ices-iii

hyatt regency montréal

June 18–21, 2007

Program and **Abstract Book**

Contents

General Conference Information

Registration

Sunday, June 17	4:00 p.m.–8:00 p.m.
Monday, June 18	7:30 a.m.–5:30 p.m.
Tuesday, June 19	7:30 a.m.–5:30 p.m.
Wednesday, June 20	7:30 a.m.–5:30 p.m.
Thursday, June 21	7:30 a.m.–5:30 p.m.

Meal Functions

Monday, June 18

10:00 a.m.	Short course refreshment break (coffee and tea)
12:00 p.m.	Lunch on your own
3:00 p.m.	Short course refreshment break (sodas and water)
5:30 p.m.	Reception with cash bar

Tuesday, June 19

7:30 a.m.	Refreshment break (coffee and tea)
10:10 a.m.	Refreshment break (coffee and tea)
12:15 p.m.	Lunch
3:25 p.m.	Refreshment break (sodas and water)

Wednesday, June 20

7:30 a.m.	Refreshment break (coffee and tea)
10:10 a.m.	Refreshment break (coffee and tea)
12:15 p.m.	Lunch
3:25 p.m.	Refreshment break (sodas and water)

Thursday, June 21

7:30 a.m.	Refreshment break (coffee and tea)
10:10 a.m.	Refreshment break (coffee and tea)
12:15 p.m.	Lunch on your own
3:25 p.m.	Refreshment break (sodas and water)
5:30 p.m.	Cash bar before dinner
6:30 p.m.	Closing Dinner and End Panel

Registration

All attending the conference, including program participants, must register and wear preprinted name badges to all program activities and dining functions. Guests attending the Monday reception or Thursday dinner are required to register and wear badges.

The registration fee includes conference materials and meals listed below under "Sponsored Meal Functions." Following the conference, all participants will receive a CD-ROM of all presented papers.

Meeting Rooms

All sessions and activities will be held at the Hyatt Regency Montréal. See floor plans in this program book for their locations. All meeting rooms will be equipped with a laptop computer, data projector, and screen.

Audiovisual Assistance

All presentations have been loaded ahead of time on laptop computers installed in the meeting rooms. For questions and assistance, please go to the Local Assistance Desk in the registration area.

Speaker Ready Room

The Speaker Ready Room will be open Monday through Thursday from 7:30 a.m.–4:00 p.m. A data projector and screen are available to speakers who wish to view their visual aids prior to presentation.

Open Conference Room

A conference room, with seating capacity of 20, is available during the day from Monday to Thursday for general attendee use. Check with the registration desk staff for availability and location.

Meal Functions

Conference registration fees include the list of meal functions provided in the gray box to the left. Badges are required for these functions. Check with the registration desk for availability of extra meal tickets for guests.

Short Course Program

Four short courses will be held Monday, June 18. There is a $125 charge for each half-day short course and a $200 charge for each full-day course. Check with the registration desk staff for space availability. See the conference agenda for details.

Messages

Messages for conference attendees may be left in their guest room.

Local Assistance Information

Local information, restaurant guides, maps, etc., are available in the registration area at the Local Assistance Desk.

The Local Assistance Desk also has the Montréal Museum Pass on sale, which will give you access to 30 museums and public transportation (metro and buses) for three consecutive days. It includes major attractions, such as the Montréal Biodôme, the Botanical Gardens, and the Insectarium. The museum pass is independent of the public transportation card, leaving you the option of activating them at different dates. The cost is $45 (Canadian) with public transportation or $35 (Canadian) without public transportation.

Montréal also is hosting 2007 L'International des Feux Loto-Québec, a well-established and renowned international fireworks competition. Spain will compete Wednesday, June 20, at 10:00 p.m. at La Ronde on Ste-Helen's Island. Tickets range from $29.10 to $55.40 (Canadian). More information is available at *www.internationaldesfeuxloto-quebec.com.*

Tours

Information about the availability of tour tickets may be obtained at the registration desk. Tickets will be sold until 5:30 p.m. on the day prior to the tour (no exceptions). The ASA reserves the right to cancel any tour if the minimum number of participants is not met. These tours will leave from the Hyatt Regency Montréal from Jeanne Mance Street, and participants are asked to join the local arranger there 15 minutes before the departure time indicated for each tour. For the Tuesday dinner cruise, you are asked to meet the local arranger in the Hyatt Regency Montréal lobby at 5:45 p.m. (45 minutes prior to departure).

Monday, June 18

Old Montréal and Notre-Dame Basilica Guided Walking Tour
9:30 a.m.–12:00 p.m.
Adult or Child: $20

Downtown Montréal and Its Underground Guided Walking Tour
9:30 a.m.–12:00 p.m.
Adult or Child: $18

Beer-Tasting in the Richelieu Valley (must be 18 to participate)
12:30 p.m.–4:30 p.m.
Adult: $40

Tuesday, June 19

Dinner Cruise on the St. Lawrence River
6:30 p.m.–10:30 p.m.
Adult or Child: $90
Note: This tour leaves the Hyatt Regency Montréal at 5:45 p.m.

HOURS
Local Assistance Desk Hours:

Sunday, June 17	4:00 p.m.–8:00 p.m.
Monday, June 18	7:30 a.m.–5:30 p.m.
Tuesday, June 19	7:30 a.m.–5:30 p.m.
Wednesday, June 20	7:30 a.m.–5:30 p.m.
Thursday, June 21	7:30 a.m.–5:30 p.m.

Wednesday, June 20

Old Montréal and Notre-Dame Basilica Guided Walking Tour
2:00 p.m.–4:30 p.m.
Adult or Child: $20

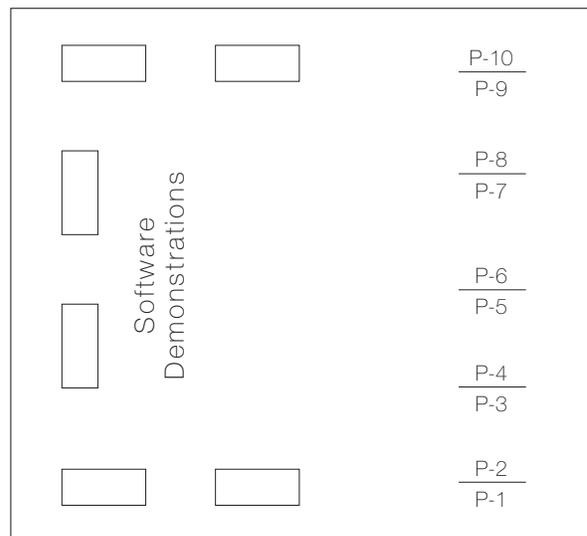**Downtown Montréal and Its Underground Guided Walking Tour**
2:00 p.m.–4:30 p.m.
Adult or Child: $18

Software Demonstrations

Software demonstrations will be held Tuesday and Wednesday from 8:00 a.m.–12:30 p.m. and 1:30 p.m.–6:00 p.m. in Grand Salon A. See the conference agenda for details.

Software Demonstrations and Poster Session Floor Plan

`room` **Grand Salon A**

Keynote Address

Monday, June 18, 2007
6:30 p.m.–7:00 p.m.
Business Surveys: Past, Present, and Challenges for the Future

Robert W. Edwards
Director, Statistics Department, International Monetary Fund

As director of the Statistics Department at the International Monetary Fund, Edwards plays a key role in fostering the highest quality standards for consistency, coverage, and transparency in economic and financial statistics. Working with countries around the world, he promotes the implementation of best practices in statistics in order to enhance the quality of national statistical systems and the data they provide to users.

Edwards leads the Statistics Department's mission to provide outstanding statistical services within the IMF and to serve the needs of the international statistical community at the national and international levels.

Prior to joining the IMF in 2004, Edwards was deputy Australian statistician, economic statistics, at the Australian Bureau of Statistics. His focus throughout his career has been on statistical and user services, corporate services, population and social statistics, and economic statistics.

ICES-III conferees will learn insights from Edward's global experience and understanding of the requirements of both producers and users of official statistics.

Closing Session and Dinner

Thursday, June 21, 2007, 6:00 p.m.–10:00 p.m.
The Future of Using Administrative Data Sources for Statistical Purpose

Moderator: *Fritz Scheuren,* vice president, NORC at the University of Chicago

Panelists: *Heli Jeskanen-Sundström,* director general, Statistics Finland; *Stephen Penneck,* executive director for surveys and administrative sources, Office for National Statistics, UK; *Don Royce,* director general, Methodology Branch, Statistics Canada

Background: Statistical offices are under budgetary pressure to do more with fewer resources. As technology for handling large volumes of data becomes more efficient, information from administrative sources is increasingly being considered to improve efficiency of survey designs—and even to replace direct data collection. Statistics based on administrative sources are relatively inexpensive, and they impose no additional burden on providers. However, several issues need to be considered and may cause frustration: conceptual differences, timeliness, and nonsampling errors.

Content: Panelists will debate future strategies for ensuring that statistics on businesses and establishments are fit for their purposes, as greater use is being made of data from administrative sources.

• How should a policy jointly emphasize quality, burden, and cost?
• How are the users affected, and how do they react?
• How could administrative sources be used to improve surveys?
• What are the challenges faced in integrating data from different sources?
• How can quality be assessed and influenced?
• Are current methods adequate, or do we need a new theory?

Bios of Panelists
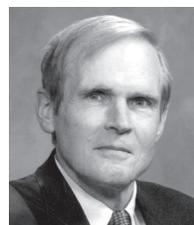
Fritz J. Scheuren
Vice President, NORC at the University of Chicago

Scheuren works on mainly sampling issues in applied settings. In recent years, these applications have largely involved human rights matters, both overseas and in the United States. Among other practitioner honors, he has received the Harry Roberts Statistical Advocate Award (from the American Statistical Association's Chicago Chapter) and the Shiskin Award for Contributions to Economic Statistics (from the National Association of Business Economists and the Washington Statistical Society).

Heli Jeskanen-Sundström
Director General, Statistics Finland

Jeskanen-Sundström joined Statistics Finland in 1968 and has since worked in a variety of statistical areas, including national accounts, business statistics, and coordination of official statistics in Finland. She served as director of business statistics from 1992–1996. Prior to her appointment as director general, she served as deputy director general and a permanent adviser of the Board of Statistics Finland from 1996–2001. Currently, she is a member of the National Information Society Council and deputy member of the Senate of the University of Helsinki.

Jeskanen-Sundström also has participated actively in international statistical cooperation and acted as speaker or chair at several international meetings and conferences. She was president of the International Association for Official Statistics from 2003–2005, having served as president-elect from 2001–2003 and vice president from 1997–1999. She is a member of the Bureau of the Conference of European Statisticians (UNECE/CES) and a vice chair of the Governing Board of the UNESCO Institute of Statistics. She served as vice chair of the UN Statistical Commission in 2006.

Jeskanen-Sundström holds a master's degree in economics from the Helsinki University, Finland.

Stephen Penneck
Executive Director for Surveys and Administrative Sources, Office for National Statistics, UK

Penneck joined the Office for National Statistics (ONS) in 1997 and has worked in his current job since September 2005. He has much experience as a government statistician, primarily in economic statistics. Prior to his current job, he was head of the Statistical Outputs Group at ONS. Penneck currently has responsibility for all aspects of ONS surveys and administrative sources, including the continuous household surveys, business surveys (e.g., Annual Business Inquiry, Prodcom, and the consumer and producer price indices), and financial surveys. He also has responsibility for the Statistical Modernization Program.

Penneck also has provided policy advice to former National (UK) Statistician Len Cook, taken responsibility for liaison with ministers and international relations, and taken forward the development of national statistics. He completed a five-month secondment to the Australian Bureau of Statistics in early 2002.

Earlier jobs include heading the national accounts division in the ONS, with responsibility for producing regular estimates of major time series—including GDP—and acting as chief adviser on statistics at the DTI. Stephen also has worked on statistical research at the Office of Fair Trading.

Penneck studied for his BSc (Soc Sc) in economics and statistics at Southampton University and holds an M SocSc in econometrics from Birmingham University. He is a fellow of the Royal Statistical Society, a chartered statistician, a member of the International Statistical Institute, and an author to articles in *Economic Trends and Statistical News.*

Don Royce
Director General, Methodology Branch, Statistics Canada

Don Royce earned his bachelor's and master's degrees in mathematics (statistics) from the University of Waterloo, Ontario, Canada, in 1973 and 1974, respectively. Since that time, he has worked as a mathematical statistician in the Methodology Branch of Statistics Canada. He spent the first nine years of his career working on a variety of special surveys, conducted primarily for external clients. This was followed by 11 years of working on the Census of Population, where he led the Research and Testing Project for the 1991 Census and was subsequently responsible for the measurement of data quality for that census. In 1994, he moved to Business Survey Methods Division, where he was involved in a variety of business surveys, including a comprehensive redesign of Statistics Canada's program of annual business surveys. He became director of that division in 1999, and, in 2004, was named director general of the Methodology Branch. In his current position, he is responsible for all statistical methods used in Statistics Canada's programs and for the program of small-area and administrative data based on tax returns. He is a member of the American Statistical Association's Census Bureau Advisory Committee, an elected member of the ISI, and an author to articles published in *Survey Methodology* and the *Journal of Official Statistics.*

Hotel Floor Plan

NIVEAU 4 *LEVEL*

BUREAUX/*OFFICES*

FOYER

C

B

A

A

GRAND SALON
(A, B, C)

B

C

FOYER

ALFRED-ROULEAU
(A, B, C)

NIVEAU 5 *LEVEL*

ANJOU

PICARDIE

LORRAINE

A

B

TOURAINE

B

A

VAUDREUIL

B

A

AUTEUIL

ARGENTEUIL

HOSPITALITÉ

FOYER

L'EXÉCUTIF

NIVEAU 6 *LEVEL*

JEANNE-MANCE

RESTAURANT
CAFÉ FLEURI

CENTRE D'AFFAIRES
BUSINESS CENTER

SALON DES ARTS

ÉTÉ DES INDIENS

BAR

MONT-ROYAL

RÉCEPTION/*FRONT OFFICE*

TABAGIE
GIFT SHOP

CONCIERGE
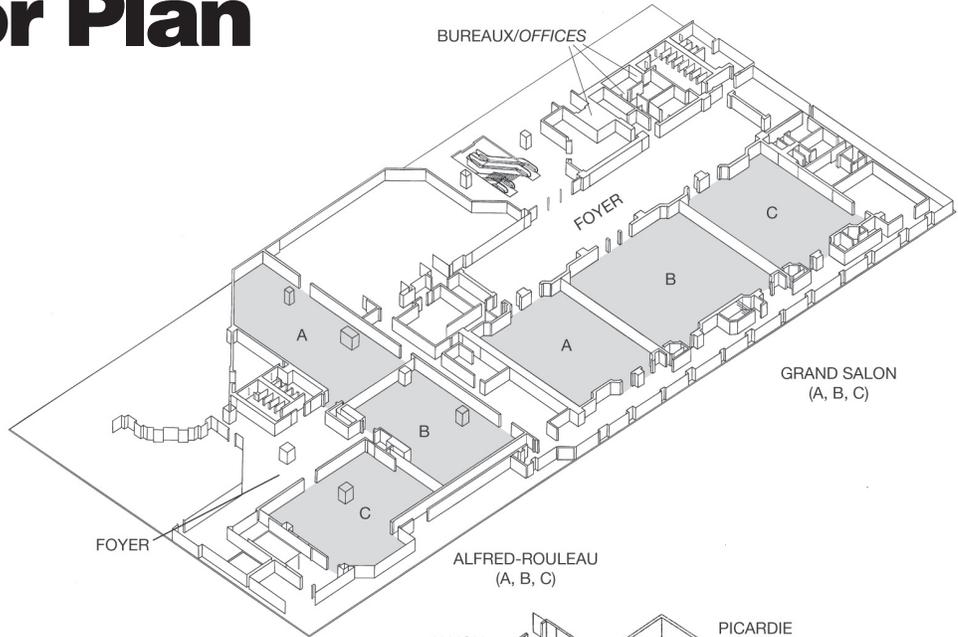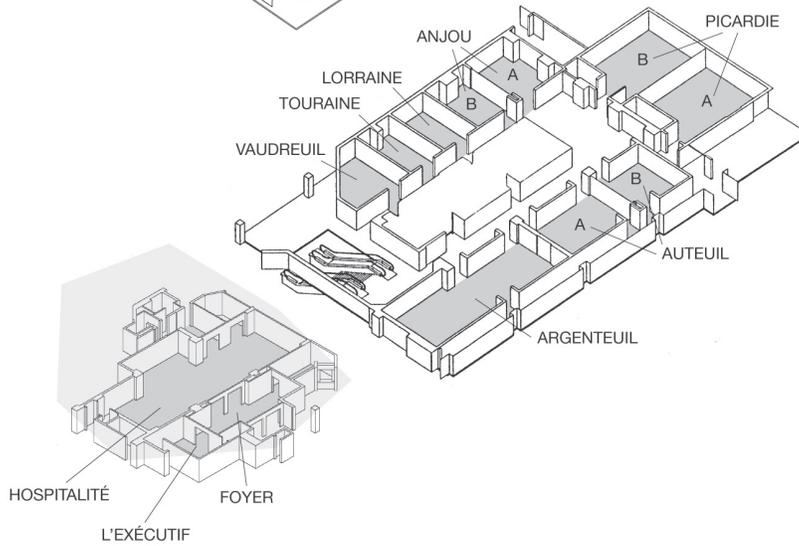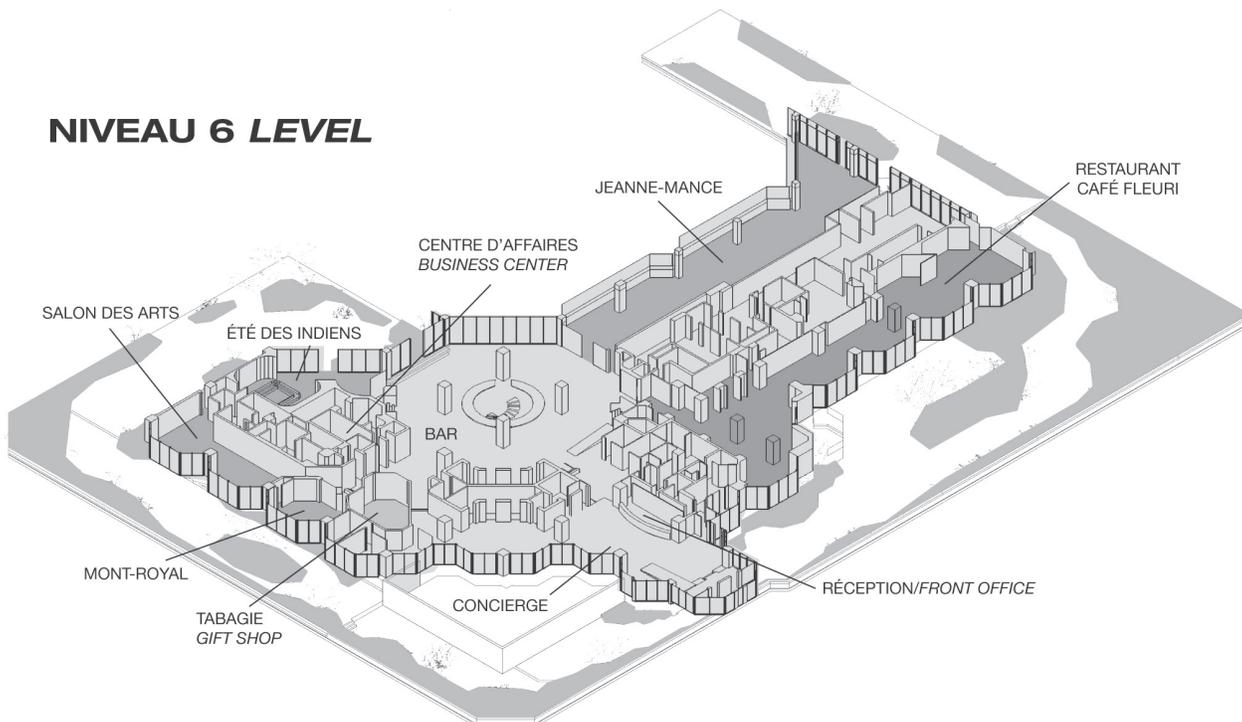
Conference Agenda

Sunday, June 17

Registration
4:00 p.m.–8:00 p.m.
`room` **Grand Salon Foyer**

Monday, June 18

Registration
7:30 a.m.–5:30 p.m.
`room` **Grand Salon Foyer**

Short Courses (fee events)

8:30 a.m.–5:00 p.m.	**Introduction to Survey Methods for Businesses and Organizations—** *Paul P. Biemer,* RTI International and The University of North Carolina (U.S.), and *David Cantor,* Westat (U.S.) `room` **Picardie A-B**
8:30 a.m.–5:00 p.m.	**Small-Area Estimation—***Ray Chambers,* University of Wollongong (Australia) `room` **Hospitalité**
8:30 a.m.–12:00 p.m.	**Nuts and Bolts of Web Surveys—** *Reg Baker,* Market Strategies, Inc. (U.S.) `room` **Argenteuil**
1:30 p.m.–5:00 p.m.	**Question Testing for Establishment Surveys—***Kristin Stettler,* U.S. Census Bureau, and *Fran Featherston,* National Science Foundation (U.S.) `room` **Argenteuil**

Short course refreshment break (coffee and tea)
10:00 a.m.–10:30 a.m.

Lunch on own
12:00 p.m.–1:00 p.m.

Short course refreshment break (sodas and water)
3:00 p.m.–3:30 p.m.

Reception with cash bar
5:30 p.m.–6:30 p.m.
`room` **Grand Salon B-C & Foyer**

TOURS
Monday, June 18

9:30 a.m.–12:00 p.m.	**Old Montréal and Notre-Dame Basilica Guided Walking Tour** (fee event)
9:30 a.m.–12:00 p.m.	**Downtown Montréal and Its Underground Guided Walking Tour** (fee event)
12:30 p.m.–4:30 p.m.	**Beer-Tasting in the Richelieu Valley Tour** (fee event)

Session 1: Keynote Address
6:30 p.m.–7:30 p.m.
`room` **Grand Salon B-C**
Chair: *Howard Hogan,* U.S. Census Bureau

Business Surveys: Past, Present, and Challenges for the Future—*Robert W. Edwards,* Director, Statistics Department, International Monetary Fund

Robert W. Edwards plays a key role in fostering the highest quality standards for consistency, coverage, and transparency in economic and financial statistics. Working with countries around the world, he promotes the implementation of best practices in statistics to enhance the quality of national statistical systems and the data they provide to users. ICES-III conferees will gain insight from Edward's global experience and understanding of the requirements of both producers and users of official statistics.

Tuesday, June 19

Refreshment Break (coffee and tea)
7:30 a.m.–8:30 a.m.
room **Grand Salon Foyer**

Registration
7:30 a.m.–5:30 p.m.
room **Grand Salon Foyer**

Session 2: Software Demonstrations
8:00 a.m.–12:30 p.m.
room **Grand Salon A**

SD-1: Windows Interface to X-12-ARIMA—*Roxanne Feldpausch* and *Kathleen McDonald-Johnson,* U.S. Census Bureau

SD-2: Interactive Data Analysis System (IDAS)—*Jeff Bailey,* U.S. Department of Agriculture/National Agricultural Statistics Service

SD-3: System for Estimation of Variance Due to Nonresponse and Imputation (SEVANI)—*Cynthia Bocci* and J*ean-François Beaumont,* Statistics Canada

SD-4: Voxco Command Center—*Louis Tanguay* and *Vincent Auger,* Voxco (Canada)

SD-5: GENeralized Enhanced Sampling and Information System (GENESIS)—*Teresa Lopez* and *Brian Richards,* U.S. Department of Agriculture/National Agricultural Statistics Service

SD-6: NASS CASIC Survey Information System—*Emily Caron,* U.S. Department of Agriculture/National Agricultural Statistics Service

Concurrent Sessions 8:30 a.m.–10:10 a.m.

Session 3 Invited: Steps to Provide Quality Industrial Coding for a Business Register
room **Auteuil**
Organizer: *Yanick Beaucage,* Statistics Canada
Chair: *Mario Ménard,* Statistics Canada

8:35 a.m.	**Making Quality Improvements to an Automated Industry Coding Application for U.S. Business Establishments—** ✱*Michael Kornbau, Julie Bouffard,* and *Michelle Vile,* U.S. Census Bureau
9:00 a.m.	**Implementing Coding Tools for a New Classification—**✱*John Perry,* Office for National Statistics (U.K.)
9:25 a.m.	**The Many Ways of Improving the Industrial Coding for Statistics Canada's Business Register—***Yanick Beaucage,* Statistics Canada
9:50 a.m.	**Discussant:** *Frank Yu,* Australian Bureau of Statistics
10:00 a.m.	**Floor Discussion**

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

TOUR
Tuesday, June 19

6:30 p.m.–10:30 p.m.   **Dinner Cruise on the St. Lawrence River** (fee event)

Session 4 Invited: Measurement of Service Sector Statistics: Challenges and Achievements
room **Alfred-Rouleau B**
Organizer: *Mark E. Wallace,* U.S. Census Bureau
Chair: *Jean-Pierre Simard,* Statistics Canada

8:35 a.m.	**The Statistical Measurement of Services: Recent International Achievements and What Next?—***William Cave,* Organization for Economic Cooperation and Development
9:00 a.m.	**Strategic Vision for the Voorburg Group on Services Statistics—** *Louis Marc Ducharme,* Statistics Canada
9:25 a.m.	**Implementing a Coordinated Approach to Improving Services Source Data Inputs to Gross Domestic Product Statistics—** *Mark E. Wallace* and *John Murphy,* U.S. Census Bureau
9:50 a.m.	**Discussant:** *Brent Moulton,* Bureau of Economic Analysis (U.S.)
10:00 a.m.	**Floor Discussion**

Session 5 Introductory Overview Lecture: Data-Processing Activities
room **Picardie A-B**
Chair: *Paul Smith,* Office for National Statistics (U.K.)

8:35 a.m.	**Editing and Coding—** *Katherine Jenny Thompson,* U.S. Census Bureau
9:15 a.m.	**Integrated Editing/Imputation—** *Ton de Waal,* Statistics Netherlands
9:55 a.m.	**Floor Discussion**

Session 6 Contributed: Questionnaire Design and Testing
`room` **Argenteuil**

Chair: *Danna Moore,* Washington State University (U.S.)

8:35 a.m.	**Cognitive Aspects Associated with Sample Selection Conducted by Respondents in Establishment Surveys—** *La Toya Barnett, Rebecca Morrison,* and *Grace O'Neill,* U.S. Census Bureau
8:55 a.m.	**Record-Keeping Studies: Love 'Em or Leave 'Em—** *Jeri Mulrow,* National Science Foundation (U.S.), and *Stanley Freedman,* Energy Information Administration (U.S.)
9:15 a.m.	**A Comprehensive Redesign of a Questionnaire Measuring Foreign Direct Investment—** *Alfred D. Tuttle* and *Rebecca Morrison,* U.S. Census Bureau, and *David Galler,* Bureau of Economic Analysis (U.S.)
9:35 a.m.	**Developing Satisfaction Surveys: Integrating Qualitative and Quantitative Information—** *David Cantor, Sarah Dipko, Stephanie Fry, Pamela Giambo,* and *Vasudha Narayanan,* Westat (U.S.)
9:55 a.m.	**Floor Discussion**

Session 7 Contributed: Weighting Issues in Estimation
`room` **Hospitalité**

Chair: *Catherine Burt,* National Center for Health Statistics (U.S.)

8:35 a.m.	**Multipurpose Small-Area Estimation—** *Hukum Chandra,* University of Southampton (U.K.), and *Ray Chambers,* University of Wollongong (Australia)
8:55 a.m.	**Applying Statistical Methods Originally Developed for Household Surveys to Establishment Studies—** *Angela Pitts, Marcus Berzofsky,* and *Michael Witt,* RTI International (U.S.)
9:15 a.m.	**Annual Growth Rates Derived from Short-Term Statistics and Annual Structural Business Statistics—** *Pieter Vlag* and *Koert van Bemmel,* Statistics Netherlands
9:35 a.m.	**Switching from Retrospective to Current-Year Data Collection in the Medical Expenditure Panel Survey - Insurance Component—**✱ *Anne Kearney,* U.S. Census Bureau, and *John P. Sommers,* Agency for Healthcare Research and Quality (U.S.)
9:55 a.m.	**Floor Discussion**

Session 8 Contributed: Design and Analysis Challenges
`room` **Alfred-Rouleau A**

Chair: *U. C. Sud,* Indian Agricultural Statistics Research Institute

8:35 a.m.	**Can We Continue To Exclude Small, Single-Establishment Businesses from Annual Survey Data Collection?—**✱ *Kari Clark* and *David Kinyon,* U.S. Census Bureau
8:55 a.m.	**Improvements in Stratification in the U.K.'s Office for National Statistics—** *Pete Brodie* and *Kevin Moore,* Office for National Statistics (U.K.)
9:15 a.m.	**Agriculture and the Environment: a Robust Approach to Commodity-Based Stratification—** *Martin Pantel,* Statistics Canada
9:35 a.m.	**Comparing Estimation Methods in Product Surveys—** *Ismo Teikari,* Statistics Finland
9:55 a.m.	**Floor Discussion**

Refreshment break (coffee and tea)
10:10 a.m.–10:30 a.m.
`room` **Grand Salon Foyer**

Concurrent Sessions 10:30 a.m.–12:10

Session 9 Invited: The New Direction of Business Surveys: the Integrated Approach
`room` **Hospitalité**

Organizer: *Marie Brodeur,* Statistics Canada
Chair: *Marie Brodeur,* Statistics Canada

10:35 a.m.	**Unified Enterprise Survey: New Horizons—** *Daniela Ravindra* and *Marie Brodeur,* Statistics Canada
11:00 a.m.	**Integration of Annual Economic Collections in the Australian Bureau of Statistics—** *Eden Brinkley,* Australian Bureau of Statistics
11:25 a.m.	**A Statistical Architecture for Economic Statistics—** *Ron McKenzie,* Statistics New Zealand
11:50 a.m.	**Discussant:** *Vladimir Markhonko,* United Nations Statistical Division
12:00 p.m.	**Floor Discussion**

Session 10 Invited: Commodity Flow Surveys
`room` **Picardie A-B**

Organizers: *Scot Dahl,* U.S. Census Bureau, and *Jock Black,* National Science Foundation (U.S.)
Chair: *Donsig Jang,* Mathematica Policy Research, Inc. (U.S.)

10:35 a.m.	**Swedish Commodity Flow Surveys Evaluated: Statistics Sweden's Experiences and Survey Adjustments Since 2001—** *Lars Werke,* Statistics Sweden

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

11:00 a.m. **Using Electronic Data from the Carriers in the Canadian Trucking Commodity Origin/Destination Survey**—*François Gagnon* and *Krista Cook,* Statistics Canada

11:25 a.m. **Designing the 2007 Commodity Flow Survey**— ✱ *Scot Dahl* and *William Davie, Jr.,* U.S. Census Bureau

11:50 a.m. **Discussant:** *Jock Black,* National Science Foundation (U.S.)

12:00 p.m. **Floor Discussion**

Session 11 Introductory Overview Lecture: Business Register/Sampling Frames
room **Alfred-Rouleau B**
Chair: *Dale Atkinson,* U.S. Department of Agriculture/National Agricultural Statistics Service

10:35 a.m. **Business Register in Economic Statistics: Content, Roles, and Place**—*Jean Ritzen,* Statistics Netherlands

11:15 a.m. **Definitions and Units**—*Andreas Lindner,* Organization for Economic Co-operation and Development

11:55 a.m. **Floor Discussion**

Session 12 Contributed: Issues in Survey Redesign 1
room **Auteuil A-B**
Chair: *Eric Rancourt,* Statistics Canada

10:35 a.m. **How To Draw a Sample for Estimating the Change in Labor Costs**—*Seppo Laaksonen* and *Outi Ahti-Miettinen,* Statistics Finland

10:55 a.m. **Developing and Implementing a Survey on Intermediate Consumption for the Service Sector in Sweden**—*Cecilia Hertzman, Annika Lindblom,* and *Fredrik Nilsson,* Statistics Sweden

11:15 a.m. **What Does It Take To Renew a 53-Year-Old Survey: a Face Lift or Reconstructive Surgery?**— *John Jankowski, Jeri Mulrow,* and *Brandon Shackelford,* National Science Foundation (U.S.)

11:35 a.m. **Adding New Data Elements to an Ongoing Survey: Operational and Response Issues**—*Richard Rosen, Patricia Getz, David O'Connell,* and *Kenneth Robertson,* Bureau of Labor Statistics (U.S.)

11:55 a.m. **Floor Discussion**

Session 13 Contributed: Nonresponse Reduction Strategies 1
room **Alfred-Rouleau A**
Chair: *Rachel Harter,* NORC at the University of Chicago (U.S.)

10:35 a.m. **Minimizing and Converting Refusals in a Survey of New Businesses**—*Tom Barton* and *David DesRoches,* Mathematica Policy Research, Inc. (U.S.)

10:55 a.m. **Improving the Effectiveness of Interviewer-Administered Surveys through Refusal-Avoidance Training**—✱ *Grace O'Neill,* U.S. Census Bureau

11:15 a.m. **Increasing Survey Cooperation: Motivating Chronic Late Responders to an Annual Survey**—*Ronda Britt* and *Fran Featherston,* National Science Foundation (U.S.)

11:35 a.m. **Using Paradata To Monitor and Improve the Collection Process in Annual Business Surveys**—*Rose-Carline Evra* and *Sylvie DeBlois,* Statistics Canada

11:55 a.m. **Floor Discussion**

Session 14 Contributed: Variance Estimation
room **Argenteuil**
Chair: *Brian Simonson,* The Lewin Group (U.S.)

10:35 a.m. **Random Group Variance Adjustments When Hot Deck Imputation Is Used To Compensate for Nonresponse**—✱ *Richard Moore, Jr.,* U.S. Census Bureau

10:55 a.m. **Variance Estimation When Nearest-Neighbor Imputation Is Used To Fill in Missing Values**—*Jean-François Beaumont* and *Cynthia Bocci,* Statistics Canada

11:15 a.m. **Methodological Evaluation of a Survey of High-School Students in Iowa**—*Lu Lu,* Iowa State University (U.S.)

11:35 a.m. **Comparison of Simulation Methods Using Historical Data in the U.S. International Price Program**—*Moon-Jung Cho, Patrick Bobbitt, Te-Ching Chen, John Eltinge, Lawrence Ernst, James Himelein,* and *Steve Paben,* Bureau of Labor Statistics (U.S.)

11:55 a.m. **Floor Discussion**

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

Lunch
12:15 p.m.–1:45 p.m.
room Grand Salon B-C

Session 15: Software Demonstrations
1:30 p.m.–6:00 p.m.
room Grand Salon A

SD-7: Q-Bank—*Rebecca Morrison, Diane K. Willimack,* U.S. Census Bureau

SD-8: Survey Data Analysis in SAS/STAT Software—*Tony An,* SAS Institute Inc. (U.S.)

SD-9: Solas for Missing Data and nQuery Advisor for Sample Size—*Brian Sullivan* and *Kevin Connolly,* Statistical Solutions (Ireland)

SD-10: Voxco Command Center—*Louis Tanguay* and *Vincent Auger,* Voxco (Canada)

SD-11: The Census Bureau's 'On the Map' Interactive Origin-Destination Flows of Workers—*Lars Vilhuber,* Cornell University (U.S.)

SD-12: MixMatch – A Record Linkage System—*Martin Lachance,* Statistics Canada

Concurrent Sessions 1:45 p.m.–3:25 p.m.

