CTPP Status Report

September 2012

U.S. Department of Transportation
Federal Highway Administration
Bureau of Transportation Statistics
Federal Transit Administration
AASHTO Standing Committee on Planning
In cooperation with the TRB Census Subcommittee

Census Transportation Planning Products (CTPP) AASHTO Update

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The CTPP Oversight Board annual in-person meeting was held on August 28-29 in St. Paul, MN. There was progress on all fronts. Discussions included:

- Long term strategies for the CTPP program: The AASHTO CTPP Task Force was officially established. The Task Force will help explore the long term strategy for the CTPP. Members of the Task Force include Susan Gorski from Michigan DOT, Clara Reschovsky from Metropolitan Washington Council of Governments, Gregory Slater from Maryland DOT, Laine Heltebridle from Pennsylvania DOT, Elaine Murakami from Federal Highway Administration, Ken Cervenka from Federal Transit Administration, Jonette Kreideweis and Alan E. Pisarski.

- 2006-2010 CTPP: The contract between AASHTO and the Census Bureau (CB) is in place. AASHTO and the CB are discussing the possibility of releasing the data in waves, rather than all at once, which may allow for some tables to be delivered in February 2013, rather than May 2013.

- Research projects: Many ideas were generated at the TRB Conference held in October 2011, and the CTPP program includes a robust budget for research. The research subcommittee identified top five research needs and then the Board approved funding for two of them: ACS Microdata Analysis System for Transportation Analyses phase I study and Prototyping with the 3-Year CTPP data into the Census Bureau DataFerrett. The Board will revisit additional topics at the November's Board Meeting after the scopes of work are filled out.

- Westat is under contract to the Census Bureau to implement the Privacy Protection Data Perturbation process for the 2006-2010 CTPP. The work is expected to be completed by September 30, 2012.

Commuting in America IV

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The next *Commuting in America* is now underway. The first three editions, authored by Alan Pisarski, published in 1978, 1996 and 2006, have been widely regarded as authoritative sources of information on commuting behavior and changes in commuting patterns over time. The Commuting in America III report can be found here: http://onlinepubs.trb.org/onlinepubs/nchrp/CIAIII.

Commuting in America IV (CIA4) will include a *National Executive Summary* and 15 T*ravel Trend Briefs* that will be published on a regular basis, in electronic format, and disseminated via the Internet. The first five briefs are expected by January 2013. Additionally, the CIA4 study will be producing supplemental data tables that will enable users to create their own summary tables, graphs, and thematic maps for specific geographic areas, such as individual States and Metropolitan Statistical Areas (MSA).

In addition to the use of the decennial Census, American Community Survey, and National Household Travel Survey, the project is investigating expanded use of the ACS Public Use Microdata Sample (PUMS), the American Housing Survey (AHS), the American Time Use Survey (ATUS), and the Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES).

CIA4 is being developed as a collaborative effort involving two teams of contractors. One team, lead by the University of South Florida, Center for Urban Transportation Research (CUTR) and funded through a contract with the American Association of State Highway and Transportation Officials (AASHTO), will have lead responsibility for writing the report. The principal authors will be Steven Polzin and Alan Pisarski. A second team, lead by Cambridge Systematics and funded under a National Cooperative Highway Research Program (NCHRP) contract, will be responsible for much of the data preparation and analysis. The CS team is lead by Bruce Spear and Liang Long, with Alan Pisarski and Nancy McGuckin serving as consultants.

Place of Work Extended Allocation for the 2006-2010 5-Year ACS

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The 2006-2010 5-Year American Community Survey (ACS) data contains information on workers' place of work location. Approximately 22 percent of worker records did not contain place of work (POW) tracts and block information. For CTPP production, workplace block information is used to tabulate the TAZ-to-TAZ flows. Standard allocation procedures at the Census Bureau impute only at the county and place level geographies. Therefore, the place of work (POW) extended allocation system was developed to improve workplace location data for 2006-2010 5-Year ACS worker records at the census block level. With the implementation of this methodology, an additional 13.5 percent of POW blocks were imputed, increasing the completion rate to 91 percent.

The extended allocation process aimed to allocate place of work block locations for worker records in counties within and around many of the nation's large urban centers. There were two phases of processing: pre-processing and main processing. The pre-processing formatted the microdata by recoding and delineating for the main processing, which then uses an algorithm involving job and trip characteristics to obtain a best fit for donor-recipient workplace information.

