



# COMMUTING IN AMERICA; DEVELOPING A NATIONAL REPORT FROM NATIONAL SURVEY SOURCES

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## 1. INTRODUCTION

This paper is not a traditional research paper; it provides both an historic scan and concepts for how commuting data sets can be employed to generate important, topical, accessible information for consumption by decision makers and the public. This paper follows the history of the development of the Commuting in America (CIA) series of four reports produced in 1987, 1996, 2008 and 2014, with an emphasis on which data were used, and how. The paper presents a brief history of the US Census Bureau including changes from the long form to the American Community Survey, the introduction and history of the journey to work question, and a brief explanation of the Census Transportation Planning Product (CTPP) special tabulation; as CIA uses those and includes other US Census and non-census data sets to recognize travel trends.

### 1.1. The Commuting in America Series of Reports

CIA describes travelers and their commutes to work, using US census data supplemented with other national data sources. The most recent iteration of CIA, CIA 2013, consists of 16 briefs in topical areas of commuting, including The Role of Commuting in Overall Travel, Population and Worker Trends, Population and Worker Dynamics, The Nature and Pattern of Jobs, Job Dynamics, Vehicle and Transit Availability, Consumer Spending on Transportation, How Commuting Influences Travel, Commuting Mode Choice, Commuting Departure Time and Trip Time, Auto Commuting, Transit Commuting, Bicycling and Walking Commuting and Commuting Flow Patterns. The reports were completed in January 2014.

### 1.2. History of Commuting in America

The first CIA chiefly used data collected with the 1980 US decennial census long form. The long form was the demographic sample survey of Americans collected from 20 percent of U.S. households at the time of the decennial census. CIA also relied on long form data from 1970 and 1960. The report has been produced four times under various auspices, three times following release of decennial census data, and most recently based on the US Census' replacement of the decennial long form; the American Community Survey (ACS). The original intent of CIA, according to American Association of State Highway and Transportation Officials (AASHTO) Executive Director Francis Francois, was to serve as a "common resource of factual information upon which policymakers could draw, in shaping transportation development actions and policies." The reports intend to dispel or confirm commonly understood ideas about commuting habits and patterns of the American working population, while also quantifying trends and phenomena.

In 1987 and 1996, CIA was published by the Eno Foundation (an independent, non-profit think tank that works in federal transportation policy and transportation leadership development), with cooperation from the AASHTO. Funding and oversight came from AASHTO, The Highway Users Federation for Safety and Mobility, the Institute of Transportation Engineers, and the Urban Land Institute and several other organizations, all with the responsibility of generating transportation policy for their members and stakeholders. Francois was an enthusiastic champion of the project. 2006 saw a significant shift, when CIA III was produced as a joint project of the National Cooperative Highway Research Program (NCHRP) and the Transit Cooperative Research Program (TCRP), both programs of the Transportation Research Board (TRB) of the National Academy of Sciences. This time the oversight panel was convened by the national academies and represented more public entities and academia, and the report benefitted greatly both from the panels' technical expertise and the support of the administrators of the primary datasets being used; The Decennial long form data, the CTPP and the National Household Travel Survey (NHTS). On the AASHTO side, it was new Executive Director John Horsley who would prove to be the author's champion on this and the subsequent effort. CIA 2013 was product of the CTPP Program with technical analysis performed under an NCHRP task.

The Census Journey to Work question (JTW) introduced in 1960, and related questions introduced in subsequent censuses, are a rich source of work travel characteristics that include automobile ownership, mode choice, residence and workplace geography, socioeconomic descriptors of households and data on industry and occupation. Despite the vast coverage, the data are also of scant detail, the JTW, for example, provided (and still provides) for one trip for one job, by one mode, in one direction. To supplement the data for CIA, other sources were used; The Census' and US Department of Transportation's (USDOT) Nationwide Personal Transportation Study (NPTS) from 1969, 1977, and 1983; and the Census' American Housing Survey (AHS). Moving forward, CTPP data – which itself is a special tabulation of Census data, along with 1990 and 1995 NPTS, and The Bureau of Labor Statistics' Consumer Expenditure Survey were used.

CIA III drew upon a new NPTS – but it had by then become the National Household Travel Survey (NHTS), conducted by USDOT; the Transportation Energy Data Book, produced by Oak Ridge National Laboratories; and sources from public transit and the Federal Transit Administration (FTA).

The replacement of the Decennial long form with the continuously collected American Community Survey (ACS) meant that interpretation of national commuting trends had to change. The chief sources for data for CIA 2013 were the ACS, including the CTPP special tabulation derived from the 2006 – 2010 ACS, and the NHTS. Additional national survey sources include the all of those listed above, the administrative records-based Longitudinal Employment Household Dynamics (LEHD), and FTA's National Transit Database (NTD).