Session 16 Invited: Editing and Imputation Strategies To Improve Statistics Using Tax Data
room Hospitalité
Organizer: *François Brisebois,* Statistics Canada
Chair: *François Brisebois,* Statistics Canada

1:50 p.m. **Methodology for Allocating Generic Field to Its Details**—*Jessica Andrews, Nathalie Hamel,* and *François Brisebois,* Statistics Canada

2:15 p.m. **Improving the Quality of U.S. Tax Statistics: Recent Innovations in Editing and Imputation Techniques at the Statistics of Income Division of the U.S. Internal Revenue Service**—*Barry Johnson, Scott Hollenbeck,* and *Todd Reum,* U.S. Internal Revenue Service

2:40 p.m. **Improving the Use of Tax Data for Dutch Business Statistics**—*Grietje Van Haren* and *J. J. Hoogland,* Statistics Netherlands

3:05 p.m. **Discussant:** *Pierre Lavallée,* Statistics Canada

3:15 p.m. **Floor Discussion**

Lunch
12:15 p.m.–1:45 p.m.
room Grand Salon B-C

Salad: Mesclun greens with sliced breast of chicken, chopped bacon, sliced pears, blue cheese, and balsamic vinaigrette and a trilogy of heirloom potatoes with a mustard dressing

Entrée: Deli buffet with Genoa salami, roasted turkey breast, smoked pastrami, Virginia sugar-cured ham, French garlic sausage, roast beef, cheeses, breads, and individual bags of potato chips

Vegetarian entrée (substitution): Grilled vegetables on pasta

Heart-healthy entrée (substitution): Grilled vegetables on pasta

Dessert: New York cheesecake with strawberry sauce

Session 17 Invited: Goals and Issues in the Development of the Services Producer Price Index (SPPI)
room Auteuil A-B
Organizer: *Susana Rubin-Bleuer,* Statistics Canada
Chair: *Susana Rubin-Bleuer,* Statistics Canada

1:50 p.m. **Methodology for the U.S. Services Product Price Index**—*Roslyn Swick* and *Deanna Bathgate,* Bureau of Labor Statistics (U.S.)

2:15 p.m. **Assessing the Quality of SPPIs**—*John Wood, Ian Richardson,* and *Markus Sova,* Office for National Statistics (U.K.)

2:40 p.m. **Survey Methodology for New Business Services Prices Indexes**—*Saad Rais* and *Zdenek Patak,* Statistics Canada

3:05 p.m. **Discussant:** *Jacob Ryten,* Statistics Canada (retired)

3:15 p.m. **Floor Discussion**

Session 18 Introductory Overview Lecture: Questionnaire Design and Testing
room Picardie A-B
Chair: *Jacqui Jones,* Office for National Statistics (U.K.)

1:50 p.m. **Instrument Design**—*Don Dillman,* Washington State University (U.S.)

2:30 p.m. **Current Practices in Questionnaire Development, Evaluation, and Testing for Establishment Surveys**—*Diane K. Willimack,* U.S. Census Bureau

3:10 p.m. **Floor Discussion**

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

Session 19 Topic-Contributed: Designing Survey Materials from the Respondents' Perspectives

room **Alfred-Rouleau B**
Organizer: *Anne S. Russell,* U.S. Census Bureau
Chair: *Richard Evans,* Statistics Canada

1:50 p.m.   **Working with Respondents To Improve Relevancy of Inventory Statistics—✱** *John Trimble* and *Scott Scheleur,* U.S. Census Bureau

2:10 p.m.   **Listening to Respondents for Better Survey Results—** *Alexander Hays,* Statistics Canada

2:30 p.m.   **Using Focus Groups To Improve Response in Monthly Surveys—✱** *Lisa Houlihan,* U.S. Census Bureau

2:50 p.m.   **Evaluating Business Survey Forms with the Cognitive Interview—** *Paul Kelly* and *Marcel Levesque,* Statistics Canada

3:10 p.m.   **Floor Discussion**

Session 20 Topic-Contributed: Business Process Improvement for Economic Programs

room **Argenteuil**
Organizer: *Deborah Stempowski,* U.S. Census Bureau
Chair: *Eddie Salyers,* U.S. Census Bureau

1:50 p.m.   **Business Process Improvement at the U.S. Census Bureau—** *Deborah Stempowski* and *Shirin Ahmed,* U.S. Census Bureau

2:10 p.m.   **A Complete Redesign of the Business Register—** *Mario Ménard, Gaétan St-Louis,* and *Philippe Gagné,* Statistics Canada

2:30 p.m.   **Means To Improve Business Survey Processes: Some Swedish Experiences—** *Lennart Nordberg,* Statistics Sweden

2:50 p.m.   **Improving Quality in ONS's Annual Earnings Statistics—** *Pete Brodie* and *Kevin Moore,* Office for National Statistics (U.K.)

3:10 p.m.   **Floor Discussion**

Session 21 Contributed: Issues in Multimode Data Collection

room **Alfred-Rouleau A**
Chair: *Bob Rutchik,* Energy Information Administration (U.S.)

1:50 p.m.   **Do Economic and Demographic Characteristics Differ between Web and Mail Respondents?—** *Nancy Dickey* and *Zulma Riberas,* U.S. Department of Agriculture/National Agricultural Statistics Service

2:10 p.m.   **Understanding Web Survey Completion in a Survey of New Businesses—** *David DesRoches, Tom Barton,* and *Janice Ballou,* Mathematica Policy Research, Inc. (U.S.)

2:30 p.m.   **Hidden Mixed-Mode Design in Catering Survey—** *Antti Siikanen* and *Petri Godenhjelm,* Statistics Finland, and *Kaija Saarni,* Finnish Game and Fisheries Research Institute

2:50 p.m.   **Redesigning Data Collection Strategies for Cost-Reduction in Two Bureau of Labor Statistics Surveys—** *Michael Searson,* Bureau of Labor Statistics (U.S.)

3:10 p.m.   **Floor Discussion**

Refreshment break (sodas and water)
3:25 p.m.–3:50 p.m.
room **Grand Salon Foyer**

Concurrent Sessions 3:50 p.m.–5:30 p.m.

Session 22 Invited: Uses of Metadata for Establishment Surveys

room **Picardie A-B**
Organizer: *Daniel W. Gillman,* Bureau of Labor Statistics (U.S.)
Chair: *Richard Vincent,* Statistics Canada

3:55 p.m.   **Modeling the Contents and Structure of Official Statistics—** *Bo Sundgren,* Statistics Sweden

4:20 p.m.   **Experiences with Developing and Using Metadata-Driven Processing Systems for the Economic Census—✱** *Sheila Proudfoot* and *Donna Hambric,* U.S. Census Bureau

4:45 p.m.   **Metadata Management Framework for Establishment Surveys—** *Michael Colledge,* Statistical Consulting Pty Ltd (Australia)

5:10 p.m.   **Discussant:** *Daniel W. Gillman,* Bureau of Labor Statistics (U.S.)

5:20 p.m.   **Floor Discussion**

Session 23 Introductory Overview Lecture: Time Series

room **Argenteuil**
Chair: *Wesley Yung,* Statistics Canada

3:55 p.m.   **Methods, Diagnostics, and Practices for Seasonal Adjustment—** *Catherine Hood,* Catherine Hood Consulting (U.S.)

4:35 p.m.   **Benchmarking—** *Susie Fortier,* Statistics Canada

5:15 p.m.   **Floor Discussion**

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

Session 24 Topic-Contributed: Electronic Data Collection Modes for Establishment Surveys
room **Alfred-Rouleau A**
Organizer: *Amy E. Anderson,* U.S. Census Bureau
Chair: *Tony Hak,* RSM Erasmus University (The Netherlands)

3:55 p.m. **Using Software To Collect Data Electronically for the Economic Census—✱***Amy E. Anderson* and *M. Diane Harley,* U.S. Census Bureau

4:15 p.m. **Interface Design and Testing for Electronic Self-Administered Survey Forms Using Excel—***Emma Farrell, Rob Burnside, Leone Van Ede,* and *Kettie Hewett,* Australian Bureau of Statistics

4:35 p.m. **The Annual Structural Business Survey: Developing and Testing an Electronic Form—***Ger Snijkers, Evrim Onat,* and *Rachel Visschers,* Statistics Netherlands

4:55 p.m. **Collecting and Transmitting Confidential International Data Electronically—***Y. Louise Ku-Graf,* Bureau of Economic Analysis (U.S.)

5:15 p.m. **Floor Discussion**

Session 25 Contributed: Employment Dynamics
room **Alfred-Rouleau B**
Chair: *Frank Potter,* Mathematica Policy Research, Inc. (U.S.)

3:55 p.m. **Measuring Business Formation, Dynamics, and Performance—***Kirk Wolter,* NORC at the University of Chicago (U.S.); *John Haltiwanger,* University of Maryland (U.S.); and *Lisa Lynch,* Tufts University (U.S.)

4:15 p.m. **Meeting the Challenges of Designing the Kauffman Firm Survey (KFS): Sampling Frame, Definitions, Questionnaire Development, and Respondent Burden—***Janice Ballou, David DesRoches, Zhanyun Zhao,* and *Frank Potter,* Mathematica Policy Research, Inc. (U.S.)

4:35 p.m. **New Developments in Business Employment Dynamics at the Bureau of Labor Statistics—***Kristin Fairman, Sheryl L. Konigsberg, Eric Simants,* and *David M. Talan,* Bureau of Labor Statistics (U.S.)

4:55 p.m. **Measurement of Establishment Birth and Death in Business Employment Dynamics—** ✱*Sheryl L. Konigsberg, Sadeghi Akbar, Richard L. Clayton,* and *David M. Talan,* Bureau of Labor Statistics (U.S.)

5:15 p.m. **Floor Discussion**

Session 26 Contributed: Analysis of Nonresponse Bias
room **Hospitalité**
Chair: *Karol Krotki,* RTI International (U.S.)

3:55 p.m. **Is There a Relationship among Survey Costs, Time in Field, Data Quality, and Bias?—***Leslie Christovich,* National Science Foundation (U.S.), and *Michael J. Brick, Benmei Liu,* and *Tim Smith,* Westat (U.S.)

4:15 p.m. **Capturing or Recapturing Information on Survey Nonrespondents—***Susan Hinkins* and *Fritz Scheuren,* NORC at the University of Chicago (U.S.)

4:35 p.m. **Analysis of Potential Nonresponse Bias in the 2003 Survey of Small Business Finances—***Michael Yang* and *Janella Chapline,* The University of Chicago (U.S.), and *Lieu Hazelwood* and *Traci Mach,* Board of Governors of the Federal Reserve (U.S.)

4:55 p.m. **Bias Adjustment in the Swedish Farm Accidents Survey—***Jörgen Svensson,* Statistics Sweden

5:15 p.m. **Floor Discussion**

Session 27 Contributed: Nonresponse Reduction Strategies 2
room **Argenteuil**
Chair: *Jeri Mulrow,* National Science Foundation (U.S.)

3:55 p.m. **Incentives in Surveys of Farmers—**✱*Kathleen Ott,* U.S. Census Bureau, and *Daniel Beckler,* U.S. Department of Agriculture/National Agricultural Statistics Service

4:15 p.m. **Do Monetary Incentives Increase Business Survey Response Rates? Results of a Large-Scale Experiment—***Paul P. Biemer, Christopher Ellis, Angela Pitts,* and *Kimberly Aspinwall,* RTI International (U.S.)

4:35 p.m. **Effectiveness of Stimuli Experimentally Carried Out across Populations for Establishment Surveys—***Danna Moore,* Washington State University (U.S.), and *Mike Ollinger,* U.S. Department of Agriculture/Economic Research Service

4:55 p.m. **Encouraging the Use of Alternative Modes of Electronic Data Collection: Results of Two Field Studies—***Kathy Downey, Dee McCarthy, William McCarthy,* and *Brian Meekins,* Bureau of Labor Statistics (U.S.)

5:15 p.m. **Floor Discussion**

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

Wednesday, June 20

Refreshment break (coffee and tea)
7:30 a.m.–8:30 a.m.
room **Grand Salon Foyer**

Registration
7:30 a.m.–5:30 p.m.
room **Grand Salon Foyer**

Session 28: Software Demonstrations
8:00 a.m.–12:30 p.m.
room **Grand Salon A**

SD-13: Survey Data Analysis in SAS/STAT Software—*Tony An,* SAS Institute Inc. (U.S.)

SD-14: Solas for Missing Data and nQuery Advisor for Sample Size—*Brian Sullivan* and *Kevin Connolly,* Statistical Solutions (Ireland)

SD-15: The Banff System for Automated Editing and Imputation—*Teodora Alexandrova,* Statistics Canada

SD-16: SPSS Survey and Research Solutions—*Tim Daciuk* and *Nancy Dobrozdravic,* SPSS Inc. (U.S.)

SD-17: Question Repository System CATI—*Quentin Coleman,* U.S. Department of Agriculture/National Agricultural Statistics Service

SD-18: wGeneralized Estimation System (GES)—*George Sampson Sapounidis,* Statistics Canada

Concurrent Sessions 8:30 a.m.–10:10 a.m.

Session 29 Invited: Efficient Use of Administrative Data in Business Surveys
room **Hospitalité**
Organizer: *Hélène Bérard,* Statistics Canada
Chair: *Hélène Bérard,* Statistics Canada

8:35 a.m.	**Redesigning French Structural Business Statistics Using More Administrative Data**—*Philippe Brion,* INSEE (France)
9:00 a.m.	**Toward a Better Integration of Survey and Tax Data in the Unified Enterprise Survey**—*Danielle Lebrasseur* and *Claude Turmelle,* Statistics Canada
9:25 a.m.	**Using Tax Data for Substitution and Auxiliary Variables in the Australian Economic Activity Survey**—*Robert Clark,* University of Wollongong (Australia), and *Frank Yu,* Australian Bureau of Statistics
9:50 a.m.	**Discussant:** *Eric Rancourt,* Statistics Canada
10:00 a.m.	**Floor Discussion**

TOURS
Wednesday, June 20

2:00 p.m.–4:30 p.m.	**Old Montréal and Notre-Dame Basilica Guided Walking Tour** (fee event)
2:00 p.m.–4:30 p.m.	**Downtown Montréal and Its Underground Guided Walking Tour** (fee event)

Session 30 Invited: The Influences of K. R. W. Brewer on Establishment Surveys
room **Alfred-Rouleau A**
Organizer: *Phillip S. Kott,* U.S. Department of Agriculture/National Agricultural Statistics Service
Chair: *J. N. K. Rao,* Carleton University (Canada)

8:35 a.m.	**Some Research on Calibration Estimators at the National Agricultural Statistics Service**—*Phillip S. Kott,* U.S. Department of Agriculture/National Agricultural Statistics Service
9:00 a.m.	**Using Unequal Probability Sampling in Business Surveys To Limit Anticipated Variances of Regression Estimators**—*Anders Holmberg,* Statistics Sweden
9:25 a.m.	**Replicate Variance Estimation and High-Entropy Variance Approximations**—*John Preston* and *Tamie Henderson,* Australian Bureau of Statistics
9:50 a.m.	**Discussant:** *K. R. W. Brewer,* Australian National University
10:00 a.m.	**Floor Discussion**

Session 31 Introductory Overview Lecture: System of National Accounts
room **Picardie A-B**
Chair: *Eva Elvers,* Statistics Sweden

8:35 a.m.	**The U.S. Perspective**—*Brent Moulton,* Bureau of Economic Analysis (U.S.)
9:15 a.m.	**The U.K./International Perspective**—*Robin Lynch,* Office for National Statistics (U.K.)
9:55 a.m.	**Floor Discussion**

Session 32 Topic-Contributed: Sample Design and Estimation in Physician Surveys
room **Auteuil A-B**
Organizer: *Kennon R. Copeland,* IMS Health (U.S.)
Chair: *Sara Thran,* American Medical Association (U.S.)

8:35 a.m. **Deriving Practice-Level Estimates from Physician-Level Surveys—***Catherine Burt,* National Center for Health Statistics (U.S.)

8:55 a.m. **Using Medicare Files To Construct a Sampling Frame for a Survey of Physicians—***Vasudha Narayanan,* Westat (U.S.)

9:15 a.m. **Use of Measures of Size in Sample Design and Estimation of Physician Surveys—***Kennon R. Copeland* and *Elizabeth Wallace,* IMS Health (U.S.)

9:35 a.m. **Determination of Target Sample Sizes for Physician Surveys—***Darrell J. Philpot* and *Kennon R. Copeland,* IMS Health (U.S.)

9:55 a.m. **Floor Discussion**

Session 33 Contributed: Strategic Directions for Business Surveys
room **Argenteuil**
Chair: *Adam Safir,* RTI International (U.S.)

8:35 a.m. **A Framework for Prioritizing Economic Statistics Programs—***Thomas Mesenbourg* and *Ronald Lee,* U.S. Census Bureau

8:55 a.m. **Statistical Sampling Plans: Collaborative Efforts between Statisticians and Subject Matter Experts—***Marla Smith,* U.S. Environmental Protection Agency

9:15 a.m. **100 Years of the U.K. Census of Production—***Paul Smith* and *Stephen Penneck,* Office for National Statistics (U.K.)

9:35 a.m. **An Overview of Business Tendency Surveys—***Richard Vincent* and *Richard Evans,* Statistics Canada

9:55 a.m. **Floor Discussion**

Session 34 Contributed: Treatment of Nonresponse
room **Alfred-Rouleau B**
Chair: *Jörgen Svensson,* Statistics Sweden

8:35 a.m. **Alternative Methods of Unit Nonresponse Weighting Adjustments: an Application from the Survey of Small Business Finances—***Lieu Hazelwood, Traci Mach,* and *John Wolken,* Board of Governors of the Federal Reserve (U.S.)

8:55 a.m. **Redefining the Unit Nonresponse Adjustment Cells for SORAR—✱***Laura Ozcoskun* and *Katherine Jenny Thompson*, U.S. Census Bureau

9:15 a.m. **Dealing with Item Nonresponse in a Catering Survey—***Pauli Ollila,* Statistics Finland, and *Kaija Saarni* and *Asmo Honkanen,* Finnish Game and Fisheries Research Institute

9:35 a.m. **Response Rates and Response Patterns among New Businesses: Results from the Kauffman Firm Survey (KFS)—***Zhanyun Zhao, Frank Potter,* and *Yuhong Zheng,* Mathematica Policy Research, Inc. (U.S.)

9:55 a.m. **Floor Discussion**

Refreshment break (coffee and tea)
10:10 a.m.–10:30 a.m.
room **Grand Salon Foyer**

Concurrent Sessions 10:30 a.m.–12:10

Session 35 Invited: Improving Statistics on the Subnational Public Sector
room **Argenteuil**
Organizer: *David Marker,* Westat (U.S.)
Chair: *David Marker,* Westat (U.S.)

10:35 a.m. **Recommendations for Research and Development Priorities for the Census Bureau State and Local Government Statistics Program—***John Czajka,* Mathematica Policy Research, Inc. (U.S.), and *David Marker,* Westat (U.S.)

11:00 a.m. **Two-Dimensional Methodological Issues in Canadian Municipal Infrastructure Time Series—***Aldo Diaz* and *Marie-Claude Duval*, Statistics Canada

11:25 a.m. **Better Information for Regional Government—**✱*Minda Phillips* and *Marie Cruddas*, Office for National Statistics (U.K.)

11:50 a.m. **Discussant:** *Henry S. Wulf,* U.S. Census Bureau

12:00 p.m. **Floor Discussion**

Session 36 Invited: A Global Path to Standards in Questionnaire Design
room **Alfred-Rouleau A**
Organizers: *Rebecca Morrison,* U.S. Census Bureau, and *Jacqui Jones,* Office for National Statistics (U.K.)
Chair: *Deirdre Giesen,* Statistics Netherlands

10:35 a.m. **Development of Questionnaire Design Guidelines—***Rebecca Morrison,* U.S. Census Bureau

11:00 a.m. **Improved Questionnaire Design Yields Better Data: Experiences from the U.K.'s Annual Survey of Hours and Earnings—***Jacqui Jones, Pete Brodie, Sarah Williams,* and *Jane Carter,* Office for National Statistics (U.K.)

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

11:25 a.m.   **A Coherent Approach to Questionnaire Design Standards, Trends, and Implementation at the ABS**—*Rob Burnside* and *Emma Farrell,* Australian Bureau of Statistics

11:50 a.m.   **Discussant:** *Don Dillman,* Washington State University (U.S.)

12:00 p.m.   **Floor Discussion**

Session 37 Introductory Overview Lecture:
Issues Related to Unit Nonresponse
`room` **Hospitalité**
Chair: *Frank Yu,* Australian Bureau of Statistics

10:35 a.m.   **Measurement of Bias**— *Clyde Tucker* and *John Dixon,* Bureau of Labor Statistics (U.S.), and *David Cantor,* Westat (U.S.)

11:15 a.m.   **Current/New Methods**—*Michael A. Hidiroglou* and *Wesley Yung,* Statistics Canada

11:55 a.m.   **Floor Discussion**

Session 38 Topic-Contributed:
The Response Process in Academic Business Surveys
`room` **Auteuil A-B**
Organizer: *Tony Hak,* RSM Erasmus University (The Netherlands)
Chair: *Paul P. Biemer,* RTI International (U.S.)

10:35 a.m.   **The Collection and Validation of Financial Performance Data within a Voluntary Workplace Survey**—*John Forth,* National Institute of Economic and Social Research (U.K.), and *Robert McNabb,* Cardiff University Business School (U.K.)

10:55 a.m.   **A Web-Based Method of Collecting Longitudinal Data**—*Cynthia S. Cycyota,* United States Air Force Academy

11:15 a.m.   **How Informants Report about Interorganizational Relationships**—*Joan M. Phillips,* University of Notre Dame (U.S.)

11:35 a.m.   **Quality of Academic Business Surveys: Strategies for Reducing Nonresponse and Enhancing Data Quality**—*Tony Hak,* RSM Erasmus University (The Netherlands)

11:55 a.m.   **Floor Discussion**

Session 39 Contributed: Updating of
Business Registers
`room` **Picardie A-B**
Chair: *Frank Nolan,* Office for National Statistics (U.K.)

10:35 a.m.   **Using the Dun and Bradstreet Database as a Sampling Frame for Establishment Surveys**—*Sarah Cotton, Daniela Golinelli, John Adams, Megan Zander Cotugno, Lois Davis,* and *Robin Beckman,* RAND Corporation (U.S.)

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

Lunch
12:15 p.m.–1:45 p.m.
`room` **Grand Salon B-C**

Salad: Caesar salad

Entrée: Cheese tortellini, spinach fettuccine, and penne pasta with alfredo, marinara, and pesto sauces

Vegetarian entrée (substitution): Spinach fettuccine and penne pasta with alfredo, marinara, and pesto sauces

Heart-healthy entrée (substitution): Vegetable couscous

Dessert: Tiramisu

10:55 a.m.   **An Evaluation of Changes to Universe Extraction Editing for Current Business Surveys**— ✱*Carol King,* U.S. Census Bureau

11:15 a.m.   **Evaluating the Effects of Business Register Updates on Monthly Survey Estimates**— *Daniel Lewis,* Office for National Statistics (U.K.)

11:35 a.m.   **Development and Maintenance of the NASS List Frame**—*Stan Hoge* and *William Iwig,* U.S. Department of Agriculture/National Agricultural Statistics Service

11:55 a.m.   **Floor Discussion**

Session 40 Contributed: Editing, Data
Quality, and Disclosure Issues
`room` **Alfred-Rouleau B**
Chair: *Peter Linde,* Statistics Denmark

10:35 a.m.   **Quality Metrics for Assessing the Impact of Editing and Imputation on Economic Data**—*Broderick Oliver* and *Katherine Jenny Thompson,* U.S. Census Bureau

10:55 a.m.   **Data Validation for the 2006 Census of Agriculture**—*Charlie Arcaro,* Statistics Canada

11:15 a.m.   **Microdata Simulation for Confidentiality of Tax Returns Using Quantile Regression and Hot Deck**—*Jennifer Huckett,* Iowa State University (U.S.)

11:35 a.m.   **A New Approach for Disclosure Control in the IAB Establishment Panel: Multiple Imputation for Better Data Access**—*Jörg Drechsler, Stefan Bender, Agnes Dundler, Susanne Rässler,* and *Thomas Zwick,* Institute for Employment Research (IAB) (Germany)

11:55 a.m.   **Floor Discussion**

Session 41: Software Demonstrations
1:30 p.m.–6:00 p.m.
room Grand Salon A

SD-19: Forillon: Benchmarking Made Easy!—*Edith Latendresse* and *Chantal Marquis,* Statistics Canada

SD-20: Community Economic Development Hot Report— *Lars Vilhuber,* Cornell University (U.S.)

SD-21: Question Repository System—*Quentin Coleman,* U.S. Department of Agriculture/National Agricultural Statistics Service

SD-22: Application of GIS and Remote-Sensing Techniques to Survey Data—*Claire Boryan,* U.S. Department of Agriculture/National Agricultural Statistics Service

SD-23: Making Sense of Data via the Web—*Irwin Anolik*, U.S. Department of Agriculture/National Agricultural Statistics Service

SD-24: SPSS Survey and Research Solutions—*Tim Daciuk* and *Nancy Dobrozdravic,* SPSS Inc. (U.S.)

Session 42 Contributed: Poster Session
1:30 p.m.–6:00 p.m.
room Grand Salon A

P-1: Multimodal Approach for Increasing Response Rates for Surveys of Slaughter and Processing Plants—*Sheryl Cates, Catherine Viator,* and *Nadia Paoli,* RTI International (U.S.)

P-2: Comparison of Fishery Enterprise Survey Findings to External Economic Indicators in Finland—*Anssi Ahvonen, Asmo Honkanen,* and *Lari Veneranta,* Finnish Game and Fisheries Research Institute

P-3: Fishery Barometer Surveys the Economic Outlook of the Finnish Fisheries in the Entire Value Chain—*Asmo Honkanen* and *Anssi Ahvonen,* Finnish Game and Fisheries Research Institute

P-4: An Overview of the Survey on Recruitment and Employment in Québec—*Éric Gagnon* and *Marie-Ève Tremblay,* Institut de la statistique du Québec (Canada)

P-5: Bootstrap Tests of Hypothesis for Survey Data—*Cynthia Bocci* and *Jean-François Beaumont,* Statistics Canada

P-6: Developing Business Conditions Surveys for Services Industry—*Sanping Chen* and *Hansheng Xie,* Statistics Canada

P-7: The Hybrid Ratio Estimator: a Ratio Estimator That Handles Domains and Universe Totals—*Brian Simonson,* The Lewin Group (U.S.)

P-8: Survey Structure and Method of the Workplace Panel Survey in Korea—*Byung You Cheon,* Korea Labor Institute

P-9: Suitability of the USPS Delivery Sequence File as a Commercial Building Frame—*Stephanie Eckman, Michael Colicchia,* and *Colm O'Muircheartaigh,* NORC at the University of Chicago (U.S.)

P-10: ACS-Automated Cell Suppression Demonstration— *Gordon Sande,* Sande and Associates (Canada)

Concurrent Sessions 1:45 p.m.–3:25 p.m.

Session 43 Invited: Generalized Survey Processing Systems: an Update
room Hospitalité
Organizer: *Paula Weir,* Energy Information Administration (U.S.)
Chair: *John Pearson,* Statistics New Zealand

1:50 p.m.	**An Assessment of the U.S. Census Bureau's Experience with Developing Generalized Economic Programs Processing Systems—***Eddie Salyers, Beverly Eng,* and *Donna Hambric,* U.S. Census Bureau
2:15 p.m.	**The Continuing Evolution of Generalized Systems at Statistics Canada for Business Survey Processing—***Chris Mohl,* Statistics Canada
2:40 p.m.	**Toward More Integrated Generalized Processing Systems: the ABS Experience for Economic Surveys—***Eden Brinkley* and *Judy Henson,* Australian Bureau of Statistics
3:05 p.m.	**Discussant:** *Paula Weir,* Energy Information Administration (U.S.)
3:15 p.m.	**Floor Discussion**

Session 44 Invited: Methods Addressing Agricultural Statistics Issues
room Alfred-Rouleau B
Organizer: *Claude Poirier,* Statistics Canada
Chair: *Norman Bennett,* U.S. Department of Agriculture/National Agricultural Statistics Service

1:50 p.m.	**Improving Response in Farm Surveys through the Use of Geo-Referenced Data—***Philip Kokic* and *Kenton Lawson,* Australian Bureau of Agricultural and Resource Economics
2:15 p.m.	**Recent Initiatives in U.K. Agriculture Surveys—** *Peter Helm, Racheal Walker, Nick J. Olney,* and *Graham Collett,* Department for Environment, Food, and Rural Affairs (U.K.)
2:40 p.m.	**The Redesign of Statistics Canada Agriculture Surveys—***Claude Poirier* and *Laurie Reedman,* Statistics Canada
3:05 p.m.	**Discussant:** *Carol House,* U.S. Department of Agriculture/National Agricultural Statistics Service
3:15 p.m.	**Floor Discussion**

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

Session 45 Topic-Contributed: Nonresponse Bias Analysis in U.S. Government Surveys
room **Alfred-Rouleau A**
Organizer: *Carl Ramirez,* U.S. Government Accountability Office
Chair: *Catherine Burt,* National Center for Health Statistics (U.S.)

1:50 p.m. **Nonresponse Bias Analysis of the Survey of Workplace Violence Prevention—***Andrew Kato, Kathy Downey, William McCarthy,* and *Samantha Cruz,* Bureau of Labor Statistics (U.S.)

2:10 p.m. **Assessing Nonresponse Bias in a Survey of Nursing Homes—***Karen E. Davis,* National Center for Health Statistics (U.S.)

2:30 p.m. **Nonresponse Bias Analysis in a Survey of Banks—***Carl Ramirez,* U.S. Government Accountability Office

2:50 p.m. **Assessing Nonresponse Bias in Estimates of Employment—** *Clyde Tucker* and *John Dixon,* Bureau of Labor Statistics (U.S.)

3:10 p.m. **Floor Discussion**

Session 46 Contributed: Respondents' Perspectives on Survey Collection
room **Picardie A-B**
Chair: *Martin Brand,* Office for National Statistics (U.K.)

1:50 p.m. **Higher Quality and Lower Burden through Better Relations: Large Enterprise Management—** *Anna-Greta Erikson,* Statistics Sweden

2:10 p.m. **A Surgical Approach for Implementing CIPSEA—** *Jacob Bournazian,* Energy Information Administration (U.S.)

2:30 p.m. **Sources of Measurement Errors in Business Surveys—***Mojca Bavdaz,* University of Ljubljana (Slovenia)

2:50 p.m. **The Unrecognized Interviewer: Studying Respondent Behavior in an Establishment Survey of U.S. Academic Institutions—***Scott Crawford,* Survey Sciences Group (U.S.), and *Emilda Rivers,* National Science Foundation (U.S.)

3:10 p.m. **Floor Discussion**

Session 47 Contributed: Sample Design Challenges
room **Argenteuil**
Chair: *Anders Holmberg,* Statistics Sweden

1:50 p.m. **Estimation of Finite Population Mean Using Ranked Set, Two-Stage Sampling Designs—** *U. C. Sud* and *Dwijesh Chandra Mishra,* Indian Agricultural Statistical Research Institute

2:10 p.m. **Design Effects of Sampling Frames in Establishment Surveys of Small Populations—** *Monroe Sirken* and *Iris Shimizu,* National Center for Health Statistics (U.S.)

2:30 p.m. **Sample Design for the FDIC's Asset Valuation Review—***David W. Chapman,* Federal Deposit Insurance Corporation (U.S.)

2:50 p.m. **Measuring the Success of the Updated Sample Design for the Medical Expenditure Panel Survey: Insurance Component—***John P. Sommers,* Agency for Healthcare Research and Quality (U.S.), and *Anne Kearney,* U.S. Census Bureau

3:10 p.m. **Floor Discussion**

Session 48 Contributed: Seasonal Adjustment
room **Auteuil A-B**
Chair: *Alex Teterukovsky,* Statistics Sweden

1:50 p.m. **Issues in Modeling and Adjusting for Calendar Effects in Economic Time Series—***Brian Monsell,* U.S. Census Bureau

2:10 p.m. **Assessment of Diagnostics for the Presence of Seasonality—***Catherine Hood,* Catherine Hood Consulting (U.S.)

2:30 p.m. **Comparing Automatic Modeling Procedures of TRAMO and X-12-ARIMA: an Update—** *Kathleen McDonald-Johnson, Chak Li,* and *Brian Monsell,* U.S. Census Bureau, and *Catherine Hood,* Catherine Hood Consulting (U.S.)

2:50 p.m. **Determining Seasonality: a Comparison of Diagnostics from X-12-ARIMA—***Demetra Lytras, William Bell,* and *Roxanne Feldpausch,* U.S. Census Bureau

3:10 p.m. **Floor Discussion**

Refreshment break (sodas and water)
3:25 p.m.–3:50 p.m.
room **Grand Salon Foyer**

Concurrent Sessions 3:50 p.m.–5:30 p.m.

Session 49 Invited: Toward a Better Understanding of the Response Process in Surveys of Businesses and Organizations
room **Alfred-Rouleau B**
Organizer: *Diane K. Willimack,* U.S. Census Bureau
Chair: *Jacqui Jones,* Office for National Statistics (U.K.)

3:55 p.m. **The Response Process Model as a Tool for Evaluating Business Surveys—***Deirdre Giesen,* Statistics Netherlands

4:20 p.m. **Using the Theory of Socially Distributed Cognition To Analyze the Establishment Survey Response Process—***Boris Lorenc,* Statistics Sweden

4:45 p.m. **Considering the Establishment Survey Response Process in the Context of the Administrative Sciences—***Diane K. Willimack,* U.S. Census Bureau

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

5:10 p.m.   **Discussant:** *David Cantor,* Westat (U.S.)

5:20 p.m.   **Floor Discussion**

Session 50 Invited: Usage of Linearization Variance Estimators for Survey Estimates
room **Picardie A-B**
Organizer: *Katherine Jenny Thompson,* U.S. Census Bureau
Chair: *Katherine Jenny Thompson,* U.S. Census Bureau

3:55 p.m.   **An Overview of the Pros and Cons of Linearization versus Replication—***Richard Valliant,* University of Michigan (U.S.)

4:20 p.m.   **Linearization Variance Estimators for Survey Data: Some Recent Work—***A. Demnati,* Statistics Canada, and *J. N. K. Rao,* Carleton University (Canada)

4:45 p.m.   **Investigation of Jackknife Linearization Variance Estimators for U.S. Census Bureau Business Survey Estimates—***Samson A. Adeshiyan* and *Katherine Jenny Thompson,* U.S. Census Bureau

5:10 p.m.   **Discussant:** *Keith Rust,* Westat (U.S.)

5:20 p.m.   **Floor Discussion**

Session 51 Topic-Contributed: Response Management Strategies in Statistics Canada and the U.S. Census Bureau
room **Hospitalité**
Organizer*: Janet Sear,* Statistics Canada
Chair: *Marie Brodeur,* Statistics Canada

3:55 p.m.   **Holistic Response Management at Statistics Canada—***Janet Sear* and *Lucie Vinette,* Statistics Canada

4:15 p.m.   **Enterprise Portfolio Management Program—** *Wilf Bozzato,* Statistics Canada

4:35 p.m.   **Strategic Response Program—***Janet Hughes, Donna Stephens,* and *Lola Docherty,* Statistics Canada

4:55 p.m.   **Company-Centric Communication Approaches for Business Survey Response Management—** ✱*Robert Marske, Laurie Torene,* and *Michael Hartz,* U.S. Census Bureau

5:15 p.m.   **Floor Discussion**

Session 52 Contributed: Administrative Data: Warehousing and Quality
room **Auteuil A-B**
Chair: *John Kovar,* Statistics Canada

3:55 p.m.   **Unified Enterprise Survey and Metadata—** *Sylvain Boucher,* Statistics Canada

4:15 p.m.   **Input Data Warehousing: Canada's Experience with Establishment-Level Information—** *Greg Peterson,* Statistics Canada

4:35 p.m.   **Challenges in Collecting Police-Reported Crime Data—***Colin Babyak,* Statistics Canada

4:55 p.m.   **Floor Discussion**

Session 53 Contributed: Utilizing Tax Data in Estimation
room **Alfred-Rouleau A**
Chair: *John Wood,* Office for National Statistics (U.K.)

3:55 p.m.   **Tax Data as a Means for the Essential Reduction of the Short-Term Survey Response Burden—** *Rudi Seljak* and *Metka Zaletel,* Statistical Office of the Republic of Slovenia

4:15 p.m.   **Reducing the Costs and Response Burden of the Farm Financial Survey—***Peter Wright* and *David MacNeil,* Statistics Canada

4:35 p.m.   **Impact of Using Fiscal Data on the Imputation of the Unified Enterprise Survey of Statistics Canada—***Jean-Sébastien Provençal,* Statistics Canada

4:55 p.m.   **Estimation in the Presence of Tax Data in Business Surveys—***David Haziza,* Université of Montréal, and *Joana Bérube* and *Gordon Kuromi,* Statistics Canada

5:15 p.m.   **Floor Discussion**

Thursday, June 21

Refreshment break (coffee and tea)
7:30 a.m.–8:30 a.m.
`room` **Grand Salon Foyer**

Registration
7:30 a.m.–5:30 p.m.
`room` **Grand Salon Foyer**

Concurrent Sessions 8:30 a.m.–10:10 a.m.

