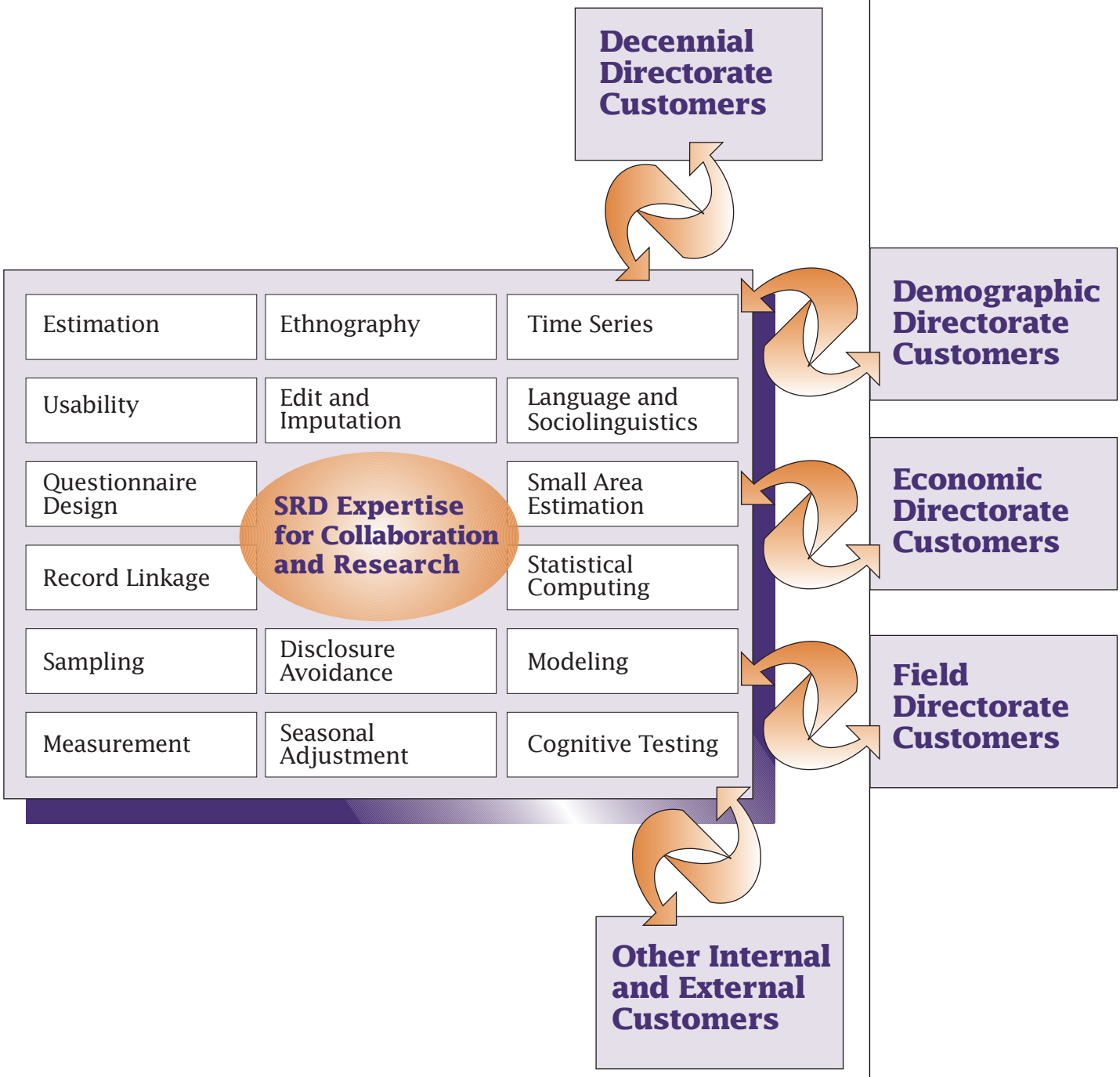
Annual Report *of the* Statistical Research Division

Fiscal Year 2009



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

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) 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.

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We help the Census Bureau improve its processes and products. For fiscal year 2009, 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 2009 follow, and more details are provided within subsequent pages of this report:

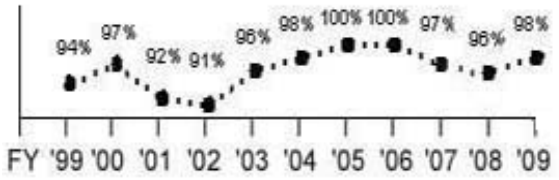
- worked with members of the Data Integration Division to develop a beta prototype of the Remote Microdata Analysis System; wrote R programs that implement disclosure avoidance methodology for regressions.
- built imputation models that can be used to generate synthetic microdata and tables; techniques will be used for Census 2010 Group Quarters data.
- developed enhancements for *X-13ARIMA-SEATS*: regressors for Easter modeling of inventory series and temporary level changes, user-defined holiday regression groups, and a chi-squared test for user defined holiday effects.
- developed a forecasting test statistic that distinguishes between two competing ARIMA models via asymptotic mean square h-step ahead forecasting error, taking parameter uncertainty into account.
- determined that assumptions on latent variable model components, such as total housing unit size, are critical and need to be included in model checking.
- developed a simulation methodology that permits investigating the effect of the influential values on estimates of total sales and inventories and estimates of period-to-period change.
- added new field comparison metrics to improve address matching in *BigMatch* software; performed a large production test as part of the 2008 Dress Rehearsal.
- updated and reprocessed the 2007 American Community Survey (ACS) PUMS data through the synthesis of key variables.
- researched, developed, and implemented selective editing methods for the Census Bureau's trade statistics programs.
- completed the SAS and Visual Basic programs to produce estimates for the required tabulations for the 2006 and 2007 Current Population Survey/Annual Social and Economic Supplement data.
- completed eight reviews of public Web sites managed by Census Bureau organizations; completed usability evaluations for 11 Census Bureau projects (including medium-fidelity testing in progress on the redesigned American FactFinder Web site; completed 31 accessibility evaluations of Web sites and software applications.
- facilitated the conduct of 35 questionnaire pretesting activities across the decennial, demographic, and economic areas under the Generic Clearance with the Office of Management and Budget.
- completed Phases I, II, and III of a project to cognitively test the Spanish language version of the CATA/CAPI instrument for the American Community Survey.
- completed research on the English version of a combined Race and Hispanic origin question series to be field tested in the 2010 Census.
- reported major results from the 2008 Event History Calendar (EHC) Test for the Survey of Income and Program Participation (SIPP): 1) Interviewers were well trained and well prepared, 2) respondents' attitudes toward the EHC interview were very positive, and 3) SIPP and EHC reports almost always agree.
- completed the production of SAIPE estimates for 2006, 2007, and 2008 state poverty ratios for four age groups and state median household incomes using ACS data along with administrative records data and Census 2000 data.
- completed contract awards to 37 firms in five technical areas for the Research and Development 2014 Contracts.
- launched a new effort, *SUMMER AT CENSUS*, which brought 16 outstanding scholars to the Census Bureau for short-term visits to give seminars reporting their research results and to engage in collaborative research with Census Bureau staff.

How Did We Do...

For an 11th year, we received feedback from our sponsors. Near the end of fiscal year 2009, our efforts on fifty-two 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-two questionnaires were obtained with the following results (The graph associated with each measure shows the performance measure over the last 11 fiscal years):

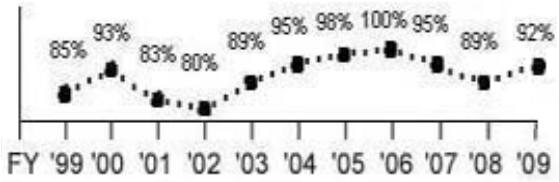
Measure 1. Overall, Work Met Expectations

Percent of FY2009 Program Sponsored Projects/Subprojects where sponsors reported that overall work met their expectations (agree or strongly agree) (51 out of 52) . . 98%



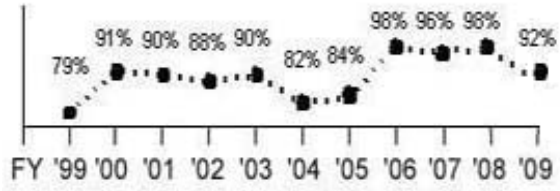
Measure 2. Established Major Deadlines Met

Percent of FY2009 Program Sponsored Projects/Subprojects where sponsors reported that all established major deadlines were met (36 out of 39 responses) 92%



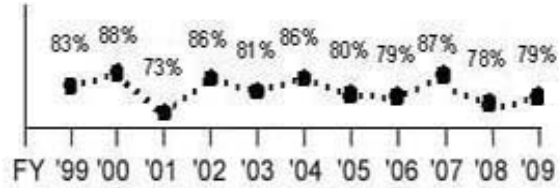
Measure 3a. At Least One Improved Method, Developed Technique , Solution, or New Insight

Percent of FY2009 Program Sponsored Projects/Subprojects reporting at least one improved method, developed technique, solution, or new insight (47 out of 51 responses) 92%



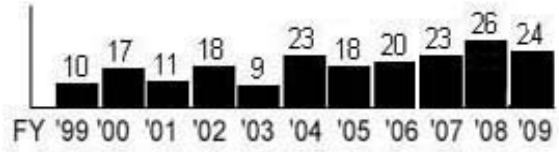
Measure 3b. Plans for Implementation

Of these FY2009 Program Sponsored Projects/Subprojects reporting at least one improved method, technique developed, solution, or new insight, the percent with plans for implementation (37 out of 47 responses) 79%



Measure 4. Predict Cost Efficiencies

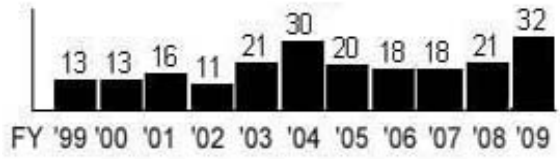
Number of FY2009 Program Sponsored Projects/Subprojects reporting at least one "predicted cost efficiency" 24



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

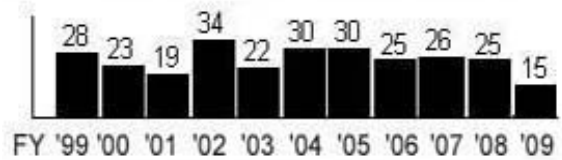
Measure 5. Journal Articles, Publications

Number of peer reviewed journal publications documenting research that appeared (18) or were accepted (14) in FY2009 32



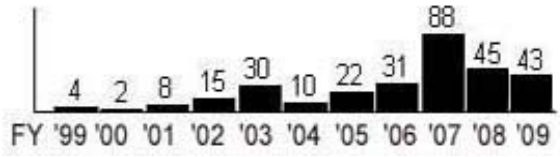
Measure 6. Proceedings, Publications

Number of proceedings publications documenting research that appeared in FY2009 15



Measure 7. Division Research Reports/Studies, Publications

Number of division research reports/studies publications documenting research that appeared in FY2009 43



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 FORMS DEVELOPMENT/CONTENT PLANNING AND DEVELOPMENT (Decennial Projects 5210901 AND 5210902)

A. Census Questionnaire Design Features (Other than Race and Ethnicity)

Description: During FY2009, this project involves participation in decennial content team meetings, including the Content and Forms Design Integrated Product Team, the Housing Unit Operational Integration Team, the Nonresponse Followup Instrument Subteam, the Mode Consistency Subteam, and the Census Program for Evaluations and Experiments (CPEX) Implementations Team. It also includes cognitive pretesting of census questionnaires.

Highlights: During FY2009, staff completed and distributed reports on the cognitive testing of the Be Counted, Enumerator Questionnaire (EQ) and the associated Information Sheet, and an experimental version of the Individual Census Response (ICR) forms that will be used in the 2010 Census. In all of these cognitive tests, staff identified problems with question wording or layout that the sponsoring divisions sought to correct either through form revisions or through interviewer training. In addition, staff followed up with Field and Decennial Statistical Studies Division on recommendations from the testing of the Enumeration for Transitory Locations (ETL) forms that impacted changes to improve the interviewer listing pages. Staff reviewed Field training materials for the 2010 Census Nonresponse Followup operation and made recommendations for revisions based on cognitive and usability testing with the form. Many of these recommendations were accepted. It is expected that these revisions will lead to better data quality in the 2010 Census.

Staff: Jennifer Hunter Childs (x34927), Leticia Fernández, Nathan Jurgenson, George Higbie, Anissa Sorokin, Mikelyn Meyers, Dawn Norris, Matthew Clifton, Lorraine Randall

B. Deadline Messaging Cognitive Testing for the 2010 CPEX Panels

Description: In the 2010 Census Program for Evaluations and Experiments (CPEX) panels mailing materials, five different deadline messages will be used. Staff used cognitive interviews to pretest each of the deadline messages on each mailing piece (advance letter, outgoing envelope, initial cover letter, and reminder postcard) developed for the CPEX panels. Respondents were asked to read each mailing piece separately for an assigned treatment and were then probed for their understanding and reactions to the various deadline statements. Each of the four treatments included a different message in the cover letter. The deadline messages are categorized as "Control," "Mild," "Progressive urgency," and "NRFU (non-response follow-up) motivation." The Control deadline statement in the cover letter read, "Please complete and mail back the enclosed census form today"; the Mild treatment deadline statement in the cover letter read, "Please complete and mail back the enclosed census form by April 5"; the Progressive Urgency deadline statement in the cover letter read, "The deadline to complete and mail back the enclosed census form is April 5"; and the NRFU Motivation deadline statement read, "Please complete and mail back the enclosed census form by April 5 so that you are not inconvenienced with a personal visit from an interviewer." The messages in the advance letter, postcard, and on the return envelope varied by treatment as well, but used language consistent with the tone in the cover letter.

Highlights: During FY2009, staff conducted cognitive research on the proposed deadline messages for the Census Bureau 2010 Census Program for Evaluations and Experiments (CPEX) panels, and published a report on the methods and findings.

Two rounds of cognitive interviews were presented. They found some comprehension problems with the deadline message tested that attempts to motivate a timely response by appealing to the respondent's presumed desire to save taxpayer money. They did not find any consistent comprehension problems with any of the other deadline messages tested. In both rounds of testing, respondents had strong reactions to the message informing them that an interviewer would come to their door and conduct an interview if the form was not received by April 5. Most respondents stated a preference for not having an interviewer come to their door and conduct an interview. The message using the word "deadline" with the date of April 5th was seen as a strong message, but generally, respondents had a more favorable reaction to that message than they did to the control message that said to complete and mail back the form today. For people who work or who get their mail late in the day, following that instruction literally is not possible. The fact that it cannot be done, makes the message meaningless, and possibly ignorable. The message, which uses both a date, April 5, and the word "please" was mentioned as being polite, but not a particularly motivating message when compared to the other deadline messages. For 2010, we recommend modifying or eliminating the deadline message attempting to motivate response based on saving taxpayer money.

Additionally, the report presents results of respondents using the form insertion instructions on the return envelope. If the respondent follows the Census Bureau instructions and folds and correctly places the form into the return envelope, the Census Bureau can check-in the questionnaire using automation. We tested two different return envelopes using two slightly different designs of the instructions. During the lab test, neither design seemed to "catch the eye" of all respondents so that they would read the form insertion instructions before attempting to put the form into the envelope for mailing.

Staff: Beth Nichols (x31724), Nathan Jurgenson, Dawn Norris

C. Development of Race and Ethnicity Questions
Description: During FY2009, staff conducted cognitive pretesting of five alternative versions of the race and ethnicity questions used in the Decennial Census for the 2010 CPEX panels.

Highlights: During FY2009, staff conducted cognitive interviews as part of its collaboration with the Population Division and Decennial Statistical Studies Division to pretest 8 CPEX panels for 2010 and to develop and test the Reinterview questionnaire that will be used to measure bias in the experimental race CPEX panels.

During this quarter, staff completed cognitive testing of the Race Reinterview Questionnaire. Staff advised the Population Division in the planning for 48 focus groups to be conducted by a contractor in 2011 to further evaluate the AQE race experimental panels. The focus groups will be with small minority subgroups who could be influenced by the experimental treatments.

Staff: Leticia Fernández (x36050), Jennifer Hunter Childs, Patricia Goerman, Terry DeMaio, Yuling Pan, Rodney Terry, Matt Clifton, George Higbie, Mikelyn Meyers, Nathan Jurgenson

1.3 LANGUAGE PLANNING AND DEVELOPMENT (Decennial Project 5210903)

Description: 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.

Highlights: During FY2009, staff provided consultation for the design and content of the 2010 Census Language Program Expansion effort. Staff translated and reviewed translation for the 2010 Census Advance letter and reminder postcard in Spanish, Chinese, and Russian.

Staff: Patricia Goerman (x31819), Yuling Pan, Leticia Fernández, Virginia Wake Yelei, Matthew Clifton, Anissa Sorokin

1.4 DATA COLLECTION PLANNING AND DEVELOPMENT (Decennial Project 5310901)

A. 2010 Census Internet Form Accessibility Evaluation
Description: Staff was requested to perform accessibility testing on the 2010 Internet form in preparation for the 2010 Census.

Highlights: During FY2009, staff began testing with InFocus evaluation software and started the manual process of eliminating the false positives using the JAWS screen-reader software. Findings revealed name and date of birth elements did not have labels. The "edit person X" buttons on the Review screen always position the user at person 1 on the questionnaire instead of the specific person.

Staff: Larry Malakhoff (x33688), Elizabeth D. Murphy

B. Quality Information for Successful Printing II (QUISP2) Application
Description: This application enables inspectors to keep current on the quality control status of official Census Bureau forms and letters.

Highlights: During FY2009, staff provided feedback to the programmers about changing from red to black text on a yellow background for better readability. Staff also advised the programmers to create keyboard access to dismiss help screens and the requirement for a link to Adobe Reader when PDF documents are present on a screen.

Staff: Larry Malakhoff (x33688), Darina Guenova (DSCMO), Kina Kovachev (DSSD)

C. Guidelines for Creating and Presenting Effective Computer Learning Content
Description: Many Federal agencies and private institutions are using computer learning as an alternative to traditional face-to-face training to satisfy annual security certification requirements or to provide awareness of procedures or regulations. Computer learning permits employees and contractors to take training on their own schedule.

Highlights: During FY2009, sponsors of computer training often just cut and paste content from their procedures manual, which may result in the employee misunderstanding the material and becoming frustrated.

Often, watermark images are placed on course screens, making content difficult to read. Feedback text can be uninformative and be difficult to read. This research provided guidelines for the creation and presentation of training content to improve readability and usability and reduce employee burden.

Staff: Larry Malakhoff (x33688), Lisa Lawler (SSD)

D. Accessible Web Surveys (Research)
Description: There is much for Web survey designers to keep in mind when designing surveys to conform to *Section 508* regulations. The regulations require persons with disabilities to have access comparable to the access available to others. This means individuals with visual deficits who use a screen-reader to read text must have the same visual sequence of questions, answer choices, skip patterns, and instructions.

Highlights: During FY2009, staff considered techniques to format, maintain, and test Web surveys for accessibility. Accessible text does not guarantee a usable interface for screen-reader users; unstructured questions can cause undue burden on short-term memory, but this burden can be minimized by avoiding stem-and-leaf questionnaire structures and using inferences to reduce wordiness. Additionally, problems screen-reader users experience with navigation can be minimized if the programmed tab sequence follows the natural reading order (top to bottom, left to right). Also, although automated accessibility testing software identifies missing labels for graphics and buttons, tabbing order and readability are best checked with screen-reader software. Finally, it is more efficient to create and maintain one accessible Web survey from the beginning of the design process rather than separate text and graphical versions. If a Web survey is accessible and usable, then all users will be more likely to respond to Web surveys with greater accuracy, ease and satisfaction.

Staff: Larry Malakhoff (x33688), Temika Holland, Andrew Zukerburg (NCES)

1.5 SPECIAL PLACE/GROUP QUARTERS (GQ) PLANNING AND DEVELOPMENT (Decennial Project 5310908)

[See Projects 5610905 and 5610906 (F).]

1.6 STATISTICAL DESIGN AND ESTIMATION (Decennial Project 5610902)

A. Decennial Editing and Imputation
[See Projects 0351000 and 1871000 (B), General Research - Statistical Methodology]

B. Decennial Record Linkage
[See Projects 0351000 and 1871000 (A), General Research - Statistical Computing Methodology]

C. Decennial Disclosure Avoidance
Description: 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 avoidance 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.

Highlights: During FY2009, staff evaluated the results of the data swapping procedure on the Dress Rehearsal data. As a result, minor changes were recommended for Census 2010. All work was documented. After examining the three HDF files (household, persons, geography) that were created for the 2008 dress rehearsal data collected from California, staff noticed some ways that the swapping could be improved. Certain non-demographic variables that are associated with the housing unit, should not be swapped. Regarding demographic variables, it was noticed that some American Indians and some Alaskan Natives with multiple tribe affiliation were incorrectly categorized as multi-racial. This will soon be corrected. An official memo was written that address these and similar issues.

Staff analyzed the effect of using historical data when identifying households that need to be swapped for ACS. Some parameters values need to be adjusted. Staff also developed software to identify households with unusual race/ethnicity compositions in the swapping procedure. Staff members are working to develop measures of data quality and disclosure risk. Staff members are working to develop synthetic ACS tabular data. Staff members developed a new method of imputing geographic information and have written a SAS program to apply it to the ACS state data. A comparison with the current swapping methods is being conducted.

Staff members worked with the American Community Survey Office on ACS five year base table plans and disclosure avoidance rules that will be applied to those tables. Staff worked with GEO on geographic areas that will be used when publishing ACS five year base tables and microdata. Staff began developing a program for ACS five-year data swapping and working with Decennial Statistical Studies Division on how to extract appropriate variables for the input files.

Staff members evaluated the ACS swapping procedure for the state of California at the county level. Staff also evaluated the swapping procedure for states based on data

from 2005-2008. We found and fixed bugs in the swapping program and updated the specification.

Staff began developing a program for data swapping for the Census 2010 Island Areas. We are working with a data expert on how to extract appropriate variables for the input files and the selection of variables to swap.

Staff: Laura Zayatz (x34955), Paul Massell, Rolando Rodríguez, Jason Lucero, Asoka Ramanayake, Lisa Singh, Bimal Sinah, Tapan Nayak

D. Census Unduplication Research
Description: 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. 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 2004.

Highlights: During FY2009, staff continued running matching and modeling procedures on the data from the 2000 Census. Staff tested modifications to the baseline four-pass matching system. One set of modifications included rules that blanked specified first and last names (and combinations) and also some specific name combinations where the last name was "Doe." The modifications appear to remove invalid links while having little effect on potentially valid links. Another set of modifications adjusted the parameters of the Within Response matching. The modifications appear to more clearly separate out strong and weak linkings of pairs of households. Staff developed a method to prevent data from Nonresponse Followup training examples from interfering with the matching. The proposed method uses *BigMatch* to match the training example data to the Census data. Census person matches that are good matches to the training example data are excluded from the Across Response matching. Results from the 2000 data suggest that appropriate preset matching cutoffs can remove most of the person links involving training example data while removing relatively small numbers of other links. The specifications "2010 Decennial Census Coverage Followup and Field Verification Duplicate Person Identification Software Requirements Specification" (data prep and general overview), "2010 Decennial Census Coverage Followup and Census Coverage Measurement Matching Parameter Software Requirements Specification" (parameter settings for matching), and "2010 Decennial Census Coverage Followup and Census Coverage Match Modeling Software Requirements Specification" (procedures for evaluating links) were released as signed memoranda. Staff are included as approving officials for all three specifications and as coauthors for the last two specifications. Also, two documents related to earlier research by staff were finalized as signed memoranda for the record. The first is "Comparison of Results from 3 Pass and 2008-based Nationwide Matching of 2000 Census Data." which showed that the results from a matching using only three *BigMatch* matching passes generally produces similar results to the 2008-based matching while having a running time on the division's research1 machine that is less than half of the running time for the 2008-based matching. The second is "Documentation of Program for Implementing an Exploratory Graphical Procedure used to Illustrate whether Links Involving more Common Names are Overrepresented at Higher Geographic Levels" which documents an exploratory graphical procedure that was useful in helping to identify general patterns in the matching results. Finally, the 2008 Dress Rehearsal Census Coverage Measurement Person Computer Matching system was run on the Dress Rehearsal data. Staff assisted with the review of output from the system. Cutoffs for potential matches were set during this review.

Staff: Michael Ikeda (x31756), Ned Porter

1.7 COVERAGE MEASUREMENT PLANNING AND DEVELOPMENT (Decennial Project 5610903)

A. Coverage Measurement Research
Description: Staff members conduct research on model-based small area estimation of census coverage, and they consult and collaborate on modeling coverage measurement.

Logistic regression modeling and general consulting
Highlights: During FY2009, staff attended bi-monthly meetings with Decennial Statistical Studies Division (DSSD) and staff on issues of fitting logistic regression models to correct enumeration data and census omission data obtained from the 2000 coverage program. This work has been written up as *DSSD 2010 Census Coverage Measurement Memorandum Series #2010-E-15*, "Using Partial Residual Plots in Modeling Covariates for Net Coverage Estimation," (July 10, 2009).

Staff has begun simulating coverage data from clustered observations in order to evaluate variance estimators of coverage and also to evaluate the Hosmer - Lemeshow test statistic.

Staff continues to attend weekly Census Coverage Measurement meetings.

Staff: Don Malec (x31718), Jerry Maples

Nonignorable nonresponse models for census component coverage estimation
Highlights: During FY2009, staff, in conjunction with staff from Decennial Statistical Studies Division (DSSD),

developed ways to compare ignorable and non-ignorable models for unresolved erroneous enumeration status. Results that expose issues between ignorable and nonignorable models for unresolved enumeration status were included in documentation for discussion at the publicly attended 2010 Census Coverage Measurement Workshop (Jan. 12-13, 2009) and were presented by Tom Mule. This document was released publicly. An EM algorithm was implemented for DSSD's use and Michael Moldoff (DSSD) was assisted in converting it to SAS. Michael recently presented this work at a regional SAS usergroup conference. Balgobin Nandram, as part of the "*SUMMER AT CENSUS*" program, spent an intensive week of discussion with DSSD staff in which a research plan was developed to implement his "centered nonignorable model" for census coverage. In addition, we began examining the model assumptions in the Bayesian nonignorable model of Stasny. Staff attends weekly meetings with DSSD staff.

Staff: Don Malec (x31718), Ryan Janicki, Jerry Maples

Modeling coverage variability of small areas

Highlights: During FY2009, preliminary results using a unit level model with housing unit and block cluster random effects were inconclusive using the 2006 Census Test data in North Dakota due to small sample size. This work continues with the larger data set obtained in the 2006 test site in Texas. Using this new data entails more fixed effects modeling performed jointly with Aaron Gilary and will entail additional modeling of the omission/commission structure within an address. In addition, the MCMC software which Malec wrote in Fortran for this project, is being re-written and streamlined by Ben Klemens.

Staff: Don Malec (x31718), Aaron Gilary, Ben Klemens

B. Accuracy of Coverage Measurement

Description: 2010 Census Coverage Measurement (CCM) 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 with data from the 2006 Census Test.

