

# The Past, Present, and Future of Federal Surveys: Observations from the Committee on National Statistics

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## Abstract

This paper examines U.S. federal statistical surveys—their progress and challenges over time—through the lens of the Committee on National Statistics (CNSTAT) at the National Academy of Sciences/National Research Council (NAS/NRC). The paper provides a brief history of federal statistical surveys, background on the role of CNSTAT, and themes from a review of CNSTAT reports related to federal surveys organized according to the four principles of relevance, credibility, trustworthiness, and independence in CNSTAT's flagship publication, *Principles and Practices for a Federal Statistical Agency*. The paper concludes with observations on the future of the federal statistical system and federal surveys.

**Key Words:** probability survey, statistical agency, administrative records

## 1. Introduction

The purpose of our paper is to look at U.S. federal statistical surveys—their progress and challenges over time—through the lens of the Committee on National Statistics (CNSTAT) at the National Academy of Sciences/National Research Council (NAS/NRC). We provide a brief history of federal statistical surveys, background on the role of CNSTAT, themes from a review of CNSTAT reports related to federal surveys (with a special focus on *Principles and Practices for a Federal Statistical Agency*), and our view of the future.

As a preview of our key findings and conclusions, we find that federal surveys cover an amazing range of topics and are vital for policy making and the public, but that they face both challenges and opportunities:

- Outdated or unclear concepts in long-running surveys are an endemic problem, which can lead to serious measurement error;
- Many surveys need major redesign to improve their data quality, relevance, or both;
- New perspectives and paradigms are needed for federal statistical programs to keep up with contemporary trends in data acquisition, processing, and interpretation;
- Data sharing and integration of administrative records in survey programs (under a design of using multiple sources for best estimates) are critically important; and

- Proactive collaboration across the federal statistical system in grappling with new data sources is critical, particularly given constraints on agency budgets.

## 2. The Federal Statistical System

### 2.1 The Rise of Federal Statistical Agencies

Decentralization is a hallmark of the U.S. statistical system, in contrast to other countries, which tend to have more centralized structures for production of official statistics—for example, Statistics Canada. In the United States, as policy issues moved onto the federal stage, new cabinet departments were established, with statistical functions close behind. In fact, the United States pioneered official statistics on many topics, in some cases establishing a statistical office before establishing a full-fledged department, and there are now statistical agencies established in most cabinet departments. The Statistical and Science Policy Office in the U.S. Office of Management and Budget (OMB) and the Interagency Council on Statistical Policy (ICSP) serve to coordinate the decentralized U.S. system, which includes 13 major statistical agencies with missions to provide a broad range of publicly available statistics in specific topic areas, and over 100 other agencies of the U.S. government that carry out statistical activities amounting to \$500,000 or more of direct funding per year, including not only survey and census design and data collection, but also data analysis, forecasting, and modeling (see U.S. Office of Management and Budget, 2013, Table 1).

Some early milestones in the development of the federal statistical system included:

- 1790—The first decennial census, as mandated by Article 1, Section 2, of the U.S. Constitution to provide the basis for reapportionment of congressional representatives among the states, was conducted under the Secretary of State.
- 1820—Collection of foreign trade statistics, authority for which flowed from the language of Article 1, Section 9 of the Constitution providing that “a regular Statement and Account of the Receipts and Expenditures of all public Money shall be published from time to time,” was put on a regular footing in the Treasury Department.
- 1863—Provision for agriculture statistics was part of the newly authorized Department of Agriculture (the “people’s department” according to Abraham Lincoln).
- 1867—An Office of Education Statistics was part of a newly created Department of Education, and the education statistics function remained even when the department was abolished 2 years later.
- 1884—The Bureau of Labor, the forerunner to the Bureau of Labor Statistics (BLS), was established in the Interior Department.
- 1902—The Census Bureau was made a permanent agency in the Commerce Department, with responsibility for both population and economic censuses and for vital statistics, which later became part of the National Center for Health Statistics (NCHS).

Some later additions to the panoply of federal statistical agencies included:

- 1977—The Energy Information Administration (EIA) was established as part of the new Department of Energy.

- 1979—The Bureau of Justice Statistics (BJS) was established in its present form.
- 1992—The Bureau of Transportation Statistics (BTS) was established in the U.S. Department of Transportation.

