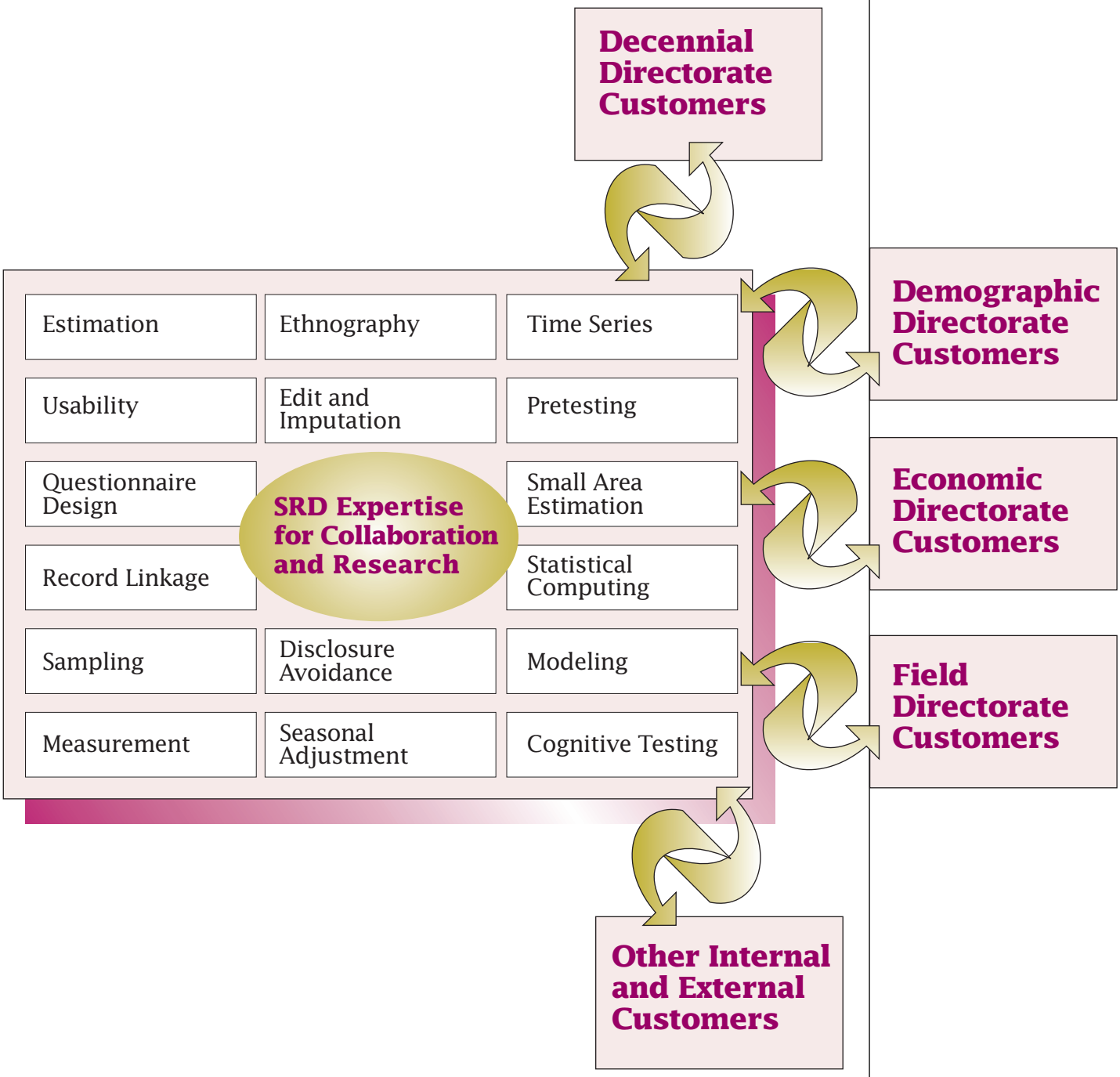
# Annual Report *of the* Statistical Research Division

## *Fiscal Year 2007*




U S C E N S U S B U R E A U

*Helping You Make Informed Decisions*

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU

***We help the Census Bureau improve its processes and products. For fiscal year 2007, this report is an accounting of our work and our results.***

***Statistical Research Division***

# Highlights of What We Did...

As a technical resource for the Census Bureau, each researcher in our division is asked to do three things: *collaboration/consulting*, *research*, and *professional activities and development*. We serve as members on teams for a variety of projects and/or subprojects.

Highlights of a selected sampling of the many activities and results in which Statistical Research Division staff members made contributions during FY 2007 follow, and more details are provided within subsequent pages of this report:

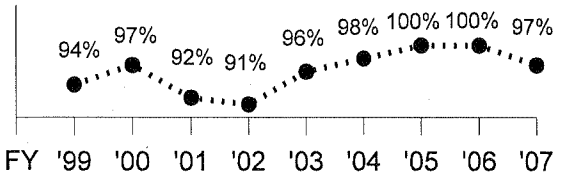
- built imputation models that can be used to generate synthetic microdata [the technique will be used for the 2006 American Community Survey (ACS) Group Quarters data]; further developed the technique of using noise addition to the underlying microdata as an alternative to cell suppression for economic microdata [Used noise balancing techniques and rounding, and this method was used to protect Non-Employer data].
- released X-12 ARIMA Version 0.3 to the public, with updated documentation and a utility which converts X-12-ARIMA's output into accessible HTML [Enhancements include facilities for including metadata into diagnostics output. Java graphics modules were also developed for incorporation into a Windows Interface to X-12-ARIMA being developed by the Economic Directorate].
- developed a nonparametric approach that results in MSEs being computed without any model fitting while also providing extensions of the X-11 filter to asymmetric filters.
- completed evaluation of variances and biases using administrative records as controls for ACS; completed initial project to improve the synthetic assumption of census coverage estimation using random effects models.
- participated in and completed several research efforts related to the re-engineered SIPP (Survey of Income and Program Participation): (1) evaluation of the Revised Recipiency History Topical Module, (2) evaluation of proposed changes to the Assets and Liabilities Topical Module, and (3) cognitive evaluation of proposed "Type-2" Questions.
- developed a small area modeling approach to estimate changes in vacancy rate and average household size from ACS.
- added new field comparison metrics to improve address matching and several variants of the string comparators in the *BigMatch* software.
- wrote new imputation software for imputing wealth data for the wave 3 SIPP (2007 wave 3).
- developed and implemented selective editing procedures for clerical review of the Census Bureau's foreign trade data.
- completed usability tests and evaluation for 10 Census Bureau projects, and completed accessibility evaluations of 10 Web sites and 6 software applications.
- facilitated the conduct of 22 pretesting activities across the decennial, demographic, and economic areas under the Generic Clearance with the Office of Management and Budget.
- completed the research on cognitive testing of translations of ACS CAPI materials in multiple languages; completed research on cognitive testing of the Decennial bilingual (English-Spanish) swimlane questionnaire; completed a bilingual (English-Spanish) behavior coding project to evaluate the 2006 Decennial Nonresponse Follow-Up instrument in both English and Spanish.

# How Did We Do...

For a ninth year, we received feedback from our sponsors. Near the end of fiscal year 2007, our efforts on fifty-nine of our program (Decennial, Demographic, Economic, External) sponsored projects/subprojects with substantial activity and progress and sponsor feedback (Appendix A) were measured by use of a Project Performance Measurement Questionnaire (Appendix B). Responses to all fifty-nine questionnaires were obtained with the following results (The graph associated with each measure shows the performance measure over the last nine fiscal years):

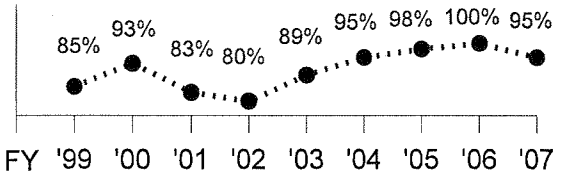
*Measure 1. Overall, Work Met Expectations*

Percent of FY2007 Program Sponsored Projects/Subprojects where sponsors reported that overall work met their expectations (agree or strongly agree) (57 out of 59) .. 97%



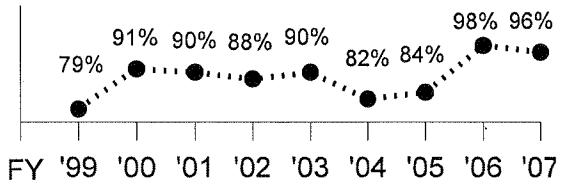

*Measure 2. Established Major Deadlines Met*

Percent of FY2007 Program Sponsored Projects/Subprojects where sponsors reported that all established major deadlines were met (42 out of 44 responses) ..... 95%



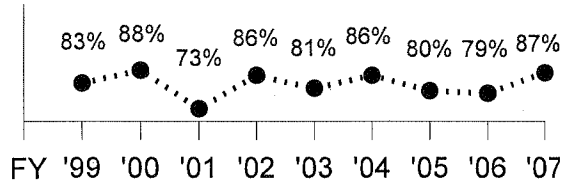

*Measure 3a. At Least One Improved Method, Technique Developed, Solution, or New Insight*

Percent of FY2007 Program Sponsored Projects/Subprojects reporting at least one improved method, technique developed, solution, or new insight (55 out of 57 responses) .... 96%




*Measure 3b. Plans for Implementation*

Of these FY2007 Program Sponsored Projects/Subprojects reporting at least one improved method, technique developed, solution, or new insight, the percent with plans for implementation (48 out of 55 responses) ..... 87%



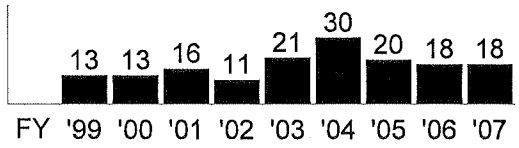

*Measure 4. Predict Cost Efficiencies*

Number of FY2007 Program Sponsored Projects/Subprojects reporting at least one "predicted cost efficiency" ..... 23


From Section 3 of this ANNUAL REPORT, we also have:

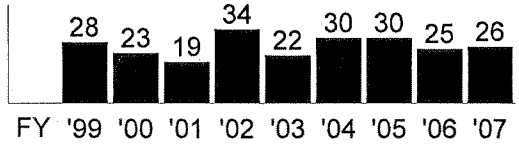
*Measure 5. Journal Articles, Publications*

Number of peer reviewed journal publications documenting research that appeared (8) or were accepted (10) in FY2007 ..... 18



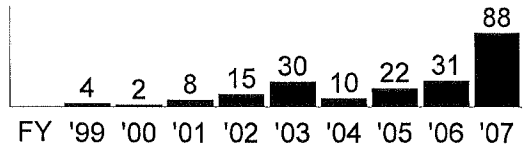

*Measure 6. Proceedings, Publications*

Number of proceedings publications documenting research that appeared in FY2007 ..... 26




*Measure 7. Division Research Reports/Studies, Publications*

Number of division research reports/studies publications documenting research that appeared in FY2007 ..... 88




Each completed questionnaire and associated details are share with appropriate staff to help improve our future efforts.

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# 1. COLLABORATION

### 1.1 – 1.2 DECENNIAL TOPICS (Decennial Projects 5210701 and 5210702)

**A. Census Questionnaire Design Features**

The project represents ongoing research using the behavior coding method to analyze interviewer/respondent interactions to evaluate the decennial Nonresponse Follow-up (NRFU) questions in the 2006 Census Test (the 2004 NRFU was also evaluated using this method). The redesign of the 2006 instrument was informed by the 2004 NRFU behavior coding results, and included a shift to topic-based data collection, instead of the person-based method used in 2004 which encouraged inappropriate interviewer behavior (e.g., omitting questions). The behavior coding of the 2006 instrument will evaluate the effectiveness of the topic-based approach, as well as continue to evaluate the questions being used to collect data from mail nonrespondents. The 2006 NRFU behavior coding data will be collected from the Austin, Texas test site and both the English and Spanish language instruments will be evaluated.

During FY 2007, the report on the results of the 2006 NRFU Behavior Coding Evaluation was finalized and distributed. Results from this study revealed that enumerators' behavior was far from perfect. High rates of poor interviewer behavior may have changed the meaning for all but two questions (one on "relationship" and one on "age"). Across all questions, "ideal" interviewer behavior (i.e., asking the question as worded or with minor changes that would not affect meaning) occurred less than half of the time (40%). Interviewers found it particularly difficult to ask the questions on residence rules and coverage as well as the question on ownership as-worded. These results and the corresponding recommendations coincide with those from previous cognitive testing of these questions.

Evaluation of the Spanish-language version of the NRFU questions revealed overall poorer interviewer and respondent behavior compared to results from the English-language version. A closer inspection revealed the 2006 NRFU instrument contained numerous typographical and a few translation errors.

At first glance, the results suggest the topic-based question administration approach did not result in more frequent reading of questions as-worded than did the person-based approach used in the NRFU 2004 instrument. Further analysis showed that this nature of the topic-based design may have affected this outcome. Interviewers were instructed to reread the question for each person in the household, one after another. However, if the instrument had allowed interviewers to use more conversational phrasing for asking the same question of subsequent household members (for example, "and Person 2/John?"), the topic-based approach would, in fact, increase the frequency with which interviewers read questions as intended.

The sponsor implemented several changes to the 2008 NRFU instrument that are supported by the findings we documented, some of which include: 1) conversational question wording was instituted in topic-based questions; 2) in the telephone questionnaire, the biological/adopted/step construct in the relationship question was removed from the main question and changed to a follow-up question; and 3) a revised series of shorter questions are asked to convey residence and coverage rules. These changes will be evaluated in the 2008 Dress Rehearsal for use in the 2010 Census.

*Staff:* Jennifer Hunter Childs (x34927), Ashley Landreth, Patti Goerman, Dawn Norris, Aref Dajani

**B. Short Form Questionnaire Content Other Than Race and Ethnicity**

This project involves participation in the 2010 Census Content Planning Group and content-related subgroups other than those focusing on race and ethnicity. It also involves consultation and testing on questionnaire content for the 2010 Census and tests leading up to it.

During FY 2007, staff served as members and advisors on the Content Integrated Product Team (IPT), advisors on the Housing Unit Operational Integration Team, and observers on the Forms Design IPT. We also chaired and participated on the Mode Consistency Subteam.

We advised on the implementation of the Hispanic origin item in the Nonresponse Follow-Up (NRFU) instrument, conducted a focus group of Field Representatives to discuss a revised instruction for the item, and conducted cognitive/usability testing of the revised instruction. The results showed that all of the respondents understood the original instruction presented to them: *Do not encourage more than one response but accept more than one response if offered.* They knew that more than one response could be recorded, but that the instruction was telling them not to probe if only one response was offered. A very similar version of the instruction was recommended and accepted by the sponsor.

Staff assisted in finalizing the *Mode Consistency Guidelines Document*, led a training session of Census Bureau staff focused on implementing the mode consistency guidelines.

We advised the Decennial Management Division and the Population Division (POP) on wording and layout for the Enumeration of Transient Locations (ETL) questionnaire. We assisted POP in finalizing the 2008 NRFU specification, and finalized the new flashcard for the 2008 NRFU. We assisted in developing plans to assess the 2008 NRFU questionnaire. We also worked with POP and the Decennial Management Division on the wording and layout of the "Be Counted" form. We also reviewed the 2008 Spanish NRFU questionnaire and provided comments.

*Staff:* Terry DeMaio (x34894), Jenny Hunter Childs, Eleanor Gerber, Patti Goerman, Ashley Landreth, Beth Nichols, Dawn Norris

**C. Development of Race and Ethnicity Questions**

Staff will participate in planning and pretesting alternative versions of the race and ethnicity questions used in the Decennial Census. We will develop proposals for cognitive testing of new question formats in conjunction with decennial staff, and lead or engage in cognitive research as needed.

During FY 2007, staff consulted on the presentation of race and ethnicity questions in the decennial short form, the Nonresponse Follow-up (NRFU) instrument, the American Community Survey (ACS) and the Enumeration of Transitory Locations (ETL.) We developed presentations that would ensure mode consistency in self-administered, enumerator administered paper and CATI/CAPI operations. We also developed and tested an instruction to enumerators for the Hispanic origin question for both NRFU and ACS. The aim of this instruction was to inform interviewers that they may accept more than one Hispanic origin if offered, but should not probe for more than one. The recommendation we made was accepted. We also consulted on the choice of question version for use in the 2010 Census, and provided an account of prior cognitive results on these questions to inform this choice.

*Staff:* Eleanor Gerber (x34890), Jenny Hunter Childs

## 1.3 LANGUAGE PLANNING AND DEVELOPMENT (Decennial Project 5210703)

Staff members participate in the inter-divisional Decennial Task Force, or language team, which focuses on developing and planning the Language Program for the 2010 Census, pre-census tests, and the Dress Rehearsal. In addition, staff members in our division provide consultation and technical support in the design, development and conduct of research for Decennial language-related projects.

During FY 2007, our staff served as Technical Managers and research collaborators on Round two of the cognitive testing of the bilingual (Spanish/English) questionnaire for use in the 2008 Dress Rehearsal and in 2010. Staff served as a liaison between the Decennial Management Division (DMD) and the contractor (RTI) on the project. Our staff also served as lead analysts and co-authored cognitive interview protocols in English and Spanish, and conducted a training of RTI staff members in preparation for Round two interviews. We traveled to Los Angeles to conduct cognitive interviews, created a coding system to analyze results and trained RTI interviewers on how to use it. In addition, we drafted our recommendations and scheduled and ran a results presentation. We participated in meetings with DMD to assist in the decision-making process as to which recommendations would be accepted and how they would be implemented. Finally, we co-authored the final project report along with RTI.

Our staff participated in the review process related to Spanish and Chinese language questionnaires and other materials. We reviewed documents at various stages in the process, including table reviews, and provided comments. Staff also provided assistance with revisions to the Chinese form.

We created a template for use in the creation of the Language Assistance Guides for 2010.

Also during this fiscal year, our staff began work on a project to pretest the Coverage Measurement Personal Interview Spanish CAPI instrument. This project is sponsored by DMD. We conducted a thorough editorial and language review of both English and Spanish instrument specifications, identifying typographical errors and discrepancies between both versions. We created and translated an interview protocol, and conducted cognitive interviews in the Washington DC area and in Texas. We summarized cognitive interviews, wrote up and presented preliminary recommendations to the project sponsor, assisted in the decision-making process as to which recommendations to implement, and began work on writing the final project report.

*Staff:* Patricia Goerman (x31819), Yuling Pan, Manuel de la Puente, Diana Simmons, Jennifer Hunter Childs

## 1.4 DATA COLLECTION PLANNING AND DEVELOPMENT (Decennial Project 5310701)

### A. Making Large Databases Accessible

This project will investigate the accessibility of tables with varying levels of column headers and row stubs which are generated from querying large databases such as the Longitudinal Employer-Household Dynamics Quarterly Workforce Indicators and the American FactFinder. This project is a collaborative effort with Westat.

During FY 2007 and based on the peer review, the analysis about relating task difficulty and time on task was removed because the test participants were not drawn from a random sample. Changes recommended by the reviewers were made, including revising some of the figures so that the y-axis scales were identical for easier comparison by the reader. The report was submitted to the *SRD Study Series*.

*Staff:* Larry Malakhoff (x33688), Sid Schneider (Westat)

### B. Usability Input to Coverage Follow-up (CFU) User-interface Requirements

Our division's role was to provide usability review of user-interface requirements for an Internet-based CFU instrument to be administered online by telephone interviewers. The CFU user-interface team developed the requirements in cooperation with the contractors, Z-Tech Corporation and Gunnison Consulting Group. When these requirements were delivered to the Decennial Response Integration System (DRIS) contractor, our division's role was to respond to any usability questions raised by the contractor and to conduct usability testing on interim development products.

During FY 2007 and working with the DRIS telephony team, we planned and conducted two rounds of usability testing: 1) a user review of partially functional prototypes at the Hagerstown Telephone Center, and 2) a scenario-based usability test of a functional user interface at the contractor's system integration facility in Greenbelt, Maryland. The user review in Hagerstown identified aspects of design elements that could cause problems for interviewers if not corrected in the operational version of the application, e.g.: All participants had problems with the process of deleting duplicates from the roster; about one third of participants found it difficult to locate a name near the end of a long, scrolling roster, and all participants said they preferred keyboard navigation to point-and-click navigation. Complete findings, recommendations, and changes proposed by the team were documented in the final report, which appears in the *SRD Research Report Series (SM #2007-12)*. Results and recommendations from the second, higher fidelity usability test were documented in memoranda to the CFU usability team. Participants' mean success rates were high (in the range of 71 to 94 percent) across the tasks in four scenarios, but the testing identified several remaining usability issues. A final report including the contents of these memoranda as well as participant performance data is under review. The design team accepted several recommendations and chose to observe interviewer performance during the 2008 CFU operation before making decisions on other usability recommendations.

*Staff:* Betty Murphy (x34858), Jenna Beck, Erica Olmsted-Hawala, Ben Smith, Alex Trofimovsky, Joyce Farmer, Lorraine Randall

### C. Usability Input to the Field Data Collection Automation (FDCA) Program

Our division's role was to provide usability review of FDCA contractor documents and other products, such as screen flows and drafts of the user-interface design style guide.

During FY 2007, our staff provided numerous comments on the contractor's draft versions of the Field Data Collection Automation (FDCA) Mobile Computing Environment (MCE) user-interface style guide and the FDCA Office Computing Environment (OCE) user-interface style guide. These comments were documented in several memoranda, in which we addressed such topics as screen behavior; images, media, and animation; font style and many other issues in the design of visual displays and controls presented at the user interface. We pointed out many instances in which the draft guidelines were in conflict with each other and noted where they were in conflict with accepted usability practice. We reviewed and commented on numerous sets of screen flows developed by the FDCA contractor for enumerators, crew leaders, and field staff managers. Again, we pointed out conflicts with best usability practices. We observed low-fidelity usability testing at the contractor's facility in Largo, MD, and provided a written critique of the contractor's methods and recommendations. In the fall of 2007, we attended a series of design review meetings and provided comments and suggestions to improve the usability of the MCE and OCE design solutions.

*Staff:* Betty Murphy (x34858), Michelle Rusch, Jennifer Hunter Childs, Erica Olmsted-Hawala

## 1.5 SPECIAL PLACE/GROUP QUARTERS (GQ) PLANNING AND DEVELOPMENT (Decennial Project 5310708)

### Group Quarters Operational Integration Team (OIT) for 2008 Dress Rehearsal

The new Group Quarters Operational Integration Team develops detailed plans, procedures, schedules, and operational assessments for group quarters enumeration in the 2008 Dress Rehearsal.

During FY 2007, we attended OIT meetings and reviewed and commented project documents for the 2008 Dress Rehearsal and the 2010 Census. We provided detailed comments to the GQE OIT on the 2008 Dress Rehearsal and 2010 Census Management Plan; GQE and Group Quarters Advance Visit (GQAV) Operations and Systems Plan (OSP); Risk and Mitigation Documents; GQE assessment schedules; and the Decennial Requirements Document (DRD) and Operational Requirements Document (ORD). Detailed comments were also submitted to Field Division (FLD) regarding training materials, including the GQE Enumerator Manual, the GQAV Crew Leader Manual, GQAV Presentations, Advance Visit Interview Records (AVIRs), and Mobile Food Van (MFV) Continuation Pages.

Our suggestion to use the JIC (Just in Case) box on the Individual Census Report (ICR) to record whether the GQ resident participated in filling out the ICR was approved by the group and adopted for use in the 2008 Dress rehearsal. A staff member worked with OIT members from FLD and the Decennial Management Division to develop access letters to present to health care facilities, student housing locations, and other GQs in the 2008 Dress Rehearsal and 2010 Census. A staff member served as a critical reviewer for the Service Based Enumeration (SBE) assessment in the 2008 Dress Rehearsal; and on subgroups on Mobile Food Vans and Targeted Non-Shelter Outdoor Locations (TNSOLs) in the SBE and on the 2010 military and maritime shipboard enumeration. We sent the draft report, "Results of Cognitive Testing of the Individual Census Report (ICR)," for sponsor review. Results from cognitive research conducted in FY2006 on the OLQVQ, "Results of Cognitive Testing of the Other Living Quarters Validation Questionnaire." were published in the *SRD Research Report Series (SM #2007-35)*.

*Staff:* George Carter III (x31774), Laurie Schwede

## 1.6 STATISTICAL DESIGN AND ESTIMATION (Decennial Project 5610702)

## 1.7 IT STATISTICAL DESIGN AND ESTIMATION (Decennial Project 5611702)

**A. Decennial Editing and Imputation** [See Projects 0351 and 1871 (B), General Research - Statistical Methodology]

**B. Decennial Record Linkage** [See Projects 0351 and 1871 (A), General Research - Statistical Computing Methodology]

**C. Research on Item and Count Imputation for Implementation in Census 2010**

Research and studies will be undertaken on item and count imputation for implementation in Census 2010.

During FY 2007, staff completed the CANCEIS (Canadian Census Imputation Software) experiments of edit and imputation with the 2006 Census Test data and name files. The objective of this experiment is to test and validate the Nearest-neighbor Imputation Methodology (NIM) in CANCEIS for possible future implementations in Census Bureau edit/imputation applications. The focus is on the decision logic table (DLT) technology. We showed that it is feasible to translate the Census Bureau's edit/imputation specifications into DLTs that can be used directly as part of the inputs to CANCEIS. The DLTs enable the analysts to specify and manipulate sets of edits without having to modify the code of the edit/imputation program. This allows a faster turnaround when edits need to be modified and eliminates the risk of a programming error. By themselves, DLTs are an unambiguous and comprehensive form of documentation of the edit process. They fulfill the dual role of stating and documenting both the requirements and specifications of any edit process.

Staff wrote C++ programs to format the input data files for the derive engine and imputation engine of the CANCEIS program and other C++ programs to perform data analysis of the imputed 2006 data. The experiment includes the variables of QREL (relationship), QSEX (sex), QAGE (age), QRACEX (race), and QSPANX (Hispanic origin) of the household items; and tenure and vacancy status of the housing units. These variables were specified in the DLTs.

Staff also wrote a long version ["CANCEIS Experiments at U.S. Census Bureau with 2006 Test Data (CANCEIS 4.5.4)"] and a short version ["CANCEIS Experiments with 2006 Test Data"] of the documentation describing the detailed implementation of the experiments. The results indicate that the

implementation of CANCEIS at U.S. Census Bureau is feasible. Several advantages were listed in the reports. The major advantage is that CANCEIS enables the analysts to specify and manipulate sets of edits without having to modify the code of edit/imputation program. Staff also recommends that a complete set of thoroughly reviewed decision logic tables be available for the 2008 census dress rehearsal and the 2010 Decennial Census for more research results.

*Staff*: Bor-Chung Chen (X34857), Yves Thibaudeau

**D. Decennial Disclosure Avoidance**

The purpose of this research is to develop disclosure avoidance methods to be used for Census Bureau publicly available decennial census and American Community Survey (ACS) data products. Emphasis will be placed on techniques to implement disclosure avoidance at the stage of processing. Disclosure research will be conducted on alternative methods to protect both tabular data and microdata from the decennial census and the ACS. Methods will be developed, tested, evaluated, and documented. We will also aid in the implementation of the methods.

During FY 2007, staff generated a revised version of the data swapping program used for ACS household data. The new program is simpler and streamlined, while providing more flexibility and control in the swapping procedure. The new ACS Housing Unit swap program has been delivered to ACS staff including thorough documentation and commenting. A module to automatically incorporate the use of historical data in the records selection process has been added and tested. A specification document that describes the swap procedure, input and output file formats, input parameters specifications, and program module descriptions was completed and delivered along with the program. The results of testing the new program were presented to ACS staff in order to illustrate the benefits of implementing soon, including the ability to add collection MODE to the swap key and still slightly improving the method. The added benefits of using multiple years of data for selection will not be clear until several years worth of data is available for testing.

Our staff has begun to study the effects of the revised data swapping program for ACS household data. The revision uses historical data to improve record selection. Comparisons were made with and without historical data. With better targeting, fewer records are selected. With the significant change in the number of selected cases, selection criteria should be re-examined.

The ACS test 5 year data product was introduced. There are extensive profiles and geography low enough to have single sample cases on occasion. Staff participated in the search for an adequate geographic suppression. Everyone involved agreed that this warranted a special swap run for the full product (suppression would be unmanageable). This can't be covered in the regular swapping program, since the condition of being a solo sample case in the five-year accumulation is hard to predict.

Staff started research on the application of the partially synthetic data method to data on the specific population of veterans collected by ACS. The new procedure will build on what we accomplished for the ACS group quarters data to attain a balance between protection of confidentiality and data utility. An initial synthetic data set was produced and results appear promising, however more work is needed before the method is ready for implementation. Staff wrote the software to apply the partially synthetic data method to data on veterans collected by ACS. The data product is a set of partially synthetic microdata files where data originated from the balance of ACS data after the public use microdata sample (PUMS) was drawn, so there is no overlap with the PUMS. Staff plans to demonstrate that there are no disclosure risks associated with the partially synthetic veterans microdata files.

*Staff:* Laura Zayatz (x34955), Paul Massell, Phil Steel, Sam Hawala, Jeremy Funk, Rolando Rodríguez

**E. Census Unduplication Research**

The goal of this project is to conduct research to guide the development and assessment of methods for conducting nationwide matching and unduplication in the 2010 Decennial Census. One of the major problems is how to incorporate the effects of name frequency into the unduplication procedures. Our staff also provides assistance in specifying and reviewing output from the matching and unduplication procedures for test Censuses and eventually for Census 2010. We began this project in May of 2004.

