

Innovation

Innovation Domains for Federal Statistical Agencies

Innovation is essential to the effectiveness of any organization (see Box H-1 on defining innovation). Federal statistical agencies, to carry out their fundamental responsibilities to provide relevant, timely, frequent, granular, accurate, credible, and readily accessible data for the public and policymakers, need to continually innovate in five functional domains:

- 1 **Concepts and topics:** to keep abreast of social and economic change and new data needs;
- 2 **Data collection:** to collect high-quality data as efficiently as possible with the least burden on people and businesses to respond;
- 3 **Data processing and estimation:** to produce relevant data as efficiently and accurately as possible;
- 4 **Data dissemination:** to ensure that users with all levels of expertise and experience can readily find the data they need; and
- 5 **Data evaluation and testing:** to assess the relevance and accuracy of collected data and experiment with methods to improve and collect new data.

Comprehensively documenting and assessing innovations by the principal federal statistical agencies was not feasible with our resources. We did the following:

- Provide examples of landmark historical innovations by statistical agencies (see Appendix H-1 for more examples).
- Provide examples of innovation by the statistical agencies during Covid-19.
- Identify opportunities for innovation and provide examples of recent innovations of note (see Supporting Materials: I for more examples).
- Identify aspects of an organizational culture of innovation at statistical agencies and assess a subset of them: staff training, attracting new blood, collaborative projects with other statistical agencies, and whether agency staff view their agency as rewarding innovation.
- Identify and assess barriers to innovation.
- Draw conclusions from our work, which also appear in the main report.

NOTE: See page H-6 for a list of statistical agency acronyms.

Box ES-2:

Defining Innovation

Innovation has been defined as the *practical implementation* [emphasis added] of ideas that result in the introduction of new goods or services or improvement in offering goods or services (see Schumpeter, 1934, *The Theory of Economic Development*). Innovation may, but need not, derive from invention; innovation requires careful testing and piloting that is followed by implementation at scale.

LANDMARK INNOVATIONS

Historically and collectively, the principal statistical agencies have a stellar record of innovation in the domains listed above, and many innovations have set standards for private sector and academic data collection and research (see Appendix H-1 below; see also Duncan and Shelton, 1978; National Academies, 2010). Examples of just a few major innovations include:

- probability sampling—the basis of the survey industry worldwide;
- the first nondefense use of computers for the 1950 census;
- small-area estimation for local government statistics (e.g., small-area income and poverty estimates used to allocate billions in Title 1 funding to school districts);
- development of the National Income and Product Accounts (NIPAs) (gross domestic product and income, personal consumption expenditures, etc.);
- The Nation's Report Card (National Assessment of Educational Progress tests of students on reading, math, and other subjects);
- estimates of crimes not reported to the police (National Crime Victimization Survey);
- electronic data products for public use (computer summary and public use microdata sample files, online data access platforms)
- secure enclaves, such as Federal Statistical Research Data Centers (FSRDCs), for analyzing confidential data; and
- estimating the undercount in the decennial census.

INNOVATION DURING COVID-19

Innovation always requires prioritization, which in turn requires input from stakeholders and data users. During the height of the Covid-19 pandemic, the priority was to obtain and disseminate relevant, accurate data as quickly and frequently as possible. Overall, the agencies rose to the challenge with innovations in data collection, processing, and dissemination (see Box H-2). Examples include the online Household and Small Business Pulse surveys, put into operation in April 2020 (within a month of the nationwide shutdown) by a coalition of statistical agencies led by the Census Bureau. The Pulse Surveys obtained data released weekly 10–14 days after data collection, on conditions people and businesses encountered during the pandemic. (NCES, due to limited staff and lack of contracting flexibility, was not able to stand up the School Pulse Panel until the 2021–2022 school year.)

Other examples of timely innovation include:

- pandemic-specific questions added to ongoing surveys—e.g., remote work added to the monthly Current Population Survey (CPS) by BLS; telemedicine added to the National Health Care Surveys by NCHS;
- increased timeliness—e.g., death statistics with Covid-19 coded released daily for states and weekly for demographic groups and counties by NCHS; weekly statistics from credit card data on consumer spending by industry (gas stations, clothing stores, etc.) issued by BEA; daily travel based on anonymized cell phone data released weekly with a two-week lag by BTS; and
- websites bringing together Covid-19–relevant data and publications reporting on Covid-19–related topics (e.g., in labor and energy).

The agencies also did their best to produce usable data products from ongoing surveys that employed in-person interviewing—which had to be curtailed during the nationwide shutdown—but could not always succeed. The Census Bureau released a limited set of experimental data collected in 2020 from the American Community Survey (ACS), and NCHS delayed the release of data from the National Health Interview Survey and shut down the National Health and Nutrition Examination Survey, which uses mobile health examination centers, for 15 months (the centers were repurposed as Covid-19 testing sites). The 2020 Census experienced delays and quality problems, but it is to the credit of the Census Bureau that the census was conducted as well as it was. This success was largely due to implementing an internet option for self-response together with innovative methods for field data collection that were tested and developed earlier in the decade (National Academies, 2023).¹

OPPORTUNITIES FOR INNOVATION AND RECENT INNOVATIONS OF NOTE

Today, there are many areas in which innovation would increase statistical agencies' value-added. Some are:

- *Measuring the economic effects of artificial intelligence (AI), specifically, large language models*—Statistical agencies will need to provide timely data on the contributions of AI and related endeavors (e.g., robotics) to employment and the economy.
- *Using AI to enhance statistical agency operations*—Statistical agencies have begun and will need to extend their R&D on ways in which their own processes can benefit from AI.
- *Providing granular data for small geographic areas and vulnerable population groups while protecting personal and business privacy and confidentiality*² —Methods exist, but statistical agencies will need to test and implement the most cost-effective approaches at scale.
- *Democratizing data access*—Statistical agencies will need to collaboratively develop robust access mechanisms for their data, more of which are behind “firewalls” because of increased threats to data confidentiality. It is important that access mechanisms serve the broad public in addition to data experts and that agencies are able to better identify and conduct outreach to diverse communities of data users to gain feedback on relevance and timeliness of data and to support evidence-based policy-making.
- *Improving data quality and relevance through blended data*—Declining response rates to surveys (a worldwide phenomenon) are the biggest threat to accuracy of key data series; creative and responsible use of multiple data sources—administrative records and private sector data in addition to survey responses—can help improve and maintain high levels of accuracy. Blending data is also a way to increase relevance: for example, by linking surveys and other data, with each source providing unique information.
- *Increasing efficiency and speeding development of additional innovation*—Implementing shared services and tools through the National Secure Data Service and streamlining approval processes for experimental initiatives are two avenues to facilitate timely innovation.

¹ See American Community Survey Experimental Data, <https://www.census.gov/programs-surveys/acs/data/experimental-data.html>; National Health Interview Survey, COVID-19, and Online Data Collection Platforms: Adaptations, Tradeoffs, and New Directions, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8667832/>; The National Health and Nutrition Examination Survey (NHANES), 2021–2022: Adapting Data Collection in a COVID-19 Environment, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8667826/>

² See Executive Order On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government, <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government/>

Work is under way at the agencies in many of the domains and areas listed above. Acknowledging the difficulty of identifying “major” or “path breaking” innovations contemporaneously (distance is required for such an assessment), we selected for this report examples provided to us that, in the opinion of the project team, seemed worthy of mention (see Box H-3). Each agency’s profile lists additional innovations (see Supporting Materials: I). The examples we chose illustrate innovations in small-area geographic detail, timeliness, and richness of content, and use of a variety of data sources (e.g., spatial imagery).

CULTIVATING INNOVATION

An essential ingredient for frequent, successful innovation is an organizational culture of innovation. We identified ten attributes for statistical agencies of an innovative culture that should translate into useful advances. They are:

- Staff have the tools (software packages, computational power) and training (in data science and other relevant areas) they need to innovate;
- Staff are encouraged to present at professional conferences and publish their work, and the agency rewards innovation, not only by staff with primary responsibility for innovating but throughout the organization;
- The agency accepts that not all innovations will pan out and emphasizes what can be learned from failures rather than the failures themselves;
- The agency has a well-specified strategic plan with innovation goals and timetables spelled out;
- The agency regularly obtains outside reviews of major programs and has a track record of implementing a large majority of recommendations from such reviews in a timely manner;
- The agency invites visiting experts and has regular seminars to hear work of agency staff and relevant outsiders;
- The agency, as a matter of policy, rotates staff among assignments to broaden perspectives and generate new ideas;
- The agency initiates and responds positively to collaborative work with other agencies on mutually beneficial innovation projects;
- The agency’s employees and data users believe that the agency is innovative and rewards innovation; and
- The agency proactively reaches out to diverse communities of users to learn where innovations would provide the most value to its stakeholders.

We have data for this inaugural assessment that bear on some but not all aspects of a culture of innovation:

Staff training. We asked agencies specifically about “training in new developments in data science”—a field that incorporates skills from computer science, statistics, data visualization, data integration, graphic design, and systems design to process and analyze large, complex datasets. The responses indicated that many statistical agencies are actively helping their staff acquire or improve updated data science skills and adopting new practices that reflect current academic training and education.

- *Training in Python and/or R* (strong in statistical and visualization tools): BEA (moving entire staff to Python from SAS by 2026); BLS; Census Bureau; NASS; NCHS (for electronic health records analysis); SOI
- *Data science training more broadly*: BLS; Census Bureau (major program and on-demand); NASS (AI and data visualization); NCES; NCSSES (applied data analytics training through Coleridge Initiative)

Key takeaway: Although some agencies did not indicate data science training opportunities, overall, the record is impressive given the relative newness of the field (the term “data scientist” was coined in 2008, degree programs are relatively new) and that training budgets are always stretched and often scaled back under budget pressures.

New blood (from the outside). There are many ways for an agency to refresh its innovation capabilities from the outside —interagency personnel agreements (IPAs), fellowships, and internships bring in junior to senior people for limited but significant periods; cooperative agreements typically bring university scientists together with agency staff to collaborate on projects (as distinct from contracts, which allow less room for experimentation). Fewer than half the agencies, however, reported using these kinds of vehicles.

- BLS offers ASA/NSF/BLS fellowships (one to two people per year from academia).
- The Census Bureau has significant numbers of interns, fellows, university fellows; it recruits senior experts on IPAs for three-year terms as associate director for research and methodology, a senior executive position.
- ERS has ~100 cooperative agreements with universities.
- NASS has cooperative agreements for research on small-area estimation, precision agriculture, differential privacy, and data integration.
- NCSES participates in the Oak Ridge fellows program and broad agency announcements (NSF BAAs) for research.

- SOI has a Joint Statistical Research Program that pairs academic scientists with staff.

Key takeaway: Fellows, interns, IPAs, and cooperative agreements are costly for an agency but have resulted in adoption of innovative practices. Greater use of these vehicles by more agencies would likely promote innovation. Giving “reverse fellowships” that place agency staff with research and data user organizations is also valuable, although that has been used less frequently and mostly at larger agencies such as the Census Bureau.

Collaborative projects (with other agencies).

- *Interagency entities:* All of the principal statistical agencies have seats on the Interagency Council for Statistical Policy (ICSP) and contribute core support to the Committee on National Statistics (CNSTAT) at the National Academies of Sciences, Engineering, and Medicine. Senior technical staff of BJS, BLS, BTS, the Census Bureau, ERS, NASS, NCES, NCHS, NCSES, and SOI currently sit on the prestigious Federal Committee on Statistical Methodology (FCSM). These entities facilitate cross-agency collaboration and innovation in federal statistics (see Box H-3).
- *Satellite accounts (SAs):*³ Many SAs are developed by BEA with other agencies. Examples include: Arts and Cultural Production SA (with National Endowment for the Arts, introduced in 2013); Digital Economy SA (with National Telecommunications and Information Administration, introduced in 2018); Health Care SA (with multiple agencies, introduced in 2015); Marine Economy SA (with National Oceanic Atmospheric Administration [NOAA], introduced in 2018); Outdoor Recreation SA (with multiple agencies, introduced in 2018); Travel and Tourism SA (with International Trade Administration, introduced in 1998).

³ The BEA system of core national accounts and satellite or supplemental accounts facilitates response to new policy interests and collaborative work with other agencies. Satellite accounts are linked to the main accounts but can provide additional detail and be more flexible in using alternative concepts, accounting conventions, and definitions.

- *Distributional statistics on household income and expenditures:* BEA, BLS, and the Census Bureau are collaborating on experimental series that decompose national account aggregates into household distributions—not just averages but medians and levels for the lowest to the highest 10 percent.
- *Statistics with race and ethnicity detail:* SOI and the Census Bureau are collaborating on estimates of adjusted gross and taxable income by race and ethnicity. NASS is part of a USDA team to add race and ethnicity detail to statistical series.
- *Expanded data on the workforce:* NCES and NCSES are collaborating on a new (first fielded in 2022 with data release scheduled for July 2024) National Training, Education, and Workforce Survey (NTEWS), conducted by the Census Bureau. BLS and the Census Bureau are collaborating on modernizing the monthly CPS—the basis for the unemployment rate.
- *Global data:* BEA and NCSES are collaborating on estimates of global value chains. BLS and BEA are collaborating on integrated estimates of foreign direct investment in the United States.
- *Conceptually improved poverty measure:* BLS and the Census Bureau collaborated to produce Supplemental Poverty Estimates that update the 1960s methodology used to calculate the annual poverty rate and are published side by side with the official measure.

Key takeaway: The above are some of the examples of interagency collaborations reported or known to us that have led or promise to lead to improved statistics for public and policy use. Not all collaborations work as smoothly or as expeditiously as would be ideal but having different agencies involved undoubtedly helps ensure that important perspectives are heeded.

Staff viewpoint. The Federal Employee Viewpoint Survey (FEVS) each year asks staff to assess their workplaces, work experiences, supervisors, and agencies.⁴ Figure H-1 plots responses to Question 32 (percent strongly agreeing that creativity and innovation are rewarded) from 2010 to 2019 for three statistical agencies, BLS, the Census Bureau, and NASS/ERS, (Agriculture REE [Research, Education, Economics]) together with the Environmental Protection Agency (EPA), NOAA, and three space-defense research agencies, NASA Ames Research Center, Langley Research Center, and Center for Naval Research (CNR).⁵ Staff at the space-defense agencies agree their agency rewards innovation at higher rates than the other agencies (the sharp decline for CNR in 2014 coincides with a significant budget reduction). The other agencies while at lower rates do show an upward trend over the period.