### 1.3. Why talk about commuting?

Commuting, though a small share of total trips (about 16% of trips but 19% of personal trip miles), tend to be more regular, longer, and temporally concentrated relative to other trips. Because of this, commuting patterns are critical in both determining network needs and influencing transportation policy. Commuting defines the peak hours of travel and is an indicator of economic performance for an area. Understanding commuting is a critical component of understanding total travel. Commuting travel patterns often define a large share of a household's total trip-making as other trips are frequently planned around commuting. Work trips are sensitive to and suffer the consequences of travel delay and large variations in travel time reliability.

## 2. THE US CENSUS BUREAU

The US Census Bureau (USCB) is a federal agency within the US Department of Commerce, charged with collecting population and demographic data for the nation.

Article 1, Section 2 of the United States Constitution states that "Enumeration shall be made within three Years after the first Meeting of the Congress of the United States, and within every subsequent Term of ten Years" The first US Census was collected among the 13 colonies in 1790 under the direction of US marshals. In their report, *History and Growth of the United States Census: 1790-1890*, Carroll D. Wright and William C. Hunt discuss and dispel the notion of the first undercount. Wright and Hunt relate how the marshals were empowered to deputize enumerators. They discuss the Census act of 1790 which specified very little apart from the six queries that were to be asked, and that the marshals were in charge, Wright and Hunt detail story of then Secretary of State Thomas Jefferson employing the red ink imputation method to raise the count from 3.9 million (black ink) to 4 million reported to President George Washington. Wright and Hunt point out that subsequent censuses bear out the 3.9 million number and that Washington and Jefferson's suspicions derived from "exaggerated estimates of colonial population which preceded the first systematic enumeration of the people" and the suspicion that households were under-reporting to avoid taxation, which Washington and Jefferson imagined householders perceived would be an outcome of the count.

By the late 1800s the work of the temporary Census Office was extending to nearly fill the decade between counts, and the permanent Census Office was created in 1902. In 1903, the Census Office was moved to the newly created Department of Commerce and Labor. It remained within Commerce when Commerce and Labor split into separate departments in 1913. The US Department of Commerce is where the US Census Bureau resides today. In 1954, the US Congress codified earlier census acts and all other statutes authorizing the decennial census as Title 13, of the United States Code. From the very first census act of 1790, Congress sought the collection of more information than just a headcount and until 1940 all questions were asked of every household.

Statistical sampling was introduced in the 1940 Decennial Census. In 1940, the census survey of the population consisted of 34 questions and introduced an additional 16 questions asked of just 5% of the population in order to gauge the effect of the Great Depression on the nation's housing stock, a census of occupied dwellings was coupled with the usual demographic survey, but this was collected by enumerators with some input from the public. The longer form included all questions on the short form and so (the count) was collected of all households and all residents of the nation, that is to say the census was taken, as proscribed in the constitution. In 1950, the shorter form was 20 questions, and the 5% sample had an additional 22 questions. The housing survey was again completed by enumerators. In 1960, the same year JTW was introduced, the short form was truly short. Similar to the original 1790 census it asked only 5 questions. The census that year was mailed out for the first time, but collected by enumerators from every residence. The long form was used to sample 25% of total households with a much more comprehensive survey that asked the five demographic count questions and an additional 34 questions. Census then expanded the data to represent the total population. By 2000, the sample size was 17% and the US Census Bureau was under conflicting political and budgetary pressure to both down-size and be less intrusive, and to produce more frequent and timely data.

In 2000, America saw the last data collected by the US CB Long Form. According to Census Technical Paper 67: Design and Methodology, American Community Survey “federal, state, and local government, as well as private sector demands for current, nationally consistent data led policymakers in government to consider the feasibility of collecting social and economic data continuously throughout the decade, instead of only once every 10 years. The benefits of current data, along with the anticipated benefits in cost savings, planning, improved census coverage, and more efficient operations led the Census Bureau to plan to implement continuous measurement in 2000....” The JTW question was retained and despite the sample dropping to about 6 to 8 percent of households, the fourth CIA was developed from the ACS and from CTPP data. It is interesting to note that the recommended sample size of 400,000 households per month to create a data set equivalent to the long form data was out of reach for the Census due to budget constraints. The settled upon sample of 200,000 households per month, has slowly inched up to the current sample of 295,000 households per month, which mathematically represents approximately 13%, but with non-response and other oddness, the sample seems to top out at around 8%. As an example, the ACS claims to collect 3.54 million households per year, but the ACS unweighted count of households for the 2015 data set is 2,305,707, just under 2%.

