

# Implications of the Census Bureau's 2000 Census Plans for the Continued Availability of Transportation Data from the Decennial Census

---

Philip N. Fulton, *Bureau of Transportation Statistics,*  
*U.S. Department of Transportation*

Data from the decennial census are the backbone of the statistical system that supports the transportation planning process of our nation. The U.S. Department of Transportation (DOT), as well as state and local transportation planning organizations, have relied on the consistent data collection provided by the decennial census since 1960, when transportation questions were first added to the census questionnaire. Today, these organizations are increasingly reliant on census data to implement the requirements of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Clean Air Act Amendments of 1990 (CAAA).

Although the next census is still more than 5 years in the future, planning for the 2000 census is well under way at the Census Bureau. The Office of Management and Budget (OMB) is already reviewing federal agency requirements for decennial census data to set priorities among competing data needs. The decisions that OMB and the Census Bureau make will determine what transportation data will be collected in the decennial census to meet the nation's data needs at the turn of the 21st century.

At this stage of the 2000 census planning cycle, the continued availability of data needed by transportation planners and policy makers and historically collected in the decennial census is by no means assured. In response to congressional criticism, the Census Bureau has taken a zero-based approach to what the 2000 census will look like. One major thrust of the bureau's approach is to consider alternative "designs" for the census (i.e., the fundamental details of how the census is conducted). A second is to question the justification for collecting any data in the decennial census beyond the minimal information required for congressional reapportionment and legislative redistricting. Both are meant to move the decennial census in the direction of achieving the Census Bureau's stated 2000 census objectives: to reduce the undercount of the population and the cost of conducting the census.

The objective of this paper is to place current and future needs for transportation data from the decennial census within the context of the Census Bureau's plans for the 2000 census as well as within the political context of the 2000 census planning process. I recount the rich history of transportation data in the decennial census and describe the critical need for and uses of the data to meet the requirements of federal legislation. I provide an overview of the political context of the 2000 census planning process and how it has influenced the Census Bureau's plans. Finally, I summarize the Census Bureau's 2000 census plans and present what in my view are the implications of those plans for the continued availability of transportation data from the decennial census.

## HISTORY OF TRANSPORTATION DATA FROM THE DECENNIAL CENSUS

### The 1960 Census: First Transportation Data from the Decennial Census

DOT and the Bureau of the Census have a long tradition of working together to meet the nation's needs for transportation data. Transportation data were first collected in the 1960 census, when questions on city and county of work, means of transportation to work, and the number of automobiles available to each household were added to the census questionnaire. The pioneering regional transportation studies undertaken in many large cities in the latter half of the 1950s and provisions of the Federal-Aid Highway Act of 1956 to provide alternative interstate service into, through, and around urban areas gave impetus to the demand for comprehensive statistics on the amount and character of commuting within metropolitan communities.

The Federal-Aid Highway Act of 1962 required that approval of any federal-aid highway project in an urbanized area of 50,000 or more population be based on a continuing, comprehensive urban transportation planning process. By 1965, all then-existing urbanized areas had an urban transportation planning process under way. This planning process created the need for more geographically detailed commuting data for urban areas to monitor local travel patterns.

### The 1970 Census: First Transportation Data from the Decennial Census for Traffic Analysis Zones

The development by the Census Bureau of computerized address coding guides made it operationally feasible for the bureau to collect the actual street address of workplaces in the 1970 census and code them to the city block level. Local transportation planning agencies, supported by state highway planning and research funds, assisted the Census Bureau at its request in the development of these coding tools.

After the 1970 census, DOT contracted with the Bureau of the Census to produce compilations of block-level socioeconomic and travel-to-work data aggregated to traffic analysis zones. The standardized tabulations contained in this "transportation planning package" were designed to provide a common data base for transportation studies and reduce processing costs. Metropolitan planning organizations submitted census block-to-traffic analysis zone equivalency files for their metropolitan areas, and the Census Bureau produced the traffic zone data packages on a cost-reimbursable basis.

In 1973, the Transportation Research Board of the National Academy of Sciences held the first national conference on Census Data and Urban Transportation Planning in Albuquerque, New Mexico. The conference was attended by DOT and Census Bureau officials, as well as professionals throughout the nation working in census and transportation planning activities. They reviewed their experiences in using the data from the 1970 census in the transportation planning process and formulated recommendations for improvements in transportation data from the 1980 census.