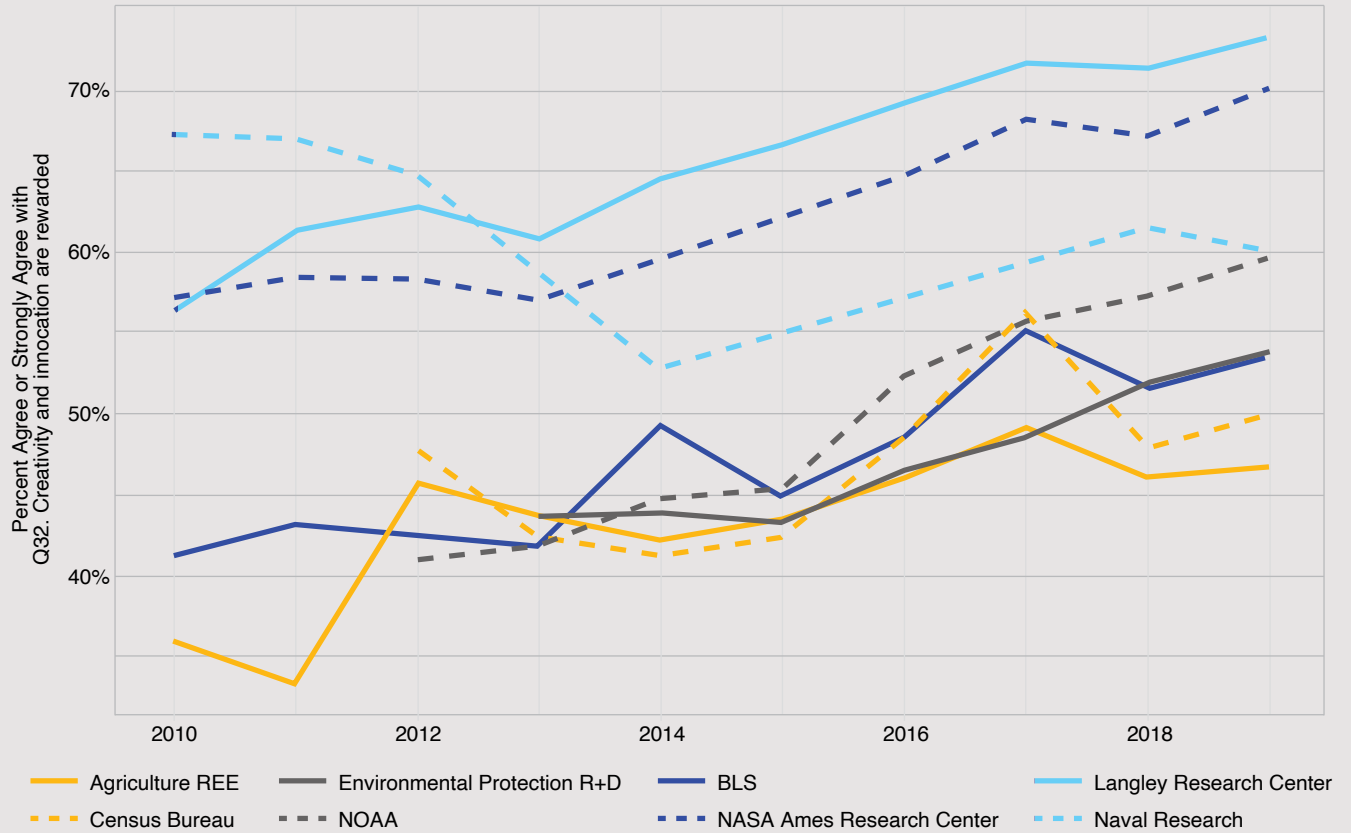
Key takeaway: Acknowledging the difficulty of specifying an “acceptable” or “high” percentage for staff perceptions that their agency rewards innovation, it appears that the percentage for the statistical agencies (and EPA and NOAA) is reasonable for production agencies compared to primarily research agencies; moreover, it is trending in a positive direction.

⁴ FEVS began in 2002 as the Federal Human Capital Survey and was administered to all federal employees every other year. Beginning in 2010, FEVS (renamed) is administered annually. It includes such questions as: “My work unit has the job-relevant knowledge and skills necessary to accomplish organizational goals” and “Employees are recognized for providing high quality products and services.” See [FEVS - OPM.gov](#).

⁵ The FEVS data are limited in availability for smaller statistical agencies, and question 32 has been discontinued.

FIGURE H-1

Percentages Who Agree or Strongly Agree That Their Agency Rewards Innovation and Creativity, Select Agencies, 2010–2019



SOURCE: Federal Employee Viewpoint Survey (FEVS), Question 32

For our subsequent assessments, we will consider other indicators of a strong culture of innovation, including agency strategic plans, outside reviews and agency responses to recommendations, and results from a Federal Data User Viewpoint Survey.

BARRIERS TO INNOVATION

Our assessment is that innovation is occurring in many important areas to improve the accuracy, timeliness, relevance, and granularity of federal statistics. That said, we have identified significant barriers to innovation by the principal federal statistical agencies that limit their current and potential future value-added—

- *Inadequate resources for continuous testing and improvement to long-standing series:* To change long-standing series, such as the monthly CPS measure of unemployment and the continuous Consumer Expenditure Survey, extensive testing to determine cost-effective changes that meet stakeholder needs and to prove in new processing systems before they go live is required. In turn, resources are required for testing, stakeholder dialogues, and production of estimates from the old and new series for a period of overlap, but such resources have historically been lacking. Agency leadership must also overcome inertia and risk aversion among both data users and agency staff.⁶ **Making continuous improvement of long-standing series part of a statistical agency's strategic plan with specific goals and timetables and requesting resources accordingly seem first steps toward keeping key series up to date. Authorizing multiyear use of funding for improvement of key series would be an important action—indeed, perhaps a game-changer—to enable sustained progress.**
- *Barriers to data sharing among agencies:* The Confidential Information Protection and Statistical Efficiency Act (CIPSEA), Title III of the Foundations for Evidence-Based Policymaking Act of 2018, authorized sharing of confidential administrative records among BEA, BLS, and the Census Bureau, which is essential to improved statistics about the economy and trends in social mobility, inequality,

and economic well-being. The Evidence Act has useful language that administrative records are to be available to statistical agencies, and the CHIPS and Science Act of 2022 establishes a National Secure Data Service pilot for linkages among datasets for evidence building research. Key to such statistics is the use of tax records. At present, selected data from business and personal tax records are available to the Census Bureau for statistical use, but the Census Bureau is not allowed to share any tax information with sister statistical agencies—even addresses of businesses (tax records are the source of addresses for nonemployer businesses). Appropriate access to tax records by statistical agencies,, and the ability to share tax records among agencies requires legislative changes to Title 26 of the U.S. Code. **Legislation to further permit data sharing (including tax records) among the principal statistical agencies (which must keep data confidential) is essential.**⁷

- *Difficulties in resourcing infrastructure improvements:* Statistical agencies (like other federal agencies) find it hard to obtain adequate resources for computing technology upgrades and modernization (e.g., moving to the cloud), making it hard to innovate and serve the nations' data needs. **Providing resources for statistical agencies to continuously upgrade their computing technology without taking away from other responsibilities should go without saying. Statistical agencies also need sufficient control over their IT resources to ensure confidentiality protection, the ability to meet data release deadlines, and the ability to serve the needs of their data users.**⁸
- *Insufficient staff in the chief statistician's office:* Sixty years ago, the chief statistician's office had upward of 40 staff; today, it has 12 staff positions supplemented by staff on short-term details from the statistical agencies. The unit is remarkably productive given its small size, but it lacks capacity to coordinate needed

⁶ See Supporting Materials: G for examples of long-standing data collection programs that have arguably lacked continuous improvement at the needed pace.

⁷ In contrast, Statistics Canada, which combines the equivalents of BEA, BLS, and the Census Bureau, has authority to use administrative data from any other agency for its household and business surveys. Statistics Canada has used administrative records to reduce respondent burden and improve accuracy, for example, in the Canadian Income Survey (see [Statistics Canada Policy on the Use of Administrative Data Obtained under the Statistics Act](#) and [Surveys and statistical programs – Canadian Income Survey – 2021 \(CIS\)](#)).

⁸ The proposed OMB regulation, "Fundamental Responsibilities of Recognized Statistical Agencies and Units" (published for public comment, August 18, 2023), includes language requiring parent agencies to support statistical agencies' abilities to produce relevant, timely, accurate, and objective statistics and protect respondents' confidentiality. The language specifically refers to computing technology, including websites and software. See [Federal Register: Fundamental Responsibilities of Recognized Statistical Agencies and Units](#).

innovation in topic areas (e.g., education, health, labor force, economic well-being) across agencies.

Adding staff with subject matter expertise in different policy areas in the chief statistician's office could help ensure that data gaps are filled and improvements are coordinated across relevant agencies and within OMB.

- Challenges to innovation and related data collection updates for smaller agencies, especially as measured by staff size: The 13 principal statistical agencies have budgets that vary for FY 2024 from \$1.4 billion to \$30 million with corresponding differences in staffing levels. The smaller agencies are constrained in what they can dedicate for staff training, outside expertise and perspectives, and other activities essential to innovation. It could help if, for example, the Census Bureau's (the largest federal statistical agency) training budget was mandated and resourced to serve all of the statistical agencies, or if a Federally Funded Research and Development Center (FFRDC) could be funded to do the same. Finding mechanisms to enable all of the statistical agencies to stay up to date in software tools, statistical methods, and the like is essential.

Finding: The principal federal statistical agencies have a rich history of meeting the nation's data needs through innovation—in concepts, collection, processing and estimation, dissemination, and evaluation (e.g., the first nondefense use of computers for the 1950 Census). Overall, they rose to the occasion when the Covid-19 pandemic called for new data delivered promptly. They continue to innovate but not at the level needed, and external and internal barriers, if not addressed, will leave them behind at a time when the demands for more timely, accurate, and granular data are growing every day.⁹

References for Further Reading

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⁹ The Committee on National Statistics added a fifth principle to the 7th edition of its widely cited publication, *Principles and Practices for a Federal Statistical Agency* (National Academies, 2021, p. 4): "Continual Improvement and Innovation—Federal statistical agencies must continually seek to improve and innovate their processes, methods, and statistical products to better measure an ever-changing world."

Statistical Agency Innovations During Covid-19

DATA COLLECTION

“Pulse” Surveys

Household Pulse Survey—The Census Bureau led a coalition of multiple federal agencies (including BLS, BTS, EIA, ERS, NCES, NCHS) that designed, had approved by OMB, and pushed out the Household Pulse Survey barely five weeks after the nationwide Covid-19 shutdown in spring 2020. From April 23–July 21, 2020, the survey collected data weekly using an internet questionnaire that asked about effects of the pandemic on mental health, employment, child care arrangements, food insecurity, and other topics. Subsequent phases used two-week data collection, followed by two weeks on and two weeks off collections, and currently continuous data collection. Question topics have changed as needed (e.g., asking about vaccination once Covid-19 vaccines were available and including questions about the infant formula shortage). Data are released two weeks after collection. The estimates have been useful to policymakers and the public, although they are appropriately labeled as experimental, given low response rates and representation issues. See [Household Pulse Survey](#).

Small Business Pulse Survey—The Census Bureau initiated the Small Business Pulse Survey in late April 2020 to provide near real-time information on the Covid-19 pandemic’s effects on U.S. small businesses (nonfarm single-establishment businesses with 1–499 employees). A year ago, this experimental weekly survey transitioned to the biweekly Business Trends

and Outlook Survey, which covers all nonfarm single-establishment businesses with at least one employee. See [Now That the Pandemic Emergency Has Ended, What’s Next?](#).

School Pulse Panel—The National Center for Education Statistics initiated the School Pulse Panel for the 2021–2022 school year (limited staff and contracting hurdles in the Department of Education prevented NCES from launching a school pulse survey similar to the household and small business pulse surveys in spring 2020). The 2021–2022 and 2022–2023 panels collected extensive data on the impact of the Covid-19 pandemic on students and staff in K-12 public schools. Beginning in 2023–2024, the survey collects a broader array of data, asking a sample of school principals each month about different topics (e.g., after-school programs, tutoring, school meal programs, student and staff mental health, school building facilities). See [School Pulse Panel](#).

Covid-19–Related Questions Added to Surveys

Monthly Current Population Survey—The Bureau of Labor Statistics contracts with the Census Bureau to conduct the monthly CPS—the source of unemployment estimates. From October 2022–November 2023, respondents were asked whether they worked from home in February 2020 (before the Covid-19 shutdown) and whether they worked at home more, less, or the same amount at the time of interview compared with February 2020. Respondents continue to be asked if they teleworked during

the survey week. See [Telework \(CPS\) : U.S. Bureau of Labor Statistics](#).

National Health Care Surveys (ambulatory care in physicians' offices, community health centers, hospitals; hospital care; long-term care; physicians' use of electronic health records)—The National Center for Health Statistics added questions to its National Health Care Surveys for the second half of 2020 and all of 2021 as appropriate (e.g., questions on telemedicine, shortages of personal protective equipment). See [COVID-19 Pandemic Impact on the National Health Care Surveys – PubMed](#).

DATA PROCESSING AND ESTIMATION

Vital Statistics—Covid-19 Deaths

The National Center for Health Statistics took quick action to make possible provisional daily updates for states and weekly updates for demographic groups, states, and counties of Covid-19 deaths. The estimates were released about one to two weeks after other data sources (four to five weeks during Covid-19 surges, as in December 2020) to ensure quality control of cause of death coding. Previously, provisional mortality data were released monthly or quarterly with a minimum three-month lag. NCHS developed guidance for death certification involving Covid-19, modified its processing systems, and developed machine-coding routines for Covid-19. Initially, 100% of certificates reporting Covid-19 had to be manually coded, falling to 20% by 2021. Most importantly, these daily updates continue after other sources (e.g., the Johns Hopkins Covid-19 database) have shut down. See [Advancements in the National Vital Statistics System to Meet the Real-Time Data](#)

[Needs of a Pandemic - PMC and Provisional Death Counts for Coronavirus Disease 2019 \(COVID-19\)](#).

Near Real-Time Spending

The Bureau of Economic Analysis began publishing weekly estimates of consumer spending by industry (gasoline stations, clothing stores, food and beverages, etc.) for the previous week on June 12, 2020 (the initial estimates extended back to February 2020). The estimates are based on aggregated credit card transactions, which BEA compares to expected spending levels prior to the pandemic. (BEA credits the Federal Reserve for the method.) The estimates are experimental, not necessarily representative of total spending in an industry, and have other limitations but are an early, frequently updated barometer of American spending. BEA has discontinued these estimates as of May 7, 2024, due to budget constraints.

[Near Real-Time Spending | U.S. Bureau of Economic Analysis](#).

Covid-19 Related Daily, Weekly, and Monthly Transportation Statistics

The Bureau of Transportation Statistics worked to develop new nearly real-time data sources on transportation and travel during the Covid-19 pandemic. It launched a website on August 4, 2020, with such experimental data series as [Daily Travel During the COVID-19 Pandemic](#) (updated weekly with a two-week lag, available for states and counties, based on anonymized cell phone data) and [Docked Bikeshare Ridership](#) (updated monthly for systems with docking information). The page also linked to [The Week in Transportation and Monthly Transportation](#)

Statistics, along with one-time reports, such as 4th of July Travel, 2020 vs. 2019. See [BTS Offers COVID-19 Related Daily, Weekly and Monthly Transportation Statistics](#).

DATA DISSEMINATION

Web Pages Specific to Covid-19

Census Covid-19 Data Hub—The Census Bureau launched a page on its website on April 23, 2020, to bring together data and analyses to help communities, businesses, and policymakers track the socioeconomic impacts of Covid-19. The page linked to data, articles, and visualizations from the American Community Survey, the Household and Small Business Pulse Surveys, Weekly Business Formation Statistics, Monthly State Retail Sales, and other datasets. The page ceased being updated in April 2023 when the Covid-19 national emergency officially ended. See [Census COVID-19 Data Hub](#).