Session 54 Invited: Advances in Disclosure Protection: Releasing More Business and Farm Data to the Public
`room` **Picardie A-B**
Organizer: *Steve Cohen,* Bureau of Labor Statistics (U.S.)
Chair: *Barry Johnson,* U.S. Internal Revenue Service

8:35 a.m.   **Lessons Learned from Internet Dissemination of Confidential Farm Survey Results: U.S. Department of Agriculture's Agricultural Resource Management Survey**—*Mitchell Morehart,* U.S. Department of Agriculture/Economic Research Service

9:00 a.m.   **Protecting the Confidentiality of Tables by Adding Noise to the Underlying Microdata**—*Paul Massell* and *Jeremy Funk,* U.S. Census Bureau, and *Jonaki Bose,* Bureau of Transportation Statistics (U.S.)

9:25 a.m.   **Quality-Preserving Controlled Tabular Adjustment: an Alternative to Complementary Cell Suppression for Disclosure Limitation of Tabular Magnitude Data**—*Lawrence Cox,* National Center for Health Statistics/Centers for Disease Control and Prevention (U.S.)

9:50 a.m.   **Discussant:** *John Eltinge,* Bureau of Labor Statistics (U.S.)

10:00 a.m.   **Floor Discussion**

Session 55 Invited: Getting Response: the Respondent's Perspective
`room` **Alfred-Rouleau A**
Organizers: *Ger Snijkers* and *Martin Luppes,* Statistics Netherlands
Chair: *Martin Luppes,* Statistics Netherlands

8:35 a.m.   **Paper and Web Questionnaires Seen from the Business Respondent's Perspective**—*Gustav Haraldsen,* Statistics Norway, and *Jacqui Jones,* Office for National Statistics (U.K.)

9:00 a.m.   **Understanding the Decision To Participate in a Business Survey**—*Ger Snijkers* and *Martin Luppes,* Statistics Netherlands

9:25 a.m.   **Factors Influencing Business Respondents' Decision To Adopt Web Returns**—*Zoë Dowling,* University of Surrey (U.K.), and *Kristin Stettler,* U.S. Census Bureau

9:50 a.m.   **Discussant:** *Don Dillman,* Washington State University (U.S.)

10:00 a.m.   **Floor Discussion**

Session 56 Introductory Overview Lecture: Variance Estimation
`room` **Argenteuil**
Chair: *Frank Potter,* Mathematica Policy Research, Inc. (U.S.)

8:35 a.m.   **Design-Based Variance Estimation**—*Kirk Wolter,* NORC at the University of Chicago (U.S.)

9:15 a.m.   **Model-Based Variance Estimation**—*Phillip S. Kott,* U.S. Department of Agriculture/National Agricultural Statistics Service

9:55 a.m.   **Floor Discussion**

Session 57 Topic-Contributed: Experiences from Web Collection in Establishment Surveys
`room` **Hospitalité**
Organizer: *David Cantor,* Westat (U.S.)
Chair: *David Cantor*, Westat, (U.S.)

8:35 a.m.   **Using the Web for Surveys of Medical Providers**—*Vasudha Narayanan, Pamela Giambo, Stephanie Fry,* and *Jennifer Crafts,* Westat (U.S.)

8:55 a.m.   **Web Design Issues in a Survey of Businesses Applying to an Advanced Technology Program**—*Kerry Levin* and *Jennifer O'Brien,* Westat (U.S.)

9:15 a.m.   **Web Usage in a Business Panel Survey**—*David Marker* and *Janice Machado,* Westat (U.S.)

9:35 a.m.   **Use of a Web Survey in a Study of Academic and Biomedical Research Facilities**—*Tim Smith* and *Cyndy Gray,* Westat (U.S.), and *Leslie Christovich,* National Science Foundation (U.S.)

9:55 a.m.   **Floor Discussion**

Session 58 Contributed: Estimation Issues in Sample Surveys
`room` **Alfred-Rouleau B**
Chair: *Michael A. Hidiroglou,* Statistics Canada

8:35 a.m.   **Optimal Number of Replicates for Variance Estimation**—*Mansour Fahimi, Peter H. Siegel, Darryl Creel,* and *Matt Westlake,* RTI International (U.S.)

8:55 a.m.   **A Resampling Study of NASS' Survey MPPS Sampling Strategy**—*Stanley Weng,* U.S. Department of Agriculture/National Agricultural Statistics Service

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✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

9:15 a.m.   **A Comparison of Variance Estimates for Schools and Students Using Taylor Series and Replicate Weighting—***Peter H. Siegel, James R. Chromy,* and *Ellen Scheib,* RTI International (U.S.)

9:35 a.m.   **Improved County-Level Estimation of Crop Yield Using Model-Based Methodology with a Spatial Component—***Michael E. Bellow,* U.S. Department of Agriculture/National Agricultural Statistics Service

9:55 a.m.   **Floor Discussion**

Refreshment break (coffee and tea)
10:10 a.m.–10:30 a.m.
room Grand Salon Foyer

Concurrent Sessions 10:30 a.m.–12:10

Session 59 Invited: Challenges and Strategies in Implementing Quality Management Programs
room Picardie A-B
Organizer: *Pamela McGovern,* U.S. Census Bureau
Chair: *Ron McKenzie,* Statistics New Zealand

10:35 a.m.   **Quality Review of Key Indicators Programs at Statistics Canada—***Claude Julien* and *Don Royce,* Statistics Canada

11:00 a.m.   **Quality Improvement in the Office for National Statistics—***Cynthia Clark* and *Frank Nolan,* Office for National Statistics (U.K.)

11:25 a.m.   **Developing a Quality Assurance Program for the U.S. Census Bureau's Business Register—***David Chapman,* U.S. Census Bureau

11:50 a.m.   **Discussant:** *Gunlög Eiderbrant-Nilsson,* Statistics Sweden

12:00 p.m.   **Floor Discussion**

Session 60 Invited: Collecting Data Electronically from Businesses: the Dream and the Reality
room Alfred-Rouleau A
Organizer: *Robert Lussier,* Statistics Canada
Chair: *Robert Lussier,* Statistics Canada

10:35 a.m.   **The Electronic Reporting Option: Does It Make Sense of Cents?—***Thomas Mesenbourg* and *Ronald Lee,* U.S. Census Bureau

11:00 a.m.   **Everything You Wanted to Know about EDR at Statistics Canada!—***Jocelyn Burgess,* Statistics Canada

11:25 a.m.   **Evaluation and Implementation of EDR in School-Based Research—***Lesli Jo Scott* and *Sue Ellen Hansen,* University of Michigan (U.S.)

11:50 a.m.   **Discussant:** *Sven Björkqvist,* Statistics Finland

12:00 p.m.   **Floor Discussion**

Session 61 Topic-Contributed: Generalized Survey Processing Systems, Part 2
room Alfred-Rouleau B
Organizer: *Paula Weir,* Energy Information Administration (U.S.)
Chair: *Chris Mohl,* Statistics Canada

10:35 a.m.   **Statistics New Zealand's Business Model Transformation Strategy: Creating a New Business Model for the National Statistical Office of the 21st Century—***Tracey Savage* and *John Pearson,* Statistics New Zealand

10:55 a.m.   **Generalized Census Processing System at the National Agricultural Statistics Service—***Thomas Jacob* and *Carol House,* U.S. Department of Agriculture/National Agricultural Statistics Service

11:15 a.m.   **StEPS at EIA: Where We Are Now—***Paula Weir* and *Sue Harris,* Energy Information Administration (U.S.)

11:35 a.m.   **Floor Discussion**

Session 62 Contributed: Outlier Detection and Robust Estimation
room Argenteuil
Chair: *Jean-François Beaumont,* Statistics Canada

10:35 a.m.   **Investigation of Macroediting Techniques for Outlier Detection in Survey Data—***Katherine Jenny Thompson,* U.S. Census Bureau

10:55 a.m.   **Winsorization for Estimates of Change—***Daniel Lewis,* Office for National Statistics (U.K.)

11:15 a.m.   **Investigation of Treatment of Influential Values—***Mary Mulry* and *Roxanne Feldpausch,* U.S. Census Bureau

11:35 a.m.   **Outlier Detection and Accommodation for Business Surveys Utilizing Multiple Linear Regression Models—***Robert Philips,* Statistics Canada

11:55 a.m.   **Floor Discussion**

Session 63 Contributed: Factors That Affect Establishment Survey Participation
room Auteuil A-B
Chair: *Hans Kiesl,* Institute for Environmental Research (Germany)

10:35 a.m.   **Survey Burden and Nonresponse: Does More Burden Really Mean Less Response?—***Jaki McCarthy, Daniel Beckler,* and *Suzette Qualey,* U.S. Department of Agriculture/National Agricultural Statistics Service

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

10:55 a.m.   **The Effects of Survey Design Features and Economic Conditions on Business Survey Response Rates**—*Diane K. Willimack,* U.S. Census Bureau

11:15 a.m.   **Like, But Oh, How Different: the Impact of Questionnaire Length and Format in the U.S. Census of Agriculture**—*Jaki McCarthy,* U.S. Department of Agriculture/National Agricultural Statistics Service

11:35 a.m.   **Floor Discussion**

Session 64 Contributed: Sampling Frame and Design Challenges
room **Hospitalité**
Chair: *Marla Smith,* U.S. Environmental Protection Agency

10:35 a.m.   **Evaluation of the NSRCG School Sample**—*Donsig Jang* and *Xiaojing Lin,* Mathematica Policy Research, Inc. (U.S.)

10:55 a.m.   **Sampling for a Highly Skewed Population: Design for National Survey of Residential Care Facilities**—*Margie Byron, Angela Greene, Vince Iannacchione, John Loft,* and *Joshua Wiener,* RTI International (U.S.)

11:15 a.m.   **Improving Efficiency in a Complex Establishment Survey Design: the O*NET Data Collection Program**—*Marcus Berzofsky, Susan McRitchie, Brandon Welch*, and *Rick Williams,* RTI International (U.S.)

11:35 a.m.   **Surveying Schools: Frame, Sampling, and Response Rate Issues**—*Cynthia Bland* and *Karol Krotki,* RTI International (U.S.)

11:55 a.m.   **Floor Discussion**

Lunch on own
12:15 p.m.–1:45 p.m.

Concurrent Sessions 1:45 p.m.–3:25 p.m.

Session 65 Invited: Building and Updating Establishment Registries in Developing Countries
room **Auteuil A-B**
Organizer: *Alex Korns,* Independent Consultant (U.S.)
Chair: *Shyam Upadhyaya,* United Nations Industrial Development Organization

1:50 p.m.   **Updating the Sri Lankan Registry of Industry and the Role of IT**—*Alex Korns,* Independent Consultant (U.S.)

2:15 p.m.   **Register Building and Updating in Developing Countries**—*William Weeks,* United Nations Industrial Development Organization

2:40 p.m.   **Business Register Guidelines for Small Developing Nations**—*Geoff Mead,* Statistics New Zealand

3:05 p.m.   **Discussant***: Eddie Salyers,* U.S. Census Bureau

3:15 p.m.   **Floor Discussion**

Session 66 Invited: Outliers and Influential Observations in Establishment Surveys
room **Picardie A-B**
Organizers: *John Eltinge,* Bureau of Labor Statistics (U.S.), and *Howard Hogan,* U.S. Census Bureau
Chair: *Brian Monsell,* U.S. Census Bureau

1:50 p.m.   **Multivariate Outlier Detection and Treatment in Business Surveys**—*Beat Hulliger,* University of Applied Sciences Northwestern Switzerland

2:15 p.m.   **Influential Observations and Colinearity in Regression Models**—*Ted Chang,* University of Virginia (U.S.), and *Phillip S. Kott,* U.S. Department of Agriculture/National Agricultural Statistics Service

2:40 p.m.   **Characterization and Optimization of Drill-Down Methods for Outliers in Establishment Surveys**—*John Eltinge,* Bureau of Labor Statistics (U.S.)

3:05 p.m.   **Discussant:** *Hyunshik Lee,* Westat (U.S.)

3:15 p.m.   **Floor Discussion**

Session 67 Introductory Overview Lecture: Data Collection
room **Alfred-Rouleau B**
Chair: *Diane K. Willimack,* U.S. Census Bureau

1:50 p.m.   **Multimode Data Collection: Why, When, and How**—*Richard Rosen,* Bureau of Labor Statistics (U.S.)

2:30 p.m.   **Nonresponse Reduction Methods**—*Carl Ramirez,* U.S. Government Accountability Office, and *Jaki McCarthy,* U.S. Department of Agriculture/National Agricultural Statistics Service

3:10 p.m.   **Floor Discussion**

Session 68 Contributed: Design and Response Challenges
room **Argenteuil**
Chair: *Fritz Scheuren,* NORC at the University of Chicago (U.S.)

1:50 p.m.   **Redesigning the German Job Vacancy Survey: Assessing the Impact of High Nonresponse Rates**—*Hans Kiesl* and *Susanne Rässler,* Institute for Employment Research (Germany)

2:10 p.m.   **Determining Subsampling Rates for Nonrespondents**—*Rachel Harter,* NORC at the University of Chicago (U.S.); *Janella Chapline,* University of Chicago (U.S.); and *Traci Mach* and *John Wolken,* Board of Governors of the Federal Reserve (U.S.)

2:30 p.m.   **Business Employment Dynamics: State Gross Job Flows**—*Eric Simants* and *David M. Talan,* Bureau of Labor Statistics (U.S.)

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

2:50 p.m. **Special Features of Sampling Design in Environmental Surveys of Establishments—** *Jorge Saralegui* and *Cesar Berrade*, National Institute of Statistics (INE) (Spain)

3:10 p.m. **Floor Discussion**

Session 69 Contributed: Coordination of Sample Design/Selection between Surveys
room **Alfred-Rouleau A**

Chair: *Jeff Bailey*, U.S. Department of Agriculture/National Agricultural Statistics Service

1:50 p.m. **On Coordination of Pareto pps Samples and Stratified Simple Random Samples—** *Annika Lindblom* and *Alex Teterukovsky*, Statistics Sweden

2:10 p.m. **Optimal Coordination of Samples in Business Surveys—** *Lenka Mach, Jean-Marc Fillion*, and *Ioana Schiopu-Kratina*, Statistics Canada, and *Philip Reiss*, New York University School of Medicine (U.S.)

2:30 p.m. **The Random Sampling/Tracking Tool: a Response to Over-Surveying—** *Steven Graves*, Intel Corporation (U.S.)

2:50 p.m. **Standardization: a Survey of Tobacco Retail Outlets in 50 United States, DC, and Territories—** *Lily Trofimovich*, RTI International (U.S.)

3:10 p.m. **Floor Discussion**

Session 70 Contributed: Reconciliation and Coherence across Surveys
room **Hospitalité**

Chair: *Gunlög Eiderbrant-Nilsson*, Statistics Sweden

1:50 p.m. **Reconciliation of the 2006 Canadian Census of Agriculture with the Farm Register—** *Martin Lachance*, Statistics Canada

2:10 p.m. **The Challenge of Integrating New Surveys into an Existing Business Survey Infrastructure—** *Éric Pelletier*, Statistics Canada

2:30 p.m. **Implementation of the NAICS 2007 Revision in the Bureau of Labor Statistics Programs—** *Amanda Chadwick* and *Michael Searson*, Bureau of Labor Statistics (U.S.)

2:50 p.m. **The Emerging Role of the Head Office in the Canadian Statistical System—** *Tony Dupuis* and *Rob Williams*, Statistics Canada

3:10 p.m. **Floor Discussion**

Refreshment Break (sodas and water)
3:25 p.m.–3:50 p.m.
room **Grand Salon Foyer**

Concurrent Sessions 3:50 p.m.–5:30 p.m.

Session 71 Invited: Surveys of Environmental Protection: Experiences and Challenges
room **Alfred-Rouleau B**

Organizer: *Randy Becker*, U.S. Census Bureau
Chair: *Paul Smith*, Office for National Statistics (U.K.)

3:55 p.m. **Environmental Surveys of Establishments: the Canadian Experience—** *Jeffrey Fritzsche*, Statistics Canada

4:20 p.m. **Experiences in Collecting Data on Environmental Protection Expenditures in Sweden—** *Mats Eberhardson*, Statistics Sweden

4:45 p.m. **Issues and Challenges in Estimating Environmental Expenditures by U.S. Manufacturing: the PACE Survey—** *Randy Becker*, U.S. Census Bureau, and *Ronald Shadbegian*, U.S. Environmental Protection Agency

5:10 p.m. **Discussant:** *Nancy Olsson*, Eurostat

5:20 p.m. **Floor Discussion**

Session 72 Invited: Targeting Intensive Follow-up of Nonrespondents in Establishment Surveys
room **Hospitalité**

Organizer: *Greg Griffiths*, Australian Bureau of Statistics
Chair: *Ron McKenzie*, Statistics New Zealand

3:55 p.m. **Realizing Value from Follow-up of Nonresponse in ABS Business Surveys—** *Greg Griffiths, Dina Neiger, Matt Ashton*, and *Louise Gates*, Australian Bureau of Statistics

4:20 p.m. **A Strategy for Prioritizing Nonresponses Follow-up To Reduce Costs Without Reducing Output Quality—** *Gareth James*, Office for National Statistics (U.K.)

4:45 p.m. **Prioritizing Follow-up for the Canadian Quarterly Survey of Financial Statistics—** *Pierre Daoust*, Statistics Canada

5:10 p.m. **Discussant:** *Clyde Tucker*, Bureau of Labor Statistics (U.S.)

5:20 p.m. **Floor Discussion**

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

Session 73 Topic-Contributed: Identifying Nonprofit Organizations and Measuring Their Activity through Establishment Surveys and Administrative Records

room **Argenteuil**

Organizer: *Martin H. David,* Urban Institute (U.S.)
Chair: *John Czajka,* Mathematica Policy Research, Inc. (U.S.)

3:55 p.m. **Nonprofit Organizations in Hungary: Methodology for Estimating the Evolution of the NGO Sector—** *István Sebestény,* Civitalis (Hungary)

4:15 p.m. **Panel Analysis of NGOs in Germany: Design and Preliminary Results—** *Lutz Bellmann* and *Christian Hohendanner,* Institute for Employment Research (Germany)

4:35 p.m. **Combining Administrative Records and Business Registers To Obtain Quarterly Estimates of Employment in the Nonprofit Sector in the USA—** *Martin H. David,* Urban Institute (U.S.)

4:55 p.m. **State of the Sector Panel: Design and Execution of a Panel of NGO Organizations in the U.K.—** *Carol Goldstone,* Carol Goldstone Associates (U.K.)

5:15 p.m. **Floor Discussion**

Session 74 Contributed: Evolution of Web Reporting in Establishment Surveys

room **Alfred-Rouleau A**

Chair: *David Desroches,* Mathematica Policy Research, Inc. (U.S.)

3:55 p.m. **Comparing Alternative Approaches for Displaying Edit Messages in Web Forms—** ✱*William Mockovak,* Bureau of Labor Statistics (U.S.)

4:15 p.m. **The Evolution of Web Surveys at the U.S. Department of Agriculture's National Agricultural Statistics Service—** *Linda Gregory,* U.S. Department of Agriculture/National Agricultural Statistics Service, and *Kathleen Ott,* U.S. Census Bureau

4:35 p.m. **Effects of Offering Web Questionnaires as an Option in Enterprise Surveys: the Swedish Experience—** *Johan Erikson* and *Eva Furubjelke,* Statistics Sweden

4:55 p.m. **Respondent Acceptance of Web and Email Data Reporting for an Establishment Survey—** *Louis Harrell, Antonio Gomes, Richard Rosen,* and *Hong Yu,* Bureau of Labor Statistics (U.S.)

5:15 p.m. **Floor Discussion**

Closing dinner
with cash bar

6:30 p.m.–9:15 p.m.
room **Grand Salon A/B/C**

Salad: Caesar salad and soup of the day

Entrée: Herb-crusted chicken breast with savory stuffing

Vegetarian entrée (substitution): Grilled vegetables

Heart-healthy entrée (substitution): Grilled salmon

Dessert: Dessert of the day

Session 75 Contributed: Issues in Survey Redesign 2

room **Picardie A-B**

Chair: *Daniel Beckler,* U.S. Department of Agriculture/National Agricultural Statistics Service

3:55 p.m. **Sharing Best Practices for the Redesign of Three Business Surveys—** *Charles Tardif,* Statistics Canada

4:15 p.m. **Survey of Electronic Commerce and Technology: Past, Present, and Future Challenges—** *Jason Raymond,* Statistics Canada

4:35 p.m. **Fixed Panel Survey of Hospitals: Sampling and Estimation Challenges—** *Darryl Creel,* RTI International (U.S.)

4:55 p.m. **Enhancing the Quality of Price Indexes—** *Zdenek Patak* and *Jack Lothian,* Statistics Canada

5:15 p.m. **Floor Discussion**

Cash bar

5:30 p.m.–6:30 p.m.
room **Grand Salon Foyer**

Closing dinner with cash bar

6:30 p.m.–9:15 p.m.
room **Grand Salon A/B/C**

Session 76 Panel Discussion: The Future of Using Administrative Data Sources for Statistical Purposes

7:45 p.m.–9:15 p.m.
room **Grand Salon A/B/C**

Chair: *Howard Hogan,* U.S. Census Bureau
Moderator: *Fritz J. Scheuren,* NORC at the University of Chicago (U.S.)
Panelists: *Heli Jeskanen-Sundström,* Statistics Finland, *Stephen Penneck,* Office for National Statistics (U.K.), and *Don Royce,* Statistics Canada

Conference adjourns

9:30 p.m.

✱ A substitute will present this paper on behalf of the authors. See Page 31 for substitutions.

✳Speaker Substitutions

Session 3: Steps to Provide Quality Industrial Coding for a Business Register
Franklin Winters will present Making Quality Improvements to an Automated Industry Coding Application for U.S. Business Establishments
Andrew Allen will present Implementing Coding Tools for a New Classification

Session 8: Design and Analysis Challenges
Ruth Detlefsen will present Can We Continue To Exclude Small, Single-Establishment Businesses from Annual Survey Data Collection?

Session 10: Commodity Flow Surveys
Ruth Detlefsen will present Designing the 2007 Commodity Flow Survey

Session 13: Nonresponse Reduction Strategies 1
Anne Russell will present Improving the Effectiveness of Interviewer-Administered Surveys through Refusal Avoidance Training

Session 14: Variance Estimation
Samson Adeshiyan will present Random Group Variance Adjustments When Hot Deck Imputation Is Used To Compensate for Nonresponse

Session 19: Designing Survey Materials from the Respondents' Perspectives
Anne Russell will present Working with Respondents To Improve Relevancy of Inventory Statistics
Anne Russell will present Using Focus Groups To Improve Response in Monthly Surveys

Session 22: Uses of Metadata for Establishment Survey
Mark E. Wallace will present Experiences with Developing and Using Metadata-Driven Processing Systems for the Economic Census

Session 24: Electronic Data Collection Modes for Establishment Surveys
Shirin Ahmed will present Using Software To Collect Data Electronically for the Economic Census

Session 25: Employment Dynamics
Eric Simants will present Measurement of Establishment Birth and Death in Business Employment Dynamics

Session 27: Nonresponse Reduction Strategies 2
Norman Bennett will present Incentives in Surveys of Farmers

Session 34: Treatment of Nonresponse
Samson Adeshiyan will present Redefining the Unit Nonresponse Adjustment Cells for SORAR

Session 35: Improving Statistics on the Subnational Public Sector
Martin Brand will present Better Information for Regional Government

Session 39: Updating of Business Registers
Ruth Detlefsen will present An Evaluation of Changes to Universe Extraction Editing for Current Business Surveys

Session 51: Response Management Strategies in Statistics Canada and the U.S. Census Bureau
Shirin Ahmed will present Company-Centric Communication Approaches for Business Survey Response Management

Session 74: Evolution of Web Reporting in Establishment Surveys
Kathy Downey will present Comparing Alternative Approaches for Displaying Edit Messages in Web Forms

Abstracts

Short Courses

Introduction to Survey Methods for Businesses and Organizations

Paul P. Biemer, RTI International and The University of North Carolina (U.S.), and *David Cantor,* Westat (U.S.)

This course is structured around the concept of Mean Square Error (MSE), which gives a systematic approach to evaluat¬ing problems and quality in data collection. Sources of error that contribute to the MSE include specification error, frame error, nonresponse error, measurement error, and processing error. Each of these sources of error will be illustrated using examples from organizational surveys conducted for the fed¬eral government and private sponsors. We will discuss ways of evaluating and reducing error, concentrate attention on nonsampling error, and describe techniques for understand¬ing and improving data quality.

Small-Area Estimation

Ray Chambers, University of Wollongong (Australia)

This course will focus on methodological issues that arise when adapting standard methods of population estimation used in business surveys to regional estimation and newly developed robust approaches that explicitly allow for the heterogeneity in business survey data. Extensions to esti¬mation of the distribution of business performance within small areas also will be described. Where possible, methods described in the course will be illustrated using actual busi¬ness survey data.

Nuts and Bolts of Web Surveys

Reg Baker, Market Strategies, Inc. (U.S.)

The first part of this course will focus on the 'mechanics' of web surveys and include topics such as soft¬ware selection and use, survey testing and quality assurance, and sample acquisition and contact methods. The second part will discuss screen design and question presentation by covering several important topics, such as survey navigation, presentation of standard question types, use of color, and im¬pact of images. In addition, we will discuss lessons learned from two recent establishment surveys: the 2006 Cyber Security Sur¬vey and the 2005 A Matter of Degree Program.

Question Testing for Establishment Surveys

Kristin Stettler, U.S. Census Bureau, and *Fran Featherston,* National Science Foundation (U.S.)

This course will cover methods and techniques for question testing with a focus on their application in surveys of estab¬lishments. Key differences between establishment and general population surveys will be discussed, and we will provide examples of how question-testing methods—such as expert review, feasibility studies (i.e., company/site visits), cognitive interviewing, focus groups, and pilot tests—are affected by these differences. The emphasis will be on practical advice for conducting question testing.

Session 1: Keynote Address

Business Surveys: Past, Present, and Challenges for the Future

Robert W. Edwards, International Monetary Fund

As director of the statistics department at the International Monetary Fund, Edwards plays a key role in fostering the highest quality standards for consistency, coverage, and transparency in economic and financial statistics. Working with countries around the world, he promotes the implementation of best practices in statistics in order to enhance the quality of national statistical systems and the data they provide to users. ICES-III conferees will learn insights from Edward's global experience and understanding of the requirements of both producers and users of official statistics.

Session 2: Software Demonstrations

SD-1: Windows Interface to X-12-ARIMA

Roxanne Feldpausch and *Kathleen McDonald-Johnson,* U.S. Census Bureau

X-12-ARIMA is a DOS-based time series and seasonal adjustment software package developed by the U.S. Census Bureau. To run X-12-ARIMA, users are required to create a specifications file ("spec file") containing input options and type commands at a command prompt. We have created a new graphical user interface for X-12-ARIMA. It allows the user to create an X-12-ARIMA spec file without having to know the proper syntax and to run X-12-ARIMA with the click of a button.

SD-2: Interactive Data Analysis System (IDAS)

Jeff Bailey, U.S. Department of Agriculture/National Agricultural Statistics Service

The National Agricultural Statistics Service (NASS) developed an Interactive Data Analysis System (IDAS), designed to help analysts get a "feel" for the survey data and to detect data values that greatly influence the level of the estimates. The system is LAN-based, written with SAS Applications Frames (AF). The IDAS analysis is applicable to any organization collecting large amounts of continuous data. Features include the identification of "risky" records early in the survey process; provision of analytical editing based on relationships across records, graphical representation of the data, "drill down" ability to view detailed information for individual records; and utilization of "traffic lighting" to identify data values that should be reviewed closely.

SD-3: System for Estimation of Variance Due to Nonresponse and Imputation (SEVANI)

Cynthia Bocci and *Jean-François Beaumont,* Statistics Canada

SEVANI version 1.10 is a SAS-based prototype system designed to estimate nonresponse and imputation variances when a domain total or mean is estimated. Estimation of the sampling variance will be included in version 2.0. SEVANI handles situations where nonresponse has been treated by deterministic or random linear regression imputation, auxiliary value (cold-deck) imputation, nearest-neighbour imputation, or a nonresponse weight adjustment. Because nonresponse is not controlled, a nonresponse model is required for proper variance estimation. When imputation is used to treat nonresponse, weaker nonresponse model assumptions can be made by incorporating imputation model assumptions. Version 1.10 will be presented, although glimpses of version 2.0 will be available.

SD-4: Voxco Command Center

Louis Tanguay and *Vincent Auger,* Voxco (Canada)

Voxco Command Center provides a comprehensive set of web-based tools for creating and managing surveys in various mode combinations. Modes currently available are CATI (outbound and/or inbound telephone surveys with or without predictive dialing), CAWI (self-administered web surveys), CAPI (laptop surveys with automated synchronization), IVR (automated inbound telephone surveys with telephone keypad entries), and asynchroneous CAPI with the Blackberry device. The common survey scripting engine enables easy creation and testing of surveys at any level. Multilingual surveys are supported (Asian and non-Latin character sets are allowed in CATI/CAWI/CAPI modes.). QA includes a built-in configurable random response generator and audio-video monitoring. The collected data can be exported to industry standard files, including SAS and SPSS.

SD-5: GENeralized Enhanced Sampling and Information System (GENESIS)

Teresa Lopez and *Brian Richards,* U.S. Department of Agriculture/ National Agricultural Statistics Service

GENESIS was developed by the National Agricultural Statistics Service as a single, standardized sampling system that provides tools to support a spectrum of users, from sample design professionals to the occasional sampler in the field office. The system was developed to be easy to use and easy to modify in order to accommodate new techniques and procedures. The GENESIS demonstration will cover each of the four processes of the system: selection of the "best" control data from multiple sources, definition and classification of the population, sampling, and analysis.

SD-6: NASS CASIC Survey Information System

Emily Caron, U.S. Department of Agriculture/National Agricultural Statistics Service

One of the highest priorities of NASS is to develop and improve survey administration capabilities in its six Data Collection Centers (DCC) concerning costs, response rates, case management, and enumerator performance. In response to that priority, the NASS CASIC Section has developed a Survey Information System (SIS) that ties data together from the Blaise CATI history file, survey response data, NASS Blaise Interviewer database, and National Association of State Departments of Agriculture (NASDA) cost data to give NASS DCC coordinators and NASDA supervisors the information they need on a daily basis to manage their data collection efforts. Our presentation will demonstrate the functionality of the CASIC SIS and show reports that can be generated from the system.

Session 3 Invited: Steps to Provide Quality Industrial Coding for a Business Register

Making Quality Improvements to an Automated Industry Coding Application for U.S. Business Establishments

Michael Kornbau, Julie Bouffard, and *Michelle Vile,* U.S. Census Bureau

In 2003 and 2004, the U.S. Census Bureau developed a methodology for the automated assignment of industry classifications to new business establishments based on common name, business description, and NAICS patterns discovered from clerical coding of EIN applications at the Social Security Administration (SSA). The bureau and SSA placed an automated coding application into production to assign a partial or complete NAICS code to at least 60% of new business births. The application consists of five coding dictionaries and an algorithm to match electronic name and description from new businesses against

the coding dictionaries to assign the NAICS code. We will present bureau results and experiences from the first two years of using the auto coder, including revisions to the original application and a description of a quality-control procedure.

Implementing Coding Tools for a New Classification

John Perry, Office for National Statistics (U.K.)

The U.K. introduced automated coding tools for coding descriptions of business activity as a means to move from its 1980 to its 1992 industrial classification system, the latter being an extension of the European NACE Rev 1 standard. The tools provided consistency of coding of source data for the first time. A minor change to the classification system in 2003 resulted in an adaptation of the coding tool and guidelines for future work. Closer work with the administrative departments and modernization of the ONS computing systems have resulted in further development of coding tools. This has provided a good basis for using such tools in the introduction of the new European classification, NACE Rev 2, in 2007.

The Many Ways of Improving the Industrial Coding for Statistics Canada's Business Register

Yanick Beaucage, Statistics Canada

As part of its redesign, Statistics Canada's Business Register (BR) team is looking at ways to improve and standardize both manual and automated coding of the industrial classification of Canadian businesses. This presentation will highlight a number of issues. For new entrants, we will select for coding units that are more relevant to survey needs. For survey feedback, we will allow interviewers to do frame updates directly on the base, but will do quality evaluation of their work to monitor their performance. For coding, we will promote the use of new tools to standardize the process. To assess the classification on the actual BR, we will develop a monthly survey to produce timely results. Finally, to improve coding, we will explore ways of making the automatic coding better by studying the dictionary and parsing rules used and possibly implementing partial coding.

Session 4 Invited: Measurement of Service Sector Statistics: Challenges and Achievements

The Statistical Measurement of Services: Recent International Achievements and What Next?

William Cave, Organization for Economic Cooperation and Development

Services are increasingly important in modern economies. Rapid developments in the internet and telecommunications allow a wider range of services to be delivered from remote locations. This has inevitably led to an internationalization of services production. I will discuss policy needs to understand the effect of services on the performance of modern economies and the most pressing measurement problems. I also will provide an overview of recent actions undertaken by international organizations and expert groups to improve the measurement of services and progress made. I will conclude with suggestions for future development and priorities related to measuring services.

Strategic Vision for the Voorburg Group on Services Statistics

Louis Marc Ducharme, Statistics Canada

Dynamism that characterizes the service sector of the economy and the increased interest and focus from policymakers on this sector have put more pressure on statistical agencies to produce better and more comprehensive statistical data. In the context of scarce resources, the development of statistical measures for complex service activities calls

for better planning of the international and national statistical production and more collaboration among statistical agencies to answer these emerging user needs. In this spirit, the Voorburg Group was created to act as an active forum to develop classifications, concepts, methodologies, and best practices related to the measurement of the service sector. I will present the issues and choices facing the development of services statistics.

Implementing a Coordinated Approach to Improving Services Source Data Inputs to Gross Domestic Product Statistics

Mark E. Wallace and *John Murphy,* U.S. Census Bureau

The initial testing of the North American Product Classification System (NAPCS) products in the 2002 Economic Census included new or revised inquiries for more than 86 service industries. As the NAPCS development continued, products for substantially all NAICS service industries were available for incorporation into the 2007 Economic Census. We will provide an overview of a completely new review process for determining NAPCS service products for inclusion in the 2007 Economic Census. The new process targets internal cooperation, external consultation, and improvements in the comparability and usefulness of data across programs and organizations in the U.S. statistical system, especially benefiting producer price indices and national accounts.

Session 5: Introductory Overview Lecture: Data-Processing Activities

Editing and Coding

Katherine Jenny Thompson, U.S. Census Bureau

I will give a general overview of common editing practices with occasional forays into accompanying coding information. The focus of this talk will be on methods for designing useful edit-test procedures for new or ongoing surveys; in doing this, we will provide formal definitions for many useful edit categories, such as range, ratio, and balance edits. We will use a fictional economic survey questionnaire to provide motivating examples for each type of micro-edit discussed. The talk will cover "best practices" for edit-developers, garnered from my experience and the literature. Special topics, such as macro-editing, will be introduced in the context of strengthening micro-edit systems.

Integrated Editing/Imputation

Ton de Waal, Statistics Netherlands

To edit data arising from business surveys, many techniques (e.g., manual editing, selective editing, automatic editing, and macro-editing) are applied at statistical offices. The same holds true for imputation (e.g., regression imputation, hot-deck imputation, and ratio hot-deck imputation). In this presentation, I will examine how various editing and imputation techniques can be integrated into an efficient and effective overall edit and imputation strategy, while ensuring the edited and imputed data are consistent with the edit rules.

Session 6 Contributed: Questionnaire Design and Testing

Cognitive Aspects Associated with Sample Selection Conducted by Respondents in Establishment Surveys

La Toya Barnett, Rebecca Morrison, and *Grace O'Neill,* U.S. Census Bureau

The Commodity Flow Survey (CFS) is a self-administered mail survey measuring U.S. product movement that is conducted every five years

by the U.S. Census Bureau for the Bureau of Transportation Statistics. It covers company information, sample selection, and the use of third-party logistics providers (3PLs). Respondents are instructed to select samples of shipment records to complete the survey. Recently, the bureau conducted three rounds of cognitive interviews where the interviewer and respondent were at the company's location. We will address four issues: the cognitive process respondents use to select a sample, the cognitive requirements respondents are supposed to use to select a sample, identifying sources of confusion and error, and suggestions for instrument redesign that may increase the ease and accuracy of the sample selection process, thus improving data quality.

Record-Keeping Studies: Love 'Em or Leave 'Em

Jeri Mulrow, National Science Foundation (U.S.), and *Stanley Freedman,* Energy Information Administration (U.S.)