During FY 2007, staff ran the matching and modeling procedures on the data from the 2000 Census. An exploratory analysis of the matching of individuals across Census addresses suggested that the most serious problems with apparent false matches were concentrated in the most common surnames and the most common Hispanic surnames. The results are presented in the draft *SRD Research Report* "Initial Results from a Nationwide *BigMatch* Matching of 2000 Census Data" by Michael Ikeda and Edward Porter. Staff proceeded with an exploratory analysis of two further stages of the matching process: within-response modeling (which evaluates housing unit pairs with multiple links), and the remaining residual person links. The results confirm the finding that problems with apparent false matches are concentrated in the most common surnames and the most common Hispanic surnames. However, name frequency does not appear to have much effect when

there are multiple links of reasonable quality between housing units or when the phone number matches. These results are presented in the draft *SRD Research Report* "Additional Results from a Nationwide Matching of 2000 Census Data" by Michael Ikeda and Edward Porter. Based on the results in the draft reports and additional information, staff developed additional rules for the handling of residual links and for handling links between group quarters persons and housing unit persons. The rules classify surnames into surname categories and place more restrictive conditions on links in categories expected to have more serious problems with false matches. The proposed rules have been incorporated into the Dress Rehearsal procedures for Coverage Followup (CFU) and Census Coverage Measurement (CCM) match modeling. Staff also reviewed the main specifications for the Dress Rehearsal CFU Duplicate Person Identification (DPI) system and CCM computer person matching system. Most of the main specifications for these systems have been released as signed memoranda. Michael Ikeda and Edward Porter are coauthors (primary author Maureen Lynch, DSSD) of the specification "2008 Dress Rehearsal Coverage Followup and Census Coverage Measurement Match Modeling Software Requirements Specification." Staff had earlier participated in the headquarters review of the output from the 2006 CCM computer person matching system. Staff also provided assistance in the evaluation of the 2006 CFU results by linking files of DPI modeling output, links sent to CFU, and field results from CFU and providing the linked files and some associated crosstabulations to the Decennial Statistical Studies Division.

*Staff*: Michael Ikeda (x31756), Ned Porter

## 1.8 COVERAGE MEASUREMENT PLANNING AND DEVELOPMENT (Decennial Projects 5610703)

### A. Coverage Measurement Research

Conduct research on model-based small area estimation of census coverage. Consult and collaborate on modeling coverage measurement.

During FY 2007, staff completed a project on using random effects models at the Local Census Office level to evaluate synthetic error of census coverage. Results were presented to the National Academies of Science Panel on Coverage Measurement Estimation on March 8. Work continues on incorporating the sample design into small domain variability (for more accurate modelling). Work has begun on an alternative method of small area coverage evaluation using marginal models. Our staff continues attending the weekly meetings of the Coverage Estimation Research Group and working and meeting weekly with staff from the Decennial Statistical Studies Division on issues of fixed-effect logistic models of census coverage.

*Staff:* Don Malec (x31718), Jerry Maples

### B. Accuracy of Coverage Measurement

2010 Census Coverage Measurement Research conducts the research necessary to develop methodology for evaluating the coverage of the 2010 Census. This includes planning, designing, and conducting the research, as well as analyzing and synthesizing the results to evaluate their accuracy and quality. The focus is on the design of the census coverage measurement survey and estimation of components of coverage error with secondary emphasis on the estimation of net coverage error. The estimation of overcount and undercount separately has not been done for previous censuses because of the difficulty of obtaining adequate data for unbiased estimates. The first attempt to implement the new methodology is in the 2006 Census Test.

During FY 2007, our staff provided technical expertise and experience in the planning and implementation of coverage measurement research for the 2010 Census. We served on three teams formed to plan and implement census coverage measurement research for the 2010 Census in the 2006 Census Test, the 2008 Dress Rehearsal, and with data from Accuracy and Coverage Evaluation Revision II and Census 2000. We reviewed 2006 Census Test evaluation reports and the Interim Report of the Nanational Academy of Sciences Panel on Census Coverage Measurement. We also served on an Executive Steering Committee Subgroup formed to identify high-level research topics and questions for the 2010 Census Program for Evaluations and Experiments. We prepared a summary of research and evaluation topics for Census Coverage Measurement appropriate to conduct during the 2010 Census. The paper, which presented a statement of the problem along with summaries and priorities for suggested research, was given to the National Academy of Sciences 2010 Census Program for Evaluation and Experiments. Our staff also prepared slides and gave a presentation. Also, our staff served on the Integrated Communications Program Research Group formed to provide research products and oversight to inform the 2010 Integrated Communication Program.

*Staff:* Mary Mulry (x31759)

### C. Questionnaire Wording and Automation Team

The purpose of this project is to design the coverage measurement survey instruments for the 2010 Census. These instruments will gather enough data to

measure both person and household coverage of the 2010 Census. In preparation for 2010, there will be a 2006 Test of the coverage measurement operation in specific sites in conjunction with the 2006 Census Test. For 2006, there will be an automated person interview (PI) collecting an independent roster of people living at pre-selected sample addresses in the sites and their residency. There will also be a paper-based person follow-up questionnaire which collects additional residency information about some people collected in the census or the independent roster, but for whom we did not collect enough residency information to determine where they should have been counted for the census. Both these instruments will be used to measure person coverage. Our immediate goals are to create and test these two instruments given requirements from other teams working on coverage measurement planning. This team is further tasked with developing the independent housing unit listing booklet, and housing unit follow-up forms in order to measure housing unit coverage in 2008/2010.

During FY 2007, we conducted several related studies to test and refine the PI. First we carried out structured observations of the interviews as they were being administered, and in some cases we conducted respondent debriefings following the interview to help clarify place of residence. We documented the methods and findings in *DSSD 2010 Census Coverage Measurement Memorandum Series #2006-D7-11: 2006 Census Coverage Measurement Person Interview: Trip Reports: July 7-14, 2006.* We tape recorded these interviews and behavior coded them, documenting the results in *DSSD 2010 Census Coverage Measurement Memorandum Series #2006-D7-12: Behavior Coding of the 2006 Census Coverage Measurement Person Interview Instrument.* We also compared data from doorstep debriefings to data collected in the PI questionnaire, and we completed an evaluation of the PI documented in *DSSD 2010 Census Coverage Measurement Memorandum Series #2006-B-05: Census Day Residence Evaluation.* Finally, we conducted cognitive testing of the Spanish PI instrument and provided recommendations that were incorporated to the 2008 PI specification. Findings from all these studies were used to refine and finalize the instrument for the 2008 Dress Rehearsal.

For the PFU instrument, we carried out observations and respondent debriefings, in a similar vein as what was done for the PI. We analyzed completed forms and compared to debriefings to see if there were errors in where persons lived, and we reviewed and analyzed completed forms and compared to tape recordings of debriefings to see if there were errors in the completion of the forms.

With regard to coverage of housing units, we contributed to two efforts: the ILB, which is used to compile a list of all housing units in the country, and the HUFU forms, which are used to reconcile discrepancies between Census Coverage Measurement and Census lists of housing units. We evaluated and modified both the ILB and HUFU forms, and provided comments on the ILB training materials. For the HUFU forms we also conducted a usability expert review. And for both operations we prepared an evaluation plan involving structured observations and analysis of new fields on the forms.

*Staff:* Joanne Pascale (x34920), Beth Nichols, Jenny Hunter Childs, Laurie Schwede, Dawn Norris, Patti Goerman, Diana Simmons, Manuel de la Puente

## 1.9 COVERAGE IMPROVEMENT PLANNING AND DEVELOPMENT (Decennial Projects 5610705)

### A. Decennial Privacy Research

The purpose of this project is to serve on and assist the work of the Privacy Policy and Research Committee (PPRC), and to conduct research to assess public opinion on privacy-related issues, including the increased use of administrative records to assist Decennial Census enumeration.

In addition to serving on and assisting the work of the Privacy Policy and Research Committee, in FY 2007 our staff participated in three major research efforts related to privacy issues.

(1) RIP Research. We carried out a research project investigating responses to the new Respondent Identification Policy (RIP) procedures incorporated into the 2004 SIPP panel questionnaire, and their impact on the conduct of the survey and subsequent survey cooperation. In essence, RIP requires obtaining consent from a respondent before revealing any of his/her answers to another household member. In SIPP, the most important implications of RIP have to do with the use of dependent interviewing procedures ("Last time I recorded that you worked for XYZ Company. Do you still have that job?"), which have been demonstrated in other research to have major impacts on data quality in a longitudinal survey such as SIPP. Results of the research are reported in two papers: (1) Chan, A. and Moore, J. (2006), *Proceedings of the Annual Meetings of the American Association for Public Opinion Research*; and (2) Chan, A. and Moore, J. (2007), *SRD Research Report Series (Survey Methodology #2007-21).*

Major results/findings of this research include the following: (a) The vast majority of respondents agree to the RIP within-household data-sharing request. (b) In most cases, declining RIP does not negate the use of

dependent interviewing procedures, because the respondent who said "no" often serves as the respondent again in the subsequent interview. (c) We find significant associations between response to the RIP question and various demographic characteristics (most notably, the presence of unrelated household members), other indicators of confidentiality concern, and noninterview status in the subsequent survey wave.

(2) Cognitive Evaluation of 2010 Census Privacy/Confidentiality Messages. At the request of the Decennial Management Division, our staff led an interdivisional team (the Confidentiality/Privacy Decennial Messages Group) in the development and evaluation of new privacy- and confidentiality-related language intended for use in decennial census mailing package materials. Descriptions of the methods and findings of this research are reported in two papers: (1) Landreth, A., Gerber, E., and DeMaio, T. (2007), "Understanding Confidentiality- and Privacy-related Statements in Respondent Materials for the 2010 Decennial: Results from Cognitive Interview Pretesting with Volunteer Respondents," final report, September 4, 2007; and (2) Gerber, E. and Landreth, A. (2007), *SRD Research Report Series (Survey Methodology #2007-37).*

Major results/findings of this research include the following: (a) Respondents prefer survey letters with more (rather than less) detailed explanations of administrative records use located on the back of the letter. (b) A statement on the front of the letter directing the reader to the detailed message on the back was successful in alerting respondents to the additional information. (c) Locating these messages on the back of the letter failed to produce negative reactions among test respondents. (d) Respondents reacted positively to a statement that served as a definition for the term "confidential" (i.e., "That means the Census Bureau cannot give out information that identifies you or your household."). (e) Few respondents had difficulty correctly (but loosely) interpreting the term "statistics" when used in the following statement: "Your survey answers will only be used to produce statistics..."

(3) Census Cooperation Focus Groups. Our staff participated in a research effort (jointly sponsored by the Director's Office and the Chief Privacy Officer) to assess issues related to completing and mailing back self-enumeration census questionnaires. The project used focus group methods to surface issues and concerns that are likely to lead to nonresponse, particularly among minority sub-populations where mail-out/mail-back self-enumeration methods have traditionally been least successful. The project represents an initial stage of a long-term, comprehensive research effort which ultimately seeks to improve 2010 Census mail return rates through an effective public communications program. Ultimately, three vendors completed 33 focus groups – one vendor focused on the black population (separate groups were conducted among African-Americans, people of Caribbean descent, and African immigrants), one on Hispanics (e.g., Mexican-Americans, recent Mexican immigrants, Puerto Ricans, etc.), and the third conducted focus groups among various Asian nationality populations, Arab-Americans, whites, and multi-racial people. We were active in all phases of the project, including: developing research plans and arrangements, interviewing potential contractors and reviewing their proposals, obtaining approval from the Office of Management and Budget (via the generic clearance arrangement; our staff played the lead role in this task), reviewing and commenting on contractors' proposed screening materials and discussion guides, observing several of the groups, and providing comments on draft reports of results.

Major findings suggest that much work needs to be done to inform and educate people about the census. Awareness of the census and its importance was minimal, especially among groups comprised of recent immigrants. The many obstacles which stand in the way of persuading people to respond to the census include: (a) lack of understanding; (b) fear of disclosure of individual information to any government agency; (c) confidentiality and privacy concerns; (d) the expectation that the questionnaire will be long; (e) the absence of any obvious benefits; (f) English-language difficulties; (g) heightened distrust of government and what it might do to fight terrorism; and (h) feelings of alienation. The results were used by companies bidding on the 2010 Census Integrated Communications contract in their technical proposals. The results also serve as the starting point for the winning contractor, Draftfcb, to develop its strategy for 2010. In other words, these results, if validated through quantitative research, will help Draftfcb determine what messages and what vehicles/channels to use to best motivate people to respond to the census.

*Staff:* Jeff Moore (x34975), Anna Chan, Terry DeMaio, Eleanor Gerber, Ashley Landreth

**B. Development of Questionnaires for Decennial Coverage Improvement**

We will consult on the development of questions and questionnaires designed to improve within household coverage in the Decennial Census. We will participate in the development and pretesting of household and individual-level coverage questions in the decennial short form and the Coverage Follow-up (CFU) reinterview instrument.

During FY 2007, staff managed a major contract to evaluate coverage issues in the decennial mail out mail back form and in the Coverage Follow-Up instrument. Staff revised forms for use in decennial programs designed to capture remote or difficult to enumerate populations. These included the Be Counted form, the Enumeration of Transitory Locations, and the Update Enumerate form. Plans for testing these instruments in 2008 were made. As a result of changes in the scope of the Dress Rehearsal, these small scale tests may be the sole venue for testing the new forms.

*Staff:* Eleanor Gerber (x34890), Jenny Hunter Childs, Elizabeth Ann Dimler, George R. Carter III

**C. Inter-divisional Decennial 2010 Working Groups on Residence Rules and Coverage Improvement**

These overall inter-divisional working groups provide input to the Decennial Management Division (DMD) for planning successive operations, and test broadly related coverage research during the decade leading up to the 2010 Census. These groups receive proposals from various subgroups on: within-household coverage, residence rules, imputation, and unduplication.

During FY 2007, these two groups finished work on the residence rules and coverage questions for the 2008 Dress Rehearsal. We participated in reviewing the National Academy of Sciences (NAS) expert report on residence rules, *"Once, Only Once, and in the Right Place."* Staff participated in discussions with DMD, the Population Division, and the Decennial Statistical Studies Division to develop the Census Bureau's positions on the NAS Panel's proposed revisions to our definition of usual residence and our mission statement, and other recommendations. Staff provided citations to previous relevant research to include as documentation in the final memo. In both the Residence Rule and Coverage Improvement Groups, staff participated in reviewing an internal proposal for the Dress Rehearsal to discontinue collecting UHE (usual home elsewhere) addresses from group quarters, then conduct matching on name and demographic data only. In the Coverage Improvement Group, staff participated in discussions on modifying the assessment of GQ time of enumeration by GQ type to identify possible coverage issues.

Other work related to residence rules and coverage through the year included: attending meetings with the NAS 2010 Census Program for Evaluations and Experiments Panel where residence rules and coverage issues were discussed; reviewing reports; and attending executive briefings and presentations on 2006 Census Test results on residence rules and coverage.

*Staff:* Laurie Schwede (x32611), Eleanor Gerber

**D. Evaluations, Experiments, and Assessments Operational Integration Team (EEA OIT)**

The purpose of the EEA OIT is to facilitate planning and timely implementation of 2008 Census Dress Rehearsal and 2010 Census evaluations, experiments, and assessments. The group specifies the general scope of the 2008 Census Dress Rehearsal Assessment Program; questions to be answered; the date when the final results are needed to inform 2010; and presents recommendations to the Census Integration Group. The group ensures that program integration and implementation of the 2010 Census Program of Evaluations and Experiments (CPEX) meet the guidance provided by the Executive Steering Committee and prepares the 2010 Census Program for Evaluations and Experiments Master Plan.

During FY 2007, our staff participated in EEA OIT team meetings and commented on plans to review and coordinate 2008 Dress Rehearsal assessments. Staff reviewed the draft team charter, lists of assessments and tracking documents, schedules, study plan templates and risk assessments. We commented on proposed policies and timeliness for reviewing study plans and assessments. One staff member served as the liaison, conveying important information–updates, study plan templates, deadlines and budget information–to colleagues planning and developing 2008 assessments, to managers, and to the division chief to aid in planning. She accepted the invitation to be the evaluation consultant and develop the initial methods proposal for the C.14 CPEX evaluation she had originally proposed: qualitative research on American Indian and Alaska Native households, Hispanic households, and immigrant communities and methods of enumeration.

*Staff:* Laurie Schwede (x32611), Manuel de la Puente

## 1.10 AMERICAN COMMUNITY SURVEY (ACS) (Decennial Project 5385760)

**A. ACS Questionnaire Design Measurement**

This project provides technical and research support for the development and improvement of ACS data collection instruments used in all modes of data collection available in the ACS. Staff members serve on inter-divisional working groups, and provide technical support in the design and conduct of questionnaire design research for the ACS.

During FY 2007, staff presented the results of cognitive interview testing of two formats (grid and sequential) for presenting the 100 percent demographic items in the ACS questionnaire. We produced a report

entitled "Comparing Navigation in Two Formats for Demographic Items in the American Community Survey." The cognitive test results were used to design two forms for a split-sample field test of 30,000 households in March 2007. The Decennial Statistical Studies Division (DSSD) is currently analyzing the results from the split-sample test.

We responded to a request by the American Community Survey Office and DSSD to cognitively test letters developed for nonresponders to the ACS self-administered questionnaire and for which there is no phone number allowing for a CATI contact. Staff completed testing and is drafting a written report after presenting findings verbally to ACSO and DSSD. (See more details below, in "ACS Additional Mail Test.")

*Staff:* Jennifer Rothgeb (x34968), Eleanor Gerber, Yuling Pan, Patti Goerman, Manuel de la Puente, Laurie Schwede

**B. ACS Labor Force Questions**

The purpose of this project is to develop recommended question wording for inclusion in the ACS 2006 Content Test. Evaluation of the 2000 Decennial Census (of which the ACS questions are extracted) labor force questions indicate that responses to those questions produced lower employment estimates than the Current Population Survey (CPS). An Office of Management and Budget Interagency Subcommittee on ACS Labor Force Questions was created and charged with producing a research plan to develop test wording for the 2006 ACS content test.

During FY 2007, our staff produced the final report for this project after the results of the large-scale 2006 ACS Content Test were known so we would know whether our recommended alternative question wording (based on 2005 cognitive testing) worked well. Results from the 2006 ACS Content Test demonstrated that the alternative questions proposed by us were favorable; they will be incorporated into the 2008 production ACS survey questionnaire. Using the revised labor force question series will now bring the ACS estimates of employment and unemployment in line with those obtained from the CPS. The final report, incorporating the results from the ACS 2006 Content Test, was distributed to appropriate divisions and posted on the SRD website in the *Research Report Series*. This project is complete.

*Staff:* Jennifer Rothgeb (x34968)

**C. ACS Small Area Estimation Research – Tract Level Coverage and Variance Reduction Using Administrative Records**

A proposed method using matched administrative records as tract level controls to reduce coverage error and variability will be evaluated.

During FY 2007, all work evaluating the effects of small demographic cell-collapsing and the effects of the non-matches to administrative records was completed. Empirical evidence shows that both the amount of cell collapsing and the amount of non-matches are directly related to biases in the controlled estimates. The final report is available in the *SRD Research Report Series*.

*Staff:* Don Malec (x31718), Lynn Weidman, Jerry Maples, Elizabeth Huang

**D. ACS Missing Data and Imputation**

This project undertakes research and studies on missing data and imputation for the American Community Survey.

During FY 2007, we consulted with staff in the Housing and Household Economic Statistics Division (HHES) to redesign the hot-deck imputation of the property insurance item for processing the 2006 ACS data. Before 2006, the imputation was done using a hot-deck based on wide property value brackets. Because of these wide brackets, discrimination for property insurance was poor. Following up on the consulting activities. HHES, implemented a more discriminatory hot-deck with narrower property value brackets. At this stage, our staff is documenting the results by comparing the imputed data obtained using a simulation of the new and using the old imputation technique.

Our staff assisted in implementing the new imputation method for property value. Jointly with staff from the Housing and Household Economic Statistics Division, we are publishing a technical report documenting the new imputation methodology.

*Staff:* Yves Thibaudeau (x31706)

**E. ACS Group Quarters (GQ) Item Imputation and Micro Data Disclosure Avoidance Research**

See project "D. Decennial Disclosure Avoidance" (1.6 Statistical Design and Estimation).

**F. ACS Weighting Simplification Research**

Group quarters (GQ) weighting and estimation has been carried out only once with ACS data, for calendar year 1999 when there were 36 counties in sample. At that time, GQ stratification and sampling was done separately for each county. For the full GQ implementation of ACS starting in 2006, a new GQ sort by type within state will be used. Now that every

county in the nation will be in sample, there is the possibility of weighting GQ persons by county or state. A simulation study is comparing options for weighting GQ persons by county or state and controlling GQ person estimates, either by themselves or together with housing unit (HU) person estimates. A research proposal was developed for determining appropriate methodology for estimating the number of persons residing in GQ and their characteristics.

During FY 2007, a final report on the project, recommending use of state major GQ type controls was completed and sent to the Decennial Statistical Studies Division (DSSD). This option will be implemented in weighting the 2006 ACS. A final report on a previously completed project, ACS weighting simplification research for HU person estimates, was prepared and sent to DSSD.

*Staff:* Lynn Weidman (x34902), Michael Ikeda, Julie Tsay

**G. ACS Language Research**

This project provides technical and research support for addressing language issues in ACS data collection instruments and supporting documents. Staff members serve on inter-divisional working groups and provide consultation and technical support in the design and development of language research for the ACS.

During FY 2007, our staff worked with the ACS Language Team to develop and pretest a multilingual brochure for the ACS. We finalized the research report on the project of cognitive testing of translations of ACS CAPI survey letters and information brochures in multiple languages with a contractor (RTI International). We also supervised and participated in the final review of revisions to the ACS materials and translations. We reviewed and incorporated changes for the Chinese and Spanish translations of the ACS CAPI materials. We delivered a presentation on pretesting the ACS Spanish instrument at the 5th International Workshop on Comparative Survey Design and Implementation.

Our staff updated a research proposal to pretest the ACS Spanish CAPI/CATI instrument. We also updated the research proposal for improving the language proficiency tests currently being used by the telephone centers to certify bilingual field representatives. The goal of this proposal is to evaluate the current tests and assess if changes are needed.

We drafted a Statement of Work to start three research projects to cognitively test translations of the ACS survey supporting documents. We also drafted a Statement of Work to pretest the ACS Spanish CAPI/CATI instrument.

*Staff*: Yuling Pan (x34950), Patti Goerman, Manuel de la Puente, Ashley Landreth, Diana Simmons

**H. ACS "Field of Degree" Questions**

The National Science Foundation (NSF) requested the Census Bureau to pretest a "field of degree" (FOD) question that it hopes will eventually be included on the American Community Survey. Assuming such a question meets the ACS Content Policy requirements and is included on the ACS, NSF will use the data to identify persons with science and engineering degrees to use as sampling frames for the National Survey of College Graduates.

During 2007, the National Science Foundation (NSF) and the Census Bureau reached agreement on the final wording and formats for the two versions (forced-choice format and open-ended format) of the field of degree question for the 2007ACS Methods Panel Test. Our staff completed the final project report on cognitive testing of the field of degree question and included it in the *SRD Research Report Series*. DSSD is currently analyzing the results of the 2007 ACS Methods Panel Test. It is not yet known whether the forced-choice format or the open-ended format will be selected for inclusion in the ACS. Our division has completed its involvement with this project.

*Staff:* Jennifer Rothgeb (x34968), Jen Beck

**I. ACS Topic-Based Mode Consistency CATI/CAPI Cognitive Pretesting**

The ACS Methods Panel staff interpreted and implemented the mode consistency guidelines and introduced the topic-based format for the collection of basic demographic data (name, relationship to householder, sex, date of birth and age, race and Hispanic origin questions) in the current ACS's automated CATI and CAPI instruments. We participated in designing and pretesting the CAPI and CATI topic-based format of the demographic items in CAPI/CATI instrument with the application of the mode consistency guidelines. The main objective of this cognitive study was to test the structure and the flow of a topic-based format of the automated instruments for the collection of demographic data. The new topic-based format was implemented in the demographics section of the ACS field test in the summer of 2007 and will be implemented in the production ACS in 2008.

During FY 2007, we reported all the findings for this pretesting study and documented the recommended topic-based format and using the vertical branching procedures whenever a branching question is needed. Details are documented in the final report which has been reviewed and approved by various staff from the Decennial Statistical Studies Division, the Population Division, and the Demographic Statistical Methods

Division. The final report has been posted under the *Research Report Series* on the SRD website. In order to be consistent with the *Mode Consistency Guidelines*, the Census Bureau has decided that ACS and decennial census instruments should use the same questions and procedures, to the maximum extent possible. Thus, despite our findings and our recommendations concerning the branching format that is best suited for the ACS, the final design of ACS branching procedures is likely to follow the decennial recommendations– which may differ from the findings from this study.

*Staff:* Anna Chan (x38462), Jeffrey Moore

**J. ACS Applications for Time Series Methods**

This project undertakes research and studies on applying time series methodology in support of the American Community Survey.

During FY 2007, staff undertook a consultation with the American Community Survey Office (ACSO), whereby various multi-year estimates are made compatible. We investigated several cases in the ACS database, determining whether the compatibility method would be effect in each case.

*Staff:* Tucker McElroy (x33227)

**K. ACS Variances**

The purpose of this short-term project is to compare variances for survey totals based on several alternative methods of controlling to population totals in the ACS.

During FY 2007, staff worked on planning data analysis for a Decennial Statistical Studies Division project to evaluate squared errors and variances of ACS estimates versus decennial census estimates, due to using alternative methods of population controls. At the same time, we began to study theoretically and through simulation the comparison between BRR and theoretical formulas for ACS variances.

*Staff:* Eric Slud (x34991), Alfredo Navarro (DSSD), Mark Asiala (DSSD), Michael Beaghen (DSSD), Yves Thibaudeau

**L. ACS Data Products – Display of Variability Measures**

This project has two parts: (1) determine which measure of variability should be displayed for each ACS data product and how it should be displayed; and (2) for the web, develop a simpler and clearer description of variability measures and how they can be used with ACS data products.

During FY 2007, a project plan was developed by our staff. A first questionnaire about use of optional representations of sampling variability and the user's background was developed for a website survey of ACS data users. Websites of other domestic and international statistical agencies are being reviewed for alternative representations of sampling variability.

*Staff:* Lynn Weidman (x34902), Betty Murphy, Ben Smith

**M. ACS Additional Mail Test**

This new inter-divisional ACS team is planning a split-panel test to determine if response rates of mail nonrespondents without known phone numbers can be improved by means of an additional mailing. If successful, this could cut the workload during the final CAPI phase, saving time and money and improving the accuracy of the data. The three proposed test treatments include: sending an additional postcard with a motivational message, mailing a third questionnaire with a revised cover letter, or using the current method.

The objective of the ACS Additional Mailing Test is to develop and cognitively test experimental reminder postcards and a letter aimed at households which do not respond to the ACS mailout request and for which we have no phone number allowing for CATI contact. The results will be used to choose one postcard and improve that postcard and the letter for the planned split-panel test next spring. At our suggestion, DSSD ran statistics on actual ACS response rate data to identify characteristics of this target population that were then used to guide recruiting for appropriate cognitive interview respondents. The team developed the revised letter as well as the two reminder postcards: one with a gentle reminder and appeal to civic engagement and the other with a more stern mandatory response statement (the "carrot" versus "stick" approaches). Our staff developed a short summary of the project's research questions and methodology, as well as the cognitive testing protocol and debriefing questions, and revised them after input from working group members. By the end of FY 2007, all materials were ready to begin cognitive interviewing in FY2008.

*Staff:* Laurie Schwede (x 32611)

**N. ACS Website: Card-sorting Study**

The purpose of this study is to identify a user-centered information architecture of the American Community Survey (ACS) domain of the Census.gov Web site. The goal for the project is to come up with a basis for a re-design of the ACS portion of the Web site.

During FY 2007 and to come up with a user-centered information architecture, usability lab staff identified the technique of card sorting as a way to understand how ACS data users think of and organize ACS information. ACS staff sent an initial draft of 100 terms to use. These terms were hard to understand so

usability staff, working with ACS staff, created more useful and relevant cards for the card sort. We aimed to come up with terms that users would understand with the idea that they would then be able to sort the terms into piles that make sense to them. An example of a term that had no meaning for general users was "code lists." We changed this to a more meaningful and contextual "list of ancestry and race codes." Including the dry-run, 15 novice participants were brought in from the Washington DC metropolitan area to participate in the study. Data from two participants were discarded because they were considered unusable. Phase 1 of the card-sorting was to develop high-level categories. Results include 5 top level headings and some sub-groups that fell within each top level heading. These follow, (the top level headings are in bold and the sub-headings are in italics):

**About the ACS**
*Basics*
*Tech info*
**How to…**
*Get to the data*
*Use the acs*
**Definitions**
*Definitions of terms and list of topics*
**FAQs**
*FAQs*
**Resources**
*Handy informational tools*

*Staff:* Erica Olmsted-Hawala (x34893), Alex Trofimovsky

### 1.11 DATA INTEGRATION (Demographic Project 0906/7374)

The purpose of this research is to identify microdata records at risk of disclosure due to publicly available databases. Microdata from all Census Bureau sample surveys and censuses will be examined. Potentially linkable data files will be identified. Disclosure avoidance procedures will be developed and applied to protect any records at risk of disclosure.