Pre-processing

The ACS microdata records were formatted for use in the extended allocation main processing. In the pre-processing, the 2006-2010 5-Year ACS microdata were:

1) recoded into seven levels of industry and occupation categories,

2) filtered to include only records that are in POW coding areas (counties for which the extended allocation process is applied) and were not previously allocated using standard processing, and

3) divided into donors and recipients. All donor records had fully coded POW block information. POW block information for recipients was coded only to the place. After records were divided into donors and recipients, donor records were aggregated to the block level and a new field was created to sum the number of workers each block represented. These donor blocks were then separated and saved based on the industry and occupation categories.

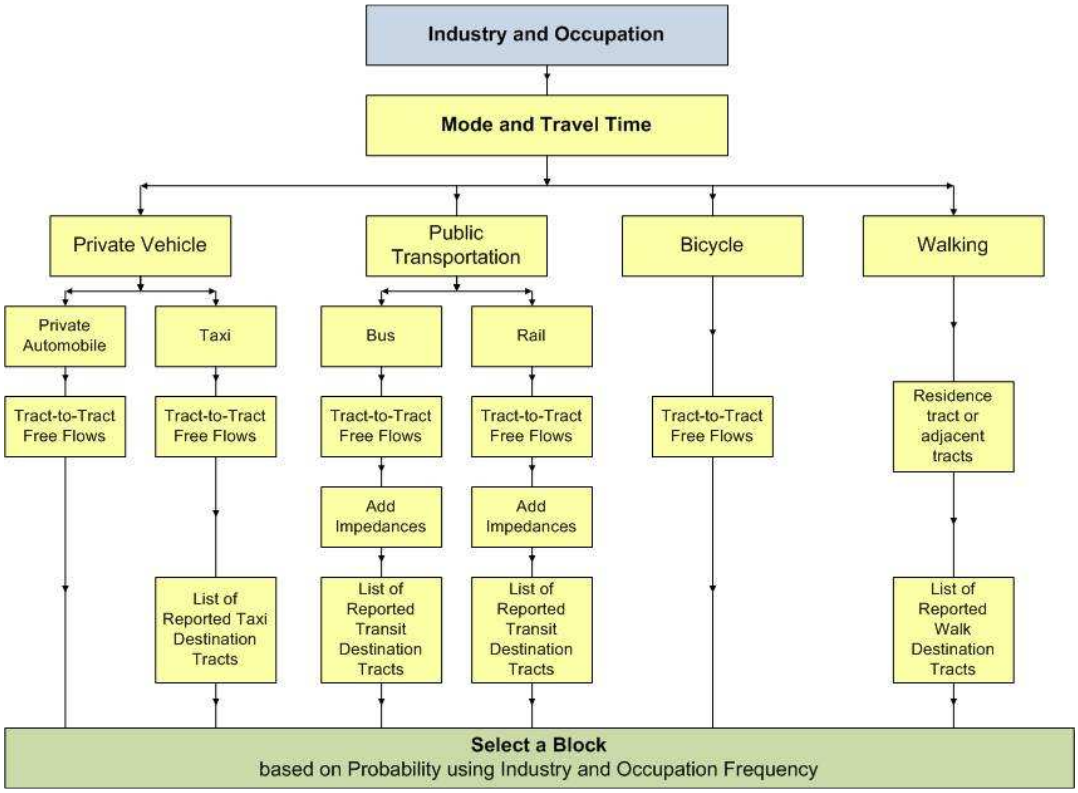

Figure 1. Flowchart for the Place of Work Allocation Process

Main Processing

Figure 1 displays the overall main processing system, which was separated into three parts: A, B, and C. Part A matched potential POW donor blocks to recipients based upon their POW geography at the place level. Next, the process filtered potential POW donor blocks for each recipient based upon industry and occupation. Seven combinations of industry and occupation classifications were created in the pre-processing, with 90 categories in the most detailed industry classification, and 24 in the most detailed occupation classification, while the least detailed combination was industry classified into two categories, goods and services.

When the process for filtering donors for each recipient began, the most detailed level of industry and occupation was first compared between the donor blocks and the recipients. If at least one match was found then the matching donor blocks were included among the set of potential POW donor blocks for that recipient and attached to the recipient for the next filtering phase (Part B). If the recipient did not find a donor block match based on the most detailed industry and occupation classification scheme, a less detailed industry and occupation classification scheme was compared for a donor block match (i.e., 90-category industry with 7-category occupation). This process continued until it reached the broadest scheme – a 2-category classification of industry into goods and services. If no match was found here, then the recipient record was removed from the processing. Otherwise, it moved on to Part B.