## 2.2 The Rise of Probability Surveys in Federal Statistics

It is not an exaggeration to say that large-scale probability surveys were the 20<sup>th</sup>-century answer to the need for wider, deeper, quicker, better, cheaper, more relevant, and less burdensome official statistics. Such surveys provided information with known precision, given the ability to estimate sampling error, in contrast to non-probability surveys; and they provided detailed information at greatly reduced cost and increased timeliness compared with censuses.<sup>1</sup> It was not clear at the time when the theory and practice of modern probability sampling was first being developed in the 1930s in the United States that probability surveys would gain such widespread acceptance. The arrival of Jerzy Neyman in the mid-1930s gave a boost to the work of W. Edwards Deming, Calvin Dedrick, Morris Hansen, and colleagues at the U.S. Census Bureau and other federal statistical agencies who were developing the needed theory for sampling of finite populations. Small-scale sample surveys in the 1930s mounted at universities and federal agencies on such topics as consumer purchases, unemployment, urban housing, and health provided proofs of concept and practical tips for survey operations.

The federal government's young statistical Turks still had to surmount hurdles in the bureaucracy up to the White House before they could move sampling into the mainstream of federal statistics. During the Great Depression, there was political pressure from two sides—those wanting estimates and those not wanting estimates—regarding the need for accurate numbers on unemployment. “Old timers” at the Census Bureau were skeptical about the possibility of using survey methods to get information (see Anderson, 1988).

In 1937, a major breakthrough occurred when a 2 percent sample of households on nonbusiness postal routes, designed by Dedrick, Hansen, and others, estimated a much higher—and more credible—number of unemployed than a “complete” census of all residential addresses, which was conducted on a voluntary basis.<sup>2</sup> Picking up on that effort, from 1940-1942 the Works Progress Administration fielded the sample-based Monthly Report on the Labor Force, the forerunner to what became the Current Population Survey (CPS). The CPS continues to this day as the source of official monthly estimates of U.S. unemployment conducted by the Census Bureau and published by the BLS.

Another breakthrough occurred when the Census Bureau, which had struggled for decades to respond to demands for added questions on the decennial census without turning the instrument into a nightmare for respondents and interviewers, decided to ask six questions on a 5 percent sample basis in the 1940 census. The success of sampling led to a decision to administer two-fifths of the questions in the 1950 census on a sample basis—sampling fractions were 20 percent and 3.3 percent for population items and 20 percent for housing items, using a matrix design. The sample results were readily accepted by the public (see Anderson, 1988).

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<sup>1</sup>For good reviews of the introduction and spread of probability sampling in U.S. official statistics, see Duncan and Shelton (1978) and Harris-Kojetin (2012).

<sup>2</sup>Both the voluntary “census” and the 2 percent sample excluded people not living on a postal route, estimated at about 18 percent of the population (Duncan and Shelton, 1978, pp. 44-45).

Once probability sampling gained a firm foothold in federal statistics, the number and scope of federal surveys blossomed to provide a rich array of policy-relevant information. Just some of the nation's oldest, continuous surveys include:

- Consumer Expenditure Survey (CE)—first conducted in 1888 on a non-probability basis, periodically conducted through 1972-73, continuous since 1980, currently being redesigned, feeds the Consumer Price Index (CPI) and supports extensive economic research;
- Current Employment Statistics (CES)—first conducted in 1939, provides data on payroll employment and related statistics;
- Current Population Survey (CPS)—first conducted in 1942 (preceded by Monthly Report on the Labor Force conducted by the Works Progress Administration from 1940-1942), source of monthly unemployment rates, an annual income supplement added in 1947 (now the Annual Social and Economic Supplement, ASEC) to provide key indicators of income, poverty, and health insurance coverage;
- Monthly Wholesale Trade Survey—first conducted in 1946, provides a principal economic indicator;
- Survey of Industrial R&D—first conducted in 1953 for the National Science Foundation (NSF), reinvented as the Business Research & Development and Innovation Survey (BRDIS) in 2008;
- National Survey of Fishing, Hunting, and Wildlife-Associated Recreation—first conducted in 1955, vitally important to its constituency;
- National Health and Nutrition Examination Survey (NHANES)—first conducted in 1960, became continuous in 1999, uniquely links physical exams to survey responses;
- National Crime Victimization Survey (NCVS)—first conducted in 1972, redesigned in 1992, currently being redesigned, provides estimates of crimes not reported to the police;
- Commercial Building and Residential Energy Consumption Surveys (CBECS/RECS)—first conducted in 1979, currently being redesigned, provide estimates of energy demand; and
- Survey of Income and Program Participation (SIPP)—first conducted in 1983 (major testing program in 1977-1981), redesigned in 1996, redesigned again in 2014, provides estimates of transitions in employment, income, and program participation within a year and across several years.