Record-keeping studies often are used to validate data and correct reporting problems on existing surveys. Their use in the survey-development process, while not new, is not as well-developed. We will describe an effort by the National Science Foundation to use the technique as part of a redesign effort of their Survey of Industrial Research and Development. Specifically, we will focus on how companies operating in the U.S. organize, conduct, and keep records on research and development and related activities. We will discuss our findings and uses of the study, strengths and weaknesses of the approach to meet the objectives, and lessons learned. We also will discuss how willing companies were to talk with us, what types of information they were willing to share, and how we plan to use this information to improve our survey.

A Comprehensive Redesign of a Questionnaire Measuring Foreign Direct Investment

Alfred D. Tuttle and *Rebecca Morrison,* U.S. Census Bureau, and *David Galler,* Bureau of Economic Analysis (U.S.)

In 2004, the U.S. Census Bureau began working with the Bureau of Economic Analysis to assist its redesign of surveys collecting foreign direct investment data with the goals of reducing response burden and improving the accuracy of reported data. The bureau first conducted background research with BEA analysts and respondents to understand the sources of measurement error. From these initial investigations, the bureau made recommendations for a new form based on best practices in form design, as well as some innovations in graphic design and placement of instructions, which it tested and refined across five rounds of cognitive interviews. BEA mailed a complete pilot questionnaire in June 2006, which the bureau evaluated via respondent debriefings and qualitative and quantitative analyses of edit failures. We will describe the complementary methods used and the findings from each stage of research.

Developing Satisfaction Surveys: Integrating Qualitative and Quantitative Information

David Cantor, Sarah Dipko, Stephanie Fry, Pamela Giambo, and *Vasudha Narayanan,* Westat (U.S.)

We will describe the methods used to develop two satisfaction surveys administered to medical providers by the Center for Medicare and Medicaid Services. Satisfaction surveys for establishments pose different challenges than surveys that collect factual data from records. To ensure a thorough evaluation, the survey development involved collecting both qualitative and quantitative data. Qualitative data involved obtaining feedback on the questionnaire from experts of each domain covered and conducting a series of cognitive interviews. Quantitative data included behavioral coding and psychometric infor-

mation from the administration of the surveys the previous year. We will describe the types of problems identified from each source and the strengths and weaknesses of each evaluation method.

Session 7 Contributed: Weighting Issues in Estimation

Multipurpose Small-Area Estimation

Hukum Chandra, University of Southampton (U.K.), and *Ray Chambers,* University of Wollongong (Australia)

Sample surveys are generally multivariate in that they measure more than one response variable. In theory, each variable can be assigned an optimal weight for estimation purposes. However, it is often a distinct practical advantage to have a single weight used with all variables. We will describe how such multipurpose sample weights can be constructed when small-area estimates of the survey variables are required. The approach is based on the model-based direct (MBD) method of small-area estimation described in Chambers and Chandra (2006). Empirical results reported in this paper show that MBD estimators for small areas based on multipurpose weights perform well across a range of variables that are often of interest in business surveys. Furthermore, these results show that the proposed approach is robust to model misspecification and efficient for the variables ill-suited to standard methods of small-area estimation (e.g., variables that contain a significant proportion of zeros).

Applying Statistical Methods Originally Developed for Household Surveys to Establishment Studies

Angela Pitts, Marcus Berzofsky, and *Michael Witt,* RTI International (U.S.)

Over the last 20 years, statisticians at RTI have enhanced and developed various survey design and analysis methodologies for household and list-based surveys. These efforts were undertaken to improve the mean square error of estimates resulting from the surveys and to further optimize the design of the studies by reducing data collection costs and schedules and minimizing the effect of nonsampling errors. We will summarize the benefits of using these survey methodologies and discuss our experience applying them to establishment studies. In particular, we will examine the benefits of multistage area probability sampling techniques, selecting stages proportional to a composite size measure, selecting units using Chromy's minimal replacement technique, and computing final weight adjustment factors using a model-based technique.

Annual Growth Rates Derived from Short-Term Statistics and Annual Structural Business Statistics

Pieter Vlag and *Koert van Bemmel,* Statistics Netherlands

During the last five years, annual growth rates derived from short-term statistics are slightly, but systematically, lower than growth rates derived from annual structural business statistics. Investigation revealed that this difference, observed in the Netherlands, is mainly related to a different weighting scheme. Enterprise populations, to which the survey data of both the short-term statistics and the annual business statistics are weighted, are based on the business register of Statistics Netherlands. However, for the short-term statistics, the enterprise population is corrected for administrative changes in the register between two successive periods. This correction is not applied to the annual business statistics. Other differences between short-term and annual statistics are related to the estimation for the number of inactive enterprises, outlier detection, and weighting of enterprises with changing activities. A simulation study showed that annual growth rates derived from short-term statistics and annual business statistics

are similar, if the same populations and outlier procedures are used. When applying the latter, however, the month-to-month growth rates of the short-term statistics are more scattered. The most likely explanation is that accidental fluctuations in the data become more visible, because the short-term statistics are based on a relatively small survey. To reduce this problem, Statistics Netherlands is conducting a simulation study by combining survey data with administrative sources.

Switching from Retrospective to Current-Year Data Collection in the Medical Expenditure Panel Survey - Insurance Component

Anne Kearney, U.S. Census Bureau, and *John P. Sommers,* Agency for Healthcare Research and Quality (U.S.)

The MEPS-IC is a national survey of approximately 44,000 establishments and governments that produces national and state-level estimates of insurance availability and costs through employers. Under the current design, MEPS-IC collects data retrospectively (i.e., respondents are asked to report data for the year prior to the current calendar year). We researched the ramifications of collecting data from the current calendar year, making the resulting estimates timelier. In order to switch to current-year data collection, we have to address frame and nonresponse adjustment and post stratification issues, as the data used in these operations will be one year older than under the retrospective design. We will present the methodology used to address and overcome some of these obstacles and make recommendations on the feasibility of switching to a current-year design.

Session 8 Contributed: Design and Analysis Challenges

Can We Continue To Exclude Small, Single-Establishment Businesses from Annual Survey Data Collection?

Kari Clark and *David Kinyon,* U.S. Census Bureau

With a new sample introduced for the 2005 Annual Retail Trade Survey (ARTS) and Service Annual Survey (SAS), the U.S. Census Bureau researched ways of reducing respondent burden and data-collection costs. A method used in the prior sample excluded small, single-establishment businesses from data collection for industries in which few data items besides sales were collected. Using data from the 2003 ARTS and SAS, we conducted research to evaluate the effect of this method on the survey estimates. Due to data items added over time, we could not limit our research to certain industries. Also, we revised the cutoff-based methodology used for identifying small businesses to account for more current, better-correlated data. We will detail the creation and implementation of the cutoffs, evaluation of the change in estimates, and final decisions reached for the 2005 surveys.

Improvements in Stratification in the U.K.'s Office for National Statistics

Pete Brodie and *Kevin Moore,* Office for National Statistics (U.K.)

ONS is in the process of designing a survey to update the business register and produce employment statistics. We will describe some of the analyses conducted to investigate ways for ONS to improve stratification in its business surveys and highlight the three main improvements in stratification. We also may discuss possible improvements to other surveys.

Agriculture and the Environment: a Robust Approach to Commodity-Based Stratification

Martin Pantel, Statistics Canada

The Farm Environmental Management Survey (FEMS) collects information on environmental practices carried out in Canada's agricultural

sector. Its 2007 edition uses up-to-date information from the 2006 Census of Agriculture to help develop the survey frame. Because crop farms deal with different environmental issues than livestock farms, FEMS is split into two modules, each with its own questionnaire. Thus, each farm must be identified as a candidate for the crop module or for the livestock module, or for either one (to reduce response burden, no farm will receive both). A commodity-based classification approach was developed to better address the environmental issues targeted by the survey. I will describe this new approach and compare it to existing methods, give an overview of some of the associated methodological challenges, and offer some preliminary results.

Comparing Estimation Methods in Product Surveys
Ismo Teikari, Statistics Finland

Production statistics are classified according the PRODCOM-list, used in EU sales and production statistics and including some 5,700 selected products. Due to the 5,700 product headings, there are many headings that have only one producer. This makes it difficult to control all products. In Finland, establishments having more than 10–20 persons are surveyed every year. This minimum varies between the activity classes. To diminish the size of surveys, the establishment unit will be replaced by the enterprise unit. Further, the small enterprise, having 10–20 employees, will be rotated so all enterprises in this group are surveyed every second year. A traditional sample survey using the sample weight is not possible due to the products with one producer. Therefore, some products will not be included, while the values of other products are increased when compared to the right value. I will compare the rotation method with traditional sampling methods. Also, I will study how many producers are required to have good estimates.

Session 9 Invited: The New Direction of Business Surveys: The Integrated Approach

Unified Enterprise Survey: New Horizons
Daniela Ravindra and *Marie Brodeur,* Statistics Canada

Since the late 1990s, Statistics Canada has used an integrated approach to economic surveys. After the initial few years, the UES reached a period of maturity that allowed users to derive significant benefits in terms of efficient use of resources, coherent data, and consistency of process. However, response burden was becoming an issue due to the additional demands made on business to report more detail. So, a concerted effort was made to streamline the process by reducing questionnaire content. At the same time, administrative files from Canada Revenue Agency were becoming of better quality. Consequently, all UES surveys use tax data for both direct replacement of survey data and estimation purposes. We will focus on the efforts channeled into further mining the power of tax data to alleviate response burden.

Integration of Annual Economic Collections in the Australian Bureau of Statistics
Eden Brinkley, Australian Bureau of Statistics

The Australian Bureau of Statistics (ABS) has had a broad theoretical framework, covering key elements of its annual economic collections, but the application of this framework has been inconsistent across collections. Moreover, the annual program's key client, the National Accounts Branch in the ABS, had raised concerns about the "fitness for purpose" of the annual industry estimates, and they were sometimes resorting to using alternative sources for selected industries to benchmark the national accounts. Specifically, when compared to data from other sources, estimates for some industries did not always look plausible. Many industries also lacked the regular product detail

required. To address these concerns, a project was established in late 2003 to progressively integrate the current suite of annual accounting-based collections into a single system, known as the Annual Integrated Collection (AIC). I will provide an overview of ABS' effort to create a more integrated program of annual collections through the AIC. Key elements relating to the design and operation of the AIC will be discussed.

A Statistical Architecture for Economic Statistics
Ron McKenzie, Statistics New Zealand

To deal with the increasing and diverse demands of users, Statistics New Zealand developed a statistical architecture to support the range of economic statistics required for the next few decades. The foundation is a dataset of core information about every business in the economy. This database will allow links between businesses and employees and support longitudinal analysis of firm development. The collection strategy will shift from dependence on postal surveys to an emphasis on administrative data wherever possible, with surveys only being used to fill the gaps. A database approach will be adopted for the largest businesses. The tax-based business register will integrate survey and administrative data. The volume of data being collected directly from businesses should be reduced, while the range and usefulness of the statistical information produced will increase.

Session 10 Invited: Commodity Flow Surveys

Swedish Commodity Flow Surveys Evaluated: Statistics Sweden's Experiences and Survey Adjustments Since 2001
Lars Werke, Statistics Sweden

The Swedish CFS is the only full-scale commodity flow survey in Europe. Its design and approach has been based on the U.S. CFS, but the survey has developed to meet the changing data needs of our commissioner. With the use of administrative data and specific industry surveys, the Swedish CFS is now a set of surveys that also covers flows of forestry and flows from the agricultural sector and more specific commodity groups. The 2004/2005 version is still based on a questionnaire with three samples, but the part originating from other data sources has increased. I will focus on the background of this expansion.

Using Electronic Data from the Carriers in the Canadian Trucking Commodity Origin/Destination Survey
François Gagnon and *Krista Cook,* Statistics Canada

The estimates produced by the Canadian Trucking Commodity Origin and Destination Survey include total tonnage transported by commodity type and revenue by origin and destination of the shipments. A sample of carriers is selected at the first stage. At the second stage, for each carrier selected, a period of time is randomly selected. At the third stage, a systematic sample of shipping documents is selected via personal onsite visits, while, at the fourth stage, a systematic sample of shipments is selected from each shipping document. We will present the pros and cons of collecting from the trucking companies (not from the shippers) and the advantages of collecting electronic data.

Designing the 2007 Commodity Flow Survey
Scot Dahl and *William Davie, Jr.,* U.S. Census Bureau

The Commodity Flow Survey produces data on the movement of goods in the United States. Auxiliaries are establishments of large companies that provide support to the rest of the company. In the past, many sampled auxiliaries turned out to be nonshippers, and our measures of shipping activity were poor. In 2006, we mailed a one-page survey form to all auxiliaries on the U.S. Census Bureau's busi-

ness register. Responses to this survey were used to classify establishments as shippers or nonshippers and to determine a measure of size. For the sample design, we identified industries with large amounts of HAZMAT shipments to better stratify the sample to capture this activity, and we used the auxiliary data collected earlier. The design was optimized subject to geographic constraints. We will discuss these activities, conducted to improve the quality of the frame and the 2007 sample design.

Session 11: Introductory Overview Lecture: Business Register/Sampling Frames

Business Register in Economic Statistics: Content, Roles, and Place

Jean Ritzen, Statistics Netherlands

We have seen a rapidly increasing awareness of the importance of comparability between individual statistics and statistics of different countries. As a result, business registers are considered the backbone in the systems of business economic statistics. This lecture will focus on the role of the high-quality business register as the linchpin for high-quality, and thus comparable, business economic statistics. I will examine the basic content of the register and its several purposes and functions. I also will discuss the distinction between statistical and administrative registers. Because of the high cost of maintaining a register, I also will highlight the continuing search for improving update strategies.

Definitions and Units

Andreas Lindner, Organization for Economic Co-operation and Development

Increasing globalization and economic integration require more cross-country comparisons and analyses for a more comprehensive understanding of economic phenomena and processes. However, this task is complicated by a lack of harmonization of statistical concepts and definitions and the risk of comparing the noncomparable. Much effort has been made to better conceptualize and align national practices, in particular within the European Union (EU), but more needs to be done to universally 'translate' concepts and wording and 'bridge' statistically between EU and non-EU countries. I will address key issues in globalization analysis and focus on new needs, such as linking business statistics with trade statistics, the statistical treatment of enterprise groups, multinationals, and intrafirm transactions.

Session 12 Contributed: Issues in Survey Redesign 1

How To Draw a Sample for Estimating the Change in Labor Costs

Seppo Laaksonen and *Outi Ahti-Miettinen,* Statistics Finland

The Finnish labor cost index is under re-engineering with several targets, one being to improve the estimation of the change in labor costs. This requires paying attention to cross-sectional estimates. Estimates are needed for both the whole private sector and main industries. This is the reason we take advantage of power allocation. To benefit from size classification, allocation was carried out in two steps: first to industries, and then to size classes within industry. Cross-sectional estimates are based on standard formulae, and can be estimated well, although some informative nonresponse will appear. After getting as accurate point estimates as possible, we discuss change estimation, in

which we can take advantage of the overlapping part of the two annual samples. An awkward drawback will be the changes in enterprises; that is, births, deaths, merges, and so on.

Developing and Implementing a Survey on Intermediate Consumption for the Service Sector in Sweden

Cecilia Hertzman, Annika Lindblom, and *Fredrik Nilsson,* Statistics Sweden

Information about the intermediate consumption for the service sector is an important input in the national accounts. Until now, there has been no regular data collection in this area. From the Structural Business Statistics (SBS) information about Raw materials and consumables and Other, expenses are collected. These aggregated variables are then further specified. To collect data on Raw materials and consumables, a gross list of goods and services considered common to each sector is provided. The combined nomenclature is used for this purpose. To collect data on Other expenses, information from the income and balance sheet statement has been used. From the SBS, we know the values of our main variables. The surveys can, therefore, be limited to obtaining estimates for relative distributions, rather than estimates of unknown totals.

What Does It Take To Renew a 53-Year-Old Survey: a Face Lift or Reconstructive Surgery?

John Jankowski, Jeri Mulrow, and *Brandon Shackelford,* National Science Foundation (U.S.)

Since 1953, the NSF Survey of Industrial Research and Development has collected data annually on the nation's research and development expenditures. The survey has evolved over the years, but a systematic and comprehensive review was needed. In 2004, the NSF embarked upon a series of activities designed to evaluate and renew the survey. The question presented here is "What did it take to renew this 53-year-old survey?" We will present a case study of the NSF efforts and discuss a series of activities undertaken to evaluate all aspects of the survey, starting with the content and user needs, going through frame development and sampling, continuing into data collection, and coming back to data presentation and dissemination to match user needs. We will discuss staff resources, scheduling, and timing issues and challenges to evaluating and renewing an ongoing, long-standing survey. We will end with lessons learned and next steps.

Adding New Data Elements to an Ongoing Survey: Operational and Response Issues

Richard Rosen, Patricia Getz, David O'Connell, and *Kenneth Robertson,* Bureau of Labor Statistics (U.S.)

The Current Employment Statistics (CES) survey, conducted by the Bureau of Labor Statistics is a large monthly establishment survey. CES collected employment, payroll, and hours information from a sample of about 400,000 nonfarm establishments. Since its inception more than 50 years ago, CES has collected payroll and hours information for only a subset of all workers. In 2005, CES decided to add collection of payroll and hours for all workers to the current CES form. In addition, CES decided to add a more comprehensive measure of payroll to the form. Collection of these new data elements posed a number of challenges to both the survey operation and respondents. Numerous systems had to be updated, including five data capture systems, editing systems, and estimation systems. For respondents, the new reporting form was more complicated and burdensome. We will review the operational issues involved in making major changes to a large monthly establishment survey and look at the impact these changes had on overall survey response rates and data item response rates. Differences in response by mode also will be reviewed.

Session 13 Contributed: Nonresponse
Reduction Strategies 1

Minimizing and Converting Refusals in a Survey of New Businesses

Tom Barton and *David DesRoches,* Mathematica Policy Research, Inc. (U.S.)

Surveys of businesses face significant challenges. Cooperation rates are much lower than those for household surveys due to a lack of interest or time and confidentiality concerns. The Kauffman Firm Survey (KFS) used various techniques to achieve a response rate of more than 40%, substantially higher than comparable studies. Refusal avoidance techniques; immediate conversion of initial participant refusals; and scripted, quick responses to typical participation barriers were emphasized during interviewer training. Interviewers also were trained to quickly screen for ineligible businesses (more than 60% of the sample). We will compare results of KFS telephone contacts with those of other business studies and describe characteristics of converted refusals.

Improving the Effectiveness of Interviewer-Administered Surveys through Refusal-Avoidance Training

Grace O'Neill, U.S. Census Bureau

Recently, two U.S. Census Bureau surveys added interviewer training prior to implementing a new sample. This decision was based on evidence that inexperienced interviewers were ineffective at gaining participation from new sample cases. The training focused on telephone skills and refusal avoidance techniques. Further, as contact strategies and nonresponse follow-up become part of survey designs, establishment survey programs must focus on interviewer training. I will focus on the importance of training, best-training practices, and how to provide evidence about the training results. Discussion will include how to design both cost- and time-effective training, effective training delivery, structured monitoring and feedback, the adaptation of household survey strategies to the establishment survey context, and cost implications.

Increasing Survey Cooperation: Motivating Chronic Late Responders to an Annual Survey

Ronda Britt and *Fran Featherston,* National Science Foundation (U.S.)

The Survey of Research and Development Expenditures at Universities and Colleges is an annual voluntary establishment survey conducted by the National Science Foundation (NSF). Each year, NSF sends the survey form to institutions in November with a requested due date of January 31. As with most voluntary surveys, only 50%–60% of the surveyed institutions respond by the deadline, even when following Dillman's (2000) recommendation for multiple contacts before the due date. Because the target response rate is 90%–95%, institutions that miss the official deadline have been allowed great flexibility in choosing when to submit their data. This has created a cycle of late response, as late institutions become conditioned to routinely ignore the official deadline each year. We will examine the results of four experiments designed to test procedures for improving the timeliness of survey respondents. We also will describe the protocols created for post-deadline contacts made on the basis of cognitive interviews and experimental results.

Using Paradata To Monitor and Improve the Collection Process in Annual Business Surveys

Rose-Carline Evra and *Sylvie DeBlois,* Statistics Canada

The Statistics Canada Unified Enterprise Survey (UES) has been conducted since 1998. Efficient data collection remains a challenge, due in part to time and cost constraints. A score function was introduced in 2002 to determine which enterprises should get a high priority for follow-up in cases of nonresponse. During collection, paradata are used in the score function to assign the initial follow-up priorities and update them throughout the collection process. Paradata also are used for the analysis of response patterns to help improve the collection process for future cycles. We will focus on the use of paradata to monitor and improve the collection process for the UES.

Session 14 Contributed: Variance Estimation

Random Group Variance Adjustments When Hot Deck Imputation Is Used To Compensate for Nonresponse

Richard Moore, Jr., U.S. Census Bureau

The 2002 Survey of Business Owners produces a comprehensive set of estimates for businesses owned by various race, ethnic, and gender groups. Variances are calculated using the method of random groups, each constructed so it will approximate a subsample of the original design. I will compare three methods for estimating the variances: adjustment of weights of the responding units, application of an adjustment factor derived from the response rate, and donation of the random group of the donor to the recipient unit with the variance calculated from the modified random group structure.

Variance Estimation When Nearest-Neighbour Imputation Is Used To Fill In Missing Values

Jean-François Beaumont and *Cynthia Bocci,* Statistics Canada

Nearest-neighbour (NN) imputation often is used to handle missing values in business surveys. Being a donor imputation method, it can be used to impute more than one variable of interest simultaneously, and it leads to plausible values even when categorical variables are imputed. We will illustrate why NN imputation can be viewed as a nonparametric method, then show the asymptotic bias and variance of the imputed estimator of a total and propose a nonparametric variance estimator, which is valid even when the sampling fractions are not negligible. The version of the proposed variance estimator that we investigate is based on penalized least squares estimation as implemented in the procedure TPSPLINE of SAS. We will compare it to other variance estimators through a simulation study.

Methodological Evaluation of a Survey of High-School Students in Iowa

Lu Lu, Iowa State University (U.S.)

Iowa's State Board of Education conducted a stratified multistage sample survey to study the availability of employment preparation courses and the degree to which students in Iowa's public high schools enroll in them. The design and estimation options motivated a series of research questions. First, alternatives for implementing PPS sampling are investigated. Second, variance estimation using collapsed strata estimators followed by synthetic variance redistribution and generalized variance functions for designs with one PSU per stratum is studied. Third, variances are compared in two situations: a comparison with a stratified noninvariant (multiphase) design that involves redistributing resources, and the trade-off between adding more schools and reducing the number of students under different assumptions concerning the cost of adding schools to the survey.

Comparison of Simulation Methods Using Historical Data in the U.S. International Price Program

Moon-Jung Cho, Patrick Bobbitt, Te-Ching Chen, John Eltinge, Lawrence Ernst, James Himelein, and *Steve Paben,* Bureau of Labor Statistics (U.S.)

Recently, the U.S. International Price Program (IPP) evaluated different variance estimation methods for their applicability to the IPP. This required the use of simulation methods to account for variability associated with both an underlying population of price relatives and the sample design, respectively. The population was characterized by an estimated cumulative distribution function (CDF) of price relatives, which were available for the past 13 years. We asked how dependent our conclusions were on specific steps in the simulation method. To answer this question, we tried alternate methods of simulation involving mixture distributions and resampling methods. We will present the results according to the magnitude of variance and bias of a given variance estimator under alternative simulation methods, over a range of selected subsets of items from the IPP.

Session 15: Software Demonstrations

SD-7: Q-Bank
Rebecca Morrison and *Diane K. Willimack,* U.S. Census Bureau

Q-Bank is an online database of federal survey questions that have been tested by questionnaire design experts. The database is searchable by topic, response category and error type, and other attributes, with links to reports of research findings that provide additional information and allow for the production of metadata. Q-Bank can be especially useful when developing questions; writing new survey questions can be informed by earlier research. Someday, users will be able to study relationships between question characteristics and response errors, thus improving survey data quality and advancing the science of questionnaire design and pretesting methods. In this software demonstration, participants will explore how Q-Bank can aid the design process. Currently, members of a U.S. interagency team that directs Q-Bank may subscribe to the database.

SD-8: Survey Data Analysis in SAS/STAT Software
Tony An, SAS Institute Inc. (U.S.)

SAS/STAT® provides procedures for sample selection and data analysis in complex surveys. The SURVEYSELECT procedure selects probability-based random samples by using a variety of methods. This procedure can select a simple random sample or a sample according to a complex multistage sample design that includes stratification, clustering, and unequal probabilities of selection. In addition, the SURVEYMEANS, SURVEYREG, and SURVEYLOGISTIC procedures perform statistical analysis for survey data. These procedures take into account the design used to select the sample. The sample design can be a complex sample design with stratification, clustering, and unequal weighting. The software will be demonstrated with typical applications, including upcoming new features.

SD-9: SOLAS for Missing Data and nQuery Advisory for Sample Size
Brian Sullivan and *Kevin Connolly,* Statistical Solutions (Ireland)

nQuery Advisor is statistical planning software used for calculating power and sample size. It includes more than 70 tables for calculating these values for various study types. There also are various side tables used during the calculation of power and sample size to assist in choosing the correct values for standard deviation or effect size. The output from nQuery Advisor includes tables, plots, statements, and references produced in accordance with FDA/ICH guidelines. SOLAS for Missing Data offers approaches for handling missing data and a choice of six imputation techniques, including two multiple imputation techniques. Data can be imported from and exported to a variety of file types, including SAS, SPSS, Splus, and Stata. Once the data is imported, the missing data pattern is displayed and a decision on the most appropriate technique is made.

SD-10: Voxco Command Center
Louis Tanguay and *Vincent Auger,* Voxco (Canada)

Voxco Command Center provides a comprehensive set of web-based tools for creating and managing surveys in various mode combinations. Modes currently available are CATI (outbound and/or inbound telephone surveys with or without predictive dialing), CAWI (self-administered web surveys), CAPI (laptop surveys with automated synchronization), IVR (automated inbound telephone surveys with telephone keypad entries), and asynchroneous CAPI with the Blackberry device. The common survey scripting engine enables easy creation and testing of surveys at any level. Multilingual surveys are supported (Asian and non-Latin character sets are allowed in CATI/CAWI/CAPI modes.). QA includes a built-in configurable random response generator and audio-video monitoring. The collected data can be exported to industry standard files, including SAS and SPSS.

SD-11: The Census Bureau's 'On The Map': Interactive Origin-Destination Flows of Workers
Lars Vilhuber, Cornell University (U.S.)

On The Map is a web-based, interactive mapping application. It provides information about census-block-to-census-block work-related travel patterns and the characteristics of workers and firms in each work and home area on an annual basis. The objective is to show where people work and where workers live on maps with companion reports on their age, earnings, industry distributions, and local workforce indicators. On The Map provides timely data for labor market, economic development, transportation, emergency management, and other potential applications. It includes analytical tools that answer questions such as How many jobs are located within five, 10, or 20 miles of a planned employment training center or transit stop? How many workers live along a transit corridor and work downtown or in some other area along the same corridor?

SD-12: MixMatch: a Record-Linkage System
Martin Lachance, Statistics Canada

MixMatch is a record-linkage system designed to perform multiple comparisons on administrative information using a variety of matching tools and remaining simple, flexible, and easy-to-use. Users build their own match strategy by "mixing and matching" pieces of information by regrouping them, selecting a matching tool, and assigning a weight to the match operation. A key feature is the likeness tool, which allows users to overcome errors. It also is possible to use referential lists to eliminate noise in the data. Although MixMatch was originally built to answer the needs of the 2006 Canadian Census of Agriculture, it suits surveys with similar needs.

Session 16 Invited: Editing and Imputation Strategies To Improve Statistics Using Tax Data

Methodology of Allocating Generic Field to Its Details
Jessica Andrews, Nathalie Hamel, and *François Brisebois,* Statistics Canada

The Canada Revenue Agency (CRA) shares its data on financial statements for incorporated enterprises (T2) with Statistics Canada (SC). The information coming from the financial declaration, balance sheet, and income statement is used at SC to replace business survey data. T2 data are received monthly. Only eight fields are mandatory at CRA. The enterprise can decide to provide generic information, details, or a combination. A methodology was developed to allocate the generic information to its details. The strategy uses cluster analysis to identify the best way to define imputation groups. A distribution is then calculated from the reported details within each imputation group. A discriminant analysis follows to predict to which cluster a unit with generic field will be assigned.

Improving the Quality of U.S. Tax Statistics: Recent Innovations in Editing and Imputation Techniques at the Statistics of Income Division of the U.S. Internal Revenue Service
Barry Johnson, Scott Hollenbeck, and *Todd Reum,* U.S. Internal Revenue Service

The Statistics of Income (SOI) Division of the United States Internal Revenue Service (IRS) is charged by Congress to prepare and publish statistics on the U.S. tax system. Teams of SOI economists, computer specialists, statisticians, and field personnel work to extract and perfect data from tax returns to create statistically valid data for use by the U.S. Treasury Department; Congress; other federal, state, and local government agencies; and private industry researchers and citizens. We will provide an overview of SOI data-collection systems, focusing on recent innovations, such as the use of digital images as source documents; integration of electronically filed tax return information with data provided on traditional, paper returns; enhancements to online tools and data-collection system features; and use of prior-year data to validate and correct establishment data. We also will detail efforts to enhance the usefulness of data reported on tax forms through the use of supplemental data obtained from support documents filed with the return, or, in special cases, additional information obtained directly from the return preparer. Finally, we will discuss procedures used to impute data for large organizations or individuals who file late.

Improving the Use of Tax Data for Dutch Business Statistics
Grietje Van Haren and *J. J. Hoogland,* Statistics Netherlands

There is increasing pressure on Statistics Netherlands to use tax data for business statistics. Available tax data increases, and the respondent burden has to be decreased. The raw tax data contain measurement errors. Potential errors can be detected using score functions and outlier techniques. Transforming fiscal units to enterprise units also is a cause for errors. Furthermore, a lot of information is lost. Tax data and survey data should be confronted at the micro level to improve editing and weighting of both survey and tax data.

Session 17 Invited: Goals and Issues in the Development of the Services Producer Price Index (SPPI)

Methodology for the U.S. Services Product Price Index
Roslyn Swick and *Deanna Bathgate,* Bureau of Labor Statistics (U.S.)

Since the publication of its first service sector industry in 1985, the Producer Price Index (PPI) Program has introduced 139 service industry price indices, and there are plans to introduce two more over the next year. We will detail the history of this important expansion, discussing the general principles for developing an index, the steps taken by BLS to develop a price index for any service industry—from initial research on how to define output to final publication—and the methodological approaches and challenges to developing and maintaining high-quality price indices for a select group of service industries.

Assessing the Quality of SPPIs
John Wood, Ian Richardson, and *Markus Sova,* Office for National Statistics (U.K.)

Constructing service producer price indices (SPPIs) is problematic in ways that constructing goods producer price indices is not. These problems include difficulties in defining individual service products on a constant quality basis, difficulty in separating business and retail components, and lack of well-developed international standards for the specification and classification of service products. Because of these problems, assessing the quality of SPPIs involves additional concerns, such as the effects of nonstandard data collection methods, the suitability of indices for use in intermediate or final consumption, and the reliability of sampling frames for price collection. We will describe how the Office for National Statistics is tackling measuring quality, setting quality standards, and creating procedures to monitor and review the quality of SPPIs.

Survey Methodology for New Business Services Price Indexes
Saad Rais and *Zdenek Patak,* Statistics Canada

As the economy becomes more services-intensive, and as services increasingly become diverse and complex, there is a need to improve the measurement of price change, real output growth, and productivity trends in the services sector. In response, Statistics Canada has proposed to develop price indices for 83 business service commodities, each of which would help form a comprehensive services producer price index (SPPI) for the business services industry. We will propose a common methodology for all SPPI surveys. We also present specific considerations for the different surveys and discuss the methodological issues confronted with SPPI surveys. Finally, we outline a vision of the future for SPPI surveys.

Session 18 Introductory Overview Lecture: Questionnaire Design and Testing

Instrument Design
Don Dillman, Washington State University (U.S.)

A decade of research on the visual layout of web and paper questionnaires has made it clear that what people report in questionnaires is affected by the use of words, numbers, symbols, and graphics, which questionnaire designers need to combine in ways that send a consistent and easy-to-understand message to respondents. During this overview presentation, I will review the theory and research findings that are changing the manner in which this process needs to be viewed by survey designers. I will link theory, results from experimental research, and practical examples of survey designs to convey the need for applying scientifically based principles to the design of business questionnaires.

Current Practices in Questionnaire Development, Evaluation, and Testing for Establishment Surveys
Diane K. Willimack, U.S. Census Bureau

I will describe methods used for establishment survey questionnaire development, evaluation, and testing (QDET) and discuss how estab-

lishment survey QDET methods accommodate the special needs and circumstances of establishments, such as the technical nature of the collected data, reliance on records, and a labor-intensive response process often involving multiple reporters. In addition, because establishment surveys have been at the forefront in developing electronic data reporting, I will present an overview of methodologies used to test and evaluate electronic instruments.

Session 19 Topic-Contributed: Designing Survey Materials from the Respondents' Perspectives

Working with Respondents To Improve Relevancy of Inventory Statistics

John Trimble and *Scott Scheleur,* U.S. Census Bureau

Inventory data collected by the U.S. Census Bureau are a key component of the U.S. national income and product accounts. The bureau's monthly surveys covering manufacturers, wholesalers, and retailers provide the primary source data for the volatile private inventories component of the U.S. gross domestic product. Because of concerns about inventories raised during a bureau study on U.S. supply chains, we decided to review the inventory questions used in our programs. The goal was to develop standard wording and definitions for all inventory questions used for manufacturing, construction, wholesale trade, retail trade, transportation and warehousing, and service sector programs while continuing to meet the requirements of national accounts. We will describe the project, including the use of response analysis and cognitive interviews to determine response and test new questions.

Listening to Respondents for Better Survey Results

Alexander Hays, Statistics Canada

Increasing response rates while reducing response burden has always been a dilemma and challenge in business surveys. Statistics Canada adopted a respondent consultation approach for some of its surveys to facilitate communication and listen better to respondent concerns. Such an open dialogue not only aids the simplification and streamlining of questionnaires, but also improves survey response rates—all the while maintaining data needs and requirements to data users and stakeholders. I will describe the consultation approach as it pertains to the annual retail and wholesale surveys and the effects it had on these surveys.

Using Focus Groups To Improve Response in Monthly Surveys

Lisa Houlihan, U.S. Census Bureau

The way statistical agencies communicate with respondents plays a key role in the respondent's decision to participate in economic surveys, especially voluntary surveys. In preparation for the introduction of new samples in the fall of 2006, managers for the U.S. monthly retail and wholesale surveys contracted with an outside group to conduct six focus group sessions to get input from potential respondents. This input was used to develop the U.S. Census Bureau's initial mailing package and devise a communication strategy for the web site and telephone follow-up calls. I will describe the focus group sessions, resulting recommendations, changes implemented, and effect on the monthly survey programs.

Evaluating Business Survey Forms with the Cognitive Interview

Marcel Levesque and *Paul Kelly,* Statistics Canada

The Questionnaire Design Resource Centre (QDRC) is the focal point of expertise at Statistics Canada for questionnaire design and evaluation. Each year, many survey collection instruments are evaluated, and a primary evaluation tool is the cognitive interview. During the

cognitive interview, important insight into the response process can be gained. This insight can be used to make significant improvements to questionnaires. We will describe how the QDRC uses cognitive interviews to test business survey forms. Attention will be focused on the testing of several services industry questionnaires that were redeveloped to meet Statistics Canada's Unified Enterprise Survey standards.

Session 20 Topic-Contributed: Business Process Improvement for Economic Programs

Business Process Improvement at the U.S. Census Bureau

Deborah Stempowski and *Shirin Ahmed,* U.S. Census Bureau

Formed in July 2004 by senior managers in the Economic Directorate of the U.S. Census Bureau, the purpose of the Business Process Improvement Team (BPIT) was to review business processes associated with Economic Directorate programs to identify processes where improvements could be made that would reduce costs or improve efficiencies, while maintaining quality and timeliness. We began our work identifying potential areas for improvement, then, based on these improvement ideas, we did the analysis of existing costs. The BPIT identified the top five major areas for improvement and made final recommendations to management in January 2005. We will cover the process to identify potential areas for improvement, recommendations for next steps after areas were identified, and an update on the changes implemented since recommendations were made to senior management.

A Complete Redesign of the Business Register

Mario Ménard, Gaétan St-Louis, and *Philippe Gagné,* Statistics Canada

The Business Register (BR) is an essential component of conducting business surveys at Statistics Canada. We will focus on changes introduced with the development of a new BR and how these changes will improve the economic survey program. In particular, we will focus on how it will help make operations more efficient with the development of a much simpler register. The paper also will present how the new BR will provide easy access to the information stored on the register and how the new BR presents a great opportunity to increase the effectiveness of collection activities as they pertain to the overall quality of the register and the timeliness of updates received from survey areas.