During FY 2007, new software was developed to look up the data marts quicker and more efficiently. The software creates a web page for easy access to the data products on a data mart website. The software also creates a linux script to get the results of the data search.

*Staff:* Ned Porter (x31798), Phil Steel

### 1.12 QUICK TURNAROUND PRETESTING OF HOUSEHOLD SURVEYS
(Demographic Project 1467001)

This project involves pretesting new or revised series of questions for insertion into household surveys. The projects are of the short-term, quick turnaround variety rather than long-term research efforts to redesign a survey. Methods used include cognitive testing and other techniques as appropriate.

During FY 2007, staff conducted cognitive interviews with teenagers to pretest newly-proposed questions on Internet predation for the National Crime Victimization Survey (NCVS). We wrote and distributed a report of research results, which showed that: 1) some respondents did not pay attention to the reference period and reported experiences that had happened over longer time periods than the requested 6-month time frame; 2) there was much ambiguity in respondents' conceptualizations of Internet activities, and distinctions between types online activities (e.g., online communities, personal web pages) were frequently blurred; 3) respondents had concerns about confidentiality and the sensitivity of the subject matter; and 4) there is the potential for overlap between reporting incidents in some of the screener questions and in these new questions. These issues seem sufficiently problematic that we recommended that additional testing be conducted before the questions are fielded. The sponsor concurred in this evaluation. Subsequently we conducted focus groups with teenagers to explore the issues further, and a report of these focus groups is currently in preparation. More cognitive interviews are planned.

Staff met extensively with staff from the Bureau of Justice Statistics, the Bureau of Justice Assistance, the Federal Trade Commission, and the Office of Victims of Crime to develop a questionnaire for a new Identity Theft Supplement. Once a questionnaire was finalized, we conducted eight rounds of cognitive interviews with identity theft victims to test it. Results of the interviews showed that: 1) respondents think about their identity theft incidents as a single unit, and when they are asked separately about actual identity thefts and then attempted identity thefts, they tend to overreport incidents of actual identity thefts; 2) the field-coded response categories for the question about how respondents first found out about the misuse of their personal information were incomplete; 3) respondents frequently incorrectly identified the Federal Trade Commission as a law enforcement agency; 4) respondents had a very strict definition of what it means to know something about the person who misused their information and were reluctant to incriminate people; and 5) respondents consistently misinterpreted the sponsor's definition of an information breach and were

unable to answer the question correctly. Almost all recommendations to address these issues were accepted by the sponsor.

*Staff:* Terry DeMaio (x34894), Jen Beck, Dawn Norris, Lorraine Randall

## 1.13 RE-ENGINEERED SURVEY OF INCOME AND PROGRAM PARTICIPATION (RE-SIPP) RESEARCH (Demographic Project 1464500)

**A. Re-Engineered SIPP Methodological Research**

This project conducts long-term methodological research to evaluate the Survey of Income and Program Participation (SIPP), and to inform the design of the re-engineered SIPP, which will eventually replace the current SIPP program. The two major components of this project are (1) the evaluation and documentation of the impacts of the many and substantial revisions to the 2004 panel SIPP questionnaire made as a result of the multi-year SIPP "Methods Panel" research and development effort; and (2) the development of instruments and procedures for the new RE-SIPP program, which will replace SIPP starting in 2011.

During FY 2007, our staff served on several re-engineered SIPP planning groups – the Content Group, the Survey Group, the Integration Group (comprised of the several re-engineered SIPP subgroup chairs), and the general planning group known simply as "The Group" – and also served as chair of the Research Group. We participated in outside stakeholder meetings on general topic areas, and also attended the public meeting of the Committee on National Statistics panel which is investigating various aspects of the proposed new design for the survey. In addition to this committee/meeting work, in FY 2007 our staff participated in several research efforts related to re-engineered SIPP issues

(1) Evaluation of the Revised Recipiency History Topical Module (RHTM). This evaluation compared data from the revised instrument used in the 2004 panel with data from the 2001 panel. Study design and results are reported in: Moore, J. (2007), *SRD Research Report Series* (*Survey Methodology #2007-08)*.

Major results/findings of this research include the following: (a) SIPP 2004 questionnaire changes to the RHTM elicited more complete reporting of pre-wave-1 receipt of Aid to Families with Dependent Children/ Temporary Assistance for Needy Families, Social Security Income, and Food Stamps (the RHTM's three target programs); (b) higher quality reports of the total number of lifetime spells of receipt of these programs; and (c) better reporting of the start dates of otherwise "left-censored" spells and first-ever spells.

(2) Evaluation of Proposed and Actual Changes to the Assets and Liabilities Topical Module Two separate projects evaluated proposed new questions on the value of annuities and trusts, and a change to the 2004 instrument to capture the cash value of life insurance, rather than the face value (death benefit). Both of these changes are intended to produce better and more complete wealth data. Study designs and results are reported in two papers, each of which was initially a final report to the project sponsor: (1) Okon, A., Gilbert, T., and Moore, J., *SRD Research Report Series (Survey Methodology #2007-13)* ; and (2) Gottschalck, A. and Moore, J., *SRD Research Report Series (Survey Methodology #2007-14).*

Major results/findings of these projects include the following: (a) The "annuity" concept is broadly interpreted, which tends to elicit reports of out-of-scope, pension/retirement-type accounts. (b) The "trust" concept seems well understood, but there are difficulties with its sister concept "managed investment accounts." (c) Although questions about the cash value of annuities/trusts must, because of the possibility of joint ownership, communicate the concept of the person's share of the cash value, use of the word "share" tends to elicit reports in percentage terms, rather than dollar values. (d) There is much uncertainty about the labels for different types of life insurance–e.g., term policies, which do not accrue a cash value, and whole life policies, which do. (e) Even if understood, "cash value" is not a particularly salient feature of life insurance policies. What people are familiar with is the face value (death benefit). (f) Merely changing one word in the relevant question–changing "what is the **face** value" to "what is the **cash** value," as was done in the 2004 panel–is not sufficient to obtain good quality data.

(3) Cognitive Evaluation of Proposed "Type-2" Questions. The re-engineered SIPP plans to try to capture some basic data on "Type-2" people–i.e., people who do not live at sampled addresses at the time of the SIPP interview, but who lived with an original sample person for at least one month of the 12-month, calendar-year reference period. These data will permit a more complete understanding of the socio-economic circumstances of SIPP respondents during the reference period of interest. Research design and results are reported in the following paper: Chan, A. and Moore J., "Report on the New 'Type 2' People Questions: A Pre-Testing Study for the Re-Engineered SIPP," draft report, September 18, 2007.

Major results/findings of this project include the following: (a) The Type-2 questions were easy for respondents to understand, and as a result many of them

successfully identified Type-2 persons and reported their basic demographic information. (b) We observed that respondents were simply not very good at recalling Type-2 people, resulting in response error, especially in proxy interviews. (c) Many respondents expressed concerns about confidentiality and their lack of knowledge about the Type-2 people. Some concerns were allayed by explanations of the basic nature of the survey and the purpose of the new questions. We recommended that optional explanatory text be made more prominent, and that the Type-2 questions be administered to self-respondents to the maximum extent possible.

(4) EHC Field Test. Most of the SIPP research activities of our staff in the latter half of this year were directed toward the development and evaluation of an event history calendar (EHC) methodology for SIPP, which is being considered for use in the re-engineered SIPP program. The proposed EHC would employ a 12-month, calendar-year reference period, in place of a standard questionnaire approach with a sliding 4-month reference period. In collaboration with the Housing and Household Economic Statistics Division, we have designed a research project to compare the quality of the data obtained under the two approaches. The essential feature of the research is a small-scale field test, in early 2008, of a prototype EHC questionnaire covering calendar year 2007, administered to expired 2004 panel SIPP households who will have already reported about calendar year 2007 via their final three waves of SIPP interviews. Analysis will focus on a comparison between the two interviewing methods of the reporting of key characteristics (e.g., participation in programs, jobs/businesses, health insurance coverage, etc.), their start and stop dates, and (where relevant) income amounts. Because little is known about how EHC methods are actually put into practice in the field, the 2008 study will also employ a variety of additional evaluations–interviewer and respondent debriefings, observations, analysis of recorded interviews, etc.–directed toward a better understanding of the EHC interview process.

The field test will be conducted in a limited area (i.e., one or more of the following states: IL, MD, and TX) both for ease of administration and, primarily, to facilitate the use of administrative record data for a more rigorous data quality assessment for some selected characteristics. We expect to complete an EHC interview in approximately 1,000 expired SIPP households (approximately 2,000 interviewed persons).

One limitation of the design is the possibility that the SIPP respondents' EHC reports will be "primed" by their having just completed three waves of SIPP interviews covering the same time period. The study will yield data about the effects of such "priming" by including a set of un-primed SIPP sample cases which, in a budget-cutting exercise, were dropped from the SIPP sample after wave 8, and thus will not have previously reported about calendar year 2007. We expect to complete approximately 500 household interviews among the latter group. In addition to working on overall field test design issues, a major effort in the latter half of the year has been the preparation and administration of a contract (with RTI) to design the paper-and-pencil prototype SIPP EHC instrument, and associated interviewer training materials, which will be used in the 2008 field test.

We were invited to prepare two papers for a joint Census Bureau/Panel Study of Income Dynamics-sponsored conference on event history calendar methods, to be held in December 2007 – "Seam Bias in the 2004 SIPP Panel: Much Improved, but Much Bias Still Remains," and "A Multi-Method Evaluation of an Event History Calendar." The former paper consists of a comparison of seam bias in the 2001 and 2004 SIPP panels using edited data files. The major findings of the research are that the new dependent interviewing procedures implemented in the 2004 panel instrument have had a profound positive impact on seam bias, compared to 2001 data, while still leaving substantial bias remaining. The second paper focuses on how interviewers and respondents actually use EHC methods–in this case, in the context of the English Longitudinal Study of Aging (ELSA).

*Staff:* Jeff Moore (x34975), Anna Chan, Joanne Pascale

**B. Longitudinal Weighting**

The objective of this project is to design and conduct research required to assess the effectiveness of weighting alternatives for the SIPP longitudinal estimation. (During FY 2007, this work was supported by Projects 0351 and 1871.)

During FY 2007, staff completed an empirical study of the effects of longitudinal nonresponse on wave estimates from the 2001 panel for several of the survey's principal items. We identified survey items for which there is seemingly a potential for significant longitudinal nonresponse bias, even after the application of the current nonresponse adjustment procedure, and effected an empirical comparison between nonresponse weight adjustment alternatives. We developed a composite metric, applicable to different population subdomains, to facilitate comparisons of different model-based data adjustment methods for nonresponse due to attrition. Using cross-sectional items from the 1996 SIPP panel, we assessed the effectiveness of the current cell-based adjustment model and several logistic regression models through a derived metric which combines the magnitudes of estimated between-wave adjustment biases based on subsets of the survey

sample. Results from this work were presented at the 2007 Federal Committee on Statistical Methodology Conference.

Staff investigated forms of measures of distance between the initial and final SIPP weight adjustment, designed to facilitate evaluations of alternative longitudinal nonresponse weighting. Results highlighted the utility of such measures of change as tools for the evaluation of the quality of nonresponse weighting options, particularly for panel estimates. In addition, we resumed an investigation of the effects of attrition and the associated nonresponse adjustments on duration measures of program participation. We analyzed and compared survival rates for dropouts and recurrent and longitudinal respondents' program participation for four of the SIPP principal items, based on the length of the first observed spell of program participation. Results suggest that conditional estimates from related behavior models may be less affected by attrition than are the cross-sectional totals.

*Staff:* Leroy Bailey (x34917), Eric Slud, Julie Tsay

### 1.14 SIPP ASSETS/LIABILITIES IMPUTATION RESEARCH/SOFTWARE DESIGN (Demographic Project 1465001)

Staff initiated new research on coupling when imputing assets and liabilities for households in SIPP panels.

During FY 2007, our staff worked on designing a new model-based system using mortgage amount, to predict real estate value for the 2004 SIPP panel. We also designed a predictive mean version of the model-based system. In addition, the new model is designed to integrate input from auxiliary information, such as administrative records and information collected through other surveys. In this context the predictive mean approach is conceptually simple and can be implemented in a production environment. We plan to implement imputation systems with focus on other assets/liabilities in a broad context.

Our staff continued to upgrade the SAS program for imputing liabilities based on assets, and for imputing assets based on liabilities. The program for the imputation of property values and mortgage have been implemented in the context of the third wave of the 2004 SIPP panel. We are working on upgrading the imputation methodology for the imputation of "business value," "business debt" and "checking account," "individual" and "joint."

*Staff:* Yves Thibaudeau (x31706), Leroy Bailey, Julie Tsay

### 1.15 SIPP VARIANCE ESTIMATION (Demographic Project TBA)

The objective of this project is to provide methodology and the associated programming code required to effect modifications in the VPLX-based BRR variance estimation occasioned by the planned reduction in the Wave-9 sample.

During FY 2007, staff reviewed documentation relevant to the conduct of SIPP variance estimation procedure and the assignment of the replicate weight factors for independently censored data. We outlined a general approach for the completion of the project; however, staff in the Demographic Statistical Methods Division is apparently available now to work on this problem and will assume the responsibility for the remaining tasks required for it resolution.

*Staff:* Leroy Bailey (x34917), Aref Dajani, Eric Slud

### 1.16 RESEARCH FOR SMALL AREA INCOME AND POVERTY ESTIMATES (SAIPE) (Demographic Project 7165)

The purpose of this research is to develop, in collaboration with the Data Integration Division (DID) (The Small Area and Poverty Estimates branch is now in DID, but was previously in the Housing and Household Economic Statistics Division), methods to produce "reliable" income and poverty estimates for small geographic areas and/or small demographic domains (e.g., poor children age 5-17 for counties). The methods should also produce realistic measures of the accuracy of the estimates (standard errors). The investigation will include assessment of the value of various auxiliary data (from administrative records or surveys) in producing the desired estimates. Also included would be an evaluation of the techniques developed, along with documentation of the methodology.

During FY 2007, we investigated use of a Bayesian approach with a t-distribution assumed for one of the error components in the model to address potential problems with outliers in models for state poverty ratios from CPS data. The motivation for this work came from some problems we found with near-outliers in applying bivariate models to CPS and ACS state poverty ratios. We thus examined use of the t-distribution in both univariate and bivariate models. We found that using a t-distribution with low degrees of freedom can diminish the effects of outliers, but in our examples the results did not go as far as approaching outright rejection of observations. We also demonstrated an important point, previously ignored in the literature on this topic, that results are affected by whether the outlier arises in the

survey errors (of the direct estimates) or the model error component. Details of the bivariate model results are given in a paper in the Proceedings of the American Statistical Association (see section 3.3). Details for the univariate model results, with a summary of the bivariate model results, will appear in a paper in the *Proceedings of the Statistics Canada Symposium 2006, Methodological Issues in Measuring Population Health* (see section 4).

With the SAIPE program's plan to switch from CPS to ACS data as the basis for its models and resulting poverty and median income estimates, an important question was whether, at the state level, SAIPE should simply use the direct ACS estimates or model these estimates to try to reduce their sampling error. The need for modeling at the state level was clear with the CPS data, but was not clear with the ACS data due to its much larger sample size. We thus modeled ACS state poverty ratio and median household income estimates, demonstrating that this produces substantial variance reductions for the smallest 10 or so states, and with smaller though still appreciable variance reductions for another 10 or so states. The direct ACS estimates and their variances for the largest states are changed very little by modeling (i.e., no harm is done).

The proposed model for school district poverty estimates using the IRS income tax data studied previously has been approved to be used in the production cycle. We provided and assisted in converting the current programs to implement the new methods within the production environment. A report has been finalized detailing the research of using IRS income tax data for school district estimates, *SRD Research Report Series (Statistics #2007-11)*. An additional evaluation has been done on the new models for a special subset of school districts that have different grade ranges for different areas for the same school district. There was a small gain in precision by using the pseudo districts as separate districts for the estimation procedures; we have combined these pseudo districts at the very end of the new proposed process.

We provided a program to the DID SAIPE team to obtain direct sampling variance estimates for ACS estimates of any function of the response variables (poverty or income) for states or counties using the ACS micro data with the furnished ACS replicates.

With the move to use of ACS data as the basis for the SAIPE county poverty models, an important question was whether and how ACS direct county variance estimates should be improved by smoothing them via a fitted generalized variance function (GVF). Particularly for smaller counties, direct ACS variance estimates are expected to have substantial error, raising questions about their use in the SAIPE county models. (Note that SAIPE uses single-year ACS county estimates, which makes this issue more acute for SAIPE than it is for the published ACS county estimates.) We thus investigated alternative GVF models for sampling error variances of the 2005 ACS direct county estimates of log number of children age 5-17 in poverty and log poverty rates for children age 5-17. We showed that county predictions from the SAIPE county models are, in certain respects, sensitive to whether we use direct sampling variance estimates or fitted GVF values. Unfortunately, technical issues remain to be resolved before we can recommend a clear choice of a preferred GVF. Research is thus continuing to examine alternative variance models and fitting procedures, and their effects on estimates from SAIPE county poverty models. The goal is to resolve this issue for next year's SAIPE production.

*Staff:* Elizabeth Huang (x34923), Jerry Maples, William Bell (DIR)

### 1.17 USE OF THE EMPIRICAL BAYES APPROACH IN THE HOUSING UNIT METHOD FOR POPULATION ESTIMATES (Demographic Project TBA)

Investigate the use of Empirical Bayes (EB) methods for estimating the change across years in county level vacancy rate (%vac) and persons per household (pph). The product of these two is then used as the estimate of change in housing unit population across years.

During FY 2007, staff developed a plan for an initial investigation of the feasibility of the EB approach for estimating change across time in %vac and pph. We proposed independent variables to be used in the mixed model regressions and obtained data files from the 1990 and 2000 censuses for use in estimating change between those two time points. Variables for use in the mixed model for each state were selected by using stepwise regression in SAS, and the selected models fit reasonably well. Some states will require individual treatment due to having a small number of counties. An attempt was then made to fit the mixed models to the rest of the states. A full Bayesian procedure was used on a couple of states to verify the results from SAS. A draft report including suggestions for further work was sent to the Population Division.

*Staff*: Lynn Weidman (x34902), Don Malec, Julie Tsay, Michael Ikeda

### 1.18 CIVIC ENGAGEMENT SUPPLEMENT TO THE CURRENT POPULATION SURVEY (Demographic Project TBA)

A new supplement on civic engagement has been proposed for the Current Population Survey (CPS) by the Corporation for National and Community Service (CNCS.) The primary objective of the supplement is to gather information on the level of social capital and the extent to which American communities are places where individuals are active citizens. Staff will conduct two rounds of cognitive interviews to test proposed questions for the supplement.

During FY 2007 and in collaboration with Demographic Surveys Division (DSD), Housing and Household Economic Surveys Division (HHES), the Bureau of Labor Statistics (BLS) and the Corporation for National and Community Service (CNCS), our staff developed a cognitive testing project plan and schedule. We researched background literature on civic engagement, requested detailed question objectives, analytic plans and primary domains of interest from CNCS in order to develop a coherent set of questions for each of the domains. We produced two alternative questionnaires and test protocols. Our staff, along with staff from DSD, completed Phase 1 cognitive testing (15 cognitive interviews), produced a draft report identifying potential problems and recommended question wording revisions. We suggested that instead of Phase 2 consisting of additional cognitive interviews, that a larger split-panel test (100 completed interviews) be conducted from the Hagerstown Telephone Center using expired CPS sample. This will allow the questions to be tested with a larger and more diverse group of persons than cognitive testing. The test will be completed in January or February 2008 with a report provided to the sponsor by the end of February. We are currently drafting the Phase 2 questionnaires and evaluation materials (respondent debriefing.) DSD will develop the interviewer training and interviewer debriefing materials.

*Staff:* Jennifer Rothgeb (x34968), Gianna Dusch (DSD), and Aniekan Okon (DSD)

### 1.19 SMALL AREA HEALTH INSURANCE ESTIMATES (SAHIE) (Demographic Project TBA)

At the request of staff from the Data Integration Division, our staff will review current methodology for making small area estimates for health insurance coverage by states and poverty level.

Staff reviewed the logic of the component models being used for estimation of insurance coverage and poverty level and provided criticisms and suggested model changes through extensive data analysis. Later, staff provided a thorough review of the final state methodology.

*Staff:* Don Malec (x31718)

### 1.20 2010 NSCG RESEARCH TO MODEL FIELD OF DEGREE INFORMATION FOR COLLEGE GRADUATES IN THE ACS (Demographic Project TBA)

Predict Field of Degree (FOD) for insertion on the 2005-2006 ACS files. FOD will be used by the staff of the Demographic Statistical Methods Division as an aid to formulating a design for the 2010 National Survey of College Graduates using the ACS sample as a sampling frame for the National Survey of College Graduates (NSCG).

Staff began implementing the use of classification tree methodology for this project using the procedure "rpart" available in "R." The 2003 NSCG with field of degree along with linked long-form information is being used to develop models. Some issues encountered are ensuring the ACS design information is available for modelling, obtaining a hierarchy of field of degree classifications for predication and developing estimated measures of prediction accuracy.

*Staff:* Don Malec (x31718), Elizabeth Huang, Lynn Weidman

### 1.21 EDITING METHODS DEVELOPMENT (Economic Project 2370754)

#### Investigation of Selective Editing Procedures for Foreign Trade Programs

The purpose of this project is to develop selective editing strategies for the U. S. Census Bureau foreign trade statistics program. The Foreign Trade Division (FTD) processes more than 5 million transaction records every month using a parameter file called the Edit Master. In this project, we investigate the feasibility of using selective editing for identifying the most erroneous records without the use of parameters. This process would allow a more efficient target of records for review and lead to an expected reduction in rejects.

During FY 2007, we developed and tested several score functions to produce a ranking of "rejects" based on the suspiciousness of the record and the potential impact it had on the data. We prepared a briefing for the managers in which the FTD data experts questioned the high rankings given to records that by experience they

consider insignificant to final cell estimates. We examined these records along with all other records in the data cell simulating the tables that analysts would use to resolve edit failures. We compared the impacts, suspicions, expected values and scores of each for each ratio edit. We found that for these records the criteria the analysts used is not tracking the large impact the records have on the estimates, however the score function correctly assigns a high priority. Which score functions perform well in terms of correctly assigning a high ranking to records that have a large impact on the total cells but might otherwise have been given lower priority by the current editing process. This project is completed. Details are documented on a forthcoming report to be issued in the *SRD Research Report Series* (M. García, A. Gajcowski, and A. Jennings).

We proposed new research to investigate the feasibility of using the methodology earlier in the editing process. In this research selective editing techniques are used for identifying the most erroneous records without the use of the Edit Master parameter file. The aim is to allow a more efficient target of records for review and to possibly reduce the number of rejects. We delivered a statement of work, researched different ways of partitioning the full data to determine the smallest aggregated data cell and the amount of data needed for assigning scores to transaction records. We completed the selection of a new test data set which takes advantage of the availability of more recent data and more historical data for the simple statistics (medians and quartiles) needed for the score functions. This new research covers data in a different, larger domain (the domain of records for this research is the full data set rather than the edit failing records.) Thus, we are re-writing and retesting all routines within the selective editing legacy software so that those routines can be applied.

*Staff:* María García (x31703), Yves Thibaudeau, Alison Gajcowski (FTD), Andrew Jennings (FTD)

### 1.22 DISCLOSURE AVOIDANCE METHODS (Economic Project 2470751)

The purpose of this research is to develop disclosure avoidance methods to be used for Census Bureau publicly available economic data products. Emphasis will be placed on techniques to implement disclosure avoidance at the stage of data processing. Disclosure avoidance research will be conducted on alternative methods to cell suppression for selected economic surveys. We will also aid in the implementation of the methods.

During FY 2007, staff were involved in a large number of high-level meetings on the use of noise for protecting tables produced by several major statistical programs within the economic directorate. The programs and their divisions are identified below. In addition to those subject-matter divisions, the Associate Director and high ranking members of the Economic Planning and Coordination Division and the Economic Statistical Methods and Programming Division were involved. After much analysis, a decision was made to use noise rather than cell suppression for each of the programs listed below, beginning with the next release cycle of the program in most cases. Since most of these programs use administrative data supplied by the Internal Revenue Service (IRS), it was necessary to seek IRS approval for the use of this method; that approval was given.

A production noise factor assignment program was developed and delivered to Non-Employer (NE) Statistics. This program assigned factors using the hybrid balanced method and implemented a special rounding algorithm for small numbers. Special considerations were needed for small values to ensure that protection was retained after rounding. The program was implemented for the 2005 data and noisy tables were published. Staff developed footnotes, summaries, and methodology reports that were disseminated along with published NE products.

Census of Island Areas (IA) staff have tested the use of noise on the Puerto Rico Economic Census tables. The results were promising, however several new issues were encountered that spurred new research. IA had to consider possible coordination effects with some County Business Patterns tables, its own set of rounding issues, and several program processing requirements that were not dealt with in the past. IA currently plans to implement noise in the 2009 publications.

Survey of Business Owners (SBO) staff used a set of random noise factors produced for them by SRD staff to test the use of noise in SBO tables. The results were very positive and at this point SBO also plans to move forward with implementing noise. Because SBO is a survey, we still need to decide on the best way to handle coefficients of variation when noise is used for disclosure avoidance purposes.

Research for the use of EZS noise with County Business Patterns (CBP) was set aside dues to issues that were not resolved at the time. Recent developments have shown that the noise balancing procedure implemented in IA works extremely well with CBP as well. A study group similar to the ones for NE, IA, and SBO will be assembled to reevaluate the effectiveness of noise on CBP data.

The Commodity Flow Survey (CFS) is conducted on a economic census cycle by a branch within the Service Sector Statistics Division (SSSD). The mathematical statistics research branch of SSSD is

planning to participate in future noise analysis and implementation issues for CFS. Staff had numerous communications with this research branch in which noise research on CFS done to date by staff was described.

Regarding the cell suppression computer programs, no algorithm changes were made to the code, but some challenging issues arose when trying to get the Fortran programs to run on the new operating system (Linux) for SRD's new supercomputer. These programs now run, and what was learned was communicated to those who write or run Fortran programs on this machine.

Staff developed a new version of the original EZS Noise method for the protection of magnitude data tables. The method is called Balanced EZS Noise and in several cases has resulted in vast improvements in the data quality noise protected table. The general method was approved by the Disclosure Review Board.

Staff researched and developed several rounding methods for use with EZS noise. The various methods were developed to deal with different features of the programs that are considering the use of noise.

A number of studies were performed on a wide range of problems relating to the use of noise. Among these were graphical studies of the amount of noise cancellation that occurs for an economic magnitude variable as a function of its degree of skewness in a given microdata survey file, and the effect of user uncertainty of weights on the (lessened) need for noise to protect tables. Several of these studies were written up in informal reports, and a few were distributed as handouts in meetings on noise.

*Staff:* Laura Zayatz (x34955), Paul Massell, Phil Steel, Sam Hawala, Jeremy Funk

## 1.23 TIME SERIES RESEARCH (Economic Project 2370752)

### A. Seasonal Adjustment Support

This is an amalgamation of projects whose composition varies from year to year, but always includes maintenance of the seasonal adjustment and benchmarking software used by the Economic Directorate.

During FY 2007, seasonal adjustment and X-12-ARIMA support was provided to: Bank of America, Banco Fatar (Brazil), Credit Suisse (Brazil), Eviews, SAS, Pulp and Paper Products Council (Canada), ERMES (France), Greenspan Associates, Moore Capital, Goldman Sachs, Schwabe, Microsoft, Geico, QVT, Gavea Investments, Norfolk Southern Corporation, Economic Cycle Research Institute, Economics from Washington, Statistics Research Associates, FTE Econometrics, Center for Automotive Research, Kingdon Capitol, Fabick CAT, Sungard Data Management Solutions, Bureau of Economic Analysis, Bureau of Labor Statistics, U. S. Office of the Courts, Illinois State Government, Colorado Department of Labor, Statistics Canada, Office of Official Statistics (UK), Australian Bureau of Statistics, Government of Myanmar, Statistics Austria, Statistics Norway, Statistics Denmark, Eurostat, Swiss Federal Statistical Office, National Institute of Statistics (Uruguay), OECD, Bundesbank, Bank of Korea, European Central Bank, International Monetary Fund, Bank of Canada, Bank of England, Wichita State University, York University (UK), University of Manchester (UK), University of Haifa (Israel), Central Michigan University, and the University of Hong Kong.

Staff met with staff from the Foreign Trade Division and the Office of Statistical Methods and Research for Economic Programs (OSMREP) to discuss possible reactions to concerns of the Bureau of Economic Analysis about perceived residual seasonality in the total imports and exports data.

Staff also met with staff from the Services Statistics Division to discuss findings of a study on the use of different Easter models on retail sales series.

As part of the Seasonal Adjustment Guidelines team, staff developed a Census Bureau response to seasonal adjustment guidelines developed by the OECD.

*Staff:* Brian Monsell (x31721), Tucker McElroy, David Findley (DIR)

### B. Seasonal Adjustment Software Development and Evaluation

The goal of this project is a multi-platform computer program for seasonal adjustment, trend estimation, and calendar effect estimation that goes beyond the adjustment capabilities of the Census X-11 and Statistics Canada X-11-ARIMA programs, and provides more effective diagnostics. This fiscal year's goals include: (1) finishing a release version of the program for the general public that includes the automatic time series modeling capability of the TRAM/SEATS seasonal adjustment program; (2) the further development of a version X-13A-S program that calls SEATS so that, when appropriate, SEATS adjustments can be produced by the Economic Directorate; and (3) further improvements to the X-12-ARIMA user interface, output and documentation. In coordination and collaboration with the Time Series Methods Staff of the Office of Statistical Methods and Research for Economic Programs (OSMREP), the staff will provide internal and/or external training in the use of X-12-ARIMA and the associated programs, such as X-12-Graph, when appropriate.