Publications Specific to Covid-19

Monthly Labor Review (MLR)—BLS has published the MLR since 1915 (articles are published online as soon as they are ready). From April–December 2020, it published nine articles on Covid-19 effects on labor markets, earnings, prices, etc.—the first such article (“How many workers are employed in sectors directly affected by Covid-19 shutdowns, where do they work, and how much do they earn?”) appeared April 16, 2020. See [Covid-19: U.S. Bureau of Labor Statistics](#).

Today in Energy—EIA has published articles every weekday since February 2011 on energy markets—supply, demand, prices, etc.—in *Today in Energy*. It published the first article on Covid-19 impacts on energy availability and use March 27, 2020. From April–December 2020, as many as four or five articles a month addressed Covid-19 effects (examples include “COVID-19 mitigation efforts result in the lowest U.S. petroleum consumption in decades” [April 23, 2020]; “As lockdowns eased in May, gasoline demand increased and jet fuel continued to fall” [August 13, 2020]). See [Today in Energy](#).

Selected Recent Statistical Agency Innovations

CONCEPTS AND TOPICS

Global Value Chains (BEA, NCSES)

BEA is developing data to shed light on global value chains (GVCs)—complicated supply chains that link multiple countries to produce a good or service • As an example, design, marketing, and software for Apple products are United States-based, while the hardware includes parts from many companies and countries (including the United States) • First prototype data released December 2021 on trade in value added (TiVA) (contributions of U.S. companies to U.S. exports) back to 2007 • Data can answer such questions as the percent of domestic inputs in a U.S. industry’s exports or how U.S. industries contribute to other countries’ GVCs • NCSES is collaborating with BEA to develop more detailed TiVA estimates for science and technology industries • Figure H-2a shows that domestic content dominates U.S. exports. See [Global Value Chains](#).

DATA COLLECTION

National Hospital Care Survey Linkages (NCHS)

NCHS has linked several administrative records datasets to its National Hospital Care Survey (NHCS) data for 2014 and 2016, greatly expanding their analytical value • Datasets linked include: National Death Index for 2014–2017; Medicare data for 2014–2017; Medicaid data for 2015–2017 (2016 NHCS only); 2013–2016 HUD Housing Assistance Program data; VA files through 2020 (2016 NCHS only) • Linked data accessible in secure NCHS Research Data Center

- “Feasibility” files available to determine if enough sample cases of interest
- Articles already published that illustrate utility of linked files
- Example: Deaths from pneumonia among ICU versus general hospital patients. See [NCHS Data Linkage - National Hospital Care Survey Data](#).

DATA PROCESSING AND ESTIMATION

Household Distribution of Personal Income (BEA)

Revival of series discontinued in 1970s • Great Recession triggered renewed interest in distributions and not just aggregate totals or averages • First estimates released in March 2020 • Updated each December with full data for the release year minus two and provisional estimates for the release year minus one • Estimates available back to 2000 • State estimates added in October 2023 • Method assigns BEA aggregates for components of personal income to households in the CPS ASEC • Figure H-2b compares means and medians. See [Distribution of Personal Income](#).

Business Formation Statistics—Monthly and weekly estimates for states (Census Bureau)

Initiated on an experimental basis in 2018 with quarterly estimates (monthly estimates replaced quarterly in January 2021) • Weekly estimates released beginning April 2020 • Annual estimates available for counties • Became a standard data product in December 2021 • Method developed in collaboration with Federal Reserve and Universities of Maryland

and Notre Dame • Applications for an Employer Identification Number (EIN) on IRS Form SS-4 are linked to the Census Bureau’s Business Register and Longitudinal Business Database to determine when the business first has payroll or employment • Figure H-2c shows drop and subsequent spike in business formation over the Covid-19 pandemic. See [Weekly Business Formation Statistics](#).

Adult Literacy Estimates for States and Counties (NCES)

Developed in response to user demand for subnational estimates • National estimates of low literacy adults are 14–15% • Models constructed to predict percent adults lacking Basic Prose Literacy Skills in the 2003 National Assessment of Adult Literacy (NAAL) and the 1992 National Adult Literacy Survey (NALS) • NAAL had additional sample for 6 states; NALS for 11 states • Models used state-level estimates of low literacy where available plus variables from the 2000 and 1990 Censuses, including educational attainment, race/ethnicity, foreign-born status and poverty (2003 model only), and native-English-speaking status (1992 model only) • Figure H-2d shows the 12 states with the lowest percentages of adults lacking basic prose literacy skills in 2003 and the 12 states with the highest percentages; note the wide confidence intervals. See [State and County Literacy Estimates](#).

DATA DISSEMINATION

Just the Stats (BJS)

Timely web-based series of one or two key indicators from one of BJS’s datasets • Announced October 2022 • Subscribers to JUSTSTATS get alerts when these brief reports (downloadable as PDFs) are released • First report, Carjacking Victimization, 1995–2021 (released October 2022) • Most recent report, Data Breach Notifications and Identity Theft, 2021 (released January 2024) • Figure H-2e shows a graph from a report on Covid-19 effects on arrests, charges, and initial hearings. See [BJS announces new report series, Just the Stats and Search Publications](#) | [Bureau of Justice Statistics](#).

The Opportunity Project (TOP) (Census Bureau)

Housed in Census Open Innovation Labs • Staff help federal agencies enlist companies, nonprofits, and universities to use public data to solve specific problems in 12-week “sprints” through development of digital tools • Launched in 2016 • Exemplar project: State Department and Wilson Center on reducing plastic waste in oceans • TOP products included [Ocean Plastics Story Map](#), Esri: storytelling with newly compiled data sets • [Georgetown University Campus Plastic Initiative](#), Georgetown University Beek Center: tracking plastic pollution on college campuses and educating students on its impact, led to creation of a Georgetown student organization and greater emphasis on reduction of plastic pollution on campus • [The Ghost Gear Project](#), Harvard University Institute of Politics: visualizing the location of ghost fishing gear at sea with accompanying mitigation techniques. See [The Opportunity Project](#).

Crop Condition and Soil Moisture Analytics Tool (Crop-CASMA) (NASS)

Provides access to high-resolution NASA data on soil moisture in user-friendly format

- Developed by NASS in collaboration with NASA and George Mason University •

- Released March 2021 • NASS analysts use the data in weekly Crop Progress Reports

- Available for farmers, researchers, and students to map, download into models, and use in other ways • Resolution of raw data is 20 miles (about the size of a county) •

- Includes a method to estimate at a resolution of three-fifths of a mile • Figure H-2f shows wet and dry areas of the United States for January 22, 2024. See [NASA Data Powers New USDA National Agricultural Statistics Service Soil Moisture Portal](#).

FIGURE H-2a

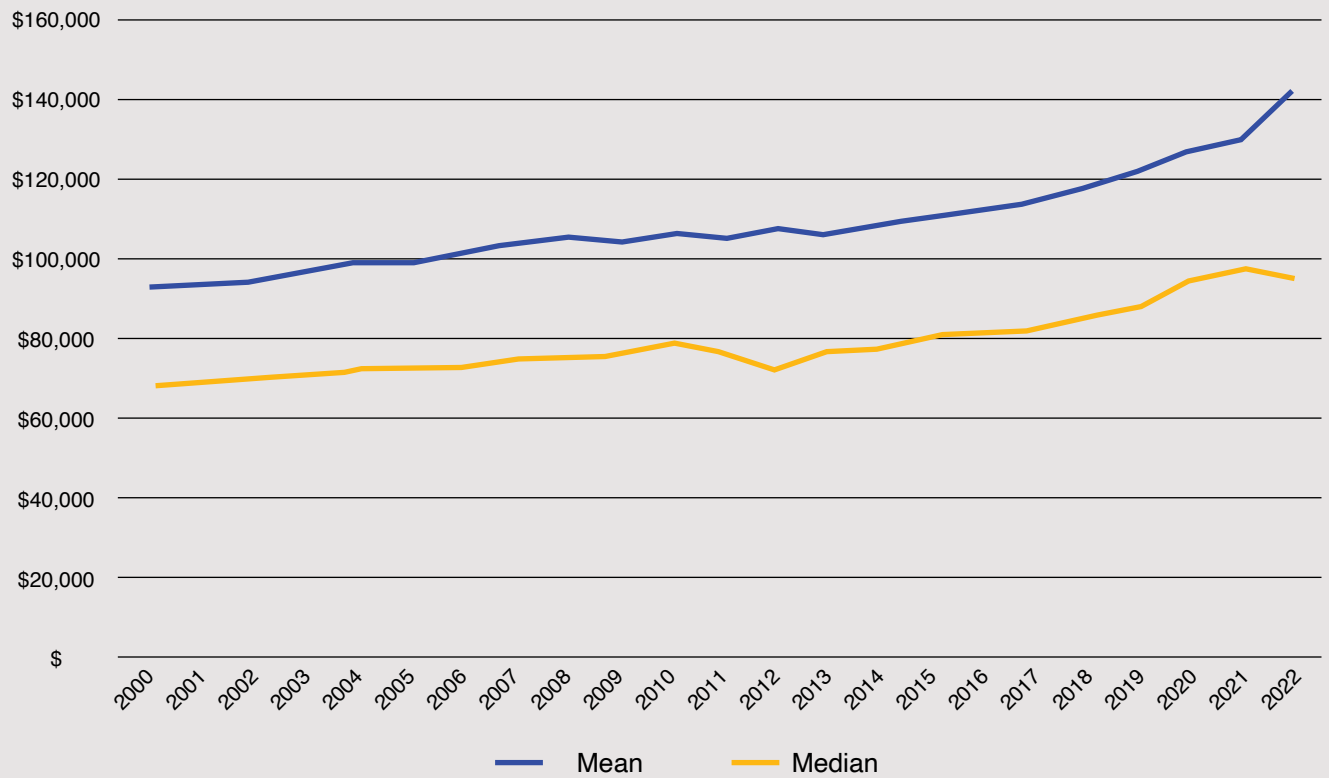
Trade in Value Added (TiVA), 2007–2021



SOURCE: [Global Value Chains | U.S. Bureau of Economic Analysis \(BEA\)](#)

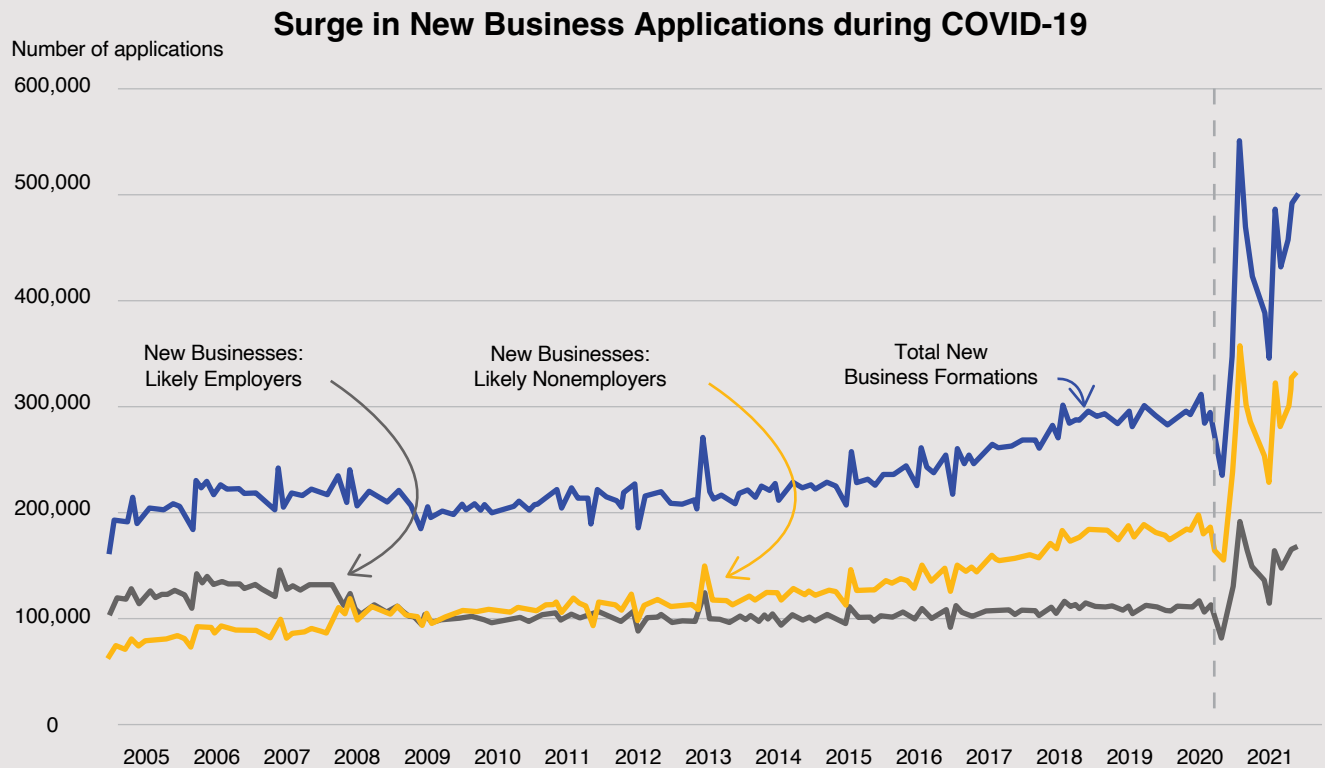
FIGURE H-2b

Household Real Disposable (After-tax) Personal Income, Means and Medians, 2000–2022 (2017 \$)



SOURCE: Bureau of Economic Analysis (December 2023 Update); 2022 data are provisional; households are equivalized for size; [Distribution of Personal Income](#)

