCHRP 8-36
 - NCHRP Synthesis
 - NCHRP “big projects”
- Self Funded Research
 - Total research generated or funded by the current CTPP since 2006 is in excess of \$1 million.
- Other



SUCCESSFUL RESEARCH HIGHLIGHTS



NCHRP 08-36 TASK 127

- **Task 127 Employment Data for Transportation Planning**
 - **Objective: Develop resource guide to employment data**
 - The “**what’s what**” with employment data
 - Project started with CS July 2015
 - Initial work created Vision, Objectives and Work Plan
 - Tech memo: Synthesis of key elements and characteristics of common employment data sources. (Technical Review)
 - Final comments on work submitted this fall.

NCHRP 08-36 TASK 128

- **Task 128: Data Visualization Methods for Transportation Agencies**
- Objective
 - “To evaluate data visualization methods and their applicability to transportation planning and analysis”
- Project is all about data visualization tools and techniques
 - We know data can be hard to understand
 - What methods can be most effective?
 - What data visualization methods exist?
 - Need to classify them for best uses.

NCHRP 08-36 TASK 128



Data Visualization Methods for Transportation Agencies

Welcome to Vizguide! This website is intended as a resource for transportation professionals who want to use illustrations and visualizations to communicate their ideas to an audience. You might associate visualization with complicated things like interactive animated websites and 3D models of major projects – and you might know how to build those things – but visualizations also include things like bar charts, maps, and even specially formatted text or numbers. Used well, it can make a strong impression. Click on one of the areas below to get started!

Examples

Need some inspiration? We've organized some high-quality and effective visualizations for some of your common tasks, with suggestions on how you can replicate them.

Process

When you're making visualizations, do you feel lost? Click on one of the steps below for tips. You can work through the process from beginning-to-end, or you can jump in wherever you are.

Charts

The most effective visualizations for communicating your message are the ones with which people are familiar. Each of the chart types below include examples, variations, and tips for use.

Style

Your style may be largely out of your control as you obey your agencies or clients. We've curated some tips that apply no matter what, including how to comply with Federal guidelines.

Tools

A great visualization shouldn't stay in your head. Here are some of the most common and well-liked tools for creating visualizations at all levels of complexity, including tips and tricks.

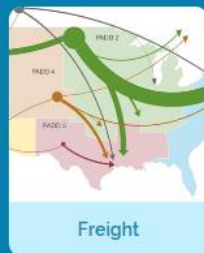
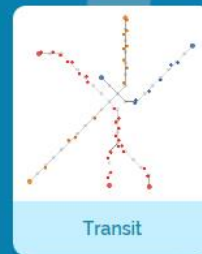
Resources

Still curious about how to proceed with visualizing your story? We've accumulated resources for you as you design, build, and implement your vision, in-print or online.