### The 1980 Census: First Census with a Fully Developed Journey-to-Work Statistics Program

The energy crisis of the early 1970s heightened the need for transportation statistics to assess the transportation implications of energy shortages and costs. To meet the need for data, DOT sponsored a travel-to-work supplement to the Annual Housing Survey, conducted by the Bureau of the Census for the Department of Housing and Urban Development. The travel-to-work statistics collected in the Annual Housing Survey between 1975 and 1977 became the model for the transportation items collected in the 1980 census. The increasing importance

with which the Bureau of the Census viewed transportation statistics was also demonstrated in 1978 when it established a journey-to-work statistics staff.

The 1980 census was the first for which the Census Bureau had a fully developed journey-to-work statistics program. The number of transportation questions asked in the census increased significantly in 1980. In addition to the inquiries on place of work, means of transportation to work, and the number of automobiles available to each household that had been included in the census in 1960 and 1970, the 1980 census asked new questions on carpooling arrangements, the number of persons in the carpool, travel time from home to work, the number of persons with disabilities that limited their use of or prevented them from using public transportation, and the number of trucks and vans available.

The geographic reference materials used to code responses to the place-of-work question for the 1980 census were improved, resulting in an improvement in the accuracy and completeness of the coded data. Major employer files and reference lists of buildings, colleges and universities, military installations, shopping centers, and other employment sites were developed to code workplace responses.

The development of computerized Geographic Base File/Dual Independent Map Encoding (GBF/DIME) files by the Census Bureau to code addresses for the 1980 census also contributed greatly to the improved accuracy of block-level place-of-work data. Regional transportation planning organizations in the nation's metropolitan areas assisted the Census Bureau in the development of the GBF/DIME files by creating and updating the files on the basis of local maps and expertise. DOT provided funding to support this cooperative effort.

Once again, for the 1980 census, DOT contracted with the Census Bureau to create a series of special tabulations in a transportation planning package. Metropolitan planning organizations obtained the data tabulated for their traffic analysis zones on a cost-reimbursable basis. To increase the utility of the census data for local transportation planning, the Census Bureau developed an innovative procedure to assign incomplete place-of-work responses to census blocks so that they too could be tabulated at the traffic analysis zone level.

After the 1980 census, the Transportation Research Board conducted the second National Conference on Decennial Census Data for Transportation Planning. Held in Orlando, Florida, in 1984, the conference was structured to review data user experience with the 1980 census and recommend improvements in the program for the 1990 census. Officials from DOT and the Bureau of the Census participated in the conference along with state and metropolitan transportation planners.

### **The 1990 Census: Refinement of Transportation Questions and Innovations in Place-of-Work Coding and Transportation Data Dissemination**

The 1990 census transportation statistics program marked the continued refinement of transportation data available from the census, technical improvement in the geographic coding of place-of-work responses to small areas within metropolitan regions, and the creation and dissemination of innovative transportation data products. The 1990 census again included questions on place of work, means of transportation to work, carpooling, carpool occupancy, and travel time to work. An important new question on time of departure from home to work was added to the census questionnaire to allow tabulation of commuting patterns and characteristics by peak hours of travel. The questions on the number of automobiles available to each household and the number of trucks or vans available to each household were combined into one question on the total number of vehicles (cars, trucks, and vans) available. The question on public transportation disability was replaced with a more general question that identified persons whose disabilities limited their ability to get around outside the home.

Two innovative technical advances in place-of-work coding were made for 1990. The first was the joint development of the Census/Metropolitan Planning Organization Cooperative Assistance Program by the Census Bureau and DOT. This program gave local metropolitan planning organizations the opportunity to assist the Census Bureau in improving the accuracy of place-of-work data for their region. Planning organizations took part in three activities:

providing files of employers and their locations to the Census Bureau, working with major employers to ensure that their employees reported accurate workplace addresses, and assisting the Census Bureau in coding place-of-work responses that census clerks could not code. More than 300 metropolitan planning organizations took part in these cooperative activities. The Federal Highway Administration (FHWA) made the costs incurred by the metropolitan planning organizations for this work an eligible activity for use of federal-aid highway planning funds.

The second advance in place-of-work coding was the implementation by the Census Bureau of an automated place-of-work coding system. Place-of-work addresses were keyed to create machine-readable files that were then matched to address coding and major employer files to assign geographic codes to the place-of-work responses. Cases that could not be coded on the computer were sorted and clustered and referred to clerks for research and computer-assisted coding. The automation of place-of-work coding allowed the Census Bureau to accomplish the coding operation efficiently and cost-effectively.