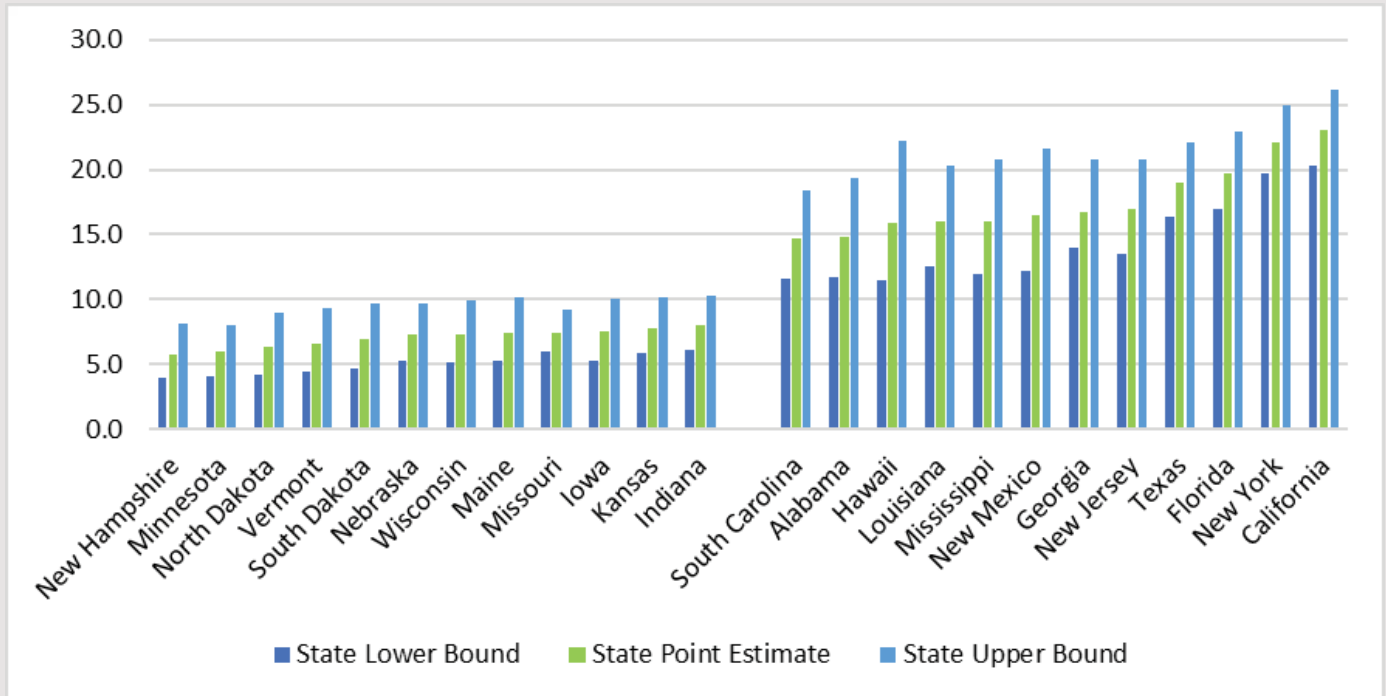
FIGURE H-2c
Weekly Business Applications, 2004–early 2021



SOURCE: Researcher's calculations using Census Bureau data. John C. Haltiwanger (June 2021). Entrepreneurship During the COVID-19 Pandemic: Evidence from the Business Formation Statistics. NBER Working Paper 28912. <https://www.nber.org/papers/w28912>

FIGURE H-2d

Percentage Adults Lacking Basic Prose Literacy Skills, 12 Lowest and Highest States, with Confidence Intervals Shown, 2003

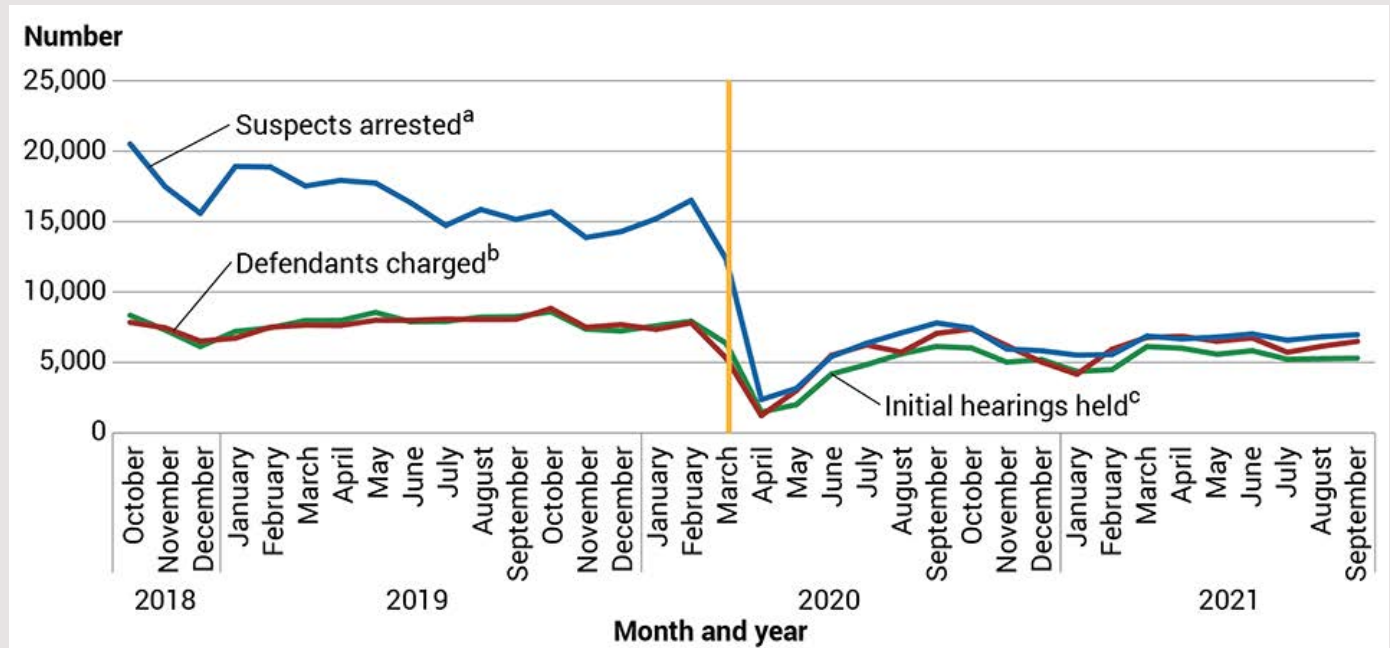


NOTE: District of Columbia excluded.

SOURCE: National Center for Education Statistics; [State and County Literacy Estimates - State Estimates](#)

FIGURE H-2e

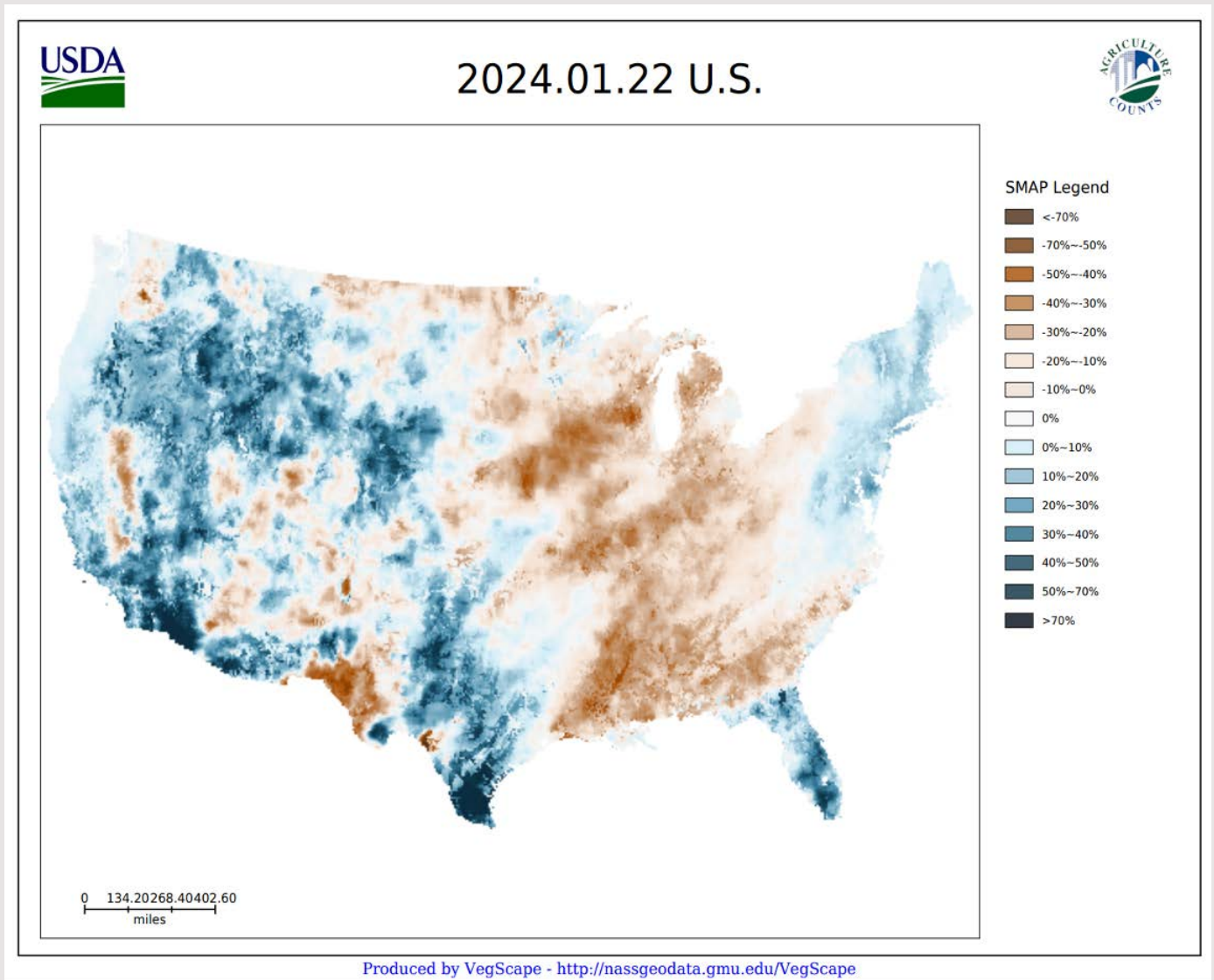
Impact of Covid-19 Shutdown (yellow vertical line) on Arrests, Charges, and Initial Hearings Held, Federal Courts, FY 2019–FY 2021



SOURCE: [Federal Pretrial Release During the Coronavirus Pandemic, Fiscal Years 2019–2021 | Bureau of Justice Statistics](#); published January 2024 (see website for footnotes to graph)

FIGURE H-2f

Crop Condition and Soil Moisture Analytics, United States, January 22, 2024



SOURCE: *Crop-CASMA*

Coordinating Bodies for Federal Statistics that Facilitate Innovation

Interagency Council on Statistical Policy (ICSP)

Established as advisory to chief statistician in 1989 • Provided for in 1995 reauthorization of Paperwork Reduction Act • Consisted of heads of principal statistical agencies, chaired by chief statistician • Expanded by Foundations for Evidence-Based Policymaking Act of 2018 to include statistical officials in all departments and heads of recognized statistical units (30 members) • Meets monthly, establishes subcommittees as needed: e.g., American Community Survey subcommittee; Standard Application Process (for FSRDCs) Governance Board; FSRDC Executive Committee • ICSP Mentoring Program furthers professional growth of participants and encourages connections across the statistical system. See [About Us - StatsPolicy](#).

Federal Committee on Statistical Methodology (FCSM)

Founded in 1975 by chief statistician's office to assist in setting and coordinating statistical policy • Serves as a resource on statistical policy issues and to provide technical assistance and guidance on statistical and methodological issues • Sponsors regular conferences (in partnership with the Council on Professional Associations

on Federal Statistics) • Writes guidance on best methods and practices for data quality measurement, confidentiality protection, other topics • Creates subcommittees and interest groups on relevant topics • Chief statistician appoints FCSM chair • FCSM members are career federal employees selected by OMB based on individual expertise and interest in statistical methods • Members (23 currently) serve for three-year, renewable terms. See [FCSM Home](#).

Committee on National Statistics (CNSTAT)

Established at National Academies of Sciences, Engineering, and Medicine in 1972 • Works to improve statistical methods and information for public policy • Holds convening functions, maintains close contact with chief statistician and ICSP • Releases new edition every four years of *Principles and Practices for a Federal Statistical Agency* (cited in Statistical Policy Directives, by GAO, and on agency websites) • Carries out studies on specific programs and agencies and system-wide studies, including *Transparency in Statistical Information for the National Center for Science and Engineering Statistics and All Federal Statistical Agencies (2022)* and *Toward a 21st Century National Data Infrastructure* (three reports, 2023–2024). See [Committee on National Statistics | National Academies](#).

Historic Statistical Agency Innovations

CONCEPTS AND TOPICS

National Income and Product Accounts (NIPAs)—BEA

Developed by National Bureau of Economic Research (NBER) and the Commerce Department • 1934: National Income, 1929–1932 • 1947: First full NIPAs • Complete, consistent double-entry accounting system • Transactions among households, businesses, government, and international • Monthly personal income and expenditures and quarterly GDP are Principal Federal Economic Indicators • Satellite accounts used for more detail and experimental methods for particular sectors (e.g., Digital Economy)

More information: [Concepts and Methods of the U.S. National Income and Product Accounts; Incorporating Satellite Accounts](#)

National Assessment of Educational Progress (NAEP, aka “The Nation’s Report Card”)—NCES

First fielded on trial basis in 1969 • “Long-term trend NAEP” uses consistent content to assess students ages 9, 13, and 17 (every 4 years from 1971 [reading]–1973 [math]) • “Main NAEP” changes content every 10 years to keep up with curricula and assesses 4th, 8th, and 12th graders (varying frequency from 1990 [math]–1992 [reading]) • Main NAEP sample increased in

1990 to provide state estimates • Congress in 2002 funded selected urban school districts to participate in main NAEP • Additional subjects assessed periodically (e.g., science, art, U.S. history)

More information: [The Nation's Report Card](#)

National Crime Victimization Survey (NCVS)—BJS

First fielded 1973 • Crimes reported by victims (more than reported to police) • School Crime Supplement added 1989 • Police Public Contact Supplement 1996 • Supplemental Victimization Survey 2006 • Identity Theft Supplement 2008 • Supplemental Fraud Survey 2017

More information: [National Crime Victimization Survey \(NCVS\) | Bureau of Justice Statistics](#)

Supplemental Poverty Measure (SPM)—Census Bureau with BLS

Built on landmark 1995 CNSTAT report, *Measuring Poverty: A New Approach* • New York City adopted report’s approach 2008 • Interagency Working Group issued guidance for SPM 2010 • First published 2011 • Official poverty measure (OPM) accounts for earnings, property income, cash transfers • SPM adds taxes, tax credits, in-kind benefits • SPM (not OPM) showed impact of expanded Child Tax Credit and its expiration on child poverty • 2023 CNSTAT report recommended improvements to the SPM

More information: [Supplemental Poverty Measure](#)

DATA COLLECTION

Probability Sampling—Census Bureau

Obtains accurate data at substantially less cost and respondent burden than a census • Introduces error (sampling variability) but that error can be estimated • First used by the federal government in the 1930s • Proved its worth in 1937 Census of Unemployment when a 2% sample gave a better estimate than an attempt to reach everyone • Used for six new questions in the 1940 Census, two-fifths of questions in 1950 Census • 1960–2000 censuses asked most questions on “long-form” sample, which became the American Community Survey in 2005 • Census Bureau statisticians made seminal contributions to theory and practice • Ubiquitous in the public and private sectors, although declining response undercuts value

More information: [Revolution in United States Government Statistics, 1926-1976 - Joseph W. Duncan, William Chastain Shelton](#)

Cognitive Questionnaire Testing—NCHS, BLS, Census

New field introduced in 1980s by survey methodologists working with psychologists • Jump-started by interdisciplinary workshop convened by CNSTAT • Known as cognitive aspects of survey methodology (CASM) • Involves one-on-one work with respondents, focus groups, and similar means to determine respondents’ understanding of a questionnaire, which may not square with the intended meaning • NCHS established first statistical agency cognitive laboratory for questionnaire testing and improvement in 1985, followed by

BLS in 1987, and the Census Bureau in 1988 • Other agencies and private sector surveys regularly engage in CASM-type questionnaire testing