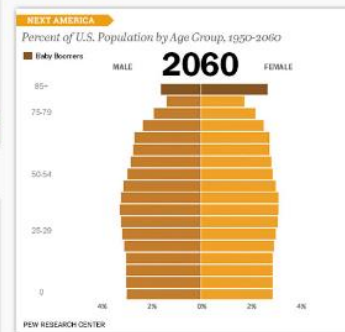
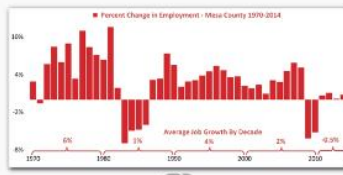
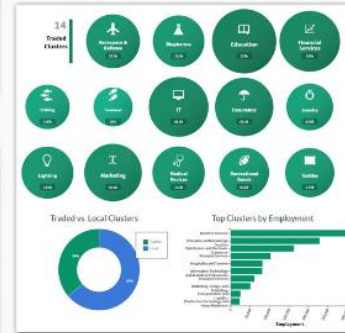
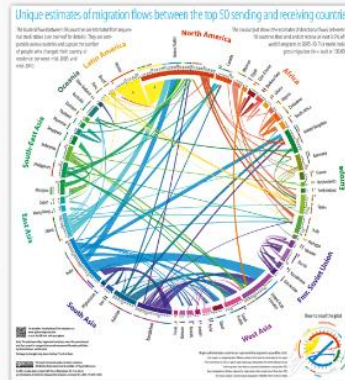
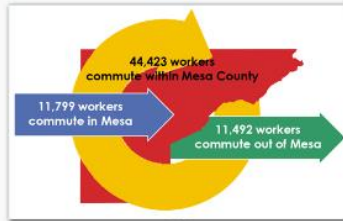
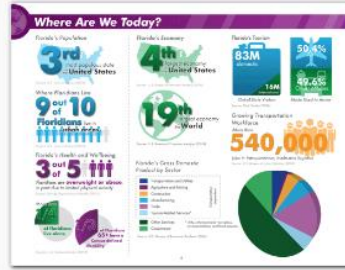
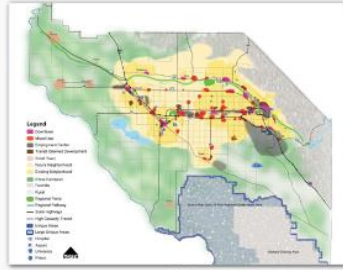
NCHRP 08-36 TASK 128

Examples

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NCHRP 08-36 TASK 128



OTHER CURRENT 08-36 RESEARCH

- NCHRP 8-36
 - Task 127 – Employment Data for Transportation Planning
 - Task 128 – Data Visualization Methods for Transportation Agencies
 - **Task 135 – Addressing Margins of Error in Small Areas of Data Delivered through the American Fact Finder or the Census Transportation Planning Products Program**

NCHRP 08-36 TASK 135

- **Task 135 – Addressing Margins of Error in Small Areas of Data Delivered through the American Fact Finder or the Census Transportation Planning Products Program**
 - Objective -
 - provide guidance on how to appropriately handle large MOEs that is tailored to the application of the data
 - address how to communicate MOE when data are represented visually, e.g. in heat maps or pie charts, and when the use of ACS data is spread too thinly to constitute an appropriate use of the data.

NCHRP 08-36 TASK 135 STATUS

- Tech memo delivered for Tasks 1 & 2
 - Task 1
 - To provide guidance leading to solutions to handle large MOEs in different applications of the data, including travel demand models;
 - To extend the research to consider issues related to the aggregation of MOEs; and
 - To propose and evaluate an alternative to the current MOE aggregation approach.
 - Task 2
 - To provide an approach to illustrate the precision of the CTPP estimates by using the MOEs in graphics, charts and other visual summaries.

NEW RESEARCH PRIORITIES

- NCHRP
 - **Census Transportation Data Use and Application Field Guide – AKA Research Priority One**
 - Seeking Potential Alternatives to CTPP – ACS Jeopardy
 - Problem Statement in Development
 - Investigating Sources for Non-Journey to Work Trips – AKA Research Priority Two, Problem Statement Under Development
 - **Research on Carpool Decline and Telecommuting**

CTPP FIELD GUIDE

- CTPP and ACS are critical data sets that support transportation planning.
- Continual changes to data and staff turnover make it difficult to learn real world applications.
- **CTPP Field Guide** is designed to solve that problem.
 - Provide knowledge and real world application examples
 - Instructional document on application
 - Key resource for junior level planners
 - CTPP, ACS, PUMS
 - Address perennial issues such as EJ and Title VI.
- Problem statement completely rewritten and submitted.