Significant innovations in the dissemination of the journey-to-work data also were achieved for the 1990 census. Two transportation planning packages were produced: statewide packages for each state and the District of Columbia, and urban packages for the transportation study area defined by each metropolitan planning organization. Production of the packages by the Bureau of the Census was sponsored by the state departments of transportation under a pooled funding arrangement with the American Association of State Highway and Transportation Officials. This arrangement supported the production of data for the entire country instead of only those areas that decided to purchase the data as in previous censuses. Funding to develop the 1990 Census Transportation Planning Package Program was provided by FHWA and the Federal Transit Administration.

To make the data contained on the data tapes easily accessible and widely available, the Bureau of Transportation Statistics released the 1990 Census Transportation Planning Packages on CD-ROM and provided software to display and retrieve the data. This revolutionary advance in disseminating census data in a format compatible with widely available microcomputers democratized data accessible only on mainframe computers in previous censuses.

Now, in April 1994, the Transportation Research Board is sponsoring the third National Conference on Decennial Census Data for Transportation Planning. DOT officials, Census Bureau officials, and state and local transportation planners are meeting in Irvine, California, to review their experiences with using the 1990 census data for transportation planning and to make recommendations for the 2000 census.

## USES OF DECENNIAL CENSUS DATA FOR TRANSPORTATION PLANNING

### Department of Transportation Uses

Transportation data from the decennial census are used by DOT as a comprehensive data base supporting development of new policies and programs and as benchmark data with which to evaluate the impacts and overall effectiveness of previously implemented programs.

DOT works in partnership with states and local governments to assess project and corridor-level effects of implemented plans, programs, and specific projects. In supporting ISTEA and CAAA, as well as other federal legislation such as the National Environmental Protection Act, Title VI of the Civil Rights Act of 1964, the Uniform Relocation Assistance Act, and the Highway Safety Act, decennial census data facilitate a consistent level of responsible federal oversight and review of state and local plans and programs. For example, census data are an important tool in the environmental review process required under the National Environmental Protection Act to assess the potential effects of yet-to-be implemented projects. In consideration of the CAAA, journey-to-work data from the 2000 census will provide important feedback on the overall effectiveness of today's national air quality agenda. To respond to the requirements of the Americans with Disabilities Act for transportation fully accessible to all segments of the population, data on persons with mobility limitations that are traditionally provided by

the census provide an opportunity for DOT to conduct a nationwide assessment of service needs.

### **State and Local Uses**

Decennial census data for small areas such as census tracts and traffic analysis zones are used by states and metropolitan planning organizations to meet the provisions of ISTEA, CAAA, and the Americans with Disabilities Act.

#### ***ISTEA—Comprehensive Planning***

ISTEA contains specific provisions requiring comprehensive transportation planning processes on a statewide basis as well as at the metropolitan area level. States, local governments, and regional agencies must analyze the impacts of transportation plans, policies, and programs. The procedures involved are data intensive, and small-area data from the decennial census provide much of the required information. Principal among these procedures is travel forecasting.

The function of transportation models is to replicate how people travel, to model their travel to and from different locations, by time of day, purpose, and mode. Models are used to forecast how people will travel in the future. Assumptions are made about transportation infrastructure development and changes, land use changes, parking cost and availability, and changes in individual travel behavior. By building these models, planners can evaluate alternatives. For example, will adding carpool lanes along a particular highway reduce or increase congestion in the future, and how do these results compare with building general-purpose lanes or increasing transit service? For most travel models, the forecasting horizon is 20 to 30 years. Thus, data from the 1990 census are used to test the reliability of current models to predict 1990 travel behavior, and to then forecast travel in 2000, 2010, and 2020.

The decennial census provides the baseline of household and person characteristics, origins and destinations of work trips, and travel characteristics for small areas such as traffic analysis zones used in regional and local travel demand modeling efforts. These forecasts are used by state, regional, and local agencies to develop, test, and refine methods for projecting future travel needs at the regional, subarea, and corridor levels. Using these models for travel forecasting allows analysis of alternative highway, transit, and multimodal developments with various policy scenarios.

In addition to supplying data for travel forecasting, the decennial census provides important information for transportation planners to monitor trends in travel behavior. Census data permit the tracking of travel times and peak hours of travel by mode of travel and by residence and work location. The census also provides estimates and data for trend analyses of rates of carpooling and public transit use in the journey to work.