Highlights: During FY2009, our staff provided technical expertise and experience in the planning and implementation of coverage measurement research for the 2010 Census. This included serving on three teams formed to plan and implement census coverage measurement (CCM) 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. The staff also reviewed documents for an outside panel to evaluate the 2010 CCM methodology.

Our staff continued previous work on the error structure for estimates of components of census coverage error by refining the structure and identifying sources of the errors. The focus was on the types of errors in the CCM E-sample and analyzed how they affect the separate estimates of erroneous enumerations for net coverage error and for component error. A new approach to the error structure had to be devised for the 2010 CCM because changes in the methodology and timing of interviews made much of the methodology for evaluating previous coverage measurement surveys not entirely applicable.

Also, the examination of the error structure included investigating the data collection and data processing sources of error and described how these sources contribute to the different types of errors in the CCM E-sample. Our staff explained the relationship between the data collection and data processing errors and the measurement of these sources of error in the CCM evaluation studies.

Our staff developed the overall design of the CCM evaluation studies in the 2010 Census Program for Evaluations and Experiments. The combination of projects is designed to provide information about the basic types of errors that may affect the CCM implementation. The 2010 Census Evaluation Program cannot just replicate the evaluations of past coverage measurement programs because of the new technologies and methods and different timing of interviews.

Staff: Mary Mulry (x31759)

C. Questionnaire Wording and Automation Team

Description: 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 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 followup (PFU) 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 (ILB), and housing unit followup (IHUFU) forms in order to measure housing unit coverage in 2008/2010.

Highlights: During FY2009, staff participated in two small-scale field tests of the Person Followup (PFU) form and operation. Respondent debriefings were incorporated into the field tests. Staff were responsible for the OMB clearance of the project, revising the Field Training, and summarizing the debriefing reports. The first field-test was successful in identifying usability problems with the design of the form. These were corrected within the Questionnaire Wording and Automation Team. A second field test was conducted. Results indicate that the changes made to the form improved interviewer performance and satisfaction as measured through interviewer debriefings and form review.

Staff also participated in the 2009 Person Interview (PI) field test as observers in Fayetteville, NC. Additionally, staff co-authored a document summarizing the goal of each section of the 2009 PI instrument, the questions in each section and justification for the questions.

Staff: Beth Nichols (x31724), Jennifer Hunter Childs, Terry DeMaio, Nathan Jurgenson

1.8-1.9 COVERAGE IMPROVEMENT PLANNING AND DEVELOPMENT/ EVALUATION PLANNING COORDINATION (Decennial Projects 5610905 and 5610906)

A. Development of Questionnaires for Decennial Coverage Improvement

Description: 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 Followup (CFU) reinterview instrument.

Highlights: During FY2009, staff worked on a series of studies that explore how to resolve coverage problems, including duplicates, in the census. In the first study (conducted last fiscal year, but documented this year), staff conducted cognitive testing on experimental questions that will be added to the end of the 2010 Coverage Followup (CFU) in an experimental sample. This test included 3 different situations identified in the 2008 Census Dress Rehearsal: 1) household marked "yes" to the undercount question on the initial census form, but did not list any potential additional people during the CFU interview; 2) households marked "yes" to an overcount category for at least one household member on the initial census form, but did not report that person as having another place to stay during the CFU interview; and 3) a potential person duplicate was identified through computer matching of the census data and the CFU interview did not reveal a potential additional address for that person. Testing on the first two sets of cases showed that, with minor revisions to the question wording, the experimental questions should function well in the 2010 Census. However, testing with the third set of cases - the suspected duplicates - revealed that telling a respondent that they "may have been counted at another residence [in STATE]" was sensitive, and respondents may feel that their confidentiality has been breached. Additionally, if the duplicate was not real, some respondents reported that this statement would raise identity theft concerns.

A second study of duplicates in the census has been developed and planned based on recommendations from the first study. Staff worked on developing a new experimental CFU questionnaire aimed at resolving long distance duplicates that will be identified in the 2010 Census data. In conjunction with Decennial Statistical Studies Division (DSSD) staff, staff have developed a new Targeted CFU that we cognitively tested and will be field tested in conjunction with the 2010 Census. Staff conducted 23 cognitive interviews with this experimental form and immediately started working on questionnaire revisions with DSSD. The cognitive testing demonstrated that this method is more likely to work than the first method, without raising those same concerns. Cognitive testing further allowed refinement of the question pathing and question wording.

Staff: Jennifer Hunter Childs (x34927), Leticia Fernández, Matthew Clifton, Anissa Sorokin, Nathan Jurgenson, Mikelyn Meyers, George Higbie, Lorraine Randall

B. 2010 CPEX Experimental Overcount Booklet

Description: The purpose of this project is to develop and test an alternative mailout census booklet with special coverage questions to compare to the standard census form in terms of coverage in the Census 2010 Alternative Questionnaire Experiment split-panel test. Both forms include a question asking whether each person in the household sometimes lives or stays somewhere else, and for what reason. On the standard census form, this question functions as a flag for later phone followup to get more complete coverage data. The alternative mailout booklet converts this question into a screener for a new set of questions on the mailout form itself to identify persons' alternative addresses and where to count them. If it works, the alternative approach has the potential to improve coverage as well as cut the costs and time involved in conducting followup operations.

Highlights: During FY2009, staff worked with the Overcount Questionnaire Working Group to develop and test the experimental overcount booklet for use in the 2010 CPEX split-panel mailout for the "Avoid Followup Evaluation." The aim was to develop and test experimental questions to 1) identify persons in the

household who may have another address and, if yes, to 2) collect the other address and 3) enough residence rule data to determine where each person should be counted from answers on the census form, rather than in a later phone followup. We applied knowledge from participation in the Residence Rule Working Group and knowledge of the 2006 NAS Residence Rule Panel discussions and recommendations on "any residence elsewhere" to draft the initial questions; the group agreed to the set and revised them. We participated in weekly meetings. We designed the protocol with working group member input and went beyond usual cognitive testing methods to do debriefings on living situations to serve as "truth" to assess how well respondents' checked answers matched where they should be counted. We recruited respondents in living situations prone to overcounts. We adapted to an unexpected 8-week forms design delay and presented oral and written results in February, meeting the Decennial Management Division (DMD) deadline for final 2010 forms. We found serious problems with the skip and the other address question and noted that the sequence may not work for persons with more than two addresses. We suggested format and wording changes; Decennial Statistical Studies Division accepted some. See "Preliminary Results and Recommendations for the CPEX Overcount Project." In addition, we did more analysis on whether answers respondents gave to the overcount questions accurately reflected whether persons in the household should be counted there or not, based on "true" living situation data in debriefings. We found that: 1) 75% of rostered persons could be counted in the right place from answers on the census form in processing; this is an improvement over the standard census form, suggesting the experimental question sequence in this booklet may work well to cut followup time and costs, and 2) respondents are not reporting a common mobile living situation: moving between one's home and a boyfriend's/girlfriend's home.

Staff: Laurie Schwede (x32611), Anissa Sorokin, Virginia Wake Yelei, Lorraine Randall

C. Evaluations, Experiments, and Assessments Operational Integration Team (EEA OIT)
Description: 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 guides and monitors the development, implementation, and reporting of the 2010 evaluations, experiments and assessments. It ensures that program integration and implementation of the 2010 Census Program of Evaluations and Experiments (CPEX) meets the guidance provided by the Census Integration Group and prepares and monitors the 2010 Census Program for Evaluations and Experiments Master Plan.

Highlights: During FY2009, staff served as the division's advisor to this group and as the Co-Advocate for Census 2010 CPEX Coverage Improvement Evaluations with Larry Cahoon. She participated in bi-weekly EEA OIT meetings, giving the team feedback on past research related to CPEX evaluations and survey methodology in general. She kept division researchers informed of Decennial Management Division/Decennial Statistical Studies Division updates/changes and advises researchers and the division chief on the decennial evaluation process. When requested, she consulted with OIT Chairs Medina and Hill and served as backup qualitative studies person at Advisory Committee meetings. She arranged and chaired a meeting of all 2010 CPEX evaluation authors in our division with the new Senior Survey Methodologist to share information about our projects, foster cooperation across division studies and prevent contamination from the nationwide evaluations, particularly the Heavy Up Experiment. She has consulted with other CPEX authors at their request.

Staff: Laurie Schwede (x32611)

D. Evaluation of the CCM Interviews
Description: The 2010 Census Program for Evaluations and Experiments (CPEX) includes studies that focus on the quality of the data collected in Census Coverage Measurement Program (CCM). In particular, the focus is on two CCM interviews, the Person Interview (PI) and the Person Followup (PFU) in 2010. The primary methodologies used to evaluate the PI and PFU are respondent debriefing studies and recall bias studies. These studies will provide information about how well the CCM instruments capture the members of the household at each housing unit on CCM interview day and the usual residence of each household member and/or followup person on Census Day. The recall bias study also investigates the quality of the reporting of dates that respondents moved and the reporting regarding previous residents of the housing units. Additionally, these studies will highlight the causes and possible remedies within the questionnaire for any errors of usual residence and household membership.

Highlights: During FY2009, staff submitted a schedule for the Observation and Respondent Debriefing. The planning is in collaboration with the Decennial Statistical Studies Division and in coordination with the development of several other CPEX CCM projects. Collaboration with an external researcher to consult on a project that would use a sample of movers to investigate bias in recalling move dates was suspended.

Staff: Beth Nichols (x31724), Mary Mulry, Jennifer Hunter Childs

E. Investigation of Study Methods for the Census Coverage Measurement (CCM) on Group Quarters (GQ) Population
Description: This project undertakes research and studies before and during the 2010 Census to ultimately develop potential methods for assessing the group quarters population coverage accuracy in the 2020 CCM program.

Study methods for the 2010 research includes: field observations, in-depth interviews, focus groups, cognitive pretesting, ethnography, respondents debriefings, and a pilot small scale post-enumeration CCM-like survey with student population residing at university housing in 2010. Staff will document the success and difficulties for conducting a 2010 ethnographic study on the coverage measurement evaluation of each of the eight broad types of group quarters population and a pilot field test of a CCM-like survey with the student population.

Highlights: During FY2009, Due to its broad scope and complex research issues, the Group Quarters Study Project is subdivided into separate phases of study. Staff identified multiple study methods (including observational study, in-depth interviews, focus groups, respondents debriefing, cognitive pretesting and field tests) to address the project goal and developed a project plan to execute the research in stages.

Staff focused on exploratory research methods to gain knowledge and understanding of the complexity, challenges, and difficulty in enumerating different types of group quarters in the United States . Between March to June of 2009, staff completed 26 observations of the ACS group quarters interviews conducted by six different regional offices. Staff provided a brief report highlighting the major issues within six major types of group quarters (correctional, health facilities, college residence halls, group homes, military and homeless shelters.) By the summer of 2009, researchers focused on recruiting and conducting in-depth interviews with eight broad types of group quarters' administrators in the DC metro areas. A total of 13 interviews have been completed by the end of FY2009.

In preparation for the small scale post-enumeration 2010 field test, staff met with many branch chiefs involved in the Decennial Group Quarters enumeration and ACS Group Quarters interviews to determine the best method and procedure for conducting the CCM-like survey with student populations residing at university's housing. Apart from the field test, staff began to recruit researchers to conduct the ethnographic studies for the 2010 Census in all broad types of group quarters.

Staff: Anna Chan (x38462), George Higbie, Temika Holland, Stephen Lubkemann

F. 2010 Census Behavior Coding Evaluation

Description: In order to learn how well census enumerators/ interviewers ask, and how well respondents answer, census questions, behavior coding studies will be conducted for all interviewer-administered instruments (e.g., NRFU, CFU, CCM) in 2010. The purpose is to calibrate how well survey instruments are administered by interviewers, and to identify problems with how interviewers ask and respondents answer questions. By conducting behavior coding for all interviewer-administered instruments, this study will tell us whether census questions are being asked as intended and will identify problems with the questions and with interviewer training. This study can further help the Census Bureau interpret apparent disparities in data that may arise between different operations.

Highlights: During FY2009, staff developed a schedule and project plan for the behavior coding that will take place next year. Staff coordinated data collection and coding logistics with other divisions.

Staff: Jennifer Hunter Childs (x34927)

G. Comparative Ethnographic Studies of Enumeration Methods and Coverage in Race/Ethnic Groups (CPEX Evaluation B-9)

Description: Staff will conduct comparative ethnographic research on enumeration methods and coverage in four to nine race/ethnic communities during Census 2010. The aim is to identify ways to improve census enumeration methods and coverage for race/ethnic populations, some of which have been categorized as hard-to-enumerate groups in previous censuses. This field study will involve accompanying enumerators to observe, tape, and debrief respondents during three 2010 operations involving personal visit census data collection: Update/Enumerate, Nonresponse Followup, and Census Coverage Measurement. We will identify and explore three sets of issues affecting the completeness and accuracy of the census: 1) enumeration methods, 2) questionnaire issues, and 3) residence rule/coverage issues. An additional component to explore factors respondents use in self-identification of race is under consideration.

Highlights: During FY2009, staff reviewed the literature, consulted with key experts and stakeholders in HQ and in the field, and developed a preliminary proposal into a formal CPEX evaluation study plan. She submitted the draft plan and obtained division approval to send the study plan to critical reviewers outside the division. She identified critical reviewers in Decennial Statistical Studies Division, Field Division, Population Division, Decennial Management Division, and the Director's Office and prepared to send the study plan out to them in the new fiscal year. She has been working closely with a colleague to see if they can coordinate one or two of their individual 2010 CPEX evaluation studies in the same research site(s). The other study is of CCM enumeration methods and coverage in generalized populations, while this researcher's study is on the same topic in specific race/ethnic communities. By coordinating their studies in 1 or 2 sites, the two researchers will have a larger sample and will be able to identify similarities and differences of the target race/ethnic group with the general population in that site. This may help to identify additional types and source of cover error and enhance both of our studies. Staff has also agreed to share the tape recordings of interviews with another colleague for that colleague's behavior coding study. Staff is working with the Senior

Survey Methodologist to try to avoid choosing research sites that will be included in other large census evaluations, such as the Heavy Up Experiment, to prevent cross-study coverage contamination.

Staff: Laurie Schwede (x32611)

H. Explaining How Census Errors Occur through Comparing Census Operations History with Census Coverage Measurement (CCM) Results
Description: The goal of this project is to help us understand what sorts of errors tend to be associated with the different Census operations. We want to merge Census files from the various stages of Census operations for a subsample of CCM areas and compare them to the CCM results. This comparison is intended to help find patterns of errors in Census operations and provide insights into ways to avoid these errors.

Highlights: During FY2009, staff sent drafts of the CPEX information sheet and the evaluation schedule to Decennial Management Division (DMD), attended Quality Process Training, and began outlining the study plan and file requirements. Staff also sent estimates of possible fieldwork to DMD for use in an OMB submission.

Staff: Michael Ikeda (x31756), Mary Mulry

1.10 AMERICAN COMMUNITY SURVEY (ACS)
(Decennial Project 5385960)

A. ACS Missing Data and Imputation
Description: This project undertakes research and studies on missing data and imputation for the American Community Survey and aims to impute missing socioeconomic data in the National Assessment of Educational Progress (NAEP) data files using Census long form and American Community Survey (ACS) data.

Highlights: During FY2009, the focus of this project was to impute missing socioeconomic data in the Early Childhood Longitudinal Study (ECLS) and the National Assessment of Educational Progress (NAEP) data files using Census long form sample edited file (SEDF) and American Community Survey (ACS) data. The National Center for Education Statistics (NCES) and staff had previously selected a donor imputation model for which staff wrote the corresponding SAS code and delivered output files corresponding to the model's donor matching scheme. Staff pointed out that ACS records must be used repeatedly to find enough matches for most sample NAEP cases. An NCES contractor thus decided to not use the imputation model but to find donors using only geographical distance. Staff provided the SEDF database needed to estimate household SES index using spherical coordinates for distance as per NCES contractor's requirements. Staff also provided requested contents and frequencies by counties for the ACS files which are needed for designing and applying a similar scheme for matching to ACS data.

Staff: María García (x31703), Yves Thibaudeau

B. ACS Group Quarters (GQ) Item Imputation and Micro Data Disclosure Avoidance Research
Description: American Community Survey group quarters microdata and tabulations are protected from identity disclosures via synthetic data methods. This project coordinates staff in our division, Decennial Statistical Studies Division (DSSD), Population Division (POP), and Housing and Household Economic Statistics Division (HHES) to generate production code (in the R language) for this purpose. Staff will also ascertain the effectiveness of using synthetic data methods as an alternative to hot deck allocation in ACS group quarters.

Highlights: During FY2009, staff members coordinated with DSSD staff to implement a synthetic data disclosure avoidance programming module for the 2008 ACS group quarters sample. Experiences with the programming module for the 2007 ACS sample highlighted a need for several improvements, notably an improved interface for satisfying ACS edit requirements and better output for verifying statistical validity of the synthetic microdata. To this end, staff made modifications to the module, including a new method for satisfying edit constraints via multidimensional arrays and test code for producing graphical output for immediate examination by internal ACS analysts. Staff, along with staff in DSSD, POP, HHES, and the American Community Survey Office, tested the new module, performing necessary debugging, and provided the final code used for the 2008 ACS production code.

Staff: Laura Zayatz (x34955), Paul Massell, Rolando Rodríguez, Jason Lucero, Asoka Ramanayake, Lisa Singh, Bimal Sinah, Tapan Nayak

C. ACS Applications for Time Series Methods
Description: This project undertakes research and studies on applying time series methodology in support of the American Community Survey.

Highlights: During FY2009, staff completed revisions to a paper describing the incompatibility of diverse multi-year estimates and presented a seminar on this research to the Decennial Statistical Studies Division. Staff made extensions and revisions to a paper describing the incompatibility of diverse multi-year estimates, and updated the main data examples. Staff also presented a seminar on this research. Staff also studied seasonal patterns in monthly state-level housing vacancy rate data with staff from the Household Economic Statistics Division, and determined that seasonal patterns were present for a few states, but additional years of data are required for more conclusive findings.

Staff: Tucker McElroy (x33227)

D. ACS Variances

Description: Work under this heading this year concerned two research projects: (i) Completion of a project providing design-based superpopulation consistency theory along with linearized variance formulas for variances of estimators of totals from complex surveys to which replication methods like BRR can be compared. (ii) Development of a method of simultaneous nonresponse adjustment, calibration to achieve population controls, and weight smoothing or truncation.

Highlights: During FY2009, for project (i), staff completed drafts of a long technical report on, "BRR versus Inclusion-Probability Formulas for Variances of Nonresponse Adjusted Survey Estimates" and augmented numerical calculations (using R code developed in the previous year) illustrating the ranges of differences between BRR and inclusion-probability-based calculations of variances. In addition, staff performed new R coding and data analyses to compare the fine-grained balance achieved for survey variables in a real survey (SIPP, the 1996 panel) between response rates in half-PSU's cross classified by working adjustment cells, such balance having been determined to be a theoretical prerequisite for close large-sample correspondence between BRR and theoretical variances. On project (ii), staff continued development of a method to adjust for nonresponse and calibrate to population totals in such a way as to minimize a metric of changes from design to final weights, with penalty terms for very large or small weights enforcing a compression of weights. This approach, with accompanying R code was explored for simulated stratified survey data, and for real SIPP 1996 Wave 1 data, and theoretical developments were also extended from the initial steps made the previous year.

Staff: Eric Slud (x34991), Yves Thibaudeau

E. ACS Data Products – Display of Variability Measures

Description: 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.

Highlights: During FY2009, analysis of the data from the user survey was planned and completed. The results from 324 respondents show that of those who expressed a preference and do not work for the Census Bureau, 61.2 percent favored the confidence interval and 33.6 favored the margin of error. Preference for the confidence interval held for all the cross-tabulations examined of user characteristics by preference.

Staff: Lynn Weidman (x34902), Kathleen Ashenfelter

F. ACS Multiyear Estimates: User Guidelines for Choosing Between 1-, 3-, and 5-year Estimates

Description: Working with Decennial Statistical Studies Division (DSSD) staff, we developed website documentation that describes and compares 1-, 3-, and 5-year ACS estimates and their standard errors, discusses their usage, and presents corresponding examples.

Highlights: During FY2009, the paper "Developing Guidelines Based on CVs for when One-Year Estimates Can Be Used Instead of Three-Year Estimates in the American Community Survey" was completed and presented at JSM and appears in the division's *Research Report Series*. For estimates that are estimated counts, reasonable rules for deciding between 1-year and 3-year estimates can be developed based on the estimate as a percentage of the estimated total. Areas are divided into different size categories with different rules for each category. For noncount estimates, "percent of total" is not relevant. Instead we set a single CV cutoff for each type of estimate within each size category. To extend this work to when 3-year estimates can be used instead of 5-year estimates, if 1-year estimates are not appropriate, a custom dataset of the 2005-07 three-year estimates was created by the American Community Survey Office. A similar analysis to determine appropriate guidelines is being carried out on it.

Michael Beaghen (DSSD) and Lynn Weidman completed the paper "Statistical Issues and Interpretation of the American Community Survey's One-, Three-, and Five-Year Period Estimates." It presents guidelines for using the ACS multiyear estimates and choosing between them when more than one is available for a geography. It is published in the ACS Research Memorandum Series and on the ACS website.

Staff: Lynn Weidman (x34902), Michael Ikeda

G. ACS 3-year Estimates: Methods for Analyst Review

Description: An interdivisional team is developing rules, combinations of rules, and systems for implementing a tool to allow efficient analyst review in 2008 of the first ACS 3-year estimates for geographies of less than 65,000. The purpose of the review is to clear the estimates for public release, but at the same time identify 'unusual' estimates and understand why they should or should not be released. One staff member is on this team.

Highlights: During FY2009, a staff member participated in team meetings and contributed to discussions on various facets of the review process. The team modified rules, combinations of rules, and systems for implementing them to allow efficient analyst review in 2009 of the second set of ACS 3-year estimates for geographies of less than 65,000. Staff modified their software to carry out the regression modeling, find predicted values, and produce outlier flags to

accommodate revisions in the set of measures requiring outlier flags and to minimize the amount of human intervention required to run it. Files of regression flags were produced in a short amount of time for several test runs of the system to produce the files required for data analysis. The team also investigated methods that could be used to review the first 5-year estimates in 2010 and made recommendations on an approach to the American Community Survey Office.

Staff: Lynn Weidman (x34902), Julie Tsay

H. ACS: 2005 and 2006 Item Nonresponse Rates
Description: The Census Bureau calculates and publishes item allocation rates for all data items collected in the American Community Survey as part of its data quality measures. However, these rates are actually composed of two separate components of item nonresponse—items that can be assigned a value through the use of related items on the survey questionnaire and items that require a statistical procedure to allocate the value of the missing item. The published allocation rates combine the two measures into one rate. It is desirable to look at both components separately and to see if these rates vary across mode of data collection, individual items, geography, certain population groups, location of call centers (for data collected by CATI), and other items. In addition to the item nonresponse rates, a completeness index can be computed for the entire questionnaire and examined by the same levels as the item nonresponse rates.

Highlights: During FY2009, a paper detailing the results that include item nonresponse rates for both assigned and allocated items and completeness indices by interview mode for 2005 and 2006 was prepared.

We found that most of the adjustment for nonresponse can be attributed to the statistical imputation (allocation) rather than assignment from related items. As one would expect, mortgage items, labor force items, and income items generally have the highest rates of both allocation and assignment rates. The rates do vary across interview modes, with mail generally higher than either CATI or CAPI. Very few items displayed unacceptable item nonresponse rates (higher than ten percent). CAPI and mail returns had slightly higher item nonresponse rates in 2006 as compared to 2005.

In 2006, the GQ (Group Quarters) population was introduced to the sample. The GQ population has much higher allocation rates than the housing unit population. The effect of adding the GQ population to the housing unit population estimates may have been responsible for the increase in item nonresponse rates from 2005 to 2006.

As expected, vacant housing units had much higher levels of item nonresponse rates than did occupied housing units. Most of the item nonresponse adjustment for the vacant units was due to allocation, rather than assignment.

The completeness indices gave indication of the same results as the item nonresponse rates. Overall, in 2005 the completeness was 94.2 percent and 93.6 percent in 2006.

Staff: Pam Ferrari (x34993)

I. ACS Data Issues
Description: Various issues related to the quality and presentation of ACS estimates were discussed and investigated by small interdivisional teams or division staff. The goal of these investigations was to make recommendations to aid in resolving the issues.

Highlights: During FY2009, staff completed the memo "Effects on Estimates from Seasonal Data of Controlling American Community Survey Person Demographic Estimates to Population Estimates." It demonstrates with simple examples how the inconsistencies inherent in using a current residence for American Community Survey (ACS) data collection and a usual residence as the basis for the population estimates used as person controls in ACS weighting can affect ACS estimates when seasonal data patterns are observed. Two examples demonstrate the two basic types of seasonality – varying by demographic groups and by geographies – for which the effects of the controls are different. A third example was developed for county GQ estimates. This work points out that there is no single direct modification of the controls that will solve these inconsistencies for the different types of seasonality, so research would be needed to find statistical estimation methodology for sub-county geographies that will do this successfully.

Staff provided comments on the proposed use of CVs to define the quality of ACS estimates, especially estimates of proportions, and proposed an alternative because of the dependence of CVs for proportions on the proportion itself. Along with two members of Decennial Statistical Studies Division (DSSD), staff analyzed CVs of ACS estimates and prepared the "Proposal for Determining Cutoffs for Data Quality Indicator" on this use of CVs, which gave alternative CV cutoffs to define levels of estimate quality.

Staff participated on a small interdivisional team that investigated what could be possible alternatives for deciding which tables of estimates to filter out from the basic set of the initial 5-year data products in 2010. Staff proposed a method for looking at groups of estimates that fail the 1- and 3-yr filtering often (more than 50%) to determine what tables should fail 5-yr filtering. The reason for the existence of this group is that the Census Bureau originally said there would be no filtering of 5-year estimates, but because of their relatively large variances, filtering alternatives are now being proposed.

Staff participated on an interdivisional team that made a preliminary investigation into whether sub-annual estimates could reasonably be made from the ACS. Analysis of the variability of national estimates showed that this is not feasible under the current weighting procedures.

Staff: Lynn Weidman (x34902), Michael Ikeda

1.11 AMERICAN COMMUNITY SURVEY (ACS)/METHODS PANEL (Decennial Project 5385995)

A. ACS Language Research
Description: 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.

Highlights: During FY2009, staff worked closely with the ACS Language Team to develop and pretest multilingual documents for the ACS, and to pretest the ACS Spanish CATI/CAPI instrument. We designed, led, and provided technical consultation to the following projects: a) cognitive testing of the ACS Spanish CAPI/CATI instrument, b) cognitive testing of the ACS Content Test questions, c) expert panel discussion on recommendations for the ACS Content Test questions, d) new ACS CAPI letters in five languages (Spanish, Chinese, Korean, Russian, and Vietnamese), and e) ACS multi-mode language guide in Chinese and Korean.