Moreover, the federal statistical system has a rich tradition of innovation for its censuses and surveys. Some notable innovations are listed below.

- Punch cards invented for the 1890 census by Herman Hollerith, later involved with the formation of IBM;
- Probability sampling used in the forerunner to the CPS in 1940–1942;
- Rotation group design introduced in 1953 in the CPS;
- UNIVAC I (now in the Smithsonian Institution) used to help process the 1950 census;
- Census mailout-mailback methods tested in 1950s and 1960s based on experiments showing significant interviewer bias;
- Small business income tax records used in the 1963 Economic Census to greatly reduce burden and costs;

- Longitudinal surveys begun in 1966–1973 by statistical agencies (e.g., the National Longitudinal Surveys [NLS]; the High School Class of 1972, the Survey of Doctorate Recipients [SDR]);
- Continuous measurement for small areas tested in 1996 and implemented as the American Community Survey (ACS) in 2005;
- ACS designed from the outset to use sampling for nonresponse follow-up; and
- The National Agricultural Statistics Service (NASS) offered a Web response option to its surveys in 2002.

### **2.3 Challenges to the Probability Survey Paradigm**

Yet the innovative and highly useful probability survey paradigm is increasingly challenged today in ways that reduce quality and increase costs. Thus:

- Unit response is in decline, and it is costly to stem the decline, let alone improve response (e.g., the National Health Interview Survey [NCHS] achieved 92% household response in 1997, falling to 76% in 2013);
- Item nonresponse is high and growing for key variables (e.g., total income imputed in the CPS ASEC increased from 24% in 1993 to 34% in 2002);
- Socioeconomic coverage differences in population coverage remain even after post-stratification of household survey weights using demographic population estimates;
- Measurement error is often a problem; and
- Concepts in long-running surveys may be progressively out of date.

Improvements in federal surveys are hampered by constrained resources, reluctance by the agency producing the survey and its users to interrupt time series, the difficulties of redesigning established processing systems to handle data from multiple sources or new imputation methods, and similar factors.

### **3. The Role of the NAS/NRC and CNSTAT**

The National Academy of Sciences is an independent, nonprofit, self-perpetuating honorific society, established in 1863 with a congressional charter signed by President Abraham Lincoln requiring the NAS to advise the government on matters of science and “art” (when “art” meant engineering and technology). The NAS members, of whom there are about 2,200 today, were and continue to provide their advice pro bono. Subsequently, the National Academy of Engineering (NAE) and the Institute of Medicine (IOM) were established (in 1964 and 1970, respectively) under the NAS charter.

The NAS carried out a few assignments in the second half of the 19<sup>th</sup> century (including how to make a compass work in an ironclad warship), but it was World War I that greatly increased the need for scientific advice. President Woodrow Wilson signed an executive order in 1916 establishing the NRC as the operating arm of the NAS. The NRC could accept government contracts and grants to support an infrastructure (e.g., study staff, conference facilities, publications staff) to facilitate the work of the experts who still serve pro bono on studies, and the pool of experts was broadened beyond the small number of NAS members.

The NRC today is organized into six operating divisions, under which are a total of about 50 standing units like CNSTAT, which oversee the NAS/NRC’s work in an intellectual

area (e.g., the Food and Nutrition Board, the Board on Atmospheric Sciences and Climate, the Committee on Population). A sister unit of CNSTAT is the Committee on Applied and Theoretical Statistics (CATS), which focuses on methodological work.

CNSTAT itself was established as a standing unit of the NRC in 1972 at the recommendation of the President's Commission on Federal Statistics, chaired by W. Allen Wallis, to provide an independent, objective resource for evaluation and improvement of federal statistical methods and operations. Its mission is to improve the statistical methods and information on which public policy decisions are based. It also serves as a coordinating force in the decentralized U.S. statistical system. Members are appointed for 3-year terms (with a possible second term)—see [www.nationalacademies.org/cnstat/](http://www.nationalacademies.org/cnstat/) for a list of current members and names of all members who have ever served, numbering over 115 individuals from over 65 academic and other organizations.