More information: [Interagency Collaboration among the Cognitive Laboratories: Past Efforts and Future Opportunities](#)

Longitudinal Surveys—BLS, NCES

Longitudinal surveys follow samples of people over time to measure individual development • They contribute unique research insights and survey methods innovations (see Box H-A1) • BLS began its National Longitudinal Surveys of Labor Force Behavior (NLS) in 1966–1968 with cohorts of young men (1966-1981), older men (1966–1990), older women (1967–2003), and young women (1968–2003) • Youth cohorts begun in 1979, 1994, 1997 are continuing • NCES began its longitudinal surveys of students in 1972 with NLS-72 (high school seniors, 1972–1986) and HS&B (high school sophomores and seniors, 1980–1993) • These and subsequent surveys measure students’ academic, social, emotional, and physical development and characteristics of their homes, classrooms, and schools

More information: [NLS Cohorts \(Active\) : U.S. Bureau of Labor Statistics; Introduction to the NCES Longitudinal Studies: 1972-2020](#)

DATA PROCESSING AND ESTIMATION

Computer Processing of 1950 Census—Census Bureau

From desperation (so many people in a growing nation), Census innovated tabulating machines beginning with 1870 Census • Punch card tabulator (invented by former Census employee Herman Hollerith—his company became IBM) used in 1890 Census • Census commissioned first electronic computer for civilian use, UNIVAC I (now in the Smithsonian), in late 1940s • Arrived in time to assist 1950 Census processing

More information: [Tabulation and Processing - History](#)

Correcting Undercount in the Agriculture Census—NASS

Well known that Census of Agriculture (conducted every five years) was incomplete, capturing most of the value of agricultural production but missing small farms • Working with statisticians at NISS, NASS adopted “capture-recapture” methods (see Data Evaluation and Testing section below) to correct each census beginning in 2012 (corrections also adjust for nonresponse and misclassification) • 2017 Census missed about 25% of the smallest farms and 2% of the largest small farms before correction • Completeness for farms important for allocating federal agriculture funds to states

More information: [Census of Agriculture Methodology](#)

Model-Based Small-Area Estimation—Census Bureau

Expensive to collect survey data for accurate estimates for small geographic areas • More accurate estimates often possible using survey results with models and additional variables • Census used “borrowing strength” models in late 1970s to improve per capita income estimates for small local governments to allocate General Revenue Sharing funds • 1994 legislation required updated county and school district estimates of poor school-age children to allocate Title I education funds for disadvantaged children • Census developed Small Area Income and Poverty Estimates (SAIPE) program • SAIPE pools model estimates using such variables as Supplemental Nutrition Assistance Program (SNAP) enrollments with survey results to produce estimates that are more reliable than either source alone

More information: [Small Area Income and Poverty Estimates \(SAIPE\) Program](#)

DATA DISSEMINATION

Electronic Data Products Beginning with 1960 Census—Census Bureau

Introduction of computers for census processing led to dissemination of public use electronic data products • Helped by interest and funding from outside sources, Census made available 1960 Census summary files (tabulations) and a 1/1000 public use microdata sample (PUMS) with identifying information removed and geographic

identification only for states • 1970 Census greatly expanded number and scope of summary and PUMS files, which became planned-for census data products • Availability of files spawned an industry of academic centers and companies acquiring and adding value to census electronic products • IPUMS at University of Minnesota created PUMS files for censuses from 1850–1950 using census records in National Archives

More information: [Technology - History](#); census procedural histories at [Publications - Demographic - History](#)

Secure Research Access to Confidential Data—NCES, Census Bureau

PUMS files from population censuses and surveys are invaluable but limited (e.g. income is top-coded) for confidentiality protection; they cannot be released at all for economic censuses and surveys • Census Bureau (beginning in 1982) and other agencies allowed researchers to access confidential data on-site as special sworn employees • NCES pioneered in 1991 licensing researchers to securely house confidential data at their institutions • Census Bureau established secure sites (Research Data Centers) beginning in Boston in 1994 • In 2016 RDCs rebranded as Federal Statistical Research Data Centers (FSRDCs) • FSRDCs provide access to data from many statistical agencies through a Standard Application Process (SAP) mandated in the Foundations for Evidence-Based Policymaking Act of 2018 • 33 FSRDCs currently in 22 states

More information: [Statistical Standards Program - Restricted Use Data Licenses; Federal Statistical Research Data Centers](#)

DATA EVALUATION AND TESTING

Dual-System Estimation of Census Coverage—Census Bureau

Well known that censuses include errors—some people missed, others counted wrongly or more than once, but how much? which groups? • Demographic Analysis assesses net undercount (omissions minus erroneous inclusions) nationally by sex, age, Blacks, and all others • Dual-System Estimation (DSE) with Post-Enumeration Survey (PES) provides more detailed estimates • First used in 1980 Census • Determined not timely or accurate enough to adjust census results but important assessment tool • Developed from “capture-recapture” methods in wildlife surveys (e.g., catch, tag, throw back into lake a sample of fish; catch again; see how many of second catch have tags; use algebra to estimate total number fish in lake) • Independent PES and census are the two catches; matched and followed up to determine people counted in both and missed in one or the other; algebra gives total population

More information: [2020 Census Data Quality](#)

Selected Findings from BLS and NCES Longitudinal Surveys

BLS NLSY79 and NLSY97*

- ✓ Head Start, the federal preschool program, improves educational outcomes all the way through college and deepens social, emotional, and behavioral development into adulthood.
- ✓ Four-year college attendance increased slightly among the 1997 cohort (youths born in the early 1980s) versus the 1979 cohort (youths born between 1957–1964), and the younger cohort saw a striking leap in two-year college attendance.
- ✓ The long-term value of employment for teens has declined. Teens who worked 20 or more hours a week in the 1980s enjoyed a 9% increase in their lifetime wages, compared to a 4% gain for later generations of teens.

NCES NLS:72, HS&B, NELS:88, and ELS:2002**

- ✓ For young adults two years out from high school graduation, 62% were enrolled in college in 2006 versus 40% in 1974.
- ✓ Among those who had not expected to go beyond high school, 22–28% were neither in school nor working for pay two years after graduation compared with 4–6% of those who expected to obtain a graduate or professional degree.
- ✓ Living with parents two years after high school graduation was more common the less educated the parents: 57% lived with parents when the parents had a high school or less education in 2006 (43% in 1974) compared with only 29% who lived with parents when the parents had a graduate or professional degree in 2006 (30% in 1974).

* National Longitudinal Survey of Youth 1979 | NORC at the University of Chicago

** Trends Among Young Adults Over Three Decades, 1974–2006

Data Quality

Federal statistical agencies exist to provide high-quality information to policymakers and the public. Although quality information is traditionally defined as accurate information with little error, it means much more.

According to the Federal Committee on Statistical Methodology (FCSM), data quality has 11 dimensions grouped within 3 domains—see Box G-1. Foundational documents for statistical agencies—the Foundations for Evidence-Based Policymaking Act of 2018 (Evidence Act) and *Principles and Practices for a Federal Statistical Agency* (see Supporting Materials: D)—single out 5 dimensions closely related to those from the FCSM framework:

- ✓ *Relevance.* Are the data useful for current policy, planning, and research purposes? As an example, information on harness makers but not car part manufacturers would not meet this test.
- ✓ *Timeliness.* Are the data produced soon after they are collected and on a frequency (monthly, annual, etc.) that users require?
- ✓ *Accuracy, reliability, and impartiality.* Do the data measure what they purport to measure? Are data errors (e.g., variability due to sampling or bias due to differences in nonresponse among groups and areas) well contained, and are the methods chosen to produce the data impartial?
- ✓ *Credibility.* Are the data adequately explained and documented so users are assured that they were collected using sound methods and that the choice of methods was not politically driven?
- ✓ *Confidentiality.* Are the data adequately protected against reasonable disclosure risks in a manner that preserves data utility and accessibility, acknowledging that confidentiality protection always impairs data quality to some extent?

Box G-1

FCSM Data Quality Framework

UTILITY—Relevance, accessibility, timeliness, punctuality, granularity

OBJECTIVITY—Accuracy and reliability, coherence

INTEGRITY—Scientific integrity, credibility, computer and physical security, confidentiality

SOURCE: A Framework for Data Quality, https://www.fcsm.gov/assets/files/docs/FCSM.20.04_A_Framework_for_Data_Quality.pdf

With limited resources, we could not undertake a comprehensive review of data quality attributes across the principal statistical agencies. Such an endeavor would be a herculean job, given the volume of federal statistics and statistical programs and that key quality indicators (e.g., response rates) are not uniformly accessible or even available on every agency’s website. For this assessment, we focused on three challenges to data quality where there are also opportunities to improve quality. The challenges are (a) declining survey response rates, which can increase error; (b) long-running data series becoming out of date; and (c) increasing threats of disclosure risk or privacy loss leading statistical agencies in some instances to reduce data availability and

usability. Opportunities for improvement include blending survey data with other data sources to bolster accuracy and relevance of estimates; obtaining resources for investment and multiyear funding authority to make timely changes to long-running data series; and legislation and other actions to promote a better balance of confidentiality protection and data accuracy and accessibility. Our investigation of these three areas, summarized in the main report, yielded three findings. The main report also describes threats to credibility and objectivity from undue political influence.

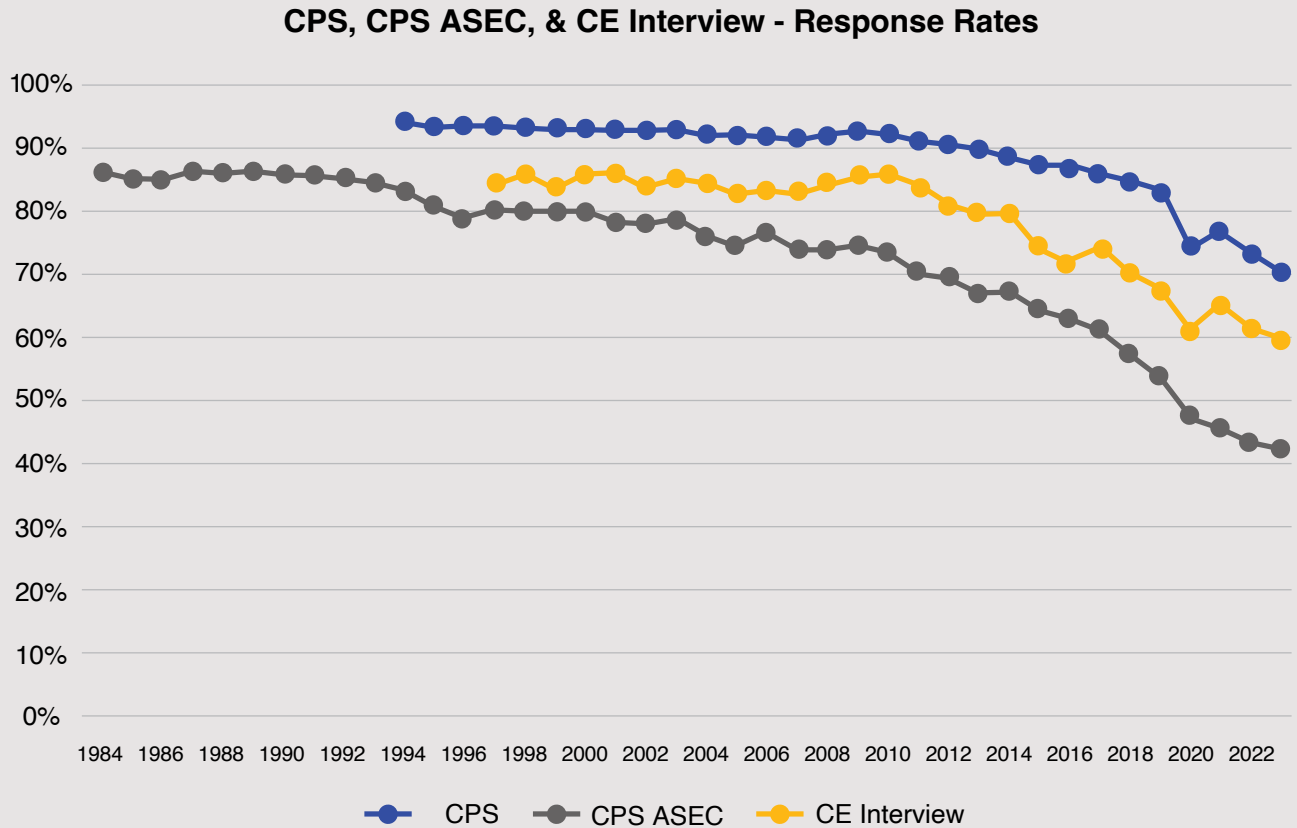
DECLINING SURVEY RESPONSE

Survey responses many years ago were uniformly high, but those days are long gone. One study estimated that refusals and noncontacts (nonresponse) in government surveys here and abroad increased 2 percent every three years from the mid 1980s through the late 1990s (de Leeuw and de Heer, 2002; see also National Research Council, 2013b). Bearing in mind that federal surveys generally get higher rates of response than commercial surveys, Figure G-1 shows a significant acceleration of nonresponse rates in the last 10–15 years for three major household surveys—the Bureau of Labor Statistics (BLS) Current Population Survey (CPS), used for monthly unemployment rates; the Census Bureau CPS Annual Social and Economic Supplement (CPS ASEC), used for annual income, poverty, and health insurance rates; and the BLS Consumer Expenditure Survey (CE), used for annual expenditure estimates. Response rates have also declined for business surveys and for other household surveys—see Figure G-2 for response rates for

the Bureau of Justice Statistics (BJS) National Crime and Victimization Survey (NCVS) household and person interviews and the National Center for Health Statistics (NCHS) National Health Interview Survey (NHIS) household and sample adult interviews as illustrations. These patterns of nonresponse occur worldwide and affect surveys on a wide range of topics. Reasons are not clear, although the saturation of the public with surveys and, for telephone surveys, the ubiquity of cell phones, which can block and filter calls more readily than landlines, likely contribute to nonresponse. For federal government surveys, increasing distrust in government institutions may also play a role (see Box G-2).