Part B further filters the set of potential donor blocks for each recipient using mode of transportation and travel time. First, the recipients were sorted into five files based upon mode of transportation: 1) private automobile and bicycle, 2) taxi, 3) bus, 4) rail, and 5) walking.

The Bureau of Transportation Statistics (BTS) provided a file with tract-to-tract estimated travel times (origin to destination) based on simulated automobile travel. To estimate travel times for other modes of transportation, specifically bus and rail, and account for varying levels of congestion depending on metro size, the BTS travel times were inflated using a multiplier of 1.8 for bus and 1.5 for rail, and 0.6 for large metro areas

(population size 1 million or larger), 0.7 for moderately sized metro areas (500,000 to 999,999 population), and 1.0 (no adjustment) for small metro (population under 500,000) and non-metro areas, respectively. The BTS travel times, as well as the recipients' reported travel times were delineated into six travel time categories: 0-11, 12-22, 23-37, 38-52, 53-67, and 68 or more minutes.

From here, the first four files (i.e., automobile and bicycle, taxi, bus, rail) of recipients with their associated potential POW donor blocks were compared with the BTS files based on travel time. First, it was determined if the recipient's residential block and potential POW blocks had a geographical match in the BTS file, meaning the commuting flows' origin and destination matched geographically. Then, the travel time categories in the recipient file and BTS file were compared. If there was a travel time match, the potential donor block(s) were filtered to keep only those matches. If there was not a direct match on the travel time category, then this was relaxed to include travel time categories above and below the recipient's. For example, if the recipient had a travel time category of 3 but none of the BTS tract-to-tract estimates matched this category, then categories 2 and 4 were also considered. Otherwise, the travel time category rule was relaxed again, to two more or two less than the recipient's travel time category. Using our example, travel time categories 1 and 5 were considered in this step. If matches were found, then these potential donor blocks and their recipients were passed onto Part C for allocation. Otherwise, none of the potential donor blocks for the recipient were subjected to filtering and were passed on to Part C for allocation.

Recipients who report that they walk to work go through a separate POW block matching process. For walking recipients, priority for selection of potential donor blocks was given to their tract of residence or adjacent tracts. If a recipient had potential donor blocks that satisfied this requirement, these blocks were kept and sent on to Part C for allocation while others were filtered out. If a recipient had no potential donor blocks that satisfy this requirement, then all of the potential donor blocks were sent on to Part C for allocation without filtering.

Part C had two different paths. The recipients that had only one potential donor block were finalized by assigning the POW tract and block codes from the donor block to the recipient.

The second set of recipients had more than one potential donor block. To choose which of these blocks was assigned to the recipient, first the potential donor blocks associated with each recipient were sorted in descending order (highest to lowest) based upon the number of workers represented by each donor block. Using the number of workers, a cumulative percentage range was assigned to each potential donor block associated with each recipient. For example, if a recipient had two potential donor blocks and Block #1 represented 75 workers and Block #2 represented 25 workers then Block #1 was assigned a cumulative percentage range of 0.000 to 0.750, while Block #2 was assigned 0.751-1.000. After the cumulative percentage range was assigned to each potential donor block then, a random number was generated for each recipient between 0.000 and 1.000. This random number was then used to choose the potential donor block based on the cumulative percent range. Using the previous example, if the recipient was assigned a random number of 0.278, Block #1 was assigned to the recipient. Meaning, if the recipient's generated random number fell within the potential donor block's cumulative percentage range that donor block's POW tract and block information were assigned to the recipient.

Results

Table 1 displays the overall results of the POW extended allocation process. In total, there were 1,391,047 recipients and 6,843,655 potential donors at the beginning of this process from the 2006-2010 5-Year ACS. Of the original recipients, 4,161 did not have any potential donor blocks by the end of Part A – the industry and occupation match. 1,251,558 recipients had just one potential donor block going into Part C, which is 90.2 percent of total recipients. Another 4.4 percent of recipients had two potential donor blocks, and approximately 2.0 percent had three potential blocks, and the percent of recipients continued to decrease as the block count increased to a maximum of 619.

At the end of the extended allocation process, 1,386,823 recipients were allocated POW tract and block information using 235,155 donor blocks. The percent of applicable recipients with no POW tract and block information was reduced from 22.4 percent to 8.9 percent, a decrease of 13.5 percent.