CNSTAT, like other NRC units, oversees a variety of activities. The classic NRC project is a consensus panel of about 10-14 members, who gather information and deliberate in response to a statement of task. Such panels issue one or more reports with findings and recommendations. Members of consensus panels are recommended by CNSTAT members and staff and appointed by the chair of the NRC who is also the president of the NAS. Consensus reports are rigorously reviewed before they are released to the sponsor and the public.

Other NRC activities include stand-alone workshops, which are organized by appointed steering committees and produce summary reports; standing committees, which assist a sponsor to develop a program; planning meetings to consider whether a consensus panel or other activity is warranted on a topic; and expert meetings to dialogue with a sponsor on a particular topic. CNSTAT itself meets three times a year and at its spring and fall meetings holds a public seminar and a luncheon with a discussion topic with the heads of the major statistical agencies who sit on the ICSP.

Individual projects under CNSTAT and other NAS/NRC units are funded by contracts or grants from government agencies and foundations. Ideas for projects are often developed by sponsors through discussion with CNSTAT staff. Sometimes Congress mandates an agency to contract with the NAS/NRC for a study. All studies must be approved by CNSTAT and the NRC Governing Board Executive Committee

CNSTAT is also fortunate that over 20 agencies contribute varied amounts of core support to enable CNSTAT to maintain staff and undertake cross-cutting activities. Most agencies contribute core funding through transfers to the NSF Methodology, Measurement, and Statistics Program, which administers a core grant to CNSTAT.

Over its 40-year history, CNSTAT has produced over 240 consensus, interim, and workshop reports. CNSTAT studies have covered the decennial census and the ACS; major survey programs and the portfolios and operations of entire statistical agencies; data and measurement needs in specific areas (e.g., food and nutrition, health, income support, civic engagement); reviews of measurement concepts (e.g., cost-of-living and price indexes, poverty, food insecurity, medical care economic risk, subjective well-being); cross-cutting issues (e.g., data access and confidentiality protection, data dissemination, causes and consequences of unit nonresponse and methods to compensate

for it, survey automation); and statistical methods application and development in diverse policy areas. CNSTAT often collaborates on studies in other NRC units to provide statistical and survey methods input as needed.

#### 4. Themes from Reviewing CNSTAT Reports

CNSTAT's flagship publication, authored by the committee itself, is *Principles and Practices for a Federal Statistical Agency*. First issued in 1992, it is updated every 4 years beginning in 2001 to be available for cabinet members in a new presidential administration or a second term. The 5<sup>th</sup> edition was released in spring 2013. *P&P*, as it is known, prescribes four principles that are fundamental to a statistical agency and 13 practices for making the principles operational. The four principles can be summarized as: relevance, credibility, trustworthiness, and independence. *P&P* also describes the decentralized U.S. statistical system, including background on the major statistical agencies, the OMB Statistical and Science Policy Office and other coordinating mechanisms, and legislation and guidance that pertain to the statistical system.

In order to identify themes about federal surveys from CNSTAT studies, CNSTAT staff developed a bibliography of about 40 relevant reports dating back to 1993 and organized recommendations in these reports around the four principles and relevant practices from the 5<sup>th</sup> edition of *P&P*. All CNSTAT reports referenced below are available for free downloading from the National Academies Press (see [www.nationalacademies.org/cnstat/](http://www.nationalacademies.org/cnstat/), which links to [www.nap.edu](http://www.nap.edu)).

##### 4.1 Relevance

Principle 1 in *P&P* states that: “A statistical agency must provide information that is relevant to issues of public policy and useful to a broad range of public and private-sector users as well as the general public.” The CNSTAT staff review of reports identified challenges and opportunities for relevance in the areas of: (1) a clearly defined and well-accepted mission; (2) the need for review and revision of established concepts and introduction of new concepts; and (3) the need for major redesign of some surveys.