#### ***ISTEA—Transportation Improvement Program: Project Selection***

ISTEA specifically requires that statewide and metropolitan transportation plans address broad issues such as land development and demographic growth, effects of transportation facilities on population segments, and regional mobility and congestion levels. These plans must consider the social, economic, and environmental effects, including air quality effects, of transportation plans and programs. Projects contained in transportation improvement programs must be found to conform to the emissions reduction schedules in a state implementation plan. Census data on commuter travel flows and travel behavior patterns provide important baseline values against which transportation improvement program projects can be evaluated and selected.

#### ***ISTEA—Traffic Congestion Management***

ISTEA requires states, in cooperation with metropolitan planning organizations, to develop traffic congestion management systems. Transportation control measures and travel demand management programs often use census data on the journey to work as baseline values from

which to establish goals for increasing average vehicle occupancy and for decreasing single-occupant vehicles. Census data also are used for preparing a comprehensive profile of peak-period commuter flows.

### *ISTEA—Corridor Preservation*

ISTEA provides a planning framework for early identification of transportation corridors needing some form of capacity expansion. Small-area data from the census provide a basis for defining these corridors and the number and characteristics of residents and jobs affected.

### *CAAA*

Regions cited for being in nonattainment of federal air quality standards must comply with Environmental Protection Agency and DOT requirements under CAAA. The transportation/air quality planning requirements of CAAA require state and local public agencies to prepare comprehensive vehicular travel and pollutant emissions profiles. Preparation of these profiles requires analysis of detailed household and worker characteristics, means of travel, commuting patterns, and journey-to-work trip lengths obtained from the decennial census.

CAAA also requires severely polluted areas to compute regional average rates of vehicle occupancy in the commute to work. The census provides these data in a consistent manner nationwide.

Under CAAA, preparation of the state implementation plan and the comprehensive urban transportation planning process must be coordinated. Transportation facilities and projects proposed as part of the long-range transportation plan must be evaluated for their effect on air quality. Thus, forecast travel volumes along specific routes are translated into forecast traffic speeds and emissions. The results are used in conformity analyses of the state implementation plan. Data from the decennial census are the basis of these forecasts.

### *Transit System Development and Modification*

Understanding regional travel patterns assists transit agencies in developing new services and revising existing services. These services may include vanpools and carpools in addition to fixed-rail and fixed-route bus services. Small-area census data for traffic analysis zones on journey-to-work characteristics are used for route planning, market analysis, publicity, and advertising.

The Americans with Disabilities Act requires states and local transit operators, with oversight and policy review by DOT, to provide service levels that are fully accessible to all segments of the population. Data from the census that describe the geographic distribution of persons with disabilities limiting their ability to get around outside the home are used to develop and improve transportation services for this population.

## **POLITICAL CONTEXT OF PLANNING FOR THE 2000 CENSUS**

As the preceding sections indicate, DOT as well as state and local transportation planning organizations have relied on decennial census data since 1960. The Census Bureau itself has supported and encouraged this reliance as it worked with DOT to develop the bureau's journey-to-work statistics program. Today, transportation agencies at all levels of government are even more dependent on census data to implement the mandates contained in ISTEA and CAAA. Why, with this long history of data collection and the increasing need for the data, is the continued collection of transportation data in the decennial census even questioned? The answer is that congressional action currently under way to limit the amount of information collected in the 2000 census has the potential to eliminate the transportation data that are so critical for DOT and state and local planning agencies in meeting the requirements that Congress has created in ISTEA and CAAA.

## Congressional Criticism of 1990 Census

After the 1990 census, the Census Bureau received a great deal of criticism from members of Congress who believed that the census cost too much and because of the differential undercount among certain geographic areas (usually large cities) and among minority groups. This criticism was exacerbated by the decision by then Secretary of Commerce Robert Mosbacher not to statistically adjust the 1990 census results to correct for the undercounts, even though the Census Bureau was prepared to do so and Census Bureau Director Barbara Everitt Bryant herself recommended that the 1990 counts be adjusted.

On the basis of the widely held opinion in Congress that the 1990 census was too costly and inaccurate, Representative Thomas Sawyer, Chairman of the Subcommittee on Census, Statistics, and Postal Personnel of the Committee on Post Office and Civil Service, which oversees the Census Bureau's operations, warned the bureau that any plan for the 2000 census that did not provide for a change in the way the census is conducted would not be acceptable to Congress. He also stated repeatedly, in hearings, speeches, and in the press, his belief that the large amount of data collected in the census contributed to the diminished accuracy of the population counts and that data users might have to find alternative sources for data previously collected in the census. In an open letter to the members of the Association of Public Data Users (APDU), published in the May 1993 *APDU Newsletter*, Representative Sawyer wrote, "I can assure you that efforts to keep 1990 content in the 2000 census will be greeted by skepticism, at best, and opposition, at worst, in Congress."