Table 1: Results from POW Extended Allocation

	Initial	*Final*
Recipients	1,391,047	1,386,823
Donors	6,843,855	235,155
POW blocks with geographic information	77.6%	91.1%

Conclusion

The Place of Work Extended Allocation process for the 2006-2010 5-Year ACS was successful in allocating POW tract and block information for 1,386,823 recipients. In the future, this process will be adapted into the standard edit process for ACS starting in data year 2013. To improve this process in the future, more data years may be added to the donor dataset. For example, for data year 2013 it would be ideal to use donors from DY2006-2012. Lastly, the newly allocated POW information was merged onto the microdata file for the 2006-2010 5-Year CTPP.

Smoothing the Borders of Labor Markets and Payment Areas: Use of the "Journey to Work" Data in Recommendations to Refine Medicare's Geographic Payment Adjusters

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The Medicare program adjusts payments to hospitals, physicians and other health care providers according to their location in designated labor markets. A labor market can be defined in general terms as a local area in which employers compete for a common group of workers and where workers compete for a common set of jobs. Operationalizing this definition is difficult, because it is not easy to definitively establish the boundaries of labor markets. Core-based statistical areas (CBSAs) are geographic designations encompassing county groups where the groupings are defined on the basis of core population centers surrounded by counties that have high levels of economic integration with that core as defined by commuting patterns.[1] For this reason they have been accepted by many state and Federal programs as reasonable approximations for local labor markets. For example, Medicare adjusts its hospital payments using a wage index that is computed by CBSA metropolitan area, with non-metropolitan counties aggregated to individual non-metropolitan markets by state.

Any time a labor market is defined by fixed borders – especially geo-political borders such as counties – boundary issues will arise. Some neighboring hospitals who know that they compete in the same labor pool find themselves classified into different wage index areas that can be subject to substantially different geographic adjustments. If the wage index values are very different on either side of a border (sometimes referred to as "wage cliffs"), this leads to a perception that the wage index is inaccurate or unfair. In the case of the Medicare hospital wage index, such perceptions have led over many years to a series of administrative exceptions,

1 http://www.census.gov/population/metro/about/

reclassifications and adjustments that have become very cumbersome.

In the spring of 2010, the Institute of Medicine (IOM) was asked by the Congress and the Secretary of Health and Human Services (HHS) to review the geographic payment adjusters used by Medicare across all of its payment systems. A committee was formed to review the hospital wage index and the physician geographic practice cost indexes (GPCIs), and to recommend changes in their construction and/or implementation.[2] Among many changes included in the final reports for the first and second years, the committee recommended that the hospital wage index be constructed from average wages collected by the Bureau of Labor Statistics Occupation Employment Survey (BLS OES), which, like the current Medicare hospital wage index, is constructed around CBSA metropolitan areas. At the same time, the committee recommended the introduction of commuter-based smoothing adjustments to address "wage cliffs" in the index and reduce or eliminate the need for administrative exceptions.

Commuter-based smoothing is a way of addressing labor market boundary issues by reducing the index differences between neighboring, economically integrated areas. Commuting patterns are already incorporated into the designation of CBSAs.

Health care commuting patterns are not necessarily the same as overall commuting patterns, however, because hospitals are not uniformly distributed across counties and other health care activity tends to cluster around hospitals. Thus, there can be intensive commuter patterns across borders of metropolitan areas. Hospital county-level commuting patterns were introduced into the Medicare hospital payment rules as one of the many different types of adjustments available to hospitals that were located near perceived "cliffs" in the wage index but were not eligible for other administrative exceptions. It is known as the "outmigration adjustment," and it is based on hospital worker commuting patterns that were provided to the Medicare program from a special tabulation of journey-to-work data from the long form survey in the 2000 Census. The adjustment is very limited in scope, and the data source for hospital worker commuting has never been updated.

When the IOM committee decided to model commuter-based adjustments for its recommendations to Congress and the Secretary of HHS, it turned to the American Community Survey (ACS) 5-year summary of journey-to-work data. The committee requested a special tabulation of all health care workers, cross-tabulating county of residence and county of employment. Data were requested for health care workers rather than hospital workers so that the smoothing factors would be generalizable to payment systems for physicians, nursing homes and other providers. Analysts from RTI International, as the contractor for the IOM committee, used these data to construct adjustments for counties based on the proportion of their workers who commuted across labor market borders (that is, who commuted to a market with a different wage index). In effect, counties at the edges of labor markets could be assigned an adjusted wage index value that reflected a weighted average of the index value for the area in which they were geographically located and the index values for areas to which their resident health care workers were commuting.