##### 4.1.1 Mission

Most federal statistical programs and surveys have a clearly defined mission. However, CNSTAT reviews have identified such problems as:

- The lack of consensus on the specifics of the mission from the beginning of the survey program—for example, the goals of the National Children's Study (NCS) have been so ambitious as to inhibit reaching agreement on a feasible design (see *The National Children's Study 2014: An Assessment*, 2014);
- A mission that is too narrow—for example, the Survey of Industrial Research & Development of the NSF National Center for Science and Engineering Statistics (NCSES) did not cover innovation and had a number of other problems of item nonresponse and reporting errors—a redesign in 2008 based on *Measuring Research and Development Expenditures in the U.S. Economy* (2005) addressed these issues; and

- A mission that has grown over time to burden respondents and increase measurement error—such mission creep has affected the Consumer Expenditure Surveys (CE), which are currently being redesigned by BLS to focus them on priority goals (see *Measuring What We Spend: Toward a New Consumer Expenditure Survey*, 2012).

#### 4.1.2 Concepts

CNSTAT studies have reviewed and recommended changes to established concepts. Often such reviews have been pushed by other than the responsible statistical agency:

- OMB and Congress requested a review of the CPI on the assumption that new goods were not being introduced into the index fast enough—the CNSTAT study comprehensively considered cost-of-living and price indexes and made recommendations, which BLS implemented as part of a program of continuous improvement to the CPI (see *At What Price? Conceptualizing and Measuring Cost-of-Living and Price Indexes*, 2002);
- OMB requested a review measure of food insecurity and hunger used by the USDA Economic Research Service (ERS) because the measure seemed ill-specified and too dependent on scaling techniques—the CNSTAT study determined that the concept was basically sound and recommended some minor changes and clarity in labeling (the measure addresses food insecurity but not hunger—see *Food Insecurity and Hunger in the United States: An Assessment of the Measure*, 2006);
- The Census Bureau requested a study of residence rules and how best to ascertain measurement for the decennial census in light of societal changes, such as children in dual-custody and people with second homes—the CNSTAT study made a number of recommendations but the technological problems for the 2010 census deferred consideration of them (see *Once, Only Once, and in the Right Place: Residence Rules in the Decennial Census*, 2006);
- The Bureau of Economic Analysis (EIA) and the National Institute on Aging (NIA) were interested in developing more informative accounting of health care expenditures and health itself—BEA is about to make public a major revision of its treatment of health care in the National Income and Product Accounts from measuring costs of services (e.g., hospital, out-patient) to measuring the costs of treatments for diseases (see *Strategies for a BEA Satellite Health Account: Summary of a Workshop*, 2008, and *Accounting for Health and Health Care: Approaches to Measuring the Sources and Costs of Their Improvement*, 2010).

CNSTAT has also examined concepts that have gained credence in the academic community and merit consideration as to their relevance and feasibility for inclusion in federal surveys:

- A CNSTAT workshop, requested by BLS, helped midwife the American Time Use Survey (ATUS), which is administered to outgoing rotation groups of the CPS (see *Time Use Measurement and Research: Report of a Workshop*, 2001). A subsequent report, *The Subjective Well-Being Module of the American Time Use Survey: Assessment for Its Continuation* (2012), for NIA, supported the ATUS SWB module.
- To be able to assess the economic security effects of the Affordable Care Act, the Assistant Secretary for Planning and Evaluation in the U.S. Department of Health and Human Services requested a CNSTAT study on a suitable measure—see *Medical Care Economic Risk: Measuring Financial Vulnerability from Spending on Medical*



- Care* (2012)—to accompany the recently implemented Supplemental Poverty Measure, itself the result of a 1995 CNSTAT study on *Measuring Poverty: A New Approach*.
- A recent CNSTAT panel on measuring subjective, or self-reported, well-being for NIA and the UK Economic and Social Research Council (ESRC) concluded that such measures could usefully be included in a variety of surveys but were not sufficiently developed for prime time as a flagship statistic (see *Supplemental Well-Being: Measuring Happiness, Suffering, and Other Dimensions of Experience*, 2013).
  - Similarly, a recent CNSTAT panel, at the request of the Corporation for National and Community Service (CNCS) and OMB, concluded that measures of civic engagement should be scaled back on the CPS and moved to more appropriate surveys and alternative data sources (see *Civic Engagement and Social Cohesion: Measuring Dimensions of Social Capital to Inform Policy*, 2014).

To enable statistical agencies to avoid retaining concepts that have become outmoded in one or more respects or of neglecting to recognize the merits of new concepts, it is important for them to have ways and means of keeping up with societal changes and research advances that have implications for concepts and measures, such as support for staff participation in conferences, workshops, and professional associations and encouragement of staff details with other agencies. Agencies could also usefully experiment with new data sources and measurement methods (e.g., web scraping) to gain intelligence for refreshing concepts and measures. It is also important to set aside resources to run overlapping series or bridges between series in order to reduce the shock to users of breaks in time series.