Means To Improve Business Survey Processes: Some Swedish Experiences

Lennart Nordberg, Statistics Sweden

Business surveys at Statistics Sweden have been run in a decentralized way for a long time, allowing freedom to survey managers as long as good general survey principles are applied and the national accounts perspective is kept in mind. This approach has merits; however, subcultures may emerge easily, unless good, standardized tools are available and used by all. Because core areas such as data collection and editing lacked such tools, a new approach was taken in 2005, when a centralized unit for data collection and editing was formed. I will report on experiences gained from this new approach.

Improving Quality in ONS's Annual Earnings Statistics

Pete Brodie and *Kevin Moore,* Office for National Statistics (U.K.)

We will describe recent work to improve the processes and methods of the U.K.'s annual structural earnings survey—the New Earnings Survey (NES)—which had hitherto remained largely unchanged since the survey's inception in 1970. Changes in the labor market since then have led to increased coverage errors in the survey and other errors through nonresponse and lack of weighting in survey estimation. We will describe the improvements researched and implemented by ONS

as part of its program of re-engineering to improve the quality of estimates from the survey and the work necessary to measure and deal with discontinuities arising from the implementation of new methods.

Session 21 Contributed: Issues in Multimode Data Collection

Do Economic and Demographic Characteristics Differ between Web and Mail Respondents?

Nancy Dickey and *Zulma Riberas,* U.S. Department of Agriculture/ National Agricultural Statistics Service

The U.S. Department of Agriculture's National Agricultural Statistics Service will give respondents the option of completing the 2007 Census of Agriculture questionnaire on the web. In advance of the census, a content test was conducted to test procedures, systems, and data-collection instruments. This included the use of the web instrument. We will compare economic and demographic data from web and mail respondents from the 2005 Agriculture Census Content Test. Analysis was based on size and type of operation, age of operator, ethnicity, race, and gender. A better understanding of the economic and demographic characteristics of web respondents can help us design questionnaires tailored to meet respondents needs and computer skills.

Understanding Web Survey Completion in a Survey of New Businesses

David DesRoches, Tom Barton, and *Janice Ballou,* Mathematica Policy Research, Inc. (U.S.)

Surveys of new establishments continue to encounter increased levels of both nonresponse and costs. Factors contributing to declining participation include the prevalence of sales solicitations new businesses receive, the lack of time available to business principals to complete surveys, and gatekeepers preventing direct access to business principals. The Kauffman Firm Survey and others have used multimode data collection methods, including a self-administered web component, to reduce time and cost and maximize respondent convenience. Understanding how establishments differ by mode of completion will inform future establishment web survey development. We will compare differences in industry, size, and complexity among businesses completing the web survey before and after CATI prompting and those completing a CATI interview.

Hidden Mixed-Mode Design in Catering Survey

Antti Siikanen and *Petri Godenhjelm,* Statistics Finland, and *Kaija Saarni,* Finnish Game and Fisheries Research Institute

We will describe a mixed-mode design applied in a catering survey in Finland. The aim of the survey design was to achieve comprehensive answers and high response rates. The survey design was to get respondents to fill out the paper questionnaire before a telephone interviewer contacted them and collected data. The rationale for using a telephone interviewer was to get a higher response rate. Still, it was obvious that all respondents would not fill out the questionnaire before a telephone interviewer called them. Thus, telephone interview respondents were asked how comprehensively they had filled in the questionnaire beforehand. By asking this question, it was possible to assess the actual mode of the survey. The data collection process produced a kind of hidden mixed-mode design, which wouldn't be explicit to a researcher without asking how the answers were produced. We will compare the responses to questions between separate modes and discuss the theoretical and practical implications of the findings.

Redesigning Data Collection Strategies for Cost-Reduction in Two Bureau of Labor Statistics Surveys

Michael Searson, Bureau of Labor Statistics (U.S.)

In a continuing process of review and redesign of business practices, the BLS Quarterly Census of Employment and Wages program has initiated several alternative data collection strategies to reduce survey costs. I will provide detailed information about these cost-cutting strategies and the accomplishments of these projects to date.

Session 22 Invited: Uses of Metadata for Establishment Surveys

Modeling the Contents and Structure of Official Statistics

Bo Sundgren, Statistics Sweden

Statistical agencies produce data from many surveys, each designed to describe various aspects of the society. Taken individually, each survey describes an aspect of society independently; however, taken as a system, there is much more value added to the data. I will discuss how the contents of official statistics could be conceptualized, structured, and described in a systematic, compact, and comprehensible way. I also will develop a model for a descriptive framework for comparing and contrasting surveys

Experiences with Developing and Using Metadata-Driven Processing Systems for the Economic Census

Sheila Proudfoot and *Donna Hambric,* U.S. Census Bureau

The Economic Census began utilizing metadata to improve forms design and dissemination processing systems in 1997. We will discuss our experience developing and using metadata-driven processing systems and how we continue to gain efficiency, consistency, and electronic capabilities.

Metadata Management Framework for Establishment Surveys

Michael Colledge, Statistical Consulting Pty Ltd (Australia)

I will focus on government organizations whose primary inputs and outputs are data processed at the public's expense. In such organizations, quality issues are typically regarded as being the major concern of methodologists, whereas data and metadata management lie in the domain of informatics experts. I will argue that data and metadata management should be handled within the broader concept of quality management. I also will adapt and integrate data, metadata, and quality standards in an example at the Ministry of Planning and Investment in Vietnam.

Session 23 Introductory Overview Lecture: Time Series

Methods, Diagnostics, and Practices for Seasonal Adjustment

Catherine Hood, Catherine Hood Consulting (U.S.)

Seasonal adjustment is used for most repeated, subannual establishment surveys, but what are we really doing to the data? When looking at data from repeated surveys, it is important to understand the components of a time series (e.g., the trend) that are estimated during seasonal adjustment. I will cover the basic concepts needed to understand the uses and mechanics of seasonal adjustment. I also will discuss software packages available for seasonal adjustment, focusing primarily on X-11/X-12-ARIMA and SEATS. Finally, I will summa-

rize recent developments in methods, including the diagnostics, and give an overview of practices in seasonal adjustment from Europe and North America.

Benchmarking
Susie Fortier, Statistics Canada

Situations that require benchmarking are common in repeated establishment surveys, whether they are related to the coherence of an annual and subannual survey on the same target population or to the necessity of preserving annual totals in case of seasonal adjustment. I will give an overview of the benchmarking methodology used at Statistics Canada and present detailed examples. Issues such as preservation of period-to-period change and availability of benchmarks, especially at the end of the series, will be discussed. Other innovative uses of the methodology, such as its use as a linkage method to reconcile two sections of a time series also will be presented. The software demonstrated will be Statistics Canada Proc Benchmarking from the Forillon package.

Session 24 Topic-Contributed: Electronic Data Collection Modes for Establishment Surveys

Using Software To Collect Data Electronically for the Economic Census
Amy E. Anderson and *M. Diane Harley,* U.S. Census Bureau

The economic census is an incredibly complex data-collection process that encompasses more than 600 form types. In 2002, the Surveyor software application was built to handle these form types and accommodate companies with 1–2,000 establishments. The U.S. Census Bureau has been working to re-engineer the 2002 version in preparation for the 2007 Economic Census. We will describe the data-collection software and changes being made. We also will discuss the bureau's decision for using a software application to collect data for an economic census and highlight research conducted in collaboration with the redesign effort.

Interface Design and Testing for Electronic Self-Administered Survey Forms Using Excel
Emma Farrell, Rob Burnside, Leone Van Ede, and *Kettie Hewett,* Australian Bureau of Statistics

The Australian Bureau of Statistics (ABS) has been using Excel to design self-administered business forms for several years. To minimize mode effects, the original design had a similar appearance to the corresponding paper forms and limited functionality. We will describe form design principles on which the interface was based and the development and testing that guided the evolution of the Excel form design standards. We will highlight where the Excel forms remain similar to the paper versions, where they are different, and why. Excel forms are used by several ABS business surveys and are popular with certain types of respondents.

The Annual Structural Business Survey: Developing and Testing an Electronic Form
Ger Snijkers, Evrim Onat, and *Rachel Visschers,* Statistics Netherlands

Statistics Netherlands strives for reduction of response burden by making data reporting for individual businesses efficient and easy. One way to do that is providing electronic forms via the internet. This is also what businesses ask for. In 2004, we started developing the electronic form of the Dutch Structural Business Survey. This was done in a number of pretests. An important research issue was whether the paper and the electronic forms had to have the same look and feel. These

pretests resulted in the identification of navigational issues, edit rules, and visual design issues that make an e-form different from a paper form. Next, a downloadable electronic form based on these pretests was developed. In the spring of 2006, a pilot with 7,000 businesses was carried out. At the beginning of 2007, this questionnaire was used for the whole sample (75,000 businesses).

Collecting and Transmitting Confidential International Data Electronically
Y. Louise Ku-Graf, Bureau of Economic Analysis (U.S.)

The Bureau of Economic Analysis, an agency of the Department of Commerce, started collecting international investment data via the Automated Survey Transmission and Retrieval (ASTAR) in 2001. One of the key features of the ASTAR system is its ability to allow respondents to work at their own pace until the data are ready for submission. The system also incorporates export and import capabilities for integration with other software, such as spreadsheets. I will describe the ASTAR system, the surveys that use the system, the benefits and limitations of ASTAR, respondent feedback, relevant changes and updates, and current and future plans.

Session 25 Contributed: Employment Dynamics

Measuring Business Formation, Dynamics, and Performance
Kirk Wolter, NORC at the University of Chicago (U.S.); *John Haltiwanger,* University of Maryland (U.S.); and *Lisa Lynch,* Tufts University (U.S.)

A National Academies panel recently issued its final report on the measurement of business dynamics, with recommendations for the U.S. federal statistical system. The panel was charged with developing strategies for improving the accuracy, currency, coverage, and integration of data used in academic and agency research on business formation and dynamics and in the production of key national (as well as regional and local) statistics. The panel's focus was on business formation, young and small businesses, and entrepreneurial activities, which are key elements in the rapidly evolving economy, but also areas for which conspicuous data deficiencies are perceived to exist. Of particular interest are data used to measure and track business entry and exit, job and worker flows, productivity, investment, wage, and price dynamics. Given the interest in business formation and growth of young and small businesses, integration of real and financial data that permit the measurement and analysis of the financing of young and small businesses also is a key area of interest. The panel's work was sponsored by the Ewing Marion Kauffman Foundation.

Meeting the Challenges of Designing the Kauffman Firm Survey (KFS): Sampling Frame, Definitions, Questionnaire Development, and Respondent Burden
Janice Ballou, David DesRoches, Zhanyun Zhao, and *Frank Potter,* Mathematica Policy Research, Inc. (U.S.)

The KFS design challenges afforded a fertile environment to study and evaluate methods for conducting establishment surveys. We will highlight noteworthy processes used during the design phase of the project: setting up an advisory committee, literature review, sample frame and design development, developing criteria to define a "new business," and questionnaire development.

New Developments in Business Employment Dynamics at the Bureau of Labor Statistics
Kristin Fairman, Sheryl L. Konigsberg, Eric Simants, and *David M. Talan,* Bureau of Labor Statistics (U.S.)

In 2003, the Bureau of Labor Statistics (BLS) began the quarterly publication of Business Employment Dynamics (BED) statistics. These are

employment from establishments that opened, expanded, contracted, and closed. The sum of employment changes from openings and expansions is defined as gross job gains, while the sum of employment changes from contraction and closings is defined as gross job losses. Examining these detailed changes allows economists and policymakers to analyze the large gross job flows that underlie the substantially smaller net employment changes and the employment dynamics across stages of the business cycle. In 2004, BLS began the publication of BED statistics by industrial sector. In 2005, it began publication of BED statistics by employment size of the firm. The source of the data used for constructing the new BLS BED data series are the UI-based Quarterly Census of Employment and Wages files that have been linked longitudinally from 1990 through the present. In the future, the BLS is considering publication of more BED statistics—such as age of firm, gross flows of wages, and business births and deaths—to provide policymakers a more thorough understanding of the U.S. economy.

Measurement of Establishment Birth and Death in Business Employment Dynamics

Sheryl L. Konigsberg, Sadeghi Akbar, Richard L. Clayton, and *David M. Talan,* Bureau of Labor Statistics (U.S.)

The release of Business Employment Dynamics (BED) data series in 2003 by the Bureau of Labor Statistics provided insights into the underlying dynamics of establishment-level employment changes. In BED statistics, gross job gains are the sum of all employment increases at opening and expanding establishments, while gross job losses are the sum of all employment losses at closing and contracting establishments. The difference between gross job gains and gross job losses is the familiar net employment change. Using establishment-level microdata, the decomposition of the net change in employment will be further expanded to measure two new data elements: 'birth' and 'death' of establishments. Currently, openings in the BED data series combine establishment births and the reopenings of temporarily closed seasonal businesses. Similarly, closings include death, which is permanent closure of businesses, and the temporary shutdown of business establishments. The measures of birth and death, as distinguished from openings and closings, will further reveal the dynamics behind the net change in employment. An alternative definition of establishment birth and death will be examined. A time series of birth and death of private sector employers will be established and viewed in relation to other BED data elements, across major industry sectors, and through various stages of business cycle.

Session 26 Contributed: Analysis of Nonresponse Bias

Is There a Relationship among Survey Costs, Time in Field, Data Quality, and Bias?

Leslie Christovich, National Science Foundation (U.S), and *Michael J. Brick, Benmei Liu,* and *Tim Smith,* Westat (U.S.)

Research into the effects of curtailing data collection efforts on costs and data quality for establishment surveys has been limited. Some evidence suggests differences exist between respondents and nonrespondents at different stages of data collection and that these differences can affect data quality. The National Science Foundation conducts two surveys of colleges and universities. In order to obtain high response rates, the data collection period can be lengthy. The lengthy field periods increase the costs of data collection and delay data dissemination. This

project investigated the extent to which shortening the field periods of these surveys might reduce the data collection costs without affecting bias and data quality.

Capturing or Recapturing Information on Survey Nonrespondents

Susan Hinkins and *Fritz Scheuren,* NORC at the University of Chicago (U.S.)

Missing data typically occur in surveys, and may significantly bias survey results. There is usually a mixture of different types of nonresponse affecting survey results. It is crucial that this mixture be analyzed to estimate what portion may be missing completely at random, missing at random, and, in particular, what portion is not missing at random. We will describe one approach to estimating the missingness mixture fractions and the bias effect due to nonresponse. The technique uses the Kish-Hess idea (TAS 1959) of consciously reusing nonrespondents, but expands by reusing both respondents and nonrespondents in a capture-recapture technique. More generally, we propose retaining safe identifiers of both responders and nonresponders for future use. This is an example of the kind of paradata we need as a profession to develop a meta-analysis approach to our common survey experiences (Scheuren 2005). Illustrations of the use of this data are for bias reduction/analysis and as a potential upper bound on bias rate calculations. Maintaining and reusing the experience and information gained from previous studies and employing them in meta-analyses could lower long-term costs and improve the quality and credibility of the analytic results.

Analysis of Potential Nonresponse Bias in the 2003 Survey of Small Business Finances

Michael Yang and *Janella Chapline,* The University of Chicago (U.S.), and *Lieu Hazelwood* and *Traci Mach,* Board of Governors of the Federal Reserve (U.S.)

Nonresponse bias analysis in the literature typically relies on comparisons between the responding sample and the sampling frame, as only limited information is available for nonrespondents in most survey settings. The 2003 Survey of Small Business Finances (SSBF) offers a rich source of data for more extensive nonresponse bias analysis. First, the SSBF employs successive levels of effort to reduce nonresponse. Assuming late respondents resemble nonrespondents, we compare estimates between early respondents and late respondents to assess potential nonresponse bias. Second, the SSBF features extensive nonresponse subsampling in both interview stages, making it possible to conduct direct comparisons between respondents and nonrespondents. We will summarize the major findings from a comprehensive nonresponse bias analysis based on the 2003 SSBF sample and conclude by pointing out possible design adjustments that may benefit future surveys of the series.

Bias Adjustment in the Swedish Farm Accidents Survey

Jörgen Svensson, Statistics Sweden

The farm accidents survey of 2004 was designed as follows. First, a sample of 7,000 farms was selected from the Farm Register by stratified Pareto (pi)ps sampling. Farms reporting accidents in the questionnaires were contacted by telephone and asked detailed questions about the accidents. After this, the sample was divided into strata. From the stratum of farms responding and not reporting accidents, 400 were subsampled for a measurement study. From the stratum of farms not responding, 400 were subsampled for a nonresponse study using the Hansen Hurwitz plan. The nonresponse bias was found to be small,

but the measurement error bias major. I conclude that the employed two-phase method substantially improved the accuracy of the final estimates and recommend it for other retrospective studies.

Session 27 Contributed: Nonresponse Reduction Strategies 2

Incentives in Surveys of Farmers

Kathleen Ott, U.S. Census Bureau, and *Daniel Beckler* and *Norman Bennett,* U.S. Department of Agriculture/National Agricultural Statistics Service

NASS conducts surveys of the farm population on a variety of agricultural topics, including acreage and production, livestock, crops, and farm economics. In 2005 and 2006, two incentive experiments were conducted to determine if a $20 ATM card would increase response rates for a detailed economic data collection instrument. Monetary and nonmonetary incentives were tested in both mail and face-to-face data collection methodologies for the ARMS. Results on response rates, costs, card usage, and data quality from this experiment will be presented.

Do Monetary Incentives Increase Business Survey Response Rates? Results of a Large-Scale Experiment

Paul P. Biemer, Christopher Ellis, Angela Pitts, and *Kimberly Aspinwall,* RTI International (U.S.)

We will describe an experiment to evaluate the effects on response rates and survey costs of offering a $20 prepaid incentive to establishment points of contact (POCs) in a large-scale establishment survey. POCs have a critical role in this survey, in that they coordinate data-collection activities among the employees within their establishments who are selected to participate in the survey. We will provide a summary of findings from the experiment and discuss the analyses completed for the POC incentive experiment.

Effectiveness of Stimuli Experimentally Carried Out across Populations for Establishment Surveys

Danna Moore, Washington State University (U.S.), and *Mike Ollinger,* U.S. Department of Agriculture/Economic Research Service

We will demonstrate the effectiveness of using monetary incentives and other stimuli across types of businesses and industry populations as well as promote a multimode survey approach in which survey respondents receive multiple contacts and stimuli in a variety of ways. We also will encourage the use of letters of support from third parties that respondents may look to for guidance, such as industry trade associations. A key aspect of these procedures is the repetitive application of stimuli and the alternating of survey mode sequencing at specific time intervals during the survey process. The industries and types of establishments covered will include dairy farmers, meat manufacturing, agricultural commodities and producers receiving foreign trade assistance, grain elevators, grain shippers, organic manufacturers, processors, distributors, and fisheries operators. Response rates achieved across studies and experimental groups will be compared to show how response rates dramatically varied with the use of repetitive application of stimuli and mode sequencing compared to the control conditions. The effectiveness (both in terms of costs and response rates) of financial incentives and other techniques across establishment populations will be discussed.

Encouraging the Use of Alternative Modes of Electronic Data Collection: Results of Two Field Studies

Kathy Downey, Dee McCarthy, William McCarthy, and *Brian Meekins,* Bureau of Labor Statistics (U.S.)

The Bureau of Labor Statistics conducted two field tests within the annual Survey of Occupational Injuries and Illnesses (SOII) to investigate strategies to decrease postage costs and increase the use of internet and email data collection. With current methodology, survey respondents could potentially receive three copies of the 12-page survey form (initial mailing, first and second nonresponse mailings) and submit their data via mail, web, or email. The SOII data for a calendar year is collected January through June of the next calendar year. For the first test, 8,000 establishments were randomly selected from the complete SOII sample, and 2,000 each were randomly assigned to the control group or one of three treatment groups for the 2005 SOII. For the 2006 SOII, a second test will be implemented with a larger sample size to see if we would get the same results as the 2005 SOII test. Preliminary results from the 2006 SOII regarding response rates and data quality issues will be presented.

Session 28: Software Demonstrations

SD-13: Survey Data Analysis in SAS/STAT Software

Tony An, SAS Institute Inc. (U.S.)

SAS/STAT® provides procedures for sample selection and data analysis in complex surveys. The SURVEYSELECT procedure selects probability-based random samples by using a variety of methods. This procedure can select a simple random sample or a sample according to a complex multistage sample design that includes stratification, clustering, and unequal probabilities of selection. In addition, the SURVEYMEANS, SURVEYREG, and SURVEYLOGISTIC procedures perform statistical analysis for survey data. These procedures take into account the design used to select the sample. The sample design can be a complex sample design with stratification, clustering, and unequal weighting. The software will be demonstrated with typical applications, including upcoming new features.

SD-14: SOLAS for Missing Data and nQuery Advisor for Sample Size

Brian Sullivan and *Kevin Connolly,* Statistical Solutions (Ireland)

nQuery Advisor is statistical planning software used for calculating power and sample size. It includes more than 70 tables for calculating these values for various study types. There also are various side tables used during the calculation of power and sample size to assist in choosing the correct values for standard deviation or effect size. The output from nQuery Advisor includes tables, plots, statements, and references produced in accordance with FDA/ICH guidelines. SOLAS for Missing Data offers approaches for handling missing data and a choice of six imputation techniques, including two multiple imputation techniques. Data can be imported from and exported to a variety of file types, including SAS, SPSS, Splus, and Stata. Once the data is imported, the missing data pattern is displayed and a decision on the most appropriate technique is made.

SD-15: The Banff System for Automated Editing and Imputation

Teodora Alexandrova, Statistics Canada

Banff is a generalized system developed at Statistics Canada for the automated editing and imputation of quantitative survey data. It is a collection of nine specialized SAS procedures that can be used independently or in combination to satisfy the editing and imputation requirements of a survey. The Banff procedures provide edit analysis; outlier detection; error localization; and deterministic, donor, estimator, and prorating imputation. The procedures are seamlessly integrated with SAS, allowing the user to take advantage of all the functionality provided by SAS in addition to the functionality provided by Banff.

This session will provide a description of the functionality of the Banff system and an overview of the methodology behind its procedures. Banff support staff will demonstrate the software and will be available for discussion and to respond to inquiries.

SD-16: SPSS Survey and Research Solutions

Tim Daciuk and *Nancy Dobrozdravic,* SPSS Inc. (U.S.)

SPSS technologies have been used, tested, and refined in conjunction with leading companies in a range of industries. In fact, 24 of the top 25 market research organizations use SPSS products. This demonstration will show how SPSS technologies can be used commercially and by public agencies to streamline, standardize, and secure the survey design, data collection, and analysis process. Attendees will see a demonstration of how to use a range of methods to centralize the collection of information across multiple channels and/or languages; design vibrant questionnaires incorporating multimedia so surveys are easy and compelling; manage complex sample data; view results and quotas as data are collected; analyze collected data (including text), alone or along with behavioral data, to identify meaningful segments or trends; and report quickly and cost-effectively in many forms.

SD-17: Question Repository System CATI

Quentin Coleman, U.S. Department of Agriculture/National Agricultural Statistics Service

NASS conducts hundreds of surveys annually and the Census of Agriculture every five years to collect information about the U.S. farm sector. To efficiently produce paper, web, and CATI instruments for all modes of collection, NASS developed a client-server–based Question Repository System (QRS) with a user interface. In 2003, NASS began using the QRS to develop paper and web instruments. In 2006, NASS enhanced the system to produce QRS-CATI instruments. In this session, the interactive editing and navigational features of NASS' latest collection tool, the QRS-CATI, will be demonstrated.

SD-18: Generalized Estimation System (GES)

George Sampson Sapounidis, Statistics Canada

GES is the Generalized Estimation System developed at Statistics Canada. It is a SAS-based application for producing design-based estimates for domains of a population based on a survey sample and auxiliary information. GES handles the estimation requirements of stratified, one-stage cluster or element sample designs, as well as two-phase designs. It can estimate the number of units in each domain, the total or mean of any survey variable, or the ratio of two variables. GES has four main functions: calculation of sample design weights, calculation of calibration weights, calculation of calibration estimates and variances, and calculation of synthetic estimates. GES runs under SAS 8 or SAS 9 and supports the use of 32-byte file and variable names. A new, enhanced English online help file is available.

Session 29 Invited: Efficient Use of Administrative Data in Business Surveys

Redesigning French Structural Business Statistics Using More Administrative Data

Philippe Brion, INSEE (France)

INSEE began redesigning French structural business statistics in 2005 with two main components: more important use of administrative data and the use of the concept "enterprise group" in business statistics. I will focus on the first component. The future system will consist of the use of some administrative data combined with a statistical survey, but methodological studies must be conducted first. In particular,

the questions of calendar are more difficult to deal with than in the case of a "single" survey. Variables collected through the survey will be available during the first half of the year, and administrative data only in the second part. How to process these different flows of data to produce combined estimates?

Toward a Better Integration of Survey and Tax Data in the Unified Enterprise Survey

Danielle Lebrasseur and *Claude Turmelle,* Statistics Canada

In the late 1990s, Statistics Canada redesigned its entire framework to integrate annual business surveys into the Unified Enterprise Survey (UES) program. The UES covers all the major industries in Canada producing both enterprise- and establishment-based information, sampled from a central frame called the Business Register (BR). In the last few years, Statistics Canada has been able to significantly reduce response burden by making greater use of tax data through different initiatives. More recently, a three-year methodological research project has started to examine strategies leading to a better integration of survey and tax data. We will give an overview of the UES methodology used for sampling, imputation, estimation, and quality evaluation, focusing on issues raised by the use of tax data and concluding with future directions.

Using Tax Data for Substitution and Auxiliary Variables in the Australian Economic Activity Survey

Robert Clark, University of Wollongong (Australia), and *Frank Yu,* Australian Bureau of Statistics

Tax data are increasingly used by national statistical offices to improve the efficiency of business surveys. They are typically used as input to maintenance of survey frames, auxiliary variables for stratification and estimation, a source for imputation, and a substitute of directly collected data. However, survey statisticians must overcome limitations, such as missingness and inaccuracy due to mismatch of conceptual definitions or reporting errors. Also, not all data items to be collected can be supplied through taxation data, and such information often has to be modeled if it is not collected from respondents. We will present a case example of how such quality issues can be tackled when combining income tax data with directly collected data.

Session 30 Invited: The Influences of K. R. W. Brewer on Establishment Surveys

Some Research on Calibration Estimators at the National Agricultural Statistics Service

Phillip S. Kott, U.S. Department of Agriculture/National Agricultural Statistics Service

No government agency has been greater influenced by the work of K. R. W. Brewer than NASS. Kott and Bailey (ICES-II, 2000) described the then-new sampling design (maximal Brewer selection) and estimator (based on Brewer's cosmetic calibration) being adapted for the agency's quarterly crops/stocks program. I will discuss recent research at NASS on cosmetic calibration and on another Brewer suggestion, using instrumental variables in regression estimation.

Using Unequal Probability Sampling in Business Surveys To Limit Anticipated Variances of Regression Estimators

Anders Holmberg, Statistics Sweden

As Brewer (1963) showed, if one wants to minimize the asymptotic variance of a nearly unbiased ratio estimator under a simple linear model through the origin, the sample should be drawn with probabilities proportional to the square root of the unit variances. This

proportion can be approximated by the auxiliary variable raised to a power between 0.5 and 1. I will describe research into the appropriate choice of that power and into extending Brewer's univariate selection scheme to the multiple-variable-of-interest environment under which most real establishment surveys operate.

Replicate Variance Estimation and High-Entropy Variance Approximations
John Preston and *Tamie Henderson,* Australian Bureau of Statistics

A recent addition to Ken Brewer's body of work has been the study of high-entropy approximations to the variance of estimators under unequal probability sampling. In Brewer (2001), Brewer and Gregoire (2001), and Brewer and Donadio (2003), Ken and his coauthors studied the use of high-entropy approximations to the variance of the Horvitz-Thompson estimator. We will briefly review this work and consider replicate variance estimation methods for estimating these high-entropy approximations. Monte-Carlo simulation and data from the ABS Manufacturing Survey will be used to illustrate this work.

Session 31 Introductory Overview Lecture:
System of National Accounts

The U.S. Perspective
Brent Moulton, Bureau of Economic Analysis (U.S.)

The System of National Accounts serves to organize a nation's economic statistics and gives guidance regarding the data that need to be collected from establishments. Since the last revision of the system, changes in technology and economic conditions have made it necessary to update it. Technological developments and the growing importance of intangible assets, such as research and development, make it necessary to give new emphasis to measuring certain economic flows and stocks. I will provide an overview of the changes forthcoming in the updated system and some of the implications for collection of business statistics in the United States.

The U.K./International Perspective
Robin Lynch, Office for National Statistics (U.K.)

The measurement of national economies is becoming increasingly difficult as globalization increases. The update to the 1993 System of National Accounts is tackling topics such as research and development, leading to the creation of intellectual property and goods for processing, both of which pose measurement challenges under globalization. I will discuss some of these challenges.

Session 32 Topic-Contributed: Sample Design and Estimation in Physician Surveys

Deriving Practice-Level Estimates from Physician-Level Surveys
Catherine Burt, National Center for Health Statistics (U.S.)

I will describe the development and use of a multiplicity estimator, designed to produce practice-level estimates from a survey of physicians. Using information about the number of physicians in the sampled physician's medical practice, collected in a national survey of office-based physicians, allows us to make estimates of the number and characteristics of office-based medical practices. Using the physician sample weight, we estimate there was an average of 311,200 physicians providing direct patient care in office-based practices during 2003/04. Multiplying the physician sampling weight by the inverse of the number of physicians in the practice allows us to further estimate that these

physicians work in approximately 161,200 practices. Practice-level estimates for group practices are consistent with those resulting from sample surveys of group practices.

Using Medicare Files To Construct a Sampling Frame for a Survey of Physicians
Vasudha Narayanan, Westat (U.S.)

I will offer a case study using Medicare files to select a sample of physicians. The Medicare Contractor Provider Satisfaction Survey measures the satisfaction of physicians and other medical providers with the services offered by contractors, organizations that pay Medicare claims. The customer typically is the individual responsible for billing Medicare and interacting with contractors, who may represent multiple sampling units (physicians or group practices). Also, a sampling unit may have multiple respondents who handle different business areas with contractors. I will describe these challenges, use of multiple files to construct the sample frame, and use of prescreening and non-CMS databases to obtain additional variables of interest.

Use of Measures of Size in Sample Design and Estimation of Physician Surveys
Kennon R. Copeland and *Elizabeth Wallace,* IMS Health (U.S.)

Physician survey sample design and estimation methods typically stratify using physician specialty and geography. However, characteristics of interest may be related to physician practice size, which is not directly available from frame information. This limitation can adversely affect sample design efficiency and survey estimate accuracy. Physician prescription (Rx) volume can serve as a proxy for physician practice size and act as an initial screener and/or stratifier when conducting physician surveys. Available information about physician Rx volume, the relationship of Rx volume and measures of interest for IMS Health physician surveys, options for using Rx volume in sample design and estimation, the relationship between Rx volume and common measures of interest, relative performance of estimates utilizing the measures of size, and caveats associated with use of Rx volume will be discussed.

Determination of Target Sample Sizes for Physician Surveys
Darrell J. Philpot and *Kennon R. Copeland,* IMS Health (U.S.)

Usable samples for physician surveys will be less than the selected sample due to refusal and nonreporting. Cooperation rates vary among specialty groups and for the initial survey period vs. continued participation. The magnitude of these factors needs to be accurately estimated to develop appropriate target-selected sample sizes yielding a desired usable sample. IMS Health physician surveys make use of historical information to model cooperation rates, accounting for specialty and geography and new vs. continuing panel. Models are then used to derive target sample sizes intended to yield the desired usable sample sizes. We will present historical information, describe models, and evaluate performance of predicted cooperation rates. We will then compare cooperation rates to suggest influence of survey purpose on physicians' willingness to participate. Bayesian methods also will be explored.

Session 33 Contributed: Strategic Directions for Business Surveys

A Framework for Prioritizing Economic Statistics Programs
Thomas Mesenbourg and *Ronald Lee,* U.S. Census Bureau

In the future, we expect increased scrutiny of statistical budgets and program performance. Besides maintaining financial program support,

we also must find resources to improve and enhance our programs, even in the face of constrained financial resources. All but the most important improvements will have to be funded internally by reallocating existing resources from lower to higher priority programs. To facilitate program review and reallocation decisions and to react to possible budget cuts, we believe we need a framework for evaluating our existing programs and considering program enhancements. We will describe recent bureau approaches and methods used or considered for establishing relative priorities among diverse economic statistics programs when faced with significant budget reduction, their effectiveness, and shortcomings.

Statistical Sampling Plans: Collaborative Efforts between Statisticians and Subject Matter Experts

Marla Smith, U.S. Environmental Protection Agency
EPA's statisticians design unique sampling plans in collaboration with subject matter experts, who also are the end users of the data. For each survey, the team is typically composed of engineers, economists, environmental assessors, and statisticians. Because the surveys are one-time efforts, each project team expends considerable effort to learn about each industry, determine the data needs for each type of analysis, refine study objectives, and find statistical approaches that will satisfy all requirements. While the same statisticians generally support all surveys, the individual subject matter experts change depending on project requirements, leading to different team dynamics. I will describe the collaborative efforts of statisticians and subject matter experts in designing statistical sampling plans for establishment surveys conducted by the Office of Water at EPA.

100 Years of the U.K. Census of Production

Paul Smith and *Stephen Penneck,* Office for National Statistics (U.K.)
The first Census of Production in the U.K. was taken for 1907. To mark the centenary, we will review the evolution of the census, considering the changes that have taken place and the pressures that have given rise to them. We will briefly consider challenges in making consistent series of historic information over a long period and draw out lessons that can be learned from the past. We will use these to suggest how the development of the Census of Production (now integrated with annual collections of data on service industries as the Annual Business Inquiry) will continue.

An Overview of Business Tendency Surveys

Richard Vincent and *Richard Evans,* Statistics Canada
In this fast-paced world, where economic and health shocks are transmitted rapidly across oceans, there is an increased need for timely information about economic impacts. Business tendency surveys are low-cost, low–response burden qualitative surveys directed at businesses and designed to fill forward-looking and current information needs. We will examine the definition of business tendency surveys and indicate their uses worldwide. Particular attention will be put on comparing and contrasting business tendency surveys around the world.

Session 34 Contributed: Treatment of Nonresponse

Alternative Methods of Unit Nonresponse Weighting Adjustments:
an Application from the Survey of Small Business Finances

Lieu Hazelwood, Traci Mach, and *John Wolken,* Board of Governors of the Federal Reserve (U.S.)
The 2003 SSBF screening interview had significant unit nonresponse

and, therefore, nonresponse adjustment was deemed necessary. The approach used differed from that used in previous surveys. We will examine the effect of this technique on weights, point estimates, and variance of the estimates by comparing the approach implemented for the 2003 survey to alternative approaches.

Redefining the Unit Nonresponse Adjustment Cells for SORAR

Laura Ozcoskun and *Katherine Jenny Thompson,* U.S. Census Bureau
Survey sampling textbooks derive the statistical properties of considered estimator and variance estimators under the "ideal" condition of complete response. Survey methodologists wrestle with reality, where not all sampled units respond. Clearly, unadjusted estimates of totals from respondent data are negatively biased for the population total. To ameliorate this bias, the survey practitioner assumes a model for the nonresponse and develops adjustments to their survey estimates. We will present our approach to developing adjustment weighting cells for unit nonresponse under the "quasirandomization" model (Oh and Scheuren, 1983) and discuss diagnostics for determining cell-collapsing criteria in the event of insufficient respondents. Finally, we will present our application of these techniques to historic data from the Survey of Residential Alterations and Repairs.

Dealing with Item Nonresponse in a Catering Survey

Pauli Ollila, Statistics Finland, and *Kaija Saarni* and *Asmo Honkanen,* Finnish Game and Fisheries Research Institute
We will describe alternative strategies to deal with item nonresponse in a Finnish catering survey and the reasons for the final strategy. The survey included questions about the fish consumption of the enterprise at different study levels and fish categories. The aim of the survey was to get respondents to fill out the paper questionnaire before a telephone interviewer contacted them and collected data. Some respondents provided insufficient or contradictory information, and, to some extent, this was corrected in the data-collection phase (conditions in the questionnaire system and checking questions). Alternatives to deal with nonresponse were considered, taking into account the specific consistency requirements at different levels of study of the data. We will discuss the pros and cons of donor imputation, regression imputation, and separate weight adjustments in the context of the catering survey data.