## 2.1. History of the JTW question

If this person worked last week, answer questions P28 and P29.

**P28. What city and county did he work in last week?**  
 If he worked in more than one city or county, give place where he worked most last week.

a. City or town .....

b. If city or town—Did he work inside the city limits? ..... { Yes   
 No

c. County ..... State .....

**P29. How did he get to work last week?**  
 (Check one box for principal means used last week)

Railroad .....	<input type="checkbox"/>	Taxicab .....	<input type="checkbox"/>	Walk only .....	<input type="checkbox"/>
Subway or elevated .....	<input type="checkbox"/>	Private auto or car pool .....	<input type="checkbox"/>	Worked at home .....	<input type="checkbox"/>
Bus or streetcar .....	<input type="checkbox"/>	Other means—Write in: .....			

As previously mentioned, the JTW Question first appeared on the Census Long Form in 1960. According to Census Bureau documentation, the purpose of asking the location of the place of work and the means of transportation used in getting to work was “(1) to provide statistics on the amount and character of commuting among communities, as an aid to understanding the relationships among place of residence and place of work in Metropolitan communities – relationships which are interwoven with the social and economic organization of urban communities and (2) to provide statistics on characteristics of the labor force on the same geographic basis as establishment data.” This was accomplished by asking: If this person worked last week, answer... “What City and County did he work in last week?” and “How did he get to work last week?” Offering seven modes, with private auto fifth and a write in choice. In 1970 Census stated the question was for all persons “born after April 1956, including housewives, students, or disabled persons, as well as part time or full time workers”, and the question read:

Did this person work at any time last week?

- a. If yes, how many hours did he work last week?
- b. Where did he work last week? (write in)
  1. Address
  2. Name of city, town, village, etc.
  3. Inside of the limits of this city, town, or village?
  4. County
  5. State
  6. Zip code
- c. How did he get to work last week?
  - Driver, private auto
  - Passenger, private auto
  - Bus or streetcar
  - Subway or elevated
  - Railroad
  - Taxicab

- Walked only
- Worked at home
- Other means (Write in, specify)

By the 1980 census, the gendered language was abandoned, trip length in minutes was added, the number of passengers in a private auto was added (car pool), and the modes were offered as:

- Car
- Truck
- Van
- Bus or streetcar
- Railroad
- Subway or elevated
- Taxicab
- Motorcycle
- Bicycle
- Walked only
- Worked at home
- Other (write in, specify)

1990 saw car truck or van collapsed into a single category, added departure time from home and eliminated the write in option for other mode. In 2000, the last year the long form was collected, there was no change from 1990. When the JTW questions moved over to the ACS, they were basically retained as is, as well, which bodes well for long term trend analysis.

The US Census collects the largest, most comprehensive national data set on commuting with the JTW questions now in the ACS. While the ACS is not a travel survey in the traditional sense, it is the source of data most used by transportation planners and modelers for demographic and commute travel behaviour, and it is the basis for the CIA series.

## **2.2. The Census Transportation Planning Products Program**

CTPP simultaneously and variously refers to both a transportation based special tabulation of Census data and the program that administers it. For distinction within this paper, I will refer to the special tabulation, the data, as CTPP, and the program as the Program. The current CIA is a product of the Program. When transportation planners learned of the JTW Question they were quick to realize the utility of the data. Several independent entities (states and metropolitan planning organizations (MPOs)) purchased special tabulations of the data. In 1970, there were 112 separate buyers, most of which were MPOs (federally designated planning agencies for geographical areas with a population over 50,000 residents). By 1980, there were 152 purchasers of JTW special tabulations. Ahead of the 1990 decennial census, the ad hoc nature of the program was abandoned in favor of a national unified program and the Program was born at AASHTO. For 1990, and again for

2000, a national "pooled-fund" process was developed by the states to allow all the states and MPO's access to the data. The tables requested has grown in number and scope, from 1970's 43 tables for 112 agencies at their own specified geographies at a total cost of \$600,000, to today's CTPP comprised of 344 tables at national coverage with a total five-year Program budget of \$5.2 million. The nature of the special tabulation is that it derives tables from the ACS data not released in Census Standard Tabulations; Flow data – origin destination data for that one way, one mode, work trip; workplace based tabulations at fine geographical detail; and many variables crossed with the means of transportation to work variable. The resultant data is a rich picture of commuting and demography. By comparison, standard census tables include 43 tables at workplace whereas the CTPP contains 116.