We made significant contributions to these projects by participating in the following activities: 1) development of two statements of work for cognitive testing of ACS letters in five languages, and cognitive testing of the ACS multi-mode language guide in Chinese and Korean, 2) review translations of the ACS materials in Spanish, Chinese, and Russian, 3) development of cognitive interview protocols, 4) critical review of contractor's deliverables on ACS Content Test question wording project, 5) organizing and serving as experts in the expert review panel for the ACS Content Test questions, 6) conducting cognitive interviews in English and Spanish, 7) summary and report of research results, and 8) recommendations for improvement of the tested question wording.

We gained valuable knowledge from these projects in terms of question evaluation, survey instrument translation, and effective ways of communicating survey messages to respondents who are speakers of languages other than English. We recommended changes to improve the ACS Spanish CAPI/CATI questions that were tested in Phase 2. We also made recommendations to the ACS Content Test questions. Our in-language reviews also led to improvements of the ACS CAPI letters in multiple languages.

In addition, we started preparation work for a behavior-coding project to study the new ACS content test questions in English and Spanish.

Staff: Yuling Pan (x34950), Patricia Goerman, Leticia Fernández, Virginia Wake Yelei, Matthew Clifton, Anissa Sorokin

B. ACS Data Reliability Indicator Project
Description: The usability team designed a series of usability evaluations of a new method of displaying the ACS data tables. The new feature to be tested was a color-coded indicator of the reliability of the data. The purpose of the testing was to examine how well the data-reliability indicator worked for users (especially as compared to the current ACS data tables without the indicator) and to identify any problems that actual users might have with the data tables. The data reliability indicator was based on the Coefficient of Variation (CV), which is defined as the standard error of an estimate divided by the mean of that estimate. Another purpose of this testing was to examine whether users would notice and use the Margin of Error (MOE) when answering questions about the estimates from the table. This second testing goal was based on the observation that although the margin of error (MOE) is currently provided with each estimate, the MOE is routinely ignored by ACS data users. This low-fidelity testing is the first round in a series of planned tests that are part of a larger research project focused on Data-Confidence Indicators.

Highlights: During FY2009, the team completed testing and finalized the usability report for the first round of testing as *Human-Computer Interaction Memo #131*. The findings were presented at the annual AAPOR and Tobii Eyetrack UC conferences. The second round of usability testing took place in the spring and summer of 2009. The results were analyzed and a draft of the report was sent to the sponsor team for review. This report was published as *Human Computer Interaction Memo # 141*.

Staff: Kathleen Ashenfelter (x34922), Elizabeth Murphy

C. ACS Messaging Project
Description: The purpose of this project is to develop and test new messages on ACS letters and a brochure to alert ACS respondents in 2010 that they are required to respond to both ACS and census questionnaires. In 2000, ACS response rates were affected by the 2000 Census environment. Until March 2000, ACS response rates rose as a result of census publicity, but they fell for the rest of the year after respondents also received their census forms, particularly around Census Day. The aim of this project is to try to avoid these drops in response rates in 2010 by informing ACS respondents that they will be receiving both forms and need to complete both.

Highlights: During FY2009, staff participated with ACS Messaging Project Working Group members from the American Community Survey Office, Decennial Statistical Studies Division, Public Information Office, Population, and Field. The goal was to revise and test ACS letters, envelopes, and a new flyer to try to prevent an ACS response rate decline in Census 2010 such as occurred during Census 2000 when response rates dropped 7%. We designed, conducted, analyzed, and reported on two phases of testing new ACS letters and envelopes and a third phase on testing the new flyer for use by ACS FRs with nonresponders. We participated in group meetings to develop the new messages, envelopes, and flyer, designed the Phase 1 testing plan, developed the protocol and debriefing, and conducted and analyzed 19 interviews. We presented preliminary results to sponsors 6 weeks ahead of schedule. We found that just 35% of respondents seemed to find and read the cover letter. Many respondents were not familiar with the ACS and did not recognize its tie to the Census Bureau. Some said the green on the envelope looked like junk mail: some said they would be less likely to read/complete the ACS form. We suggested revising the envelope to more closely link the ACS to the Census Bureau in the text box on the envelopes. We squeezed in a second interviewing round, revised the materials and protocol, conducted 10 Phase 2 interviews, reported written results, and recommended enlarging the font and keeping the green (accepted). We designed the Phase 3 protocol to test the flyer, did 10 interviews and suggested reordering the flyer FAQs (most suggestions accepted). The revised versions will be used in 2010. Results are in 2 final project reports sent to the group for review: "Cognitive Testing Results of ACS Experimental Envelopes and Letters..." and "Cognitive Testing Results for the ACS Field Flyer for ... 2010."

We did more analysis of the green text boxes on the Phase 1 and 2 envelopes and gave an AAPOR talk. The results in this work led the American Community Survey Office to develop a new split-panel test in 2010 of experimental envelopes with color and no-color text boxes with the current ACS envelope as the control, to monitor response rates in 2010 and to decide which envelope to use from 2011 onward. The experimental letters and current messages will also be tested.

Finally, we submitted an additional special draft report, "More Analysis on the ACS Messaging Project…," compiling data from all three cognitive testing phases. We found that 1) just 33% of respondents found and read the questionnaire package cover letter with key messages; 2) about ¾ of respondents opened the package with the questionnaire on top; and 3) those opening it with the questionnaire on top were much less likely to find and read the cover letter than those opening it with some other insert on top. We suggest that change in ordering and/or in the number, of inserts in the envelope might increase letter reading, and maybe increase mail response rates. This suggests a new line of research for the ACS, and perhaps other surveys, beyond 2010, that might help to improve response rates.

Staff: Laurie Schwede (x32611), Anissa Sorokin, Lorraine Randall

D. ACS Internet Testing – Usability Input

Description: The usability team is leading our division's contribution to the development of an online instrument for the American Community Survey. The multi-year project will consist of several rounds of usability testing of prototypes of the internet instrument. Staff will provide test plans and formal reports for each round of testing as well as provide input at regular team meetings during the development of the ACS online instrument and its subsequent field testing.

Highlights: During FY2009, the usability staff met with the rest of the development team on a weekly basis and provided input from a usability perspective during the development of a low-fidelity version of the ACS online survey instrument. The usability team developed test plans for an experimental test of the login section of the ACS Internet tool, which was approved by OMB. Another test plan is in preparation for the rostering section of the ACS Internet instrument. Testing will begin once a working prototype has been developed by the ACS team.

Staff: Kathleen Ashenfelter (x34922), Elizabeth Murphy, Andre Garcia

E. ACS Internet Testing – Cognitive Input

Description: The cognitive lab is participating in the development of an online instrument for the American Community Survey. The multi-year project will consist of questionnaire development and several rounds of cognitive and usability testing of prototypes of the internet instrument in both English and Spanish. Staff will provide questionnaire development and mode consistency expertise at regular team meetings during the development of the ACS online instrument and its subsequent field testing. Staff will also participate in the joint cognitive/usability testing sessions led by the usability lab.

Highlights: During FY2009, staff provided expert guidance on question wording and mode consistency at weekly development meetings for the ACS Internet application. Staff also worked with sponsoring divisions to develop appropriate roster screens for the instrument. This development work resulted in two sets of roster screens that will be experimentally compared through a cognitive and usability test next fiscal year.

Staff: Jennifer Hunter Childs (x34927), George Higbie

F. ACS Internet Test Experimental Design Team

Description: Staff is contributing methodological expertise and input to the development of the

experimental design that will be used for the field testing of the ACS Internet form that is currently being developed and is planned for early 2011. The design of this methodology includes such considerations as sampling, pre-notification letters, mailing schedule, panel design, and planned analysis of the results.

Highlights: During FY2009, usability staff attended the initial meetings of the ACS Internet Test Experimental Design Team and is continuously contributing to the development of this methodology. Combined usability and cognitive testing of the letters and postcards associated with the ACS Internet Test is planned for FY2010.

Staff: Kathleen Ashenfelter (x34922), Elizabeth Murphy

G. ACS Food Stamps Pretest

Description: The Food Stamp program is undergoing a revision that involves changing the program name to "Supplemental Nutritional Assistance Program" or SNAP. The Census Bureau is working to identify appropriate changes to each survey's food stamps questions. In the American Community Survey (ACS), the first modification to be implemented will be a respondent instruction on the self-administered form and an interviewer instruction on the interviewer-administered automated instruments. The objective of this research was to conduct cognitive interviews to test a change in instructions for the Food Stamps question in the American Community Survey (ACS) self-administered form for implementation in 2010.

Highlights: During FY2009, staff cognitively tested the new food stamps instruction for the 2010 self-administered ACS form. Results indicated that, although respondents were not familiar with the new program name, the instruction did not impair their ability to respond correctly; thus, the proposed question wording performed well in the regions tested (VA, MD, WV and DC). Staff proposed a minor formatting recommendation that was accepted. In addition, staff provided guidance on the ACS Content test based on the evidence gained through this testing.

Staff: Jennifer Hunter Childs (x34927), Matthew Clifton, Dawn Norris, Lorraine Randall

1.12 CURRENT POPULATION SURVEY (CPS) / ANNUAL SOCIAL AND ECONOMIC SUPPLEMENT (ASEC) TABLES (Demographic Project TBA)

Description: Staff provided technical consultation services and programming support for the redesign and content of SAS programs that produce the table packages for the 2007 Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC) that will feature information at the national and regional levels for special population/topics.

Highlights: During FY2009, staff completed the SAS and Visual Basic programs to produce estimates for the required tabulations for the 2006 and 2007 CPS/ASEC Supplement data. Algorithms for medians and margins of error were validated. The final tabulations are Excel spreadsheets in a 508-compliant format and were posted to the Census Bureau's website. Staff began training Population Division personnel in running the SAS and Visual Basic programs to produce estimates for the required tabulations for CPS/ASEC Supplement data for 2005 through 2008.

Staff: Aref Dajani (x31797), Pam Ferrari, Tom Petkunas

1.13 DATA INTEGRATION (Demographic Project 0906/7374)

Description: 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.

Highlights: During FY2009, the re-identification study continued to try to determine the individual identities of people when staff combines publicly available data with released Census Bureau data. Staff is creating a large data warehouse that integrates information from various public sources. It also contains released ACS data. This year, staff identified and purchased public data; set up the database and related database tables; populated the database with public data; populated the database with ACS data; mapped fields from the public data to the ACS data; created new tables based on these mapping; wrote a brief plan for re-identification matching; and standardized addresses and birthdates in the purchased dataset.

Staff is running existing matching software on these data to determine what needs to be added to the custom scripts.

Staff: Ned Porter (x31798), Lisa Singh, Rolando Rodríguez

1.14 QUICK TURNAROUND PRETESTING OF HOUSEHOLD SURVEYS (Demographic Projects 7317000/0906/7374)

Description: 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.

A. American Housing Survey
Description: The purpose of this research is to perform an expert review of the Home Improvement and Recent Movers Modules for the Hurricane Katrina Supplement to the American Housing Survey (AHS).

Highlights: During FY2009, staff conducted an expert review of the AHS Home Improvement and Recent Movers Modules for the Hurricane Katrina Supplement and responded to informational requests from the AHS subject matter staff in the Demographic Surveys Division.

Staff: Terry DeMaio (x34894)

B. National Immunization Survey Project
Description: This project involved conducting research to evaluate the Special Sworn Status procedures for health care providers who participate in the National Immunization Survey (NIS) Evaluation Study. This is necessitated by the use of the American Community Survey address file as the frame for the study. An additional mailing will be sent to health care providers of children in the survey whose parents have given permission for the providers to complete an NIS questionnaire. The mailing will contain an advance letter describing the study and the need to obtain Special Sworn Status, forms that must be completed to obtain Special Sworn Status, and instructions for completing the form and for protecting the confidentiality of the identity of patients in the NIS.

Highlights: During FY2009, staff conducted two focus groups in Baltimore, MD, with health care providers from public health clinics and two focus groups in Miami, FL, with health care providers from private practices. At each site one of the groups was comprised of physicians and the other was comprised of nurses and other office staff (e.g., office managers). The focus groups showed that: 1) participants said the cover letter was too long, the type was too small, and the look was generally off-putting; 2) participants were well-versed with HIPAA requirements, and thought the immunization information was what needed to be kept confidential; 3) participants did not understand that Special Sworn Status protects the fact that a specific patient was in the NIS. Because of this misunderstanding, they felt that Special Sworn Status and the associated fines for violating confidentiality were both severe and intimidating; 4) there was some concern about how many people in the office would have to sign a form(s).

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

1.15 RE-ENGINEERED SURVEY OF INCOME AND PROGRAM PARTICIPATION RESEARCH (Demographic Project 1465666)

Re-Engineered SIPP Methodological Research
Description: The re-engineered Survey of Income and Program Participation (SIPP) is scheduled to replace the current SIPP in 2013. This project conducts long-term methodological research to evaluate SIPP and to inform the design of re-engineered SIPP instruments and procedures.

Highlights: During FY2009, staff served on two re-engineered SIPP planning groups, the Survey Group and the Integration Group (comprised of the several re-engineered SIPP subgroup chairs), and chaired the Research Group. The latter focused on evaluating the results of the 2008 Event History Calendar (EHC) "paper" field test and planning the larger-scale EHC-CAPI test to be conducted in early 2010. Major results and findings from the 2008 test included the following: (1) According to observers' reports, about one-third of observed interviews included at least one instance of an interviewer trying to help a respondent recall the date of an event by reminding him/her of a landmark event or an event from another interview domain. Among those who observed such behaviors, most reported that it seemed to help the respondent recall a date of interest; (2) No observer reported an instance of an interviewer trying to introduce a landmark event date or a date from another domain inappropriately; fewer than 10% reported observing any missed opportunities to apply this key EHC technique; (3) Interviewers were well-trained and well-prepared: 97% administered the interview "smoothly and confidently;" 98% appeared "adequately trained on fundamental SIPP concepts;" 94% appeared "adequately trained on EHC techniques;" and 91% of interviewers whose interviews presented them with "especially difficult challenges" responded well to those challenges; (4) Respondent attitudes toward the EHC interview were very positive. 85% reported that they found the EHC interview "very" or "somewhat" interesting; 91% described it as "very" or "somewhat" enjoyable; (5) Among those with SIPP experience, respondents favored the EHC by a wide margin. On the "interesting" scale 66% rated the EHC higher than the SIPP, vs. 26% in the opposite direction; on the "enjoyable" scale the EHC had a similar advantage: 64% vs. 31%; (6) About 20% of respondents reported experiencing some difficulty recalling the date of an event during the EHC interview. Among those respondents, 85% reported that the interviewer used EHC-specific techniques to try to help (i.e., by referring to the dates of events in other interview domains), and among that subset 93% found the help useful in aiding recall; (7) SIPP and EHC reports almost always agree. This statement applies to all measured characteristics, and across all months of the CY2007 reference period. In

general, about 97-98% of respondents' SIPP and EHC reports were in agreement; (8) Disagreements revealed themselves in 3 patterns: (a) no directional disagreement – i.e., SIPP and EHC estimates were indistinguishable statistically throughout the year; (b) consistent SIPP>EHC estimates throughout the year; and (c) SIPP>EHC early in the year only. Pattern (c) represents the most troubling finding, since it suggests that EHC data quality may suffer, relative to SIPP, in months which are most distant in time from the annual EHC interview; and (9) Although there are issues which require close monitoring, the EHC method does appear to be a feasible option for the re-engineered SIPP, and further refinement and testing is indicated.

As noted above, staff were active participants in and chaired the Re-Engineered SIPP Research Group. Under the division's leadership, the Research Group developed the basic sample design for the next major test of the re-engineered survey, the 2010 SIPP EHC-CAPI field test; defined the test's research goals; specified the methods to be used to capture the data to address those goals; and, in many cases, worked out key implementation details (e.g., concerning interviewer training, recording of selected interviews, assessment of EHC instrument problems, capturing evaluation data from interviewers and respondents, etc.).

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

1.16 RESEARCH FOR SMALL AREA INCOME AND POVERTY ESTIMATES (SAIPE) (Demographic Project 7165000)

Description: The purpose of this research is to develop, in collaboration with the Data Integration Division (DID) (The Small Area and Poverty Estimates Branch was previously in Housing and Household Economic Statistics Division and is now in DID), 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.

Highlights: During FY2009, staff completed the production of SAIPE estimates for 2006, 2007, and 2008 state poverty ratios for four age groups and state median household income using American Community Survey (ACS) data along with the administrative records data and Census 2000.

Staff completed an example to illustrate a new Bayesian benchmarking procedure developed by Gauri Datta and Malay Ghosh using state level CPS poverty models. The new benchmarking procedure achieves agreement of the national estimate of number of children in poverty, and agreement of the variability of the state estimates. We demonstrated several different estimators based on different loss function criteria, using state level SAIPE model and data from 1999 and 2000. The hierarchical Bayes (HB) estimates of overall poverty level for year 1999 had to be raised to agree with the national direct estimate. While for year 2000, the HB estimates had to be lowered to obtain agreement. The results were published in our division's *Research Report Series.*

Staff assisted the SAIPE staff with developing production-ready code to estimate standard errors for school district estimates. These standard error estimates are based on the research of Maples (2008) with modifications. One concern with the methodology in the report is that the category of the geocoding rate of the IRS exemptions can be worked out from the standard error estimates and other publicly available data. This is a potential disclosure issue. We proposed a minor change from grouping the counties into cells by population size and geocoding rate to smoothing around 'similar' counties. Thus each county has its own cell, but the cells are now overlapping. This change now makes it impossible to reconstruct the geocoding rate from the publicly available data and also has the benefit of avoiding large changes in estimated standard errors at the boundary of the cells as defined by Maples (2008).

Staff applied small area estimation techniques to the estimated sampling error variances for county level poverty estimates from ACS (single year). The goal is to reduce the huge variability observed in the design based sampling error variance estimates, especially among the smaller counties. We have investigated several alternative models. One issue that arose for the variance modeling is that little seems to be known about the distribution properties of Fay's successive difference replication variance estimator being used in ACS, especially when the sample size is small. One of the parameters of the model for the sampling error variances used in ACS is related to the precision of the sampling error variance estimators. We did simulation studies using ACS 2005 data to investigate the distribution and the precision of the sampling error variance estimators as follows:

- We did a simulation study of Fay's replicate weight variance estimate of the mean (or total) of children in poverty using random samples of various sample sizes drawn from an artificial population constructed from ACS 2005 data from the five largest counties of Maryland. We examined the simulation results to see whether the distribution of the variance estimates can be approximated by a scaled chi-squared distribution and, if so, with what degrees of freedom. We obtained various measures (Kolmogorov-Smirnov statistics, degrees of freedom, coefficient of variation, relative

bias) to evaluate the distribution of the variance estimates from the simulated samples. We found that the results were similar to the results obtained from samples drawn from a simulated population of Poisson (0.02). The sample size needs to exceed 120 for Fay's variance to be well approximated by a scaled chi-squared distribution. We also found that the degrees of freedom of the variance estimator in this case are small. For example, it is only 9.9 for a sample of size 760.

- We also did a simulation study of Fay's variance estimator for the variance of the log total number of school age children in poverty using all possible systematic samples of various sample sizes drawn from the same artificial population as above. Fay's variance estimate significantly underestimates the true variance for small sample sizes. We also found that the estimate of the log total number of school age children in poverty is downward biased for small sample sizes. This comes from the nonlinearity of the log transformation. The effects of this are seen mainly for sample sizes of 100 or less. Similar results were also found using ACS 2005 data for Michigan.
- We completed a Bootstrap simulation using ACS 2005 data to study the variance of Fay's replicated weight variance estimator for county log number of poor children and incorporated information gained about the precision of Fay's variance estimator from the Bootstrap simulation into the Small Area Variance model. One result is that we see a strong empirical relationship between the precision of Fay's variance estimate and the square root of the number of responding households in sample. A second result from the Bootstrap simulation is that there is significant downward bias in Fay's variance estimator for counties with small sample sizes.

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

1.17 SMALL AREA HEALTH INSURANCE ESTIMATES (SAHIE) (Demographic Project TBA)

Description: At the request of staff from the Data Integration Division (DID), our staff will review current methodology for making small area estimates for health insurance coverage by state and poverty level. Staff will work on selected topics of SAHIE estimation methodology, in conjunction with DID.

Highlights: During FY2009, one staff member reviewed draft technical reports of both State and County 2005 estimation.

At the request of DID staff, staff prepared proposals outlining possible research for three problems related to SAHIE estimation; 1) benchmarking estimates between separate models of county, state and the Nation, 2) developing confidence intervals for SAHIE estimates between years and 3) SAHIE variance estimation research. Based on DID approval, projects 1 and 3 are going forward. Project 2 was put on hold due to no additional staff resources to work on it. Project 1) has been developed further and entails a completely Bayesian benchmarking with independent small area models by assuming that the model at the higher level is correct for higher-level estimates. This approach will not only ensure that small area estimates add up to their appropriate larger area estimates but that the resulting estimates of precision have a justifiable interpretation (which is lacking in current methods). Progress by Malec and Janicki has been made towards implementing this approach with DID's current MCMC estimation method.

Staff: Don Malec (x31718), Elizabeth Huang, Joe Sedransk, Aaron Gilary, Ryan Janicki

1.18 EDITING METHODS DEVELOPMENT (Economic Project 2370954)

Investigation of Selective Editing Procedures for Foreign Trade Programs

Description: 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.

Highlights: During FY2009, we investigated the feasibility of using selective editing for identifying suspicious records earlier in the editing process. The goal is to edit the data without the use of the Edit Master parameter file. It is expected that the application of selective editing to the full data set will lead to a reduction in edit rejects. Division staff had previously proposed a score function combining the Hidiroglou-Berthelot method with an effect function to identify highly suspicious records. Division and FTD staff implemented this by adjusting the selective editing legacy program. Applying this method allows editing to proceed as a two-tiered flow system in which all records (as opposed to only rejects) are assigned a score. Records with a score higher than a pre-set cut-off value are marked for clerical review without passing through the editing parameter file. Results showed additional data identifiers are needed to properly evaluate the selective editing outputs. Re-structuring of FTD data processing system will take care of including the capacity to store all necessary identifiers for evaluating selective editing results. We also developed an alternate score function in which the measure of suspicion is computed using the quartile method.

Staff: María García (x31703), Yves Thibaudeau, Rachelle Reeder (FTD)

1.19 DISCLOSURE AVOIDANCE METHODS (Economic Project 2470951)

Description: 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.

Highlights: During FY2009, the use of noise to protect economic magnitude tabular data is being implemented for some surveys or statistical programs (the latter use mainly administrative data) such as County Business Patterns, Non-Employer statistics and the Commodity Flow Survey. However research is continuing on the application of noise because each new survey to which it is applied typically has some special features which affect the application of noise.

For weighted survey data, the measure of noise distortion at the cell level will likely be incorporated into a total uncertainty measure for the cell that includes sampling variance and all other measurable sources of uncertainty (e.g., other types of weights unknown to users). For those economic programs that use (sample) weighted data (e.g., Commodity Flow Survey), there was much discussion about the best way to provide noise distortion information to users. It was decided to extend the currently used sampling variance to include a 'noise variance'. For cells with a medium or large sampling weight, the noise variance is a small percentage of the total uncertainty variance for the cell. However, when the sampling variance is small, the noise variance may be the major contribution to the total variance. Mathematical statisticians from the Economic Directorate have derived a formula for the combined variance that will be used for now. However, research on this interesting topic will continue by staff.

Research will continue on other aspects of noise that impact the type of inferences that data users can draw from noisy data. For example, trend analysis sometimes involves examining a given cell value in a table over a small number of publication years for the table. In some applications, changes over time of just a few percentage points are of interest. Noise may limit the ability of users to detect such small changes.

Since noise protection has been determined to be a suitable replacement for cell suppression protection for certain economic programs, a natural question is whether noise can replace cell suppression in all programs. The Economic Directorate decided not to use EZS noise to protect tables produced by the 2012 Economic Census. This decision was made after a thorough analysis of distortion levels for some important set of tables using data from earlier censuses.

After the decision was made not to use noise for the 2012 Economic Census, there was increased interest in modernizing the cell suppression programs used for production. A cell suppression modernization team was formed to determine how the old program could best be improved. The new program will probably be written in a language that is more familiar to Census Bureau software developers than is Fortran, the language now used. The team plans to make the new program easier to understand and modify than is the current one. In addition, the documentation of the program will be improved.

Staff: Laura Zayatz (x34955), Paul Massell, Jason Lucero, Asoka Ramanayake, Lisa Singh, Tapan Nayak, Bimal Sinha

1.20 TIME SERIES RESEARCH (Economic Project 2370952)

A. Seasonal Adjustment Support

Description: 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.

Highlights: During FY2009, staff consulted with analysts from Services Division on issues related to outlier identification at the end of time series, and constructed series with different drop rates for the next 6 months to allow Services Division to test the results of different ways of handling this situation. Staff consulted with staff from the Economic Directorate on issues related to benchmarking and benchmarking software, giving lectures on the theoretical basis for the methods currently used by the Economic Directorate and offering advice on the development of a SAS benchmarking program to be developed by the Economic Directorate. Staff provided information on trend estimation to analysts at the Bureau of Economic Analysis, and with staff from the Time Series Methods Staff (OSMREP), staff met with analysts from the Department of Transportation (DOT) to support the DOT's seasonal adjustment efforts with X-12-ARIMA. Staff provided information and support for time series issues from over 75 different statistical agencies, national banks, private firms, and academics both within the United State and internationally.

Staff: Brian Monsell (x31721), Tucker McElroy, Natalya Titova, Bill Bell (DIR), David Findley (consultant)

B. Seasonal Adjustment Software Development and Evaluation

Description: 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) developing a Windows programming interface for the X-12/X-13 seasonal adjustment software in collaboration with analysts from the Bank of Belgium; (2) finishing a version of the X-13ARIMA-SEATS program with accessible output and improved performance so that, when appropriate, SEATS adjustments can be produced by the Economic Directorate; and (3) incorporating further improvements to the X-12-ARIMA/X-13A-S 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.

Highlights: During FY2009, staff provided the Economic Directorate an updated version of X-12-ARIMA to test prior to release of the software, as specified in the decision document generated by the X-12-ARIMA Release Co-ordination Team. Prior to this, updates to working version of the X-12-ARIMA software were provided to the Economic Directorate through our intranet site. Staff implemented the following new features into X-13A-S in the last fiscal year: the ability to specify groups of user-defined holiday regressors, along with a chi-squared test to test for the significance of these effects separately; a new spectrum spec to gather all arguments related to the spectrum diagnostic in one place; added an end-of-month stock Easter regressor and a temporary ramp regressor to the pre-defined regressors. Staff also improved the error handling capabilities of the automatic model identification procedure in both X-12-ARIMA and X-13A-S, further improving the performance of that procedure, and added outlier iteration information to the diagnostic summary file at the request of the Time Series Methods Staff (OSMREP). Staff also responded to Services Division's requests for changes in the output of X-12-ARIMA. Staff corrected a defect found by Services Division in the automatic outlier identification procedure that would cause X-12-ARIMA to stop execution when no observations in the span can be tested for outliers. Staff produced accessible HTML tabular output for sections of the SEATS output that did not pass a *Section 508* review and developed Fortran code to implement this tabular output in SEATS and X-13A-S.