FIGURE G-1

Household Response Rates for the Current Population Survey (CPS), CPS Annual Social and Economic Supplement (CPS ASEC), and Consumer Expenditure (CE) Interview Survey, 1984–2023

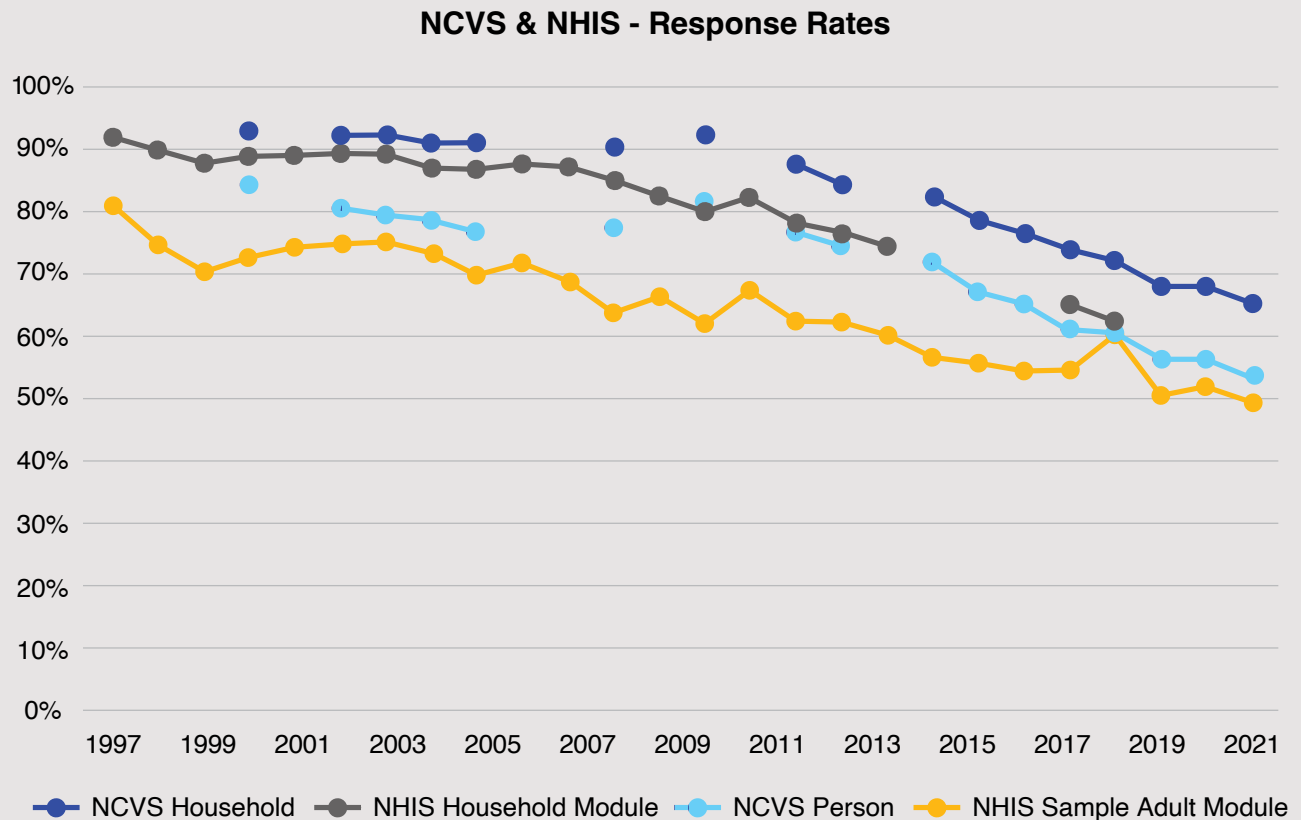


NOTE: Rates for the CE Interview Survey are for consumer units, which closely approximate households.

SOURCE: Rates compiled by Katherine Abraham and David Johnson from Census Bureau and BLS staff. (Response rates for the CPS and CE Interview Survey beginning in 2014 are available at: <https://www.bls.gov/osmr/response-rates/#chart1a>. See also https://www.bls.gov/cps/methods/response_rates.htm for CPS response rate concerns and steps that BLS and the Census Bureau are taking to improve response.)

FIGURE G-2

Response Rates for the National Crime Victimization Survey (NCVS) Household and Person Interviews and the National Health Interview Survey (NHIS) Household and Sample Adult Modules, 1997–2022



NOTE: The NCVS person and NHIS sample adult module response rates are unconditional; that is, they account for household nonresponse as well as person nonresponse within responding households. Cooperation rates (not shown) for persons (i.e., responding persons as a percentage of responding households) are higher than the household rates.

SOURCE: Rates compiled by Constance Citro from BJS and NCHS publications

BOX G-2.

Public Trust In Government 1958–2023

According to *Public Trust in Government: 1958-2023* | Pew Research Center:

Public trust in the federal government, which has been low for decades, has returned to near record lows following a modest uptick in 2020 and 2021. Currently, fewer than two-in-ten Americans say they trust the government in Washington to do what is right “just about always” (1%) or “most of the time” (15%). This is among the lowest trust measures in nearly seven decades of polling. Last year, 20% said they trusted the government just about always or most of the time....

In 1958, about three-quarters of Americans trusted the federal government to do the right thing almost always or most of the time. Trust in government began eroding during the 1960s, amid the escalation of the Vietnam War, and the decline continued in the 1970s with the Watergate scandal and worsening economic struggles. Confidence in government recovered in the mid-1980s before falling again in the mid-1990s. But as the economy grew in the late 1990s, so too did confidence in the government. Public trust reached a three-decade high shortly after the 9/11 terrorist attacks but declined quickly thereafter. Since 2007, the share saying they can trust the government always or most of the time has not surpassed 30%.

There is also evidence that people are less willing to answer all the questions on a survey than in the past. As one example, the CPS ASEC collects data each spring for estimates of poverty, health insurance coverage, median household income, and many other important aspects of economic well-being. Some people who answer the regular monthly employment questions on the main CPS do not answer any of the CPS ASEC questions. Some other people answer some but not all of the CPS ASEC questions. In particular, many people fail to report income they received, or they indicate a type of income but not the amount, or they provide an inaccurate amount. At present, over 40% of estimated income from the CPS ASEC is imputed rather than reported (compared to about 20% three decades ago).¹ Even with imputations, income from property and transfers is significantly underreported.

Although nonresponse may lead to reducing the target number of respondents, survey nonresponse does not necessarily indicate that estimates are biased in some way. Nonresponse often varies by population group and geographic area. To bolster response, statistical agencies have experimented with question design, messaging to respondents about the importance of their participation, and sophisticated procedures for weighting responses to the full population. They have also spent more money per case to increase responses. However, resources to increase response rates are limited. To date, survey response rates appear to be in a holding pattern at best.

¹ See https://www.bea.gov/system/files/2020-05/Rothbaum-BEA-5-15-20_0.pdf, slide 10. See also National Academies (2023d).

OPPORTUNITIES FOR BLENDED DATA

Opportunities abound, with sufficient resources and staff, to use administrative records and other data with survey responses to create “blended data,” with each source compensating for problems in the other source to generate higher-quality estimates. Committee on National Statistics reports outline and endorse this approach (National Academies, 2023b, c; 2024b). Here are a few examples:

- *National Experimental Wellbeing Statistics (NEWS)*—NEWS is a Census Bureau project to provide high-quality distributions of household income, using administrative records to correct for nonresponse and underreporting of income in the CPS ASEC. The first available estimates are for 2018 for money income (this concept excludes tax credits and in-kind benefits such as SNAP); they show (Bee, et al., 2023, Table 16) an increase of \$4,000 or 6 percentage points in household median income, mostly due to the use of administrative records for retirement and investment income for the elderly. The project could benefit from greater access by the Census Bureau to tax return data from SOI and state administrative records. If NEWS had additional resources, the program could make faster progress toward the goal of releasing production estimates of pre- and post-tax-and-transfer income for households every fall for the preceding calendar year.
- *Use of administrative records in the American Community Survey (ACS)*—The Census Bureau plans to use administrative records to replace the ACS question on property acreage and one or more income questions.² To facilitate use of income records, the Census Bureau is testing the previous calendar year as the reference period rather than the previous 12 months. This work is important to reduce respondent burden (which has led to complaints to Congress about the survey) but is proceeding at a slow pace.
- *Use of administrative records for health care provider data*—In 2012, NCHS replaced two surveys (the National Nursing Home Survey and the National Home and Hospice Care Survey) with administrative data from the Centers for Medicare & Medicaid Services (CMS) on the nursing home, home health, and hospice sectors. NCHS has also replaced surveys for inpatient rehabilitation facilities and long-term care hospitals with CMS administrative data. The use of administrative data has allowed NCHS to provide more frequent and more geographically detailed publications of the characteristics of these providers and service users, at modest costs, than was possible with the previous sample surveys. NCHS currently conducts surveys for adult day care and residential care communities because of the lack of comprehensive nationally representative administrative data for these types of care.³
- *Replacing import/export price data from surveys with administrative data*—BLS is in the process of replacing its survey-based import/export price data with administrative data from the Commerce Department. Response rates dropped substantially for the surveys during the Covid-19 pandemic, but the trade data from Commerce are proving to be a satisfactory substitute in many instances.⁴

² Barth, D. (2023, October 4). Using Administrative Records in the American Community Survey: Overview. FCSM Research and Policy Conference, College Park, MD. https://www.fcsm.gov/assets/files/docs/2023-conference-docs/C4.1_Barth.pdf

³ See NPALS 2022 Survey Methodology for the Adult Day Services Center and Residential Care Components, <https://www.cdc.gov/nchs/data/npals/NPALS-2022-survey-method-doc.pdf>

⁴ See MXP Research, <https://www.bls.gov/mxp/data/research.htm>

Finding: Surveys remain invaluable because some information (e.g., self-reported health or crime victimization) can only be obtained by asking people questions. Yet, declining response and rising costs to address the decline raise significant concerns for their future. As the Committee on National Statistics documents, opportunities exist to combine surveys with administrative records and other sources to improve quality, although there are challenges in properly blending data sources, accounting for the uncertainty in estimates from them, and using them for estimates when that was not their original intent. Statistical agencies will need adequate resources to evaluate and implement, as appropriate, blending approaches for the future and to continue research into ways to improve the cost-effectiveness of surveys. Congress, OMB, parent agencies, and statistical agencies can do more to support blended data programs, as appropriate. Some examples include supporting legislation to enable easier and more extensive data sharing; providing resources and staffing to make the most of multiple data sources and to redesign processing and publication systems to accommodate different data streams; and encouraging the cultivation of innovation within and among statistical agencies (see Recommendations in main body of report).

KEEPING LONG-RUNNING SURVEYS UP TO DATE—TIMELINESS AND FREQUENCY VS. RELEVANCE

What if federal agencies could provide unemployment and labor force participation data quarterly instead of monthly—being 2.5

months old rather than 3 weeks old when released? Markets, the Federal Reserve Board, Congress, and the executive branch would find shifting from monthly to quarterly unacceptable. Yet, this is the standard in many European Union countries (e.g., Belgium, Ireland, France, Croatia, Latvia, Poland, Slovenia, and Slovakia). In contrast, BLS issues unemployment and labor force participation rates every month like clockwork, with only a 3-week lag after data collection by the Census Bureau in the monthly Monthly CPS.⁵

Many other U.S. “principal federal economic indicators” are issued monthly for the preceding month (see Box G-3) by such agencies as NASS, BEA, BLS, and the Census Bureau. The EIA issues a weekly natural gas storage report every Thursday for the preceding Friday. In addition, NCHS provides continuously updated provisional estimates of deaths due to Covid-19 and other causes with about a 1-week lag and provisional estimates of births with about a 1-month lag. Other important social, economic, and demographic data are released annually for the preceding calendar year. Some examples include income, poverty, and health insurance coverage estimates from the CPS ASEC by the Census Bureau; food security estimates from an annual supplement to the CPS by the Economic Research Service (ERS), U.S. Department of Agriculture (USDA); and various health statistics from the NHIS by NCHS. In fact, NCHS has had an early release program since 2001 for key statistics from the NHIS, publishing quarterly estimates absent final data editing and weighting about four months after the reference quarter.⁶

⁵ The private sector produces some data series more frequently than the corresponding federal series, but often the private series depends on the federal series for representativeness, has less distributional detail, and is proprietary. For example, ADP develops proprietary weekly and public monthly estimates of nonfarm payroll jobs from its database of payroll processing clients. The ADP series uses BLS data to make the estimates more representative. The detail in the weekly and monthly series is less than the BLS monthly payroll job series. See ADP® Employment Report, <https://adpemploymentreport.com/>.

⁶ See NHIS Early Release Program, <https://www.cdc.gov/nchs/nhis/releases.htm>

Principal Federal Economic Indicators From Statistical Agencies

Bureau of Economic Analysis

Personal Income and Outlays—monthly for prior month

Gross Domestic Product—advance, second, and third estimates issued each month of a quarter

Corporate Profits—quarterly for prior quarter

U.S. International Trade in Goods and Services—monthly for two months' prior (joint with Census Bureau)

U.S. Imports for Construction of Steel Products—preliminary monthly (joint with Census Bureau)

U.S. International Transactions—quarterly for prior quarter

Bureau of Labor Statistics

The Employment Situation—monthly for the prior month

Producer Price Index—monthly for the prior month

Consumer Price Index—monthly for the prior month

Real Earnings—monthly for the prior month

Productivity and Costs—quarterly (preliminary and revised)

Employment Cost Index—quarterly for the prior month

U.S. Import and Export Price Indexes—monthly for the prior month

Census Bureau

Construction Put in Place—monthly for two months' prior

New Residential Construction—monthly for prior month

New Residential Sales—monthly for prior month

Monthly Wholesale Trade—monthly for two months' prior

Advance Monthly Retail and Food Services—monthly for prior month

Manufacturing and Trade: Inventories and Sales—monthly for two months' prior

Manufacturers' Shipments, Inventories, and Orders—monthly for two months' prior

Advance Report on Durable Goods—Manufacturers' Shipment, Inventories and Orders—monthly for prior month

Quarterly Financial Report, Manufacturing, Mining, and Wholesale Trade—quarterly for prior quarter

Quarterly Financial Report, Retail Trade—quarterly for prior quarter

Housing Vacancies—quarterly for prior quarter

Quarterly Services—quarterly for prior quarter

Energy Information Administration

Natural Gas Storage Report—weekly for the prior week

National Agricultural Statistics Service

Agricultural Prices—monthly for the prior month

Crop Production—monthly for the first of the month

Grain Stocks—monthly for the first of the month

Cattle on Feed—monthly for the first of the month

Hogs and Pigs—quarterly for the first of the month

Plantings—first half of March and June

NOTE: The Federal Reserve Board, Foreign Agricultural Service, and World Agricultural Outlook Board also release principal federal economic indicators.

SOURCE: Schedule of Release Dates 2024 ([whitehouse.gov](https://www.whitehouse.gov))

The track record of the principal federal statistical agencies in releasing key indicators month after month, quarter after quarter, year after year is virtually unblemished. In the 21st century, government shutdowns are the only cause for delayed release of monthly principal federal economic indicators—not the Great Recession or the Covid-19 pandemic.⁷

The U.S. economy and society depend on these key data series and additional detailed data from the statistical agencies. They often take for granted that tight schedules will be met with quality indicators. Informed decision-making is at risk should statistical agencies lack sufficient staff and budget to release key socioeconomic indicators and other important data series on a timely schedule as well as to continuously improve and modernize their series to keep pace with economic, social, and technological change.

Not all data are released on a timely basis. Even allowing that particularly complex surveys (e.g., the National Center for Science and Engineering Statistics (NCSES)'s longitudinal Survey of Doctorate Recipients) can legitimately take up to two years to produce data. There are surveys that have taken even longer, such as the National Survey of College Graduates (conducted by the Census Bureau for NCSES). Investigation would be required to determine the impact of factors such as inadequate funding and staffing, or bottlenecks in various stages of data production and analysis, which may reflect a lack of attention by the agency. Dramatic improvements in delivery time over the past 10 years for microdata files from the Census Bureau's Survey of Income and Program Participation (SIPP)

are due to a concerted effort to give timeliness greater priority after implementing a major redesign (see Box G-4). Due to holdups by the director appointed in the Trump administration, BJS experienced major delays in previously timely products during the late 2010s. The affected data series are now being produced on schedule.