Response Rates and Response Patterns among New Businesses: Results from the Kauffman Firm Survey (KFS)

Zhanyun Zhao, Frank Potter, and *Yuhong Zheng,* Mathematica Policy Research, Inc. (U.S.)
KFS is a national-level longitudinal survey of new businesses that gathers data on the resources and processes used to initiate and sustain businesses. The sample is a stratified random sample, with oversampling of high-tech firms. We will discuss how we detected the characteristics of respondents and did nonresponse adjustment using statistical methods. To better understand the responding pattern, we will investigate the response rate in a hierarchy model: investigations on the location rate among all sample members; investigations on the response rate among all located firms. We will model both the location and response models using Chi-squared Automatic Interaction Detector (CHAID) and logistic regressions.

Session 35 Invited: Improving Statistics on the Subnational Public Sector

Recommendations for Research and Development Priorities for the Census Bureau State and Local Government Statistics Program

John Czajka, Mathematica Policy Research (U.S.), and *David Marker,* Westat (U.S.)

In late 2005, the U.S. Census Bureau commissioned a National Academy of Sciences panel to review the bureau's state and local government statistics program and make recommendations for research and development priorities. This represents the first independent review of the government statistics program, which collects a range of data on the organization, finances, and employment of state and local governments through an array of annual and quarterly surveys and a quinquennial census. Data collected in the census provide the sampling frame for most (if not all) surveys of governments in the United States, while the financial data collected in the surveys are used to estimate 12% of the country's GDP. We will review the panel's recommendations and key findings.

Two-Dimensional Methodological Issues in Canadian Municipal Infrastructure Time Series

Aldo Diaz and *Marie-Claude Duval,* Statistics Canada

The allocation of infrastructure investment is based on knowledge of size and the nature of the services it provides. Information is typically obtained from surveys focused on the commodity dimension from which capital stock, depreciation, and average age are derived. The financing of municipal infrastructure projects are typically arranged on the functional dimension—such as environmental protection, transportation, or protection of persons and property—and their sub-functions. We will present a method that bridges the gap between investment capital made at the functional level and investment capital made at the microcommodity level. The method requires a two-dimensional approach, which was applied to Canadian municipal data for the period between 1871 and 2004. The result permits the simultaneous geographical, commodity, and functional analysis of municipal investment decisions.

Better Information for Regional Government

Minda Phillips and *Marie Cruddas,* Office for National Statistics (U.K.)

In recent years, there has been intense interest in subnational statistics in the U.K.. We will discuss various aspects of the way in which the requirements are being addressed, such as the development by ONS of the Neighbourhood Statistics Service, an internet service whose aim is to provide good-quality information at the small-area level for use by central and local government, public service providers, and the community.

Session 36 Invited: A Global Path to Standards in Questionnaire Design

Development of Questionnaire Design Guidelines

Rebecca Morrison, U.S. Census Bureau

Though the U.S. Census Bureau has standards for pretesting questionnaires, there are currently no standards or guidelines for their design. Staff members who work exclusively on establishment surveys have been creating a set of preliminary guidelines for the design and layout of questionnaires. These preliminary guidelines address formatting and layout issues and the placement of question-specific instructions. They are used to address tradeoffs within the context of the survey environment. I will discuss the process being used to develop the questionnaire design guidelines, and then show how they can be applied to various surveys.

Improved Questionnaire Design Yields Better Data: Experiences from the U.K.'s Annual Survey of Hours and Earnings

Jacqui Jones, Pete Brodie, Sarah Williams, and *Jane Carter,* Office for National Statistics (U.K.)

Since 2002, the U.K. Office for National Statistics (ONS) has been developing and testing standards for the design of paper self-completion questionnaires in business surveys. The objectives of the standards are to reduce measurement error, processing error, and respondent burden. The standards are regarded as dynamic and evolve as further research and evaluation is undertaken. They are implemented as existing business surveys are overhauled during a 'full review' or as new surveys are implemented. Often, when the standards are implemented, the questionnaire increases in length. The prospect of a longer questionnaire often results in compromises in order to reduce the costs of paper, printing, and postage. We will provide an overview of the standards for business survey paper self-completion questionnaires, the compromises that were made for the Annual Survey of Hours and Earnings questionnaire, and evidence of improved data accuracy and respondent experiences despite these compromises.

A Coherent Approach to Questionnaire Design Standards, Trends, and Implementation at the ABS

Rob Burnside and *Emma Farrell,* Australian Bureau of Statistics

We will describe how ABS questionnaire design standards and guidelines are created, maintained, and implemented organizationally and how the scope and emphasis of the standards have changed over time. We will describe their content and touch on emerging trends in requirements for enterprise form standards. The standards are based on ABS and international theoretical and applied research and experience. They cover format, structure, common components, and question wording principles. They also include detailed specifications and examples for different types of questions and forms. They are mandatory for in-scope forms and apply to paper forms, CATI, electronic forms, and material seen as effectively being part of a form, such as covering and other contact letters.

Session 37 Introductory Overview Lecture: Issues Related to Unit Nonresponse

Measurement of Bias

Clyde Tucker and *John Dixon,* Bureau of Labor Statistics (U.S.), and *David Cantor,* Westat (U.S)

Response rates often serve as the most visible measure of survey quality, but this may be just a matter of convenience. Although response rates are easy to produce, they do not necessarily provide an accurate measure of survey bias. In this presentation, we will discuss methods for both the direct measurement and modeling of bias for various types of establishments. The possible relationship between response rates and bias also will be explored.

Current/New Methods

Michael A. Hidiroglou and *Wesley Yung,* Statistics Canada

Nonresponse is one of many errors that can affect survey quality. The resulting impact on the associated estimates is that they are inefficient and perhaps biased (if the characteristics of the nonrespondents are

different from those of the respondents). Nonresponse is divided into two main categories: unit and item nonresponse. While unit nonresponse occurs if a sampled unit does not provide any information, item nonresponse occurs if the sampled unit provides some information. I will focus on the treatment of unit nonresponse. The best way to reduce the negative effects of unit nonresponse is to minimize it. However, full response is hard to achieve, even with a rigorous follow-up of the nonresponding units. The residual unit nonresponse is customarily treated by either weighting and/or imputation methods. I will present a number of methods to reduce the negative impact of unit nonresponse.

Session 38 Topic-Contributed: The Response Process in Academic Business Surveys

The Collection and Validation of Financial Performance Data within a Voluntary Workplace Survey
John Forth, National Institute of Economic and Social Research (U.K.), and Robert McNabb, Cardiff University Business School (U.K.)
The desire to better identify the microfoundations of improved productivity has increased demand for data on workplaces' financial performance. Performance data have historically been collected by national statistical agencies or published in company accounts, but these sources typically contain little information about working practices. The 2004 Workplace Employment Relations Survey was one of the first large-scale, voluntarily administered workplace surveys in Great Britain to collect quantitative data on establishments' financial performance. It did so via a short, paper-based questionnaire issued at the end of the main survey interview. We evaluate the success of this innovation and consider the procedures adopted in the survey and the achieved response rates. We also look at response biases at survey and item level and the quantity and quality of the resultant data.

A Web-Based Method of Collecting Longitudinal Data
Cynthia S. Cycyota, United States Air Force Academy
Researchers must rely on information obtained from informants in organizations to obtain information. For some types of information, they need the cooperation of top executives. Usually, this information is collected using traditional survey methods such as mailed surveys. While these methods are valuable, it is difficult to collect and maintain historical trends or other longitudinal data. I will explore an alternative, web-based method of collecting longitudinal data in a manner that provides timely feedback to organizations.

How Informants Report about Interorganizational Relationships
Joan M. Phillips, University of Notre Dame (U.S.)
I will discuss applying cognitive psychology perspectives to investigate how organizational informants report about interorganizational relationships. I will refer to a quasiexperimental field study that identifies the cognitive processes and data sources used by 109 organizational informants when answering survey questions and examines how consensus among multiple informant reports is related to the similarity of the cognitive processes and data sources used by informants.

Quality of Academic Business Surveys: Strategies for Reducing Nonresponse and Enhancing Data Quality
Tony Hak, RSM Erasmus University (The Netherlands)
I will report the results of a review of survey research published in top business research journals, focusing on problems regarding unit and item nonresponse and data quality. These are mapped on the eight elements of the hybrid model of the response process in establishment

surveys, as proposed by Sudman et al. (2000): Encoding in memory/record formation, selection and identification of respondents, assessment of priorities, comprehension of the data request, retrieval of information from memory and company records, judgment of the adequacy of the response, communication of the response, and release of the data. I will draw conclusions about the applicability of the Sudman et al. model to academic surveys and discuss the main issues that should be addressed by academic survey researchers to improve their surveys.

Session 39 Contributed: Updating of Business Registers

Using the Dun and Bradstreet Database as a Sampling Frame for Establishment Surveys
Sarah Cotton, Daniela Golinelli, John Adams, Megan Zander Cotugno, Lois Davis, and Robin Beckman, RAND Corporation (U.S.)
In 2006, RAND fielded the National Computer Security Survey, which involved a sample of 36,000 U.S. businesses across 37 industry sectors. The goal was to produce national- and industry-level estimates of the prevalence of computer security incidents against businesses and the resulting losses incurred. As the U.S. Census' establishment frame was not available to us, Dun & Bradstreet (D&B) was used as the sample source. D&B claims the world's largest publicly available business database, containing information about 38 million U.S. businesses. We will draw upon this and other experiences to detail our findings related to the strengths and weaknesses of using the D&B file as a sampling frame; the assumptions made when drawing the sample about the organization of large, multitier business entities; the testing of the veracity of those assumptions; and recommendations for structuring the sampling of similar business surveys in the future to improve fielding outcomes.

An Evaluation of Changes to Universe Extraction Editing for Current Business Surveys
Carol King, U.S. Census Bureau
The U.S. Census Bureau selects new samples for its Current Business Surveys about once every five years. An initial step is the extraction of establishment data from the bureau's Business Register. We compute a measure of size (MOS) for sampling for each in-scope establishment. Edits are performed on data used in the MOS computations. In the past, we edited data at the establishment level. Sampling units consist of one or more establishments. For the 2006 Business Sample Revision, we incorporated sampling unit edits so that only sampling units affecting sample sizes were flagged. The review of establishments occurred only when the sampling unit failed an edit. We also revised the methods to calculate establishment edit bounds and created a system to monitor data changes during the review of edit failures. I will provide an evaluation of these changes.

Evaluating the Effects of Business Register Updates on Monthly Survey Estimates
Daniel Lewis, Office for National Statistics (U.K.)
Monthly business survey estimates can be unstable due to variability on the sampling frame caused by births, deaths, and reclassifications. The way the sampling frame is updated to reflect real-life changes in the population can have a large impact on the quality of estimates that utilize frame data. I will describe an evaluation of methods for updating the Inter-Departmental Business Register (IDBR) in the U.K. Office for National Statistics. I also will discuss the potential to extend the simulation model to investigate a range of issues relating to surveys that use the IDBR as a sampling frame.

Development and Maintenance of the NASS List Frame

Stan Hoge and *William Iwig,* U.S. Department of Agriculture/National Agricultural Statistics Service

NASS has the responsibility of conducting the Census of Agriculture every five years. The census is the only source of uniform data on agricultural production, value of products sold, farm characteristics, and operator characteristics for each county, state, and the United States. NASS also administers an annual survey program that produces more than 400 published reports and covers more than 120 crop and 45 livestock items. All survey samples and the Census Mail List (CML) are selected from the NASS list frame. Development of a high-quality and efficient list frame for the census and survey programs is critical to NASS's mission of producing a comprehensive statistical picture of United States agriculture. We will discuss the development and maintenance of the NASS list frame on a five-year cycle for the purposes of both survey sampling and conducting the census. Besides describing issues related to the development and analysis of the list frame in preparation for the 2007 census, we also will outline plans for the next five-year cycle.

Session 40 Contributed: Editing, Data Quality, and Disclosure Issues

Quality Metrics for Assessing the Impact of Editing and Imputation on Economic Data

Broderick Oliver and *Katherine Jenny Thompson,* U.S. Census Bureau

The correction of survey returns accounts for a significant portion of the cost and time of conducting sample surveys. Editing and imputation are carried out to detect and correct inconsistencies in the data resulting from sources such as the respondent, interviewer, and data capture instrument. Rather than trying to detect and correct all errors in the data, the new focus on editing is to identify and correct those edit queries that have the most impact on the tabulated data and identify and collect data on errors, problem areas, and error causes to provide a basis for a continuous improvement of the whole survey vehicle. With this perspective in mind, the Economic Directorate of the U.S. Census Bureau developed a set of quality metrics to evaluate the editing efficiency of its various economic programs. We will discuss the development of these metrics and the results.

Data Validation for the 2006 Census of Agriculture

Charlie Arcaro, Statistics Canada

The Census of Agriculture (CEAG) is held every five years and collects inventories of farm commodities and financial information. Data validation is a major part of the data quality evaluation, done at both the macro and micro levels to ensure quality at the major geographical and small-area levels as well as ensuring good sampling frames for the major survey collections. In 2006, CEAG data will become available for free at finer geographical levels, and this will come under increased scrutiny. There also is a need to maximize the efficiency for validation resources during this long and vigorous process. I will discuss an outline for the 2006 data validation process and present new methods that will address resource management and improved data quality for lower levels of geography.

Microdata Simulation for Confidentiality of Tax Returns Using Quantile Regression and Hot Deck

Jennifer Huckett, Iowa State University (U.S.)

Government agencies simultaneously maintain confidentiality of records and disseminate useful microdata. Iowa's Legislative Services Agency (LSA) submits requests for tax revenue predictions based on proposed policy changes to Iowa's Department of Revenue (IDR), which estimates revenue based on individual income tax returns. IDR cannot, by law, release the data. We will study combining quantile regression, hot deck imputation, and additional confidentiality-preserving methods so IDR can produce a synthetic microdata file for release to LSA. Several versions of microdata can be imputed to assess uncertainty. Measures of disclosure risk to evaluate confidentiality protection will be considered. Methods will be studied using simulated data with known properties. Methodology could extend to any number of large establishment survey databases.

A New Approach for Disclosure Control in the IAB Establishment Panel: Multiple Imputation for Better Data Access

Jörg Drechsler, Stefan Bender, Agnes Dundler, Susanne Rässler, and *Thomas Zwick,* Institute for Employment Research (IAB) (Germany)

For microdatasets considered for public release, statistical agencies face guaranteeing the confidentiality of survey respondents while offering sufficiently detailed data. For that reason, a variety of methods to guarantee disclosure control is discussed in the literature. We will present an application of Rubin's (1993) idea to generate synthetic datasets from existing confidential survey data. We will use a set of variables from the 1997 wave of the German IAB Establishment Panel and evaluate the quality of the approach by comparing results from an analysis by Zwick (2005) containing the original data with the results we achieve for the same analysis run on synthetic datasets.

Session 41: Software Demonstrations

SD-19: Forillon: Benchmarking Made Easy!

Edith Latendresse and *Chantal Marquis,* Statistics Canada

Situations that require benchmarking are common in repeated establishment surveys, whether they are related to the coherence of annual and subannual surveys on the same target population or to the necessity of preserving annual totals in case of seasonal adjustments. Using SAS/TOOLKIT®, Statistics Canada developed under the project name Forillon a new benchmarking procedure for both UNIX and Microsoft Windows environments. PROC BENCHMARKING is presented in SAS® Enterprise Guide® through a user-friendly interface that automates the production of analytical tables and graphs based on the benchmarking results.

SD-20: Community Economic Development Hot Report

Lars Vilhuber, Cornell University (U.S.)

The Community Economic Development Hot Report aggregates data from a variety of state and federal sources to assess economic conditions and help industries and communities plan or respond to a range of shocks—from tornados to base realignments. HotReport incorporates statistical intelligence and produces maps, graphs, and tables with dynamic text that can be published to a web site. For those who like to manipulate data and are not intimidated by sheer volume, DataWeb and DataFerrett can provide access to thousands of public datasets.

SD-21: Question Repository System

Quentin Coleman, U.S. Department of Agriculture/National Agricultural Statistics Service

NASS conducts hundreds of surveys annually and the Census of Agriculture every five years to collect information about the U.S. farm sector. Multiple data-collection modes (e.g., mail, face-to-face, internet, and telephone/CATI) are used, requiring the building of paper, web, and CATI instruments for most surveys. To efficiently build properly formatted instruments for each mode of collection, NASS

began developing a client-server–based Question Repository System (QRS) with a user interface. I will demonstrate the QRS features and how they are used to interactively build instruments, including question development, formatting, and development of an end product for paper, web, and QRS-CATI. There will be a video presentation highlighting major points, system requirements, and unique features of the tool.

SD-22: Application of GIS and Remote-Sensing Techniques to Survey Data

Claire Boryan, U.S. Department of Agriculture/National Agricultural Statistics Service

NASS' Spatial Analysis Research Section creates a variety of GIS and remote-sensing products, including County Estimate Crop Maps (annual), Agricultural Atlas (every five years), Cropland Data Layers for selected states (annual), and NDVI Vegetation Condition maps (weekly). These products and the Florida Commercial Citrus Project, a citrus GIS data layer, will be discussed.

SD-23: Making Sense of Data via the Web

Irwin Anolik, U.S. Department of Agriculture/National Agricultural Statistics Service

I will show results of research at NASS to improve ways of disseminating data via the internet. Specifically, I will demonstrate web-based solutions that enable viewing, analyzing, and dynamically interacting with summary data at the state and county levels. I will present concepts and technologies implemented on the NASS web site to enhance the ability to find data of interest and see structure and pattern inherent in the data. While this presentation will focus on agricultural data, the concepts can be applied to other types of data.

SD-24: SPSS Survey and Research Solutions

Tim Daciuk and *Nancy Dobrozdravic,* SPSS Inc. (U.S.)

SPSS technologies have been used, tested, and refined in conjunction with leading companies in a range of industries. In fact, 24 of the top 25 market research organizations use SPSS products. This demonstration will show how SPSS technologies can be used commercially and by public agencies to streamline, standardize, and secure the survey design, data collection, and analysis process. Attendees will see a demonstration of how to use a range of methods to centralize the collection of information across multiple channels and/or languages; design vibrant questionnaires incorporating multimedia so surveys are easy and compelling; manage complex sample data; view results and quotas as data are collected; analyze collected data (including text), alone or along with behavioral data, to identify meaningful segments or trends; and report quickly and cost-effectively in many forms.

Session 42 Contributed: Poster Session

P-1: Multimodal Approach for Increasing Response Rates for Surveys of Slaughter and Processing Plants

Sheryl Cates, Catherine Viator, and *Nadia Paoli,* RTI International (U.S.)

To obtain data on establishments' use of technologies and practices to control food-borne pathogens and promote food safety, USDA's Food Safety and Inspection Service contracted with RTI International to conduct national surveys of meat, poultry, and egg products establishments. The OMB burden for the mail questionnaire was 30 minutes/response. A multimodal survey approach was used and a variety of procedures aimed at maximizing the response rate to the voluntary survey was implemented. Survey procedures yielded response rates of 70% or greater for most industry segments. Response was higher among large

(500+ employees) and small plants (10–499 employees), compared with very small plants (< 10 employees or < $2.5 million in sales). The survey approach demonstrates that multiple contacts and a variety of modalities increases response rates for establishment surveys.

P-2: Comparison of Fishery Enterprise Survey Findings to External Economic Indicators in Finland

Anssi Ahvonen, Asmo Honkanen, and *Lari Veneranta,* Finnish Game and Fisheries Research Institute

The fishery barometer surveys the economic prospects and trends of fishery enterprises in Finland. The barometer survey was developed on the basis of the general business surveys and has been carried out annually since 2000. We studied whether the results could be explained by external economic information or internal results. The external economic information is based on the official account statistics data. The internal comparison is made by comparing whether the entrepreneurs' opinions of previous years economy explains the prospects for the coming year. We will discuss the conclusions of the comparisons.

P-3: Fishery Barometer Surveys the Economic Outlook of the Finnish Fisheries in the Entire Value Chain

Asmo Honkanen and *Anssi Ahvonen,* Finnish Game and Fisheries Research Institute

Fishery barometer surveys economic prospects and trends of fishery enterprises in Finland. The enterprises are divided into fishing, aquaculture, processing, and the wholesale or retail trade. Since 2000, the enterprises have been asked to evaluate their economic parameters, such as financial standing, turnover, and investments. The present situation is compared with the previous 12 months and expectations for the coming 12 months. The aim is to collect data that are reliable and comparable in the long term. The survey population consists of all fishery sector enterprises on the register of Statistics Finland. The net sample has been 300–400, and the response rate about 80%. The sample has been allocated to fixed quotas to ensure enough observations of all strata. We will discuss the development and relevance of the barometer.

P-4: An Overview of the Survey on Recruitment and Employment in Québec

Éric Gagnon and *Marie-Ève Tremblay,* Institut de la statistique du Québec (Canada)

The Survey on Recruitment and Employment in Québec is conducted annually by the Institut de la statistique du Québec at the request of the Centre d'étude sur l'emploi et la technologie (CETECH). The main objective of the survey, which is for private-sector Québec establishments, is to measure changes in the Québec labor market by quantifying departures, hirings, and vacant positions in the establishments concerned. In the 2006 survey, nearly 7,000 establishments were sampled on the basis of Statistics Canada's Business Register. We will present two survey's aspects more specifically: the evolution of response rates over the years and the efforts made to relieve response burden as well as the production of regional estimates.

P-5: Bootstrap Tests of Hypothesis for Survey Data

Cynthia Bocci and *Jean-François Beaumont,* Statistics Canada

We will present a simple bootstrap alternative to more complex methods of testing multiple hypotheses when using complex survey data. The basic idea underlying the proposed method is to use standard statistics obtained with classical software packages applied to bootstrap samples. The distribution of the standard statistics produced for each bootstrap set of weights can be used to perform the test. We will perform a simulation study in an informative sampling context and

compare it to several other methods. The proposed method may be useful to analysts who perform multiple tests of hypotheses in complex surveys and do not have access to an appropriate software package, but have access to bootstrap weights.

P-6: Developing Business Conditions Surveys for Services Industry
Sanping Chen and *Hansheng Xie,* Statistics Canada
Business Conditions Survey (BCS) is a short, concise, forward-looking qualitative survey with the objective of publishing current and leading indicators for the targeted industry. It bears a strong resemblance to consumer opinion surveys, yet with a key characteristic of a business survey, namely the critical role of the size of business. We will discuss several important methodology issues related to the development of business conditions surveys for the services industry.

P-7: The Hybrid Ratio Estimator: a Ratio Estimator That Handles Domains and Universe Totals
Brian Simonson, The Lewin Group (U.S.)
The Centers for Medicare and Medicaid Services (CMS) effort to estimate improper payments in Medicare and Medicaid uncovered shortcomings with the two predominant ratio estimators: the separate ratio estimator (SRE) and the combined ratio estimator (CRE). The SRE allows the rates by strata to be projected to a known universe total for the denominator. Unfortunately, it does not allow for the analysis of subsets of the data, known as domain-level analysis. The CRE allows for domain-level analysis, but does not utilize population total information. It follows that all denominator totals are projected from sampling weights, and these estimated totals may not equal the known universe totals. This difference leads to confusion and may cast doubt on the usefulness of results, particularly by the nonstatistician. The analysis of large programs, such as Medicare and Medicaid, requires a method for which all dollars are accounted for. In addition, domain-level analysis is crucial. Thus, the Hybrid Ratio Estimator (HRE) was formulated, allowing for domain-level analysis while projecting to the universe using known universe totals where available. Additionally, unlike the SRE that requires population totals to be known at the strata level, the HRE utilizes known population known at any level of granularity.

P-8: Survey Structure and Method of the Workplace Panel Survey in Korea
Byung You Cheon, Korea Labor Institute
The Workplace Panel Survey (WPS) is the nation's only large-scale workplace panel survey conducted by the Korea Labor Institute, a government-sponsored policy research institute. WPS is carried out on a biannual basis, systematically tracking and investigating information about workplace employment structure, human resources management, and industrial relations. WPS is divided into a main survey and a supplementary survey, which I will discuss in detail.

P-9: Suitability of the USPS Delivery Sequence File as a Commercial Building Frame
Stephanie Eckman, Michael Colicchia, and *Colm O'Muircheartaigh,* NORC at University of Chicago (U.S.)
The USPS Delivery Sequence File (DSF) has proven to be an accurate and low-cost frame for household surveys. In recent years, most national survey research firms have used the DSF as a residential frame or supplement to a traditionally listed frame. However, to our knowledge, no research organization has evaluated the use of the DSF as a frame of nonresidential buildings. Given the success we and other organizations have had using the DSF as a household frame, we are optimistic that the database will provide good coverage of nonresidential buildings.

But before we or others can begin using it as a frame, we must assess its accuracy and coverage. We have conducted such an assessment in 11 segments across the United States. For each of these, we have both the recent field listing of commercial buildings and the DSF database of nonresidential delivery points. We will compare the two frames and present results on what kinds of buildings and segments are overcovered and undercovered by each frame. We will report the percent of addresses in each frame we are able to match, as well as which variables are good predictors of the performance of the DSF frame.

P-10: ACS-Automated Cell Suppression Demonstration
Gordon Sande, Sande and Associates (Canada)
I will demonstrate the ACS Suite of programs, which provides a microdata to suppression pattern capability that provides confidentiality protection for enterprise statistics. The basic technique is cell suppression. This is provided by specialized tabulation, support utilities, and an auditing capability to allow for both automation and subject matter overrides for one-time and continuing enterprise surveys.

Session 43 Invited: Generalized Survey Processing Systems: an Update

An Assessment of the U.S. Census Bureau's Experience with Developing Generalized Economic Programs Processing Systems
Eddie Salyers, Beverly Eng, and *Donna Hambric,* U.S. Census Bureau
For more than 10 years, the Economic Directorate of the U.S. Census Bureau has been committed to developing and implementing generalized systems for economic census and survey processing. The objectives of this strategy include improving timeliness for new surveys, decreasing resources required for system development and maintenance, and improving analytical tools available for data analysis. Prior to standardizing systems, census supported more than 12 specialized processing systems. Census decided to consolidate most processing into two distinct systems: one for the Economic Census and Annual Survey of Manufacturers and one for all other surveys. We will examine the efforts and challenges at census in developing these generalized systems.

The Continuing Evolution of Generalized Systems at Statistics Canada for Business Survey Processing
Chris Mohl, Statistics Canada
Since the mid 1980s, Statistics Canada has built generalized business survey processing tools to perform the tasks of sampling, editing and imputation, estimation, and tabular data confidentiality. Despite the development and maintenance costs, they have proven to be an effective way to standardize the methods used, reduce the amount of custom development required, and ease staff transition between projects. However, development work has not finished. The systems are constantly evolving through improvements to the methodologies used and necessary upgrades to the underlying software and platforms. I will introduce the main systems and their current usage at Statistics Canada. I also will discuss the way the products have evolved, factors influencing these changes, and possible directions for the future.

Toward More Integrated Generalized Processing Systems: the ABS Experience for Economic Surveys
Eden Brinkley and *Judy Henson,* Australian Bureau of Statistics
A major business re-engineering program, the Business Statistics Innovation Program (BSIP), has been under way in the Australian Bureau of Statistics (ABS) transforming the "end-to-end" processes (e2e), methodologies, and technologies in the production of ABS

Economic Statistics. In terms of business processes, significant work has been undertaken to map and analyze current business processes within a consistent e2e, high-level framework. Over time, the number of disparate processes has started to evolve to a smaller number of more common approaches. In this period, drivers have led to new methodologies being developed to improve data quality and reduce provider load. We will outline key developments over the last few years, how we have gone about the planning and development, what we have learned along the way, challenges we have faced, and emerging issues.

Session 44 Invited: Methods Addressing Agricultural Statistics Issues

Improving Response in Farm Surveys through the Use of Geo-Referenced Data
Philip Kokic and *Kenton Lawson,* Australian Bureau of Agricultural and Resource Economics
In this presentation, we will motivate the use of a rural livelihood framework for the statistical modeling of farm productivity. This framework suggests that the physical and financial dimensions of ABARE's annual farm survey data need to be complimented with a greater amount of social, biophysical, geographic, and land use information. We will describe the results of a trial in which ABARE utilized geo-referenced data of farm paddocks and boundaries to link its farm financial and production data with biophysical and geographic data.

Recent Initiatives in U.K. Agriculture Surveys
Peter Helm, Racheal Walker, Nick J. Olney, and *Graham Collett,* Department for Environment, Food, and Rural Affairs (U.K.)
The U.K. Department for Environment, Food, and Rural Affairs (DEFRA) has been doing, and continues to do, work to reduce the compliance costs on farmers and help improve their response rates. Initiatives include sampling, questionnaire improvements, use of administrative sources, and developments in the register. By the time of ICES-III, DEFRA will have experience using data from the Whole Farm Appraisal, which is being introduced next year.

The Redesign of Statistics Canada Agriculture Surveys
Claude Poirier and *Laurie Reedman,* Statistics Canada
For the post-census redesign of agriculture surveys, methods are being considered to balance the competing goals of data quality and minimum burden. Ideas include increasing the small farm exclusion threshold; coordinating sample overlap; reviewing sample replacement schemes; standardizing concepts and definitions; minimizing the common content across survey questionnaires; coordinating collection phases; using score functions to prioritize units within the collection process; dedicating interviewers to agriculture operations; using the Farm Register as a tool to control response burden; guaranteeing a maximum limit over which the annual burden cannot go; replacing survey data with administrative data from a tax register, animal register, etc.; modeling data for survey exclusions; and combining estimates of multiple surveys for analysis purposes.

Session 45 Topic-Contributed: Nonresponse Bias Analysis in U.S. Government Surveys

Nonresponse Bias Analysis of the Survey of Workplace Violence Prevention
Andrew Kato, Kathy Downey, William McCarthy, and *Samantha Cruz,* Bureau of Labor Statistics (U.S.)
The Bureau of Labor Statistics conducted a nonresponse bias analysis that compared the characteristics of responding and nonresponding establishments in the Survey of Workplace Violence Prevention (SWVP). Establishment characteristics were compared to the sampling frame, which consisted of respondents to the 2003 Survey of Occupational Injuries and Illnesses (SOII). The SOII is an annual, mandatory survey of work-related injuries and illnesses. We examined establishment industry and size class, as well as the method of data submission for the 2003 SOII. We also analyzed the incidence rate of employee illnesses and injuries and the rate of assaults and violent acts from previously published SOII data to determine possible patterns. We will discuss the potential for nonresponse bias in the SWVP in light of the findings.

Assessing Nonresponse Bias in a Survey of Nursing Homes
Karen E. Davis, National Center for Health Statistics (U.S.)
The National Nursing Home Survey (NNHS) is a nationally representative sample survey of nursing home facilities, their residents, discharges, and staff conducted by the National Center for Health Statistics (NCHS). The NNHS has been conducted six times since 1973; it was not fielded in 2001 to allow time to conduct survey and sample design developmental work that would facilitate future survey redesign efforts. A redesigned NNHS was fielded in 2004. I will examine the questionnaire response rates at the facility level. Characteristics of responding and nonresponding facilities will be compared using a benchmarking technique. Data from the sampling frame for the survey also will be used to evaluate bias due to nonresponse in the 2004 survey estimates.

Nonresponse Bias Analysis in a Survey of Banks
Carl Ramirez, U.S. Government Accountability Office
The U.S. GAO often conducts one-time, list-frame sample surveys of narrow business populations. I will describe the nonresponse bias analyses used in such a survey and the emerging GAO practices in this area.

Assessing Nonresponse Bias in Estimates of Employment
Clyde Tucker and *John Dixon,* Bureau of Labor Statistics (U.S.)
The relationship between level of nonresponse and the bias in estimates from establishment surveys is a matter of great debate. Even if nonresponse bias is not large in population estimates, serious bias still may exist at the subpopulation level. Using administrative records supplied to BLS by the states, estimates of employment for the respondents to the CES will be compared to estimates of employment, including both responding and nonresponding firms. The effects of level of nonresponse on these differences will be modeled for a number of industry/size classes using quantile regression. The characteristics of the regression curves will indicate the inter-relationships between bias, nonresponse, firm size, and industry.

Session 46 Contributed: Respondents' Perspectives on Survey Collection

Higher Quality and Lower Burden through Better Relations: Large Enterprise Management

Anna-Greta Erikson, Statistics Sweden

Good-quality data from the largest enterprises are essential to achieving good quality in economic statistics. At the same time, the response burden of the largest enterprises is very large, and their willingness to provide good-quality data may decrease as the demand for statistical information increases. Also, the collection of data from global enterprise groups that continuously reorganize their operations poses special challenges. To solve this puzzle in Sweden, a group of contact persons was established. The group has a broad scope of tasks, ranging from following and understanding the enterprises, profiling statistical units and keeping the business register up-to-date, working extensively in actual data collection, and coherence analysis. I will describe the work within Statistics Sweden and discuss advantages and pitfalls of the broad scope of work.

A Surgical Approach for Implementing CIPSEA

Jacob Bournazian, Energy Information Administration (U.S.)

The Energy Information Administration (EIA) collects information under CIPSEA on 12 out of approximately 70 surveys. Some of the agency's data-sharing activities are nonstatistical, but vital for informed policymaking decisions on energy policy. Section 504(d) of CIPSEA is beneficial for reconciling EIA's requirements to disclose energy information for nonstatistical uses; however, a middle ground allowing data sharing for limited nonstatistical purposes may be needed. CIPSEA impacted the agency's pledge on non-CIPSEA surveys, and that may affect data collection in energy emergency situations when EIA needs to provide strong assurances to respondents. I will discuss the issues raised by collecting information under CIPSEA and its benefits and limitations.

Sources of Measurement Errors in Business Surveys

Mojca Bavdaz, University of Ljubljana (Slovenia)

Measurement errors are commonly ascribed to four sources: the respondent, interviewer, instrument (survey questionnaire), and mode of data collection. The unique characteristics of business populations and business surveys affect the survey response process and contribute to the occurrence of specific measurement errors. Several authors have exposed the need for an additional source of measurement error in business surveys: the information system or, more broadly, the organization. Although this addition considerably improves the usefulness of the categorization, some sources of measurement error still lack. I will propose an extension of the existing categorization to cover all known sources of measurement error in business surveys and elaborate on its implications for detection, reduction, and prevention of measurement error in business surveys.

The Unrecognized Interviewer: Studying Respondent Behavior in an Establishment Survey of U.S. Academic Institutions

Scott Crawford, Survey Sciences Group (U.S.), and *Emilda Rivers,* National Science Foundation (U.S.)

Establishment surveys collect data about establishments; however, it is typically not the establishment that responds to the survey request. Someone must play the role of the respondent for the establishment, and, perhaps unknowingly, this person plays the role of the interviewer for the data collector. Unfortunately, little is known about respondents playing these dual roles and what they do in the process of responding. This can be done using respondent behavior studies (RBS). We will present procedures, results, and lessons learned from a pretest and pilot RBS conducted with both respondents and nonrespondents to the Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS) in 2005 and 2006.

Session 47 Contributed: Sample Design Challenges

Estimation of Finite Population Mean Using Ranked Set, Two-Stage Sampling Designs

U. C. Sud and *Dwijesh Chandra Mishra,* Indian Agricultural Statistical Research Institute

The Ranked Set Sampling (RSS) procedure for the estimation of finite population mean has been extended to the case of two-stage sampling design under a finite population framework. Three cases have been considered: RSS at second stage and SRS at second stage, RSS at first stage and SRS at second stage, and RSS at both stages. Using data on yield of wheat crop, we will demonstrate that the use of RSS results in a gain in precision of the estimate of finite population over the SRS procedure.

Design Effects of Sampling Frames in Establishment Surveys of Small Populations

Monroe Sirken and *Iris Shimizu,* National Center for Health Statistics (U.S.)

We will discuss the design effects of three sampling frames in establishment surveys that estimate the utilization of establishment services by a small population domain. Survey I uses a population survey–generated frame that lists every establishment having transactions with people in a household sample survey. Survey II uses a population survey–generated frame that lists only those establishments having transactions with the small population of interest in a household sample survey. Survey III uses a complete establishment frame that lists all establishments that have transactions with households.

Sample Design for the FDIC's Asset Valuation Review

David W. Chapman, Federal Deposit Insurance Corporation (U.S.)