Staff examined why seasonal adjustment results differed between SEATS and RegCMPNT when the same models were specified, and discovered that SEATS adds a correction for bias when logs are applied to the series. Staff created a version of X-13A-S that would allow adjustments without the bias correction, and determined what the size of that bias correction would be for several Census Bureau series.

Staff: Brian Monsell (x31721), Ekaterina Sotiris, Natalya Titova, William Bell (DIR), David Findley (consultant)

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

Description: 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) continuing research on seasonal adjustment diagnostics; (2) studying further the effects of model based seasonal adjustment filters; (3) examining goodness of fit diagnostics for time series modeling and signal extraction; (4) determining if information from the direct seasonally adjusted series of a composite seasonal adjustment can be used to modify the components of an indirect seasonal adjustment; (5) studying the modeling of seasonality using Bayesian methods, and determining if using such a method is feasible for short time series; (6) studying the modeling of stock holiday and trading day on Census Bureau time series; (7) examining approaches for modeling time series with heteroskedastic errors.

Highlights: During FY2009, staff (a) modified model-based seasonal adjustment diagnostics to account for parameter uncertainty, and completed a set of empirical studies to examine finite sample size and power for various data generating processes, (b) completed empirical testing on a method to produce a seasonal adjustment estimate whose dynamics approximately match those of the target, which ameliorates the problem of negative seasonality, i.e., dips in the spectrum of seasonally adjusted data at seasonal frequencies, (c) developed formulas and code for a goodness of fit diagnostic test based off of comparing multi-step ahead forecasting performance, (d) developed basic theory for seasonal long memory time series models, including Bayesian model estimation, component decomposition, and seasonal adjustment, (e) developed a computationally efficient method for calculating autocovariances from generalized long memory exponential time series models, which are being used to model seasonality, (f) examined the performance of stock calendar regressors in Census Bureau inventory series, and developed a report detailing results for this study, (g) developed new summary output for the RegCMPNT software at the request of BLS, and tested the latest version of the code against output from previous versions of RegCMPNT, and (h) developed new procedures for spectral peak testing, allowing for an exact treatment of multiple hypothesis testing. Ongoing research includes: (a) exploring diagnostic tests for the presence of business cycles in unadjusted and seasonally adjusted data, (b) investigating the nested sampling

technique for efficient computation of statistical quantities arising from a Bayesian approach to ARIMA modeling of time series data, (c) researching turning point methodologies applied to diverse trend estimation algorithms, and (d) comparing the forecasting performance of revised versus non-revised trends.

Staff: Tucker McElroy (x33227), Christopher Blakely, Brian Monsell, Ekaterina Sotiris, Natalya Titova, William Bell (DIR), David Findley (consultant)

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

Description: 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, improving the documentation of X-12-ARIMA, rendering the output from X-13A-S accessible, and exploring the use of component and Java software developed at the National Bank of Belgium.

Highlights: During FY2009, the X-12-ARIMA and X-13A-S manual were updated to reflect changes in the software and to make certain concepts clearer. The revised versions of the manuals were made available to Census Bureau users via an Intranet site. Staff completed a revision of an X-13A-S spec file conversion utility that preserves comments from the original spec file into the new spec file which was requested by staff in the Economic Directorate. Staff revised and tested a utility for generating user-defined holiday regressors to allow it to generate stock moving holiday regressors for a specified stock day, rather than just end-of-month stocks. Staff updated the Seasonal Adjustment Papers website with updated papers from authors on the staff. Several papers developed by the staff documenting research and features of software developed by the staff were accepted for publication by peer-reviewed journals, and other papers were made available as technical reports.

Staff: Brian Monsell (x31721), Chris Blakely, Tucker McElroy, Natalya Titova, Bill Bell (DIR), David Findley (consultant)

1.21 SURVEY OF RESEARCH AND DEVELOPMENT IN INDUSTRY, IMPUTATION AND SAMPLING RESEARCH AND SOFTWARE DESIGN (Economic Project 7497000)

Description: This project undertakes research on the imputation of unreported mandatory items in the Survey of Research and Development in Industry. It also examines what estimators are more appropriate under alternative sampling plans; in particular, it evaluates using calibration estimators to compensate for missing data. The possibility of extending calibration to new sampling plans, such as balanced sampling, is investigated. Both traditional linear regression techniques and nonparametric regression techniques are examined.

Highlights: During FY2009, staff continued the development of a synthetic database for the Survey of Research and Development in Industry, for universal use by researchers in industry and academia. The number of variables to be simulated has been extended to four, for four consecutive data years. They are: total research and development investment, commercial R&D investment, federal R&D investment, payroll and number of employee. These variables are made available for years 2002, 2003, 2004, and 2005. The salient feature of the data is the complexity of the specific pattern of the missing data configuration. For the purpose of synthesis, staff has stratified the population in 80 strata based on inclusion in the sample on any of the four years and unit response/nonresponse. This stratification maintains the homogeneity of the response variables for a given longitudinal response/nonresponse pattern. So, it preserves the correlation between the reported data and the underlying response/nonresponse patter for research in missing data.

Staff has identified the more important strata for simulation and the production of the synthetic data. Staff identified the most frequent sample-inclusion patterns and response-nonresponse patterns. Staff produced the simulated data for the sample-inclusion pattern for which companies are included in all four samples has been expanded. There are 16 patterns of response/nonresponse for this sample-inclusion pattern.

Staff extended the simulated data from the sample-inclusion patterns for which companies are included in all four samples to inclusion patterns covering three years and two years in-sample companies. This entails creating an additional 24 strata, in addition to the 4 existing strata. Staff plans on creating enough strata among the total of 80 to cover 90% of the cases.

Staff implemented the method of Xu, Shao, Palta and Wang to impute unreported R & D in the Survey of Research and Development in Industry. The method is based on the entire longitudinal history available previous to the year that is unreported. The method allows for unbiased imputation is some situations where data are not missing at random, a more general assumption than what is currently assumed (data missing at random).

Staff: Yves Thibaudeau (x31706), Martin Klein, Jun Shao

1.22 REMOTE ACCESS - MICRODATA ANALYSIS SYSTEM (Strategic Planning and Innovation Project 0359999)

Description: Researchers and sophisticated data users' demand for Census Bureau microdata, both for general research and programmatic needs, continues to grow. Microdata allows virtually any type of analysis, and it is the desired form of data that allows modeling. Internal Census Bureau microdata files contain levels of detail, and variables, which are not available in public use files. Methods are applied to reduce detail, both by suppressing and coarsening variables in public use files, in order to protect the identity of respondents and to ensure confidentiality of responses under Title 13 of the U.S. Code. As data on individuals accumulate, and identifiable public and commercial data becomes more and more accessible, the ability to publish quality microdata while maintaining a sufficient level of ambiguity is becoming an issue.

Highlights: During FY2009, staff continued to work with members of the Data Integration Division on the development of a new Advanced Query System (AQS) / Microdata Analysis System (MAS). Staff members have written a memo that contains an initial set of confidentiality rules and routines for cross-tabulation analyses. Staff members have written and tested an initial R program to create and check dummy variables for Ordinary Least Squares (OLS) and logistic regressions. This program first chooses a reference category level for each categorical independent variable within the regression model, generates all sets of dummy variables for OLS and logistic regressions, then checks the number of observations within each dummy variable. Each dummy variable must pass a required size threshold, otherwise, the dummy variable is absorbed into the intercept term, along with the dummy variables that represent the reference category levels for each independent categorical variable within the regression model. Staff members have written an initial R program that creates synthetic residuals and synthetic fitted values for OLS regressions. These synthetic residuals and synthetic fitted values are designed to mimic the patterns seen in scatterplots of the real residuals vs. the real fitted values. Staff members have written a memo that contains specifications for the initial design of the MAS user interface.

Staff members have studied and documented how a differencing attack can be performed on the MAS. A differencing attack links the results from two or more different statistical queries to attempt to uniquely identify someone. To perform a differencing attack on the MAS, a data intruder first creates two universe data sets: U(n) and U(n-1). U(n-1) contains the same number of n observations as U(n), less one. The difference U(n) – U(n-1) = U(1), where U(1) is a universe that contains one unique observation. The data intruder would then attempt to rebuild the confidential microdata record for the one unique observation contained in U(1) by requesting the exact same m-way contingency table T[ ] for both U(n) and U(n-1), then perform a cell subtraction between these two tables: T[U(n)] – T[U(n-1)] = T[U(1)]. The resulting m-way table T[U(1)] is a cross-tabulation on a universe that contains only one unique observation, which discloses the confidential microdata record for the one unique observation contained in U(1).

To prevent differencing attack disclosures, the MAS prototype currently implements a subsampling routine called the Drop q Rule. The Drop q Rule randomly removes q observations from the original universe data set, U(n), to yield a new subsampled data set U(n-q), where n >> q. If the same U(n) is selected again by the same user, or by a different user, then the exact same q observations are removed from U(n) to yield the same U(n-q) data set as before. All statistical routines on the MAS are performed on the subsampled U(n-q) data set, and not on the original U(n) data set. Therefore, if a data intruder attempts the differencing attack T[U(n)] – T[U(n-1)], they would be performing the differencing attack of T[U(n-q)] – T[U(n-1-q)], where U(n-q) is a subsampled universe based on U(n), and U(n-1-q) is an independently subsampled universe based on U(n-1).

Staff members evaluated the effectiveness of the Drop q Rule on preventing the reconstruction of a confidential microdata record through the differencing attack of T[U(n-q)] – T[U(n-1-q)] = T[U(1)], where T[ ] is an m-way contingency table and U(n-q) and U(n-1-q) were two independently subsampled universe data sets. Staff members derived and tested a function that models the approximate probability of obtaining a successful disclosure from T[U(n-q)] – T[U(n-1-q)] = T[U(1)]. In the absence of other confidentiality rules, staff members found that the effectiveness of the Drop q Rule was dependent on the distribution of cell proportions within the m-way table T[U(n)], where U(n) is the original universe data set. It was found that the Drop q Rule provided the most protection against differencing attack disclosures when the cell proportions within T[U(n)] were evenly distributed among all cells, and higher values of q provided lower approximate probabilities of obtaining a successful disclosure from T[U(n-q)] – T[U(n-1-q)] = T[U(1)]. However, it was also observed that if at least one cell proportion in T[U(n)] contained a very high proportion of counts relative to the remaining cells, then the Drop q Rule was not as effective in preventing differencing attack disclosures, even for higher values of q. As a result, staff members are currently looking into possible modifications of the current Drop q Rule subsampling routine with the MAS.

Staff members have also been working on a cutpoint program for the MAS. The cutpoint program generates bin boundaries for data of a particular variable. Each bin must contain at least 80 records for confidentiality. There

are a number of approaches for generating cutpoints. The ones we consider are the following: fixed width bins, minimum width bins, increasing width bins, and partitioned bins. The fixed width bin approach ensures that the width of each bin is the same. In other words, the difference between the maximum bin cutpoint value and the minimum bin cutpoint value is the same for every bin. The minimum width bin approach creates bins with as close to 80 observations in each bin. These bins vary in size. The bin widths tend to be smaller than the other approaches, leading to bins of a finer granularity. The increasing width bins approach gradually increases the width of the bins. Based on previously written software, this approach begins with a fixed bin width that increases as numeric values increase. For example, the bin width d may equal 50 when the numeric variable values are less than 200, but increase to 100 once variable values get larger. Finally, unlike the other methods partitioned binning uses a top down strategy for bin generation. Beginning with the entire set of values, this strategy recursively partitions the sorted data until there are approximately 80 observations in each bin. Using this approach, bin widths are not equal, but they are multiples of each other. Each of these approaches has a number of strengths and weaknesses depending upon the range and distribution of the variable in question. We are going to begin to evaluate the strengths and weaknesses of each approach.

Staff: Laura Zayatz (x34955), Paul Massell, Rolando Rodríguez, Jason Lucero, Asoka Ramanayake, Lisa Singh, Bimal Sinah, Tapan Nayak

1.23 PROGRAM DIVISION OVERHEAD (Census Bureau Project 0381000)

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, Robert Creecy, Michael Hawkins, Gloria Prout, Stephanie Sheffield, Kelly Taylor

B. Research Computing
Description: 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.

Highlights: During FY2009, staff completed important milestones related to the Certification and Accreditation (C&A) of CEN16, which received authorization to operate on January 29, 2009. Of the 44 residual findings relevant to the division's servers, 18 have been closed. Closure on the others is expected by March, 2010. We worked with ISSRO staff to define a plan for the migration of the current research computing environment to blade servers, which is scheduled to be completed by the end of FY 2010. The planned environment will consist of four IBM LS42 blade servers, each with four AMD quad-core processors and 128 GB of memory, configured as a compute cluster. Approximately 73 TB of space for user data will be shared among the nodes of the cluster. The document describing the initial build of the cluster is currently in review. The replacement of staff desktop computers began in Q4. Once this phase is complete, all staff desktop computers in the division will meet or exceed the current desktop standard.

Staff: Chad Russell (x33215)

2. RESEARCH

2.1 – 2.2 GENERAL RESEARCH AND SUPPORT TOPICS (Census Bureau Projects 0351000, 1871000)

Statistical Methodology

A. Disclosure Avoidance

Description: 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.

Highlights: During FY2009, staff revised the Census Bureau Disclosure Review Standard, the Census Bureau Disclosure Checklist Confidential Addendum, the American Statistical Association Privacy and Confidentiality Statement, and the American Statistical Association Privacy and Confidentiality web site. Staff aided the Social Security Administration in forming two Disclosure Review Boards.

Staff investigated the theoretical properties of random noise multiplication for both microdata and magnitude tabular data. Our findings include the following: i) all polynomial estimators for the original data can be adopted and easily applied to noise-multiplied microdata, ii) the noise CV of a cell total decreases as the contributing values to the cell become more homogeneous, and iii) for a balanced noise masking procedure, the perturbed total of any cell is an unbiased estimator of the original cell total. We also obtained an expression for the reductions in cell level noise variance from using balanced noise perturbation.

Staff explored various problems that arise in the disclosure protection of magnitude data tables. Some of these have been explored using mathematical and statistical analysis. They range from the problem of how much protection rounding of cell values provides, to whether partial cell suppression has significant advantages over traditional cell suppression. The concept of protection at a company level was also explored.

Staff began exploring computational improvements and variants of the traditional cell suppression that have been developed in the last decade, e.g., partial cell suppression, and controlled tabular adjustment. This exploration will involve careful study and analysis of several important papers that have appeared in disclosure related books and journals. Many problems explored were related to computer implementations of a cell suppression method. For example, we explored (with the help of a researcher in the Manufacturing and Construction Division) whether a sequential approach to partial cell suppression has the same advantages as the simultaneous approach.

Mathematical modeling languages that are associated with statistical or mathematical programming packages were explored. In particular, PROC

OPTMODEL allows for easy implementation of LP and Integer Programming models in SAS. These modeling languages may play a role in the new cell suppression software.

Staff: Laura Zayatz (x34955), Paul Massell, Jason Lucero, Lisa Singh, Asoka Ramanayake, Tapan Nayak, Bimal Sinha, Rolando Rodríguez

B. Disclosure Avoidance for Microdata

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

Highlights: During FY2009, one staff member completed the paper "General Discrete-data Modeling Methods for Producing Synthetic Data with Reduced Re-identification Risk that Preserve Analytic Properties."

The methods provide computationally tractable general method for producing synthetic public-use data files with valid analytic properties that serve as an alternative to epsilon-privacy (Dinur and Nissim, 2003). Until the breakthrough of cryptographers Dinur and Nissim, most computer scientists felt that the problem of allowing an arbitrary number of queries against a database (even with noise added) was impossible. Cryptographers and other computer scientists have generally not been able to justify analytic properties of epsilon-private files (Dwork and Yekhanin 2008, Xaio and Tao 2008).

One staff member did additional empirical work on methods for generating synthetic data with valid analytic properties that has drastically reduced re-identification risk.

One staff member updated some of the generalized, parameter-driven software in preparation for modeling with much larger databases. The purpose is to perform a more rigorous comparison of both analytic validity and reduced re-identification risk with methods that may be approximately epsilon-private.

Staff: William Winkler (x34729), William Yancey

C. Seasonal Adjustment (See Economic Project 2370952)

D. Household Survey Design and Estimation

Description: 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.

For examples of efforts undertaken during FY2009, refer to Project 1.11.

Staff: Lynn Weidman (x34902)

E. Sampling and Estimation Methodology: Economic Surveys

Description: 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.

Highlights: An observation is considered influential if the estimate of total monthly revenue is dominated by its weighted contribution. The goal of the research is to find methodology that uses the observation but in a manner that assures its contribution does not dominate the estimated total or the estimates of period-to-period change. The research produced a simulation methodology for investigating the statistical properties of two candidate methods for detecting and treating influential values in the Monthly Retail Trade Survey (MRTS). The investigation completed the calculations for the first of scenarios in the simulation study. A paper describing the methodology and results for the first scenario was prepared.

Staff: Mary Mulry (x31759)

F. Research and Development Contracts

Description: 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 Fiscal Year 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 5-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 Fiscal Year 2002 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.

Highlights: During FY2009, fifteen new task orders were awarded, thirty-three modifications were awarded and twenty task orders were completed. To date, there have been ninety-six (96) task orders awarded under the R&D 2007 contracts, with a monetary value of over $129 million (over $95 million obligated). Seventy-four task orders have been completed and one task order terminated, leaving 21 active tasks.

On September 28, 2009, the U.S. Census Bureau made awards to thirty-seven firms in five technical areas for the Research and Development 2014 Contracts. The period of performance for these contracts is September 28, 2009, through September 27, 2010, with four option years. The multiple contracts were awarded in five technical areas: 1) assessment, planning, and analysis; 2) data analysis and dissemination; 3) statistical analysis and evaluation, 4) methodological research, and 5) survey engineering.

Staff: Ann Dimler (x34996)

G. Small Area Estimation

Description: Methods will be investigated to provide estimates for geographic areas or subpopulations when sample sizes from these domains are inadequate.

Random effects modeling of interaction terms

Highlights: This project was motivated by an empirical finding in Decennial Statistical Studies Division (DSSD) that high order interaction terms left out of the logistic models could cause apparent discrepancies in the estimation. During FY2009, a method to include random effects for higher order interactions was developed in order to account for erroneously excluded interaction terms (due to type II error) with only introducing a very few new parameters (as variance components instead of fixed effects). This project is mostly defined by the use of large models proposed by DSSD, is designed to provide empirical Bayes estimates (i.e., non-Bayesian) and uses SAS so that, if needed post CCM estimation, it could be implemented relatively easy. Staff identified MLE estimation methods from random effect models in SAS but did non use them because either they were based on approximate likelihoods or they failed to converged in certain instances. To improve computing time, staff investigated two other approximations: a normal approximation to the binomial with smoothed small area variances and a normal approximation to the likelihood. Both approximations performed poorly based on comparison with exact procedures. Staff is currently

implementing exact, iterative procedures based on work by Berslow and Kin (1995) with satisfactory results using Proc IML.

Staff: Don Malec (x31718), Julie Tsay, Aaron Gilary, Elizabeth Huang, Joe Sedransk, Lynn Weidman

Data Integration Division (DID)/ACS Unit level models for small area tract-level estimation
Highlights: During FY2009, and in consultation with the Data Integration Division staff began revisiting the Bayesian approach using a unit level model in Malec (*Journal of Official Statistics*, 2005) for possible use in estimating very small areas in ACS. Issues in extending the model include the use of administrative record-based housing unit covariates that may be missing, modeling the effects due to stratification and non-response strata and the development of models of complex housing unit structures. In addition, tract-definition was compared to school districts definition to ascertain whether tract-level small are models could be used to make school district level estimates. At present, staff has found that the data cannot easily be aggregated to school district levels. A report outlining all of these issues was prepared.

Staff completed a 15 page draft overview on how unit level models could be developed for ACS tract-level model-based estimates. This report was discussed with the Data Integration Division. Given time and interest, this project could continue.

Staff: Don Malec (x31718), Aaron Gilary

Spatial Models for the tract-level ACS
Highlights: Early this fiscal year, more coverage intervals were made and a report including Patrick's parts was completed. This work was documented in the division's *Research Report Series*. This project is complete.

Staff: Don Malec (x31718), Patrick Joyce

Disclosure limitation for LEHD projects
Highlights: During FY2009, and at the request of staff in the Economic Directorate, we reviewed the Bayesian procedures documented in the LEHD project. The purpose of this consultation was to provide additional Bayesian perspective to Economic Directorate staff, which may be providing recommendations on standards for the project. Two meetings were held in which this type of discussion took place.

Staff: Don Malec (x31718)

Statistical Computing Methodology

A. Record Linkage and Analytic Uses of Administrative Lists
Description: 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.

Highlights: During FY2009, staff wrote an additional background document on computer matching for a National Academies of Science committee that is studying voter registration databases. The person also wrote a design for a national voter registration database with particular emphasis on implementation issues. *BigMatch* software is sufficiently fast but parallel record linkage software recently developed at Australia National University, Stanford University, and Pennsylvania State University that are 40 or more times slower are not.

Staff worked on methods that connect edit/imputation with record linkage, and moved some features from earlier division matching software into a special version of *BigMatch* that could be used for additional exploratory and analytic work.

Staff developed a nickname comparison loop in *BigMatch* that allows 'on-the-fly' comparison of name variants such as Bill with William. One staff member did a preliminary empirical comparison of the new version of *BigMatch* with the current IBM entity analytics record linkage software.

Staff developed methods and software for estimating the expected number of coincidental agreements on date-of-birth among groups of individuals agreeing on other characteristics such as name. The methods are a straightforward generalization of the 'Birthday problem'. The estimation algorithm is an application of the Ergodic Theorem. A draft technical report shows how to do the estimation using Stirling Numbers of the second kind.

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

B.1 Editing
Description: 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.

Highlights: During FY2009, staff researched methods for creating a set of edits for a given set of data for both discrete and continuous data. In this research, we reviewed existing methods and provided new ideas on creating a set of edits for a set of data and applying them in an efficient, cost-effective manner. For discrete data, we proposed using information from a loglinear model fit to the data. For continuous data, we proposed to look at

pairs of variables with strong correlations and examining the tails of distribution of ratios of variables with correlations above a certain point as they may delineate possible outlying observations. The idea is that this information could be used for creating additional edits. Staff wrote a division research report "Determining a Set of Edits" (W. Winkler and M. Garcia). Because the edit constraints are intended to improve the quality of the data, we also studied the link between the quality of the set of edits and the quality of the resultant database. We provided a strategy for efficiently monitoring the edits including three separate (partial) measures for quality of the edit set. The measures include the proportion of records that are affected by an edit, the precision of an edit, and the number of edits needed for cleaning the data (details in "Determining a Set of Edits and Quality of a Database" M. Garcia and W. Winkler).

Staff: María García (x31703)

B.2 Editing and Imputation

Description: Under this project, our staff provides advice, develops computer edit/imputation systems in support of demographic and economic projects, implements prototype production systems, and investigates edit/imputation methods.

Highlights: During FY2009, and in the context of compensating for missing data longitudinally in the Survey of Income and Program Participation (SIPP), staff showed that "hybrid estimators" based on a forecasting approach are sometimes more efficient than the traditional Horvitz-Thompson estimator adjusted for missing data. After results on hybrid estimation in the context of SIPP were presented at the "Sample Surveys and Bayesian Statistics 2008" conference (Southampton, England, August 26, 2008), staff integrated an additional covariate in the estimator of the size of the cohort of unemployed: education. The new estimator for the size of the unemployed cohort makes use of the information available at the previous wave and of the new covariate. In the process of implementing the new estimator, staff implemented software to compute the posterior means of the probabilities of transition from one wave to the next. The software can also be used to compute the MLE's of the transition probabilities, as the MLE is an instance of a posterior mean. Staff is implementing methods to estimate the variance of the MLE. Two types of methods, based on two different schools of statistical practice are being implemented. The first method is balanced repeated replication (BRR), related to the frequentist school of statistical practice. The second method is the method of Laplace for approximating posterior variances (Tierney Kass Kadane, 1989), related to the Bayesian school. In addition to each providing variance estimators, results from both methods, when compared, serve to diagnose model misspecification. Equivalent diagnostic tools are not easily available, so this particular application is a significant breakthrough.

The replication methodology has been extended to assess the significance of differences between design-based and model-based estimators. Model-based estimators subject to comparison with design-based methods include the multiple-imputation (MI) estimator, and/or estimators derived from synthetic data. These estimators in this context are essentially the same as the MLE when the number of multiple imputations is large enough –5 or more.

Staff identified flaws in the specifications of the hot-deck imputation for the imputation of the "On Layoff" question (ELAYOFF). The current imputation procedure chooses any donor for imputing the value of ELAYOFF for an individual who partly worked during the reference period. The set of eligible donors include a very large pool of individuals who never worked in the first place, even though the record to be imputed belongs to an individual who has worked during the reference period. The end result is that someone not "on layoff" during the preceding reference period can ever be imputed "On Layoff" during the current period. This is clearly an unrealistic imputation since there is a substantial fraction of those individual who reported not being on layoff during the preceding reference period who are on layoff during the current reference period. Model-based imputation and estimation techniques that avoid this type of misspecification are being researched and presented as alternatives. These methods can also serve to update administrative information to make-up for the lag in real time involved in using administrative information. Research in that area is in progress.

The forecasting estimator was used to predict the status of two other demographic variables: employment status (employed or unemployed), and health insurance coverage. For this application we show how to build forecast estimators taking advantage of static covariates. The specific forecast estimator predicts health insurance coverage and employment status based on these variables for the previous wave. The static covariate is a categorical version of education: college degree or no college degree. We showed that this covariate is indeed useful (significant) to predict employment status, even when health coverage and employment status from the previous wave are known. But it is not useful (not significant) to predict health insurance coverage when employment status and coverage from the previous wave are known. This application of the forecast estimator shows that, when a good sampling design and a valid model are exploited in concert, the result is a highly accurate predictor that may be very difficult to outperform, even when the size of the post-strata are known. This is a powerful result with important implications for the future of prediction methodology: It implies more relevant post-stratification variables can be taken advantage of to construct predictors, rather than be limited only to traditional post-stratification variables such as age, race and sex, for which post-strata sizes are known.

Staff: Yves Thibaudeau (x31706), Eric Slud

C. Developed Software Support – General Variance Estimation Development and Support
Description: This project will develop new methods and interfaces for general variance estimation software including VPLX, WesVar, and SUDAAN. Our staff will provide training for variance estimation software applications, and will provide support for complex applications such as the Survey of Income and Program Participation and the Survey of Construction.

Highlights: During FY2009, staff assisted the Survey of Construction in the Manufacturing and Construction Division (MCD) in migrating its variance estimation processes from VPLX to SAS. Staff learned about another Economic Directorate survey that continues to calculate variance estimates using VPLX. Staff will work with them to similarly migrate their processes to SAS via StEPS.

Staff: Aref Dajani (x31797), Ned Porter

D. Missing Data and Imputation: Multiple Imputation Feasibility Study
Description: Methods for imputing missing data are closely related to methods used for synthesizing sensitive 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 (e.g., synthetic data). This project ascertains the effectiveness of applying multiple imputation to both missing data and disclosure limitation in the American Community Survey (ACS) group quarters data. Statistical models are used to generate several synthetic data sets for use within the multiple-imputation framework.