In response to its congressional critics, the Census Bureau has taken a zero-based approach to planning for the 2000 census. In January 1991, the Year 2000 Research and Development Staff was created within the Census Bureau, and formal 2000 census planning began.

The Year 2000 Research and Development Staff developed 14 alternative designs for conducting the 2000 census. The alternatives ranged from a "census" based on administrative records with no actual data collection, to a more traditional short-form-long-form census but with a number of innovations in data collection and processing, to a "continuous measurement" census that would include only a basic head count in 2000 and a series of surveys throughout the decade to obtain the characteristics of the population collected on the long-form questionnaire in previous censuses. The work of the staff focused on the viability of these alternative designs, to determine one or two candidate designs for testing in 1995.

## Selection of a 2000 Census Design

The Census Bureau published a notice in the March 25, 1993, *Federal Register* to announce and request comments on its proposed criteria for assessing the 14 alternative 2000 census designs and selecting two designs for testing in 1995. The notice set forth mandatory criteria that a design must meet as well as desirable (but not mandatory) criteria against which designs would be evaluated. Under the mandatory criteria, the 2000 census would provide only counts of the total population and the population 18 years and over by race and Hispanic origin to provide data for reapportionment, state redistricting, and enforcement of the Voting Rights Act.

The requirement that the decennial census continue to provide the full range of subject matter content and small-area data (such as the transportation data) that are best and uniquely supplied by a census was proposed by the Census Bureau to be a desirable but not mandatory criterion for selecting a 2000 census design. The most frequent comment that the Census Bureau received from data users in response to the *Federal Register* notice was that this criterion be mandatory. The Census Bureau, however, chose not to accept the recommendation.

On May 20, 1993, the Census Bureau issued a series of Design Alternative Recommendations describing the results of its assessment of each of the 14 alternative 2000 census designs. The bureau announced that it was rejecting all 14 designs and, instead, proposed to test a "hybrid" design in 1995 composed of the most promising features selected from among the 14 candidate designs.

### Congressional Response to 2000 Census Planning Process

Congressional reaction to the direction that the Census Bureau was taking in planning the 2000 census came through the budget process. The Census Bureau requested \$23 million for fiscal year 1994 for 2000 census planning activities. In the June 1993 markup by the Subcommittee on Commerce, Justice, State, the Judiciary, and Related Agencies of the House Committee on Appropriations, the Census Bureau request was cut to \$8 million. In its report, the subcommittee commented as follows:

1. The 1990 census was too costly and inaccurate.
2. The Census Bureau's rejection of all 14 census design alternatives that had been under study for more than a year suggested that the bureau was not serious about correcting the concerns of Congress.
3. It is not acceptable to conduct the 2000 census under a process that follows the general plan used in the 1990 decennial census.

The committee further stressed that the basic purpose of a decennial census is to enumerate the population, in accordance with the Constitution, and that other data that were collected in the 1990 census could be determined through alternative methods. Finally, the committee encouraged OMB to ensure that only data needed to satisfy statutory requirements be collected in the census at taxpayer expense.

In early August 1993 the Census Bureau issued its 1995 Census Test Design Recommendations describing the proposed goals and methods for use in the 1995 test census. The results of the 1995 test will determine how the Census Bureau will conduct the 2000 census. The Census Bureau originally planned to use the 1990 census questionnaire in 1995, since the 1995 test census was not meant to be a test of questionnaire content. In response to Congress and to guidance from OMB, however, the bureau took the position that 1995 census test would contain only questions needed to satisfy current statutory requirements. Although the transportation data collected in the decennial census are the backbone of the statistical system that supports the transportation planning process in the United States, no law requires that transportation data be collected in the decennial census. Thus, if the Census Bureau and OMB adhered to the criterion that the census should include only questions required to satisfy statutory requirements, no transportation data would be collected in the 1995 census test or the 2000 census.

### Subsequent Congressional Action

After many federal agencies, including DOT, expressed strong objections to restricting the data collected in the census, Congress eased somewhat its criterion of "statutory requirements" in subsequent guidance included in the House-Senate conference report on the Census Bureau's fiscal year 1994 budget request. The report stated that the conferees expected the Commerce Department and OMB to ensure that all concerns of the Congress, the absolute data requirements of federal departments and agencies, as well as state and local government data needs, were considered in the 2000 census planning effort.