When an FDIC-insured financial institution (bank) is in danger of filing, FDIC asset experts need to assess the market value of the institution's loan portfolio in a short period of time as part of an Asset Valuation Review (AVR). Based on these valuations, price tags are assigned to various loan pools, and these are used to sell the bank's loans to other institutions if the bank fails. In general, the number of loans in the bank's portfolio will be too numerous for all the loans to be assessed in the limited time available. So, sampling must be used to estimate the value of the loan pools. The key to creating an optimum design is to establish size strata within loan pools, based on loan book values, and to allocate the sample efficiently to the size strata. The creation of size strata, including a certainty stratum, needs to be fully automated because of the limited time available to conduct the AVR. The current design is in the process of being revised to improve sampling efficiency for the AVR. The challenges and features of the revised design will be discussed.

Measuring the Success of the Updated Sample Design for the Medical Expenditure Panel Survey: Insurance Component

John P. Sommers, Agency for Healthcare Research and Quality (U.S.), and *Anne Kearney,* U.S. Census Bureau

The MEPS-IC is an establishment survey that collects information about employer-sponsored health insurance. In survey year 2004, we changed the sample for private sector establishments considerably. The changes included strata definitions, allocation per state, number

of states with minimum sample for publication that grew from 40 to 51, overall sample size that grew by 7,000 units, and special sampling rules that limit the sample per firm. The goal of the design was to improve sampling errors for state estimates and maintain the errors at the national level. We will compare errors from the new to the previous design to determine if we met our goals. As we made changes to the design that could decrease sampling error for certain estimates, we also will compare specialized design effects to determine the effects of stratification and oversampling on final results.

Session 48 Contributed: Seasonal Adjustment

Issues in Modeling and Adjusting for Calendar Effects in Economic Time Series
Brian Monsell, U.S. Census Bureau

I will examine the effectiveness of alternate models for estimating working day and moving holiday effects in economic time series. Several alternative approaches to modeling Easter holiday effects will be examined, including a method suggested by the Australian Bureau of Statistics that includes a linear effect. In addition, a more parsimonious technique for modeling trading day variation will be examined by making the weekday/weekend trading day contrast regressor found in TRAMO and X-12-ARIMA more flexible by allowing contrasts for user-specified days of the week. Examples for stock trading day will be examined.

Assessment of Diagnostics for the Presence of Seasonality
Catherine Hood, Catherine Hood Consulting (U.S.)

By definition, a seasonally adjusted series should contain no estimable seasonality; therefore, an important criterion when assessing the quality of a seasonally adjusted series is the presence of residual seasonality. So far, X-12-ARIMA is the only software that automatically checks for residual seasonality, but the spectral analysis could easily be used for other methods. Spectral diagnostics are generally considered reliable if there are 60 points in the series; however, this is longer than most quarterly series. I use a large sample of both real and simulated quarterly and monthly series to look at various options available in X-12 for spectral estimation and other diagnostics sometimes used to detect seasonality. The spectral diagnostics worked well, even for short series, especially with some of the newer options available in X-12.

Comparing Automatic Modeling Procedures of TRAMO and X-12-ARIMA: an Update
Kathleen McDonald-Johnson, Chak Li, and *Brian Monsell,* U.S. Census Bureau, and *Catherine Hood,* Catherine Hood Consulting, (U.S)

The U.S. Census Bureau's enhanced X-12-ARIMA seasonal adjustment program includes the automatic ARIMA (Autoregressive Integrated Moving Average) model selection procedure developed by Statistics Canada and a second procedure based on the automatic procedure of TRAMO, a modeling package developed by Victor Gómez and Agustín Maravall. Each program has automatic identification of key regressors, allowing for full automatic regARIMA model selection. X-12-ARIMA's procedure differs from TRAMO's in a number of ways, the most notable differences listed by Findley (2005). Our study, using the most recent versions of the programs, updates work by Farooque, Hood, and Findley (2001). We applied the procedures to a set of bureau time series and simulations. When model choices differed, we compared standard modeling diagnostics to look for a consistent preference for either procedure.

Determining Seasonality: a Comparison of Diagnostics from X-12-ARIMA
Demetra Lytras, William Bell, and *Roxanne Feldpausch,* U.S. Census Bureau

Before a series is seasonally adjusted, it should be shown that it is seasonal. When using X-12-ARIMA, two diagnostics commonly used to do this are M7—a diagnostic developed at Statistics Canada for X-11-ARIMA—and the F test for seasonality assuming stability. However, the statistical properties of these are not well-understood. We used simulated series to determine properties of these statistics and compared them to those of two other diagnostics: the presence of seasonal peaks in the spectrum of the original series and the chi-squared test of seasonal regressors added to the model (replacing the seasonal component of the ARIMA model).

Session 49 Invited: Toward a Better Understanding of the Response Process in Surveys of Businesses and Organizations

The Response Process Model as a Tool for Evaluating Business Surveys
Deirdre Giesen, Statistics Netherlands

The Questionnaire Lab of Statistics Netherlands uses the Sudman et al. (2000) response process model as a tool in the evaluation of business surveys. The model is used as a framework to reconstruct or observe each step of the actual response process in order to locate sources of response burden and data error. For this presentation, several dozen case studies with detailed descriptions of how establishments respond to questionnaires will be reviewed to answer the following questions: To what extent were the steps of the model relevant for describing the response process? Which kinds of data error and response burden did we find, and how are they linked to the different steps of the model? How has the response process model been useful in understanding the causes of response burden and data error and in improving the survey design to reduce these?

Using the Theory of Socially Distributed Cognition To Analyze the Establishment Survey Response Process
Boris Lorenc, Statistics Sweden

In this presentation, I will argue that Socially Distributed Cognition (SDC) provides a coherent conceptual framework for studying response processes in establishments. I will illustrate this with a Statistics Sweden survey analyzed using the SDC. I also will sketch out possible quantitative analysis of the response process and outline implications for survey design.

Considering the Establishment Survey Response Process in the Context of the Administrative Sciences
Diane K. Willimack, U.S. Census Bureau

In an establishment survey, the subject of requested data is an organization, and people (e.g., employees) collect data from the organization on behalf of survey researchers in much the same way that interviewers collect data from individuals in household surveys. However, survey-takers do not have the managerial controls over establishment survey respondents that they exercise with household survey interviewers. Moreover, the behavior of people in organizations is influenced or constrained by attributes of the organization. In a sense, survey-takers are outsiders trying to influence the behavior of individual respondents and their organizational context. I will draw upon literature about the

behavior of people in organizations and on management science to glean insights into organizational attributes and their implications for the establishment survey response process.

Session 50 Invited: Usage of Linearization Variance Estimators for Survey Estimates

An Overview of the Pros and Cons of Linearization versus Replication

Richard Valliant, University of Michigan (U.S.)

I will present a review of the practical pros and cons of linearization vs. replication in the presence of nonresponse, imputations, and calibration estimation. The effects of grouping first-stage units for variance estimation will be examined, along with the accuracy of standard rules-of-thumb used for assigning degrees of freedom.

Linearization Variance Estimators for Survey Data: Some Recent Work

A. Demnati, Statistics Canada, and *J. N. K. Rao,* Carleton University (Canada)

In survey sampling, Taylor linearization is often used to obtain variance estimators of calibration estimators of totals and nonlinear finite population parameters. Demnati and Rao (2004) proposed a new approach to deriving Taylor linearization variance estimators that leads directly to a unique variance estimator that satisfies desirable properties for general designs. Demnati and Rao (2002) considered the case of missing responses when adjustment for complete nonresponse and imputation for item nonresponse are used. Demnati and Rao (2005) studied total variance estimation in the context of finite populations assumed to be generated from superpopulation models. We will give a brief account of the Demnati-Rao method for variance estimation and present new developments.

Investigation of Jackknife Linearization Variance Estimators for U.S. Census Bureau Business Survey Estimates

Samson A. Adeshiyan and *Katherine Jenny Thompson,* U.S. Census Bureau

Many business surveys conducted by the U.S. Census Bureau use a one-stage stratified SRS-WOR design with relatively few strata and large number of units per stratum. Consequently, replicate variance estimation methods offered in the bureau's Standardized Economic Processing System (StEPS) have been adequate. However, when these surveys publish finer domain estimates, or when surveys with more complex designs use StEPS, the stratified jackknife is more appropriate. The computational costs of the stratified jackknife can be nearly prohibitive for surveys that have many sampled units, employ complex estimators, or utilize several weight adjustments. We will investigate linearizing the jackknife, comparing the results to those obtained from the stratified jackknife both empirically and via simulation.

Session 51 Topic-Contributed: Response Management Strategies at Statistics Canada and the U.S. Census Bureau

Holistic Response Management at Statistics Canada

Janet Sear and *Lucie Vinette,* Statistics Canada

Statistics Canada is well on its way to implementing a holistic response management strategy to better manage relationships with its business survey respondents. The strategy is predicated on a relationship management plan that segments the business population into four tiers based on complexity, importance to estimates, and eligibility for tax replacement. Embedded programs such as the Enterprise Portfolio Management Program and the Strategic Response Management Program, allow the agency to proactively manage and coordinate ongoing relationships with its business survey respondents and deal with cross-cutting issues beyond the scope of any one survey area in order to ensure the delivery of timely, accurate, and coherent data.

Enterprise Portfolio Management Program

Wilf Bozzato, Statistics Canada

Tier I in Statistic Canada's holistic approach to response management refers to the Enterprise Portfolio Manager Program (EPMP). The EPMP is responsible for managing the ongoing, overall relationship with Canada's largest and most complex enterprises. This consists of a group of Enterprise Portfolio Managers (EPMs) establishing and maintaining proactive, ongoing relationships with the businesses within their portfolios. While nurturing these relationships, the EPMs are responsible for completing legal and operating profiles, negotiating survey arrangements, coherence analysis, issue resolution, and data collection. We will cover a year in the life of an EPM.

Strategic Response Program

Janet Hughes, Donna Stephens, and *Lola Docherty,* Statistics Canada

The Strategic Response Program was initiated in 2005 as a "proof of concept": Use your resources to address the nonresponse problem for survey-critical units and make the results measurable. Team members were formerly Enterprise Portfolio Managers who brought with them extensive experience negotiating with the largest and most complex enterprises in the Canadian economy and more than 200 surveys in the agency that target businesses. The program leveraged this experience and insight to engage these so-called "problem" respondents and solicit cooperation from the many survey areas implicated in a solution. The results have been both very promising and somewhat surprising. We will discuss what we did to turn these problem companies into good, consistent reporters and why the approach has been so effective in the STC collection environment.

Company-Centric Communication Approaches for Business Survey Response Management

Robert Marske, Laurie Torene, and *Michael Hartz,* U.S. Census Bureau

Changes affecting businesses include new technologies, new forms of business organization, and increasing demands on scarce business resources. We will focus on how the bureau is responding to the changing environment by providing a more company-centric approach to communication. Since 1991, the bureau has provided a special, one-on-one relationship with the largest companies to prepare and assist them in Economic Census reporting. In the last census, this "account manager" program helped to achieve a 92% response rate for the companies involved, compared to an overall response rate for all companies of somewhat less than 84%. Also, by constructing reporting calendars to provide a comprehensive view of companies' reporting requirements, we give them an invaluable tool as they struggle to make sense of requests for information. We will describe characteristics of these programs and the challenges we anticipate as we make plans to expand their scope and impact. We also will review lessons learned, including metric and anecdotal evidence of the impact of these practices on bureau practices and respondent behavior.

Session 52 Contributed: Administrative Data: Warehousing and Quality

Unified Enterprise Survey and Metadata

Sylvain Boucher, Statistics Canada

The integration of annual business surveys through the Unified Enterprise Survey provided great opportunities in developing data-processing infrastructure. Establishing comprehensive metadata became an important challenge in order to share and process data in a timely fashion. The Enterprise Statistics Division created the Integrated Questionnaire and Metadata System (IQMS). IQMS is a tool used to store and maintain metadata for questionnaire content, collection applications, postcollection processing, and data warehousing. IQMS improved the metadata quality used among the UES systems and became an essential tool for the sound processing of UES surveys. During this presentation, the different types of metadata included in IQMS will be discussed. The different users updating the metadata and the data flow among the different processes also will be presented.

Input Data Warehousing: Canada's Experience with Establishment-Level Information

Greg Peterson, Statistics Canada

There is a continuum along which a national statistical office can approach the issue of input data warehousing. At one end is a completely decentralized approach where each program manages its data holdings. At the other end is a completely centralized approach, whereby one corporate system will hold all the input data (register information, survey data, metadata, etc.). Currently, as it relates to business statistics, Statistics Canada is positioned midway along this spectrum. Using the Unified Enterprise Statistics (UES) program, I will describe where Statistics Canada is positioned with regard to the warehousing of business statistics. I will further describe how data warehousing in the UES is evolving from being primarily focused on supporting the UES to being driven by analytical requirements.

Challenges in Collecting Police-Reported Crime Data

Colin Babyak, Statistics Canada

The Uniform Crime Reporting (UCR) survey collects administrative data on all police-reported criminal incidents in Canada. In an ideal world, extraction programs are integrated with police record management systems to automate this collection and ensure timely analysis and dissemination. Unfortunately, in the real world of crime data, missing data occurs as police services change or upgrade their systems, new legislation is introduced, data needs evolve, and crime continues. I will describe the structure of the UCR and how we treat methodological issues, such as multiple collection instruments, data validation, and quality assurance. Particular emphasis will be placed on recent changes to the UCR and how these changes differ from typical establishment surveys due to the institutional nature of the respondents.

Session 53 Contributed: Utilizing Tax Data in Estimation

Tax Data as a Means for the Essential Reduction of the Short-Term Survey Response Burden

Rudi Seljak and *Metka Zaletel,* Statistical Office of the Republic of Slovenia

In recent years, most national statistical institutes have been confronted with improving the timeliness of published data with no significant influence on their accuracy. There is also a growing demand for the reduction of response burden, again with no significant influence on

accuracy or timeliness. These demands are especially outstanding for short-term business surveys, which are, by definition, designed to provide quick results with an acceptable level of accuracy. We will present a system for estimating the turnover index, with special emphasis on combining the survey and administrative data. We will explain the conceptual difference between both types of data, point out what trouble these differences could cause, and explain what procedures were used to overcome these problems. We also will present what the most important benefits of using administrative data are and explore the influence of the change of methodology on the quality components of the estimated indices.

Reducing the Costs and Response Burden of the Farm Financial Survey

Peter Wright and *David MacNeil,* Statistics Canada

The annual Farm Financial Survey collects financial information and information about the physical characteristics of farms in Canada. With more than 250 variables, an average length of telephone interview exceeding 30 minutes, and a sample size of 18,000, both the costs of collection borne by Statistics Canada and the burden of response on farm operations are great. In this study, alternatives to the existing survey methodology were examined, being mindful of the needs of policymakers, to reduce costs and response burden without compromising data quality. Tax data shared by the Canada Revenue Agency were assessed to replace survey data directly and gauge whether other survey variables could be well-represented using functions of tax data. Other data sources and the use of more than one questionnaire format also were examined.

Impact of Using Fiscal Data on the Imputation of the Unified Enterprise Survey of Statistics Canada

Jean-Sébastien Provençal, Statistics Canada

An agreement with the Canadian Revenue Agency (CRA) grants Statistics Canada access to fiscal data collected from tax reports of incorporated and unincorporated businesses. In 2002, a project was launched to increase the use of data from administrative sources, such as the tax reports in survey programs, to reduce the response burden of businesses and collection costs. Starting in reference year 2003, the Unified Enterprise Survey (UES) of Statistics Canada planned to use fiscal data from tax reports for a portion of the sample. The use of tax data grew in the last couple of years, and now represents a significant portion of the global estimates, affecting all survey steps. I will give an overview of the edit and imputation process for the UES and emphasize major changes. I also will attempt to quantify the impact of this process on data processing.

Estimation in the Presence of Tax Data in Business Surveys

David Haziza, Université de Montréal, and *Joana Bérube* and *Gordon Kuromi,* Statistics Canada

In an ongoing effort to reduce respondent burden and the cost of survey programs, an approach was initiated where tax data are used in lieu of survey data. For a unit to be eligible for replacement, it has to be a simple unit. The Data Integration Project (DIP) is a Methodology Branch research and development initiative created to determine which methodology is best suited to increase the use of tax data in surveys while producing accurate, consistent, timely, and relevant estimates across a given business statistics program. We will discuss several aspects of sampling and estimation in the context of tax data: the choice of allocation, the choice of a tax replacement method, the choice of a point estimator, and the choice of a method for displaying data. Empirical results also will be presented.

Session 54 Invited: Advances in Disclosure Protection: Releasing More Business and Farm Data to the Public

Lessons Learned from Internet Dissemination of Confidential Farm Survey Results: U.S. Department of Agriculture's Agricultural Resource Management Survey

Mitchell Morehart, U.S. Department of Agriculture/Economic Research Service

ERS and NASS annually collect a wealth of data that describe farming in America through the Agricultural Resource Management Survey (ARMS). While ARMS provides a rich set of economic data, customers outside the government, especially researchers, have gone largely underserved. ARMS data was available only within the USDA, except when summary information was released publicly, users requested ERS do special tabulations, or when academic researchers entered into special research agreements with ERS/NASS to access the data in USDA offices. In response, ERS developed easy-to-use, web-based data delivery tools that expand access to farm survey data as a public good, while maintaining the security of the confidential data. Experience in the construct and maintenance of the tool since its inception, stakeholders use and satisfaction, and recent changes and enhancements will be discussed.

Protecting the Confidentiality of Tables by Adding Noise to the Underlying Microdata

Paul Massell and *Jeremy Funk,* U.S. Census Bureau, and *Jonaki Bose,* Bureau of Transportation Statistics (U.S.)

Users of statistical tables released by the economic directorate of the U.S. Census Bureau have suggested an alternative to cell suppression be used to protect the confidentiality of tables. They would like an alternative that allows users to have access to at least an approximate value for each cell, except possibly for the most sensitive cells. A method to achieve this was developed a decade ago by researchers at the bureau (Evans-Zayatz-Slanta; J. Official Statistics, 1998). In it, a simple distribution generates noise that is added to the microdata values of a magnitude variable (e.g., receipts). From these noisy microdata values, tables are formed that protect the original microdata values. This method is conceptually simple and easy to implement. We will apply this method to additional surveys with different features and use new methods of analysis.

Quality-Preserving Controlled Tabular Adjustment: an Alternative to Complementary Cell Suppression for Disclosure Limitation of Tabular Magnitude Data

Lawerence Cox, National Center for Health Statistics/Centers for Disease Control and Prevention (U.S.)

Previously, the SDL method for tabular magnitude data was cell suppression. Suppression is undesirable because it eliminates data, thwarting analysis. The suppression mechanism is not probabilistic and not amenable to statistical imputation. Controlled tabular adjustment (CTA) has been introduced. Original CTA replaced disclosure cells by safe values and adjusted other values using LP to rebalance tables. CTA was accomplished optimally with respect to global and local measures of data "closeness." Quality-preserving CTA extends CTA by augmenting the linear constraint system by constraints that mimic changes to distributional properties, such as sufficient statistics for linear models, thereby preserving them. Finally, minimum discrimination information CTA (MDI-CTA), which, via iterative proportional fitting, seeks to preserve the original empirical data distribution.

Session 55 Invited: Getting Response: the Respondent's Perspective

Paper and Web Questionnaires Seen from the Business Respondent's Perspective

Gustav Haraldsen, Statistics Norway, and *Jacqui Jones,* Office for National Statistics (U.K.)

Both in Britain and Norway, a lot of data about the objective and perceived response burden in businesses have been collected. Yet, the data have not been analyzed within a social-psychological framework. We have not learned much about how the respondents' perceptions and attitudes toward the questionnaires are colored by their initial interest and competence. Even less is known about the effects company characteristics and decision processes have on the respondents' available time and technology, interest in statistical surveys, and response competence. During 2006, more data about these aspects were collected. We will take a fresh look at the data from this perspective. Second, Britain and Norway differ in that all British business surveys are on paper, while all Norwegian business surveys are available and predominantly answered on the internet. We will use this difference to discuss how the technology shift from paper to web changes the personal and contextual conditions of business respondents and consequently affects the response burden.

Understanding the Decision To Participate in a Business Survey

Ger Snijkers and *Martin Luppes,* Statistics Netherlands

In 1998, Groves and Couper defined a framework for survey cooperation. This framework identifies aspects of the survey process that are under and out of the researcher's control to get survey cooperation. Willimack et al. (2002) transformed this framework to business surveys. They indicated that surveys have no priority to businesses. Why then are businesses willing to pay attention to a request for participation in a survey? We will try to answer this fundamental question. In 1992, Groves, Cialdini, and Couper described a number of basic compliance principles underlying the decision of social survey participation. We will describe the effects of using these compliance principles for business surveys, using the Willimack framework.

Factors Influencing Business Respondents' Decision To Adopt Web Returns

Zoë Dowling, University of Surrey (U.K.), and *Kristin Stettler,* U.S. Census Bureau

The web presents a new mode of data collection for business surveys and one that appears to offer many improvements to current methods. While web reporting may be beneficial to statistical agencies, it is necessary to ask how respondents view this new option. What expectations do they have of the web as a mode of response? We analyzed data from interviews with current respondents to U.K. Office for National Statistics and U.S. Census Bureau surveys in order to address these questions. Findings show that overall respondents are receptive to the idea of web returns. Expectations of web questionnaires vary, owing to factors ranging from computer competency levels to perception of the task. In general, the design and functionality elements are the key factors leading respondents to adopt web data collection. However, respondent perception of the web also is important.

Session 56 Introductory Overview Lecture:
Variance Estimation

Design-Based Variance Estimation

Kirk Wolter, NORC at the University of Chicago (U.S.)

Instruction will be given on methods of variance estimation for complex sample surveys. The lecture will include discussion of the random group, balanced half-sample, jackknife, bootstrap, and Taylor series methods. Brief examples will be given. The lectures will be based on Introduction to Variance Estimation (2nd ed.).

Model-Based Variance Estimation

Phillip S. Kott, U.S. Department of Agriculture/National Agricultural Statistics Service

This lecture will begin with discussion of the uses of models in establishment surveys, which range from providing estimation strategies using cutoff or convenience samples for some statistical structure to improving the accuracy of more robust strategies based on probability sampling. In both situations, a statistician usually constructs an estimator unbiased (or nearly so) under a simple, yet plausible, linear model. A model-based measure of the estimator's variance given a particular sample can be estimated. Alternatively, one can measure the estimator's variance under the combination of the model and the random-sampling mechanism. Of particular interest are ratio estimators that are both unbiased under certain assumed models and nearly unbiased under the random-sampling mechanism. Robust model-based variance estimators for a ratio often possess better coverage properties than the conventional probability-based alternative. Results for the ratio extend to calibration estimators. Models also can be helpful in variance estimation when there is unequal probability sampling within strata, additional phases of sample selection, reweighting for unit nonresponse, and imputation for item nonresponse.

Session 57 Topic-Contributed: Experiences from Web Collection in Establishment Surveys

Using the Web for Surveys of Medical Providers

Vasudha Narayanan, Pamela Giambo, Stephanie Fry, and *Jennifer Crafts,* Westat (U.S.)

We will offer case studies of using the web in the Medicare Contractor Provider Satisfaction Survey and Survey of Provider Satisfaction with Quality Improvement Organizations. In both, the web survey is offered as the first option. All respondents receive a survey notification package with instructions to complete the web survey and a reminder/thank you postcard. Nonresponders are followed up by telephone. While the design is relatively straightforward, use of the web and telephone poses unique challenges. We will focus on design issues for a multimode survey, use of usability testing to ensure ease of navigation of the web survey, proportion of the sample completed by the web, correlates of selecting the web to respond, and procedural issues related to accommodating two or more modes.

Web Design Issues in a Survey of Businesses Applying to an Advanced Technology Program

Kerry Levin and *Jennifer O'Brien,* Westat (U.S.)

Westat is contracted by the Advanced Technology Program (ATP) at the National Institute of Standards and Technology (NIST) to design, administer, and maintain a suite of establishment surveys, known as the Business Reporting System (BRS). Organizations awarded ATP funds to develop technologies that promise commercial payoffs and benefits for the economy must complete four surveys per year. These surveys are a hybrid survey/progress report that asks attitudinal questions and projects progress items. The BRS is a case study of web design issues, including online logic checks, use of prefilled information, financial items, management of multiple respondents, and development of supplementary systems. The BRS affords the opportunity to experiment with cutting-edge web design and administration issues, such as prompting for item nonresponse and best practices for notification of web site availability.

Web Usage in a Business Panel Survey

David Marker and *Janice Machado,* Westat (U.S.)

From 2003 through 2005, Westat conducted the Terrorism Risk Insurance Program (TRIP) Surveys for the U.S. Department of the Treasury. TRIP attempted to collect up to three waves of data from a sample of 30,000 businesses, with separate samples of insurance and reinsurance companies. Respondents were senior executives, but sometimes multiple people had to respond to different parts of the survey. Companies were offered both hard copy and web response options. We will discuss a number of web usage issues encountered in the administration and processing of TRIP data: deciding whether to program online logic checks vs. back-end logic checks, handling multiple respondents per instrument, relative use of hard copy and web in responding, getting complete information from initially partial completes, analyzing data quality issues during data collection, and clarifying legitimately skipped items from item nonresponse when respondents can go back and edit their data.

Use of a Web Survey in a Study of Academic and Biomedical Research Facilities

Tim Smith and *Cyndy Gray,* Westat (U.S), and *Leslie Christovich,* National Science Foundation, (U.S.)

Data on mode of data collection for the NSF Survey of Science and Engineering (S&E) Research Facilities will be presented. In 2005, 633 institutions (95%) participated in the survey; 91% of respondents submitted data online. All institutions received a paper version of the questionnaire, which many used as a worksheet to prepare their online submission. Discussion topics will include contacting respondents, distributing instructions, communicating relationships between survey questions, incorporating online editing tools, and resolving cases with internal inconsistencies and missing data. In addition, we will compare institutions by mode of response, looking at institution size, amount of research, level of online editing suggested prior to submission, level of item nonresponse at the time of submission, and length of time between survey distribution and submission.

Session 58 Contributed: Estimation Issues in Sample Surveys

Optimal Number of Replicates for Variance Estimation

Mansour Fahimi, Peter H. Siegel, Darryl Creel, and *Matt Westlake,* RTI International (U.S.)

Survey estimates can be interpreted properly only in light of their associated sampling errors. With weighted data obtained under complex sample designs, two general approaches for variance estimation can be distinguished. One is linearization, in which a nonlinear estimator is approximated by a linear one, and then the variance of this linear proxy is estimated using standard variance estimation methods. The second is replication, in which several estimates of the population parameters under the study are generated from different, yet comparable subsets of the original sample. The variability of the resulting estimates is then used to approximate the variance of the statistic of

interest. With replication, recommendations regarding the optimal number of replicates for variance estimation are at variance. This discrepancy is partly due to a larger number of replicates possibly being needed for certain statistics to produce stable estimates of variance. Relying on two establishment surveys with complex sample designs, we will present an array of empirical results regarding the number of bootstrap replicates for optimal estimation of variances for a range of statistics.

A Resampling Study of NASS' Survey MPPS Sampling Strategy

Stanley Weng, U.S. Department of Agriculture/National Agricultural Statistics Service

We will report on a recent resampling study of the National Agricultural Statistics Service's crops survey samples. Resampling estimates of the survey totals and variances were produced using two sampling strategies for comparison: maximal Brewer selection, which NASS currently uses, and stratified simple random sampling. The results enhance our understanding of the statistical nature and characteristics of NASS agricultural data and the estimation strategies adopted.

A Comparison of Variance Estimates for Schools and Students Using Taylor Series and Replicate Weighting

Peter H. Siegel, James R. Chromy, and *Ellen Scheib,* RTI International (U.S.)

We will use data from the Education Longitudinal Study of 2002 to compare school-level and student-level variance estimates computed using balanced repeated replication with variance estimates computed using Taylor series linearization. We will describe the replication of the weighting process, including school and student nonresponse and poststratification/calibration adjustments. The calibration of longitudinal replicate weights is back to previous round replicate totals. We will use the empirical data to demonstrate the actual differences between the variance estimates using the two methods

Improved County-Level Estimation of Crop Yield Using Model-Based Methodology with a Spatial Component

Michael E. Bellow, U.S. Department of Agriculture/National Agricultural Statistics Service

Estimates of agricultural commodities at the county (small-domain) level published by the USDA's National Agricultural Statistics Service are scrutinized by users in government, the private sector, and academia. For that reason, ensuring their accuracy and reliability is important. An interesting avenue of research along those lines has been the application of model-based methodology to estimate crop yields. Such methods have the potential to provide substantial improvements in efficiency over standard ratio-based estimation. The Stasny-Goel method, developed through a cooperative agreement between NASS and The Ohio State University, assumes a mixed-effects model with a spatial component that takes into account correlations among yields from neighboring counties. Estimates are computed via an iterative Bayesian algorithm. I will describe a simulation study where the Stasny-Goel method was found to compare favorably with ratio estimation and another model-based approach for various crops in 10 geographically dispersed states. Issues related to potential integration of the method into NASS's operational county estimation program also will be discussed.

Session 59 Invited: Challenges and Strategies in Implementing Quality Management Programs

Quality Review of Key Indicators Programs at Statistics Canada

Claude Julien and *Don Royce,* Statistics Canada

In September 2006, Statistics Canada formed a committee to conduct a review of the quality assurance practices in the production of nine key indicators. The review, completed in March 2007, was carried out on a variety of business, economic, and household surveys based on respondent data, administrative data, or other survey outputs. I will describe the review process and summarize its key findings. I also will highlight the benefits of the review to the statistical programs, the individuals involved in the review, and Statistics Canada's Quality Assurance Framework.

Quality Improvement in the Office for National Statistics

Cynthia Clark and *Frank Nolan,* Office for National Statistics (U.K.)

With more decisions based on information provided by national statistical offices, there is a need to manage the risk that decisionmakers do not understand the variability in published data. In the U.K., this has led to calls for more documentation of the strengths and limitations of data to better inform the tolerance and reliability of the statistics. The ONS has taken the opportunity of modernizing its statistical systems to look at its reporting on quality in statistics. We will look at the implementation of the strategy within ONS and the links between management processes, statistical processes, quality reviews, and quality management. We will include discussion on work coordinated through Eurostat and how this has benefited the ONS.

Developing a Quality Assurance Program for the U.S. Census Bureau's Business Register

David Chapman, U.S. Census Bureau

An objective of the 2002 Economic Census was to redesign the Business Register and convert it to an ORACLE database. An additional key Business Register redesign objective was to begin a quality assurance program to monitor and manage Business Register activities. The Business Register Quality Team was created to develop a Business Register quality plan. I will describe team activities that included analysis of migration to the new Business Register, current administrative record processing, the new Business Register LINKS table, how current surveys develop their frames from the Business Register, and current customer problems with the Business Register. The final product was a set of recommendations for a Business Register quality assurance program. I will discuss lessons learned and continuing activities to implement that plan.

Session 60 Invited: Collecting Data Electronically from Businesses: the Dream and the Reality

The Electronic Reporting Option: Does It Make Sense of Cents?

Thomas Mesenbourg and *Ronald Lee,* U.S. Census Bureau

While there is much agreement about the possible benefits of electronic reporting, has the promise been realized? Those supporting it promote it as a method of reducing reporting burden that improves response rates and quality of response. Financially, it saves the printing, mail prep, postage, and processing costs associated with the paper. Because these benefits are generally perceived to be true for noneconomic surveys, they also are often attributed with little empirical evidence to economic surveys. For the past 30 years, the bureau has

aggressively expanded its electronic reporting, working closely with businesses to ensure their needs are being met. We will describe these efforts, detailing the evolution of electronic reporting at the bureau, strategies employed, lessons learned, cost structures in place, benefits gained, and future directions.

Everything You Wanted to Know about EDR at Statistics Canada!
Jocelyn Burgess, Statistics Canada
Statistics Canada has continued to move toward collection methods that are more efficient, secure, and responsive to the needs and preferences of respondents. In support of these objectives, the agency aggressively embarked on the development of internet Electronic Data Reporting (EDR) capacities five years ago for each of approximately 50 business and agriculture surveys. During the past year, however, as a result of low take-up rates and increasing technical difficulties, Statistics Canada has been re-evaluating its EDR work from a technical, security, and cost point of view. New strategies are emerging, which will position the bureau to offer a more streamlined, technically simple, and cost-effective electronic mode of collection to respondents, where judged appropriate. I will outline the challenges Statistics Canada has faced during the past four years and present new ideas for delivering EDR solutions to our respondents.

Evaluation and Implementation of EDR in School-Based Research
Lesli Jo Scott and *Sue Ellen Hansen,* University of Michigan (U.S.)
Public school systems within the US have developed technological infrastructures at differing rates, depending on social, economic, and political environment. In some institutes, school staff members have access to multiple computers and/or electronic devices, such as PDAs in their classrooms and reliable high-speed internet connectivity. In others, access to computing resources may be limited to library and computing laboratory settings. Researchers at the University of Michigan have used EDR in pilot activities for school-based studies since the late 1990s. To avoid confounding study results related to differing levels of technological capacity, the data collection phases often have reverted to traditional modes, such as paper-based collection instruments. We will report on the progressive evaluation and implementation of EDR options as schools move toward more uniform and reliable technological infrastructures. We will draw lessons that can be applied generally to business, agriculture, and institutional surveys.

Session 61 Topic-Contributed: Generalized Survey Processing Systems, Part 2

Statistics New Zealand's Business Model Transformation Strategy: Creating a New Business Model for the National Statistical Office of the 21st Century
Tracey Savage and *John Pearson,* Statistics New Zealand
In mid-2004, Statistics New Zealand instigated the Business model Transformation Strategy (BmTS), a long-term strategy and major investment that aims to improve the way information is managed. The BmTS will streamline and standardize business processes, methods, and systems throughout the end-to-end statistical cycle and deliver a new processing and information platform on which all our statistical systems will work in the future. For establishment surveys, BmTS will build on the strengths of SProceT, but generalize it further and eventually supersede it. I will provide an overview of the BmTS platform and a summary of progress to date, then focus on how the platform

has been implemented to support the processes and methods used in Statistics New Zealand establishment surveys and the changes that have resulted from this.

Generalized Census Processing System at the National Agricultural Statistics Service
Thomas Jacob and *Carol House,* U.S. Department of Agriculture/National Agricultural Statistics Service
The NASS-integrated census processing system is undergoing a major redesign, to be used operationally in January 2008. The system will include modules for record management, record-level editing, imputation, micro-level analysis, weighting, macro-level analysis, summarization, tabulation, disclosure review, and cell suppression. The system was first designed for operational use on the 2002 Census of Agriculture. Although that system achieved many of its goals, it lacked the desired level of speed and efficiency. The redesign addresses those issues and adds additional functionality. We will describe the new system and discuss lessons learned from the original.

StEPS at EIA: Where We Are Now
Paula Weir and *Sue Harris,* Energy Information Administration (U.S.)
In 2001, the EIA acquired StEPS from the U.S. Census Bureau with the intent of examining its potential as a low-cost solution for replacing the deteriorating processing systems used for a number of EIA establishment surveys. Since then, one of EIA's offices has implemented StEPS for 10 of its monthly and annual surveys. Because of differences in survey requirements and business process between the bureau and EIA, significant customization has taken place. We will describe the challenges faced in implementing a generalized system designed initially with other surveys and processes in mind, lessons learned, and future directions.

Session 62 Contributed: Outlier Detection and Robust Estimation

Investigation of Macroediting Techniques for Outlier Detection in Survey Data
Katherine Jenny Thompson, U.S. Census Bureau
An important step in the evaluation of survey data estimates is the identification of macro-level outliers to determine whether outlying preliminary estimates are the result of uncorrected respondent or data capture errors or are values that provide useful information. Hence, it is important to identify and investigate outliers prior to data release and subsequent economic analyses. I will compare a variety of robust and resistant bivariate and multivariate methods for detecting macro-level outliers for the U.S. Census Bureau's Annual Capital Expenditures Survey. I will conclude with recommendations for the studied datasets that can be applied to other surveys with similar designs and estimators.

Winsorization for Estimates of Change
Daniel Lewis, Office for National Statistics (U.K.)
Outliers are a common problem in business surveys that, if left untreated, can have a large impact on survey estimates. For business surveys in the U.K. Office for National Statistics (ONS), outliers often are treated by modifying their values using Winsorization. The method involves identifying a cutoff for outliers. Values lying above the cutoffs are reduced toward the cutoff. The cutoffs are derived in a way that approximately minimizes the mean square error of level estimates. However, for many surveys, estimates of change are more important. I will look at a variety of methods for Winsorizing specifically for estimates of

change and then evaluate the methods using change estimates derived by taking the difference between two regular Winsorized-level estimates as a comparison. The evaluation will use data from the ONS Monthly Production Inquiry. Methods will be compared by estimating mean square errors from survey data and using Monte Carlo simulation.