Highlights: During FY2009, the R-based module for creation of synthetic data for ACS group-quarters disclosure avoidance was implemented successfully in the ACS 2008 production cycle. Work on this project has concluded for the year. Further research will focus on improving the statistical properties of the synthetic data and on decreasing computational time needed to run the module. New research will assess the feasibility of using synthetic data for ACS housing unit data; currently, only group quarters records are modified via synthetic data methods.

Staff: Rolando Rodríguez (x31816), Yves Thibaudeau

E. Modeling, Analysis, and Quality of Data
Description: 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.

Highlights: During FY2009, staff completed the paper "Using General Edit/Imputation and Record Linkage to Enhance Methods for Minimizing Uncertainty in Statistical Matching" for the 2009 International Statistical Institute meeting.

Staff investigated new extended methods for statistical matching that should both increase accuracy and allow a far greater number of applications to multiple data sets simultaneously.

Staff worked on the mathematical basis for the categorical data-modeling/convex-constraint/imputation software.

Staff developed theory, algorithms, and software for variance estimation in situations where valid probabilistic models have been developed. Via very non-trivial indexing methods, missing data records are almost instantly compared with records that agree on other characteristics. A novel variant of binary search allows nearly instantaneous probability-proportional-to-size sampling according to the cell-probabilities in the model. Because there is a full probabilistic model (Winkler 2008), the estimation methods should have substantially less bias than methods based on hot-deck (that are used almost universally). The new methods have valid variances rather than the compromise approximate variances (such as via linearization, bootstrap, and jackknife) that individuals use because there is no valid probabilistic model associated with hot-deck.

Staff: William Winkler (x34729), Rob Creecy, William Yancey, María García

Social & Behavioral Survey Methodology

A. Usability Research and Testing
Usability Day was observed on May, 27, 2009, at the U.S. Census Bureau with the following presentations: "Patterns of visual attention: Eye-tracking technology." (Kathleen T. Ashenfelter); "Expert Reviews" (Elizabeth Murphy); "What is Accessibility?" (Larry Malakhoff); "Card Sorting" (Erica Olmsted-Hawala); "Low-Fidelity and High-Fidelity Usability Testing" (Jennifer Romano and Jennifer Chen); "Field Research" (Elizabeth Nichols); and "Recruiting for Usability Testing" (Temika Holland).

A.1. Web Applications Accessibility
Description: This project focuses on the accessibility of Internet and Intranet applications by blind and low vision users in accordance with the *Section 508* regulations.

<u>Census IPCD SalesForce Application</u> (Field Division)
Description: This application permits Field employees to check the status of various operations during the 2010 Census through graphs.

Highlights: During FY2009, the application had some accessibility issues including incorrectly programmed combo boxes, incorrect tab order, reading order of text in two columns, and improper programmed instructions about required fields. The main usability problem is the difficulty screen reader users will have in turning on the accessibility features because the instructions for this task are deeply buried. These findings were included in an expert review and provided to the sponsor.

Staff: Larry Malakhoff (x33688), Kathleen Ashenfelter

ECON Data Release Schedule (Economic Planning & Coordination)

Highlights: During FY2009, an accessibility evaluation was performed so this same functionality would be available to screen reader users with a tab key. After several iterations, the SSD programmer devised a strategy to overlay a tiny image over each block containing ALT text describing the data release. Presence of the ALT text made the grid accessible to screen reader users. This project is complete.

Staff: Larry Malakhoff (x33688), Matt Olsen (EPCD), Greg Henle (SSD)

Census In the Schools (CIS) Documents (CLMSO)
Description: Teachers instructing children in all grades would use these lesson plans and exercises to learn about what information the Census Bureau collects and how it is used.

Highlights: During FY2009, staff evaluated 37 Census In Schools on-line documents for accessibility. These files included K-8 Maps (Stateside, Island Areas and Puerto Rico) (7 files); Principal Kit Brochures (Stateside, Island Areas and Puerto Rico) (6 files); K-8 Lesson Plans (Stateside, Island Areas and Puerto Rico) (13 files); Quick Guides (Stateside, Island Areas and Puerto Rico) (6 files); Promotional Brochures (Stateside) (3 files); Superintendent Kit Brochure (Stateside) (1 files); and Puerto Rico Secretary of Education Letter (1 file).

Maps were made accessible by providing equivalent tables. Some tables had accessibility issues because nested row stubs were not being read correctly. Tables for the median ages of the 5 youngest and oldest were not readable by the screen-reader software. The Lessons and Brochures had ALT text describing groups of images instead of unique ALT text for each image. One lesson had an image of the 2010 Census form that was blurry and unreadable. A Puerto Rico K-4 activity used an incorrectly designed bar graph which elevated the y-value of zero above the x-axis to show no children got to school by airplane just to assign a color to the airplane category. All of these findings were submitted to the sponsor for appropriate action.

Staff: Lawrence Malakhoff

Census In the Schools (CIS) Application (Management Services Office)
Description: Children in grades K-5 would use this application to learn about what information the Census Bureau collects and how it is used.

Highlights: During FY2009, three main types of issues needed remediation.
1) Accessibility of controls: Status of the audio button used to toggle the sound off and on, selection of the quiz character and status (selected or not selected) of a quiz response option, and the keyboard icon on the Word Find activity.
2) Links to plug-in programs: Links are needed to the Flash player and Adobe Reader.
3) ALT text: ALT text is needed for the coloring pages, the checkmark and "X" graphics on the quiz feedback screens, and the cards and the hidden image in the Memory Game.

A report was written and provided to the sponsor and was submitted to our Division's *Research Report* series.

Staff: Larry Malakhoff (x33688), Jeffrey Jones (SSD), Lisa Lawler (SSD), Cecelia Maroney (SSD)

Foreign Trade Imports, Exports and Dress Rehearsal Software (Administrative Customer Services Division)

Highlights: During FY2009, this project had an iterative approach. Staff would identify accessibility problems with output tables and forms labeling. After each meeting reprogramming was done and the application was retested. All accessibility violations were resolved and the software conforms to *Section 508* regulations.

Staff: Larry Malakhoff (x33688), Tina Egan (ACSD)

Support for X-12 Arima Documentation and Software (Statistical Research Division)

Highlights: During FY2009, staff completed an accessibility evaluation of HTML tables from the Bank of Spain. The main problem was that primary and sometimes secondary headers were associated with the wrong column. All these issues were resolved by staff.

Staff: Larry Malakhoff (x33688), Brian Monsell

CPSI-PAL High-Level Concept Accessibility Recommendations (Systems Support Division)
Description: Staff reviewed the high-level concept document of the CPSI-PAL web site for potential accessibility issues.

Highlights: During FY2009, staff informed SSD analysts about pitfalls of using color alone to identify elements in a process and the need for an accessible media player and captioning to play animated tutorials. This project is on hold until the CPSI-PAL website is available.

Staff: Larry Malakhoff (x33688)

Report of Inmates Under Sentence of Death Application (Systems Support Division and Bureau of Justice Statistics)
Description: Wardens working in prisons would use this application to submit information to the Bureau of Justice Statistics (BJS) about inmates under a death sentence.

Highlights: During FY2009, This application will need a moderate to large effort to resolve the accessibility violations. The NPS-8A form is inaccessible because it is only suitable for making a print-out, no electronic data entry is possible. The NPS-8 form has unlabeled combo boxes and edit fields for the month and year, respectively. This project is on hold until SSD hears from DOJS.

Staff: Larry Malakhoff (X33688)

NotifyMe (Economic Planning and Coordination Division)
Description: NotifyMe allows persons to select manufacturing reports and be notified when they become available.

Highlights: During FY2009, 1) Displayed text for the Accommodation button did not match the text vocalized by screen-reader software. Characters used as arrows (“>>“) in the “More” link were vocalized as “greater than greater than” and provided no value to JAWS users. These issues were corrected and the revised NotifyMe application was submitted to staff for a second evaluation; 2) An evaluation of the revised NotifyMe application revealed some accessibility and usability issues. Screen-reader users hear extra information on the introduction screen because all the horizontal navigation bar buttons are vocalized as “link [label] on mouseover on mouseover.” Neither of the extended list boxes to select states or sectors is labeled on the second screen and JAWS users cannot use control-left click to select single options in list-boxes. Focus is not shown as a rectangular box around links and buttons when tabbing on all screens. Usability issues included placement of FAQs below the “fold” where users could not see them and usage of jargon on the introduction screen. All accessibility and usability issues were reported to the sponsor for their action and the application will undergo a final evaluation from staff.

Staff: Larry Malakhoff (x33688)

Data Tables (Systems Support Division)
Description: Staff reviews various data tables for accessibility and provides recommendations if the table is not coded properly.

Highlights: During FY2009, 1) Geography Division submitted two tables for an accessibility evaluation. Superscripts for footnotes were being read as numbers, with no indication as to their meaning. For example, 1990 with a superscript 2 reads as 19902. Footnotes were vocalized before the data values. All these problems were addressed by the programmers; and 2) Two tables, one created in-house and the other by DeQue (a contractor) were evaluated for accessibility. The table built by DeQue was technically accessible, but had usability issues that needed to be addressed. The main issue was footnotes were voiced as “backslash number” which means JAWS users would not recognize the string “\1” as footnote 1. It was recommended the footnote be replaced with a same page link. The in-house table read a footnote as the first row instead of the last. All problems with these tables were resolved.

Staff: Larry Malakhoff (x33688), Laura Yax (SSD)

A to Z Search Index (Systems Support Division)
Description: This application permits users to click on the first letter of the topic they are seeking on the Census Bureau Intranet web site.

Highlights: During FY2009, staff found the group of links on the right have nothing to do with the object of the search, yet focus is placed on the first item when a person clicks on a letter. It was recommended that a skip link bypass the list of links and focus be placed on the first link listed under the letter index. This project is complete.

Staff: Larry Malakhoff (x33688)

Broadcast Message Form (Service Sector Statistics Division)
Description: Staff received a request to investigate the accessibility of the web form that Census Bureau employees use to submit messages for broadcast.

Highlights: During FY2009, This web form was made accessible in 2006, but somehow this quarter it reverted back to the inaccessible version. Contact person fields (first name, last name, MI) were not labeled. A screen-reader user cannot put focus on the message field. These problems were remedied in a collaboration with SSD staff. This project is complete.

Staff: Larry Malakhoff (x33688), Peter Moreno (SSD)

Medical Expenditure Panel Survey (MEPS) (Systems Support Division)
Description: The MEPS Web Survey permits respondents to provide insurance coverage information about their company.

Highlights: During FY2009, the MEPS-10 and MEPS-15 Web surveys lack a link to the Adobe Reader, per *Section 508* 1194.22 paragraph M. JAWS can read all text on all screens. However, the presentation order of instructions and examples, lack of internal navigation structures, usage of stem-and-leaf formatting, and incorrectly programmed check-boxes make this application unusable

for screen-reader users. An unusable application is inaccessible.

Instructions and examples placed between the question and the response area interfere with a JAWS user's recall of the question. A stem-and-leaf structure for questions consists of stem-text, followed by two or more lines of leaf text. Together, the stem and leaf make up a complete question. This structure is accessible, but can be unusable if there are many leaves and screen-reader users cannot recall the stem part of the question. In this situation JAWS users must navigate backward. Additionally, questions programmed in a grid present a barrier to screen-reader users because access to the original question creates a memory burden. This project is complete.

Staff: Lawrence Malakhoff (x33688), Robert Brown (SSD)

Historical Census Newsletters (Administrative Customer Services Division)
Description: ACSD scanned all existing copies of Census Bureau employee newsletters dating back to 1942 and placed them on-line for employee use.

Highlights: During FY2009, the accessibility evaluation revealed the initial screen lacked ALT text for the cover images and the reflection below the graphic makes the header difficult to read. Links below each publication year are visually associated with the publication year. When screen-reader users access links, they must remember what year they are currently located or navigate backwards to the top of the column to hear the year.

All the accessibility issues were resolved before the page was published on the Census Bureau Intranet. This project is complete.

Staff: Lawrence Malakhoff (x33688), Carolyn Stewart (ACSD)

Learning Management System (LMS) Completion Certificate Accessibility Evaluation (Systems Support Division)
Description: As a result of a complaint to the Office of Civil Rights at the Commerce Department, staff investigated the accessibility of the completion certificate all users must obtain upon completion of an E-Learning course within the LMS.

Highlights: During FY2009, the evaluation revealed the completion certificate graphical link was not in tab order nor labeled correctly on the My Transcript screen.

Three clickable graphics precede each course title. Due to their placement, the three clickable graphics have no indication to which course they are associated. They are labeled "view certificate," "view course properties," and "view course notes." The "view certificate" graphic cannot be accessed by the tab key. A JAWS user would have no idea the certificate was there unless JAWS reads out the entire screen first. Even if JAWS users do hear "view certificate," they may not know what it means because they told to specifically look for their "completion certificate." The lack of tab key access and incorrect labeling violates 1194.21 paragraph L of *Section 508*.

We recommend first renaming the clickable graphic as "completion certificate" and reprogramming the LMS so the clickable graphic can be accessed by the tab key. We also recommend switching the title column with the column with the three clickable graphics. The title should be the first item in a row which will help the screen-reader user associate the title with the clickable graphics. These recommendations were provided to the Census Bureau Civil Rights Office for their action.

Staff: Lawrence Malakhoff (x33688), Lisa Lawler (SSD)

New Employee Processing Web Form (LTSO)
Description: LTSO requested an expert review of four screens used to collect data about a new employee. Staff contributed an accessibility evaluation to the expert review.

Highlights: During FY2009, the evaluation revealed the tabbing order does not follow the visual reading order and drop-down menus cannot be accessed by keyboard commands. Further, users could alter menu options which could result in data-entry errors. Instructions following data-entry fields occurred too late to be useful to screen-reader users. These findings were merged into a memorandum and sent to the sponsor.

Staff: Lawrence Malakhoff (x33688), Andy Su, Jennifer Chen, Elizabeth Murphy, Temika Holland

Decennial Census Challenge Computer Based Training (CBT) (Field Division)

Description: Census employees that will manage Census offices during the 2010 Census are required to take this CBT to become familiar with data collection and processing procedures.

Highlights: During FY2009, testing identified the following accessibility problems: depending on the button clicked, screen-reader users must sometimes navigate backwards from the bottom NEXT button to hear screen content; visual focus is not shown when tabbing; radio buttons are not labeled; and the targets for "Previous" and "Next" buttons go to two different places.

During the process of accessibility testing, these usability problems were detected: unvisited links are displayed as underlined red instead of blue; and bullets are not

programmed correctly and do not provide the position and number in the list (e.g., 2 of 7).

These findings were provided to the sponsor for their action.

Staff: Lawrence Malakhoff (x33688), Robert Tomassoni (FLD)

A.2. Desktop Applications Accessibility
Description: 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.

MAF/Tiger Partnership Software (MTPS) (Geography Division)
Description: This application enables persons to update addresses and roads and features on maps used for official U.S. Government purposes.

Highlights: During FY2009, this application was evaluated for keyboard accessibility only since the maps were inherently visual. The primary usability issue with the MTPS viewer is the Log-in screen. Users will likely be puzzled about the requirement to enter a "Participant ID" in addition to a username and password. All links on the MTPS viewer are blue, even when visited. The Census Bureau standard (IT Standard 15.0.2) requires links should change color, from blue to magenta (purple) after being visited. It is not apparent how to zoom in and out from the widget appearing on map screens. There are no labels to assist users and the widget looks different from what is used in the Internet applications MapQuest and Google Maps, which may be more familiar to users. A report was provided to the sponsor and submitted to our division's *Research Report Series*.

Staff: Larry Malakhoff (x33688)

Articulate/Captivate Accessibility Review (Systems Support Division)
Description: At the request of the Training Branch, an accessibility evaluation was performed on typical screen output by the Articulate and Captivate E-Learning software applications.

Highlights: During FY2009, the JAWS screen-reader had issues with announcing navigation labels implemented by both software packages. The Articulate quiz maker module created a reading order that alternated between the left navigation bar and the quiz responses. The only method to navigate between quiz screens was to click on the submit button. The Captivate package generated a tab order which alternated between navigation buttons and media player controls.

A significant effort is needed to make the Articulate package accessible because its screen text is not accessible. A moderate level of effort is needed to make the Captivate package accessible. Research on the Internet revealed issues between JAWS and Captivate may be resolved if the newest versions of these packages are used. The Captivate software package was recommended for use by the Training Branch. This project is complete.

Staff: Larry Malakhoff (x33688)

Foreign Trade Imports, Exports - Historical Summary Software (Administrative Customer Services Division)

Description: Staff met with the ACSD programmer this quarter to assess the conformance of *Section 508* to the Foreign Trade Imports, Exports Historical Summary application.

Highlights: During FY2009, staff met with the ACSD programmer assess the conformance of *Section 508* to the Foreign Trade Imports, Exports Historical Summary application. The evaluation revealed the Concord screen had two issues. First, the combo box labeled "category code list," was vocalized as "select an area." instead of the displayed text. Second, the word "hi-tech" was being mispronounced because it was labeled as "HITECH."

All accessibility violations were resolved and this project is complete.

Staff: Larry Malakhoff (x33688), Tina Egan (ACSD)

A.3. Census.gov Template Development
Description: 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.

Highlights: During FY2009, staff continued to meet with the Information Architecture and Design Working Group (IADWG) on a weekly basis to work on the long-tail analysis of the Census.gov Google search terms. Staff wrote a summary report for the team on the results of both rounds of the card-sorting study with the intention of pulling out areas where the card sorting results and the long-tail analysis overlap. Staff provided input to discussions of terminology for use as category headings and sub-headings in the template. The template is now in use across the Census Bureau Internet.

Staff: Erica Olmsted-Hawala (x34893), Elizabeth Murphy

A.4. AFF Usability Study: Iterations 1 and 2– Conceptual Design and Low-Fidelity Prototype Testing

Description: The U. S. Census Bureau releases much of the nation's economic and demographic data on the American FactFinder (AFF) Web site. In conjunction with the massive data release anticipated at the conclusion of the 2010 Census, AFF is currently undergoing a major redesign, which is scheduled to launch sometime in 2011 or 2012. The Data Access and Dissemination Systems Office (DADSO) has asked the Census Bureau's usability lab to participate in the redesign effort. This effort encompasses the full spectrum of user-centered design activities, from iterative low-fidelity paper prototype testing to high-fidelity testing with a working prototype. The purpose of the testing is to identify usability issues. Recommendations made to resolve the issues are intended to improve the usability of the Web site for all users.

Highlights: During FY2009, staff conducted iterative usability testing to evaluate the emerging design of the new American FactFinder (AFF) Web site. The conceptual-design phase of the AFF Usability Study was completed with the submission of a final report to the division's *Research Report Series*. One finding of the conceptual-design was that users needed assistance in understanding what they needed to do to begin their search or to understand their results. Staff delivered a memorandum documenting findings and recommendations to improve the design. The new designs were created and tested with additional participants. New designs show user performance improvements over the initial conceptual design. Staff delivered a memorandum documenting findings and recommendations and is working on submitting the usability report on iteration 2 and 2.5 into our division's *Research Report Series.*

Staff: Erica Olmsted-Hawala (x34893), Jennifer Romano, Jennifer Chen, Elizabeth Murphy

A.5. AFF Usability Study: Baseline Testing

Description: American FactFinder (AFF) is a free, public online tool that allows users to find, customize and download data on the population and economy of the United States. The AFF Web site is undergoing a thorough redesign under the sponsorship of the Data Access and Dissemination Systems Office (DADSO). In order to evaluate whether the re-designed effort is successful, the Usability Lab proposed and conducted a baseline usability study to measure user performance and satisfaction with the current site. Ultimately the results will be used to compare user performance and satisfaction with the same measures taken on the final release of the new AFF Web site, expected sometime in 2011 or 2012.

Highlights: During FY2009, staff prepared for and conducted usability testing on the current American FactFinder Web site with novice participants. An initial memo of results was drafted and presented to the clients. This study showed that the overall accuracy score for novice participants on simple tasks was 67% and the overall accuracy score for complex tasks was 27%. The average time to complete simple tasks for novice participants was 2.83 minutes, and the average time to complete complex tasks for novice participants was 7 minutes. The average satisfaction score for novice participants was 6.17, which is above the median, but not well above, which was the goal set for the Web site. Two of the main usability problems uncovered during the testing of novice participants were 1) the search function was not helpful to users, and 2) the maps were difficult for participants to use.

Recommendations included improving the search algorithm and providing sharper visual contrast between screen foregrounds and backgrounds. Further testing of expert participants is underway. The current site will not be changed, but staff's recommendations will inform the redesign effort of the new AFF Web site.

Staff: Erica Olmsted-Hawala (x34893), Jennifer Romano, Elizabeth Murphy

A.6. 2007 Economic Census Web Site Redesign

Description: Our division's role in this project was to provide usability and accessibility evaluations of prototype screen designs for the 2007 Economic Census Web site. To begin this project, management in the Economic Planning and Coordination Division (EPCD) asked our division to conduct an expert review of prototype screen designs for the 2007 Economic Web site. The expert review was followed with two rounds of usability testing.

Highlights: During FY2009, Continuing the work begun in FY2008 (Statistical Research Division, *Study Series (Survey Methodology #2008-11*)), staff collaborated with the Economic Planning and Coordination Division's Summary Statistics Processing Branch in planning and conducting further usability testing of their redesigned, public Web site. The second round testing focused on evaluating changes that EPCD had made to the user interface based on results and recommendations from the first round. Soon after completion of the testing, staff delivered a report of the high-priority usability findings and recommendations, which we discussed with EPCD. Despite some positive findings, overall accuracy of 63% was below the goal of 75%; only one of three user-performance-time goals was met; and user satisfaction was below the team's goal. Our recommendations included, for example, making the related links less prominent so that users would not be enticed away from the site; reducing the amount of text on the main page, which users said was overwhelming; and using a larger font size for headings and text to increase legibility. In response to these recommendations, EPCD moved the related links to a less prominent place on the screen and

increased the font size for text located in the center of the screen. The improved EPCD site was launched to the public in mid-March, 2009. Staff prepared a final report for delivery to EPCD; this report was published in our division's *Study Series*.

Staff: Jennifer Romano (x33577), Elizabeth Murphy, Temika Holland

A.7. Spatial Ability Research with Iowa State University

Description: The purpose of this research is to continue the Census Bureau's investigations of the role of spatial ability in mediating the success of field personnel in performing computer-based tasks.

Highlights: During FY2009, Iowa State and co-authors from the Census Bureau received a National Science Foundation grant to pursue the proposed investigations. A summary of the NSF-funded research was prepared for presentation at a joint meeting of federal agencies that fund certain National Science Foundation projects.

Staff: Kathleen Ashenfelter (x34922), Elizabeth Murphy

A.8. Expert Reviews of Public Sites within Census.gov

Description: As part of the effort to update the Census Bureau's Web pages to a consistent, corporate look and feel, the Systems Support Division (SSD) asked our division to conduct numerous reviews of various Web sites within Census.gov. An expert review is typically the first step in user-centered design of an existing or prototypical user interface, and it is often followed by low-fidelity prototype testing and high-fidelity usability studies. During the expert review, staff members look for usability and accessibility issues related to the visual design and navigation of the site. We focus on what we think would cause problems for users based on our understanding of users and usability principles, as well as the *Section 508* federal regulations on accessibility. Documentation of expert reviews typically includes a ranked list of usability and accessibility problems along with recommendations for improvement. We generally meet with the subject-matter team before beginning a review and again to discuss our findings and recommendations. The sections below describe progress made this year on several expert reviews.

A.8.a. Expert Review of Internal Web Site for the Information Technology Security Office (ITSO)

Highlights: During FY2009, we delivered an expert review of the ITSO Web site. Positive findings included the use of an appropriate writing style for reading from the Web and the use of a sans serif font, which supports ease of on-line reading. We made design recommendations to reduce the excessive amount of white space on the main page, which makes the content hard to follow; to use a different color for the blue titles and headings, which could be mistaken for links; and to make some link titles more descriptive. Usability testing is planned for the next fiscal year.

Staff: Elizabeth Murphy (x34858), Jenna Beck

A.8.b. Expert Review of a Concept of Operation for the Census Software Process Improvement (CSPI) Process Asset Library (PAL)

Highlights: During FY2009, the usability lab received a request from the Systems Support Division (SSD) / Software Methodology Staff (SMS) to review their high-level concept for a new Web site, which will contain information about software development as it is practiced by and for the Census Bureau. Staff met with the SMS team to gather further information about the expected users of the site and the kinds of tasks users will perform at the site, and conducted an expert review of the CSPI-PAL concept of operation.

Staff recommended that site content be organized by user role instead of by particular phases of the software development life-cycle. We recommended using color as a redundant code to identify processes; writing content for the Web in short phrases and bulleted points; and making the site compliant with the federal accessibility regulations. For example, graphics should be tagged for logical reading order for low-vision or blind users who rely on screen readers. As well, keyboard alternatives should be provided for all mouse functions, and the content of any animations should be accessible to users with visual impairments. We further recommended iterative usability testing and software accessibility testing as development progresses. We documented all recommendations in a memorandum delivered to the Census Process Improvement Section in the System Support Division (SSD). This project has been completed.

Staff: Elizabeth Murphy (x34858), Jenna Beck, Larry Malakhoff

A.8.c. Expert Review of the Build-a-Table Tool

Highlights: During FY2009, the Governments (GOVS) Division asked the usability lab to conduct an expert review of a new tool, called "Public Employment and Payroll Build-a-Table," which permits users to build customized tables from data on local, state, and federal employee payrolls. We met with GOVS staff, prepared and delivered an expert review of the Build-A-Table Main Web site, and planned to conduct usability testing. This project has been completed.

Staff: Kathleen Ashenfelter (x34922), Jennifer Romano, Elizabeth Murphy

A.8.d. Expert Review of the Annual Retail Trade Survey (ARTS) Data Web Site

Highlights: During FY2009, the Service Sector Statistics Division (SSSD) requested this usability review of their current site prior to redesigning the site. We found that the ARTS site was correctly using blue text and underlining for links as well as bold text for headings. As required by Census Bureau Web design standards, the site provided a link to plug-in software for the Adobe Acrobat Reader. We recommended that the site adopt the new look and feel for the Census Bureau's public Web sites; restructure content to reduce vertical scrolling; and use strict XHTML 1.0 doctype to increase the likelihood of consistency across browsers. We pointed out requirements in IT Standard 15.0.2 that remained unmet by the site. We delivered a report containing our prioritized findings to the SSSD sponsor. This project has been completed.

Staff: Kathleen Ashenfelter (x34922), Jenna Beck, Allison Morgan, Elizabeth Murphy

A.8.e. Expert Review of the Business Expenses Survey (BES) Web Site

Highlights: During FY2009, the usability review of this site was also conducted for the Service Sector Statistics Division prior to site redesign. Positive findings included the use of blue, underlined links; partial use of sans serif font; and the use of bold headings. We recommended that Excel files be labeled as such and that a link be added to an Excel reader; that PDFs be labeled as such and that their size be indicated, as required by IT Standard 15.0.2; that acronyms be spelled out on first use; that outdated information be updated, and that text be written for the Web in short, bulleted phrases (not sentences or paragraphs). We delivered a prioritized set of findings and recommendations to the sponsor. This project has been completed.