During FY 2007, staff added new capabilities to Version 0.3 of the X-12-ARIMA software, allowing users to print and save backcasts from regARIMA models and include user-specified metadata in the unified diagnostics output, adding information on the number and types of outliers in the final model to the unified diagnostics output, resolving a rounding problem in program output, not allowing automatic transformation selection when fixed regressors are included in the regARIMA model, and changing the structure of the automatic model identification procedure to redo outlier identification when the final model identified undergoes a change in differencing. Much of this work was done at the request of the Time Series Methods Staff of OSMREP.

Staff released Version 0.3 of X-12-ARIMA to the public after testing new options incorporated into the code and correcting software defects as they were encountered and reported. In addition, utilities were released to convert program output to accessible HTML, convert input files for the previous version of X-12-ARIMA to input files that can be used with Version 0.3, and develop diagnostic summaries for seasonally adjusted series.

After release of the software, an open source utility was used to search for vulnerabilities in X-12-ARIMA's Fortran subroutines. Staff also incorporated enhancements to the automatic model identification procedure suggested by colleagues at Statistics Canada. These were made available to analysts via the intranet, and this version will be released to the public soon.

Staff continued to develop the X-13A-S seasonal adjustment software, incorporating all changes made to Version 0.3 of the X-12-ARIMA program, and adding a model-based seasonality F-test for stable seasonality based on research conducted by the Time Series Methods Staff of OSMREP and one parameter stock trading day regressors.

Staff developed Linux versions of the seasonal adjustment software, and made available to staff in the Economic Directorate Linux source code that could be compiled on their Linux machines for their testing and implementation purposes.

Staff attended a meeting of a newly formed IT Tools Subgroup of a Seasonal Adjustment Steering Group set up by Eurostat and OECD to discuss the development of a new seasonal adjustment tool incorporating X-12-ARIMA to be used at Eurostat and other European statistical agencies.

*Staff:* Brian Monsell (x31721)

### C. Research on Seasonal Time Series - Modeling and Adjustment Issues

The main goal of this research is to discover new ways in which time series models can be used to improve seasonal and calendar effect adjustments. An important secondary goal is the development or improvement of modeling and adjustment diagnostics. This fiscal year's projects include: (1) development of seasonal adjustment diagnostics; (2) further study of the effects of model based seasonal adjustment filters; (3) development of methods to estimate signal extraction errors in X-12-ARIMA; (4) examination of methods for modeling time varying trading day using regression component models; and (5) exploration of alternate models for holiday and calendar adjustment of economic time series.

During FY 2007, staff conducted research on several projects related to seasonal adjustment and time series modeling, including:

A. Continued development of seasonal adjustment diagnostics–the first set of diagnostics is non-model-based, and looks for seasonal peaks in the residual spectrum, and the second set of diagnostics is model-based, and constitute several goodness-of-fit tests focused on local spectral bands. We extended this work in various ways: multi-peak testing, handling nonstationary time series, refinement of convexity hypotheses, and extension to log spectrum methods.

B. Continued work on empirical revision variances, which can be used to assess model misspecification pertinent to model-based seasonal adjustment procedures, forming a model-based analog of the sliding-span procedures. We made important corrections to formulas for the variance, and conducted extensive empirical testing of the diagnostics, modifying them to improve power.

C. Researched methods to recast the X-11 seasonal adjustment filters into a finite-sample model-based signal extraction context, whereby time-varying filters could be obtained–allowing for fluid and coherent handling of edge effects–as well as signal extraction mean squared errors. Determination of decent estimates of the signal extraction mean squared errors for X-11 seasonal adjustment is a long-standing problem of exceptional importance to the U.S. Census Bureau. Staff developed two paradigms for recasting the X-11 filters and has begun implementation of the methods.

D. Revised the regCMPNT software to allow constraining variables for specified components, to allow researchers to use a model for moving trading day developed by Harvey.

E. Derived formulas that explain the frequency domain effects of linear filters on nonstationary

data, which is important for the understanding of the gain function of seasonal adjustment filters.

F. Evaluated the use of stock trading day regressors with Census Bureau inventory series, finding support for the use of a constrained version of the standard stock trading day regressor in M3 inventory series, refining the results by using spectral peak and Ljung-Box Q diagnostics to determine which series would be best for adjustment by constrained stock trading day.

G. Continued to derive formulas for signal extraction that allow for a variable sampling frequency, as well as producing interpolated values in an optimal fashion. This has the goal of producing interpolated seasonal adjustment estimates.

H. Examined the use of various alternates to the Easter regressor currently used in selected Retail Sales series. While the study found that some of the alternate regressors had better model selection diagnostics than the current Easter regressor, often the choice of regressor did not improve forecast performance versus a model without Easter regressors.

I. Began investigation of a new goodness-of-fit diagnostic based on the log spectral density.

J. Began investigating variance estimation for processes with a unit root, which is pertinent to the modeling of economic data.

K. Began researching unobserved components models with heavy-tailed distributions, as a way of modeling economic time series with extreme values.

*Staff:* Tucker McElroy (x33227), Christopher Blakely, Donald Martin, Brian Monsell, William Bell (DIR), David Findley (DIR)

**D. Supporting Documentation and Software for X-12-ARIMA and X-13A-S**

The purpose of this project is to develop supplementary documentation and supplementary programs for X-12-ARIMA and X-13A-S that enable both inexperienced seasonal adjustors and experts to use the program as effectively as their backgrounds permit. This fiscal year's goals include improving the documentation of X-12-ARIMA, creating utilities that render the output from X-12-ARIMA accessible, and collaborating with the Time Series Methods Staff (TSMS) of the Office of Statistical Methods and Research for Economic Programs (OSMREP) to develop a graphics package for the Windows Interface to X-12-ARIMA.

During FY 2007, our staff updated drafts of the *X-12-ARIMA Reference Manual* for Versions 0.3 and X-13A-S, and arranged for a contractor to develop an accessible version of the *X-12-ARIMA Reference Manual* that will satisfy Section 508 requirements. The X-12-ARIMA Reference Manual for Version 0.3 was released along with a set of release notes for the program; utilities for converting spec files used with version 0.2.10 of X-12-ARIMA to spec files that can be used with version 0.3 of X-12-ARIMA as well as a utility to produce diagnostic summaries were also released.

Staff completed development of a utility in the Icon programming language to convert an X-12-ARIMA output file into accessible HTML. The utility was revised to generate footnotes in the sliding spans and regARIMA modeling output using best practices for producing accessible output. Staff also developed a Java-based graphical package that will be a component of a redesigned Windows Interface for X-12-ARIMA, in collaboration with the Time Series Methods Staff of OSMREP.

Staff produced research papers concerning the error found in business cycle estimates, using a spectral approach for assessing time series model misspecifications, changes in seasonal adjustment software developed by the Census Bureau and continuous time signal extraction, as well as two papers on estimating tail indexes for heavy-tailed distributions, one using a non-parametric approach and another using log moments.

*Staff*: Brian Monsell (x31721), Tucker McElroy, David Findley (DIR)

## 1.24 POSTAL REGULATORY COMMISSION/ STATISTICAL CONSULTING (Statistical Research Division Project 8150)

The work associated with this project will entail the review of testimony, interrogatories, decisions, and other documentation relating to proceedings of the Commission in order to identify major statistical issues and provide relevant consultation. The consultation will include: 1) the briefing of the commissioners and other commission officials on the ramifications and desirable approaches to the identified statistical questions; and 2) the presentation of written summaries of the major findings from all assigned reviews.

During FY 2007, staff conducted technical reviews of testimony, interrogatories, briefings and survey results and documentation related to the 2006-07 rate case. We also provided statistical briefings from

members of the Rate Analysis and Planning and General Counsel staffs and completed reviews of estimation and analysis proposals, by participants in the rate case, regarding the U.S. Postal Service's Window Time Transaction study and costs projections for the Within County Periodicals mail subclass.

We prepared initial drafts of segments of the technical sections of the Commission's decision relating to the requisite analysis and subsequent determination of the rate change for "Within County Periodicals." Moreover, we reviewed relevant reports and other USPS documentation related to mail delivery standards and performance measurement and reporting and participated in associated technical conferences and follow-up meetings. Staff also conducted an extensive technical review of the Postal Service's final proposal for a revision of the mail delivery performance measurement system.

*Staff:* Leroy Bailey (x34917)

## 1.25 PROGRAM DIVISION OVERHEAD (Census Bureau Project 0251)

### A. Division Leadership and Support

This staff provides leadership and support for the overall collaborative consulting, research, and operation of the division.

*Staff:* Tommy Wright (x31702), Tina Arbogast, Alice Bell, Pat Cantwell, Robert Creecy, Manuel de la Puente, Michael Hawkins, Judi Norvell, Barbara Palumbo, Gloria Prout, Diana Simmons, Kelly Taylor

### B. Research Computing

This ongoing project is devoted to ensuring that Census Bureau researchers have the computers and software tools they need to develop new statistical methods and analyze Census Bureau data.

The SGI Altix (research1.srd.census.gov) is a significant component of the Longitudinal Household Employer Dynamics (LEHD) program. During FY 2007, we assisted LEHD in the preparation of its IT security certification and accreditation (C&A) package. All federal information systems are required by law to undergo C&A, which involves a careful analysis of the risks to the system and the selection and implementation of security controls to mitigate those risks. The C&A package was submitted and the system was formally certified on April 12. Work continues on addressing a few outstanding security issues documented in the system's Plan of Action with Milestones (POA&M). In June, LEHD found that running jobs related to their OnTheMap (OTM2) application on research1 greatly reduced the processing time. Accordingly, they are planning to migrate OnTheMap processing to research1.

*Staff:* Chad Russell (x33215), Mohammed Chaudhry

# 2. RESEARCH

### 2.1 – 2.2 GENERAL RESEARCH AND SUPPORT TOPICS
### Census Bureau Projects 0351, 1871)

## *Statistical Methodology*

**A. Disclosure Avoidance**

The purpose of this research is to develop disclosure avoidance methods to be used for all Census Bureau publicly available data products. Emphasis will be placed on techniques to implement disclosure avoidance at the stage of processing. Methods will be developed, tested, evaluated, and documented. We will also aid in the implementation of the methods.

During FY 2007, staff conducted computational analysis into the uniqueness problem. Sample uniques may not be population uniques therefore do not introduce disclosure risk if they are part of the data release. Unique elements in the sample are at the basis of several disclosure avoidance procedures and as such, the problem of protecting sample uniques that are not population uniques (or overprotection) is an important one. Another aspect of this research is the sampling method used to draw sub-samples. Staff showed empirically that the sampling scheme does not make a significant difference in the probability of being unique in the population given being unique in the sample.

Staff tested an alternative to publishing several versions of a synthetic data file for the evaluation of the correct standard errors. The alternative resamples the same proportion of synthesized data and applies the same synthesis process to the sub-samples to create pseudo-synthetic data files. The method is still under investigation. It currently does not show consistency in estimating standard errors.

Staff worked the Census Bureau lawyers and Policy Office to develop letters to Congressmen with constituents complaining about being in a Census Bureau survey.

Staff worked with Longitudinal Employer Household Dynamics staff to develop a new synthetic data product called "On The Map."

Staff worked with staff from other federal statistical agencies to develop the "Guidance for Implementing Confidential Information Protection and Statistical Efficiency Act."

Staff contributed to writing the funding proposal for the Microdata Analysis System (MAS) and its integration into the Ferret System. Funding from the Associate Director for Strategic Planning and Innovation should support the project through testing and a prototype of the Ferret version. Meanwhile, American Community Survey data have been incorporated into the existing version, and staff have revised the cutpoint program to handle data features newly encountered in the ACS. These features include automatic treatment for negative values, treatment for missing values, and non-monetary "continuous" variables. Debugging the MAS continued. Draft specification of the rules for the DataFerret version was written. Keeping rules accessible for revision is a major design problem. The rules testing contract and criteria were issued, bid and accepted. The contract for the final prototype (a new rule, rewrite of some existing rules and documentation) was issued and bid.

We determined that a tabulation that went out to the private company Apprise did not constitute a data breach. It did not, however, conform to our confidentiality standards. A letter from the Director was sent to Apprise requesting the return of the original data. Apprise is complying with the request. This has the added bonus of clearing the way for a new tabulation with a shifted threshold.

One of our staff members chaired the interagency Confidentiality and Data Access Committee (CDAC) meeting. The committee is in transition due to the formation of the new privacy committee. CDAC continues to serve as the focus of statistical data protection methodology. CDAC continues to provide the instructor pool for the committee's course offering. Our staff organized the one-day course that was offered at the annual meeting of the North American Association of Central Cancer Registries. It was well attended and received.

Another staff member attended a meeting on the proposed data product for the National Educational Assessment Program, which may end up being the model for big programmatic needs. Staff attended the Personal Identifiable Information Assessment kickoff meeting. The Disclosure Review Board (DRB) has a role in the data classification scheme. Our staff held discussions with Consumer Expenditure staff from the Bureau of Labor Statistics. They have implemented the DRB's checklist addendum, documented the topcoding, and have the package nearly ready to go. Staff met with the Dress Rehearsal planning group and began to develop a strategy for data protection, in particular for Groups Quarters data. A staff member met with staff from the National Opinion Research Center and several CDAC members at Statistics of Income (Internal Revenue Service) to discuss researcher training in confidentiality. Staff attended meetings discussing the development of the data custodian guidance. This is a fairly substantial oversight function being implemented directorate by directorate. Staff attended several meetings to discuss a Department of Justice request for

insurance data. Staff are working with The Economic Statistical Methods and Programming Division to implement a procedure for making realistic fake test and training data.

*Staff:* Laura Zayatz (x34955), Phil Steel, Paul Massell, Sam Hawala, Jeremy Funk, Mohammed Chaudhry

**B. Disclosure Avoidance for Microdata**

Our staff investigates methods of microdata masking that preserves analytic properties of public-use microdata and avoid disclosure.

During FY 2007, we updated the list of microdata confidentiality references. Staff distributed the papers "The Deleterious Effects of Masking" and "Straightforward Procedures for Producing and Verifying Public-Use Microdata" and the microdata confidentiality references.

We worked on methods of modeling (primarily discrete data) that preserve a few of the analytic properties of data. The models are to be used in producing 'synthetic' or 'artificial data' that can be used in re-identification experiments for potential public-use microdata. We wrote new versions of loglinear modeling software that has features not available in commercial software. The intent is to produce a version of the synthetic data that approximately reproduces certain large sets of aggregates that are needed for the loglinear modeling. Small cells in the first version of the synthetic data that correspond closely with small cells in the original, confidential microdata would be changed with a controlled reduction/enhancement procedure that is somewhat analogous to the controlled distortion procedure of Kim and Winkler (1995). As with the Kim-Winkler procedures for continuous microdata, any re-identification in the synthetic (or masked) data due to small cell counts would be with 'artificial' records that preserve certain aggregates for analysis but do not correspond to 'real' entities.

We created methods and software that systematically produce models (in terms of minimizing Kullback-Leibler distance) that accurately fit original, confidential data. Synthetic data drawn from the model has mass associated with small cells in original data allocated to both the original cells and sampling-zero cells. While assuring analytic properties of the synthetic data drawn from the model, the methods significantly reduce the probability of re-identification. We can further place upper bounds on specified cells and even zero out some cells (by making them structural zeros). While providing a more systematic method of assuring analytic properties than recent results of Abowd et al. (2007), it should reduce re-identification risk as well as Abowd et al. (2007) and as well as Reiter and Mitra (2007). The results are documented in "Analytically Valid Discrete Microdata Files and Re-identification" that was presented at the Joint Statistical Meetings and will appear in the *SRD Research Report Series*.

We completed the document "Examples of Easy-to-implement, Widely Used Methods of Masking for which Analytic Properties are not Justified." The paper systematically examines a number of the easy-to-implement masking methods that are widely used in statistical agencies for producing public-use files. In all situations, the methods severely distort analytic properties of the original, confidential microdata. In many situations, a small subset of records are still re-identifiable. In several of the worst situations, a moderately high proportion of the records are re-identifiable within certain frameworks. The results will appear in SRD's *Research Report Series*.

*Staff:* William Winkler (x34729), Yves Thibaudeau, William Yancey

**C. Seasonal Adjustment (See Economic Project 2370752)**

**D. Small Area Estimation-Decennial/ Demographic Applications**

A meeting designed as an open forum for small area research and topics on small area census coverage evaluation was established and meets twice each month. These meetings are designed as a way to disseminate ideas on small area estimation at the early stages of development. The group includes researchers in the Decennial Statistical Studies Division, the Statistical Research Division, and the Director's Office who are working on small area coverage projects.

During FY 2007, topics covered included: 1) random effects models for coverage; 2) review and discussion of publications of Elliot and Little; 3) modelling within Local Census Offices (LCO) variability; 4) including random effects to account for model error in logistic regression; 5) modelling multi-levels of coverage variability; 6) State estimates of coverage using logistic regression or using post-strata and evaluation of single-year age groups for estimating coverage using logistic regression or using post-strata; 7) marginal logistic models as an alternative to conditional logistic models for small area estimation; 8) comparisons of small area estimates from the random effects model with hard-to-count scores in which it was found that the Targeted Extended Search design may have an impact on model-based estimates; and 9) comparison of sex ratios from the random effects model with demographic estimates to evaluate whether the geographic heterogeneity in the model can account for correlation bias.

*Staff:* Jerry Maples (x32873), Don Malec

**E. Nonresponse in Longitudinal Surveys**

The purpose of this continuing project is to develop methodology to evaluate alternative (cell-based and logistic regression) models for nonresponse adjustment in longitudinal surveys, especially in the re-engineered SIPP.

During FY 2007, staff continued work on an FCSM paper about using a metric of nonresponse adjustment quality, developed last year, for the purpose of model selection.

*Staff:* Eric Slud (x34991), Leroy Bailey

**F. Household Survey Design and Estimation**

The household surveys of the Census Bureau cover a wide range of topics but use similar statistical methods to calculate estimation weights. It is desirable to carry out a continuing program of research to improve the accuracy and efficiency of the estimates of characteristics of persons and households. Among the methods of interest are sample designs, adjustments for nonresponse, proper use of population estimates as weighting controls, and the effects of imputation on variances.

During FY 2007, we worked on a joint project with the Decennial Statistical Studies Division to prepare website documentation that describes and compares 1-, 3-, and 5-year estimates and their standard errors for ACS, discusses their usage, and presents corresponding examples.

One staff member is on the 2010 Sample Redesign Optimal Sample Design Strategy Team led by the Demographic Statistical Methods Division. The team looked at overall approaches using or not using primary sampling unit (PSU)-based designs and prepared a report with recommendations for the next phase of study.

Staff (Weidman, Malec, Cantwell) attended a meeting of the National Survey Working Group for the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. We discussed ideas for making the survey design and estimation more efficient. For inclusion in the meeting minutes, we prepared a summary of the two main research paths presented and why they should both be pursued.

*Staff*: Lynn Weidman (x34902), Michael Ikeda, Julie Tsay

**G. Sampling and Estimation Methodology: Economic Surveys**

The Economic Directorate of the Census Bureau encounters a number of issues in sampling and estimation in which changes might increase the accuracy or efficiency of the survey estimates. These include estimates of low-valued exports not currently reported, alternative estimation for the Quarterly Financial Report, and procedures to address nonresponse and reduce respondent burden in the surveys. Further, general simulation software might be created and structured to eliminate various individual research efforts.

During FY 2007, we continued to investigate methodology for treating an influential observation in the estimation of total revenue from the Monthly Survey of Retail Trade. An observation is considered influential if the estimate of total monthly revenue is dominated by its weighted contribution. The goal is to find methodology that uses the observation but in a manner that assures its contribution does not dominate the total. We prepared two papers that describe the methodology and some results.

Our staff completed and documented research on estimators of low-valued exports (LVEs) for the Foreign Trade Division. For the majority of exporters, we have no information on LVEs, those valued at or below the exemption level of $2,500. The Census Bureau estimates the low-valued component for any country by multiplying its total of exports valued over $2,500 by a pre-determined country factor, determined in the late 1980s. Some experts believe that the current system may underestimate LVEs. We explored potential procedures that would accurately represent what is currently being exported, and can adapt over time with minimal review to reflect changes in export patterns. Some results follow: (1) Combining exports into groups within or across countries seems to produce more robust estimators that can reflect the changing patterns of exports over time. (2) Estimating LVEs based on the small portion of exporters who report their LVEs appears to underestimate the component from exporters who don't report their LVEs. (3) Although the totals and details of LVEs to Canada are available from Statistics Canada, the difference in export patterns to Canada render these data less useful. (4) Modeling the probabilities that an exporter will file via one of two permitted processing procedures was not successful because the probabilities appear to have a reversal in trend at the exemption level, $2,500. (5) A model that hypothesizes that some shippers split their exports into smaller pieces to avoid filing export documents is well motivated. The resulting estimates of LVEs are more in line with what is expected based on prior reconciliation studies, but are based on several assumptions that would be difficult to prove with current data. Additional information and detail can be found in "Several Approaches to Estimating Low-Valued Exports from the U.S.," P. Cantwell, 2007, *SRD Research Report Series (Statistics #2007-12).*

Our staff also participated in a panel that reviewed and evaluated the Department of Agriculture's plans for the 2012 Census of Agriculture (COA), and provided recommendations. The contribution from our division was focused on statistical components of the evaluation, including improving coverage adjustment, improving the area-frame sample, and adjusting for nonresponse. Staff recommended (among other things) that the National Agricultural Statistical Service should (1) consider developing a total-error model based on data from the 2007 COA, to incorporate errors due to matching, interviewing, response, nonresponse, edits, etc., in 2012; (2) investigate potential coverage issues from new and existing farms following the 2007 June Agricultural Survey and 2007 Agricultural Coverage Estimation Survey, but before the 2007 COA; (3) target strata that are both intensely and not intensely agricultural when allocating the area sample, to better capture farms not likely to be on the Census Mailing List; (4) follow up with a sample of cases that do not respond to screeners and the survey in the 2007 COA to determine how many are farms, then model the probabilities that such cases are farms in the nonresponse weighting in 2012; and (5) follow up in person a sample of cases with undeliverable addresses in the 2007 COA, thereby permitting an estimation of the number of farms among them in 2012.

*Staff:* Pat Cantwell (X34982), Mary Mulry, Roxanne Feldpausch (ADEP), Lynn Weidman, Don Malec

**H. Research and Development Contracts**

The Research and Development Contracts are indefinite delivery, indefinite quantity task order contracts for the purpose of obtaining contractor services in highly technical areas to support research and development activities across all Census Bureau programs. The contracts provide a pool of contractors to assist the Census Bureau in conducting research on all survey and census methods and processes to improve our products and services through FY 2007. The prime contractors include educational institutions, university-supported firms and privately owned firms that concentrate in sample survey research, methodology, and applications to create a pool of specialists/experts to tackle some of the Census Bureau's most difficult problems through research. Many of the prime contractors are teamed with one or more organizations and/or have arrangement with outside experts/consultants to broaden their ability to meet all of the potential needs of the Census Bureau. These five-year contracts allow Census Bureau divisions and offices to obtain outside advisory and assistance services to support their research and development efforts quickly and easily. The multiple contracts were awarded during FY2002 in six technical areas: 1) assessment, planning, and analysis; 2) data analysis and dissemination; 3) statistical analysis, 4) methodological research, 5) sub-population research, and 6) survey engineering.

During FY 2007, eleven new task orders were awarded, 41 modifications were awarded, 19 task orders were completed and one was a stop work order. To date, there have been 67 task orders awarded under the R&D 2007 contracts, with a monetary value of over $67.9 million (over $57.9 million obligated). The Master Contracts were extended six months and the ceiling was raised from $50 million to 70 million dollars to allow additional time to award the next 5-year R&D contracts.

*Staff:* Ann Dimler (x34996)

## *Statistical Computing Methodology*

**A. Record Linkage and Analytic Uses of Administrative Lists**

Under this project, our staff will provide advice, develop computer matching systems, and develop and perform analytic methods for adjusting statistical analyses for computer matching error.

During FY 2007, we gave the talk "Data Quality and Record Linkage" at the National Academies of Science. We supplied substantial background material and new examples as supplements to the talk.

Our staff produced a new version of production *BigMatch* software for Decennial Census testing. We created two parallel versions of *BigMatch*. The second version uses substantially improved logic that has some similarity to the C++ version of *BigMatch* (that is not being used for production matching). We are testing the new version for consistency of outputs with the main production *BigMatch* software. If the new, parallel version of *BigMatch* is successful (including substantial speed increases with multiple CPUs) staff will likely write a new version of the SRD matcher that contains the new logic.

We completed the documents "Estimation of False Match Error Rates for Record Linkage" and "Test Databases for Approximate Joins."

We completed a version of *BigMatch* with a faster string comparator variant and preprocessing that is approximately twice as fast the existing *BigMatch*. In initial tests, the software processed approximately 375,000 pairs per second on a single-processor machine. Although not as accurate as the existing *BigMatch*, the faster software allows new exploratory analyses and matching.

We delivered a new version of *BigMatch* with an '*S*' comparison that is used for street name comparison where some street names contain numbers. The original

'*uo*' comparison would not adequately deal with street names with numbers. The new version will be locked down and used during the 2008 Dress Rehearsal.

Using two different versions of parallel *BigMatch*, we have decided that it will be nearly impossible to write a version of *BigMatch* that can be used for large files (over 100 million records) that must fit in RAM. The difficulty is that memory of the Research1.SRD computer (where we can use the Open MP parallel programming methods) is tightly coupled with pairs of CPUs. A large data structure must be spread across the noncontiguous memory associated with individual CPUs and the CPUs that are performing the computation cannot access all of the data (that they need to access).

We continue to work on the better structured version of *BigMatch* to improve its speed and maintainability. This new C version has the excellent overall structure of an earlier C++ version but is as fast the current C version of *BigMatch*. The C++ version was 8-12 times slower than the C version that we are currently using for production matching.

On Research1.SRD, we are able to perform national matches by subdividing the 300 million-record Census file into the 500 contiguous regions associated with Local Census Offices. Although this method recreates nearly identical data structures and repeats some computations on different CPUs, it is straightforward to implement using the current version of *BigMatch*.

We completed documentation for the version of *BigMatch* that is being used during the 2008 Dress Rehearsal.

*Staff:* William Winkler (x34729), William Yancey, Ned Porter

**B.1 Editing**

This project covers development of methods for statistical data editing. Good methods allow us to produce efficient and accurate estimates and higher quality microdata for analyses.

In this research we review methods for developing edits for survey data. For economic surveys, we looked at ratios of highly correlated fields to determine if records in the tails of distributions of ratios are actually in error and can be used to identify fields that must be changed. We examined whether records associated with the tails of distributions of ratios of highly correlated fields are actually in error and can be used to identify (most) erroneous items. We used a set of 10,000 artificial records with a large number of errors by design (both clean and edit-failing records) for comparing the results obtained when editing the data using both ratio edits and the tails of distributions of ratios. We completed tables and plots of basic statistics, comparisons of regression parameters, and studied the effects of large records on the aggregates. We have drafted a report for the *SRD Research Report Series* ("Determining a Set of Edits," Winkler and García).

*Staff:* María García (x31703)

**B.2 Editing and Imputation**

Under this project, our staff will provide advice, develop computer edit/imputation systems in support of demographic and economic projects, implement prototype production systems, and investigate edit/imputation methods.

During FY 2007, and with the help of the Manufacturing and Construction Division, we set up a database including frame information along with survey records. The database contains the information needed for imputing and editing missing or inconsistent items for the Survey of Research and Development, a semi longitudinal survey.

*Staff:* Yves Thibaudeau (x31706)

**C. Developed Software Support – General Variance Estimation Development and Support**

This project will develop new methods and interfaces for general variance estimation software including VPLX, WesVar, and SUDAAN. Our staff will provide support for complex applications such as the Survey of Income and Program Participation and the Survey of Construction, create training materials, and provide training for variance estimation software applications.

During FY 2007, we continued to offer ongoing Hotline support for variance estimation software to the four program directorates at the Census Bureau. Staff continued to provide specific, long-term support to the Manufacturing and Construction Division. In addition, staff installed VPLX on the new Economic Directorate Linux machines and updated VPLX source code to accommodate those machines.

*Staff:* Aref Dajani (x31797), Ned Porter, Bob Fay (DIR)

**D. Statistical Computation for Longitudinal Employer-Household Dynamics (LEHD)**

The Longitudinal Employer-Household Dynamics project is a cooperative effort among several areas of the Census Bureau to combine federal and state economic data with demographic data. Sources of data include the American Community Survey, IRS, and Social Security data. Using this data, researchers will now be able to perform analyses that help disentangle the effects of choices that firms make from the choices workers make.

During FY 2007, the sequential version of the cg2 fixed effects modeling program was significantly sped up by about 40% by paying careful attention to memory access patterns. Initial development of a hybrid MPI and OpenMP version was started. The Monte Carlo FORTRAN program, cg2_4mix, for computing the Restricted Maximum Likelihood (REML) estimates of the mixed model was finished. A test example with about 500,00 persons and 100,000 firms ran more than 2500 times faster than the ASREML program and gave nearly identical results. Also MATLAB and R versions of the fixed and mixed model programs were written to help with software development. An extended version of cg2_4mix which computes standard errors of the fixed effects estimates was also completed, and adding the computation of the standard errors added only about 75% more time for the 500,00 person test example. A draft *SRD Research Report*, "Linear Mixed Model Estimation for High Dimensional Crossed Factors Using Conjugate Gradient," documents the new algorithms and software.