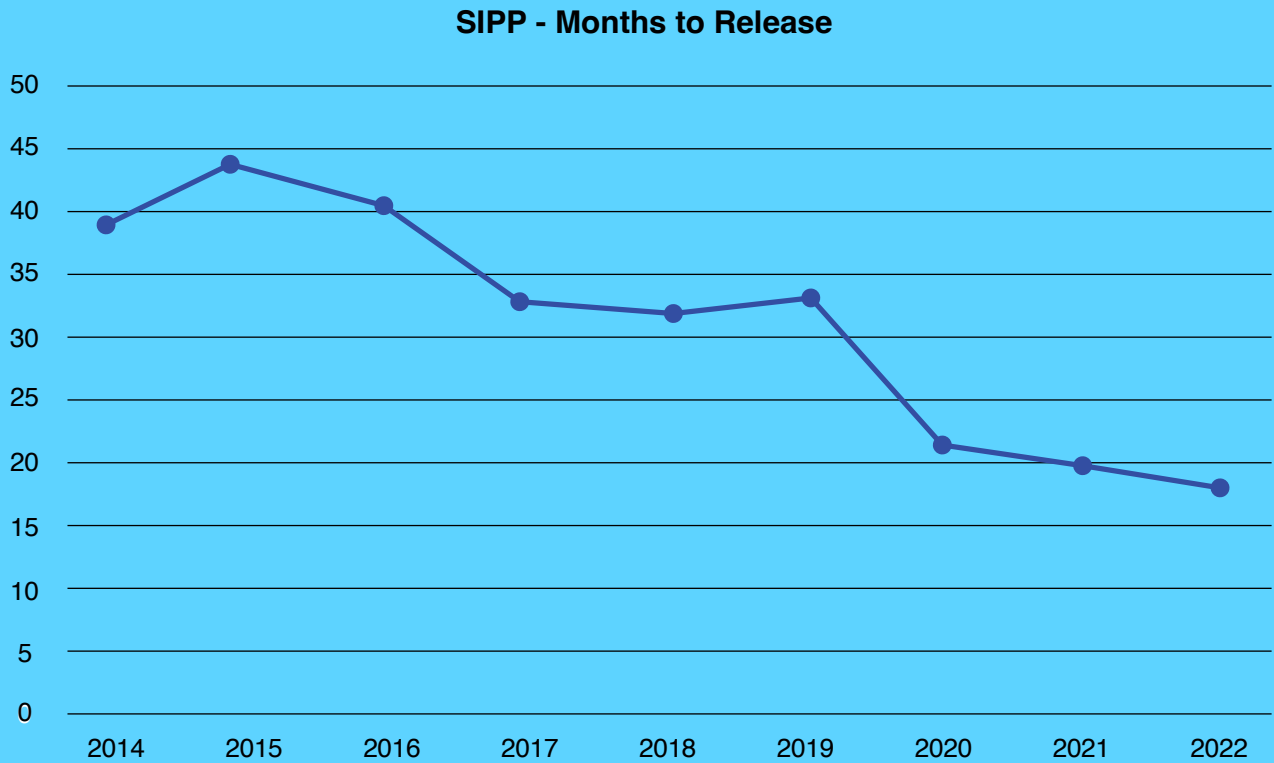
For key data series with a smooth production process, there may still be insufficient staff and budget resources to continue testing, piloting, and consulting with data users to ensure the series stays up to date. Resources may also be lacking to run overlapping series (e.g., producing estimates of consumer prices using current and new methods for some months), which are essential for users to assess and deal with the impact of changes. Ideally, resources for testing, piloting, and engaging in user dialogue would accompany adequate production budgets year after year to ensure improvements could occur in frequent, smaller increments rather than big changes at long intervals. Without a steady stream of such resources—ideally, including multiyear funding authority—data series become and stay outmoded for longer periods, and change is more disruptive to users even with overlapping series.

With few exceptions (one is the ACS—see Box G-5), statistical agency budgets do not explicitly include resources for continuous testing and piloting. Instead, important changes are infrequent and may take a long time to fully implement. Below are three case studies in point for the monthly CPS, CE, and NHANES.

⁷ See, e.g., <https://www.nytimes.com/2023/09/28/business/economy/shutdown-government-data.html>.

Box G-4

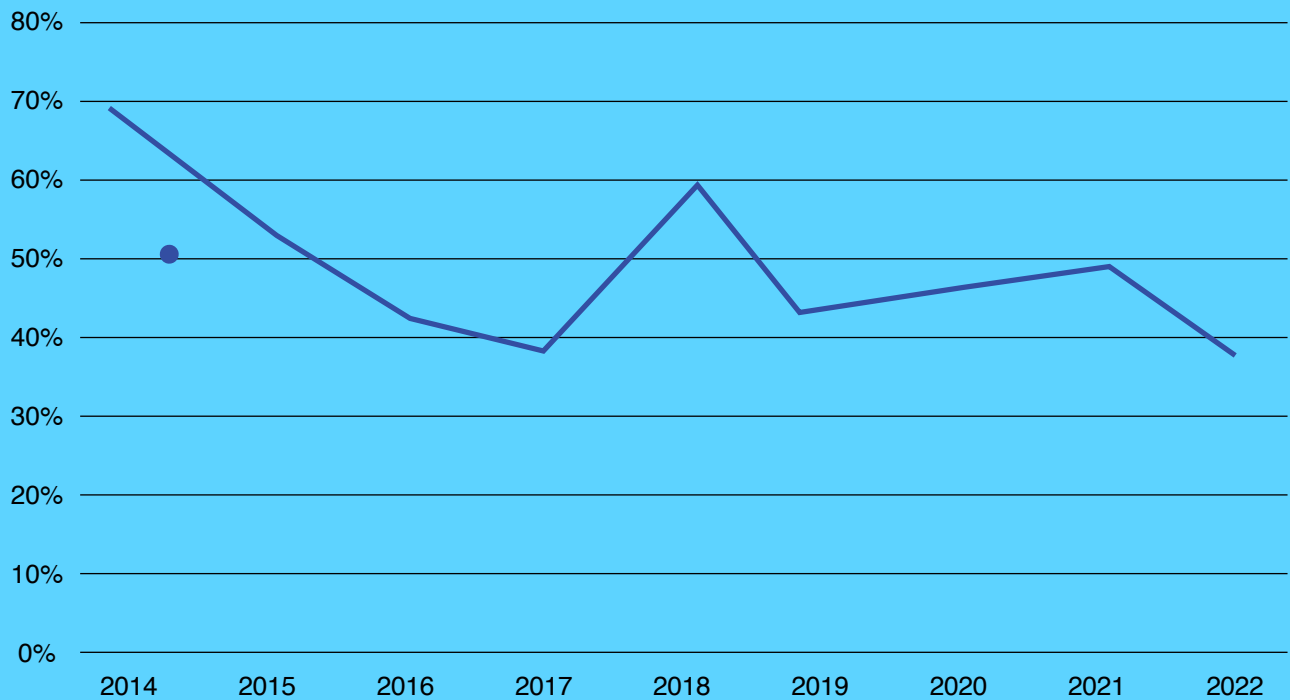
Survey of Income and Program Participation



NOTES: Number of months is measured from the end of the reference period to the release of a microdata file (e.g., it took 39 months—until March 2017—to release the 2014 file, for which the reference period ended in December 2013). There were two reissues of the 2014 file to correct problems (the second in March 2018).

SOURCE: U.S. Census Bureau (September 2023), *2022 SIPP Users' Guide*, Figure 1-2. *2022 Survey of Income and Program Participation* ([census.gov](https://www.census.gov))

SIPP - Wave 1 Response Rates for Eligible Households



NOTE: New panels began in 2014, 2018, and each year since 2019.

SOURCE: Compiled by Constance Citro from SIPP User's Guides for each year.

SIPP in Brief. SIPP is an important survey for policy analysis and evaluation of people's income, employment, and participation in such programs as Social Security, unemployment compensation, housing vouchers, and subsidized school meals. Just two examples of policy-relevant findings from research with SIPP data are (see National Academies, 2024a, p. 42):

- Substandard housing (e.g., ceiling cracks, holes in the floor, pests, plumbing problems) is associated with poorer health status, higher medical use, and higher likelihood of hospitalization even after controlling for such factors as disability; and
- Higher-income households pay more, but lower-income households pay a higher proportion of their income in healthcare costs.

After extensive testing and piloting, the Census Bureau inaugurated the SIPP in the fall of 1983. The SIPP follows samples of people for two to four years, asking them for monthly or quarterly information on jobs, earnings, program participation, family composition, and many other topics. The survey is complex because the U.S. safety net is complex, with many programs with different rules for participation and benefits. Even in the short span of a few years, people may change jobs, graduate from school, retire, marry, divorce, have children, and so on.

The Census Bureau has redesigned the SIPP several times to be more cost-effective and timely. A major redesign in 2014 changed the interviewing from every four months to every year. Yet the Census Bureau experienced long delays in releasing the SIPP research data files, as shown above (SIPP does not produce regular reports except for a report on wealth that began annual publication in 2022). The Census Bureau finally achieved timely release for SIPP with the 2020 file.

Unfortunately, declining response rates and flat budgets threaten the future of SIPP. For 2024, the sample size will be only 35,000 households, compared with 53,000 in 2023. On March 8, 2024, Congress provided additional funding for FY 2024 to restore the SIPP sample. However, it is unclear when that funding will become available, given that 2024 SIPP interviewing is well underway. The Census Bureau is working to redesign the SIPP once again to include an internet response option, change from annual to semiannual interviews, and streamline the questionnaire, among other changes. The target date for implementation is 2030, including an 18-month period of overlap in data collection with the current SIPP design, assuming budget is forthcoming (see [SIPP SEAMLESS: Modernizing the Survey of Income and Program Participation](#)).

Box G-5.

American Community Survey Methods Panel

The ACS replaced the decennial census “long-form” sample, last included in the 2000 Census, by collecting similar demographic and socioeconomic information on a continuous basis. In 2005, the ACS began monthly data collection and has since produced data products every fall for the prior calendar year. The products include microdata samples and tables produced from 12 months and 60 months of data (one-year and five-year estimates, respectively—the latter provide information for small geographic areas). The sample size is about 2 million interviewed households every year. (See National Research Council, 2007; National Academies, 2015.)

Early in its history, the ACS established “methods panels,” comprising large samples of households to test new and revised survey content, questionnaire design, mailings to boost response, and other aspects of this large-scale, continuous measurement survey. For some testing, subsamples of the production ACS compose the test panel. For content testing, separate samples are selected. The current methods panel costs about \$4 million per year (see [American Community Survey Methods Panel Tests - OMB 0607-0936](#)). That amount represents a modest investment in continuous improvement for the largest household survey conducted in the United States, currently costing \$235

million a year (about \$120 per interviewed household, see [PRA ICR Documents](#)), which supports federal, state, and local government planning, fund allocation, voting rights, and many other purposes.

Since its inception, the ACS, based on methods panel testing, has dropped questions on business on property and flush toilet; added questions on the fields of bachelor's degree (used to draw the sample for the NCSES National Survey of College Graduates), computer use, internet accessibility, internet subscription, and health insurance premium and subsidy; and revised about 16 questions. (See [Chapter 5: Content Development Process](#), Table 5-2.)

Case Study #1: CPS. The monthly CPS, begun in 1940 and conducted by the Census Bureau for BLS, is the basis for the official unemployment rate. It has made several changes each decade, but most of them reflect standard readjustments of population weights, the sample design, and industry and occupation codes following a decennial census or changes in demographic categories (e.g., race/ethnicity) to meet OMB standards. Other significant changes since 1990 include:

- *Questionnaire changes:* January 1994—Revised questionnaire with enhanced editing features and some new and modified questions (some in response to recommendations of the 1979 Levitan Commission), designed for computer-assisted telephone/personal interviewing (CATI/CAPI), introduced following four years of experimentation and running

concurrent series; 2015—questions added on certifications and licenses; 2020—questions added to help gauge the effects of the Covid-19 pandemic on the labor market (since deleted); 2022—questions added on telework or work at home for pay (ongoing)

- *Data collection changes:* 2020—R&D begun on an internet response option, announced in October 2024, with a target of 2027 to implement; 2023–2027—Blaise CAPI/CATI system being phased out
- *Data publication changes:* 1948—BLS published two definitions of unemployment (U1 and U3); 1967—BLS adopted the current U3 definition as its flagship statistic and began publication of U2; 1984—BLS added U4–U6 definitions
- *Changes in response to unexpected conditions that hindered data collection:* BLS made changes to operate the CPS during Hurricane Katrina in 2005 and Covid-19 in 2020. BLS also cut the sample in 1996 due to budget cuts (sample was restored in 2000 but is being cut again for 2025).

The CPS has been later than other surveys in developing a web instrument because of the complexity of the questionnaire and a relatively short collection period. The basic questionnaire does not yet adequately reflect the increase in alternative work arrangements (e.g., driving for Uber, et al.). Until recently, data on alternative work arrangements has been collected sporadically (six times in a supplement between 1995 and 2017—see National Academies, 2020). A revised supplement was conducted in 2023 and is to be conducted biennially beginning in 2025. Terminology and concepts for classifying

people in various statuses (e.g., unemployed) and survey interview questions need updating (e.g., Census interviewers and BLS analysts misclassified workers who potentially would have been classified as laid off in the early months of the Covid-19 pandemic and were classified as “employed but not at work,” which understated the unemployment rate—see [Impact of the coronavirus \(COVID-19\) pandemic on The Employment Situation for May 2021: U.S. Bureau of Labor Statistics](#)). Also, whether U3 is the best “official” definition of unemployment is debatable. Finally, there has been no outside review of the CPS since the 1979 Levitan Commission. See FESAC (2023) for a compelling argument for a much more thoroughgoing redesign, which would require resources—ideally, multiyear resources.

Case Study #2: CE. BLS fielded the first survey of consumer expenditures in 1888, four years after BLS was established as a federal statistical agency. BLS conducted expenditure surveys at irregular intervals (eight in all) until 1980, when the Consumer Expenditure (CE) survey became continuous. BLS currently publishes 12-month consumer unit expenditure estimates every six months from the CE survey. The Census Bureau conducts the survey, which consists of two separate samples. The first is the Interview Survey (samples of households interviewed 4 times every 3 months that provide estimates of expenditures by category). The other is the Diary Survey, which contains samples of households that provide two 1-week diaries of detailed expenditures. The results of these surveys provide the market basket for the Consumer Price Index (CPI), such as how much weight to give to housing, food, and other goods and

services. The results also inform the public and policymakers. For example, telling the public that households spend considerably less on food and beverages as a percent of total spending today than they did 60 years ago, but that lower income households are constrained to spend proportionately more of their budget on food and beverages.