Staff: Kathleen Ashenfelter (x34922), Jenna Beck, Elizabeth Murphy

A.8.f. Expert Review of the Integrated Partner Contact Database (IPCD)

Highlights: During FY2009, and at the request of the Field Division's Partnership and Data Services (PDS) Branch, we reviewed the IPCD for usability and accessibility. We found that, in general, the system seemed to be functioning as intended for the tasks provided by the sponsor. We recommended that text-heavy screens be reorganized to make them easier to read online; that all PDFs be labeled with file size, especially if they were extremely long documents; and that accessibility issues be corrected to comply with Federal regulations (*Section 508* of the Rehabilitation Act). We recommended usability testing to evaluate whether IPCD users can accurately and efficiently achieve their goals. Staff delivered a memorandum documenting findings and recommendations. This project has been completed.

Staff: Kathleen Ashenfelter (x34922), Larry Malakhoff

A.8.g. LTSO Expert Review

Highlights: During FY2009, staff worked on and completed an expert review for the LTSO staff. An example of a high priority finding and the recommendation follows: Use of the shopping cart metaphor seems unnatural in the context of the LTSO interface, since the user is not trying to buy anything. Understanding the purpose of the shopping cart requires making an inference that the request is like an item to be purchased. Forcing the user into a "shopping" mind set is not particularly helpful in advancing the process, and does not make the system easier to use than it would be without the shopping cart metaphor. Because LTSO will not be charging divisions for its services (presumably), any fields related to pricing or cost are unnecessary and distracting. Usability lab staff made the following recommendations: that the system allow the user to submit a request and to review all submitted requests without the extra step of going through the shopping-cart ritual; that all references to the cart, including cart name, cart ID, and Service Cart, be removed; that the line for Total Price on the review/summary page be removed; and that all references to cost and pricing be removed.

Staff: Erica Olmsted-Hawala (x34893), Andy Su, Jennifer Chen, Andre Garcia, Elizabeth Murphy

A.8h. Medical Expenditure Panel Survey (MEPS) Expert Review

Highlights: During FY2009, and at the request of staff from the Office of the Associate Director for Economic Programs (ADEP), usability staff reviewed the online MEPS site and prepared a memorandum with our comments and recommendations. The site was developed using Centurion, an in-house software tool for development of online surveys. We found, for example, that the site separated instructions about creating an account from the data-entry fields to which the instructions applied; the site used non-standard colors for both visited and unvisited links; and the site's banner was unnecessarily large while using a small font for the name of the survey. We mocked up sample screens to show the development team how to improve the account-creation screen and how to redesign the banner so that it would occupy less space while doing a better job of conveying information to the user. We submitted our comments and recommendations to the sponsor; and we made plans to review the design guidelines developed by the ADEP sponsor.

Staff: Elizabeth Murphy (x34858), Jennifer Chen, Temika Holland, Andre Garcia

A.9. Web Governance Video/Multimedia Working Group

Description: The purpose of this multi-divisional working group is to develop technical standards and policies for any and all video or multimedia projects to be used/deployed on Census.gov. These technical standards, specifications, and policies will allow for a consistent approach and governance of multimedia use on Census.gov. We will promote the responsible use of video and multimedia across Census.gov to help illustrate what our numbers mean - in effect, bringing our numbers to life for the general population. This will be accomplished by facilitating the use of video and multimedia across Census.gov and by identifying potential uses of video and multimedia via Census programs.

Highlights: During FY2009, staff investigated the accessibility of different flash media players being considered by the group as a web standard. Media player controls, rewind, play/pause, and fast forward were not accessible to keyboard commands. Staff also collaborated on the *Section 508* checklist for multimedia which will be used as a standard for the U.S. Census Bureau.

At the request of the chairperson, staff evaluated different versions of the Camtasia media player for the accessibility of the controls. The Camtasia media player controls were not accessible because they were all labeled with numbers instead of meaningful text (pause, play, mute, rewind, fast forward). Camtasia version 6 had improved accessibility, but persons using a screen-reader were not informed of the status of the pause/play button. Staff collaborated with Cecelia Maroney to develop an alternative to the inaccessible media player. A transcript was provided to furnish screen-reader users the information shown in the video.

Staff: Larry Malakhoff (x33688), Cecelia Maroney (SSD)

A.10. Usability Evaluation and Redesign of the Governments (GOVS) Web Site

Description: The purpose of this project is to assist the Governments (GOVS) Division with its effort to improve the usability of their public Web site. This project follows previous activities with GOVS, including card sorting and an expert review, which identified issues such as difficulties for external users in comprehending Census terminology and difficulties in navigating to target information. The GOVS project is one of several usability evaluation efforts we have conducted while working with the Economic Current Surveys Redesign Team, which is chaired by the Chief of the Sector Services Statistics Division (SSSD).

Highlights: During FY2009, usability testing focused on the Governments Main page and the Governments Employee and Payroll page. Participants were given tasks to attempt using low-fidelity (paper) prototypes of the two pages. They were told to indicate where they would click if they were working with functional software. A first-click analysis was conducted to determine whether the screen design supported participants in choosing a path that would ultimately lead them to the target information. Participants selected a potentially successful path in 67.5% of their attempts to move off the paper prototypes presented to them in a random order. Another finding was that participants' attention was not captured by the design of the top navigation bar. Since this finding cut across all the sites we have evaluated for the Economic Current Web Surveys Redesign Team, we recommended rethinking the design of the top navigation bar, which is a basic element of the design template for all of SSSD's sites. Staff prepared a report documenting our methods, results, and recommendations.

Staff: Jennifer Romano (x33577), Jennifer Chen, Elizabeth Murphy, Jenna Beck

A.11. Usability Evaluation of the Business & Industry Web Site

Description: Our division was asked to provide usability guidance and testing support to the Economic Current Surveys Web Site Redesign Team, chaired by Mark Wallace (Chief, Sector Services Statistics Division). This effort entailed attending regular team meetings and commenting on proposed design elements; providing input to occasional planning meetings with the SSSD Chief; and implementing a wide range of usability evaluation methods, from expert review to high-fidelity prototype testing.

Highlights: During FY2009, the first round of testing involved two low-fidelity prototypes of the Business & Industry Web page, which were tested using a verbal "first-click" method to see whether participants could get started on a potentially successful path to target information at lower levels of the site. We found that the main navigation in both prototypes was too complex for users. The report included recommendations for simplifying the navigation, some of which were implemented in a new, higher-fidelity (physically clickable) prototype that was tested for usability. Results from the first round of testing were published in the division's *Research Report Series.* This second round of testing was conducted with novice and expert internal Census employees. Findings show that a high-priority issue remained with the visibility of the top-navigation bar. Testing identified additional high-priority issues, such as the focus on repetitive content in the center section and the misleading hierarchy of importance implied by heading sizes. Staff prepared a report on this round of testing, including methods and recommendations, for delivery to the team and is working on entering this report into the *Research Report Series.*

Staff: Erica Olmsted-Hawala (x34893), Jenna Beck, Kathleen Ashenfelter, Elizabeth Murphy, Jennifer Chen

A.12. Eye-Tracking Usability Study of the 2007 and 2008 ACS Mail forms

Description: Sponsors from Housing and Household Economic Statistics Division requested this testing to investigate and compare respondent responses to the 2007 versus 2008 ACS Paper forms. Usability staff met with the sponsor, developed two prototypes that could be examined with the usability laboratory's current Tobii eye-tracking equipment, and conducted usability testing.

Highlights: During FY2009, usability staff completed the eye-tracking study and analysis and issued a draft of the report of the results to the sponsor. Results indicated that users employed several different techniques for completing the 2007 form, but completed the 2008 form in a more uniform fashion. This report was published as *Human Computer Interaction Memo #140*.

Staff: Kathleen Ashenfelter (x34922)

A.13. Usability Input to Data Products Planning Working Group (DPPWG)

Description: The usability team provided input from a usability perspective on the filtering issues associated with 5-year ACS data. Specifically, the usability team contributed feedback and input based on the two rounds of ACS Data Reliability Indicator testing that have been completed.

Highlights: During FY2009, usability staff attended weekly meetings of the 5-year filtering subgroup and gave usability input where appropriate. Staff contributed input on usability issues based on the ongoing results of the related ACS Data Reliability Indicator project. This project has been completed.

Staff: Kathleen Ashenfelter (x34922)

A.14. Plain Text Review for the 2010 Census Web Site

Description: At the request of the Systems Support Division (SSD), usability staff reviewed the draft content for the 2010 Census Web site, which had been developed by a contractor. The purpose of the review was to replace difficult terminology with plain text understandable to the general public and to apply principles of writing for the Web to the draft content.

Highlights: During FY2009, staff edited the draft content for accuracy, grammar, readability, and style. Staff developed examples of content written and formatted for online reading, which were intended to provide the development team with models for total revision of the content. Consulting several Census 2010 experts in our division and other divisions, staff researched questions about the content, for example, the issue of bilingual forms. Staff was then able to correct the false impression created by the draft that there will be several bilingual forms. As noted, the only bilingual form in the 2010 Census will be the English-Spanish form, although forms will be available in several other monolingual versions. Staff completed the review and provided a marked-up file to Systems Support Division and the Geography (GEO) Division. GEO forwarded our comments and recommendations to the contractor with instructions to revise the content.

Staff: Elizabeth Murphy (x34858), Yuling Pan, Jennifer Hunter Childs

A.15. Plain Text Review for Electronic (e)-Learning Content

Description: At the request of the Systems Support Division (SSD), usability staff reviewed the draft content for an online tutorial on the American Community Survey (ACS): "ACS e-Tutorial Transcript." Since this content was to be read aloud by an online narrator, the purpose of the review was to identify places in need of smoothing for a better narrative flow and to identify terminology that might be unnecessarily technical or unclear to the person taking the tutorial.

Highlights: During FY2009, staff provided comments and recommendations, for example, on reducing cognitive overload imposed on the person taking the tutorial, on clarifying vague language, and on improving the tutorial's internal consistency. Staff identified jargon terms and offered recommendations for improving the logical flow of the narrative. SSD forwarded the marked-up draft to the ACS program level.

Staff: Elizabeth Murphy (x34858)

A.16. Baseline Usability Testing of the American Community Survey Web site

Description: Our division was asked to provide a baseline measure of the current American Community Survey (ACS) Web site. Within a year, the development team of the ACS Web site plans to make some major re-design changes to the interface of the Web site. In order to evaluate whether the re-designed effort is successful, the Usability Lab proposed a baseline usability study to measure user performance and satisfaction with the current site. Ultimately the results will be used to compare user performance and satisfaction with the same measures taken on the final release of the new American Community Survey Web site.

Highlights: During FY2009, staff ran novice participants through the usability baseline study and found that terminology and labels were confusing for the participants. The main tabs across the top of the Web site convey little about what is found under each section. Staff recommended that the tab labels be more descriptive of the contents in each section of the site as well as make the tab labels distinct enough to allow easy discrimination between sections. Staff prepared to run expert participants through a usability test.

Staff: Erica Olmsted-Hawala (x34893), Andy Su, Elizabeth Murphy

A.17 Usability Testing of the Build-a-Table Tool
Description: The division's role was to conduct usability testing of a revised version of the Build-a-Table user interface developed by the Public Employment and Payroll Branch in the Governments (GOVS) Division. The revisions included implementations of changes recommended in staff's expert review of this site.

Highlights: During FY2009, usability testing was planned and conducted to evaluate the support provided by the user interface for the user's accuracy, efficiency, and satisfaction. Eye tracking was among the observation methods used in this study. Although the user interface appeared to meet or exceed goals set for user efficiency and satisfaction, further analysis indicated that overall user satisfaction had been inflated by the ratings of one participant, who reported the highest possible satisfaction on all items in the satisfaction instrument. The user interface achieved an overall score of 64% for user accuracy, which did not meet the pre-established goal of 75%. Usability issues were identified at all levels of importance (high, medium, and low). Critically, users did not appear to understand instructions and had trouble navigating from one page to the next. Staff prepared a final report documenting findings, recommendations, and team responses (Statistical Research Division, *Study Series (Survey Methodology #2009-06)*).

Staff: Jennifer Romano (x33577), Elizabeth Murphy

B. Questionnaire Pretesting
Description: This project involves coordinating the Census Bureaus 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.

Highlights: During FY2009, staff administered the generic clearance for questionnaire pretesting research, consulting with staff from across the Census Bureau regarding projects that were proposed to be conducted under the clearance. Thirty-five pretesting activities were conducted, involving a total of 1,879 respondent burden hours. Staff also completed and sent to OMB a report summarizing the results of pretesting activities conducted at the Census Bureau during the 2007-2008 reporting year.

Staff: Terry DeMaio (x34894)

C. Questionnaire Design Experimental Research Survey 2006 (QDERS)
Description: 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 a questionnaire design experiment examining different ways to determine a person's place of residency on Census day.

Highlights: During FY2009, staff worked on completing the analyses and revising the paper comparing this RDD study with a site test as well as the full project report.

Staff: Jennifer Hunter Childs (x34927), Beth Nichols, Rolando Rodríguez, Aref Dajani

D. Language: Interdisciplinary Research on Language and Sociolinguistic Issues Relevant to Survey Methodology
Description: 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 English and non-English language data collection instruments.

Highlights: During FY2009, staff worked collaboratively with researchers in academia and survey research organizations on cross-cultural issues in survey interviews and translation methods. Specifically, we studied the following problems: 1) cross-cultural communication norms and survey interviews, 2) the use of interpreters in survey interviews, 3) language and cultural effects on conducting cognitive interviews in non-English languages, 4) survey messages to encourage survey participation from speakers of languages other than English, and 5) creation of best practices for the management of non-English language cognitive testing research.

In collaboration with researchers at the National Cancer Institute, we started a research project comparing English and Chinese cognitive interviews. This research effort aims at identifying methodological issues, including protocol development, probing techniques, and optimal number of interviews for cognitive testing in multiple languages. Staff developed a draft linguistic coding scheme to code key linguistic features associated with the probing questions and responses and started interviewing in English and Chinese.

We also developed a sociolinguistic paradigm to analyze survey translation and to identify solutions to address three main factors affecting the quality of survey translation. They are language issues, cultural norms of communication, and social practices. We helped design cognitive testing of translated survey instruments and survey documents using this paradigm as an analytical framework so as to be more accurate in capturing translation problems and be more efficient in resolving translation issues.

In addition, we analyzed data collected from the Census Barriers, Attitudes, and Motivators Survey to study motivational messages for English and non-English populations. We demonstrated that main barriers to census and survey participation among non-English-speaking populations in the United States are low level of census knowledge and low level of awareness of legal requirements for census. We recommended that more education is needed to enhance the general awareness and knowledge of census among non-English-speaking populations so as to encourage census and survey participation.

We were also actively writing up research results during this quarter. Staff was working on two articles on cross-cultural study of cognitive interviews for the *Journal of Field Methods*, one article on politeness in survey interviews for the *Journal of Asian Pacific Communication*, one article on linguistic politeness for the *Journal of Pragmatics*, and one article on multilingual cognitive testing methodology for the *International Journal of Social Research Methodology*. Staff presented research findings at several conferences.

Staff continued to collaborate with university researchers to work on two book projects on discourse analysis and politeness communication, and to work on editing a special issue for the *Journal of Politeness Research*.

Staff: Yuling Pan (x34950), Patricia Goerman, Jennifer Hunter Childs, Anna Chan, Virginia Wake Yelei, George Higbie, Matthew Clifton

E. Training for Cognitive Interviewing
Description: Our staff will train members of other divisions in the Census Bureau to carry out cognitive interviewing and provide consultation and support for projects.

Highlights: During FY2009, staff held one training session for six new staff members in our division and three staff members from Population Division. Staff participated in a cognitive interviewing project soon after their training to further their on-the-job training.

Staff: Jennifer Hunter Childs (x34927), Yuling Pan, Patricia Goerman, Terry DeMaio

F. Research on Cognitive Testing of Non-English Language Survey Instruments
Description: The staff is currently engaged in a study designed to test and identify best practices for conducting cognitive interviews with Spanish-speaking respondents. We have tested 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 was 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.

Highlights: During FY2009, staff completed research and gained publication acceptance for "Adaptation of Standard Cognitive Interview Techniques for use with Spanish-Speaking Respondents" in *Field Methods Journal.*

Staff: Patricia Goerman (x31819)

G. Interviewer-Respondent Interactions
Description: 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 due to the need for additional follow-up, and can also decrease data quality.

Highlights: For most of FY2009, work on this project was suspended. Work on checking data in the database resumed in August 2009.

Staff: Tommy Wright (x31702), Jennifer Beck, Tom Petkunas

H. Q-Bank: A Database of Pretested Questions
Description: Q-Bank was developed through an interagency committee, led by the National Center for Health Statistics (NCHS), of which the Census Bureau is a member. The objective of Q-Bank is to have an online interagency database of pretested survey questions and research results. The database is maintained at NCHS and is 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 pretesting 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 a necessary step before it becomes available to a broader audience.

Highlights: During FY2009, staff worked with the interagency group to expand the coding system to account for behavior coding reports as well as cognitive interviewing reports. Staff also worked on recommendations to incorporate reports into Q-Bank from testing non-English language questionnaires. In addition, staff worked with the National Center for Health Statistics to promote a Questionnaire Evaluation Workshop in which Q-Bank was highlighted for its usefulness throughout the field of survey methodology.

Staff: Jennifer Hunter Childs (x34927), Jennifer Beck, Dawn Norris, Patricia Goerman

I. Health Insurance Measurement
Description: 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.

Thus far staff has carried out an extensive and continuing literature review, conducted several rounds of cognitive testing, and produced a synthesis of findings from these tests and other qualitative studies carried out by researchers outside the Census Bureau. Staff has also conducted quantitative research, including several split-ballot field tests and a record-check study linking CPS survey data to Medicaid enrollment records. Findings from all these sources strongly suggest that three design features are associated with measurement error: the calendar year reference period, the household-level screener questions, and the general structure of the questionnaire (asking eight questions, one on each specific type of coverage). Guided by these findings, a redesigned set of questions on health insurance was developed and cognitively tested in summer 2008, and pretested in March 2009 in preparation for a full field test in March 2010.

Highlights: During FY2009, a formal pretest report was delivered to Housing and Household Economic Statistics Division. No major flaws were detected in the pretest, and minor modifications to the questionnaire were made in preparation for the March, 2010 field test. Staff pursued data sharing agreements with various agencies who maintain records on health plan enrollment (in both public and private health plans) in order to "seed" the field test RDD sample with records on people whose coverage status is known. The objective is to build in a validation source of coverage to assess relative accuracy in reporting across the three panels. Staff also worked with the Policy Office and other researchers on embedding an experiment for requesting consent to link survey data to these administrative records. Staff developed detailed instrument specifications for the outside contractor to write the CATI questionnaire, and continued to work with internal staff on procedures for sampling, operations, data collection, data output specifications and so on.

Staff: Joanne Pascale (x34920)

J. Emerging Social Trends on Household Structure and Living Situations, Race/Ethnicity, and Linkages to Enumeration Methods and Coverage
Description: In 2006, the National Academies of Science (NAS) Panel on Residence Rules recommended that the Census Bureau establish a trends office with an ongoing research program on social trends, enumeration methods, and coverage. This program would include monitoring emerging social trends and their impact on the accuracy of basic residence information and census coverage. It would also include developing, conducting, and synthesizing new research to suggest changes in enumeration methods and improve census coverage. Specifically recommended ongoing research topics include: "research on changing factors influencing people's attachments to locations where they are counted," "living situations," "large households," "sources of omissions in the census, as well as duplications," and "questionnaire strategies" (NRC 2006: 175-178).

Highlights: During FY2009, staff participated in the May 8 Symposium, "The Federal Statistical System—Recognizing its Contributions; Moving it Forward" at the National Academy of Sciences. Several speakers discussed dramatic changes in family structure that are underway and that need to be tracked accurately in federal statistics. One speaker called on federal agencies to do a better job of continuously monitoring trends in their own data, assessing whether their current data collection methods and questions are measuring those trends accurately or not, and revising the data collection methods, if improvements are needed. Staff discussed these findings and recommendations related to changing family and household structure patterns with Dr. Norwood and Dr. Coontz after the conference. Staff attended similar presentations at the 2009 Joint Statistical Meetings. This project has been on hold due to other project deadlines for sponsors.

Staff: Laurie Schwede (x32611)

K. Using Vignettes to Explore Survey Concepts
Description: Vignettes are a common tool for survey pretesting. Vignettes depict hypothetical situations and allow us to evaluate concepts without actually having to

recruit people in those situations. Vignettes are also useful when evaluating survey topics that may be highly sensitive. This research will identify and explore how teens classify their contacts with online strangers and the degree to which they are aware of the danger in such interactions. The study will be a mixed-design qualitative and quantitative study. Participants will classify vignettes depicting online contacts with strangers and online contacts with non-strangers as either being appropriate and harmless or inappropriate and dangerous. Participants will also answer open-ended questions about why they feel these contacts are or are not dangerous. The results of the vignette classification task and the open-ended questions will help to identify how teens conceptualize their online relationships and reveal potential online vulnerabilities.

Highlights: During FY2009, staff submitted a research proposal that was approved within tour division. We began recruiting participants. We also submitted a paper that is currently under review for our division report series. The paper explores research themes in preliminary vignette data.

Staff: Jennifer Beck (x31736), Terry DeMaio, Dawn Norris

L. Retrieval Effects on Judgments about Knowledge

Description: Surveys are a common way to collect information on a variety of topics. It is easy assume that if people understand the intended meaning of and know the answer to a survey question, they should have relatively little problem providing an accurate answer. However, research on human memory and knowledge assessment casts significant doubt on this assumption. Context, in the form of both situational variables and individual differences, can have a significant effect on how accurately people answer questions.

In an attempt to investigate the effects of these variables on evaluations of knowledge, we have developed a set of experiments that will investigate the effects of retrieval context on how people evaluate their knowledge of general, factual information. This research will be jointly conducted with researchers at SUNY Stony Brook.

Highlights: During FY2009, staff submitted a research proposal that was approved within our division. We submitted and received IRB approval at SUNY Stony Brook.

Staff: Jennifer Beck (x31736)

Research Assistance

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

Staff: Tina Arbogast, Gloria Prout, Lorraine Randall, Kelly Taylor

3. PUBLICATIONS

3.1 JOURNAL ARTICLES, PUBLICATIONS

Alvarez, R. M., Jonas, J., Winkler, W.E., and Wright, R. (2009). "Interstate Voter Registration Database Matching: The Oregon-Washington 2008 Pilot Project." *Electronic Voting Technology*.

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Bennett, I. J., Romano, J. C., Howard, D. V., and Howard, J. H. Jr. (2008). "Two forms of implicit learning in young adults with dyslexia." *Annals of the New York Academy of Sciences*, *1145*, 184-198.

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Moore, J. (2009). "Review of Belli, R., Stafford, F., and Alwin, D. [eds.] (2008), *Calendar and Time Diary Methods in Life Course Research*." *Journal of Official Statistics, 25.2,* 295-298.

Nichols, E. and Childs, J.H. (2009). "Respondent Debriefings Conducted by Experts: A Technique for Questionnaire Evaluation." *Field Methods, 21.2,* 115-132.

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3.2 BOOKS/BOOK CHAPTERS

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3.3 PROCEEDINGS PAPERS

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- Goerman, P., Childs, J., and Clifton, M. (2008). "Explaining Differences in Inter-Coder Reliability Between English and Spanish Language Behavior Coding Research," 4156-4163.
- Nichols, E., Childs, J., and Linse, K. (2008). "RDD versus Site Test: Mode Effects on Gathering a Household Roster and Alternate Addresses," 4274-4281.
- Schwede, L. (2008). "'Carrot' or 'Stick' Approach to Reminder Cards: What Do Cognitive Respondents Think?," 4352-4359.

IEEE International Professional Communication Annual Conference, July 22, Honolulu, Hawaii.
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- Olmsted, E., Romano, J., and Murphy, E. (2009). "The Use of Paper-Prototyping in a Low-Fidelity Usability Study."

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- Blakely, C. (2008). "Besov Spaces and Empirical Mode Decomposition for Seasonal Extraction in Nonstationary Time Series."
- Holan, S., McElroy, T., and Chakraborty, S. (2008). "Bayesian FEXP Models for Long Memory Time Series Analysis," 59-70.
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an Empirical Information Criterion," 1367-1374.

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- Schwede, L. (2008). "Using Multiple Data Sources To Identify Types and Sources of Coverage Errors on an American Indian Reservation," 2485-2492.
- Slud, E. and Thibaudeau, Y. (2008). "BRR versus Inclusion-Probability Formulas for Variances of Nonresponse Adjusted Survey Estimates," 2057-2064.
- Thibaudeau, Y. and Slud, E. (2008). "The Method of Laplace and BRR: A Hybrid Variance Estimation Method in Surveys," 1972-1979.
- Weidman, L. and Malec, D. (2008). "Exploration of the Use of Empirical Bayes Procedures for Estimating Changes in Occupancy Rate and Persons per Household," 1275-1282.
- Zayatz, L. (2008). "New Ways to Provide More and Better Data to the Public While Still Protecting Confidentiality," 17-26.

3.4 STATISTICAL RESEARCH DIVISION RESEARCH REPORTS

<http://www.census.gov/srd/www/byyear.html>

RR (Statistics #2008-08): William E. Winkler, "General Methods and Algorithms for Modeling and Imputing Discrete Data under a Variety of Constraints," October 3, 2008.

RR (Statistics #2008-09): Elizabeth Huang, Donald Malec, and Lynn Weidman, "Research to Model Field of Degree Information for College Graduates, Using the 2003 NSCG File with Linked Census 2000 Long-Form Data," September 30, 2008.

RR (Statistics #2008-10): Jerry J. Maples, "Calculating Coefficient of Variation for the Minimum Change School District Poverty Estimates and the Assessment of the Impact of Nongeocoded Tax Returns," November 4, 2008.

RR (Statistics #2008-11): Thomas M. Trimbur and William R. Bell, "Seasonal Heteroskedasticity in Time Series Data: Modeling, Estimation, and Testing," November 13, 2008.

RR (Statistics #2008-12): Tucker McElroy, "A Modified Model-based Seasonal Adjustment that Reduces Spectral Troughs and Negative Seasonal Correlation," November 21, 2008.

RR (Statistics #2008-13): Jae Kwang Kim, Wayne A. Fuller, and William R. Bell, " Variance Estimation for Nearest Neighbor Imputation for U.S. Census Long Form Data," December 30, 2008.

RR (Statistics #2009-01): Gauri Sankar Datta, Malay Ghosh, Rebecca Steorts, and Jerry J. Maples, "Bayesian Benchmarking with Applications to Small Area Estimation," January 29, 2009.

RR (Statistics #2009-02): Scott Holan and Tucker S. McElroy, "Tail Exponent Estimation via Broadband Log Density-Quantile Regression," February 26, 2009.