*Staff:* Rob Creecy (x33207)

**E. Missing Data and Imputation: Multiple Imputation Feasibility Study**

Methods for imputing missing data are closely related to methods used for synthesizing missing items for disclosure limitation. One method currently applied to both issues is multiple imputation. Although the two issues may be addressed separately, techniques have been developed that allow data users to analyze data in which both missing data imputation and disclosure limitation synthesis have been accomplished via multiple-imputation techniques. This project ascertains the effectiveness of applying multiple imputation to both missing data and disclosure limitation in American Community Survey group quarters data. Statistical models are used to generate several synthetic data sets for use in the multiple-imputation framework.

During FY 2007, we tested the feasibility of performing missing-item allocations using our synthetic data framework; tests were performed on synthetic data. The tests show promise, but further research is needed to guarantee that any allocations made via synthetic-data methods will completely satisfy edit requirements. Research on edit compliance is being conducted for disclosure avoidance, and findings from that research will be incorporated into the allocation system.

*Staff:* Rolando Rodríguez (x31816)

**F. Optimizing Field Operations**

This project is intended to provide the Field Division with a resource for new research in areas that will improve its processes. Over time, research topics may include modeling or forecasting. The first project will study the use of operations research techniques to improve the ability to predict survey costs and response rates in the field.

During FY 2007, staff analyzed the 2004 National Health Interview Survey (NHIS) contact history instrument (CHI) data sets. They were used to estimate the contact/no contact probability based on the day of a week and the time of a day and therefore, to perform the input analyses of the simulation model of the NHIS field operation. The analysis indicates that late afternoon to early evening (from 3:00 to 8:00 p.m.) of weekdays usually and consistently has better chance to contact the respondents than any other time including weekends. The empirical distributions of contact/no contact were used to generate random numbers to simulate the contact or no contact of households in the "sample." Staff also made changes to the simulation model on the interview length distributions and the simulation model with C++ programming. Staff performed the experimental design and output data analysis of the simulation model. Staff also completed a draft report of the paper, "Stochastic Simulation of Field Operations in Surveys" to present the results of the simulation modeling. The results indicate that a smaller primary sampling unit (PSU) area for each field representative is more cost effective. It has been shown that the concept of *less time on the roads and more time knocking on the doors* is feasible. The most important result is that the cost saving is **not** at the expense of the response rate. The results are based on the 2004 NHIS CHI data. Staff also obtained 2006 NHIS CHI data from the Demographic Surveys Division, and began to investigate the activities of field representatives so that all PSUs (each PSU is usually assigned a field representative) can be classified into several categories to improve the validity of the simulation model.

The staff wrote a SAS program and C++ program to detail the field representatives' field activities based on the 2006 CHI (Contact History Instrument) dataset. We also listed the sample sizes of the PSUs sampled for the 2006 National Health Interview Survey. The states, the counties (or county-equivalents), and their FIPS (Federal Information Processing Standards) codes were also listed for the purpose of classifying the PSUs. The staff also reviewed the general modeling methodology for the outbound telephone calling centers, such as telephone surveys, for optimizing the calling center operations.

*Staff:* Bor-Chung Chen (x34857), Matt Windham

**G. Modeling, Analysis and Quality of Data**

Our staff investigates methods of the quality of microdata primarily via modeling methods and new

software techniques that accurately describe one or two of the analytic properties of the microdata.

During FY 2007, we wrote a first version of generalized imputation software for discrete data that can also be used for statistical matching (D'Orazio, Di Zio, and Scanu *JOS* 2006). The software incorporates basic methods of modeling interactions (Bishop, Fienberg, and Holland 1975) as in commercial software, and allows two types of generalized, convex constraints (Winkler, *Ann. Prob.* 1990). The advantage of the convex constraints is that the final database of completed data can be restricted in a plausible manner that more accurately reproduces margins that correspond to 'true' margins available from comparable survey data. The iterative fitting procedures use I-Projections that via duality (Dykstra and Lemke, *JASA*, 1988) increase the likelihood to local maxima using an MCECM procedure (Meng and Rubin, *Biometrika* 1993, Winkler 1993).

As a significant enhancement to the first version of the modeling software, we created new software for general loglinear modeling of discrete microdata and for creating models of microdata under the ignorable nonresponse assumption (as is universally used in hot-deck–a special case). The software is much faster and provides several features not available in commercial software. Additionally, we created new imputation software that makes uses of the data models produced by the general modeling software and that can be extended for the special case of hot-deck imputation.

The new methodology and generalized software make it very easy to produce multiple copies of imputed data sets and consequently to produce reasonable estimates of imputation variance. From a data quality perspective, the general software can be used for production work in many demographic and other surveys. Possibly for the first time, the software may allow straightforward evaluation of the hot-deck and other (more valid) imputation methods. Hot-deck has well-known difficulties preserving joint distributions. Generalized software eliminates many of the difficulties in implementing hot-deck due to analytic logic errors, errors due to programming production systems from scratch, and lack of evaluation of alternative hot-deck matching procedures.

Using some of the previously developed software for modeling and imputation, we are able to show the substantial variation in aggregate estimates of well-implemented hot-deck methods over different random orderings. It is well known that it is often difficult to implement hot-deck matching rules and correct logic so that joint distributions are approximately preserved. With the modeling software, we are able to create good-fitting loglinear models from which to draw (probability proportional to size) imputations that preserve joint distributions in the manner of Little and Rubin (2002). Both hot-deck (implicitly) and the general software impute according to a missing-at-random principle. Whereas most hot-deck software is implemented from scratch using highly survey-specific methods with ad hoc matching rules that may contain logic errors, the generalized software can be used on almost all demographic surveys (with discrete data) and produces justifiably superior data (with far less resources).

We produced several background/issues documents on file clean-up, merging and maintenance for a National Academies of Science (NAS) committee that will be studying issues related to the creation and interoperability of state voter registration databases. The study is related to the Help America Vote Act of 2002. One staff member agreed to serve on the NAS panel.

One staff member co-authored a monograph on data quality that will be a featured book at the annual meeting of the Society of Actuaries and was part of a short course at the Joint Statistical Meetings.

*Staff:* William Winkler (x34729), Rob Creecy

## *Survey Methodology*

### A. Usability Research and Testing

#### A.1. Web Applications Accessibility

This project focuses on the accessibility of Internet and Intranet applications by blind and low vision users in accordance with the Section 508 regulations.

Section 508 Implementation Team: This inter-divisional team's purpose is to raise awareness of the Section 508 laws through on-line training and dissemination of information. During FY 2007, staff created e-mail messages for general broadcast for Disability Awareness Month in October 2006.

AESDirect (Foreign Trade Division): AESDirect permits exporters to declare the value of goods they are sending to foreign countries. During FY 2007, the report detailing accessibility findings was delivered to the sponsor. Staff met with the contractor to discuss the findings. It was discovered that the registration page and the PCWebLink application were not evaluated in this report. The WebLink application had buttons and text which were inaccessible to screen- reading software. The accessibility findings were merged with findings from usability testing and submitted to the *SRD Research Report Series.*

CalendarWiz (Marketing Services Office): Members of the public and Census employees will use this application to get information on presentations, meetings, and exhibits and when and where the event occurs. During FY 2007, an accessibility evaluation was performed on this application. It was found that

images were not tagged within the help system. This project is complete and the report will be submitted to the *SRD Research Report Series.*

PDF Flow Diagram (Data Integration Division): This PDF document contained a flow diagram for the State and Counties Totals Estimates process. During FY 2007, it was found that text in elements past the first line were not detected by the screen reader. Staff directed the sponsor to look at the tag structure again and the coding error was uncovered. All elements in the flowchart are now accessible.

Maryland County Population Ranking Table (Systems Support Division): This table was written in AJAX and contains State and County data. During FY 2007, testing revealed that the table was accessible to screen reader users, but the order of the first two columns was reversed. Switching the ranking and County name so the County is read first addressed the issue.

Waiver Procedure Flash Paper (Data Integration Division): A waiver procedure was created in Flash so it can be viewed in any browser without downloading a plug-in. During FY 2007, staff performed an accessibility evaluation on the Flash document provided by DID. It was found that the table containing document revision history was not accessible to the screen reader software. It was recommended that an HTML version replace the Flash version of the waiver document.

X-12 ARIMA Output Tables (Statistical Research Division): Output from X-12 ARIMA is presented in various type of tables and charts. During FY 2007, we assisted another SRD staff member in validating all output tables for Section 508 compliance. One specific issue addressed was table footnotes. These footnotes were programmed so after they were read by the screen reader software, the focus was returned to the data table.

Waiver Procedure Flash Paper (Data Integration Division): During FY 2007, a waiver procedure was created in Flash Paper so that it could be viewed in any browser without downloading a plug-in. DID staff were unable to make the table containing the document revision history accessible in Flash Paper. This situation was resolved by eliminating the Flash Paper version of the document and posting only the PDF version. This project is complete.

DOC Home Page (Office of the Secretary): During FY 2007, DOC headquarters employees met with staff to learn about accessibility testing methods using screen-reading software and automated tools. Output from the automated tools was provided to the Headquarters employees and instructions were given on how to interpret the results. This project is complete.

Personal Property Management Web Based Training (System Services Division): This application allows Census Bureau employees to learn about personal property management for government equipment. Users of this software have the option to listen to the training while they are reading the course screens. During FY 2007, the main findings were that the volume control is not accessible to keyboard commands and playing of the audio conflicts with the screen reader, which reads screen text. Recommendations were provided to the sponsor.

History of the Census Bureau Web Site (Management Services Office): An evaluation was performed on the new History of the Census Bureau Web site where people can read about changes in Census data collection technology and Census programs. During FY 2007, among other findings, it was determined that the recorded Census anthem needed a written transcript of the lyrics. Recommendations were provided to the sponsor.

2010 Local Update of Census Addresses (LUCA) Web-Based Training (Geography Division): This application enables field personnel to learn about the LUCA operation to be conducted in 2010. The evaluation began first with module 1 of 7, which provided guidance to the contractor for programming the remaining 6 modules. During FY 2007, we reviewed the remaining 6 modules in time for the scheduled release. Among other findings, it was determined that drag-and-drop exercises are not accessible, and the alternative of providing different sequences of items as radio button options was recommended.

Census Learning Management System (LMS) (Department Of Commerce): This LMS will replace the current system that Census Bureau employees use to access mandatory web-based training. During FY 2007, staff performed an accessibility evaluation on the interface and found that 1) in the calendar component, color was the only means used to identify different event types; and 2) completion status icons were not accessible. Recommendations were provided to the Economic Statistical Methods and Programming Division, which then passed those recommendations on to the contractor.

Support for X-12 ARIMA Documentation & Software (Statistical Research Division): During FY 2007, staff reviewed work done by NetCentric Logo to make X-12 ARIMA PDF documentation accessible. We found tables and plain text accessible, but equations and equation terms embedded within the text were not always accessible. Staff will continue to work to create a refined specification for the next round of changes to be performed by NetCentric Logo on the X-12 ARIMA PDF documentation.

*Staff:* Larry Malakhoff (x33688), Brian Monsell

2008 Title 13 Web-Based Training (Policy Office): During FY 2007, staff performed an accessibility evaluation on the Title 13 awareness training E-Learning course all Census employees must take annually. The evaluation revealed image and text links are not accessible and pop-up windows could not be closed by keyboards commands. Screen-reader users cannot use keyboard commands to adjust the volume. A report with all recommendations was provided to the sponsor. Staff will continue to review corrections to the application as they become available.

Censtats Tables (Administrative and Customer Services Division): During FY 2007, staff performed an evaluation of typical data tables provided on the Censtats pages on www.census.gov. It was found footnote numbers did not link to footnotes at the bottom of the pages and some row stub text is not associated with the data cell value. Staff checked to see if recommendations were correctly implemented.

*Staff:* Larry Malakhoff (x33688)

**A.2. Desktop Applications Accessibility**

This project focuses on accessibility of desktop applications by blind and low vision users in accordance with the Section 508 regulations. Desktop applications are either downloaded or sent to the respondent on disk.

**A.2.a X-12 ARIMA Graphing Application:** This application generates graphs from X-12 ARIMA data. The application can be downloaded by the X-12 user community.

During FY 2007, three rounds of accessibility testing were performed on this application because it had changed from a wizard, or step-by-step procedure, to a tabbed interface, where all options could be accessed from one screen. The main finding was that the combo boxes, or drop-down menus, were not passing the instructions to the screen reader software about selection of items and the number of options. Tasks were drafted for usability testing. The tasks fall into two areas: creating and editing graphs. Usability testing revealed ambiguous wording in instructions directing users to delete or comment out graphs. Test participants believed these actions did the same thing. The main menu also contains controls to perform two separate functions, which confused some test participants. Accessibility and usability findings were merged into one report and provided to the sponsor.

*Staff:* Larry Malakhoff (x33688), Demetra Lytras (ADEP)

**A.2.b X-12 ARIMA Batch Submission Application:** This graphical user interface permits users to submit batch jobs to the X-12 ARIMA application.

During FY 2007, an accessibility evaluation was performed and it was found that data entry labels were incompletely spoken by the screen reader software among the other findings. Corrections were addressed from the accessibility evaluation, and the newest version of the software was delivered.

*Staff:* Larry Malakhoff (x33688), Roxanne Feldpausch (ADEP)

**A.2.c MAF/Tiger Partnership Software (MTPS) Application:** This graphical user interface permits users to update Census addresses, boundary and annexation survey information, and school districts and participant statistical areas.

During FY 2007, work was completed on evaluating the accessibility of the Local Update of Census Addresses (LUCA) section of the MTPS application. The effort continued to complete the remaining training sections, the Boundary and Annexation Survey (BAS), School District Review Program (SDRP), the Redistricting Data Program (RDP), and the Participant Statistical Areas Program (PSAP). Among other findings, the evaluation revealed that tutorial screens do not have a text alternative when animation is used and the "continue," "cancel," and "end" buttons are not accessible by keyboard commands. A report was provided to the sponsor.

*Staff:* Larry Malakhoff (x33688), Brian Timko, Kathryn Wimbish (GEO)

**A.2.d 2007 Economic Census Reporting Application (Surveyor 2007):** This application allows businesses to complete and submit their 2007 Economic Census forms electronically.

During FY 2007, an accessibility evaluation was performed on Surveyor 2007. Findings revealed that keyboard navigation did not function between panels on screens and data tables are not accessible with screen reader software. The welcome message and instructions are inaccessible and the "Quick search" field on the "Inbox" tab has gray text on a white background which is difficult to read. This project is complete.

*Staff:* Larry Malakhoff (x33688), Amy Anderson (ESMPD)

**A.3. Web Forms Usability Testing**

This project focuses on usability testing for Census Bureau Internet and Intranet forms.

During FY 2007, staff investigated a complaint by a Census Bureau employee who uses the JAWS screen reader. It was found that some fields were not labeled on the Census broadcast request form. This matter was addressed and the form performs properly now.

*Staff:* Larry Malakhoff (x33688)

**A.4. Census.gov Template Development**

The purpose of this study is to develop a set of templates with a consistent and usable look and feel for the Census.gov website. The template is intended to be used by both the demographic and economic domains of Census.gov. Some of the techniques to develop the template include card sorting, low-fidelity prototype testing, and usability testing. Currently, the focus of the study is card sorting.

During FY 2007, we created 100 new cards with new data items on the cards to be in the card sort. The card labels came from 14 focus group interviews with the Census call centers staff from divisions throughout the Census Bureau, a focus group interview with the regional offices during their annual visit, as well as the Google and Ask Census search terms. Results and recommendations from the 15 card sorting sessions include the following:

- Users grouped cards based on the subject matter of the card. Cards clustered into approximately 10 primary categories. User's defined high level categories by topics, such as "Health," or "Imports and Exports." Based on these findings, we recommended content be organized by subject (as opposed to the agency's organization) and grouped into 16 primary categories. The team agreed to this recommendation.
- Users placed terms into one category but commented that they could have gone in another category. In addition, many of the terms that were placed in more than one category were consistently placed in the same alternate categories. (e.g., Wealth: Users put wealth in "Income and Poverty" and also in "Business and Industry;" Housing patterns, residential segregation: Users put these terms in both "Income and Poverty"and also in "Housing."). Based on these findings, we recommended that certain terms and concepts go in more than one category. This is an important insight and may be the key to improving government Web sites. The team agreed to implement this recommendation.
- Working with users to get evidence-based results helped in our discussions with web developers. Our content providers were more willing to listen and implement recommendations because we were not merely speculating but basing our recommendations on data from actual users.

*Staff:* Erica Olmsted-Hawala (x34893)

**A.5. AES*Direct* (Automated Export System) Computer Self-Administered Questionnaire: Foreign Trade Division Web Site Re-Design**

The purpose of this study is to identify usability problems with the AES*Direct* Computer Self-Administered Questionnaire (CSAQ). The team members are interested in redesigning problem areas of the site, and before they begin they would like a baseline study on how users perform (accuracy and efficiency measures) and a subjective satisfaction rating of the site.

During FY 2007, we recruited 8 novice participants, 2 expert participants, and 2 internal AES direct filer participants, and ran them through the usability study. We identified usability problems and came up with recommendations for solutions to the problems. We wrote a quick report and a final report with video clip highlights, and we presented the results to the design team.

The usability study revealed that the mean accuracy score for novice participants was 32 percent. The mean efficiency score for novice participants was 47:38 minutes per session. Novice satisfaction score was 4.4 out of 9, with 1.7 as the standard deviation—the average variation between all the ratings given by the participants and the mean rating of a particular item. These can be considered the baseline values for novices. For experts, mean accuracy was 86 percent. Mean efficiency for expert participants was 35:22 minutes per session. Expert satisfaction was 6 (with .2 as the standard deviation). These can be considered the baseline values for experts. A sample of high-priority findings follow:

- All participants experienced problems on how to get started using the application. The navigation was not intuitive, and participants often ended up needing directions/instructions from the Test Administrator.
- Participants had problems when filling out the form. When they came to a section of the form where they were required to add in codes they had (1) no idea what was needed in the field, and (2) no idea where to get the code for that field (e.g., participants tried to enter "SW" for Switzerland, which was not correct.)
- Participants were not able to submit or save data. All participants who worked with any section of the form said they expected (and didn't find) a "Submit" button at the bottom of the data-entry form.
- Participants were confused by technical jargon. Acronyms were not defined and it's questionable whether that would have helped (e.g., USPPI stands for U. S. Principal Party in Interest).

Central to the success of the CSAQ is to implement the primary recommendation which is to offer guided help throughout the entire form filling process. Guiding users could take many forms such as:

- Cue users in how to progress onto the next screen or section of the form (e.g., place obvious next, back, and submit buttons at strategic points, such as at the bottom of each section of the form)
- Offer additional linked information at each data entry point that could be confusing (e.g., "What is x?" and "How to find x.")
- Use terminology and words that users know and understand (e.g., plain language, as opposed to technical jargon –acronyms-, will help tell users where they are and where they need to go).

*Staff:* Erica Olmsted-Hawala (x34893), Betty Murphy, Alex Trofimovsky

### A.6. Usability Study of the *Statistical Abstract* Web Pages

The purpose of this study is to gather usability data on the *Statistical Abstract* web pages. The website uses a newer web navigation technique of pop-open windows. The Systems Support Division is interested in pushing this technique out to other areas of the Census.gov website, however, before they do this they would like to know whether it works for our general, novice users or not. This study will pay particular attention to user issues with the pop-open windows, how users search for information, and how users interact with the layout of the tables. In addition, we will take general quantitative measurements of accuracy, efficiency, and satisfaction.

During FY 2007, novice participants were given eight tasks. Tasks were primarily simple finds, where users were required to find a single item or piece of information. Tasks were intended to give usability feedback on certain features of the site. Overall accuracy score was 36 percent; lower than the goal of 80 to 100 percent. Overall time-on-task was 5 minutes 47 seconds; this is longer than the goal of 2 minutes. A sample of high priority findings and recommendations follow:

- All users expressed frustration with data displayed in Excel tables. Fourteen out of the 48 failed tasks (29% of the time) failed because users were not able to find information on the Excel table. Four out of six users saw the .pdf option; and, of the four, two saw it only once during the entire session.
  **Recommendation:** Display individual tables in another format in addition to Excel. Put individual tables into .pdf and html format. Have these other formats as links where currently there is only an Excel link.
- Users experienced problems with the search function. Some of the queries users typed into the search did not return the expected information. For example, users found it frustrating when results highlighted a link for the entire statistical abstract rather than what the user was expecting: a link for a specific subsection of the abstract. Search results returned link names that had no meaning for users, which made users hesitant or unwilling to click on them. For example, a link labeled "07s0038" was the link the user needed, but because it had no meaning, the user did not click it.
  **Recommendation:** Re-name the metadata label of tables so that, as the search tool "crawls" the table, it pulls up a usable name rather than the current six digit number-letter combination. In addition write the table title and key words in the document properties (under file). This will help the search engine pick up meaningful labels to display in results section.
- Users experienced problems with terminology, link labels and content location on the site. For example, three users looked for information on tourism and said they expected to see it under "accommodation, food, and other services" because they said as tourists they would need both accommodation and food. Many users looked for poverty under "population," "poverty," or even "vital stats" but not under "wealth."
  **Recommendation:** Re-organize, re-name, and double list some content items. Card sorting is one way to identify content that needs to be re-organized, re-named, and double listed. Reduce the use of Census jargon both in the tables and on the navigation paths to the tables.

*Staff:* Erica Olmsted-Hawala (x34893), Sherae Daniel

### A.7. Usability Study of the International Database Web Pages

The purpose of this study is to identify usability problems with the International Database web pages (IDB). The team members are interested in redesigning problem areas of the site, and before they begin they would like a baseline study on how users perform (accuracy and efficiency measures) and a subjective satisfaction rating of the site.

During FY 2007, novice participants were given eight tasks. Tasks were primarily simple finds, where users were required to find a single item or piece of information. Tasks were intended to give usability feedback on certain features of the site. We ran participants through the sessions and logged all sessions. We analyzed the data and summarized accuracy, efficiency and user satisfaction results. The average overall accuracy score was 45 percent. The

average overall time-on-task for users was 6 minutes. The average overall user satisfaction score with the site was 4 on a 7 point scale. Usability problems include the following:

- Users experienced considerable problems in navigating to the information they were after.
  **Recommendation:** Put primary database query tools (e.g., summary and online access) at a higher level on the IDB site. These query tools could be located on a re-designed **main** International Programs Center (IPC) page. Put other query tools one link in.
- Users experienced problems with understanding the advanced level of terminology that appears throughout the site.
  **Recommendation:** use plain language to direct users where to go (i.e., "Get Country Data," "Get Country Level Data," Get Data about Your Country," "Get Data about any country."
- Users experienced problems with the way information was presented on the site.
  **Recommendation:** Work with the Systems Support Division (SSD) to come up with data tables that freeze the table title, column and rows. Add features to the tables so that users could search or manipulate the columns by clicking on a column header, or skipping down an alphabetized list by using keyboard shortcuts rather than the mouse. This will help users who have accessibility issues with the mouse as well.
- Users experienced trouble with the search results not returning links that were useful to them.
  **Recommendation:** Have search results lead users to the database query tools. Add synonyms into the search database. Work with SSD staff on this issue.

*Staff:* Erica Olmsted-Hawala (x34893)

**A.8. Usability Study of the 2010 Web Site**

The purpose of this study is to identify usability problems and successes in an ongoing and iterative way with the 2010 web pages, a domain off of Census.gov. This domain is unusual in that as 2010 approaches, the audience and content will change. Taking these characteristic into account will be of primary importance when designing and modifying the interface.

During FY 2007, usability lab and cognitive lab staff created and modified tasks to more accurately encompass what the client was interested in measuring in the study. An example of the feedback we gave on the task development was that the tasks needed to be targeted to the two identified user groups. In addition, we recommended the tasks have motivators or a one sentence rationale for why a person would come to find the information. For example, instead of "Search for information about privacy. Find the name of the law that keeps your information safe." We recommended the rewording: "You have just received a letter in the mail explaining that you are going to receive a census form. You are a little concerned about giving out your personal information, even to the Census Bureau and would like a little more information. What would you do?" Usability lab and cognitive lab staff ran two user groups through the usability study with an eye-tracking component and a cognitive debriefing.

*Staff:* Erica Olmsted-Hawala (34893), Betty Murphy, Eleanor Gerber, Ashley Landreth

**A.9. Usability Study of the Census in the Schools Web Site**

The Census in Schools (CIS) program promotes data literacy and increases awareness of Census Bureau products and activities by providing educators with teaching tools, resource materials, workshops, and other professional development opportunities. In addition to targeting teachers, the Census Bureau's Public Information Office (PIO) is expanding the current Web site to include online activities for students in grades Kindergarten (K)-12. PIO is currently developing Web content customized for grades K-5. The Census in Schools (CIS) design team was interested in having usability lab staff evaluate the developing site with respect to its usability for primary aged school children. CIS also anticipated recommendations for ways to improve the usability for the users. In this study, usability lab staff recruited children in grades K-6, conducted dry runs to evaluate the study's protocol, conducted the study, identified areas of the site that worked for the children as well as areas where they encountered usability problems and/or had low satisfaction. We recommended possible solutions for the problem areas.

Led by Michelle Rusch, a summer intern from Iowa State University, the CIS usability team developed and documented a test plan, which was reviewed by the design team (MSO, PIO, and SSD) and revised by mutual agreement. Following the first round of usability testing with children in grades K-2, the SRD team documented our findings and recommendations in a memorandum, "Usability Study on the Census-in-Schools Web Site (Grades K-2): Quick Report with Usability Findings and Recommendations," dated July 12, 2007. At this point, the test plan was further revised and updated for testing with children in grades 3-6. After recruiting test participants in these grades, the CIS usability team conducted the study. The findings and recommendations from this second round of testing were documented in a memorandum, "Usability Study on the Census in Schools Web Site (Grades 3-6): Quick

Report with Usability Findings and Recommendations," dated August 17, 2007. Our staff is preparing a final report, which will incorporate the methods, findings and recommendations from both rounds of testing. Many recommendations have already been accepted and implemented by the software contractor.

*Staff:* Betty Murphy (34858), Michelle Rusch, Ben Smith, Erica Olmsted-Hawala, Joyce Farmer, Carollynn Hammersmith (SSD)

**A.10. Usability Study of the Monthly and Annual Wholesale and Retail Trade Web site**

The Monthly Wholesale Trade and the Annual Wholesale Trade domains, currently two different domains off of Census.gov are combining into one primary domain. Staff from the two different domains would like to have usability assistance as they undergo the development and improvement of the new domain of the Census.gov web site. The Wholesale Trade design team is interested in receiving iterative usability feedback and recommendations on improvement as it works on the development of the site.

During FY 2007, staff met with the Wholesale Trade design team to discuss users, tasks, goals, and scope of the project. The Wholesale Trade design team came up with an initial list of tasks, and usability lab staff responded with feedback on how to improve tasks. We offered motivation for some of the tasks, removed unnecessary tasks and added tasks that will test different parts of the new Web site. Usability lab staff recommended low-fidelity prototype testing and gave feedback on the prototype to use during the study.

*Staff:* Erica Olmsted-Hawala (x34893), Ben Smith

**B. Questionnaire Pretesting**

This project involves coordinating the Census Bureau's generic clearance for questionnaire pretesting research. Pretesting activities in all areas of the Census Bureau may use the clearance if they meet the eligibility criteria.

During FY 2007, 41 letters using a total of 2015 respondent burden hours were approved by the Office of Management and Budget for pretesting activities for census and survey questionnaires and procedures. In addition, OMB approved an extension of the generic clearance for another three years, until August 31, 2010. Staff also gave a presentation on Pretesting Questionnaires as part of a course on questionnaire design taught by the Demographic Surveys Division.

*Staff:* Terry DeMaio (x34894)

**C.1. Questionnaire Design Experimental Research Survey 2003 (QDERS)**

QDERS 2003 is an omnibus survey designed to facilitate independent research related to questionnaire design issues, interviewer training, and other survey methodological issues. The QDERS 2003 was conducted from the Tucson Telephone Center in June/July 2003 using a Random Digit Dialing (RDD) sample.

During FY 2007, our staff conducted analysis of the experiments from the QDERS 2003 and included the results in conference papers and other reports.

*Staff:* Jennifer Rothgeb (x34968), Joanne Pascale, Ashley Landreth, Terry DeMaio

**C.2. Questionnaire Design Experimental Research Survey 2004 (QDERS)**

QDERS 2004 is an omnibus survey designed to facilitate independent research related to questionnaire design issues and other survey methodology issues. The QDERS 2004 was conducted from the Census Bureau's Telephone Center using an RDD sample. Researchers conducting questionnaire design and survey methods experiments are participating.

During FY 2007, our staff conducted analysis of the experiments from the QDERS 2003 and included the results in conference papers and other reports.

*Staff:* Jennifer Rothgeb (x34968), Joanne Pascale, Jenny Hunter Childs, Nancy Bates (C2PO)

**C.3. Questionnaire Design Experimental Research Survey 2006 (QDERS)**

QDERS 2006 is an omnibus survey designed to facilitate independent research related to questionnaire design issues and other survey methodology issues. The QDERS 2006 was conducted from the Hagerstown Telephone Center. The focus of the 2006 QDERS is an questionnaire design experiment examining different ways to determine a person's place of residency on Census day.