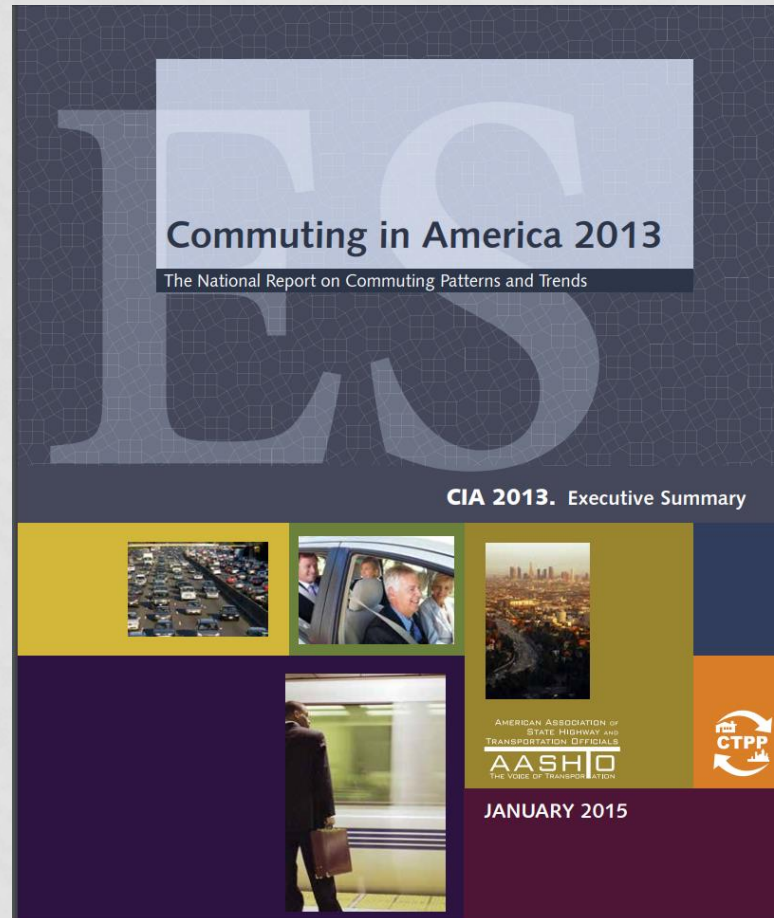
CARPOOL AND TELECOMMUTING TRENDS

- Carpooling as a means of commuting has continued its historic decline in spite of evidence of changing trends for other modes such as transit and walk and in spite of high fuel prices and a challenging economy which should motivate shared ride use.
- Changes in carpool commuting have dwarfed in significance the changes in bike walk and transit use yet we don't fully understand the reasoning for the reluctance to carpool.
- In addition, the prospect of technology aids for carpooling such as dynamic matching, create a potential opportunity for this mode.
- Many transportation analysts acknowledge the single most obvious solution to congestion reductions is to fill more of the empty seats in vehicles traveling to work.
- We feel that additional research attention to this topic including in-depth exploration of the motivations and attitudes surrounding carpooling merit further investigation.

CARPOOL AND TELECOMMUTING TRENDS

- Work at home has shown significant increases in the past decade and many analysts anticipate this phenomenon will continue to grow over time.
- Yet, some major firms such as Yahoo and Hewlett-Packard have modified telecommuting programs and indicated at least some of the agglomeration benefits of in-person interaction were not being captured in aggressive telecommuting environments.
- It's acknowledged within human resources circles that certain types of functions are more conducive to telecommuting but there has been no systematic analysis of telecommuting potential nor strategy for predicting possible future telecommuting mode shares.
- We believe that additional investigation into this phenomenon paying particular attention to future workforce composition and classifications including age based effects would provide transportation planners with greater insight as to the potential impact of telecommuting for mitigating commute volumes.