RR (Statistics #2009-03): Patrick M. Joyce and Donald Malec, "Population Estimation Using Tract Level Geography and Spatial Information," February 27, 2009.

RR (Statistics #2009-04): David F. Findley, "Stock Series Holiday Regressors Generated By Flow Series Holiday Regressors," April 30, 2009.

RR (Statistics #2009-05): William E. Winkler and María García, **"**Determining a Set of Edits," August 3, 2009.

RR (Statistics #2009-06): Natalya Titova and Brian C. Monsell, "Detecting Stock Calendar Effects in U.S. Census Bureau Inventory Series," September 29, 2009.

RR (Survey Methodology #2009-01): Yuling Pan, M. Mandy Sha, Hyunjoo Park, and Alisu Schoua-Glusberg, "2010 Census Language Program: Pretesting of Census 2010 Questionnaire in Five Languages," February 10, 2009.

RR (Survey Methodology #2009-02): Theresa A. O'Connell, Elizabeth D. Murphy, and Renate J. Roske-Shelton, "2039: A Day in the Life of a Usability Engineer," February 25, 2009.

RR (Survey Methodology #2009-03): Anna Y. Chan, "The 2008 SIPP Event History Calendar (EHC) Field Test: Respondents' Reactions to the Interview," April 20, 2009.

RR (Survey Methodology #2009-04): Nathan Jurgenson and George E. Higbie, "Results of Cognitive Testing of the Alternative Version of the Individual Census Report (ICR) for the 2010 CPEX Experiment," May 14, 2009.

RR (Survey Methodology #2009-05): Jennifer Hunter Childs, Dawn Norris, Theresa J. DeMaio, Leticia Fernández, Matthew Clifton, and Mikelyn Meyers, "2010 Nonresponse Followup Enumerator Questionnaire Cognitive Test Findings and Recommendations," September 29, 2009.

RR (Survey Methodology #2009-06): Jennifer Hunter Childs, Eleanor Gerber, and Dawn Norris, "2008 Be Counted Form: Respondent Problems Encountered in Cognitive Testing," September 30, 2009.

3.5 STATISTICAL RESEARCH DIVISION STUDIES

<http://www.census.gov/srd/www/byyear.html>

SS (Statistics #2008-01): Julie Tsay and Lynn Weidman, "SAS Programs for Fitting a Large Number of Stepwise Regressions, Each with a Large Number of Model Variables, and Identifying Outliers," October 1, 2008.

SS (Statistics #2008-02): Michael Ikeda, "Developing Guidelines Based on CVs for when One-Year Estimates Can Be Used Instead of Three-Year Estimates in the American Community Survey (ACS) for Areas with Populations of 65,000 or More," October 6, 2008.

SS (Statistics #2009-01): Lynn Weidman and Kathleen T. Ashenfelter, "Project Report: Investigation of User Preferences for Measures of Sampling Error to be Displayed on American Community Survey Data Products and Modification of Definitions of these Measures," September 3, 2009.

SS (Survey Methodology #2008-10): Jennifer Romano, Elizabeth Murphy, Erica Olmsted-Hawala, and Jennifer Hunter Childs, "A Usability Evaluation of the Nonresponse Followup Enumerator (NRFU) Questionnaire Form," October 19, 2008.

SS (Survey Methodology #2008-11): Jennifer Romano and Elizabeth Murphy, "A Usability Evaluation of the Economic Census Web Site," October 19, 2008.

SS (Survey Methodology #2008-12): Theresa DeMaio, Jennifer Beck, and Laurel Schwede, "Report on Cognitive Pretesting of the Census 2010 Mailing Package Materials," October 19, 2008.

SS (Survey Methodology #2008-13): Michelle Rusch, Benjamin Smith, Erica Olmsted-Hawala, Elizabeth Murphy, and Lawrence Malakhoff, "A Usability and Accessibility Evaluation of the Census-in-the-Schools Web Site," October 20, 2008.

SS (Survey Methodology #2008-14): Lawrence Malakhoff, Lisa Lawler, and Cecelia Maroney, "An Accessibility and Usability Review of the Census-in-the-Schools Application," October 20, 2008.

SS (Survey Methodology #2008-15): Jenna Beck and Elizabeth Murphy, "A Usability Evaluation of the Monthly and Annual Wholesale Trade Survey Web Site," October 20, 2008.

SS (Survey Methodology #2008-16): Debra R. Miller, "Summary of Observers' Reports from the Re-Engineered Survey of Income and Program Participation Event History Calendar Field Test," November 21, 2008.

SS (Survey Methodology #2009-01): Kathleen T. Ashenfelter, Jenna Beck, and Elizabeth D. Murphy, "Final Report for First-Round Usability Testing of Data-Reliability Indicator Prototypes," February 18, 2009.

SS (Survey Methodology #2009-02): Joanne Pascale, "Event History Calendar Field Test Field Representative Focus Group Report," February 24, 2009.

SS (Survey Methodology #2009-03): Kathleen T. Ashenfelter, Jennifer C. Romano, and Elizabeth D. Murphy, "First-Round Usability Testing of the Redesigned Census Information Centers (CIC) Web Site," February 24, 2009.

SS (Survey Methodology #2009-04): Lawrence Malakhoff, "An Accessibility and Usability Evaluation of the MAF/TIGER Partnership Software Viewer Application," February 27, 2009.

SS (Survey Methodology #2009-05): Jennifer Romano, Erica L. Olmsted-Hawala, and Elizabeth D. Murphy, "A Usability Evaluation of Iteration 1 of the New American FactFinder Web Site: Conceptual Design," April 29, 2009.

SS (Survey Methodology #2009-06): Jennifer Romano and Elizabeth D. Murphy, "A Usability Evaluation of the Build-a-Table Web Site," April 29, 2009.

SS (Survey Methodology #2009-07): Lawrence A. Malakhoff, "An Accessibility and Usability Review of the Articulate and Captivate E-Learning Software Packages," May 13, 2009.

SS (Survey Methodology #2009-08): Jennifer Hunter Childs, Dawn Norris, and Matthew Clifton, "ACS Food Stamps Instruction Revision: Cognitive Test," May 13, 2009.

SS (Survey Methodology #2009-09): Yuling Pan, "A Process for Reviewing Translations of Data Collection Instruments and Related Materials," June 8, 2009.

SS (Survey Methodology #2009-10): Lawrence A. Malakhoff, "An Accessibility and Usability Review of the NotifyMe Web Application," June 8, 2009.

SS (Survey Methodology #2009-11): Jennifer Romano, Temika Holland, and Elizabeth D. Murphy, "A Usability Evaluation of the Economic Census Web Site: Round 2," June 18, 2009.

SS (Survey Methodology #2009-12): Jennifer Hunter and Ashley Landreth, "Person-Based Data Collection in Practice: An Evaluation of Interviewer/Respondent Interactions," July 10, 2009.

SS (Survey Methodology #2009-13): Theresa DeMaio and Jennifer Beck, "The National Immunization Survey Evaluation Study Special Sworn Status Procedures: Focus Group Results," August 4, 2009.

SS (Survey Methodology #2009-14): Elizabeth Nichols, Nathan Jurgenson, and Dawn Norris, "Report on Cognitive Pretesting of the 2010 Census Program for Evaluations and Experiments Panels Mailing Package: Deadline Messages," September 30, 2009.

SS (Survey Methodology #2009-15): Erica Olmsted-Hawala, Jenna Beck, Elizabeth Murphy, and Kathleen Ashenfelter. "A Usability Evaluation of the Business and Industry Web Site," September 30, 2009.

3.6 OTHER REPORTS

Ashenfelter, K., Beck, J., and Murphy, E. (December 2008). "Final Report for First-Round Usability Testing of Data-Reliability Indicator Prototypes." (*Human-Computer Interaction Memorandum #131*).

Ashenfelter, K., Romano, J., and Murphy, E. (January 2009). “First-Round Usability Testing of the Redesigned Census Information Centers (CIC) Web Site.” (*Human-Computer Interaction Memorandum #130*).

Beaghen, M. and Weidman, L. (October 2008). “Statistical Issues of Interpretation of the American Community Survey’s One-, Three-, and Five-Year Period Estimates,” American Community Survey Research Memorandum Series. Available online at <http://www.census.gov/acs/www/UseData/mye/myechoosing.html>.

Beck, J., Murphy, E., Olmsted-Hawala, E., Ashenfelter, K., and Chen, J. (May 2009). “A Usability Evaluation of the Business & Industry Web Site.” *Human-Computer Interaction Memorandum Series Number 136.*

Massell, P., Ramanayake, K., and Zayatz, L. (2009). “Examination of the Post-Swapping Hundred Percent Detail (HDF) Files associated with a Dress Rehearsal Region for the 2010 Decennial Census.” Confidential document sent to Decennial Management Division.

Pascale, J. (April 2009). “Survey Measurement of Health Insurance Coverage: Pretest Final Report.” Unpublished Census Bureau report submitted to the Housing and Household Economic Statistics Branch.

Pascale, J. (February 2009). “Survey Measurement of Health Insurance Coverage: Cognitive Testing Results of Experimental Questions on Integrated Current and Calendar Year Coverage.” Unpublished Census Bureau report submitted to the Housing and Household Economic Statistics Branch.

Romano, J. C. and Murphy, E. D. (March 2009). “A Usability Evaluation of the Build-a-Table Web Site.” (*Human-Computer Interaction Memorandum #134*).

Romano, J. C., Olmsted-Hawala, E. L., and Murphy, E. D. (February 2009). “A Usability Evaluation of Iteration 1 of the New American FactFinder Web Site: Conceptual Design.” (*Human-Computer Interaction Memorandum #133*).

4. TALKS AND PRESENTATIONS

INFORMS Annual Meeting in Washington, DC, October 12-15, 2008.

- Paul B. Massell, "Comparing Statistical and Mathematical Approaches to the Problem of Tabular Data Protection."

Annual Meeting of the Southern Demographic Association, Greenville, SC, October 30- November 1, 2008.

- Linda A. Jacobsen, Nancy Bates, and Mary H. Mulry, "Using the ACS to Enhance Population Segmentation for the Census 2010 Integrated Communications Program."

European Social Survey Quality Enhancement Meeting on Qualitative and Quantitative Pretesting, Mannheim, Germany, November 3-4, 2008.

- Terry DeMaio, "Overview of Qualitative Methods."

Third Institute of Employment Research Workshop on Disclosure and Confidentiality, Nuremberg, Germany, November 21, 2008.

- William E. Winkler, "General Discrete-data Modeling Methods for Producing Synthetic Data with Reduced Re-identification Risk that Preserve Analytic Properties."

Midwest Association for Public Opinion Research Annual Conference, Chicago, IL, November 21-22, 2008.

- Hyunjoo Park, Mandy Sha, and Yuling Pan, "Cognitive Testing as a Method of Pre-Testing Questionnaires in High and Low Context Cultures: A Comparison of Korean and English Cognitive Interview Data."

Sixth International Workshop on Comparative Survey Design and Implementation, Ann Arbor, Michigan, March 5-7, 2009.

- Patricia Goerman and Matthew Clifton, "The Use of Vignettes in Cross-Cultural Cognitive Testing of Survey Instruments."

19th Annual Rotman Research Institute Conference: *Cognitive Aging*: *Research and Practice*, Toronto, Canada, March 8-10, 2009.

- Jennifer C. Romano, Erica L. Olmsted-Hawala, and Elizabeth D. Murphy, "Investigating Age-Related Differences in Useful Field of View on Web Sites."

Society for Applied Anthropology Annual Meetings in Santa Fe, New Mexico, March 17-21, 2009.

- Laurie Schwede, "What Can We Learn from Within Site Pretesting of the Census 2010 Enumerator Questionnaire on the Navajo Reservation?"

2009 Federal Computer-assisted Survey Interview Conference (FEDCASIC), Bureau of Labor Statistics, Washington, D.C., March 18, 2009.

- Kathleen Ashenfelter and Lynn Weidman, "Gauging User Preference for the Display of Sampling Error in the American Community Survey: Methodology and Findings from a Web-based User Survey."

Mathematical Sciences Department Seminar, University of Alaska, Anchorage, AK, March 26, 2009.

- Tommy Wright, "Concepts in Probability Sampling, Research Topics at the U.S. Census Bureau, and Opportunities at the U.S. Census Bureau."

Department of Mathematics Colloquium, University of Hawai´i at Manoa, Honolulu, Hawai´i, April 1, 2009.

- Tommy Wright, "Lagrange's Identity and Applications to Probability Sampling."

The 50th Anniversary Celebration of FSU's Statistics Department, Tallahassee, Florida, April 17-18, 2009.

- Brian C. Monsell, "A Painless Introduction to Seasonal Adjustment."

Department of Sociology and Anthropology, Texas Tech University, Lubbock, Texas, April 20, 2009.

- Leticia Fernández, "Cognitive pre-testing of U.S. Census Hispanic origin and race questions."

Tobii EyeTrack User Experience (UX) Conference 2009, Frankfurt, Germany, April 21-22, 2009.

- Kathleen T. Ashenfelter. "The use of color-coding in data tables: Considerations for the placement of coded columns and coding legends."

Seasonal Adjustment Introductory Course, Eurostat, Luxemburg, April 27-30, 2009.

- Brian C. Monsell, "Seasonal Adjustment With X-12-ARIMA."

64th Annual Meeting of the American Association for Public Opinion Research (AAPOR), Hollywood, Florida, May 14-18, 2009.

- Kathleen T. Ashenfelter, Jennifer Tancreto, and Michael Springer, "Improving the Usability of American Community Survey Data Tables: Results from Testing a Prototypical Data Reliability Indicator."
- Anna Y Chan and Yuling Pan, "The Use of Cognitive Interviewing Data to Explore the Effectiveness of Advance Materials Among Five Different Language Groups."
- Jennifer Hunter Childs, Jennifer Romano, Erica Olmsted-Hawala, and Elizabeth Murphy, "Concurrent Cognitive and Usability Testing: Taking Full Advantage of Pretesting Methodologies."
- Leticia Fernández, Patricia L. Goerman, Matt Clifton, and Mikelyn Meyers, "Overlap and Gaps between Experts and Respondents: What we learn from both and from each about race/ethnicity questions."
- Patricia L. Goerman and Matt Clifton, "Vignettes in Cross-Cultural Cognitive Testing: Adaptation for Spanish-Speaking Respondents of Lower Educational Levels."
- Jeff Moore, "A Comparison of Survey Reports Obtained via Standard Questionnaire and Event History Calendar."
- Mary H. Mulry and Timothy P. Olson, "Lessons for Partnerships from the Census Barriers, Attitudes, and Motivators Survey (CBAMS)."
- Yuling Pan and Ashley Landreth, "Conveying Translated Informed Consent Concepts: Effects of Language and Culture on Interpretation of Legally Required Messages."
- Hyunjoo Park, Mandy Sha, and Yuling Pan, "Cognitive testing as a method of pre-testing questionnaires in high and low context cultures: a comparison of Korean and English cognitive interview data."
- Joanne Pascale, "An Examination of Landmarks in an Event History Calendar."
- Jennifer C. Romano, "Benefits of Using Eye Tracking in Usability Testing."
- Laurie Schwede and Anissa Sorokin, "To Link or Not to Link? Exploring Approaches to Maintaining ACS Response Rates During Census 2010."
- Mandy Sha and Yuling Pan, "The Use of Vignettes in Questionnaire Evaluation: An Application from the 2010 Census Form and its Translation in Chinese, Korean, Vietnamese, and Russian."
- Hyunjoo Park and Virginia Wake Yelei, "Asians—Are they the same? Findings from cognitive interviews with Chinese, Korean, and Vietnamese Americans."

Questionnaire Evaluation Standards Workshop, Bergen, Norway, May 17-20, 2009.

- Jennifer Hunter Childs, Jennifer Romano, Erica Olmsted-Hawala, Elizabeth Murphy, "Concurrent Cognitive and Usability Testing: Taking Full Advantage of Pretesting Methodologies."
- Joanne Pascale, "Health Insurance Measurement: A Synthesis of Cognitive Testing Results."

International Field Directors & Technologies Conference, Delray Beach, Florida, May 17-20, 2009.

- Larry Malakhoff, "Guidelines for Writing Effective E-Learning Content."
- Erica Saleska, Alisú Schoua-Glusberg, Herman Alvarado, Marjorie Hinsdale-Shouse, Yuling Pan, Hyunjoo Park, Virginia Wake Yelei, and Michelle Yuan. "Recruiting Respondents with Limited or No English Competency – Lessons Learned from American Community Survey (ACS) Cognitive Interviews."
- Michelle Yuan, Virginia Wake Yelei, Hyunjoo Park, and Lan Nguyen, "Conducting Cognitive Interviews with Linguistically Isolated Asian Populations."

BLS Seasonal Adjustment Group Meeting, Washington Statistical Society, Bureau of Labor Statistics Conference Center, May 27, 2009.

- Brian C. Monsell, "Version 0.3 of X-12-ARIMA and Beyond."
- William E. Winkler, "General Methods and Algorithms for Modeling and Imputing Discrete Data under a

Variety of Constraints."

Celebrating 75 Years of Statistics at Iowa State University, Ames, Iowa, June 3-5, 2009.
- Tucker McElroy, "Distribution Theory for the Studentized Mean for Long, Short, Negative, and Differential Memory Time Series."

Usability Professional's Association Conference, Portland, Oregon, June 8-12, 2009.
- Jennifer C. Romano, Erica L. Olmsted-Hawala, and Elizabeth D. Murphy, "Investigating Age-Related Differences in Web Site Usability Testing Performance by Using Eye Tracking."

2009 Conference of the International Society for Language Studies, Orlando, Florida, June 11-13, 2009.
- Virginia Wake Yelei, "When a guiding principle becomes an institutionalized power."

2009 International Total Survey Error Workshop (ITSEW), Tallberg, Sweden, June 14 – 17, 2009.
- Mary H. Mulry, "A Study of Sources for the Error Structure in Estimates of Census Coverage Error Components."

CORS/INFORMS 2009 Operations Research Conference, Toronto, Canada. June 14-17, 2009.
- Laura Zayatz, "Expressing Confidentiality Problems with Statistical Data as Optimization Problems."
- Paul B. Massell, "Expressing Confidentiality Problems with Statistical Data as Optimization Problems."

6th International Symposium on Face and Politeness, Griffith University, Brisbane, Australia. July 10, 2009.
- Yuling Pan, "Facework in Refusals in Chinese Survey Interviews."

11th International Pragmatics Conference, Melbourne, Australia. July 12-17, 2009.
- Yuling Pan, "What Are Chinese Respondents Responding to? Discourse Analysis of Question-answer Sequence in Survey Interviews."
- Anna Chan and Yuling Pan, "Analysis of Chinese Speakers' Responses to Survey Interview Questions in Comparison to Other Language Speakers."

2009 IEEE International Professional Communication Annual Conference, Honolulu, Hawaii, July 19-22, 2009.
- Erica Olmsted-Hawala, Jennifer Romano, and Elizabeth Murphy, "The Use of Paper-Prototyping in a Low-Fidelity Usability Study."

Joint Statistical Meetings, *American Statistical Association*, Washington, DC, August 1-6, 2009.
- Christopher Blakely and Tucker McElroy, "An Empirical Evaluation of Signal Extraction Goodness-of-Fit Diagnostic Tests."
- Jennifer Hunter Childs, Nathan Jurgenson, and Dawn Norris, "Pretesting with Populations Experiencing Transience: Testing to Ensure Questionnaires Are Broadly Accessible."
- Gauri Datta, Malay Ghosh, Rebecca Steorts, and Jerry Maples, "Bayesian Benchmarking with Applications to Small Area Estimation."
- David Findley, "Stock Series Holiday Regressors Generated by Flow Series Regressors."
- Scott Holan and Tucker McElroy, "A Bayesian Approach to Seasonal Long Memory."
- Elizabeth Huang and William Bell, "A Simulation Study of the Distribution of Fay's Successive Difference Replication Variance Estimator."
- Michael Ikeda, "Developing Guidelines Based on CVS for When One-Year Estimates Can Be Used Instead of Three-Year Estimates in the American Community Survey."
- Peter Kenny and Tucker McElroy, "Seasonality and Trends in the Temperature Anomaly Data from Goddard Institute for Space Studies."
- Martin Klein, "Statistical Inferences from Formaldehyde DNA-Protein Cross-Link Data."
- Jason Lucero, "The Current State of the Microdata Analysis System at the Census Bureau."
- Jerry Maples, William R. Bell, and Elizabeth Huang, "Small-Area Variance Modeling with Application to County Poverty Estimates from the American Community Survey."
- Paul Massell, "An Overview of Uncertainty Creation to Protect Statistical Data."

- Kathleen McDonald-Johnson, David Findley, and Erica Cepietz, "Investigating Quarterly Trading Day Effects."
- Tucker McElroy and Scott Holan, "The Detection of Cycles in Raw and Seasonally Adjusted Data."
- Brian Monsell, "Update on the Development of X-13A-S."
- Mary Mulry and Broderick E. Oliver, "A Simulation Study of Treatments of Influential Values in a Monthly Retail Trade Survey."
- Mary Mulry and Tamara Adams, "Overview of Evaluations of the 2010 Census Coverage Measurement Program."
- Christopher Roberts, Scott Holan, and Brian Monsell, "Comparison of X-12-ARIMA Trading Day and Holiday Regressors with Country-Specific Regressors."
- Laurie Schwede, Anissa Sorokin, and Virginia Wake Yelei, " 'You Really Have to Puzzle This Out': Checking Residence and Coverage Duplications on a Census 2010 Questionnaire."
- Eric Slud and Yves Thibaudeau, "Simultaneous Calibration and Nonresponse Adjustment."
- Natalya Titova and Brian Monsell, "Detecting Stock Calendar Effects in U.S. Census Bureau Inventory Series."
- Lynn Weidman (Panelist), "Efforts to Assist Users with American Community Survey Data." Topic Contributed Session.
- Lynn Weidman (Panelist) and Kathleen T. Ashenfelter, "Results of a Survey on Choice of Sampling Error Display in American Community Survey Data Products." Topic Contributed Session.
- William Winkler, "General Discrete-data Modeling Methods for Producing Synthetic Data with Reduced Re-identification Risk that Preserve Analytical Properties."
- Laura Zayatz (Discussant), "O' Privacy, Where Art Thou? Mapping the Landscape of Data Confidentiality." Invited Session.

International Statistical Institute, Durban, South Africa, August 14-15, 2009.
- Brian C. Monsell and Craig McClaren (ONS, UK), "Seasonal Adjustment for Official Statistics." (Short Course)

Computational Statistics Seminar, George Mason University, September 4, 2009
- William E. Winkler, "General Discrete-data Modeling Methods for Producing Synthetic Data with Valid Analytic Properties and Extremely Reduced Re-identification Risk"

Conference of the Washington-Baltimore Chapter of the American Association for Public Opinion Research (DC-AAPOR), Washington, DC, September 10, 2009.
- Larry Malakhoff (Invited speaker), "How Can Respondents With Visual Deficits Complete My Web Survey?"

Economic Area Methods Seminar, U.S. Census Bureau, Suitland, MD, September 16, 2009.
- Mary H. Mulry, "Outliers and Influential Values in Economic Surveys."

Advertising Week, Multicultural Advertising Council, New York, NY, September 21-25, 2009.
- Nancy Bates, Mary Mulry, Joe Panzarella, Vita Harris, Darlene Billia, Tanya White, and Linda Jacobsen, "Segmenting the Population for the 2010 Census."

September 2009 Meeting of the Potomac Chapter of the Human Factors and Ergonomics Society, Washington, D.C., September 22, 2009.
- Ashenfelter, Kathleen T. "User-Focused Data Collection Issues at the U.S. Census Bureau: Designing Usable Surveys for The Twenty-First Century."

Workshop for Transportation Forecasters, Department of Transportation, September 22-23, 2009.
- Brian C. Monsell, "Seasonality in Data and How to Adjust."

5. STATISTICAL RESEARCH DIVISION SEMINAR SERIES

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

Mike A. Yao, "Linear Least Squares and High Performance Computing," October 22, 2008.

Stephen C. Lubkemann, George Washington University, "The Weakness of Strong Ties: Kinship Networks in Migration and Social Theory–A Critique," October 27, 2008.

Jeffrey Moore, SRD, and Jason Fields, HHES, U.S. Census Bureau, "The SIPP Event History Calendar Field Test: Analysis Plans and Preliminary Report," October 28, 2008.

William E. Winkler, SRD, U.S. Census Bureau, "Building Effective, Exceptionally Fast Fellegi-Holt Edit/Imputation Systems that are Both Much Easier to Implement and that Produce Data that are Far Superior to Well-implemented Hot-deck-based Edit/Imputation," October 29, 2008.

Tucker McElroy, SRD, U.S. Census Bureau, "Incompatibility of Trends in Multi-Year Estimates from the American Community Survey," November 18, 2008.

Scott Holan, University of Missouri, "A Bayesian Approach to Estimating the Long Memory Parameter," November 19, 2008.

Gauri S. Datta, University of Georgia, "Estimation of Small Area Means under Measurement Error Models," November 20, 2008.

Ryan Janicki, University of Maryland, College Park, "Parametric Estimation Using Fisher-Type Estimating Functions," December 2, 2008.

Martin Klein, University of Maryland, Baltimore County, "A Statistical Perspective of DNA-Protein Cross-Links (DPX) Data," December 4, 2008.

Christopher Blakely, SRD, U.S. Census Bureau, "Using Nested Sampling for the Bayesian Analysis of Parameter Selection and Order Uncertainty in ARIMA Models," December 17, 2008.

Richard Griffin, DSSD, U.S. Census Bureau, "Relaxing the Autonomous Independence Assumption for Census Coverage Measurement Dual System Estimates," December 17, 2008.

William E. Winkler, SRD, U.S. Census Bureau, "General Discrete-Data Modeling Methods for Producing Synthetic Data with Valid Analytic Properties and Extremely Reduced Re-Identification Risk," January 6, 2009.

Mohammed Jirari, "Computer Aided System for Detecting Masses in Mammograms," January 7, 2009.

Joe Sedransk, Case Western Reserve University, "Assessing the Value of Bayesian Methods for Inference about Finite Population Quantities," January 22, 2009.

Matthew Jans (U.S. Census Bureau Dissertation Fellow), University of Michigan, "Can Speech Disfluency and Voice Pitch Predict Item Non-Response and Accuracy to Income Questions?" January 27, 2009.

George Wilson, MITRE Corporation, "An Overview of Human Language Technologies," January 27, 2009.

Ben Klemens, Consultant, "New Models for Old Techniques," January 29, 2009.

Christina Dye, Georgetown University, "The Emergence of Language in the Mind: Evidence from Children's Acquisition of Auxiliaries," February 12, 2009.

Kevin Tolliver, Auburn University, "Bounded Risk Problems in the Gamma Distribution," February 25, 2009.

Nathan N. Dong, The University of Texas at Arlington, "Logistic Regression with Misclassification Error Using Auxiliary Data," March 2, 2009.

Howard Weinert, Johns Hopkins University, "A Fast Compact Algorithm for Cubic Spline Smoothing," March 25, 2009.