During FY 2007, our staff coordinated and managed all tasks related to the QDERS 2006 which contained an experiment testing two different strategies ("cycle" questions verus "dates" questions) for determining where a person should be counted according to census residence rules. Prior to data collection, we tested the survey instrument, tested output and data file extraction. We developed interviewer training materials and interview taping procedures. Interviewer training was conducted and data collection occurred between in November 2006. The data collection period was extended due to low productivity during the early part of data collection. By extending data collection one week, we obtained our

target number of interviewed households. There were 982 completed cases in the Dates panel and 888 in the Cycle panel. We obtained a response rate (using AAPOR standards) of 60.77 percent for the Dates panel compared to 55.92 for the Cycle panel. Interview taping produced data for 200 interviews which will facilitate behavior coding of the data.

From this study, we concluded that the alternative approach to measuring residence status (i.e., the Dates method) performed comparably to the traditional approach (i.e., the Cycle method). Details are contained in Childs, J., Nichols, E., Dajani, A., and Rothgeb, J. (2007). "A New Approach to Measuring Residence Status" forthcoming in *Proceedings of the Survey Research Methods Section of the American Statistical Association*.

*Staff:* Jennifer Rothgeb (x34968), Jenny Hunter Childs, Beth Nichols, Aref Dajani

**D. Language: Interdisciplinary Research on Language and Sociolinguistic Issues Relevant to Survey Methodology**

There is a need for both qualitative and quantitative interdisciplinary research on how to best develop and successfully use non-English language collection instruments and other survey materials. Interdisciplinary research is also needed to determine the quality of the data that respondents with little or no knowledge of English provide the Census Bureau using both non-English and English language data collection instruments.

During FY 2007, staff members have been working closely with an international group of researchers who are members of the Comparative Survey Design and Implementation (CSDI) group, on the development of interpretation guidelines, cognitive testing in non-English languages, and translation issues. Staff acted as one of the organizers for a multilingual issues interest group for the American Association for Public Opinion Research.

Our staff worked collaboratively with researchers at Westat and completed a project on investigating the effectiveness of three different sets of instructions provided to translators. We designed rating scales for professional survey methodologists to evaluate translations in three languages: Chinese, French, and Spanish. After the evaluation was completed, we conducted a debriefing with 15 evaluators in these three languages. We also completed both quantitative and qualitative analysis of the results. We co-authored, with Westat researchers, an SRD report documenting findings from the research, and presented a paper at the European Survey Research Association (ESRA) Conference in Prague.

Staff also presented a paper summarizing our language research activities to the 2007 Annual Conference of the American Association for Applied Linguistics. Staff co-authored a paper with scholars at University of Nebraska and University of Michigan for presentation on questionnaire design at the European Survey Research Association (ESRA) Conference in Prague. Our staff also participates in the Interagency Language Roundtable meetings for discussion of translation, interpretation, and language proficiency testing issues.

Staff also initiated a project to further investigate language and cultural effects on the conduct of cognitive interviews in non-English languages. We completed the analysis of interview transcripts in four languages (Spanish, Chinese, Korean, and Russian) and conducted debriefing sessions with cognitive interviewers in these languages to obtain their feedback on issues and challenges in conducting cognitive interviews with respondents who are monolingual speakers of these languages. The findings of this project will be reported in a special invited paper at the 2008 International Conference on Survey Methods in Multilingual, Multiregional and Multicultural Contexts, and will appear as a chapter in a monograph published by Wiley & Sons.

We completed a book chapter on cross-cultural communication norms and survey interviews, and started working on two invited papers on cross-cultural issues in cognitive interviews for the 2008 International Conference on Survey Methods in Multilingual, Multiregional and Multicultural Contexts.

*Staff:* Yuling Pan (x34950), Manuel de la Puente, Patti Goerman, Diana Simmons

**E. Training for Cognitive Interviewing**

Our staff will train members of other divisions in the Census Bureau to carry out cognitive interviewing and provide consultation and support for projects which they carry out.

During FY 2007, two cognitive interviewer training sessions were held. In all, 13 people from the Statistical Research Division, Data Integration Division, and Demographic Surveys Division, were trained. A presentation on training cognitive interviewers to pretest translated questionnaires was made at the meetings of the Comparative Survey Design and Implementation group.

*Staff:* Eleanor Gerber (x33489)

**F. Research on Cognitive Testing of Non-English Language Survey Instruments**

The staff is currently engaged in a study designed to test and identify best practices for conducting

cognitive interviews with Spanish-speaking respondents. We are testing both widely accepted and new techniques and probes (e.g., "What does the term *foster child* mean to you in this question?") with Spanish-speaking respondents of high and low educational levels. The research is based on a segment of the CAPI version of the American Community Survey. Future applications of this research should extend to cognitive interview techniques for use with respondents who speak additional non-English languages.

During FY 2007, staff members continued to work on summarizing and coding interviews. We also worked on refining the interview coding scheme. This project is currently on hold because of higher-priority projects.

*Staff:* Patricia Goerman (x31819), Diana Simmons

**G. Interviewer-Respondent Interactions**

Survey nonresponse rates have been increasing, leading to concerns about the accuracy of (demographic) sample survey estimates. For example, from 1990 to 2004 initial contact nonresponse rates have approximately doubled for selected household sample surveys including the Current Population Survey (CPS) (from 5.7% to 10.1%). While mailout/mailback is a relatively inexpensive data collection methodology, decreases in mailback rates to censuses and sample surveys mean increased use of methodologies that bring respondents into direct contact with Census Bureau interviewers (e.g., field representatives) using CATI (computer assisted telephone interviewing) or CAPI (computer assisted personal interviewing). CAPI can include face-to-face or telephone contact. Unsuccessful interviewer-respondent interactions can lead to increased costs, with the need for additional follow-up, and can decrease data quality.

The research problem is: Can we obtain a deep understanding (through data, the scientific literature, and experimentation) of interviewer-respondent interactions (1) during the first few moments of the initial meeting/interaction; (2) during the interaction; and (3) towards the conclusion of the interaction in order to ultimately slow and reverse the increase in unit and item nonresponse rates for interviewer-administered questionnaires?

During FY 2007, we completed two exploratory studies of the current behavior of Current Population Survey interviewers–"Field Representative Experiences with the Current Population Survey"–one study collected and analyzed data from CPS Coordinators and Supervisors; the second study collected and analyzed data from CPS Senior Field Representatives. Across both studies, both the coordinators/supervisors and the senior field representative tended to report more behaviors that were successful at gaining cooperation than behaviors that were unsuccessful at gaining cooperation. Coordinators/supervisors also tended to focus their comments on more administrative, task-oriented behaviors than any of the other types of behaviors (self-directed, interview, other). In contrast, the senior field representatives tended to focus their comments on interactive interview behaviors more than any of the other types of behavior (Beck, Wright, Petkunas, 2007).

During this fiscal year, we also completed mailout of questionnaires (two types: one with open-ended questions, and the other with multiple-choice questions) to a national sample of 600 CPS Field Representatives as part of a third exploratory study on what behaviors CPS interviewers feel have greatest impact on gaining cooperation. Associations will be studied.

*Staff:* Tommy Wright (x31702), Kahtleen Ashenfelter, Jen Beck, Tom Petkunas, Gerri Burt (FIELD), Richard Ning (FIELD)

**H. Research on Cognitive Testing of Housing Questions from the American Community Survey (ACS) and the American Housing Survey (AHS)**

As part of a postdoctoral research fellowship, staff conducted a study designed to understand sources of measurement error in number of rooms and number of bedrooms measures in the ACS, housing quality measures from the AHS, and neighborhood quality measures from the AHS. The main goal of this research was to determine the extent to which cognitive difficulties in answering these questions may bias indices of dwelling unit density, housing inadequacy, and neighborhood quality.

During FY 2007, thirty cognitive interviews were conducted with households in low, middle, and high-income households in the Baltimore-Washington DC metropolitan area. Staff developed a hybrid research instrument, combining housing and neighborhood questions from the ACS and AHS CAPI instruments and developed a new visual methodology (not found in previous literature) for probing respondent understanding. Visual vignettes, which were photographic and computer assisted design (CAD) virtual tour imagery of different configurations of rooms, were created and used to explore respondent understanding of the ACS "room" definition. A map-based method of probing respondent self-definitions of "neighborhood" was also developed.

Most respondents were able to use the visual vignettes and expressed that they helped them visualize and think through the ACS "room" definition. Study results included the following: 1) respondents provided

the number of rooms based on the function of the room (e.g., living room, dining room, bedroom) rather than the intended criteria of separateness (i.e., built-in archways or walls that extend out from the wall at least 6 inches and go from floor to ceiling); 2) respondents living with housemates and roommates experienced difficulty responding to questions about their housemates' and roommates' rooms (e.g., were there working electrical outlets, paint and plaster peeling, and holes in the walls, ceilings, and floors in housemates' and roommates' rooms?); 3) apartment dwellers whose heat was included in the rent experienced difficulties in answering what type of fuel was used to heat their apartment; 4) renters were found to be less likely to know when the house or apartment they were living in was first built; and 5) respondents varied widely in their self-definitions of neighborhood boundaries and estimates of the half block area around their housing unit. Analyses from this study have been organized into a research report that is currently being reviewed for submission to the *SRD Research Report Series*. The draft report is entitled: "Measurement of Housing Quality and Neighborhood Quality in the American Community Survey (ACS) and American Housing Survey (AHS.)" The report includes recommendations for the 2009 AHS and future administrations of the ACS.

*Staff:* George Carter III (x31774)

**I. Q-Bank: A Database of Pretested Questions**

Q-Bank was developed through an interagency committee, led by the National Center for Health Statistics (NCHS), in which the Census Bureau is a member. The objective of Q-Bank is to have an online interagency database of pre-tested survey questions and research results obtained primarily from cognitive interviews. The database is maintained at NCHS and guided and used by other participating Federal statistical agencies, including the Census Bureau. Q-Bank serves many purposes. When survey questions and questionnaires are being developed, Q-Bank can be used by survey methodologists and subject matter experts to search through previously tested questions. Q-Bank provides a forum to catalog our cognitive testing reports in a manner that is easy to search by content or subject matter. Q-Bank also will allow us to produce meta-data about our pretesting findings. And, finally, Q-Bank will be an additional resource for analysts to interpret survey data. Q-Bank has just reached the production phase and is currently being populated with cognitive test reports which is necessary before it becomes available to a broader audience.

During FY 2007, our staff actively participated on the interagency Q-Bank steering committee, making decisions about the continued development of the database. We also participated in and co-led two 2-day training sessions for survey methodologists in our division, so that all cognitive testing reports can be coded and submitted for cataloging in the Q-Bank database. During this fiscal year, many reports were coded, reviewed and submitted to NCHS to be entered into Q-Bank.

*Staff:* Jennifer Childs (x34927), Jennifer Rothgeb, Wes Quattrone, Dawn Norris

**J. Health Insurance Measurement**

The U.S. health care system is a patchwork of public and private programs and plans, thus there are no definitive centralized records on the number of individuals without insurance. Researchers must rely on surveys for this estimate, and the Current Population Survey (CPS) is the most widely-cited source for this statistic. It is not without its critics, however, and recent official reports have included caveats regarding the data quality. The purpose of this research is to identify particular features of the CPS questionnaire that are associated with measurement error, and to explore alternative designs to reduce that error.

During FY 2007, research efforts included an ongoing literature review (including "gray" literature on cognitive testing in particular), a series of split-ballot experiments and cognitive tests, behavior coding and a record-check study. Results suggest that the basic structure of the questionnaire (asking about eight different types of coverage, one at a time), and several individual questions (such as items on employer-sponsored coverage, Medicaid and Medicare) are problematic. Other general features of the questionnaire were also identified as driving measurement error, such as the reference period embedded in the questions ("At any time during [calendar year]...") and the household-level design ("was anyone in this household covered..."). In order to examine the effects of these two design features in particular, a record-check study was conducted (in collaboration with staff from the Data Integration Division) in which CPS survey data was linked to Medicaid administrative records data. Results indicated that the more recent the respondent had the coverage, the more likely it was to be reported accurately, and that when the respondent and referent were both covered by Medicaid, reporting accuracy was improved (compared to respondents who were not covered by Medicaid but the referents were).

Based on the cumulative findings from these research efforts, a redesign was developed and a split-ballot field test comparing the redesign to the CPS was carried out through the QDERS series. Results suggest that the redesign performs on par with the CPS, and may demonstrate improved measurement of Medicare.

As a result of these findings, funding has been secured from the U.S. Department of Health and Human Services to conduct further cognitive testing to refine the questions asking about retrospective coverage, and to field a follow-up split-ballot field test comparing the CPS to the refined questionnaire as a whole. Preparations for cognitive testing have begun, and include a literature review on recall and retrospective reporting and a review of other health insurance surveys that ask about past coverage.

*Staff:* Joanne Pascale (x34920)

## *Research Assistance*

This staff provides research assistance, technical assistance, and secretarial support for the various research efforts.

*Staff:* Tina Arbogast, Alice Bell, Joyce Farmer, Judi Norvell, Barbara Palumbo, Gloria Prout, Lorraine Randall, Diana Simmons

# 3. PUBLICATIONS

### 3.1 JOURNAL ARTICLES, PUBLICATIONS


Cantwell, P. (In Press). "Census," *Encyclopedia of Survey Research Methods*, Sage Publications, Newbury Park, CA.

Cantwell, P. (In Press). "Composite Estimation," *Encyclopedia of Survey Research Methods*, Sage Publications, Newbury Park, CA.

Cantwell, P. (In Press). "Rotating Panel Designs," *Encyclopedia of Survey Research Methods*, Sage Publications, Newbury Park, CA.

Herzog, T. N., Scheuren, F., and Winkler, W. E. (2007). "Applications of Record Linkage," *The Actuary Magazine*, *Society of Actuaries, Feb. 07*.

Herzog, T. N., Scheuren, F., and Winkler, W. E. (2007). "Data Quality and Why We Should Care," *Contingencies*, *American Academy of Actuaries, Jan/Feb. '07*, 28-32.

Malec, D. (In Press). "Superpopulation," *Encyclopedia of Survey Research Methods*, Sage Publications, Newbury Park, CA.

Martin, D. E. K. (In Press). "Application of Auxiliary Markov Chains to Start-up Demonstration Tests," *European Journal of Operational Research.*

Martin, D. E. K. (2006). "The Exact Joint Distribution of the Sum of Heads and Apparent Size Statistics of a 'Tandem Repeats Finder' Algorithm," *Bulletin of Mathematical Biology*, *68,* 2353-2364.

McElroy, T. (In Press). "Statistical Properties of Model-Based Signal Extraction Diagnostic Tests," *Communications in Statistics.*

McElroy, T. and Gagnon, R. (In Press). "Finite Sample Revision Variances for ARIMA Model-Based Signal Extraction," *Journal of Official Statistics.*

McElroy, T. and Politis, D. (2007). "Self-Normalization for Heavy-Tailed Time Series with Long Memory," *Statistica Sinica 17*, 199-220.

McElroy, T. and Politis, D. (In Press). "Stable Marked Point Processes," *Annals of Statistics*.

Mulry, M. H. (In Press). "Coverage Error," *Encyclopedia of Survey Research Methods*, Sage Publications, Newbury Park, CA.

Mulry, M. H. (2007). **"**Summary of Accuracy and Coverage Evaluation for Census 2000." *Journal of Official Statistics*, 23, 345-370.

Mulry, M. H., Bean, S. L., Bauder, M., Wagner, D., Mule, T., and Petroni, R. J. (2006). "Evaluation of Estimates of Census Duplication Using Administrative Records Information," *Journal of Official Statistics, 22,* 655-679.

Rothgeb, J., Forsyth, B., and Willis, G. (2007). "Questionnaire Pretesting Methods: Do Different Techniques and Different Organizations Produce Similar Results?" *Bulletin De Methodologie*, International Association of Sociology, October 2007, No. 96. Paris, France.

Rothgeb, J. (In Press). "Pilot Testing." *Encyclopedia of Survey Research Methods,* Sage Publications, Newbury Park, CA.

Zarate, A. and Zayatz, L. (2006). "Essentials of the Disclosure Review Process: A Federal Perspective," *Journal of Empirical Research on Human Research Ethics*, *1(3)*, 51-62.


### 3.2 BOOKS/BOOK CHAPTERS


Herzog, T. N., Scheuren, F., and Winkler, W. E. (2007). *Data Quality and Record Linkage Techniques,* New York: Springer.

Massell, P., Zayatz, L., and Funk, J. (2006). "Protecting the Confidentiality of Survey Tabular Data by Adding Noise to the Underlying Microdata: Application to the Commodity Flow Survey," in Josep Domingo-Ferrer, Luisa Franconi (Eds.), *Privacy in Statistical Databases, CENEX-SDS International 2006 Conference Proceedings*, *Lecture Notes in Computer Science 4302,* New York: Springer.

Murphy, E., Malakhoff, L., and Coon, D. (2007). "Evaluating the Usability and Accessibility of an Online Form for Census Data Collection," in Jonathan Lazar (Ed.), *Universal Usability: Designing Computer Interfaces for Diverse User Populations*, West Sussex, UK: Wiley, 517-558.

O'Connell, T. A. and Murphy, E. D. (2007). "The Usability Engineering Behind User-Centered Processes for Website Development Lifecycles," in P. Zaphiris & S. Kurnianwan (Eds.), *Human-Computer Interactive Research in Web Design and Evaluation*, Hershey, PA: Idea Group Publishing, 1-21.

Pan, Y. (In Press). "Cross-cultural Communication Norms and Survey Interviews," in H. Sun and D. Kadar, D. (Eds.), *It's the Dragon's Turn – Chinese Institutional Discourse(s)*. Berne: Peter Lang.

Winkler, W.E. (In Press). "Record Linkage," in C. R. Rao and D. Pfeffermann (Eds.), *Sample Surveys: Theory, Methods and Inference.* New York: North-Holland.

### 3.3 PROCEEDINGS PAPERS

*2006 American Association for Public Opinion Research Meeting*, Montreal, Quebec, Canada, May 18-21, 2006.
*2006 Proceedings of the American Statistical Association*.

- Chan, A. and Moore, J. (2006). "Unwillingness to Reveal Personal Information to Other Household Members and Its Relationship to Subsequent Survey Nonresponse in a Longitudinal Panel Survey," 4074-4081.
- Pascale, J. (2006). "Measuring Health Insurance in the U.S.," 4197-4204.

*2006 Joint Statistical Meeting (American Statistical Association),* Seattle, Washington, August 6-10, 2006.
*2006 Proceedings of the American Statistical Association*.

- Bailey, L. (2006). "The Effectiveness of Weighting Cell Adjustments for Longitudinal Nonresponse," 3318-3325.
- Evans, T. D., Holan, S., and McElroy, T. (2006). "Evaluating Measures for Assessing Spectral Peaks," 981-988.
- Hawala, S. (2006). "Partial Synthesis for Disclosure Avoidance," 1357-1363.
- Huang, E. and Bell, W. R. (2006). "Using the t-Distribution in Small Area Estimation: An Application to SAIPE State Poverty Models," 3142-3149.
- Huang, E., Malec, D., Maples, J., and Weidman, L. (2006). "American Community Survey (ACS) Variance Reduction of Small Areas Via Coverage Adjustment Using an Administrative Records Match," 3150-3152.
- Martin, D. E. K. and Findley, D. F. (2006). "Adjustment of Data from Period Reporters in Estimates of Monthly Retail Trade," 1058-1065.
- Massell, P. B. and Russell, J. N. (2006). "Protecting the Confidentiality of Commodity Flow Survey Tables by Adding Noise to the Underlying Microdata," 1066-1076.
- McElroy, T. (2006). "Model-Based Formulas for Growth Rates and Their Standard Errors," 1077-1084.
- McElroy, T. and Holan, S (2006). "Assessing Time Series Model Misspecification through Local Frequency Domain Methods," 1085-1096.
- Mulry, M. H. and Kostanich, D. K. (2006). "Framework for Census Coverage Error Components," 3461-3468.
- Rodríguez, R. A. and Hawala, S. (2006). "Disclosure Avoidance for the American Community Survey Public-Use Microdata Samples: A Model-Based Approach for Group Quarters Data," 3604-3609.
- Slud, E. V. and Bailey, L. (2006). "Estimation of Attrition Biases in SIPP," 3713-3720.
- Winkler, W. E. (2006). "Automatically Estimating Record Linkage False Match Rates," 3863-3870.
- Yancey, W. E. (2006). "Evaluating String Comparator Performance for Record Linkage," 3905-3912.

*Proceedings of the 2006 Annual Conference of the Institute of Electrical and Electronic Engineers (IEEE) Professional Communication Society*, Saratoga, NY, October 22, 2006.

- Olmsted-Hawala, E. (2006). "Card Sorting, Information Architecture and Usability: Adding in our Users' Perspective to Re-design the Census Bureau Web Site."

*2007 Questionnaire Evaluation Standards (QUEST) Conference,* Ottawa, Canada, April 24-26, 2007.

- Pascale, J. and McGee, A. (2007). "Using Behavior Coding to Evaluate the Effectiveness of Dependent Interviewing."

*Proceedings of the Survey Research Methods Section, Statistical Society of Canada Annual Meeting,* St. John's, Newfoundland, Canada, June 10-13, 2007.

- Mulry, M. H. and Feldpausch, R. M. "Treating Influential Values in a Monthly Retail Trade Survey."

*Proceedings of the 2007 Third International Conference on Establishment Surveys (ICES-III),* Montreal, Canada, June 18-21, 2007.

- Massell, P. and Funk, J. (2007). "Protecting the Confidentiality of Tables by Adding Noise to the Underlying Microdata."

- Mulry, M. H. and Feldpausch, R. M. (2007). "Investigation of Treatment of Influential Values."

*2007 Joint Statistical Meeting (American Statistical Association),* Salt Lake City, Utah, July 29-August 2, 2007. *2007 Proceedings of the American Statistical Association*.

- Mulry, M. H. and Keller, J. K. (2007). "Investigation of the Relationship between Census Mail Response and the Advertising and Partnership Campaign."

*Proceedings of the 54th Session of the International Statistical Institute,* Lisbon, Portugal, August 22-29, 2007.

- Massell, P. and Funk, J. (2007). "Disclosure Avoidance Software Used at the U.S. Census Bureau."

*Proceedings of the Research Conference of the Federal Committee on Statistical Methodology,* Arlington, Virginia, November 5-7, 2007.

- Massell, P. and Funk, J. (2007). "Recent Developments in the Use of Noise for Protecting Magnitude Data Tables: Balancing to Improve Data Quality and Rounding that Preserves Protection."
- Hawala, S. and Funk, J. (2007). "Model Based Disclosure Avoidance for Data on Veterans."

*Proceedings of the Workshop on Data Access to Microdata,* Nurembourg, Germany, August 20-21, 2007.

- Weinberg, D., Abowd, J., Rowland, S., Steel, P., and Zayatz, L. (2007). "Access Methods for United States Microdata," also found on the Social Science Research Network http://hq.ssrn.com, and U.S. Census Bureau *Center for Economic Studies Paper No. CES-WP-07-25.*

### 3.4 STATISTICAL RESEARCH DIVISION RESEARCH REPORTS (http://www.census.gov/srd/www/byyear.html)

**RR (Survey Methodology #2006-07)**, Peter Hainer, Catherine Hines, Elizabeth Martin, and Gary Shapiro, "Research on Improving Coverage in Household Surveys," October 17, 2006.

**RR (Computing# 2006-01),** Yves Thibaudeau, Alfred Gottschalck, and Thomas Palumbo, "The Predictive-Mean Method of Imputation for Preserving Coupling Between Assets and Liabilities," October 23, 2006.

**RR (Statistics #2006-11),** Tucker S. McElroy, "The Error in Business Cycle Estimates Obtained from Seasonally Adjusted Data," November 14, 2006.

**RR (Statistics #2006-12),** Tucker S. McElroy and Scott Holan, "A Spectral Approach for Locally Assessing Time Series Model Misspecification," November 15, 2006.

**RR (Statistics #2006-13),** Tucker S. McElroy and Thomas Trimbur, "Continuous Time Extraction of a Nonstationary Signal with Illustrations in Continuous Low-pass and Band-pass Filtering," November 16, 2006.

**RR (Survey Methodology #2006-08)**, Elizabeth Martin, "Vignettes and Respondent Debriefings for Questionnaire Design and Evaluation," December 1, 2006.

**RR (Survey Methodology #2006-09)**, Yuling Pan, Marjorie Hinsdale, Alisú Schoua-Glusberg, and Hyunjoo Park, "Cognitive Testing of Translations of ACS CAPI Materials in Multiple Languages," December 12, 2006.

**RR (Survey Methodology #2006-10)**, Elizabeth Martin, "Privacy Concerns and the Census Long Form: Some Evidence from Census 2000," December 21, 2006.

**RR (Survey Methodology #2006-11)**, Elizabeth Martin, "The Effects of Questionnaire Design on Reporting of Detailed Hispanic Groups in Census 2000 Mail Questionnaires," December 21, 2006.

**RR (Survey Methodology #2006-12)**, Nancy Bates, Elizabeth Martin, Theresa DeMaio, and Manuel de la Puente, "Questionnaire Effects on Measurements of Race and Spanish Origin," December 21, 2006.

**RR (Survey Methodology #2006-13)**, Elizabeth Martin, "Survey Questionnaire Construction," December 21, 2006.

**RR (Statistics #2007-01)**, Scott Holan and Tucker McElroy, "Semiparametric Tail Index Estimation: A Density Quantile Approach," January 24, 2007.

**RR (Statistics #2007-02)**, Tucker McElroy, "Tail Index Estimation for Parametric Families Using Log Moments," January 24, 2007.

**RR (Survey Methodology #2007-01),** Yuling Pan, "The Role of Sociolinguistics in Federal Survey Development," January 24, 2007.

**RR (Survey Methodology #2007-02),** Kathleen P. Creighton, Karen E. King, and Elizabeth A. Martin, "The Use of Monetary Incentives in Census Bureau Longitudinal Surveys," January 29, 2007.

**RR (Survey Methodology #2007-03),** Nancy Bates, "The Simplified Questionnaire Test (SQT) - Results from the Debriefing Interviews," January 26, 2007.

**RR (Survey Methodology #2007-04),** Elizabeth Martin, "A Look at Some Preliminary Results of Evaluating the Census 2000 Integrated Marketing Strategy," January 29, 2007.

**RR (Survey Methodology #2007-05),** Jorge del Pinal, Elizabeth Martin, Claudette Bennett, and Art Cresce, "Overview of Results of New Race and Hispanic Origin Questions in Census 2000," January 30, 2007.

**RR (Survey Methodology #2007-06),** Elizabeth Martin, "Changes in Public Opinion During the Census," January 30, 2007.

**RR (Survey Methodology 2007-07)**, Pamela C. Campanelli, Matt T. Salo, Laurel Schwede, and Brian Jackson, "The Accuracy of Self Reports: Some Preliminary Findings from Interviewing Homeless Persons," January 30, 2007.

**RR (Survey Methodology #2007-08),** Jeffrey C. Moore, "Changes to the SIPP 2004 Panel Wave 1 Recipiency History Topical Module and Their Impacts on Survey Estimates and Data Quality," January 30, 2007.

**RR (Survey Methodology #2007-09),** Jennifer Hunter Childs, George R. Carter, III, Dawn Norris, Kristin Hanaoka, and Laurie Schwede, "Cognitive Test of the NRFU Round 3: Revised Questions," January 30, 2007.

**RR (Survey Methodology #2007-10),** Anna Chan, "Report on Topic-based Mode Consistency CATI/CAPI Pretesting Study in the American Community Survey (ACS)," March 6, 2007.

**RR (Survey Methodology #2007-11),** Joanne Pascale, "Measuring Health Insurance in the U.S.," March 6, 2007.

**RR (Computing #2007-01)**, William E. Yancey, "*BigMatch*: A Program for Extracting Probable Matches from a Large File," June 15, 2007.

**RR (Statistics #2007-03)**, Brian C. Monsell, "Release Notes for Version 0.3 of X-12 ARIMA," June 12, 2007.

**RR (Statistics #2007-04)**, Lynn Weidman, Julie Tsay, and Michael Ikeda, "Comparison of Alternatives for Controlling Group Quarters Person Estimates in the American Community Survey," June 14, 2007.

**RR (Statistics #2007-05)**, William E. Winkler, "Automatically Estimating Record Linkage False Match Rates," June 13, 2007.

**RR (Survey Methodology #2007-12)**, Elizabeth Murphy, "2008 Coverage Follow-up (CFU) User Interface Usability: Observations and Recommendations from Interviewer Review of CFU Wire Frames," May 22, 2007.

**RR (Survey Methodology #2007-13)**, Aniekan Okon, Timothy Gilbert, and Jeffrey Moore, "Results from a Cognitive Interview Evaluation of Proposed New Questions on the Value of Annuities and Trusts and Existing Questions on the Cash Value of Life Insurance," June 7, 2007.

**RR (Survey Methodology #2007-14)**, Alfred O. Gottschalck and Jeffrey C. Moore, "Evaluation of Questionnaire Design Changes on Life Insurance Policy Data Product No. 5, Interagency Agreement (IAA) BC-06-05," June 7, 2007.

**RR (Survey Methodology #2007-15)**, Jennifer M. Rothgeb and Jennifer L. Beck, "Cognitive Interview Research Results and Recommendations for the National Science Foundation's Proposed Field of Degree Question for the American Community Survey," June 7, 2007.