On the basis of this new guidance, the Bureau of the Census, with approval from OMB, will include in the 1995 census test those 1990 census questions providing data mandated by law for collection in the census *and* data specifically required by federal legislation and for which the decennial census is the only or historical source. The transportation items collected in the 1990 census fall under the latter category and thus will be included in the 1995 census test. OMB also is using these broader criteria in determining the questions to be included in the 2000 census, which bodes well for the continued collection of transportation data in the census if Congress agrees with OMB's interpretation of federal data needs.



## CENSUS BUREAU'S 2000 CENSUS PLANS

The Census Bureau's designs for fundamental change are embodied in the census attributes that it will be testing in the 1995 census test and in its research on a continuous measurement system as an alternative to the traditional census. The most significant design changes and the continuous measurement system are described next.

### Design Changes To Be Tested in 1995 Census Test

#### *Use of Sampling and Statistical Estimation To Reduce the Differential Undercount and Census Costs*

The primary aspects of this design change are integrated coverage measurement and sampling for nonresponse. With the inclusion of integrated coverage measurement, the 2000 census will produce a single set of census results combining counting and estimation techniques. A statistical adjustment to correct for undercounts will be incorporated in the census before the counts are released. Using sampling for nonresponse, only a sample of nonrespondents will be followed up after the initial data collection, rather than attempting to contact all nonrespondents as in previous censuses.

#### *Increasing Census Response Options*

In addition to the mail out-mail back enumeration, the Census Bureau plans to make unaddressed questionnaires available at many locations for people who may not receive a questionnaire or believe they may not have been included on a census form. The Census Bureau also plans to collect data electronically where feasible using computer-assisted telephone interviews and other technologies to reduce the unit cost of data collection and provide alternatives to respondents.

#### *Use of Respondent-Friendly Questionnaires and Implementation Methods*

Respondent-friendly implementation has three components: the design of the questionnaire to make it easier for the respondent to understand and complete; the mail implementation, involving multiple mail contacts (a prenotice letter, a reminder card, an initial questionnaire, and a replacement questionnaire); and first-class postage instead of bulk rate mailing.

#### *Cooperative Ventures*

Opportunities for the U.S. Postal Service, local governments, and private and nonprofit organizations to play a role in the census will be expanded. This role would be primarily in the area of coverage improvement to reduce differential undercounts (such as updating the census address list) but also would include outreach and promotion.

#### *Targeted Methods To Count Historically Undercounted Populations and Geographic Areas*

The Census Bureau would develop a data base to enable it to target areas where there are major enumeration barriers and use specific methods from a "tool kit" of special methods to overcome barriers.

#### *Capture of Data for the 2000 Census Using Electronic Imaging*

The Census Bureau plans to implement a system to scan and capture an electronic image of the pages of census questionnaires to reduce clerical handling of paper documents and processing costs.

### *Collection of Sample Data Using Multiple Sample Forms*

Using a "matrix sampling" approach, the questions traditionally collected on the long-form questionnaire would be split up into multiple, medium-length forms. The samples derived from the medium-length forms would be cumulated to provide estimates for small areas. Matrix sampling could allow the Census Bureau to either expand the level of content compared with 1990 and maintain average respondent burden or maintain the content level and reduce average respondent burden.

### **Continuous Measurement**

Independent of the 1995 census test, the Census Bureau is also studying the operational feasibility and cost of implementing what it calls a continuous measurement system as an alternative to the traditional census. Under a continuous measurement system, the 2000 census would collect on a 100 percent basis only population and housing unit counts and minimal population and housing data, such as the information traditionally obtained from the short-form questionnaire. The characteristics obtained in past censuses from a sample of households using the long-form questionnaire—place of work; mode of travel to work; carpooling and vehicle occupancy; travel time; time of departure from home to work; the number of vehicles available to each household; persons with mobility-related disabilities; and the whole range of detailed social, economic, and housing data—would not be collected. Instead, the long form would be replaced with an Intercensal Long-Form Survey.

The Intercensal Long-Form Survey would comprise a monthly 400,000-household sample that would be cumulated to produce rolling averages over various periods of time. National estimates could be monthly estimates or quarterly averages. For large geographic areas, such as states and metropolitan areas or cities with more than 250,000 population, annual average estimates could be produced. For the smallest areas (the level of sample data used to produce data for census tracts or to aggregate into traffic analysis zones), the estimates would be 5-year moving averages.