#### **4.1.3 Major Redesign**

CNSTAT panels have recommended major redesigns for the:

- Survey of Income and Program Participation (SIPP, conducted by the Census Bureau), once in 1993 (*The Future of the Survey of Income and Program Participation*), and again in 2009 (*Reengineering the Survey of Income and Program Participation*);
- The National Crime Victimization Survey (NCVS, conducted by the Census Bureau for BJS), in a 2008 report (*Surveying Victims: Options for Conducting the National Crime Victimization Survey*), and in a 2013 report on measurement of rape and sexual assault, for which the CNSTAT panel recommended a separate survey (*Estimating the Incidence of Rape and Sexual Assault*);
- The Commercial Buildings and Residential Energy Consumption Surveys (CBECS/RECS, conducted by survey contractors for EIA), in a 2012 report (*Effective Tracking of Building Energy Use: Improving the Commercial Buildings and Residential Energy Consumption Surveys*); and
- The Consumer Expenditure Surveys (CE, conducted by the Census Bureau for BLS), in a 2012 report (*Measuring What We Spend: Toward a New Consumer Expenditure Survey*).

Several of these reports recommended greater use of alternative data sources, such as administrative records, use of new data collection technologies, incorporating a longitudinal component, and other substantial changes in design and procedures. What factors undermined these surveys so that they clearly needed a major overhaul?

- SIPP has had conflicting goals, such as the provision of both cross-sectional and longitudinal estimates; its core topics, such as income, program participation, and assets, are difficult and burdensome to measure accurately in the detail desired; and the survey lacks a subject-matter-agency sponsor that could work with the Census Bureau to ensure its continued relevance and cost-effectiveness.
- The NCVS's topics are also difficult and burdensome to measure; moreover, the reduction in crime in recent decades made the sample too small for needed annual change estimates; and prior to the Census Bureau's efforts to become more customer-oriented, the very small BJS was unable to influence Census Bureau procedures to be more cost-effective.
- For CBECS and RECS, highly constrained budgets limited sample size and frequency; also, EIA lacked resources and sufficient in-house expertise to experiment with alternative data sources and methods and consequently had to be overly reliant on contractors.
- The CE surveys (interview and diary) were constrained by the need to satisfy highly detailed data requirements for the CPI, even though respondents clearly could not and would not provide that detail, and by a concern to maintain the time series.

Practices that may help statistical agencies to continuously improve major ongoing federal surveys and avoid the need for major redesigns, include: scheduling regular internal and external reviews; facilitating a culture whereby incremental change is viewed as a feature and not a bug; providing for overlapping series and bridges to make it possible for users to accommodate changes; and keeping some budget aside for continuous evaluation, testing, and improvement. Minor redesign is not easy, but it is less disruptive than major design, and it is a disservice to policy makers and the public to keep a survey on autopilot when it has known flaws.

## **4.2 Credibility**

Principle 2 in *P&P* states that: “A federal statistical agency must have credibility with those who use its data and information.” The CNSTAT staff review of reports identified challenges and opportunities for credibility with users in the areas of: (1) continual development of more useful data and commitment to quality; (2) wide dissemination of data; and (3) cooperation with data users

### ***4.2.1 Continual Development of More Useful and Higher Quality Data***

CNSTAT reports have more and more recommended alternative data sources to improve survey data utility and quality:

- *Improving Data to Analyze Food and Nutrition Programs* (2009) recommended that ERS/USDA add food prices and location of outlets to NHANES dietary and health data;
- *Reengineering the Survey of Income and Program Participation* (2009) recommended a major push to use administrative records in SIPP, both indirectly (e.g., to improve imputations) and directly (e.g., to replace survey questions); and
- *Capturing Change in Science, Technology, and Innovation: Improving Indicators to Inform Policy* (2014) recommended that NCSES carefully explore data mining, web

scraping, and other “big data” techniques to support new and improved science, technology, and innovation indicators.

#### **4.2.2 Wide Dissemination of Data**

CNSTAT reports have consistently recommended better access to microdata—for example, *Expanding Access to Research Data: Reconciling Risks and Opportunities* (2005); *Understanding American Agriculture: Challenges for the Agricultural Resource Management Survey* (2007); and *Understanding Business Dynamics: An Integrated Data System for America’s Future* (2007). CNSTAT reports have also recommended improved access to tabular data on the Internet—for example: *State and Local Government Statistics at a Crossroads* (2007); and *Communicating Science and Engineering Data in the Information Age* (2011).