**RR (Survey Methodology #2007-16)**, Jennifer M. Rothgeb, "ACS Labor Force Questions: Results from Cognitive Testing," June 12, 2007.

**RR (Survey Methodology #2007-17)**, Jennifer M. Rothgeb, "A Valuable Vehicle for Question Testing in a Field Environment: The U.S. Census Bureau's Questionnaire Design Experimental Research Survey," June 13, 2007.

**RR (Survey Methodology #2007-18)**, Yuling Pan, Brian Kleiner, and Jerelyn Bouic, "The Impact of Instructions on Survey Translation: An Experimental Study," June 15, 2007.

**RR (Survey Methodology #2007-19)**, Anna Y. Chan and Jeffrey C. Moore, "Educational Attainment and Vocational/Technical Training: Questionnaire Design and Data Quality," June 13, 2007.

**RR (Survey Methodology #2007-20)**, Anna Y. Chan, "New Roster Procedures and Probes to Improve Coverage in the Survey of Income and Program Participation," June 13, 2007.

**RR (Survey Methodology #2007-21)**, Anna Y. Chan and Jeffrey C. Moore, "Unwillingness to Reveal Personal Information to Other Household Members and Its Relationship to Subsequent Survey Nonresponse in a Longitudinal Panel Survey," June 13, 2007.

**RR (Survey Methodology #2007-22)**, Elizabeth M. Martin and Don M. Dillman, "Does a Final Coverage Check Identify Census Omissions and Reduce Errors? Preliminary Results of an Experiment," June 15, 2007.

**RR (Statistics #2007-6)**, Michael Ikeda and Edward Porter, "Initial Results from a Nationwide BigMatch Matching of 2000 Census Data," July 17, 2007.

**RR (Survey Methodology (#2007-23)**, Joanne Pascale, "Census Coverage Measurement - 2006 Person Interview Behavior Coding Results," July 17, 2007.

**RR (Survey Methodology (#2007-24)**, Elizabeth Martin, "Questionnaire Effects on Reporting of Race and Hispanic Origin: Results of a Replication of the 1990 Mail Short Form in Census 2000 (With Supplemental Analyses 1 and 2)," July 19, 2007.

**RR (Survey Methodology (#2007-25)**, Elizabeth Martin, "Final Report of an Experiment: Effects of a Revised Instruction, Deadline, and Final Question Series in the Decennial Mail Short Form," July 25, 2007.

**RR (Survey Methodology (#2007-26)**, Elizabeth Martin, "Strength of Attachment: Survey Coverage of People with Tenuous Ties to Residences," July 26, 2007.

**RR (Survey Methodology (#2007-27)**, Elizabeth Martin, "Analysis of Questionnaire Errors in Survey Measurements of Census Coverage," July 26, 2007.

**RR (Survey Methodology (#2007-28)**, Sid Schneider and Lawrence Malakhoff, "Accessibility Assessment of Statistical Web Pages," August 7, 2007.

**RR (Survey Methodology (#2007-29)**, Matt T. Salo, "1988-89 Exploratory Research on Enumerating Homeless Individuals in Baltimore and Washington," August 22, 2007.

**RR (Survey Methodology (#2007-30)**, Elizabeth A. Martin, Pamela C. Campanelli, and Robert E. Fay, "An Application of Rasch Analysis to Questionnaire Design: Using Vignettes to Study the Meaning of "Work" in the Current Population Survey," August 23, 2007.

**RR (Survey Methodology (#2007-31)**, Theresa J. DeMaio and Nancy Bates, "Using Cognitive Research Methods to Improve the Design of the Decennial Census Form," August 27, 2007.

**RR (Survey Methodology (#2007-32)**, Theresa J. DeMaio, "Results of the 1980 Applied Behavior Analysis Survey or What People Do With Their Census Forms," August 27, 2007.

**RR (Survey Methodology (#2007-33)**, Leon Pritzker and N.D. Rothwell, "Procedural Difficulties in Taking Past Censuses in Predominantly Negro, Puerto Rican, and Mexican Areas," August 28, 2007.

**RR (Survey Methodology (#2007-34)**, Elizabeth Martin, Dave Sheppard, Michael Bentley, and Claudette Bennett, "Results of the 2003 National Census Test of Race and Hispanic Questions," August 28, 2007.

**RR (Statistics #2007-7)**, Laura Zayatz, "Imputation for Disclosure Avoidance," September 4, 2007.

**RR (Statistics #2007-8)**, Tucker McElroy, "Coherent Trends, Turning Points, and Forecasts for ACS Data," September 6, 2007.

**RR (Statistics (#2007-9)**, Elizabeth Huang, Donald Malec, Jerry Maples, and Lynn Weidman, "Tract-level, Residence-rule Independent, Coverage-error Adjustment of the American Community Survey (ACS) Using An Administrative Records Match," September 17, 2007.

**RR (Statistics #2007-10)**, Yea-Jane Chu, George C. Tiao, and William R. Bell, "A Mean Squared Criterion for Comparing X-12-ARIMA and Model-Based Seasonal Adjustment Filters," September 17, 2007.

**RR (Survey Methodology (#2007-35)**, Laurel K. Schwede, George Carter III, and Andy Jocuns, "Results of Cognitive Testing of the Other Living Quarters Validation Questionnaire (OLQVQ)," September 20, 2007.

**RR (Survey Methodology (#2007-36)**, Eleanor Gerber, and Gianna Dusch, "Comparing Navigation in Two Formats for Demographic Items in the American Community Survey," September 24, 2007.

**RR (Survey Methodology (#2007-37)**, Eleanor Gerber and Ashley Landreth, "Respondents' Understanding of Confidentiality in a Changing Privacy Environment," September 24, 2007.

**RR (Statistics #2007-11)**, Jerry J. Maples, "Small Area Estimation of School District Child Population and Poverty: Studying Use of IRS Income Tax Data," September 26, 2007.

**RR (Statistics (#2007-12)**, Patrick J. Cantwell, "Several Approaches to Estimating Low-Valued Exports from the U.S.," September 27, 2007.

### 3.5 STATISTICAL RESEARCH DIVISION STUDIES (http://www.census.gov/srd/www/byyear.html)

**SS (Survey Methodology #2006-08)**, Andrew Jocuns and Theresa DeMaio, "Cognitive Interview Research Report: Findings and Recommendations Resulting from Pretesting the 2007 National Crime Victimization Survey's School Crime Supplement," October 18, 2006.

**SS (Survey Methodology # 2007-01),** Elizabeth Martin, Susan Schechter, and Clyde Tucker, "Interagency Collaboration Among the Cognitive Laboratories: Past Efforts and Future Opportunities," January 26, 2007.

**SS (Survey Methodology #2007-02),** Paul Siegel, Elizabeth Martin, and Rosalind Bruno, "Language Use and Linguistic Isolation: Historical Data and Methodological Issues," January 26, 2007.

**SS (Survey Methodology #2007-03),** Nancy Bates and Cynthia Good, "An Evaluation of the 1995 Test Census Integrated Coverage Measurement (ICM) Interview: Results from Behavior Coding," January 26, 2007.

**SS (Survey Methodology #2007-04),** Yuling Pan, "Development of Guidelines on the Use of Interpreters in Survey Interviews," January 24, 2007.

**SS (Survey Methodology #2007-05),** Margaret Rappaport, Diana Davis, and Samuel Allen, "Final Report on an Observational Study of Census Non-Response Follow-up Interviews During the 2006 Census Test in Travis County, Texas, Spring and Summer 2006," January 30, 2007.

**SS (Survey Methodology #2007-06)**, Jennifer Hess and Eleanor Singer, "Report on the Behavior Coding of Pilot Interviews for Food and Nutrition Service Supplement," March 8, 2007.

**SS (Survey Methodology #2007-07)**, Theresa J. DeMaio, "Results of the 1980 Applied Behavior Analysis Survey or What People Do With Their Census Forms," May 1, 2007.

**SS (Survey Methodology #2007-08)**, Karen Bogen, Meredith Lee, and Theresa DeMaio, "Report of Cognitive Testing of Decennial Long Form Developed by 212 Associates," May 2, 2007.

**SS (Survey Methodology #2007-09)**, Paul Beatty and Wendy Davis, "Evaluating Discrepancies in Print Reading Disability Statistics through Cognitive Interviews," May 2, 2007.

**SS (Survey Methodology #2007-10)**, Theresa J. DeMaio and Nancy A. Bates, "Using Cognitive Research Methods to Improve the Design of the Decennial Census Form," May 2, 2007.

**SS (Survey Methodology #2007-11)**, Teresa L. Parsley, Theresa J. DeMaio, Elizabeth Page Sigman, Elizabeth Martin, Pamela C. Campanelli and Patricia L. Petrick, "Report on Results of the Classroom Testing for the Questionnaire Design Project," May 2, 2007.

**SS (Survey Methodology #2007-12)**, Nancy Bates, Karen Bogen, Theresa DeMaio, Eleanor Gerber, Jennifer Hess, Cleo Jenkins, Elizabeth Martin, Jeffrey Moore, Jennifer Rothgeb, and Dawn Von Thurn, "Cognitive Interview Results and Recommendations for the 1996 National Content Test," May 2, 2007.

**SS (Survey Methodology #2007-13)**, Donny Rothwell, "Questionnaire Research Report, Series A, Report 3: Results of Three Classroom Experiments with Census of Population and Housing Questionnaires," May 14, 2007.

**SS (Survey Methodology #2007-14)**, Ashley Landreth and Jennifer Hunter Childs, "Results and Recommendations from the Final Round of Cognitive Pretesting with the SIPP Advance Letter," May 14, 2007.

**SS (Survey Methodology #2007-15)**, Lawrence Malakhoff, "An Accessibility Evaluation of the Census Calendar Application," June 7, 2007.

**SS (Survey Methodology #2007-16)**, Jennifer Hunter Childs, Ashley Landreth, Patricia Goerman, Dawn Norris, and Aref Dajani, "Behavior Coding Analysis Report, Evaluating the English and Spanish Versions of the Non-Response Follow-Up (NRFU) for the 2006 Census Test," June 14, 2007.

**SS (Survey Methodology #2007-17)**, Linda C. Illingworth, "African American Mental Health Module: Final Report," July 19, 2007.

**SS (Survey Methodology #2007-18)**, Clair M. Cassidy (Paradigms Found, Bethesda, Md.), "Beliefs and Attitudes About Mental health and Illness of White Middle-Class Americans," July 25, 2007.

**SS (Survey Methodology #2007-19)**, Erica Olmsted-Hawala, Alex Trofimovsky, and Elizabeth Murphy, Part 1: Usability, and Larry Malakhoff and Elizabeth Murphy, "A Usability and Accessibility Evaluation of the Foreign Trade Division's AES*Direct* Web Site," July 26, 2007.

**SS (Survey Methodology #2007-20)**, Jennifer Beck and Theresa DeMaio, "First Round Cognitive Pretesting on the Proposed Internet Predation Questions for the National Crime Victimization Survey: Results and Recommendations," September 26, 2007.

**SS (Survey Methodology #2007-21)**, Lawrence A. Malakhoff, "An Accessibility and Usability Evaluation of the 2007 Economic Census Electronic Reporting Software Application," September 7, 2007.

**SS (Survey Methodology #2007-22)**, Erica Olmsted-Hawala and Sherae Daniel, "A Usability Evaluation of the Statistical Abstract Web Site," September 7, 2007.

**SS (Survey Methodology #2007-23)**, Lawrence Malakhoff, "An Accessibility Evaluation of the Census Learning Management System," September 20, 2007.

**SS (Survey Methodology #2007-24)**, Lawrence Malakhoff, "An Accessibility Evaluation of the History of the Census Bureau Web Site," September 20, 2007.

**SS (Survey Methodology #2007-25)**, Lawrence Malakhoff, "An Accessibility and Usability Evaluation of the 2010 Local Update of Census Addresses (LUCA) Web-Based Training Application," September 20, 2007.

**SS (Survey Methodology #2007-26)**, Jennifer Beck, Tommy Wright, and Tom Petkunas, "Gaining Cooperation with the Current Population Survey: Subjective Experiences from the Field," September 27, 2007.

### 3.6 OTHER REPORTS


Cantwell, P. et al. "Improving Information About America's Farms & Ranches: A Review of the Census of Agriculture," the Council on Food, Agricultural and Resource Economics (C-FARE), 2007, Washington, DC.

Gerber, E., Childs, J., Nichols, E., and Norris, D. "Interviewer Instruction for the Hispanic Origin Question in the American Community Survey and Nonresponse Followup Instruments," forthcoming.

Gottschalck, A. O. and Moore, J. C. "Evaluation of Questionnaire Design Changes on Life Insurance Policy Data," report to the Social Security Administration [Product No. 5, Interagency Agreement (IAA) BC-06-05], December 14, 2006.

Martin, E., Childs, J. H., DeMaio, T., Hill, J., Reiser, C., Gerber, G., Styles, K., and Dillman, D. (2007). *Guidelines for Designing Questionnaires for Administration in Different Modes.* U.S. Census Bureau, Washington, DC.

Massell, P. "Methods for Ensuring that Statistical Information Does Not Reveal Underlying Individual Data," slides from presentation at "Quantitative Methods in Defense and National Security 2007" (a meeting of the American Statistical Association on February 7-8, 2007 in Fairfax, VA). Slides appear online at http://www.galaxy.gmu.edu/QMDNS2007/

Okon, A., Gilbert, T., and Moore, J. C. "Results from a Cognitive Interview Evaluation of Proposed New Questions on the Value of Annuities and Trusts and Existing Questions on the Cash Value of Life Insurance," report to the Social Security Administration, January 11, 2007.

Pascale, J. "Health Insurance Measurement: A Synthesis of Cognitive Testing Findings," March 28, 2007.

Rothgeb, J. and Beck, J. "Final Report: Cognitive Interview Research Results and Recommendations for the National Science Foundation's Proposed Field of Degree Question for the American Community Survey," February 20, 2007.

Schwede, L. "A New Focus: Studying Linkages Among Household Structure, Race/Ethnicity, and Geographical Levels, with Implications for Census Coverage," September 26, 2007.

Steel, P. and Zayatz, L. "Description of a Microdata Access System," Presentation to the Census Advisory Committee of Professional Associations, U.S. Census Bureau, October 27, 2006.

# 4. TALKS AND PRESENTATIONS

*Institute of Electrical and Electronic Engineers (IEEE),* Saratoga, NY, October 22, 2006.

- Erica Olmsted-Hawala, "Card Sorting, Information Architecture and Usability."

*Washington Statistical Society Seminar,* Washington, DC, October 24, 2006.

- Paul Massell, "Protecting the Confidentiality of Commodity Flow Survey Tabular Data by Adding Noise to the Underlying Microdata."

*National Academies of Science*, Washington, DC, October 26, 2006.

- Bill Winkler, "Data Quality and Record Linkage."

*23rd International Methodology Symposium*, Ottawa, Ontario, Canada, November 1-3, 2006.

- William Bell and Elizabeth Huang, "Dealing with Influential Observations and Outliers in Small Area Estimation."

*Washington Statistical Society Seminar,* Washington, DC, November 2, 2006.

- Sam Hawala, "Partially Synthetic Data for Disclosure Avoidance."

*American Anthropological Association Annual Meeting*, San Jose, CA, November 15, 2006.

- Laurie Schwede, "From Both Sides Now: Using Qualitative and Quantitative Data to Study Ethnic Variations in Household Structure."

*Population Society of America, Committee on Population Statistics,* Washington, DC, November 16, 2006.

- Philip Steel, "Confidentiality and Data Access."

*Federal Committee on Statistical Methodology, Statistical Policy Seminar,* Washington, DC, November 28, 2006.

- Philip Steel, "Design and Development of the Census Bureau's Microdata Analysis System: Work in Progress on a Constrained Regression Server."

*6th ZUMA Symposium on Cross-Cultural Survey Methodology,* Mannheim, Germany, December 4-6, 2006.

- Patti Goerman, " The Bilingual 'Swimlane' Questionnaire: Results from Round 1 Pretesting and General Project Overview."

*Inter-Agency Response Error Group (IREG) Meeting,* Bureau of Labor Statistics, Washington, DC, December 6, 2006.

- Beth Nichols and Jennifer Hunter Childs, "Respondent Debriefings Conducted by Experts: A New Qualitative Methodology for Questionnaire Evaluation."

*Privacy in Statistical Databases Conference,* Rome, Italy, December 13-15, 2006.

- Jeremy Funk, "Protecting the Confidentiality of Survey Tabular Data by Adding Noise to the Underlying Microdata: Application to the Commodity Flow Survey ."

*Washington Association of Professional Anthropologists Book Signing Event Presentation*, January 9, 2007.

- Laurie Schwede, "Summary of Methods and Results from the Book, *Complex Ethnic Households in America,*" Edited by L. Schwede, R. L. Blumberg, and A. Y. Chan."

*Interagency Response Error Group (Web IREG) Monthly Meeting*, Washington, DC, January 17, 2007.

- Erica Olmsted-Hawala, "Card Sorting, and Redesigning the Census Bureau Web Site."

*American Statistical Association's Conference on Quantitative Methods & Statistical Applications in Defense and National Security,* George Mason University, Fairfax, VA, February 7-8, 2007.

- Paul Massell, "Methods for Ensuring that Statistical Information Does not Reveal Underlying Individual Data."

*George Washington University School of Public Health, Graduate Level Methods Class Invited Seminar,* Washington, DC, March 5, 2007.

- Laurie Schwede, "Combining Qualitative and Quantitative Data in Studying Ethnic Variations in Household Structure."

*New York City Department of Health and Mental Hygiene Speaker Series*, New York, NY, March 27, 2007.

- Joanne Pascale, "Highlights of Census Bureau Survey Methods Research."

*Fifth International Workshop on Comparative Survey Design and Implementation Conference,* Chicago, IL, March 29-31, 2007.

- Manuel de la Puente, "Cognitive Testing of the Spanish Language American Community Survey (ACS) CAPI/CATI Instrument: Lessons Learned and Plans for Future Research."
- Eleanor Gerber, "Considerations for Training Cognitive Interviewers for Pretesting Translations."
- Patricia Goerman, Rachel Caspar, Georgina McAvinchey, Rosanna Quiroz, and Mandy Sha, "Census Bureau Bilingual Questionnaire Research: Preliminary Results of Cognitive Testing."
- Yuling Pan and Alisú Schoua-Glusberg, "Cognitive Interviewing in Non-English Languages: A Cross-cultural Perspective."

*Population Association of America Annual Meeting,* New York, NY, March 30, 2007.

- Laurie Schwede and Rae Blumberg, "A New Approach to Studying Interactions of Household Structure and Race/Ethnicity at the National and Local Levels." Abstract and poster available on conference website: http://paa2007.princeton.edu/abstractViewer.aspx?submissionId=72069.

*2007 Statistics Canada/Census Bureau Methodology Interchange,* U.S. Census Bureau, Washington, DC, April 16, 2007.

- Bor-Chung Chen, "CANCEIS Experiments at U.S. Census Bureau with 2006 Test Data."
- Tommy Wright, "General Methods Research Program at the Census Bureau."

*The 11th Biennial CDC/ATSDR Symposium on Statistical Methods,* Decatur, GA, April 17, 2007.

- Donald Malec, "Small Area Random Effect Models for Capture/Recapture Methods with Applications to Estimating Coverage Error in the U.S. Decennial Census."

*Association of Applied Linguistics Annual Conference,* Costa Mesa, California, April 21-24, 2007.

- Manuel de la Puente, Yuling Pan, and Patricia Goerman, "Collecting Survey Data From Non-English-Speaking Populations: A Program of Research at the U.S. Census Bureau's Statistical Research Division."

*2007 Questionnaire Evaluation Standards (QUEST) Conference,* Ottawa, Canada, April 24-26, 2007.

- Joanne Pascale and Alice McGee, "Using Behavior Coding to Evaluate the Effectiveness of Dependent Interviewing."

*Washington Statistical Society Seminar,* Bureau of Labor Statistics, Washington, DC, May 10, 2007.

- William Bell and Elizabeth Huang, "Using the *t*-Distribution to Deal with Outliers in Small Area Estimation."

*Annual Meeting of the American Association for Public Opinion Research,* Anaheim, CA, May 17-20, 2007.

- George Carter, Discussant, "Studying Racial Attitudes: Antecedents and Outcomes."
- George Carter and Laurie Schwede, "Is this a Mobile Home or a Monastery?: Differentiating Group Quarters from Housing Units with a Validation Questionnaire" (Poster presentation).
- Rachel Caspar and Patricia Goerman, "The Use of Vignettes in Questionnaire Evaluation: An Application from the 2010 Bilingual Census Form."
- Jennifer Hunter Childs, Theresa DeMaio, Eleanor Gerber, Joan Marie Hill, and Elizabeth Ann Martin, "Mode Consistency Guidelines: Asking Questions in Multimode Surveys."
- Manuel de la Puente, Patricia Goerman, and Yuling Pan, "Collecting Survey Data from Non-English-Speaking Populations."
- Eleanor Gerber and Ashley Landreth, "Respondents' Understandings of Confidentiality in a Changing Privacy Environment."

- Patricia Goerman and Rachel Caspar, "A New Methodology for the Cognitive Testing of Translated Materials: Testing the Source Version as a Basis for Comparison."
- Jeff Moore, Discussant, "Cognitive Factors in Surveys."
- Mary H. Mulry and Jay K. Keller, "Investigation of the Relationship Between Census Mail Response and the Advertising and Partnership Campaign."
- Elizabeth Nichols and Jennifer Hunter Childs, "Respondent Debriefings Conducted by Experts: A New Qualitative Methodology for Questionnaire Evaluation."
- Yuling Pan, Ashley Landreth, Marjorie Hinsdale, Hyunjoo Park, and Alisu Schoua-Glusberg, "Methodology for Cognitive Testing of Translations in Multiple Languages."
- Hyunjoo Park and Yuling Pan, "Cognitive Interviewing of Translated Material with Asian Population—Findings from Chinese and Korean Interviews in American Community Survey."
- Joanne Pascale, Marc Roemer, and Dean Resnick, "Medicaid Underreporting: the Role of Household Composition."

*International Field Directors & Technologies Conference (IFD&TC),* Santa Monica, CA, May 22, 2007.

- Jennifer Hunter Childs and Kathleen Styles, "Implementation of the Census Bureau's Mode Consistency Guidelines."
- Lawrence A. Malakhoff, Facilitator, "Remote Training and Distance Learning," Session 5A.

*North American Association of Central Cancer Registries (NAACCR)*, Detroit, MI, June 9, 2007.

- Philip Steel, Course Organizer and Faculty Member, "Privacy, Confidentiality, and the Protection of Health Data: A Statistical Perspective on Data Sharing."

*Statistical Society of Canada Annual Meeting,* St. John's, Newfoundland, Canada, June 10-13, 2007.

- Mary H. Mulry and Roxanne M. Feldpausch, "Treating Influential Values in a Monthly Retail Trade Survey."

*Third International Conference on Establishment Surveys (ICES III)*, Montreal, Canada, June 18-21, 2007.

- Brian C. Monsell, "Issues in Modeling and Adjusting for Calendar Effects in Economic Time Series."
- Brian C. Monsell, "Comparing Automatic Modeling Procedures of TRAMO and X-12-ARIMA: an Update."
- Paul B. Massell, "Protecting the Confidentiality of Tables by Adding Noise to the Underlying Microdata."

*International Symposium of Forecasters*, New York City, NY, June 24-27, 2007.

- Tucker S. McElroy, "Signal Extraction Revision Variances as a Goodness-of-Fit Measure."
- Brian C. Monsell, "Issues in Modeling and Adjusting for Calendar Effects in Economic Time Series."

*2nd Conference of the European Survey Research Association,* Prague, Czech Republic, June 27-29, 2007.

- Janet Harkness, S.E. Hansen, and Manuel de la Puente, "Comparative Questionnaire Design: A Review of Current Practice."
- Brian Kleiner, Jerelyn Bouic, and Yuling Pan, "Impact of Instructions on Survey Translation: An Experimental Study."

*2007 Workshop of Department Chairs in Statistics and Biostatistics*, Salt Lake City, UT, July 27-28, 2007.

- Tommy Wright, "Academic Collaboration with Government-Methodology Research Opportunities at the Census Bureau."

*Joint Statistical Meetings, American Statistical Association*, Salt Lake City, UT, July 29-August 2, 2007.

- Michael Beaghen and Lynn Weidman, "Statistical Issues and Interpretation of the American Community Survey's One-, Three-, and Five-Tear Period Estimates."
- Jennifer Childs and Elizabeth Nichols, "A New Approach to Measuring Residence Status."
- Rolando Rodríguez and Rob Creecy, "Synthetic Data Disclosure Control for American Community Survey Group Quarters."
- Tucker McElroy and Agustín Maravall, "Recasting X-11 Seasonal Adjustment Filters into Smoothers."
- David Findley, Brian Monsell, John Aston, and Jyh-Ying Peng, "New Models for Seasonal Time Series and Seasonal Adjustment."
- Sam Hawala, Panelist, "Protecting Confidentiality in Public Use Data by Releasing Synthetic Datasets: Experiences with Genuine Applications."

- Sam Hawala, Session Chair, "Synthetic Data and Other Methods for Disclosure Limitation and Confidentiality Preservation."
- Tucker McElroy and Scott Holan, "A Local Goodness-of-Fit Diagnostic Based on the Log Determinant of the Sample Covariance Matrix."
- Fritz Scheuren and William Winkler (Short Course), "Data Quality and Record Linkage Techniques."
- Yves Thibaudeau, Jun Shao, and Jeri Mulrow, "An Evaluation of Basic Calibration Estimators in Presence of Nonresponse."
- William Winkler, "Analytically Valid Microdata Files and Reidentification."
- Tommy Wright, Discussant, "Understanding and Measurement of Human Capital."

*American Sociological Association Annual Meetings,* New York, NY, August 10-14, 2007.

- Laurie Schwede, "How You Can Link Qualitative and Census Data: Using Our Complex Family Types Study as a Guide," (Part 1 of the 2-part seminar by Laurie Schwede and Rae Lesser Blumberg, "How You Can Link Qualitative and Census Data: Learning from our Complex Family Types Study)," Invited Didactic Seminar.

*DC Chapter of the American Association for Public Opinion Research*, Washington DC, August 22, 2007.

- Joanne Pascale, Marc Roemer, and Dean Resnick, "Medicaid Underreporting in the CPS: Results from a Record Check Study."

*Innovative Methodologies for Censuses in the New Millennium*, South Hampton, United Kingdom, August 31-September 2, 2007.

- Jennifer Childs and Elizabeth Nichols, "A New Approach to Measuring Residence Status."

*Latin American Studies Association Conference,* Montreal, Canada, September 5-8, 2007.

- Patti Goerman, "The Lives and Voices of Hispanic Immigrants in a New Receiving Area in the Southeast."

# 5. STATISTICAL RESEARCH DIVISION SEMINAR SERIES

Seminar Series Team: Aref Dajani, Richard Griffin (DSSD), Paul Massell, Barbara Palumbo, Laurie Schwede, Katherine Thompson (ADEP)

Shuying Zhu, Department of Statistics, University of California, Davis, "The Bootstrap Method for Multivariate Regression," October 18, 2006.

Vince Barabba, former U.S. Census Bureau Director (The Wise Elders Program), "The Value of Information is in its Use! ...Asking a Favor of Mr. Jefferson," October 25, 2006.

Betty Murphy, Erica Olmsted-Hawala, Larry Malakhoff, Beth Nichols, Sherae Daniel, and Alex Trofimovsky, SRD, U.S. Census Bureau, "World Usability Day at the U.S. Census Bureau," November 14, 2006.

Tucker McElroy, SRD, U.S. Census Bureau, "The Error in Business Estimates Obtained from Seasonally Adjusted Data," November 16, 2006.

Mario Callegaro, University of Nebraska, Lincoln, "What is Event History Calendar and Its Quality When Compared to Conventional Questionnaire Data Collection?," November 21, 2006.

Lynn Weidman and Michael Ikeda, SRD, U.S. Census Bureau, "Comparison of Alternatives for Controlling Group Quarters Person Estimates in the American Community Survey," November 22, 2006.

Jae-kwang Kim, Yonsei University, Seoul, Republic of Korea, "Improved Variance Estimation for Poverty and Income Statistics," January 25, 2007.

Kobi A. Abayomi, Columbia University, Manhattan, New York, "Diagnostics for Multivariate Imputations," March 15, 2007.

Monica Jackson, American University, Washington, DC, "Exploring Goodness-of-Fit and Spatial Correlation Using Components of Tango's Index of Spatial Clustering," March 20, 2007.

Mirjana N. Decaic, Georgetown University, Washington, DC, "The Pragmatic Analysis of a Lie in Question-Answer Interactions," March 22, 2007.

Lauren O. Gonce, Bowling Green State University, Bowling Green, OH, "The Role of Context in the Recall of Minimally Counterintuitive Concepts," March 27, 2007.

Jai Choi, National Center for Health Statistics, "A Test of Association of a Two-Way Categorical Table for Correlated Counts," March 29, 2007.

Jesse Frey, Villanova University, "Some New Results in Ranked-Set Sampling," April 4, 2007.

Andy Killmer, Decennial Statistical Studies Division, U.S. Census Bureau, "Results of Count Imputation Methods for the 2010 Census," May 23, 2007.

Leticia Fernandez, University of Texas El Paso, "US-Mexico Border Contraceptive Access Study: Preliminary Findings," May 29, 2007.