COMMUTING IN AMERICA



COMMUTING IN AMERICA

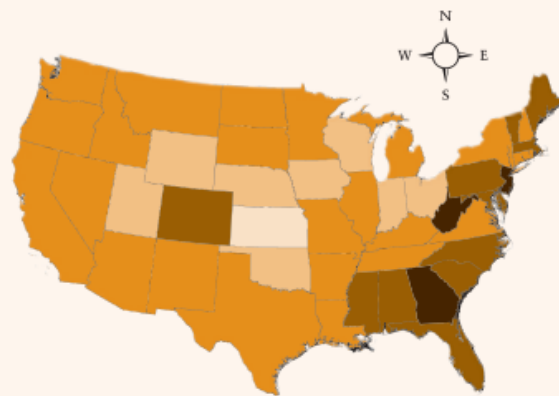
- CIA is national report that describes travelers and their commuting trends.
- Goal is to provide factual commuting data for transportation professionals to base their decisions.
- Began in 1984 with new reports approximately every 10 years. Decennial Census and ACS.
- Uses Census data (CTPP) as the basis for evaluating commuting trends.

COMMUTING IN AMERICA

TABLE ES-5 Average Travel Times by Broad Geographic Areas

Area	Average Travel Time (Minutes)	Less Than 20 Minutes (%)	More Than 60 Minutes (%)
United States	25.54	47.01	7.98
Northeast region	27.31	44.49	11.08
Midwest region	22.38	53.46	5.79
South region	24.93	47.20	7.11
West region	24.62	49.12	7.86
In metro area	26.14	44.48	8.13
In central city of metro area	24.82	48.70	7.67
In suburb of metro area	26.89	42.07	8.39
In nonmetro area	22.90	58.09	7.29

FIGURE ES-9 Change in Travel Times by State, 1990-2000



Change in travel time from 1990-2000:

- 4.6 to 5.3
- 3.6 to 4.6
- 2.6 to 3.6
- 1.9 to 2.6
- 0 to 1.9

Note: Map uses the 3-minute average national change statistics. Data not available for Alaska; Hawaii change equals 2.3.

FIGURE 2-26 Vehicle and Housing Ownership

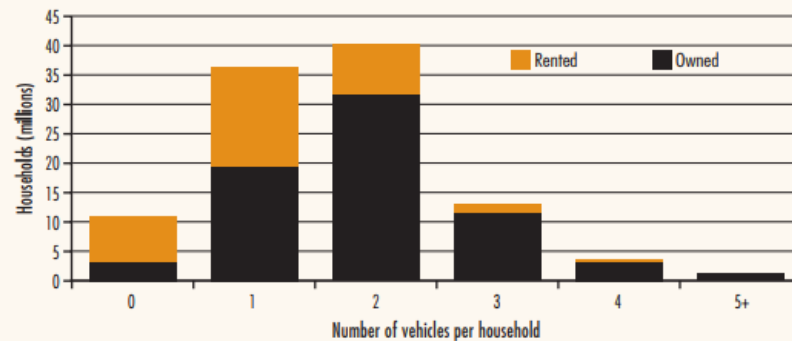
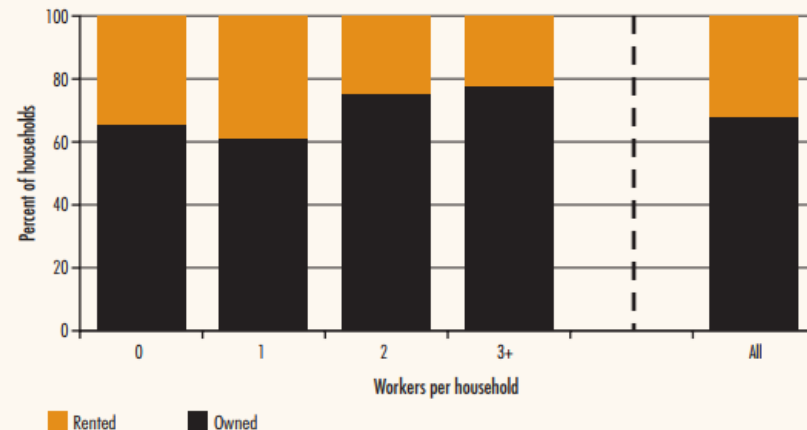


FIGURE 2-27 Housing Renters and Owners by Workers per Household



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