Kevin Singley, IBM T.J. Watson Research Center, "Promoting Learning and Transfer Through Model Tracking," April 6, 2009.

Chaitra Nagaraja, London School of Economics, "Housing Markets, Models, and Indices," April 15, 2009.

Aleks Aris, Northwestern University, "Visualizing & Exploring Networks Using Semantic Substrates," April 29, 2009.

Rodney Terry, SRD, U.S. Census Bureau, "Race Self Complexity Within Multiracial College Students: Negotiating the Suppression of Multiracial Integration," May 5, 2009.

Scott Holan, University of Missouri, "Bayesian Multiscale Multiple Imputations to Data Confidentiality," May 20, 2009.

Stephanie Eckman, University of Maryland, (U.S. Census Bureau Dissertation Fellow), "Coverage Rates and Coverage Error in Household Unit Listing," June 9, 2009.

Elijah Anderson, Yale University, *SUMMER AT CENSUS*, "The Cosmopolitan Canopy: Race Relations in Everyday Life," June 16, 2009.

Art Sakamoto, Jr., University of Texas, Austin, *SUMMER AT CENSUS*, "Sociological Aspects of Racial and Ethnic Identification among Asian Americans," June 16, 2009.

Elijah Anderson, Yale University; Eva Marie Garroutte, Boston College; Art Sakamoto, Jr., University of Texas, Austin; Matthew Snipp, Stanford University; *SUMMER AT CENSUS*, "Measuring Race & Ethnicity Discussion Panel - 1," June 17, 2009.

Eva Maria Garroutte, Boston College, *SUMMER AT CENSUS*, "Who Is an American Indian? Competing Identity Definitions and Challenges to Population Enumeration," June 18, 2009.

Matthew Snipp, Stanford University, *SUMMER AT CENSUS*, "Defining Race and Ethnicity in America: American Indians and Others," June 18, 2009.

Gabrielle Tayac, National Museum of the American Indian, *SUMMER AT CENSUS*, "Native Lives On The Edge: Identity, Diversity, and Complexity," June 18, 2009.

Trivellore Raghunathan, University of Michigan, *SUMMER AT CENSUS*, "Diagnostic Tools for Assessing Validity of Synthetic Data Inferences," June 24, 2009.

Thomas Mathew, University of Maryland, Baltimore County, "Parametric Statistical Tolerance Regions: An Introduction," July 6, 2009.

Matthew Frye Jacobson, Yale University, *SUMMER AT CENSUS*, "Race, Citizenship, and U.S. Political Culture, 1790-2009," July 7, 2009.

Kerry Ann Rockquemore, University of Illinois at Chicago, *SUMMER AT CENSUS*, "Life on the Color Line: Exploring the Struggle to Conceptualize and Measure Racial Identity in the Mixed-Race Population," July 7, 2009.

Eduardo Bonilla-Silva, Duke University, *SUMMER AT CENSUS*, "We Are All Americans: The Future of Racial Stratification in Obamamerica," July 8, 2009.

Eduardo Bonilla-Silva, Duke University; Matthew Frye Jacobson, Yale University; Kerry Ann Rockquemore, University of Illinois at Chicago; *SUMMER AT CENSUS*, "Measuring Race & Ethnicity Discussion Panel - 2," July 9, 2009.

Donald K. Martin, North Carolina State University, *SUMMER AT CENSUS*, "Modeling Time-Varying Trading Day Effects in Monthly Time Series," July 23, 2009.

Sharon L. Lohr, Arizona State University, *SUMMER AT CENSUS*, "Small Area Estimation When the Auxillary Information Has Error," July 28, 2009.

Ralf Münnich, University of Trier, Germany, "Design and Estimation in the Register-Based German Census 2011," July 30, 2009.

Keri Stephens, University of Texas, Austin, *SUMMER AT CENSUS*, "Conceptualizing Individuals as Part of Organizations: Opportunities and Challenges to Reach Difficult Populations," August 6, 2009.

Chandra Erdman, Yale University, "Bayesian Change Point Analysis and Application," August 10, 2009.

Thomas Lumley, University of Washington, *SUMMER AT CENSUS*, "Survey Analysis in R," August 10, 2009.

Jennifer Leeman, George Mason University, *SUMMER AT CENSUS*, "Changing Views Towards Language and the History of the Language Questions," August 11, 2009.

Thomas Lumley, University of Washington, *SUMMER AT CENSUS*, "Design-based vs. Model-based Inference: Robustness of Efficiency," August 11, 2009.

Jennifer Leeman, George Mason University, *SUMMER AT CENSUS*, "Sociolinguistic Perspectives on Language and Identity: The Role of Spanish in the U.S.," August 13, 2009.

Balgobin Nandram, Worcester Polytechnic Institute, *SUMMER AT CENSUS*, "Bayesian Analyses of BMI Data from Small Domain Under Non-ignorable Non-response and Selection," August 18, 2009.

Teresa Schellhamer, DID, U.S. Census Bureau, "Using Partial Residual Plots in Modeling Covariates for Net Coverage Estimation," August 26, 2009.

Ben Klemens, SRD, U.S. Census Bureau, "On the Design of a New Platform for Scientific Computing," September 10, 2009.

Colleen Choi, DID, U.S. Census Bureau, "The Ecology of Service Coordination for Children with Special Health Care Needs," September 17, 2009.

6. PERSONNEL ITEMS

6.1 HONORS/AWARDS/SPECIAL RECOGNITION

Bronze Medal Award, U.S. Bureau of the Census

- ***Lawrence A. Malakhoff—***Lawrence uses electronic technologies and his own expertise in federal regulations to evaluate user-interface software for its ability to provide accessible information to persons with disabilities. He is recognized as the Census Bureau's expert in accessibility. His recommendations have led to innumerable improvements in software accessibility for internal and external users who aspire to live productive lives with disabilities.

- ***Jeffrey C. Moore (Team Award)*** —The Integration Committee of Reengineering SIPP provided leadership for over 50 staff in multiple divisions and directorates to work together in an extremely uncertain budgetary and programmatic period to produce an implementation plan, develop an innovative new electronic survey instrument (the Event History Calendar), and create a new processing system that will enable the SIPP to provide more timely and relevant data in an efficient manner.

Director's Award for Innovation

- ***Lynn Weidman***—For work as part of the MYART/VisART Team, which consisted of staff from five divisions (Housing and Household Economic Statistics Division, Decennial Statistical Studies Division, the American Community Survey Office, Statistical Research Division, and Data Integration Division) who worked under a tight deadline to produce a highly innovative data review tool that enabled the Census Bureau to release the first three-year-period estimates from the American Community Survey (ACS) in a timely, accurate, and efficient manner.

Evaluations Award for Excellence (Council of Inspectors General on Integrity and Efficiency)

- ***Jennifer Hunter Childs***—For work completed during a 4-month detail at the Office of the Inspector General (U.S. Department of Commerce) which reviewed the science used by NOAA to set catch limits for the heavily fished New England commercial fisheries that highlighted the importance of good working relationships between Federal agencies and the industries they regulate.

6.2 SIGNIFICANT SERVICE TO PROFESSION

Kathleen Ashenfelter
- Co-Chair, Eastern Michigan University National Capital Area Alumni Chapter Scholarship Fund
- Member, Eastern Michigan University National Capital Area Alumni Chapter Board
- Reviewed abstracts for the American Association for Public Opinion Research Conference
- Chair, Session, American Association for Public Opinion Research 2009 Conference.
- Capital Area Social Psychological Association Representative, AAAS Science and Human Rights Coalition.

Jen Beck
- Refereed papers for the *Journal of Official Statistics.*
- Reviewed abstracts for the American Association for Public Opinion Research Conference.

Pat Cantwell
- Associate Editor, *Journal of Official Statistics.*
- Associate Editor, *Survey Methodology.*

Anna Chan
- Refereed a paper for *Public Opinion Quarterly*.

Jennifer Hunter Childs
- Reviewer, National Cancer Institute/National Institutes of Health Institutional Review Board.
- Refereed a paper for the *Journal of Official Statistics*.

Terry DeMaio
- Member, Editorial Board, *Public Opinion Quarterly*.
- Refereed a paper for *Public Opinion Quarterly*.
- Reviewed abstracts for the American Association for Public Opinion Research Conference.

Leticia Fernández
- Refereed papers for the *Journal for the Scientific Study of Religion* and *Open Demography*.

María García
- Member, Organizing Committee, UN/ECE Work Session on Statistical Data Editing.
- Session Organizer and Discussant, "Editing and Imputation of Administrative and Census Data," 2009 UN/ECE Work Session on Statistical Data Editing.

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

Jason Lucero
- Member, Confidentiality and Data Access Committee.

Don Malec
- Secretary, Section on Bayesian Statistical Science, of the American Statistical Association.
- Reviewed a manuscript for the *Journal of the American Statistical Association.*
- Reviewed a proposal for the Center for Economic Studies.

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

Tucker McElroy
- Publications Officer, Business and Economics Statistics Section, American Statistical Association.
- Organizer, Short Course, Business and Economics Statistics Section, American Statistical Association.
- Organizer, Topic-contributed Sessions, 2009 Joint Statistical Meetings.
- Refereed papers for *Nonlinear Dynamics and Econometrics*, *Journal of Statistical Research*, *Computational Statistics and Data Analysis*, *Journal of Multivariate Analysis*, *Econometric Theory*, *Journal of Statistical Planning and Inference*, *Empirical Economics*, *Econometrics Journal*, *Statistical Science*, *Journal of Nonparametric Statistics*, *Econometric Theory Notes, and Applied Stochastic Models in Business and Industry*.

Brian Monsell
- Webmaster, Business and Economics Statistics Section, American Statistical Association.
- Organizer, Invited Paper Sessions, 2009 Joint Statistical Meetings.
- Organizer, Topic-contributed Poster Sessions, 2009 Joint Statistical Meetings.

Jeff Moore
- Consultant, Proposed Survey, NYC Public Housing Authority.
- Refereed papers for *Public Opinion Quarterly* and the *Journal of Official Statistics.*

Mary H. Mulry
- Chair and Past-Chair, Survey Research Methods Section, American Statistical Association.
- Associate Editor, *The American Statistician*.
- Associate Editor, *Journal of Official Statistics.*

Tapan Nayak
- Member, Committee on Privacy and Confidentiality, American Statistical Association.
- Member, Editorial Board, *Communication and Statistics*.

Yuling Pan
- Member, Advisory Board, *Journal of Politeness Research.*
- Member, Coordinating Committee of Chinese Discourse Research Group.
- Member, Multilingual Interest Group, American Association for Public Opinion Research.
- Member, Editorial Board, *Journal of Chinese Language and Discourse.*
- Organizer, Invited Paper Session, the 6th International Symposium on Face and Politeness, 2009.
- Organizer, Topic-contributed Session, the 11th International Pragmatics Conference, 2009.
- Refereed papers for *Journal of Language and Gender* and the *Journal of Official Statistics.*
- Refereed book chapter manuscripts for Cambridge University Press.

Joanne Pascale
- Refereed papers for *Inquiry*, *Field Methods Journal*, and *Public Opinion Quarterly*.

Asoka Ramanayake
- Member, Confidentiality and Data Access Committee.
- Member, NAS CTPP project panel for Producing Transportation Data Products from the American Community Survey that Comply with Disclosure Rules.
- Refereed papers for *The American Statistician* and the *Journal of Statistical Computation and Simulation.*

Jennifer Romano
- Refereed papers for the *Journal of American Geriatrics Society.*
- Reviewed abstracts for the Human Factors and Ergonomics Society's 53rd Annual Meeting.
- Reviewed abstracts for the Usability Professional Association 2010 International Conference.

Natalya Titova
- Instructor, "Signing Mathematical and Statistical Concepts Workshop," Birnbaum Interpreting Services.

Virginia Wake Yelei
- Refereed a paper for the *Journal of Asian Pacific Communication.*

Lynn Weidman
- Refereed a paper for the *Journal of Official Statistics*.

Bill Winkler
- Associate Editor, *Journal of Privacy Technology.*
- Associate Editor, *Journal of Privacy and Confidentiality.*
- Associate Editor, *Transactions on Data Privacy.*
- Member, Committee on Voter Registration Databases, National Academies of Science.
- Member, Expert Review Panel for a Possible Public-use File Related to Airline Safety Being Proposed by the National Aeronautics and Space Administration, National Academies of Sciences.
- Member, Program Committee for the Quality in Databases (QDB'09) Workshop at the 2009 Very Large Database Conference in Lyon, France.
- Member, Program Committee for Statistical Data Protection 2010 in Corfu, Greece.
- Reviewed a book proposal for J. Wiley.
- Refereed papers for *The Proceedings of the National Academies of Science, Journal of Official Statistics,*

Software: Practice and Experience, *Communications in Statistics: Simulation and Computation*, *Transactions on Data Privacy*, *Quality in Databases '09*, *Privacy in Statistical Databases 2009*, and *IEEE Transactions on Knowledge and Data Engineering*.

Tommy Wright
- Chair, Morris Hansen Lecture Committee, Washington Statistical Society.
- 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 International Statistical Institute (ISI) Session Program Committee, International Association of Survey Statisticians. (Also organized and chaired an ISI Invited Paper Meeting).
- Reviewer, research proposal for the National Science Foundation.

Laura Zayatz
- Advisor, Disclosure Review Board, Social Security Administration.
- Member, Confidentiality and Data Access Committee.
- Member, NAS CTPP project panel for Producing Transportation Data Products from the American Community Survey that Comply with Disclosure Rules.
- Member, Advisory Board, *Journal of Privacy Technology.*
- Member, Committee on Privacy and Confidentiality, American Statistical Association.
- Member, UK Census Design and Methodology Advisory Committee.
- Member, Advisory Board, *Journal of Empirical Research on Human Research Ethics*.
- Organizer, Disclosure Avoidance Session, International Statistical Institute 2009.
- Refereed a paper for *Public Opinion Quarterly*.
- Refereed a report on Proposed Disclosure Avoidance Techniques to be used by the Office of National Statistics, United Kingdom, for Census 2011.

6.3 PERSONNEL NOTES

Rodney Terry joined the Language and Measurement Research Group as a Postdoctoral Researcher.

Eliot Lee (senior with double major in sociology and English language and literature at The University of Maryland) joined our division as an intern.

Temika Holland (senior with double major in psychology and criminology/criminal justice at The University of Maryland) joined our division as an intern. Following her graduation, she accepted a position in our Human Resources and Usability Research Group.

Alexander Mont (senior in computer science and mathematics at The University of Maryland) joined our division as an intern.

Edward Park (senior with economics major at The University of Maryland) joined our division as an intern.

Ekaterina Sotiris (Ph.D. student in statistics at the University of Maryland) joined the Time Series Research Group as an intern.

Pat Cantwell accepted a position in the Decennial Statistical Studies Division.

Jennifer Chen (graduate student in human factors/applied cognition at George Mason University) joined our Human Factors & Usability Research Group as an intern.

Joe Sedransk joined our Small Area Estimation Research Group.

Aaron Gilary transferred from the Service Sector Statistics Division to our Small Area Estimation Research Group.

Vanessa Patterson (graduate student in mathematics and statistics at Georgetown University) joined our Disclosure Avoidance Research Group as an intern.

Andre Garcia (Ph.D. student in human factors and applied cognitive psychology at George Mason University) joined our Human Factors and Usability Research Group as an intern.

Shira Appelbaum (graduate student in mathematics and statistics at Georgetown University) joined our Disclosure Avoidance Research Group as an intern.

Andy Su (graduate student in human-computer interaction at Rice University) joined our Human Factors and Usability Research Group as an intern.

David Findley retired from the U.S. Census Bureau and joined our Time Series Research Group under a contract.

Ben Klemens joined our Missing Data Methods Research Group.

Ryan Janicki joined our Small Area Estimation Research Group.

Jennifer Romano successfully defended her dissertation and joined our Human Factors and Usability Research Group as a Postdoctoral Researcher.

Martin Klein joined our Missing Data Methods Research Group.

Patrick Joyce joined our Sampling and Estimation Research Group.

Steve Lubkemann (Anthropology and International Affairs Faculty, The George Washington University) accepted a Schedule A Appointment in our Language and Measurement Research Group.

Chaitra Nagaraja joined our Sampling and Estimation Research Group.

Betty Murphy retired from the Census Bureau after 10 years of federal service.

Partha Lahiri (Professor of Statistics at the University of Maryland, College Park) joined the Census Bureau as an ASA/NSF/Census Research Fellow.

Greg Bulmash (senior in marketing and international business at the University of Maryland, College Park) joined our division as an intern to assist with contracting.

APPENDIX A **Statistical Research Division's FY 2009 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		
5210901	Forms Development		
5210902	Content Planning and Development		
	1. *Census Questionnaire Design Features (Other Than Race & Ethnicity)*	Jenny Childs	Sharon Boyer
	2. *Deadline Messaging Cognitive Testing for the 2010 CPEX Panels*	Beth Nichols	Michael Bentley
	3. *Development of Race and Ethnicity Questions*	Leticia Fernandez	Nicholas Jones
5210903	4. *Language Planning and Development*	Patti Goerman	Sharon Boyer
5310901	Data Collection Planning and Development		
	5. *2010 Census Internet Form Accessibility Evaluation*	Larry Malakhoff	Kathleen Styles
	6. *Quality Information for Successful Printing II (QUISP2) Application*	Larry Malakhoff	Teresa Caldaro
5610902	Statistical Design and Estimation		
	7. *Decennial Record Linkage*	William Winkler	Maureen Lynch
	8. *Decennial Disclosure Avoidance*	Laura Zayatz	Marie Pees
	9. *Census Unduplication Research*	Michael Ikeda	Maureen Lynch
5610903	Coverage Measurement Planning and Development		
	10. *Coverage Measurement Research*	Don Malec	Tom Mule
	11. *Accuracy of Coverage Measurement*	Mary Mulry	Pat Cantwell
	12. *Questionnaire Wording and Automation Team*	Beth Nichols	Magda Ramos
5610905	Coverage Improvement Planning and Development/		
5610906	Evaluation Planning Coordination		
	13. *Development of Questionnaires for Decennial Coverage Improvement*	Jenny Childs	Elizabeth Poehler
	14. *2010 CPEX Experimental Overcount Booklet*	Laurie Schwede	Sarah Heimel
	15. *Evaluations, Experiments, and Assessments Operational Integration Team (EEA OIT)*	Laurie Schwede	Karen Medina
	16. *Observation and Respondent Debriefing of CCM Personal Interviews*	Beth Nichols	Magda Ramos
	17. *Investigation of Study Methods for the Census Coverage Measurement (CCM) on Group Quarters (GQ) Population*	Anna Chan	David Whitford
	18. *2010 Census Behavior Coding Evaluation*	Jenny Childs	Nancy Bates
	19. *Comparative Ethnographic Studies of Enumeration Methods and Coverage in Race/Ethnic Groups (CPEX Evaluation B-9)*	Laurie Schwede	Karen Medina
5385960	American Community Survey (ACS)		
	20. *ACS Missing Data and Imputation*	María García	David Raglin
	21. *ACS Group Quarters Item Imputation and Micro Data Disclosure Avoidance Research*	Laura Zayatz/Rolando Rodriguez	Mark Asiala
	22. *ACS Applications for Time Series Methods*	Tucker McElroy	Alfredo Navarro
	23. *ACS Variances*	Eric Slud	Alfredo Navarro
	24. *ACS Data Products - Display of Variability Measures*	Lynn Weidman	Susan Schechter Bortner
	25. *ACS Multiyear Estimates: User Guidelines for Choosing Between 1-, 3-, and 5-year Estimates*	Lynn Weidman	Alfredo Navarro
	26. *ACS 3-year Estimates: Methods for Analyst Review*	Lynn Weidman	Grace Clemons
	27. *ACS: 2005 and 2006 Item Nonresponse Rates*	Pam Ferrari	Anthony Tersine

Project #	Project/Subproject Sponsor(s)	SRD Contact	Sponsor Contact
5385995	American Community Survey (ACS) / Methods Panel		
	28. ACS Language Research	Yuling Pan	Todd Hughes
	29. ACS Data Reliability Indicator Project	Kathleen Ashenfelter	Tony Tersine
	30. ACS Messaging Project	Laurie Schwede	Debra Klein
	31. ACS Internet Testing –Usability Input	Kathleen Ashenfelter	Susan M. Ciochetto
	32. ACS Internet Testing –Cognitive Input	Jenny Childs	Susan M. Ciochetto
	33. ACS Internet Test Experimental Design Team	Kathleen Ashenfelter	Mary Frances Zelenak
	34. ACS Food Stamps Pretest	Jenny Childs	Todd Hughes
	DEMOGRAPHIC		
1443000	*35. Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC) Tables*	Aref Dajani	Karen Humes
0906/7374	*36. Data Integration*	Ned Porter	Marie Pees
7317000/ 0906/7374	Quick Turnaround Pretesting of Household Surveys (National Crime Victimization Survey-Identity Theft Supplement and Internet Predation Questions)		
	37. American Housing Survey	Terry DeMaio	LaTerri Bynum
	38. National Immunization Survey Project	Terry DeMaio	Andrea Piani
1465666	Re-Engineered Survey of Income and Program Participation (RE-SIPP) Research		
	39. RE-SIPP Methodological Research	Jeff Moore	David S. Johnson
7165000	*40. Research for Small Area Income and Poverty Estimates (SAIPE)*	Elizabeth Huang	Lucinda P. Dalzell
TBA	*41. Small Area Health Insurance Estimates (SAHIE)*	Don Malec	Donald Luery
	ECONOMIC		
2370954	*42. Editing Methods Development (Investigation of Selective Editing Procedures for Foreign Trade Programs)*	María García	Ryan Fescina
2470951	*43. Disclosure Avoidance Methods*	Laura Zayatz	Rita Petroni
2370952	Time Series Research		
	44. Seasonal Adjustment Support	Brian Monsell	Kathleen McDonald-Johnson
	45. Seasonal Adjustment Software Development and Evaluation	Brian Monsell	Kathleen McDonald-Johnson
	46. Research on Seasonal Time Series - Modeling and Adjustment Issues	Tucker McElroy	Kathleen McDonald-Johnson
	47. Supporting Documentation and Software for X-12-ARIMA and X-13A-S	Brian Monsell	Kathleen McDonald-Johnson
7497000	*48. Survey of Research and Development in Industry, Imputation and Sampling Research and Software Design*	Yves Thibaudeau	Jeri Mulrow
	STRATEGIC PLANNING AND INNOVATION		
0359999	*49. Remote Access – Microdata Analysis System*	Laura Zayatz	Nancy Gordon
	STATISTICAL RESEARCH DIVISION		
Other	*50. Current Population Survey (CPS) Health Insurance Measurement Research*	Joanne Pascale	Chuck Nelson
	51. Accessibility Support for Web Pages, Data Tables, Flash Players, and Camtasia	Larry Malakhoff	Lisa Wolfisch
	52. Census In Schools Lessons and Training Materials	Larry Malakhoff	Joanne Dickinson

APPENDIX B

FY 2009 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 eleventh year to provide *seven measures of performance*, this time for the fiscal year 2009. For FY 2009, the *measures of performance* for our division are:

- *Measure 1. Overall, Work Met Expectations:* Percent of FY 2009 Program Sponsored Projects/Subprojects where sponsors reported that work met their expectations.
- *Measure 2. Established Major Deadlines Met:* Percent of FY 2009 Program Sponsored Projects/Subprojects where sponsors reported that all established major deadlines were met.
- *Measure 3a. At Least One Improved Method, Developed Technique, Solution, or New Insight:* Percent of FY 2009 Program Sponsored Projects/Subprojects reporting at least one improved method, developed technique, solution, or new insight.
- *Measure 3b. Plans for Implementation*: Of the FY 2009 Program Sponsored Projects/Subprojects reporting at least one improved method, developed technique, solution, or new insight, the percent with plans for implementation.
- *Measure 4. Predict Cost Efficiencies:* Number of FY 2009 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 2009.
- *Measure 6. Proceedings Publications:* Number of proceedings publications documenting research that appeared in FY 2009.

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 October 12 thru October 30, 2009 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 2009 ***(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 / Developed Techniques / Solutions / New Insights

2. Listed below are at most 2 of the top improved methods, developed techniques, solutions, or new insights offered or applied on this project or subproject in FY 2009 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 2009 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 2009 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

Statistical Research Division

Assistant Division Chief for
Computing & Technology
Robert Creecy
- Chad Russell
- Matthew Gore (HRD)
- VACANT

Machine Learning & Computational Statistics Research
Bill Winkler
- William Yancey
- VACANT

Computing Applications
Aref Dajani
- Thomas Mathew (UMBC)
- Tom Petkunas
- Ned Porter
- VACANT

Missing Data Methods Research
Yves Thibaudeau
- Chandra Erdman
- Maria Garcia
- Martin Klein
- Ben Klemens
- Rolando Rodriguez
- Jun Shao (U. of WI)
- VACANT

Assistant Division Chief for
Mathematical Statistics
VACANT
- Gloria Prout

Sampling Research
Lynn Weidman
- Mike Ikeda
- Patrick Joyce
- Mary Mulry
- Chaitra Nagaraja
- Eric Slud (U. of MD)
- Julie Tsay
- VACANT

Small Area Estimation Research
Don Malec
- Aaron Gilary
- Elizabeth Huang
- Ryan Janicki
- Partha Lahiri (F)
- Jerry Maples
- Joe Sedransk

Disclosure Avoidance Research
Laura Zayatz
- Marlow Lemons (S)
- Jason Lucero
- Paul Massell
- Tapan Nayak (GWU)
- Asoka Ramanayake
- Lisa Singh (Georgetown U)
- Bimal Sinha (UMBC)

Time Series Research
Brian Monsell
- Chris Blakely (Postdoc)
- David Findley
- Tucker McElroy
- Ekaterina Sotiris (S)
- Natalya Titova
- VACANT
- VACANT

Assistant Division Chief for
Survey Methodology
VACANT
- Tina Arbogast

Questionnaire Design & Measurement Research
Jeff Moore
- Anna Chan
- Joanne Pascale

Language & Measurement Research
Yuling Pan
- Jenny Hunter Childs
- Matt Clifton
- Patti Goerman
- George Higbie
- Nathan Jurgenson (S)
- Jon Krosnick (Stanford U)
- Stephen Lubkemann (GWU)
- Laurie Schwede
- Anissa Sorokin (S)
- Rodney Terry (Postdoc)
- Virginia Wake (Postdoc)
- VACANT

Questionnaire Pretesting for Household Surveys
Terry DeMaio
- Jen Beck
- Lorraine Randall
- VACANT

Human Factors & Usability Research
VACANT
- Kathleen Ashenfelter
- Jennifer Chen (S)
- Temika Holland
- Matt Jans
- Larry Malakhoff
- Beth Nichols
- Erica Olmsted-Hawala
- Victor Quach (S)
- Jennifer Romano (Postdoc)
- VACANT

Tommy Wright, Chief
- Kelly Taylor
- Ann Dimler
- Michael Hawkins
- Stephanie Sheffield
- Greg Bulmash (S)

(F) ASA/NSF/Census Research Fellow
(S) Student

December 2009