Investigation of Treatment of Influential Values

Mary Mulry and *Roxanne Feldpausch,* U.S. Census Bureau
We will investigate ways to treat an influential observation in the estimation of total revenue from the U.S. Monthly Retail Trade Survey. An observation is considered influential if it is true and its weighted contribution has an excessive effect on the estimate of total monthly revenue. The goal is to find methodology that uses the observation, but in a manner that assures its contribution has less impact on the estimate of the total. Preliminary investigation led the study to focus on Winsorization with an individual cutoff for each observation (Clarke, 1995; Chambers, Kokic, Smith, and Cruddas, 2000) and generalized M-estimation (Beaumont and Alavi, 2004; Beaumont, 2004).

Outlier Detection and Accommodation for Business Surveys Utilizing Multiple Linear Regression Models

Robert Philips, Statistics Canada
I will illustrate a robust outlier detection and accommodation method for business surveys that incorporate multiple linear regression models in the edit and imputation or modeling of survey data. The method is based on a robust Bayesian hierarchical model and produces results that are comparable to the more complex M-estimator type techniques. A specific version applied to the simple ratio model is currently in place at Statistics Canada for the Monthly Wholesale and Retail Trade Survey. I will develop the theoretical extension to situations involving several covariates and present results based on both simulated and real datasets.

Session 63 Contributed: Factors That Affect Establishment Survey Participation

Survey Burden and Nonresponse: Does More Burden Really Mean Less Response?

Jaki McCarthy, Daniel Beckler, and *Suzette Qualey,* U.S. Department of Agriculture/National Agricultural Statistics Service
In establishment surveys, individual establishments may be contacted on many occasions. Some may be selected with near certainty for recurring surveys and are in samples for multiple surveys. Cooperation in one survey may be affected by the cumulative burden imposed by a survey organization in the past. We examined the relationships between response in a four-year period (187 potential contacts) of U.S. agricultural operations and the prior survey burden placed on those operations by NASS. The results indicate that burden (e.g., the number of other NASS survey contacts, the time since last contact, and the type of information for which they were contacted in the past) does not uniformly have a negative effect on response. Even where effects were found, they were small and did not lead to clear-cut strategies for improving response.

The Effects of Survey Design Features and Economic Conditions on Business Survey Response Rates

Diane K. Willimack, U.S. Census Bureau
A recurring question in survey research is the effect of survey length on response rates. For self-administered paper forms, the typical hypothesis is that response rates fall as the number of pages increases. U.S. Census Bureau managers were seriously concerned that response rates would decline substantially when extensive formatting changes to the 2002 Economic Census increased questionnaire length, which historically ranged from 2–16 pages, to 3–27 pages. In addition, business survey response rates may be affected by economic conditions, a relationship found in household surveys. Considering the survey form as our unit of analysis, this study investigated the effects on economic census response rates of questionnaire length and economic conditions. Using multivariate methods, we assessed the effects of variables reflecting these and other survey design features.

Like, But Oh, How Different: the Impact of Questionnaire Length and Format in the U.S. Census of Agriculture

Jaki McCarthy, U.S. Department of Agriculture/National Agricultural Statistics Service
The Census of Agriculture is conducted every five years. In advance, a content test tests procedures, systems, and the form(s). During the 2005 content test, two forms were tested. One version was 24 pages long and had more extensive instructions and information preprinted on the form. A shorter, 12-page form reordered and combined questions, required more written information, and had less room to record information. Both forms, however, collected the same information. While intended for different types of operations in the census, the two forms were directly compared in the content test. The shorter form did not increase the response rate and showed several areas of lowered data quality. Additional information also was gained in limited follow-up interviews. Based on the findings, recommendations for use of the forms in the 2007 Census were made.

Session 64 Contributed: Sampling Frame and Design Challenges

Evaluation of the NSRCG School Sample

Donsig Jang and *Xiaojing Lin,* Mathematica Policy Research, Inc. (U.S.)
The NSRCG is a repeated survey, conducted every two or three years. There has been a perception that if a school participated in previous surveys, it is more responsive to the survey than the new schools selected into sample. The same school sample is thus expected to be retained as the school sample for the next few rounds of surveys. This approach is a cost-effective option if schools respond more quickly after the first survey round. However, the current practice to keep the same school sample for several survey rounds may result in severe coverage problems, especially in some domains. It also may cause unplanned, unduly high weight variations due to changes in the distributional changes of graduates over time. We will compare the current sample method with two alternatives to provide recommendations for consideration when planning the next NSRCG sample design.

Sampling for a Highly Skewed Population: Design for National Survey of Residential Care Facilities

Margie Byron, Angela Greene, Vince Iannacchione, John Loft, and *Joshua Wiener,* RTI International (U.S.)
The National Survey of Residential Care Facilities (NSRCF), to begin in 2008, will be a nationally representative sample of U.S. residential care facilities (RCFs) and their residents. Because this will be a general-purpose survey, the study design needs to balance the desire to conduct analyses at both the facility and resident levels against the costs of conducting onsite interviews at the selected facilities. Analysis of a preliminary sampling frame of RCFs determined that the estimated population distribution of RCFs is very skewed with respect to the number of residents within the facilities. Probability proportional-to-size (PPS) sample designs are optimal for resident-level analyses due to the epsem

properties of the resident-level analysis weights, but the unequal selection probabilities at the facility level reduce the power of facility-level analyses. Stratified designs that use simple random samples to select the units within strata are optimal for facility-level analyses, especially for comparative analyses between strata, due to the lower unequal weighting effects at the facility level, compared to PPS designs. However, the resident samples may incur large design effects due to the large variations in resident selection probabilities. Sample selection simulations were conducted on the preliminary RCF sampling frame using four two-stage sample designs to determine which sample design would best meet the analytic and cost constraints for the NSRCF. Simulation and power analyses results provided the optimal sample design with sufficient sample sizes and power to meet the facility- and resident-level analytic criteria within the estimated costs constraints.

Improving Efficiency in a Complex Establishment Survey Design: the O*NET Data Collection Program

Marcus Berzofsky, Susan McRitchie, Brandon Welch, and *Rick Williams,* RTI International (U.S.)

The O*NET Data Collection Program is a probability-based business establishment survey that began data collection in 2001 and derives national estimates for 810 occupations. The study is sponsored by the U.S. Department of Labor and is conducted by the National Center for O*NET Development and RTI International. We will describe the evolution of the sample design and the efficiencies gained, the process for identifying industries where an occupation is located and maximizing the overlap between occupations selected at an establishment, coverage requirements, composite size measure used during sample selection, and the use of Dun and Bradstreet's business list for our frame. We also will describe how these factors inform the two-stage sampling process and the wave design that allows us to efficiently control the sample size and target industries for each occupation.

Surveying Schools: Frame, Sampling, and Response Rate Issues

Cynthia Bland and *Karol Krotki,* RTI International (U.S.)

This research addresses issues related to building a sample frame of schools in the US, using this frame for sample selection, and sampling methods concerning participation and response rates. The frame is based on the combination of two data sources: the Common Core of Data and the Private School Survey. Coverage, accuracy of data, and availability of supplementary information will be addressed, and we will focus on falling participation and response rates at the school and student levels, a phenomenon that is becoming of increasing concern in school surveys. Primary sampling unit construction and stratification methods to increase participation rates will be highlighted. We will discuss field strategies for increasing participation rates and the extent to which these strategies improved rates over those found in previous iterations of the surveys. Specific applications of these methods will be discussed in the context of the 2006 U.S. component of the Program for International Student Assessment/Progress in International Reading Literacy Study survey programs.

Session 65 Invited: Building and Updating Establishment Registries in Developing Countries

Updating the Sri Lankan Registry of Industry and the Role of IT

Alex Korns, Independent Consultant (U.S.)

I will describe a registry-updating system at the Department of Census and Statistics (DCS) in Sri Lanka that was developed in 2002 and is being used to update a registry of about 5,000 industrial establishments. The system matches the DCS registry with external data sources to select unmatched candidates for addition to the registry. The candidates are checked by phone or in the field to confirm whether they qualify for the registry. In addition, a simple procedure was added to the Annual Survey of Industry (ASI) to identify the reasons for an establishment's failure to respond to the ASI, including closure or other changes in activity status. In this way, the system receives data for establishment entries and exits. An application developed by a Colombo software company manages the matching of the DCS registry with external sources and many other system tasks.

Register Building and Updating in Developing Countries

William Weeks, United Nations Industrial Development Organization

The quality of the industrial register profoundly affects the quality of the industrial census, annual survey, and index of industrial production. With typically less rigorous and widespread official and private administrative record-keeping and often without institutionalized data-sharing arrangements, many developing countries face issues in register building and maintenance that are quite different from those faced in developed countries. I will examine issues related to choosing the proper cutoffs, prioritizing data collection by size class, identifying closures and new establishments, ascertaining and using entity relationship data, devising record-linkage techniques, and organizing operations to facilitate continuity and the preservation of information. I will recommend specific procedures and features for register software.

Business Register Guidelines for Small Developing Nations

Geoff Mead, Statistics New Zealand

Statistics New Zealand has a successful history of involvement with official statistics in the small developing island economies of the Pacific and regularly provides resources to assist with capacity-building in the region. Through this work, a clear need has emerged for simple, but statistically robust, methodology and systems to support the official statistical requirements of these countries. An important requirement for all but the smallest nations is a robust, fit-for-use, business survey frame—essential for producing meaningful business statistics. I will address this issue by presenting business register guidelines for small developing nations. The guidelines are based on filtering out the key features required in any business register, even for a small economy. This will help provide a map for the efficient development and implementation of a fit-for-use business register. The standards also could be the catalyst for developing a generic IT system "shell" that could be produced for use as a business register system. Feedback and endorsement from the conference on the business register guidelines presented will be an important contribution to the development of the statistical infrastructure for small developing nations.

Session 66 Invited: Outliers and Influential Observations in Establishment Surveys

Multivariate Outlier Detection and Treatment in Business Surveys

Beat Hulliger, University of Applied Sciences Northwestern Switzerland

Outliers in business surveys are common due to the structure of the economy. This is reflected in the common sample designs for business surveys where large enterprises often are in take-all strata, while small enterprises have low sampling fractions. For a single variable that is well-correlated with the size of the enterprises (usually measured by number of employees), outlier problems are attenuated and tractable with the basic model of a ratio estimator robustified against outliers in

residuals. However, a coherent approach over all variables of interest must be considered from a multivariate point of view. Multivariate robust estimators and multivariate outlier detection (MOD) have been developed in statistics for years, but problems are still formidable. In public statistical agencies, the focus has been more on detection of multivariate outliers because the separation from treatment permits the use of clerical work for verification of outliers and subsequent imputation. The particular problems of survey data have not been addressed until recently. I will discuss some of these in this presentation.

Influential Observations and Colinearity in Regression Models

Ted Chang, University of Virginia (U.S.), and *Phillip S. Kott,* U.S. Department of Agriculture/National Agricultural Statistics Service

The USDA conducts a Census of Agriculture using a mailing list as a frame. An area-frame survey is conducted to estimate list undercoverage. Using data from this survey in California, we fit a logistic regression model to determine what variables predict whether a farm was on the mailing list. Despite the large sample size relative to the number of variables, we observed that a single observation, or small group of observations, could exert an enormous effect on a linear combination of coefficients. This suggests the importance of developing some form of influence diagnostics to detect this type of problem. To this end, we propose comparing various forms of model- and randomization-based variance estimates.

Characterization and Optimization of Drill-Down Methods for Outliers in Establishment Surveys

John Eltinge, Bureau of Labor Statistics (U.S.)

The formal literature on outliers in survey data emphasizes microdata-based approaches in which outliers are identified through comparison of individual observations or related quantities (e.g., influence functions) to appropriately defined reference distributions. In some cases, however, statistical agencies have chosen to use a two-step "drill-down" procedure in which an analyst reviews preliminary point estimates for each of many prespecified "estimation cells" and, within cells identified as "extreme," the analyst examines microdata records to determine whether the "extreme" cell-level estimate can be attributed to a small number of outlying or influential observations. I will explore the characterization and optimization of "drill-down" procedures, emphasizing cost structures, risks, and the use of prior information and reference distributions.

Session 67 Introductory Overview Lecture: Data Collection

Multimode Data Collection: Why, When, and How

Richard Rosen, Bureau of Labor Statistics (U.S.)

With response rates on the decline, survey organizations often look to hi-tech collection methods as a way to improve response. This often leads to the establishment of multiple data collection modes. Multimode collection can be a double-edged sword, providing potential benefits but also potential costs and risk. I will review the advantages and disadvantages of collecting survey data using multiple modes. I will look at the multimode data collection from a number of perspectives, such as why survey organizations might consider multimode collection, how an organization should proceed if it is going to add new modes of collection, and what factors need to be considered in planning for any transition.

Nonresponse Reduction Methods

Carl Ramirez, U.S. Government Accountability Office, and *Jaki McCarthy,* U.S. Department of Agriculture/National Agricultural Statistics Service

As for all survey statistics, nonresponse has the potential to reduce the quality of establishment survey estimates. Therefore, federal agencies employ multiple strategies before, during, and after scheduled data collection to minimize nonresponse. We will give an overview of current practices employed by federal statistical agencies that are members of the Interagency Group on Establishment Nonresponse. The rationale for the effectiveness of these practices and specific examples from member agencies will be provided. In addition, several examples of empirical evaluation of the effectiveness of these strategies will be presented. This is intended to provide audience members a full palette of practical strategies to reduce nonresponse throughout all phases of data collection.

Session 68 Contributed: Design and Response Challenges

Redesigning the German Job Vacancy Survey: Assessing the Impact of High Nonresponse Rates

Hans Kiesl and *Susanne Rässler,* Institute for Employment Research (Germany)

Information about job vacancies in Germany is provided by the Federal Employment Agency, which collects job openings from business units. They cover only about 40% of all vacancies, as many businesses prefer not to cooperate. Therefore, the Institute for Employment Research conducts a yearly job vacancy mail survey. Response rates have dramatically declined over the years. In 2006, less than 20% of the sampled units participated in the survey. We will give an overview of our approach to redesigning the survey and focus on an effort to gather information about the nonresponse bias: During the latest wave, with the usual questionnaire of eight pages, we conducted an additional survey among 5,000 units with a one-page questionnaire. We will present our findings concerning the impact of questionnaire length on response rates and the estimates of the target variables.

Determining Subsampling Rates for Nonrespondents

Rachel Harter, NORC at the University of Chicago (U.S.), *Janella Chapline,* University of Chicago (U.S.), and *Traci Mach* and *John Wolken,* Board of Governors of the Federal Reserve (U.S.)

It is becoming increasingly common to subsample nonrespondents to increase weighted response rates, or to maintain response rates while reducing costs. Response rates and costs are not the only factors affected by subsampling, however. Subsampling increases variability in the weights, which increases the design effect and decreases the effective sample size. The subsampling also may affect the number of completed cases. At what rate should the nonrespondents be subsampled? If sufficient information is available from prior rounds or other sources, the decision can be made on the basis of constraints in terms of weighted response rate, design effect, cost, or number of completed cases. The constraints applied might depend on whether the subsampling rate decision is made prior to initial sample selection or in the midst of data collection. We will review the literature, present possible decision rules, and illustrate those rules with screener data from the 2003 Survey of Small Business Finances.

Business Employment Dynamics: State Gross Job Flows

Eric Simants and *David M. Talan,* Bureau of Labor Statistics (U.S.)

The BLS measures of gross job gains and losses provide a better understanding of the labor market decisions of the millions of business establishments in the U.S. economy. Examining establishment-level employment changes aids in analyzing the large gross job flows that underlie the smaller net employment changes across various stages of the business cycle. We will introduce the new BLS Business Employment Dynamics data series on gross job flows by state, giving special attention to comparing these data by state and analyzing the flows geographically. A brief section will be devoted to technical issues, such as defining gross job gains and losses, and the methodology for longitudinally linking establishment records.

Special Features of Sampling Design in Environmental Surveys of Establishments

Jorge Saralegui and *Cesar Berrade,* National Institute of Statistics (INE) (Spain)

The administrative sources managed by the national, regional, and local environmental authorities have not been able to supply the growing demand of information for diverse national and international users. Nevertheless, important aspects of statistical infrastructure are not appropriately integrated within the general statistical system of registers, as is the case with waste facilities, irrigation entities, and water purification or waste water treatment plants. This also has had consequences on estimation procedures, either direct or model-assisted. We will illustrate through examples special features of environmental surveys, to which we might say not enough attention has been paid by research forums on official statistics.

Session 69 Contributed: Coordination of Sample Design/Selection between Surveys

On Coordination of Pareto pps Samples and Stratified Simple Random Samples

Annika Lindblom and *Alex Teterukovsky,* Statistics Sweden

The system for coordination of frame populations and samples from the Business Register at Statistics Sweden is called the SAMU. The sample coordination is based on permanent random numbers. SAMU permits both stratified simple random sampling (ssrs) and probability-proportional-to-size without replacement (ppswor). The ppswor sampling scheme is Pareto pps, one of the order pps sampling schemes with attractive theoretical properties. We will focus on practical implementation of Pareto pps sampling and coordination of Pareto and ssrs samples. Two surveys, Use of Information and Communication Technology in Enterprises and Domestic Trade and Stock of Goods in the Wholesale and Retail Trade will serve as examples.

Optimal Coordination of Samples in Business Surveys

Lenka Mach, Jean-Marc Fillion, and *Ioana Schiopu-Kratina,* Statistics Canada, and *Philip Reiss,* New York University School of Medicine (U.S.)

We will present new methods for coordination of samples selected according to stratified SRSWOR designs. Let s (s') denote a sample selected for the first (second) survey. We say samples are optimally coordinated if their joint probabilities p(s,s') maximize or minimize the expected overlap. The overlap of the two samples, o(s,s'), is the number of units that s and s' have in common. We formulate our problem as a Linear Programming (LP) problem whose objective function is the expected overlap under a joint probability distribution of the integrated surveys. The joint probabilities are the unknowns,

and the marginal probabilities of s and s' are the constraints. We will use the exchangeability of the SRSWOR design and reduce the LP problem by grouping samples. Finally, we will compare the properties of the proposed methods and the methods currently used and describe their implementation.

The Random Sampling/Tracking Tool: a Response to Over-Surveying

Steven Graves, Intel Corporation (U.S.)

Surveys of top company executives repeatedly brought up over-surveying by IT. We also found that researchers often surveyed an entire population of interest, rather than a sample. Plus, with repeated random sampling, a small percentage of people can be hit multiple times. To address these issues, I conceptualized and built a random sampling/tracking tool using a RAD database programming language. This tool generates different types of samples more efficiently, saving researcher's time. It also tracks all samples that are generated, so people will not be selected for later samples for a specified time period, addressing over-surveying by delaying surveys when not enough people are available. Sampling also is spread out more evenly. Plus, when teams come to us to get their samples, we can instruct them on appropriate sampling techniques, further reducing over-surveying.

Standardization: a Survey of Tobacco Retail Outlets in 50 United States, DC, and Territories

Lily Trofimovich, RTI International (U.S.)

The objective of the survey is to determine the retailer violation rate for each state and territory based on random, unannounced inspections of a sample of tobacco retail outlets accessible to youth. The sample of outlets inspected must be implemented annually and be representative of the geographic distribution of tobacco outlets in the state. The result of the state's survey is used to determine whether the state has met the required target violation rate and precision requirements. I will focus on making the sampling process uniform, efficient, and easy to implement across the 60 jurisdictions. Simplicity of design is important, given that most states do not have statisticians to design and conduct the survey. I will discuss measures taken to simplify and help standardize the sample designs, the degree to which these measures were successful, methods used for implementing the coverage studies, results of the field operation, and final data in terms of violation rates and sampling error for all jurisdictions across the duration of the survey, which is now almost 10 years old.

Session 70 Contributed: Reconciliation and Coherence across Surveys

Reconciliation of the 2006 Canadian Census of Agriculture with the Farm Register

Martin Lachance, Statistics Canada

In Canada, the Farm Register (FR) plays a key role in data collection for agriculture surveys. Indeed, the FR holds the contact information and profile of farming operations from across the country. Every five years, the Census of Agriculture allows us to improve the FR coverage and refresh the information it contains. Furthermore, the significant changes that have occurred in the agriculture industry in the last few years have increased the importance of improving the reconciliation process for 2006, bringing more automation into it and improving the FR quality. The difficulties faced when combining information are tackled using new matching tools. More importantly, the natural link between the Census of Agriculture and Census of Population proves useful in various aspects of the reconciliation process.

The Challenge of Integrating New Surveys into an Existing Business Survey Infrastructure

Éric Pelletier, Statistics Canada

A large portion of Statistics Canada's annual business surveys are integrated into the Unified Enterprise Survey (UES), which consists of a business survey infrastructure where common methodologies and processing are used. On a regular basis, existing surveys are integrated into the UES. For some surveys, it is necessary to perform the integration in two stages when the survey methodologies differ from the ones used in the UES. I will focus on the challenges related to the collection and estimation strategies for new surveys.

Implementation of the NAICS 2007 Revision in the Bureau of Labor Statistics Programs

Amanda Chadwick and *Michael Searson,* Bureau of Labor Statistics (U.S.)

In 2002, the Bureau of Labor Statistics implemented the North American Industry Classification System (NAICS) in the Quarterly Census of Employment and Wages (QCEW) program. This classification system, developed with Mexico and Canada, represented a major change from the former Standard Industrial Classification System used in the United States. Consequently, several years were needed to fully incorporate these classification changes into the other statistical programs that used these QCEW data as a sampling frame and/or the employment benchmark for their published data series. Minor revisions to NAICS are planned every five years with major revisions taking place five years later. This policy enables the system to recognize new and emerging industries and provide clarifications to existing industry descriptions and definitions with minimal impact on economic time series. In 2007, the QCEW program will convert their micro and macro level from a 2002- to a 2007-based NAICS. I will focus on the implementation strategy developed by QCEW staff to convert these data as quickly as possible to meet their needs and those of other BLS statistical programs.

The Emerging Role of the Head Office in the Canadian Statistical System

Tony Dupuis and *Rob Williams,* Statistics Canada

Head offices exist as ancillary units that support other establishments within complex enterprises. The role of these units is becoming increasingly important as certain functions of organizations are centralized to a greater extent. While often seen as the second cousin to establishment-based economic production surveys, obtaining information on head offices is key to understanding the complete operation of complex enterprises. We will examine the Canadian Head Office survey and suggest that separate statistics need to be published on head offices as an industry. The survey would measure economic activity not collected elsewhere in the structure of the organization. Finally, revenues and expenses from head offices need to be allocated to the production units within the enterprise.

Session 71 Invited: Surveys of Environmental Protection: Experiences and Challenges

Environmental Surveys of Establishments: the Canadian Experience

Jeffrey Fritzsche, Statistics Canada

Since the mid-1990s, Statistics Canada has administered a number of environmental surveys designed to fill important data gaps and improve our understanding of the links between economic actions and environmental change. Although significant experience has been gained in the collection of environmental statistics, the administration of environmental surveys continues to be challenging from both subject matter and methodological perspectives. I will explore the development of the environment survey program at Statistics Canada, the framework within which the surveys exist, and what data gaps the surveys fulfill. I will focus on Statistics Canada's experiences and challenges related to the recent development of a new environment survey on industrial water use and the methodological redesign of an existing survey on environmental protection in industry.

Experiences in Collecting Data on Environmental Protection Expenditures in Sweden

Mats Eberhardson, Statistics Sweden

Since 1981, Statistics Sweden has conducted surveys for environmental protection expenditures (EPE) in industry. In 1997, the method changed to be in line with the definitions of the European Union. Total EPE in Swedish industry is typically about 0.4% of GDP. The response rate has steadily increased since 1997, and the last couple of years it has been around 90%. Reasons for this can be explained by legislation, a simplified questionnaire (including internet reporting), and information and communication to the enterprises. Statistics Sweden strives to limit the burden for enterprises of reporting statistics. The EPE often are used in combination with other data from environmental accounts, which gives a strong validation and enhanced analyses. Useful input for improving the statistics are provided with communication with users.

Issues and Challenges in Estimating Environmental Expenditures by U.S. Manufacturing: the PACE Survey

Randy Becker, U.S. Census Bureau, and *Ronald Shadbegian,* U.S. Environmental Protection Agency

The Pollution Abatement Costs and Expenditures (PACE) survey is the most comprehensive source of information about U.S. manufacturing's capital expenditures and operating costs associated with pollution abatement. In 2003, the U.S. Environmental Protection Agency began a significant initiative to redevelop the survey, guided by the advice of a multidisciplinary workgroup consisting of economists, engineers, survey design experts, and experienced data users, in addition to incorporating feedback from key manufacturing industries. We will describe some of these redevelopment efforts. Issues discussed will include the approach to developing the survey instrument, methods used to evaluate (and improve) its performance, innovations in sampling, and the special development and role of outside expertise. The completely redesigned PACE survey was first administered in early 2006.

Session 72 Invited: Targeting Intensive Follow-up of Nonrespondents in Establishment Surveys

Realizing Value from Follow-up of Nonresponses in ABS Business Surveys

Greg Griffiths, Dina Neiger, Matt Ashton, and *Louise Gates,* Australian Bureau of Statistics

Many business surveys follow a set of standard follow-up procedures for nonrespondents. As budgetary and timing pressures increase, the need to understand the relationship between the effort invested in the follow-up and the quality of survey output increases. We will look at a total survey error framework similar in philosophy to that of Linacre and Trewin (1993) for developing and assessing the relationship

between follow-up effort and survey error. Analysis of the relationship of follow-up procedures and the level of response will be discussed with a view to isolating factors that influence the relationship between effort and response rate, documenting best practice, and developing measures that can be used to estimate effort required to achieve a given level of response.

A Strategy for Prioritizing Nonresponses Follow-up To Reduce Costs Without Reducing Output Quality

Gareth James, Office for National Statistics (U.K.)

In ONS business surveys, a considerable amount of resource is spent following up sampled businesses that either delay their response or do not respond at all. There are pressures to economize by reducing the amount of follow-up, but there are unavoidable quality implications. ONS is investigating methods for targeting nonresponders. Current practice is to aim for an overall response rate by survey. We aim to develop a mechanism that will allow us to prioritize follow-up in terms of predefined quality criteria. Whatever strategy is employed will require a better understanding of, and treatment for, nonresponse; performance measurement will depend on the quality of imputation for nonresponse. Other issues are treatment of different types of nonresponders and how many small businesses need following up to avoid bias.

Prioritizing Follow-up for the Canadian Quarterly Survey of Financial Statistics

Pierre Daoust, Statistics Canada

The Canadian Quarterly Survey of Financial Statistics (QFS) is a survey of the corporate sector designed to obtain information about corporate income statements and balance sheets. The estimates for large businesses are obtained from a sample survey, while the contribution from small businesses is estimated through a model based on administrative data. The collection of data from the sample is optimized by prioritizing the follow-up of nonrespondents based on the relative importance of the businesses in its industry. To achieve this, a score function was developed that takes into account the contribution of each business to its industry. We will introduce the methodology used to calculate the scores, summarize the QFS experience in using the scores for production, and highlight future plans regarding the use of the score function.

Session 73 Topic-Contributed: Identifying Nonprofit Organizations and Measuring Their Activity through Establishment Surveys and Administrative Records

Nonprofit Organizations in Hungary: Methodology for Estimating the Evolution of the NGO Sector

István Sebestény, Civitalis (Hungary)

The need to produce estimates of the size and growth of NGOs in Hungary was created internally by transformation of the former socialist regime and externally by the desire to conform to the SNA that defines a sector of nonprofit organizations supplying services to households. The capacity to produce those estimates was limited, as pertinent law evolved after 1989 and judicial oversight of the sector did not provide a registry of active organizations. The HCSO created a registry of active organizations that is updated annually. Annual updates identify NGOs that cease operation (a major problem). Beginning in 1993, HCSO surveyed the sector and collected data about activities and labor inputs into NGOs, including both paid and

unpaid workers. Estimates for the sector account for nonresponse by a process of imputing entire records for missing organizations. The sector is characterized by the NCNPO classification, introduced to provide international comparability of NGOs. The annual data from 1993–2000 make it possible to identify changes in the sector. Significant aspects of the evolution of NGOs will be reported.

Panel Analysis of NGOs in Germany: Design and Preliminary Results

Lutz Bellmann and *Christian Hohendanner,* Institute for Employment Research (Germany)

The IAB Establishment Panel was initiated in 1993 so the Federal Employment Agency could provide detailed information about the demand side of the labor market. It is based on a stratified random sample—strata for 16 industries and 10 employment size classes—from the population of all establishments. Personal interviews with 16,000 establishments are conducted by interviewers from TNS Infratest. We identify NGOs from internal and external sources for the years 1996–2005. Information about the workforce, its composition, and development over time are central elements of the panel questionnaire. Further questions concern establishment sales, exports and investment, technological status, age, corporate form and legal status, the size of the overall wage bill, training provision, working time, reorganization measures, and aspects of collective bargaining. Most questions are asked annually.

Combining Administrative Records and Business Registers To Obtain Quarterly Estimates of Employment in the Nonprofit Sector of the USA

Martin H. David, Urban Institute (U.S.)

The USA has rich collections of employment data from monthly and annual surveys. The data are collected from sampling frames that can be updated monthly with tax-exempt status of the organization operating the establishment. Nonprofits are identified in a registry. Annual information documents filed by exempt organizations are public and disclosable, as is information in the registry. Statistical estimates at the organization level can be constructed from existing sampling frames in the U.S. Census Bureau and Bureau of Labor Statistics (BLS). Problems include failed matches arising from identifier errors and coverage of administrative records that generate the census and BLS sample frames.

State of the Sector Panel: Design and Execution of a Panel of NGO Organizations in the U.K.

Carol Goldstone, Carol Goldstone Associates (U.K.)

In 2003, the Home Office established the State of the Sector Panel to monitor the voluntary sector in England. The panel consists of 5,600 organizations of all sizes that represent all parts of the sector. Panel members participate in four studies each year. The panel's primary purpose is to monitor the level of voluntary activity. Funding and engagement with government bodies also are surveyed annually. The data collected are unique and enable the government to evaluate its programs and identify measures that clearly benefit the sector and country. I will discuss the design of the panel, the recruiting of respondents, and analyses. I also will describe solutions to major problems we encountered.

Session 74 Contributed: Evolution of Web Reporting in Establishment Surveys

Comparing Alternative Approaches for Displaying Edit Messages in Web Forms

William Mockovak, Bureau of Labor Statistics (U.S.)

This study compared three approaches for displaying edit messages in a web form. Edit messages were displayed toward the top of a page, directly under an item after the page was completed, or directly under an item as soon as the user left the field and moved to the next item. Using a talk-aloud procedure, 42 paid participants completed a form for each of three firms. The key dependent variable was the rate at which an edit message was noticed on its first appearance. A second dependent variable was success rate, which was defined as a user taking the action specified by the edit message. None of the design factors had a statistically significant effect on either variable. A soft edit message that appeared early in the form was missed an average of 40% of the time on its initial appearance. Edits appearing later in the form were missed less often.

The Evolution of Web Surveys at the U.S. Department of Agriculture's National Agricultural Statistics Service

Linda Gregory, U.S. Department of Agriculture/National Agricultural Statistics Service, and *Kathleen Ott,* U.S. Census Bureau

NASS conducts hundreds of surveys annually on the nation's farmers and agribusinesses. The majority of these establishment surveys is multimodal and utilizes some combination of mail, face-to-face, telephone/CATI, and, most recently, the World Wide Web. We will examine the evolution of web surveys at NASS and examine the number and types of surveys on the web, along with response rates and characteristics of web responders.

Effects of Offering Web Questionnaires as an Option in Enterprise Surveys: the Swedish Experience

Johan Erikson and *Eva Furubjelke,* Statistics Sweden

In 2005 and 2006, Statistics Sweden made major efforts to offer web questionnaires as an option for data providers in more or less all enterprise surveys. These web questionnaires were designed with our newly developed tool for standardized web questionnaires. In the autumn of 2006, a number of follow-up studies were planned to evaluate the results, in both qualitative and quantitative ways. Qualitative follow-ups focused on both respondents' reactions to web collection as an option and reactions regarding the functionality and usability of the standardized web questionnaires. Quantitative follow-ups focused on take-up rates, data quality, and differences in effects between different types of surveys. We will present a summary of the findings.

Respondent Acceptance of Web and Email Data Reporting for an Establishment Survey

Louis Harrell, Antonio Gomes, Richard Rosen, and *Hong Yu,* Bureau of Labor Statistics (U.S.)

The Current Employment Statistics (CES) survey conducted by the Bureau of Labor Statistics is a large monthly establishment survey. CES collected employment, payroll, and hours information from a sample of about 400,000 nonfarm establishments. For the past 10 years, the CES program has offered internet data reporting to a small number of respondents. We will review issues involved in collecting data via the internet in a fast-paced monthly survey environment and the development of the BLS web site, as well as recent changes made in an effort to streamline data reporting and improve respondent cooperation. A new option for direct reporting via email, data security, and data quality also will be discussed.

Session 75 Contributed: Issues in Survey Redesign 2

Sharing Best Practices for the Redesign of Three Business Surveys

Charles Tardif, Statistics Canada

Three Statistics Canada monthly business surveys—the Monthly Wholesale Retail and Trade Survey (MWRTS); the Monthly Survey of Manufactures (MSM); and the Monthly Restaurants, Caterers, and Taverns Survey (MRCTS)—just underwent a redesign. These independent surveys are targeting different industries and need to meet the specific expectations of their data users. On the other hand, they all share key objectives. With their respective redesign, all three surveys are looking into improving the quality (particularly in terms of timeliness, accuracy, consistency, and relevance), while reducing costs and response burden. We will review the issues the different surveys were facing before their redesign and how they have shared common practices to achieve these objectives.

Survey of Electronic Commerce and Technology: Past, Present, and Future Challenges

Jason Raymond, Statistics Canada

The Survey of Electronic Commerce and Technology (SECT) is an annual survey consisting of a sample of approximately 20,000 Canadian enterprises from most areas of the industrial economy. The objective of SECT is to measure both the use of various technologies by Canadian businesses and the extent to which the internet is used to buy and sell goods and services. This survey also measures the barriers to buying and selling over the internet. Since its inception, various studies have been undertaken with respect to different aspects of the survey, such as the sample design, the potential nonresponse bias, and influential observations. I will give an overview of the survey and highlight challenges encountered, along with implemented or proposed measures and future challenges.

Fixed Panel Survey of Hospitals: Sampling and Estimation Challenges

Darryl Creel, RTI International (U.S.)

The New Drug Abuse Warning Network (DAWN) survey is a public health surveillance system that monitors drug-related emergency department visits for the United States and selected metropolitan areas within the US. Some the challenges faced in the sampling and estimation of the New DAWN (i.e., a fixed panel survey with the added complication of the redesign) were accounting for the annual changes in the population of hospitals; sampling new hospitals annually to add to the fixed panel; adjusting for partial eligibility of hospitals, data quality, and nonresponse; using substitute hospitals for nonresponding hospitals; acquiring and adjusting control totals for poststratification; and using ratio estimation to make national estimates. I will examine these challenges and discuss how they were addressed.

Enhancing the Quality of Price Indexes

Zdenek Patak and *Jack Lothian,* Statistics Canada

With the release of the Boskin Report (1996), there has been an intense debate on measuring the quality of price indexes. In Canada and the US, there have been questions raised about the conceptual framework underpinning the collection and processing of price data. As a result of this report, standard business survey methodologies are being introduced into an area that has been dominated by judgment and subject-matter expertise. Statistics Canada is developing a new set of Service Industries Producers' Price Indexes, and these indexes will incorporate some of these innovations. Statistics Canada is using this opportunity to

investigate issues such as improving frame and sample coverage, introducing two-stage random sampling techniques together with variance estimates, and improving outlier detection. We will report on a simulation study contrasting the use of PPS and SRS sampling.

Session 76: Panel Discussion
The Future of Using Administrative Data Sources for
Statistical Purposes
Fritz Scheuren, NORC at the University of Chicago (U.S.); *Heli Jeskanen-Sundström,* Statistics Finland; *Stephen Penneck,* Office for National Statistics (U.K.); and *Don Royce,* Statistics Canada

Statistical offices are under budgetary pressure to do more with fewer resources. As technology for handling large volumes of data becomes more efficient, information from administrative sources is increasingly being considered to improve efficiency of survey designs—and even to replace direct data collection. Statistics based on administrative sources are relatively inexpensive, and they impose no additional burden on providers. However, several issues need to be considered that may cause frustration: conceptual differences, timeliness, and nonsampling errors. Panelists will debate future strategies for ensuring that statistics on businesses and establishments are fit for their purposes, as greater use is being made of data from administrative sources.

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