### **3. REASONS TO BASE POLICY DECISIONS ON DATA RATHER THAN POPULAR OPINION**

So what are the quantifiable commuting trends and phenomena that should influence policy? What are these “commonly understood ideas” about the commuting habits and patterns of the American working population from 1960 forward? In the early second half of the last century, commuting was stereotypically seen to be a leisurely, suburban to downtown, by car or commuter rail trip, by the male head of household. Even though leisurely, commuting was regarded as an evil, a waste of time. Stereotypes cloud nuance. While this certainly describes the commute of some workers, the chief findings in the first CIA report that from the 1960s to the 1980s the US experienced worker growth, a suburban workplace expansion, and a private vehicle boom. Workers and jobs grew faster than population. The well documented baby boom coupled with the increase in overall jobs was one source of worker expansion, but the explosion in women entering the job force played the largest part. Between 1950 and 1985 the number of women in the workforce doubled. Of 50 million new jobs created from 1950 to 1985, 30 million were filled by women and women comprised 44% of the workforce, up from 28%. Population growth in the suburbs caused jobs to also expand there and between 1960 and 1980, the suburbs saw about two thirds of all metropolitan job growth. As for the increase in auto ownership, that figured climbed from 1.03 vehicles per household in 1960 to 1.61 in 1980. This only tells a portion of the story, as household size went down as well. From 1960 to 1980 vehicles available per worker climbed from .85 to 1.34. For 1990, these trends tapered off, growth was not as robust, but there was certainly no decline. Additionally, immigration represented 40% of US population growth from 1980 to 1990, with 80% of those 8.7 million being of workforce age. Further study yielded that the increase in auto ownership was concentrated in white, suburban populations. Between 1980 and 1990 travel time for commutes remained constant, with the national average at 22.4 minutes, increasing by a mere 40 seconds per trip. The most recent CIA has few surprising findings compared to years past, commuting has gone down as a share of total trips. Workers leave later in the day than historically with 38% getting on the road between 7:00 and 8:30 am. Both travel time and work at home increased with increased income. Changes have been modest.

## 4. WHAT TO LOOK FOR IN YOUR OWN DATA

The chief consideration in trend analysis is question comparability. Unfortunately data collection tends to change tools, methods, manners over time. A question labeled “Transportation” could have a vastly different meaning from one survey to the next. The field of data transferability both across time and across geography is well studied and bears reference here, However, it is the responsibility of the analyst to ensure term and question comparability across sets. In the arena of travel surveys, if it is possible to include identical questions or referents, as from a national well vetted source, an analyst has the opportunity to relate and expand data to cover a broader sample. As to temporal analysis: changes in geography, changes in verbiage or indeed even changes in the meaning of words, can trip an analyst. Be vigilant.

### 4.1. Eurostat and the European Statistical System

A source of transport data for Europe is Eurostat. Eurostat collects data from its member states and produces European Union level tables on broad categories of transport such as modal split by three modes of all passenger travel for all purposes for the European Union and for each member state. Eurostat uses the Eurostat/ITF/UNECE Common Questionnaire on Transport Statistics to collect the data collected by the member states, and in the Statistical Processing notes it is stated that “techniques of data collection might differ from one mode of transport to another depending on the methodology applied and organisation of the work in the countries.” Furthermore, Comparability over time is restricted, as sources for a country may vary during the covered period due to survey methodology changes, and no error term is provided. A better source would be the individual member states, the countries that make up the European Statistical System. It is more likely to get better source data from the individual agencies – although most, if not all agencies are committed to privacy protection and access to microdata is protected. Additionally individual member agencies will have more data at more refined geography. For example, the Central Statistics Office of Ireland conducts an annual, voluntary national travel survey, querying trip length and time, trip purpose, and mode. The survey is in conjunction with their household survey, so demographic data is coupled. From this they produce some 22 detailed tables of travel behavior of Irish residents. Just as with CIA, the bigger an area, the less refined the data can be. There are national statistics on travel for the US, but not with related trip purpose, for that data one must look to local travel surveys.

## 5. CONCLUSION

It is clear that CIA provides a wealth of data and insight into commuting patterns in the context of an ever-changing sociodemographic landscape. CIA is deemed worth the time, expense, and effort; it is valuable because it weaves together a comprehensive story about its eponymous topic, commuting in America.

The CIA series has a home in the CTPP Program, a group has been convened to navigate the future of CIA. To that end, a survey of users was conducted to ask about the frequency, topic, level of technical detail and other aspects of CIA. It appears that CIA proves useful, one user describes it as his go to document for briefing and informing decision makers regarding the topics covered. CIA has been produced every 5 – 10 years since its inception. Now, with continuously collected national data, more products and projects that rely on these data are moving to more frequent release schedules. CIA is no exception. The vision is to continue with short, not-yet-covered topical briefs as interim products between revisiting major commuting reports.

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