#### **4.2.3 Cooperation with Data Users**

CNSTAT reports have recommended improved communication with data users through such means as advisory groups; ways for users to readily feed back information on data quality concerns; proactive communication about concepts; and a culture of seeking advice from both methodologists and data users on possible future changes in survey programs. See, for example, *Measuring Personal Travel and Goods Movement: A Review of the Bureau of Transportation Statistics’ Surveys* (2003) and many of the other previously cited reports.

It is a never-ending challenge to statistical agencies to satisfy users who always want more and more information, and constrained budgets do not help. Agencies need, however, to fight a tendency to focus on production at the expense of dissemination and user communication. Users are, after all, the *raison d’être* for statistical programs. It could be useful for agencies to periodically rotate staff with policy analysis and research agencies, state and local government agencies, and think tanks, so that a user perspective is constantly refreshed and brought to bear.

### **4.3 Trust**

Principle 3 in *P&P* reads: “A federal statistical agency must have the trust of those whose information it obtains.” The CNSTAT staff review of reports released over the past 20 years identified many that explicitly outlined challenges and opportunities for gaining trust of data providers by: (a) respecting the privacy and autonomy of data providers, including reduction of burden; and (b) protecting the confidentiality of data providers’ information.

#### **4.3.1 Respecting Privacy and Acknowledging Burden**

CNSTAT reports have often addressed ways of reducing respondent burden and making questionnaires more user-friendly. The issues in this area tend to be survey-specific. For example, *Small Populations, Large Effects: Improving the Measurement of the Group Quarters Population in the American Community Survey* (2012) called for tailoring the ACS questionnaire to the type of group quarters (nursing home, prison, etc.); *Measuring What We Spend: Toward a New Consumer Expenditure Survey* (2012) called for providing respondents with large incentives to acknowledge the time and effort required to provide accurate, detailed information on all kinds of expenditures; and *The National*

*Children's Study 2014: An Assessment* (2014) identified the potential for burden from the proposed approach to measure a wide variety of phenotypical characteristics of children and parents. *Nonresponse in Social Science Surveys: A Research Agenda* (2013, funded by the Russell Sage Foundation) documented growing nonresponse, noted that the “survey community is painfully aware of these trends and has responded aggressively,” but warned that research is still needed on what motivates people to participate in surveys; the effects of incentives; the effects of perceived/actual burden; and the costs and benefits of alternative ways to reduce burden and increase response.

#### **4.3.2 Protecting Confidentiality and Providing Access to Data**

Federal statistical agencies have strict policies and procedures for protecting the confidentiality of respondent information (e.g., the Census Bureau's Title 13 and the 2002 Confidential Information Protection and Statistical Efficiency Act, CIPSEA). Yet the mission of a statistical agency is to provide data to users, so agencies must continually balance confidentiality protection and access, particularly access to microdata for research. Because the threats to confidentiality are continually changing (due, e.g., to such factors as the rise of the Internet and the development of sophisticated matching software), so the balance with data access needs continual reassessment. CNSTAT has produced at least a dozen reports on the topic.

CNSTAT advice on confidentiality and data access is often sought from users, but statistical agencies have asked for such advice, too:

- *Private Lives, Public Policies* (1993), a major study of principles and best practices in this area, was funded by NSF, NIA, the National Center for Education Statistics, and the IRS Statistics of Income Division, and carried out in cooperation with the Social Science Research Council;
- *Expanding Access to Research Data: Reconciling Risks and Opportunities* (2005), was funded by NIA, which in light of its support for numerous long-running observational studies has striven to find ways to facilitate research access to microdata for the U.S. decentralized research enterprise;
- *Putting People on the Map: Protecting Confidentiality with Linked Spatial-Social Data* (2007), carried out by a companion unit to CNSTAT in the NRC, was funded by NSF, the National Institute of Child Health and Human Development (NICHD), and NASA.
- *Conducting Biosocial Surveys: Collecting, Storing, Accessing, and Protecting Biospecimens and Biodata* (2010) focused on the issues posed by collection of biospecimens that could be used for genomic analysis, and was funded by NIA;

#### **4.4 Independence**

The fourth and last principle in *P&P* states that: “A federal statistical agency must be independent from political and other undue external influence in developing, producing, and disseminating statistics” (where “undue external influence” is defined as an effort to undermine a statistical agency's impartiality and professional judgment). The CNSTAT staff review of reports identified challenges and opportunities for independence in the areas of: (1) commitment to quality and professional standards; (2) providing for professional advancement of staff; (3) strong internal and external evaluation programs; and (4) collaborating with other statistical agencies.