Commuter-based smoothing adjustments can be positive or negative. Negative adjustments tend to occur in outlying metropolitan counties located contiguous to another metropolitan area with a lower index value. The balance of commuting, however, is from lower-wage areas to higher-wage areas. This is because workers tend to seek higher wages, and also because larger hospitals are located in larger, higher-wage metropolitan areas. Smoothing is particularly beneficial to hospitals located in non-metropolitan counties that are adjacent to metropolitan areas, as these institutions find themselves competing with nearby metropolitan hospitals, for the same pool of workers. Because the balance is toward higher wage areas, a small budget neutrality factor was also incorporated into the IOM committee's models, to assure that aggregate payments would not be affected. In this way, all hospitals, even those located in counties with no aggregate

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2 http://www.iom.edu/Reports/2011/Geographic-Adjustment-in-Medicare-Payment-Phase-I-Improving-Accuracy.aspx; http://www.iom.edu/Reports/2012/Geographic-Adjustment-in-Medicare-Payment-Phase-II.aspx

balance of out-commuting to other labor markets, paid a small "tax" to fund the smoothing adjustments throughout the system.

Figure 2 below provides a graphic on the impact of commuter-based smoothing on the IOM committee's proposed hospital wage index. The results are summarized by county of hospital location, where counties have been grouped according to rural-urban continuum codes (RUCCs) as defined by the U.S. Department of Agriculture.[3] RUCCs are particularly helpful for descriptive purposes in this instance, because they identify non-metropolitan counties both by town size and by contiguity to metropolitan areas. The graph confirms that the largest adjustments were made for non-metropolitan counties located adjacent to metropolitan areas.

Similar modeling was conducted for the IOM committee's recommendations for the wage components of the physician geographic practice cost indexes. The results were similar, with smoothing adjustments ranging from reductions of up to 3 percent to increases of up to 6 percent. The committee felt that in both payment systems, use of health care commuting data makes a significant contribution to the accuracy and fairness of the payment adjusters.

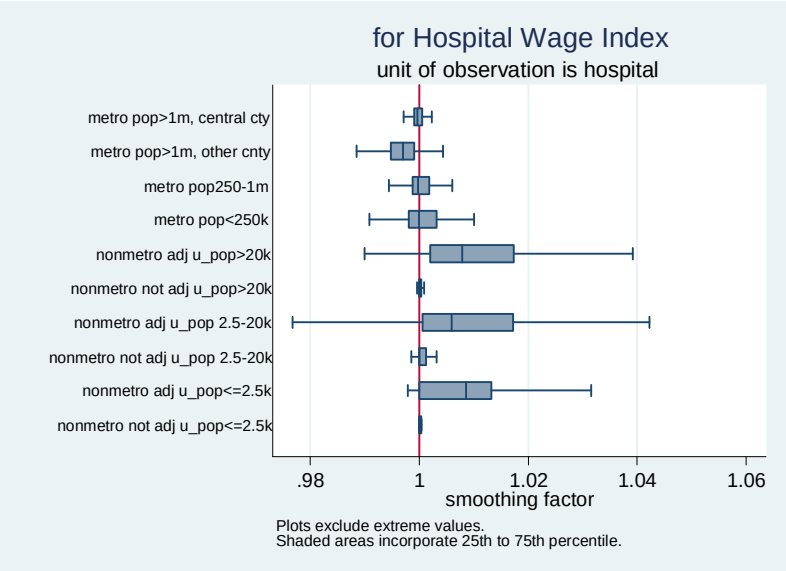

Figure 2: Summary of Health-Care Worker Smoothing Adjustments by Rural-Urban Continuum Codes

Source: http://www.iom.edu/Reports/2012/Geographic-Adjustment-in-Medicare-Payment-Phase-II

3 http://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx

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2005-2007 ACS Profiles: http://ctpp.transportation.org/profiles_2005-2007/ctpp_profiles.html
AASHTO Web site for CTPP: http://ctpp.transportation.org
1990 and 2000 CTPP data downloadable via Transtats: http://transtats.bts.gov/
TRB Subcommittee on census data: http://www.trbcensus.com

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