John M. Abowd, Johhannes Gehrke, Daniel Kifer, Ashwin Machanavajjhala, and Lars Vilhuber, Cornell University (Joint work with U.S. Census Bureau), "Using Formal Privacy Models for Statistical Disclosure Avoidance with Synthetic Data," May 31, 2007.

Tucker McElroy, SRD, U.S. Census Bureau, "Continuous-time Signal Extraction and Filter Discretization for Stock and Flow Time Series - Part I," June 6, 2007.

Song XiChen, Iowa State University, "Efficient Semi-parametric Estimation with Surrogate Outcome Data," June 7, 2007.

Tucker McElroy, SRD, U.S. Census Bureau, "Continuous-time Signal Extraction and Filter Discretization for Stock and Flow Time Series - Part II," June 13, 2007.

Mark Asiala, DSSD, U.S. Census Bureau, "American Community Survey Weighting and Estimation: ACS Family Equalization," June 20, 2007.

Tucker McElroy, SRD, U.S. Census Bureau, "Continuous-time Signal Extraction and Filter Discretization for Stock and Flow Time Series - Part III," June 20, 2007.

Nancy Eickelmann, Motorola Labs, "Recipe for Usability - 1 Part CMM1; 2 Parts Six Sigma; 3 Parts Use Cases," June 21, 2007.

Jerry Reiter, Duke University, "Assessing Risks of Identification Disclosures in Partially Synthetic Data," June 28, 2007.

Jennifer Huckett, Census Bureau Dissertation Fellow, Iowa State University, "Microdata Simulation for Confidentiality Protection Using Regression Quantiles and Hot Deck," July 25, 2007.

Timothy Leroy White, U.S. Army Research Laboratory, "Exploring the Use of Tactile Displays During Combat Assault Maneuvers," July 26, 2007.

Christine N. Kohnen, Saint Olaf College, Northfield, Minnesota, "From Missing Data to Data Sharing: Applications of Multiple Imputation," August 13, 2007.

Derek Young, The Pennsylvania State University, "A Study of Mixtures of Regressions," August 21, 2007.

Kathleen T. Ashenfelter, University of Notre Dame, "Analysis of Coordinated Human Face-to-Face Communication," August 22, 2007.

Lelyn D. Saner, University of Pittsburgh, "Framing in the Wild: Exploring Expressions of Decisions in Real-World Settings," August 23, 2007.

Michael Ikeda and Edward Porter, SRD, U.S. Census Bureau, "Unduplicating the 2010 Census," September 18, 2007.

Jeremy M. Funk, SRD, U.S. Census Bureau, "The Use of Multiplicative Noise as a Disclosure Avoidance Technique," September 27, 2007.

# 6. PERSONNEL ITEMS

## 6.1 HONORS/AWARDS/SPECIAL RECOGNITION

***Bronze Medal Award, Bureau of the Census***

- ***Donald Malec*** – for the development and evaluation of innovative techniques in small-area estimation in support of the decennial census and the American Community Survey. His application of random-effects models and other hierarchical modeling has enabled estimation at lower geographical levels than would be possible with the current (design-based) methods.

- ***Yuling Pan*** – for applying methods and theories from the discipline of sociolinguistics to survey methodology and implementation. Her accomplishments include defining the role of sociolinguistics in the development and implementation of federal surveys; creating a guideline for the translation of surveys; and adapting the methodology of cognitive interviewing to non-English-speaking survey respondents.

***Honorable Mention, Director's Award for Innovation***

- ***Jennifer Hunter Childs, Theresa DeMaio, and Eleanor Gerber*** – for work on the Mode Consistency Working Group.

***Customer Service Award***

- ***Larry Malakhoff*** – for continued fast and helpful service in response to dozens of requests from Census Bureau divisions/offices for accessibility and usability testing on Web and desktop applications to meet *Section 508* disability-related regulations.

## 6.2 SIGNIFICANT SERVICE TO PROFESSION

Jen Beck
- Secretary, DC-American Association for Public Opinion Research (DCAAPOR).
- Member, Program Committee for DCAAPOR Workshop on Nonresponse.

Pat Cantwell
- Associate Editor, *Journal of Official Statistics*.
- Associate Editor, *Survey Methodology*.
- Participant, Expert Panel Reviewing Plans for the Census of Agriculture (report published by the Council on Food, Agricultural and Resource Economics).
- Member, Program Committee for the 2007 Joint Statistical Meetings (JSM).
- Member, Selection Subcommittee for Continuing Education courses at 2007 JSM.
- Member, Committee on Committees, American Statistical Association.
- Member, Committee on Meetings, American Statistical Association.

Anna Chan
- Reviewer, Abstracts, 2007 American Association for Public Opinion Research (AAPOR) Meeting.
- Member, Organizing Committee, AAPOR.
- Refereed paper for *Public Opinion Quarterly*.

George Carter
- New Member Docent, AAPOR Annual Meeting.

Jennifer Hunter Childs
- Secretary (outgoing), DC-American Association for Public Opinion Research.
- Member, Q-Bank Steering Committee.
- Member, Program Committee for DCAAPOR Workshop on Nonresponse.

Terry DeMaio
- Member, Editorial Board, *Public Opinion Quarterly.*
- Refereed paper for the *Journal of General Internal Medicine*.

Jeremy Funk
- Member, Confidentiality and Data Access Committee, Federal Committee on Statistical Methodology (FCSM).

María García
- Member, Steering Committee, UN/ECE Work Session on Statistical Data Editing.
- Session Organizer and Discussant, Topic (V): "Editing Based on Results, Macroediting," UN/ECE Work Session on Statistical Data Editing.

Patti Goerman
- Refereed paper for the *Journal of Official Statistics.*

Sam Hawala
- Member, Confidentiality and Data Access Committee, FCSM.
- Member, National Center for Education Statistics Disclosure Review Board.

Donald Malec
- Instructor, "Bayesian Small Area Estimation." (Half-day course at the 11-th Biennial CDC/ATSDR Symposium on Statistical Methods).
- Methodology Program Chair (2005-07), Washington Statistical Society.
- Refereed papers for the *Journal of the American Statistical Association* and the *Journal of Official Statistics*.

Donald Martin
- Refereed paper for the *European Journal of Operational Research*.
- Refereed papers for *Computers & Operations Research*.
- Reviewed an NSA Grant Proposal for the American Mathematical Society.

Paul Massell
- Member, Confidentiality and Data Access Committee, FCSM.
- Member, Bureau of Transportation Statistics Disclosure Review Board.

Tucker McElroy
- Session Organizer, 2007 Joint Statistical Meetings.
- Session Organizer, 2007 International Symposium on Forecasting.
- Refereed papers for *Bernoulli*, *Journal of Statistical Planning and Inference,* and the *Journal of Official Statistics*.

Brian Monsell
- Webmaster and *AMSTAT* Online Assistant Editor, Business and Economic Statistics Section, American Statistical Association (ASA).

Jeff Moore
- Refereed papers for *Public Opinion Quarterly* and the *Journal of Official Statistics*.

Mary Mulry
- Associate Editor, *The American Statistician*.
- Associate Editor, *Journal of Official Statistics.*
- Chair-Elect, Survey Research Methods Section, ASA.
- Secretary, ASA Council of Sections Governing Board.

Betty Murphy
- Reviewed three papers for the Conference on Computer-Human Interaction (CHI '07).
- Reviewed three submissions to the Work-in-Progress segment of CHI'07.

Yuling Pan

- Advisor, Editorial Advisory Board of *the Handbook of Business Discourse*.
- Refereed abstracts and papers for the *Handbook of Business Discourse.*
- Refereed two papers for *SKY Journal of Linguistics*.
- Refereed one paper for a book volume on *"Face, Communication and Social Interaction."*
- Reviewed two manuscripts for Peter Lang Publication Inc.
- Member, AAPOR Multilingual Interest Group.
- Member, Coordinating Committee of Chinese Discourse Research Group.

Joanne Pascale

- Reviewer, Survey on Emergency Preparedness, American Public Health Association (Statistics Section).
- Book Reviewer, "The Averaged American," review published by the *Journal of Official Statistics*.

Jennifer Rothgeb

- Refereed paper for *Public Opinion Quarterly*.
- Evaluated abstracts for 2007 AAPOR Annual Conference.
- Chair, Endowment Committee, American Association for Public Opinion Research.
- Member, AAPOR 2007 Policy Impact Award Committee.
- Member, AAPOR 2007 Conference Committee.
- Session Chair: AAPOR 2007 Conference Session "Methodological Briefs: Nonresponse Issues".
- Mentor, AAPOR 2007 Conference.
- Member, Interagency Committee for Q-Bank Development.

Eric Slud

- Associate Editor, *Journal of Royal Statistical Society, Series B*.
- Associate Editor, *Lifetime Data Analysis.*

Phil Steel

- Chair, Confidentiality and Data Access Committee (CDAC), Federal Committee on Statistical Methodology (FCSM).
- Member, new Committee on Privacy Issues, FCSM.

Bill Winkler

- Member, National Academies of Science Committee on Voter Registration Databases.
- Program Committee Member, *Statistical Data Protection 2006*, monograph to be published by Springer (Winkler refereed six papers for possible inclusion in the monograph).
- Refereed papers for *Journal of Official Statistics (2)* and *IEEE Information Systems*.
- Pre-reviewed one paper for *Computers and Mathematics with Applications*.
- Reviewer, three chapters for a proposed monograph on sampling being edited by C. R. Rao and D. Pfeffermann.
- Associate Editor, *Journal of Privacy Technology*.
- Associate Editor, *Journal of Privacy and Confidentiality.*

Tommy Wright

- Associate Editor, *The American Statistician*.
- Associate Editor, *The American Journal of Mathematical and Management Sciences.*
- Member, Department of Statistics Advisory Council, George Mason University.
- Member, Department of Mathematics Advisory Board for Masters Program, Georgetown University.
- Member, 2009 ISI Session Program Committee, International Association of Survey Statisticians.
- Member, Executive Director Search Committee, American Statistical Association.
- Member, Morris Hansen Lecture Committee.

Laura Zayatz

- Member, Confidentiality and Data Access Committee, FCSM.

- Member, Advisory Board of *Journal of Privacy Technology.*
- Member, American Statistical Association's Committee on Privacy and Confidentiality.
- Refereed article for *Journal of Privacy and Confidentiality*.
- Member, UK Census Design and Methodology Advisory Committee
- Refereed report on proposed disclosure avoidance techniques to be used by the Office of National Statistics, United Kingdom, for Census 2011.
- Refereed papers for *Journal of Official Statistics.*
- Co-Organizer of National Science Foundation's Workshop on Confidentiality, September 6-7, 2007.

### 6.3 PERSONNEL NOTES

Alexander Trofimovsky (graduate student in Human Factors and Applied Cognition at George Mason University) continued the internship that he began in the summer in our Human Factors and Usability Research Group.

Ashley Landreth accepted a position in the Population Division.

Donald Martin accepted a faculty position at North Carolina State University.

Christopher Blakely accepted a Postdoctoral Research position in our division.

Summer Visitors:

*Census Bureau Dissertation Fellow*
- Jennifer Huckett (PhD candidate in statistics at Iowa State University)

*Joint Program in Survey Methodology Junior Fellow*
- Mallory Ray (Senior in mathematics at Sweet Briar College)

Westleigh Quattrone (graduate student in sociology at University of Maryland, College Park)
Michelle Rusch (PhD candidate in human-computer interaction at Iowa State University)
Benjamin Smith (graduate student in cognitive psychology at University of Maryland, College Park)
K. Matthew Windham (graduate student in mathematics and statistics at Georgetown University)

Joyce Farmer retired from the Census Bureau after 37 years of federal service.

Kathleen Ashenfelter joined our Human Factors & Usability Research Group.

Jenna Beck (graduate student in psychology at George Mason University) joined our Human Factors & Usability Research Group as an intern.

Sara Wade (a senior in mathematics and economics at the University of Maryland) joined our Office of the Chief as an intern.

| APPENDIX A | Statistical Research Division's FY 2007 Program Sponsored Projects/Subprojects With Substantial Activity and Progress and Sponsor Feedback (Basis for PERFORMANCE MEASURES) | | |
|---|---|---|---|
| Project # | Project/Subproject Sponsor(s) | SRD Contact | Sponsor Contact |
| | **DECENNIAL** | | |
| 5210701 | Forms Development | | |
| 5210702 | Content Planning and Development | | |
| | *1. Census Questionnaire Design Features* | Jenny Childs | Kathleen Styles |
| | *2. Short Form Questionnaire Content Other Than Race & Ethnicity* | Terry DeMaio | Sharon Boyer |
| | *3. Development of Race and Ethnicity Questions* | Eleanor Gerber | Roberto Ramirez |
| 5210703 | *4. Language Planning and Development* | Patti Goerman | Sharon Boyer |
| 5310701 | Data Collection Planning and Development | | |
| | *5. Usability Input to Coverage Follow-up (CFU) User-Interface Requirements* | Betty Murphy | Sarah Brady |
| | *6. Usability Input to the Field Data Collection Automation (FDCA) Program* | Betty Murphy | Rose Byrne |
| 5310708 | Special Place/Group Quarters Planning and Development | | |
| | *7. Group Quarters Operational Integration Team for 2008 Dress Rehearsal* | George Carter | Annetta Clark Smith |
| 5610702 | Statistical Design and Estimation | | |
| 5611702 | IT Statistical Design and Estimation | | |
| | *8. Decennial Record Linkage* | William Winkler | Maureen Lynch |
| | *9. Decennial Disclosure Avoidance* | Laura Zayatz | Mark Asiala |
| | *10. Census Unduplication Research* | Michael Ikeda | Maureen Lynch |
| 5610703 | Coverage Measurement Planning and Development | | |
| | *11. Coverage Measurement Research* | Don Malec | Richard Griffin |
| | *12. Accuracy of Coverage Measurement* | Mary Mulry | Donna Kostanich |
| | *13. Questionnaire Wording and Automation Team* | Joanne Pascale | Donna Kostanich |
| 5610705 | Coverage Improvement Planning and Development | | |
| | *14. Decennial Privacy Research* | Jeff Moore | LaShaunne Graves David |
| | *15. Development of Questionnaires for Decennial Coverage Improvement* | Eleanor Gerber | Dave Sheppard |
| | *16. Inter-Divisional Decennial 2010 Working Groups on Residence Rules and Coverage Improvement* | Laurie Schwede | Ed Byerly |
| | *17. Evaluations, Experiments, and Assessments Operational Integration Team (EEA OIT)* | Laurie Schwede | Debbie Bolton |
| 5385760 | American Community Survey (ACS) | | |
| | *18. ACS Questionnaire Design Measurement* | Jennifer Rothgeb | Jennifer Tancreto |
| | *19. ACS Labor Force Questions* | Jennifer Rothgeb | Jennifer Tancreto |
| | *20. ACS Group Quarters Item Imputation and Micro Data Disclosure Avoidance Research* | Yves Thibaudeau | Mark Asiala |
| | *21. ACS Language Research* | Yuling Pan | Todd Hughes |
| | *22. ACS "Field of Degree" Questions* | Jennifer Rothgeb | Jennifer Tancreto |
| | *23. ACS Applications for Time Series Methods* | Tucker McElroy | Freddie Navarro |
| | *24. ACS Variances* | Eric Slud | Mark Asiala |
| | *25. ACS Data Projects - Display of Variability Measures* | Lynn Weidman | Doug Hillmer |
| | *26. ACS Additional Mail Test* | Laurie Schwede | Jennifer Tancreto |
| | *27. ACS Website: Card-sorting Study* | Erica Olmsted-Hawala | Jennifer Holland |

| Project # | Project/Subproject Sponsor(s) | SRD Contact | Sponsor Contact |
|---|---|---|---|
| | **DEMOGRAPHIC** | | |
| 0906/7374 | 28. *Data Integration* | Ned Porter | Marie Pees |
| 1467001 | 29. *Quick Turnaround Pretesting of Household Surveys (National Crime Victimization Survey-Identity Theft Supplement and Internet Predation Questions)* | Terry DeMaio | Marilyn Monahan |
| 1464500 | Re-Engineered Survey of Income and Program Participation (RE-SIPP) Research | | |
| | 30. *RE-SIPP Methodological Research* | Jeff Moore | David Johnson |
| | 31. *Longitudinal Weighting* | Leroy Bailey | Smanchai Sae Ung |
| TBA | 32. *SIPP Variance Estimation* | Leroy Bailey | Tracy Mattingly |
| 1465001 | 33. *SIPP Assets/Liabilities Imputation Research/Software Design* | Yves Thibaudeau | Thomas Palumbo |
| 7165 | 34. *Research for Small Area Income and Poverty Estimates (SAIPE)* | Elizabeth Huang | Craig Cruse |
| TBA | 35. *Use of the Empirical Bayes Approach in the Housing Unit Method for Population Estimates* | Lynn Weidman | Charles Coleman |
| TBA | 36. *Civic Engagement Supplement to the Current Population Survey* | Jennifer Rothgeb | Kathleen Creighton |
| TBA | 37. *Migration Supplement to the Current Population Survey* | Anna Chan | Melissa Chiu |
| TBA | 38. *Small Area Health Insurance Estimates (SAHIE)* | Don Malec | Don Luery |
| | **ECONOMIC** | | |
| 2370754 | 39. *Editing Methods Development (Investigation of Selective Editing Procedures for Foreign Trade Programs)* | Maria Garcia | Ryan Fescina |
| 2470751 | 40. *Disclosure Avoidance Methods* | Laura Zayatz | Rita Petroni |
| 2370752 | Time Series Research | | |
| | 41. *Seasonal Adjustment Software Development and Evaluation* | Brian Monsell | Kathy McDonald-Johnson |
| | 42. *Research on Seasonal Time Series - Modeling and Adjustment Issues* | Tucker McElroy | Kathy McDonald-Johnson |
| | **STATISTICAL RESEARCH DIVISION** | | |
| 8150 | 43. *Postal Regulatory Commission/Statistical Consulting* | Leroy Bailey | John Waller |
| Other | Usability/Field Related | | |
| | 44. *Web Applications Accessibility-AES Direct* | Larry Malakhoff | Paul Newman |
| | 45. *Web Applications Accessibility-Calendar WIZ* | Larry Malakhoff | Rebecca Vilky |
| | 46. *Web Applications Accessibility-Personal Property Management WBT* | Larry Malakhoff | Lisa Lawler |
| | 47. *Web Applications Accessibility-History of the Census Bureau Web Site* | Larry Malakhoff | Eileen Marra |
| | 48. *Web Applications Accessibility-2010 LUCA WBT* | Larry Malakhoff | Lornell Parks |
| | 49. *Web Applications Accessibility-Census LMS* | Larry Malakhoff | Sarah Presley |
| | 50. *Web Applications Accessibility-Section 508 Implementation Team* | Larry Malakhoff | Laura Yax |
| | 51. *Desktop Applications Accessibility-X-12ARIMA Graphing* | Larry Malakhoff | Kathy McDonald-Johnson |
| | 52. *Desktop Applications Accessibility-MAF/Tiger Partnership Software* | Larry Malakhoff | Brian Timko |
| | 53. *Desktop Applications Accessibility-2007 Economic Census Reporting Application* | Larry Malakhoff | Amy Anderson |
| | 54. *Census.gov Template Development* | Erica Olmsted-Hawala | Trudy Suchan |
| | 55. *AES Direct (Automated Export System) Computer Self-Administered Questionnaire: Foreign Trade Division Web Site Re-Design* | Erica Olmsted-Hawala | Paul Newman |
| | 56. *Usability Study of the Statistical Abstract Web Pages* | Erica Olmsted-Hawala | Lars Johanson |
| | 57. *Usability Study of the International Database Web Pages* | Erica Olmsted-Hawala | Tom McDevitt |
| | 58. *Usability Study of the Census in the Schools Web Site* | Betty Murphy | Victoria Glasier |
| | 59. *Usability Study of the Monthly and Annual Wholesale and Retail Trade Web Site* | Eica Olmsted-Hawala | Suneye Holmes |

**APPENDIX B**

# FY 2007 PROJECT PERFORMANCE MEASUREMENT QUESTIONNAIRE STATISTICAL RESEARCH DIVISION

Dear

In a continuing effort to obtain and document feedback from program area sponsors of our projects or subprojects, the Statistical Research Division will attempt for the ninth year to provide *seven measures of performance,* this time for the fiscal year 2007. For FY 2007, the *measures of performance* for our division are:

*Measure 1. Overall, Work Met Expectations:* Percent of FY 2007 Program Sponsored Projects/Subprojects where sponsors reported that work met their expectations.

*Measure 2. Established Major Deadlines Met:* Percent of FY 2007 Program Sponsored Projects/Subprojects where sponsors reported that all established major deadlines were met.

*Measure 3a. At Least One Improved Method, Techniques Developed, Solution, or New Insight:* Percent of FY 2007 Program Sponsored Projects/Subprojects reporting at least one improved method, techniques developed, solution, or new insight.

*Measure 3b. Plans for Implementation:* Of the FY 2007 Program Sponsored Projects/Subprojects reporting at least one improved method, techniques developed, solution, or new insight, the percent with plans for implementation.

*Measure 4. Predict Cost Efficiencies:* Number of FY 2007 Program Sponsored Projects/Subprojects reporting at least one "predicted cost efficiency."

*Measure 5. Journal Articles, Publications:* Number of journal articles (peer review) and publications documenting research that appeared or were accepted in FY 2007.

*Measure 6. Proceedings Publications:* Number of proceedings publications documenting research that appeared in FY 2007.

These measures will be based on response to the five questions on this form from our sponsors as well as from members of our division and will be used to help improve our efforts.

To construct these seven measures for our division, we will combine the information for all of our program area sponsored projects or subprojects obtained during September 24 thru October 19, 2007 using this questionnaire. Your feedback is requested for:

Project Number and Name: _____
Sponsoring Division(s): _____

After all information has been provided, the SRD Contact ____ _____ will ensure that the signatures are obtained in the order indicated on the last page of this questionnaire.

We very much appreciate your assistance in this undertaking.

_____

Tommy Wright Date
Chief, Statistical Research Division

*Brief Project Description* ***(SRD Contact will provide from Division's Quarterly Report):***

*Brief Description of Results/Products from FY 2007* ***(SRD Contact will provide):***

*(over)*

**TIMELINESS:**
**Established Major Deadlines/Schedules Met**

**1(a).** Were all established major deadlines associated with this project or subproject met? **(Sponsor Contact)**

☐ Yes ☐ No ☐ No Established Major Deadlines

**1(b).** If the response to 1(a) is No, please suggest how future schedules can be better maintained for this project or subproject. **(Sponsor Contact)**

**QUALITY & PRODUCTIVITY/RELEVANCY:**
**Improved Methods /Techniques Developed/Solutions/New Insights**

**2.** Listed below are at most 2 of the top improved methods, techniques developed, solutions, or new insights offered or applied on this project or subproject in FY 2007 where an SRD staff member was a significant contributor. Review "a" and "b" below **(provided by SRD Contact)** and make any additions or deletions as necessary. For each, please indicate whether or not there are plans for implementation. If there are no plans for implementation, please comment.

☐ No improved methods/techniques/solutions/new insights developed or applied.

☐ Yes as listed below. (See a and b.)

Plans for Implementation?

a. _____ Yes ☐ No ☐

b. _____ Yes ☐ No ☐

**Comments (Sponsor Contact):**

**COST:**
**Predict Cost Efficiencies**

**3.** Listed **(provided by SRD Contact)** below are at most two research results or products produced for this project or subproject in FY 2007 that predict cost efficiencies. Review the list, and make any additions or deletions as necessary. Add any comments.

☐ No cost efficiencies predicted.

☐ Yes as listed below. (See a and b.)

a.

b.

**Comments (Sponsor Contact):**

**OVERALL:**
**Expectations Met/Improving Future Communications**

**4.** Overall, work on this project or subproject by SRD staff during FY 2007 met expectations. **(Sponsor Contact)**

☐ Strongly Agree
☐ Agree
☐ Disagree
☐ Strongly Disagree

**5.** Please provide suggestions for future improved communications or any area needing attention on this project or subproject. **(Sponsor Contact)**

***(SRD Contact will coordinate first two signatures as noted and pass to SRD Chief.)***

First _____
Sponsor Contact Signature Date

Second _____
SRD Contact Signature Date

***(SRD Chief will coordinate last two signatures as noted.)***

Third _____
Sponsor Division Chief Signature Date

Fourth _____
SRD Division Chief Signature Date

## *Since August 1, 1933...*

*"...As the major figures from the American Statistical Association (ASA), Social Science Research Council, and new Roosevelt academic advisors discussed the statistical needs of the nation in the spring of 1933, it became clear that the new programs—in particular the National Recovery Administration—would require substantial amounts of data and coordination among statistical programs. Thus in June of 1933, the ASA and the Social Science Research Council officially created the Committee on Government Statistics and Information Services (COGSIS) to serve the statistical needs of the Agriculture, Commerce, Labor, and Interior departments...COGSIS set...goals in the field of federal statistics...(It) wanted new statistical programs—for example, to measure unemployment and address the needs of the unemployed...(It) wanted a coordinating agency to oversee all statistical programs, and (it) wanted to see statistical research and experimentation organized within the federal government... In August 1933 Stuart A. Rice, President of the ASA and acting chair of COGSIS,...(became) assistant director of the (Census) Bureau. Joseph Hill (who had been at the Census Bureau since 1900 and who provided the concepts and early theory for what is now the methodology for apportioning the seats in the U.S. House of Representatives)...became the head of the new Division of Statistical Research...Hill could use his considerable expertise to achieve (a) COGSIS goal: the creation of a research arm within the Bureau..."*

Source: Anderson, M. (1988), *The American Census: A Social History*, New Haven: Yale University Press.

*Among others and since August 1, 1933, the Statistical Research Division has been a key catalyst for improvements in census taking and sample survey methodology through research at the U.S. Census Bureau. The introduction of major themes for some of this methodological research and development where staff of the Statistical Research Division[1] played significant roles began roughly as noted—*

- **Early Years (1933–1960s):** *sampling (measurement of unemployment and 1940 census); probability sampling theory; nonsampling error research; computing; data capture.*
- **1960s–1980s:** *self-enumeration; social and behavioral sciences (questionnaire design, measurement error, interviewer selection and training, nonresponse, etc.); undercount measurement, especially at small levels of geography; time series and seasonal adjustment.*
- **1980s–Early 1990s:** *undercount measurement and adjustment; ethnography; record linkage; confidentiality and disclosure avoidance.*
- **Mid 1990s–Present:** *small area estimation; missing data and imputation; usability (human-computer interaction); linguistics, languages, and translations.*

[1] The Research Center for Measurement Methods joined the Statistical Research Division in 1980. In addition to a strong interest in sampling and estimation methodology, research largely carried out by mathematical statisticians, the division also has a long tradition of nonsampling error research, largely led by behavioral and social scientists. Until the late 1970s, research in this domain (e.g., questionnaire design, measurement error, interviewer selection and training, nonresponse, etc.) was carried out in the division's Response Research Staff. Around 1979 this staff split off from the division and became the Center for Human Factors Research. The new center underwent two name changes—first, to the Center for Social Science Research, in 1980, and then, in 1983, to the Center for Survey Methods Research before rejoining the division in 1994.

**U.S. Census Bureau**
**Statistical Research Division**
**Room 5K108**
**4600 Silver Hill Road**
**Washington, DC 20233**
**301-763-1702**

# Statistical Research Division

Assistant Division Chief
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Barbara Palumbo
Judi Norvell
Chad Russell

**Machine Learning & Computational Statistics Research**
Bill Winkler
Mohammed Chaudhry
William Yancey
VACANT

**Computing Applications**
Aref Dajani
Pam Ferrari
Tom Petkunas
Ned Porter
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**Missing Data Methods Research**
Yves Thibaudeau
Bor-Chung Chen
Maria Garcia
Rolando Rodriguez
Jun Shao (U. of WI)
VACANT

Assistant Division Chief
Pat Cantwell (D)
Alice Bell
Gloria Prout

**Sampling Research**
Lynn Weidman
Mike Ikeda
Mary Mulry
Julie Tsay
VACANT

**Small Area Estimation Research**
Don Malec
Elizabeth Huang
Jerry Maples

**Statistical Estimation & Analysis Research**
Leroy Bailey
Eric Slud (U. of MD)
VACANT

**Disclosure Avoidance Research**
Laura Zayatz
Jeremy Funk
Sam Hawala
Paul Massell
Phil Steel
VACANT

**Time Series Research**
Brian Monsell
Chris Blakely (S/Postdoc)
Tucker McElroy
VACANT
VACANT

Assistant Division Chief
Manuel de la Puente
Tina Arbogast
Diana Simmons

**Questionnaire Design & Measurement Research-1**
Jeff Moore
Anna Chan
Joanne Pascale
Jennifer Rothgeb

**Questionnaire Design & Measurement Research-2**
Eleanor Gerber
George Carter (PostDoc)
Yuling Pan
Laurie Schwede
VACANT

**Questionnaire Pretesting for Household Surveys**
Terry DeMaio
Jen Beck
Jenny Hunter Childs
Patti Goerman
Dawn Norris (S)
Lorraine Randall
VACANT

**Human Factors & Usability Research**
Betty Murphy
Kathleen Ashenfelter
Jenna Beck (S)
Larry Malakhoff
Beth Nichols
Erica Olmsted-Hawala
Alex Trofimovsky (S)
VACANT

Tommy Wright, Chief
Kelly Taylor
Ann Dimler
Michael Hawkins
VACANT

(D) On Detail to Data Integaration Division
(S) Student

December 2007