#### ***4.4.1 Quality and Professional Standards***

Many CNSTAT reports have addressed issues of quality and standards, which are key for the relevance, accuracy, trustworthiness, and credibility of federal statistics. Examples include:

- *Understanding American Agriculture: Challenges for the Agriculture Resource Management Survey* (2007) called for an evaluation of interviewer departures from standards and procedures in light of the reliance by NASS on state-based interviewers recruited and overseen by the National Association of State Departments of Agriculture;
- *Using the American Community Survey: Benefits and Challenges* (2007) applauded the publication of quality measures (e.g., unit and item response rates) by the Census Bureau and called for additional information on quality to be regularly provided to the ACS Program Office and to users; and
- *The National Children's Study: An Assessment* (2014) emphasized the need for adherence by NICHD to existing standards for sample design, data collection, and other features of the proposed NCS;

#### ***4.4.2 Professional Expertise of Staff and Regular Program Evaluation***

CNSTAT reports have regularly emphasized the need for sufficient in-house expertise, not only for methodology, but also in relevant subject matters. For example, the 2007 ARMS report advised ERS/USDA to add in-house survey statisticians to work alongside its econometric staff; and the 2014 NCS report advised NICHD to have evaluation be a regular, not special, activity. Evaluation should also tap both in-house and external expertise.

#### ***4.4.3 Collaboration with Other Agencies***

Many CNSTAT reports have recommended collaborative efforts among two or more agencies to improve federal surveys. Two CNSTAT workshops in 2011—*Facilitating Innovation in the Federal Statistical System* and *The Future of Federal Household Surveys*—made clear the barriers to and needs for collaboration. Collaborative approaches identified in CNSTAT reports include coordination of content among related surveys for greater utility of information and reduction of burden; pooling staff and resources for research on new data sources and methods (e.g., scraping the web to identify changing concepts); and nesting or linking surveys and administrative records for more utility and less cost and burden.

### **5. View of the Future**

Federal statistical agencies and their survey programs will continue to be the backbone of the nation's information needs, but surveys are no longer sufficient by themselves, given response and measurement problems. It is crucial for the statistical system to look to alternative data sources, particularly administrative records. It is also crucial for the individual agencies to proactively collaborate with other agencies, including sharing and rotating staff to garner the benefit of new ideas and perspectives.

There are promising developments. These include: evidence of continued innovation by statistical agencies, as in the design and implementation of BRDIS and the planned redesign of the CE surveys; the Census Bureau's efforts to reengineer its census and survey operations to reduce costs, improve quality, and adopt "corporate" solutions (e.g., standard software, use of the Master Address File as a sampling frame), all of which should help the entire system; and OMB memo M-14-06, issued February 24, 2014, *Guidance for Providing and Using Administrative Data for Statistical Purposes*,<sup>3</sup> which takes a proactive stance toward the use of administrative records for statistical purposes.

A major challenge and opportunity for the entire statistical system stems from the explosion of potential new data sources in addition to surveys and administrative records—for example, commercial transaction records, electronic medical records, on-line prices, surveillance camera footage, Google Street View, Twitter feeds, etc., etc. There will be plenty of work for statistical agencies to improve traditional surveys and integrate them with relevant administrative records, including replacing questions with the direct use of records in order to reduce respondent burden and improve quality, but that may not be enough. It is possible that new, fast, potentially cheap, but untested data sources—for example, data on prices, employment, crime, transportation, et al. from the Web—may drown out official statistics. The statistical system and data users will need to think hard and plan for ways in which statistical agencies can play in this arena responsibly and effectively.

CNSTAT is honored to have been able to contribute to the renewal and refreshment of federal surveys in service to the public good and hopes to have the opportunity to be of continued service to the statistical system in the future.

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<sup>3</sup>Available <http://www.whitehouse.gov/sites/default/files/omb/memoranda/2014/m-14-06.pdf> [September 2014].