For example, if the survey were to begin in 1998, small-area data for traffic analysis zones could be released in 2003 on the basis of the cumulated average of survey data collected between 1998 and 2002. Since the survey would be continuous, the Census Bureau could theoretically produce new 5-year moving averages for small areas each year if resources allow and demand warrants (e.g., 2004 based on the average of 1999 to 2003, 2005 based on the average of 2000 to 2004, and so on). However, year-to-year comparisons of data for small areas would not provide good estimates of annual change, since only one-fifth of the sample from which the moving averages are derived actually changes each year.

### **Options for 2000 Census Content**

The demand for fundamental change in the census places congressional questioning of content needs, perception of the adverse impact of the length and complexity of the census questionnaire on the undercount, and interest in reducing cost in direct conflict with the strong legislative requirements and legitimate needs for transportation data from the decennial census. The current circumstances present four options for content for the 2000 census:

- **Reduced content:** Congressional questioning of content needs, perception of the adverse impact of the length and complexity of the census questionnaire on the undercount, and interest in reducing the cost of the census offer the very real possibility that the amount of information collected in the 2000 census may be reduced significantly compared with past censuses. In the extreme, the long-form questionnaire could be eliminated.
- **Traditional long form:** This option would provide data comparable with the 1990 census and previous censuses. At this point in the planning cycle, it is unlikely that a full traditional long form will be used in 2000, given the sense of Congress.

- Multiple long forms (matrix sampling): The Census Bureau is testing the use of multiple medium-length long forms in the 1995 census test. Operational complications of administering, collecting, and processing multiple forms may preclude this option from use in the actual decennial census.

- Continuous measurement: There is a great deal of support for continuous measurement at the Census Bureau, especially because it represents radical change in an attempt to appease congressional critics and removes the collection of the sample data from the decennial enumeration. The Census Bureau has focused its research on the operational feasibility of a continuous measurement system without much concern for its ability to meet data needs. Now, part of the bureau's program is to overcome data user resistance to continuous measurement data. Nevertheless, it behooves users to decide what effect continuous measurement will have on their programs, since it is a very real possibility.

## IMPLICATIONS OF CENSUS BUREAU PLANS FOR TRANSPORTATION DATA

### General Implications for All Subject-Matter Topics

1. Nearly all of the innovations the Census Bureau is testing and planning for use in the 2000 census are focused on reducing the undercount and reducing the cost of the census rather than meeting data needs. With the exception of the indirect benefits of respondent-friendly questionnaires and the image capture system for the collection and processing of long-form data (if there is a long form), all of the bureau's plans deal with the counts rather than meeting data needs.

2. Less emphasis on counting and more emphasis on estimation could have a detrimental effect on the quality of sample data if there is a long form. If integrated coverage measurement and sampling for nonresponse are implemented, more sample data will be imputed. This may be a particular problem for place-of-work information.

3. Emphasis is being given to separating the count from the collection of data on characteristics. Despite the Census Bureau's own research evidence to the contrary, the perception on the part of Congress is that collection of characteristics is detrimental to simply counting the population. One of the main attractions of continuous measurement to the Census Bureau and Congress is that it reduces the census to little more than a head count and relegates the collection of programmatic data to monthly surveys.

4. Emphasis is being given only to the cost of the census and not to the replacement cost of the data. If transportation data are not collected in the census, DOT estimates that it would cost more than \$900 million to replace the transportation data with new, locally administered surveys.

5. All of these plans respond to congressional guidance.

### Specific Implications for Transportation Content

#### *Reduced Content*

If Congress mandates a reduction in the number of questions asked in the 2000 census, there will be intense competition among the legitimate data needs of the various federal agencies and their constituencies at the state and local levels. Reducing the content of the census also will make it unlikely that new questions to meet emerging data needs will be added to the census.

The decisions about which census questions to retain and which to drop will ultimately depend on congressional perception of the importance of the data on each topic that is covered by the census. This perception will be influenced greatly by the legislative justification for collecting the data in the census.

In its analysis of federal agency requirements for 2000 census data, OMB is classifying each topic into one of three categories: (a) decennial census data specifically mandated by legislation; (b) data specifically required by legislation for which the census is the only or historical

source; or (c) data used for program planning, implementation, or evaluation or to provide legal evidence.

Questions that collect decennial census data specifically mandated by legislation obviously stand the best chance of being included in the 2000 census, as long as Congress does not pass new legislation to remove the requirement. Other questions that collect data specifically required by legislation would have second priority, and questions that collect data to fulfill program needs would have the lowest priority.

The Census Bureau, under OMB's guidance, will include in the 1995 census test those 1990 census questions that fall in the "mandatory" and "required" categories. Questions in the "program" category will not be asked. The transportation items are included in the "required" category, so they will be included in the 1995 test questionnaire. When the time comes to determine the questions that will actually be asked in the 2000 census, it likely will come down to which agencies are successful in making their questions mandatory and convincing Congress that their items are the most critically needed. Questions that fall in the "program" category will not be included in the census, and those in the "required" category will be closely scrutinized to prove that their inclusion is warranted. If a reduced-content census becomes a reality, it will be in the transportation community's best interest for DOT to take whatever steps are necessary to make inclusion of transportation questions in the decennial census mandatory.

### *One Long-Form Questionnaire*

If the 2000 census again uses a long-form questionnaire similar to that used in 1990 and most recent censuses, the content will be determined by assessing the relative priority among many worthy competing topics and questions. Use of a conventional long form would make it somewhat easier to include new questions, so long as existing questions were dropped to keep the questionnaire burden neutral.

Under a long-form scenario, congressional perception of the relative importance of competing data items will be heavily dependent on the legislative justification of those items. Transportation will again have to make its case. Legislation to make the inclusion of transportation items in the decennial census mandatory would be very helpful in making this case.

### *Multiple Long Forms (Matrix Sampling)*

The use of multiple long forms would be a satisfactory alternative for transportation topics as long as all the transportation items plus questions that provide data needed for cross-tabulation with transportation items are included on the same questionnaires. The multiple long-form option also offers the greatest possibility for expanding the traditional decennial census questions to collect information on such topics as multimodal commuting trips and stops made by commuters on the way to and from work. As stated earlier, the likelihood that multiple long forms will actually be used in the 2000 census is slim because of the operational complexities of controlling and processing more than one sample form on a national scale.

### *Continuous Measurement*

The implications of transportation data from a continuous measurement system are much more difficult to assess than the previous content scenarios, because it is difficult to conceptualize what continuous measurement data would actually mean. The point-in-time estimates of commuting patterns between traffic analysis zones that the last three decennial censuses have provided would be replaced by data that are derived from a 5-year average of those commuting patterns. Can a data set that portrays the average zone-to-zone commuting flows for a metropolitan region over a 5-year period be used to calibrate travel forecasting models?

A continuous measurement system would give annual averages for large geographic areas of 250,000 or more. Would the availability of annual data for these areas be beneficial in monitoring macro-level travel trends and making model-based estimates for smaller geographic areas?

A continuous measurement system could theoretically produce a moving 5-year average picture of commuting between traffic analysis zones every year, once it is fully operational. Would transportation planners use data available with that frequency, or would new data every 3 or every 5 years be sufficient?

If journey-to-work data are provided by a continuous measurement system, the Census Bureau would have to implement and maintain a continuous place-of-work coding system that included commercial addresses, geocoded establishment names, buildings, colleges, hospitals, shopping centers, and other workplaces and that was continually updated with changes to be able to handle coding requirements for the continuous monthly surveys. Changes in city boundaries and traffic analysis zone geographical definitions would have to be added to the coding system on an ongoing basis to reflect geographic changes over time. Is the Census Bureau prepared to invest in this level of coding support?

To address these and other questions, the Bureau of Transportation Statistics has funded a formal study of the implications of continuous measurement for the uses of decennial census data in transportation planning. A panel of experts representing the broad range of data users within the transportation field has been selected to participate in the study. In September 1994 the panel will meet in Washington, D.C., for a 1-day workshop to gain a thorough knowledge of continuous measurement. The panel will be briefed by Census Bureau staff and statistical experts, who will discuss the methodology and the pros and cons of continuous measurement compared with a traditional census.

After the workshop, the panel members will return home to carefully study the implications of continuous measurement for the traditional uses of census data within their particular area of expertise (travel forecasting models, clean air models, transit planning, planning for large metropolitan areas, planning for small metropolitan areas, statewide planning, etc.). Each panel member will prepare a position paper giving views on the adequacy of continuous measurement to meet transportation data needs. These position papers will be the basis for the second meeting of the panel.

The panel members will return to Washington, D.C., in November 1994, for a 2-day meeting to present their views on continuous measurement and make formal recommendations with regard to its possible use as a replacement for the traditional census. The contractor conducting the study will then prepare a final report of the study that summarizes the panel's findings and recommendations. The Bureau of Transportation Statistics expects to be able to submit the report to OMB, the Department of Commerce, the Bureau of the Census, Congress, and the entire transportation community in February 1995.