The CE is costly and burdensome and has experienced substantial declines in response rates (see Figure G-1 above). Some expenditure categories are underreported because households learned not to indicate that they spent money on things like clothing or travel because they would then be asked detailed questions about their purchases. In 2003, the Interview and Diary Surveys were converted from paper questionnaires to CAPI. In 2009, BLS launched the Gemini project to thoroughly test a redesigned CE to reduce cost and burden. BLS reached an initial redesign decision in 2013 but determined through testing that it was not an improvement over the current design. In 2018, BLS decided to pursue a more incremental approach. To date, an online option for the diary survey (necessitated by Covid) has been built into the CE, and the Interview Survey questionnaire has been simplified by combining related topics and reducing detail (e.g., for clothing). Yet the estimated respondent burden remains about the same as it has been for the past 20 years (about an hour per household). Before then, the estimated burden was about 1.5 hours. In the future, pending availability of resources for further testing, the CE may interview households twice at one-year intervals instead of four times every three months, and the samples for the Interview Survey and Diary Survey may be

combined. This is a clear example of a slow pace of change for this important survey program.⁸

Case Study #3: NHANES. The current, continuous National Health and Nutrition Examination Survey (NHANES) is a series of national examination studies conducted in the United States by NCHS under the authority of the 1956 National Health Survey Act. It represents a landmark innovation in survey methodology because of the collection of actual physical and biological measurements in a lab-type setting together with questionnaires. The first National Health Examination Surveys (NHES) were fielded in the 1960s. A large nutrition component was added to the basic design in 1970, and NHES was renamed NHANES. Three NHANES were conducted in the period of 1971–1994, along with a special study of Hispanic people. NHANES became continuous in 1999, with each round of data collection covering two years. Covid-19 interrupted NHANES, so that there are data combined for 2017–March 2020 and a new round of collection covering August 2021–August 2023.

NHANES collects data via traditional interviews plus medical examinations and testing in specially designed and outfitted medical examination centers (MECs). The MECs are tractor-trailer units (to be replaced by trucks in the next round, beginning in January 2025), which rove around the country. For the post-Covid 2021–2023 data collection round, NHANES dropped oversampling by race, ethnicity, and income to reduce the number of households that had to be screened. The length of the household interview was reduced from 90

minutes to 60 minutes. For the round beginning in 2025, the sample sites will be more spread out around the country, which may permit releasing one year’s worth of data instead of data aggregated over two years.

Uses of NHANES data are many and consequential—for example, informing federal policies to fortify grain and cereal products with iron, eliminating lead in gasoline, setting safety standards for maximum airplane passenger loads, and increasing awareness of diabetes. However, NHANES is a demanding survey on respondents, field personnel, and data editing and analysis staff. It is also very costly for a small sample size of about 5,000 people interviewed and examined at about 15 sites (\$46 million in FY 2024, or about \$9,000 per interviewed/examined person). Funding for the survey depends on contributions from other agencies (e.g., ERS/USDA, NIH). The current amount of support is 45% of total funding but can vary from year to year. NHANES had high response rates for many years but in recent years, the response rates have declined considerably since 2011–2012 (see Figure G-3). Methodological innovation is challenging given the constant flow of data to be collected, edited, and analyzed as well as the need to maintain time series. Although NHANES has a solid record of adding new tests and exams to respond to stakeholder needs, NHANES is hard-pressed to respond to growing demands for more detailed information on population groups and geographic areas.

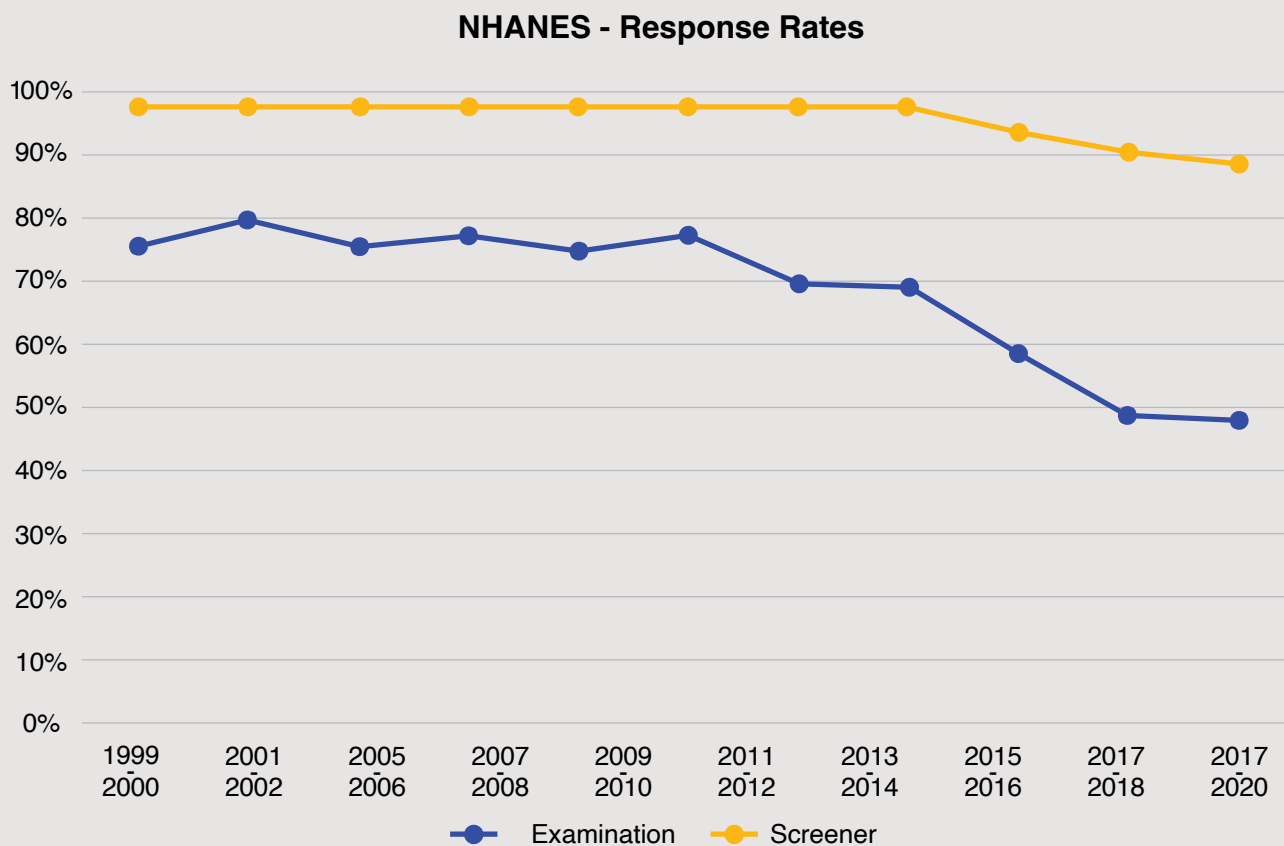
There have been calls to reimagine NHANES in various ways. For example, Taylor et al. (2023) provide an overview of possible options to consider, one of which is to use electronic health

⁸ See [Gemini Project to Redesign the Consumer Expenditure Surveys: U.S. Bureau of Labor Statistics \(bls.gov\); Plain language](#); National Research Council (2013a).

records and certified lab results for some or all sample members in place of examinations. When the survey began, the MECs provided standardized, state-of-the-art testing, in contrast to the variable quality and extent of testing in the medical care arena. At this time, it would be worth assessing the potential for using records to a greater or lesser extent. Resources would be required to investigate the possibilities and how to handle the fact that some portion of the population does not use medical care services. The potential gains in sample size and the reductions in costs and respondent burden could justify the investment.

FIGURE G-3

National Health and Examination Survey (NHANES) Household Screener and Examination Response Rates



SOURCE: [NHANES Response Rates and Population Totals \(cdc.gov\)](https://www.cdc.gov/nchs/nhanes)

Finding: Long-running data series on important social and economic topics, which generally meet high standards of timeliness, are susceptible to becoming outmoded in content, accuracy, and efficiency. Reasons include the costs to run overlapping data series to enable users to changeover from the old to the new, inertia and hesitation to change on the part of agency staff and the user community, and the lack of adequate (ideally multiyear) funding for continuous testing and implementation of improvements.

BALANCING DATA ACCESS AND USABILITY WITH CONFIDENTIALITY PROTECTION

Statistical agencies promise confidentiality to respondents under the Confidential Information Protection and Statistical Efficiency Act (CIPSEA), first enacted in 2002 and folded into Title III of the Evidence Act in 2018—see Supporting Materials: D) and other legislation (e.g., Title 13, which pertains to the Census Bureau, and Title 26, which pertains to SOI). The reason is to encourage response and to guard against misuse of individual data for nonstatistical purposes such as enforcement or determination of eligibility for programs. CIPSEA imposes stiff penalties for statistical agency staff should they make individually identifiable information available to the public (up to five years in prison and up to a fine of \$250,000).

Statistical agencies take their mandate to protect respondent confidentiality seriously. In recent years, with the increase in data for individuals on the internet and the availability of sophisticated web scraping and data linkage tools, agencies have worried that heretofore publicly available microdata and tabular data could be reengineered to identify specific

respondents. Agencies use a variety of methods to guard against such reidentification (e.g., specifying minimum cell sizes for table entries). They also have established means for analysts to access confidential data in secure enclaves, such as the Federal Statistical Research Data Centers (FSRDCs). NCSES is piloting demonstration products for a potential National Secure Data Service (NSDS) with funding from the CHIPS and Science Act of 2022. The NSDS is intended to provide a means to conduct policy research and program evaluation (as stipulated in the Evidence Act) in a secure environment in which data linkages are performed and analytic results (appropriately protected) are returned to users, but neither the original nor linked data sets are stored or shared.

Some agencies have turned to new computer science–based confidentiality protection methods, most notably algorithms that satisfy a theory called “differential privacy,” which is designed to inject statistical noise into every statistic to guard against any attack (currently known or not), even if low probability. The Census Bureau decided at a late stage in planning for the 2020 Census to use such algorithms for the 2020 census data products. This late start led to a series of problems, which resulted in delays of key data products. More importantly, the data for many small governmental units and population groups were impaired in accuracy and usability by the noise injection (see National Academies, 2023a, Ch. 11).

SOI is supporting work on synthesizing highly sensitive tax return data for research use (see, e.g., studies by Raj Chetty and his colleagues of economic mobility in the United States).⁹ Users would run preliminary analyses on a synthesized

public use file (PUF), submit their analysis code to a “validation server,” which, in turn, would run the code on the “real” data and then protect the output with a differentially private algorithm. Should this approach prove feasible, SOI would be able to make data files available that it stopped releasing 10 years ago because of the increased threats to confidentiality. The Census Bureau is working on a similar approach for the ACS public use microdata sample (PUMS) files—namely, a synthetic file with validation and confidentiality protection obtained through use of a validation server. However, the risk of disclosure for the ACS PUMS file has not been established under realistic attack scenarios, and whether a validation server could handle the volume of requests from the wide community of ACS users in a timely fashion is not clear.

Across the statistical agencies, there is a heightened movement to provide “tiered access” to data. For example, one tier could provide a limited set of public products, with traditional confidentiality protection methods applied (e.g., assigning a broad upper category for sensitive values, such as income); the next tier could provide public products with additional noise applied and perhaps a requirement for users to register; another tier could allow users access to synthesized products with a validation server and confidentiality protection applied to specific outputs; and finally, the last tier could provide access after a rigorous screening and approval process to confidential data in a secure environment such as one of the FSRDCs or the NSDS, once established.

A subcommittee of the Interagency Council on Statistical Policy is developing a Data Protection

Toolkit.¹⁰ The toolkit is intended to cover topics such as assessing disclosure risk, methods and approaches to reducing disclosure risk (e.g., including tiered access), and tools and reference materials for statistical agencies to use to promote data access while protecting confidentiality.

Responding to Section 3583 of the Evidence Act, the ICSP and the FSRDC network established a standard application process (SAP) and website to make it easier for researchers and other users to locate and apply to use confidential data sets from statistical agencies in a secure setting (e.g., an FSRDC or comparable facility at a statistical agency). The site, ResearchDataGov.org, developed and operated by the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan under contract to NCSES, has come a long way since it was first launched on a pilot basis in December 2019. The SAP provides a catalog of datasets potentially available from 16 principal statistical agencies and recognized statistical units, a common application form, standards for criteria and timeliness of agency review, and metrics on status of applications received since December 2022 when the portal became fully functional. The SAP, however, does not address the time required for additional steps beyond approval to begin work with the data (e.g., to obtain security clearances for the researchers). It also does not solve the problem that a “seat” in an FSRDC typically costs thousands of dollars. Its timeliness metrics measure the status of all applicants since 2022 without differentiating when applications were submitted.

The SAP’s annual report for 2023 provides average times by agency to accept and reject

⁹ See Opportunity Insights, <https://opportunityinsights.org/paper/>

¹⁰ See Data Protection Toolkit, <https://nces.ed.gov/fcsm/dpt>

projects—SOI exceeds the standard review time of 84 days for both acceptances and rejections, and the Census Bureau exceeds the standard review time for acceptances. The report does not provide historical data for comparison, either for numbers of applications or review times.¹¹ It will likely be time-consuming to conduct analyses within the NSDS as well. The SAP also places considerable administrative burden on agencies that have highly sought data with no additional funding to support agency work on SAP requests.

While increased threats to confidentiality are real, the statistical agencies exist to provide accurate, accessible, and usable information to the public and policymakers. The challenge is to devise a confidentiality protection approach that is sufficiently protective while not impairing the accuracy and usability of public data products with extensive noise injection or pulling more and more datasets into restricted access environments.¹² State and local governments, non-governmental organizations (NGOs), and members of the public may find it difficult to use statistical agency data with noise injection and precluded, because of time and expense, from use of synthesized files with a validation server, let alone from working with restricted files that are in an FSRDC. There are a limited number of these facilities, and the closest one could be hundreds of miles away. Secure remote access is sometimes possible but not generally for first-time users and not for all datasets.¹³

The Evidence Act and the Year 2 Report of the Advisory Committee on Data for Evidence

Building (ACDEB, mandated by the Evidence Act) provide relevant guidance. The Evidence Act (44 U.S.C. § 3582) requires statistical agencies, “to the extent practicable,” to “expand access to data assets [to] develop evidence while protecting such assets from inappropriate access and use,” tasking the U.S. Office of Management and Budget with issuing regulations to enable statistical agencies to carry out those requirements.

The ACDEB Year 2 Report (2022, p. 34) provided a list of guiding principles, which it recommends the mandated OMB regulations (not yet issued) reflect, including that:

- (1) disclosure risk is on a continuum and is not binary,
- (2) not all data are equally sensitive, (3) there is shared responsibility between the statistical agency and users for protecting and not disclosing or re-identifying data, and (4) there is a need to protect good faith actors (i.e., data providers and users who take all precautions appropriate for known risks).

One approach to restoring a balance in statistical agencies’ thinking regarding confidentiality protection versus access and utility is to pass legislation to make confidentiality protection a shared user-agency staff responsibility, as recommended in several reports from the National Academies (1993, Chs. 4–5; 2005, pp. 73–74; 2023a, Ch. 11; 2024b, pp. 245–246). An amendment to the Evidence Act could apply the penalties imposed on agency staff to users who willfully disclose individual identities by reengineering a statistical dataset. “Users” would include not only people in the private sector

¹¹ Available at Standard Application Process, <https://nces.nsf.gov/about/standard-application-process>

¹² In this regard, Hotz et al. (2022) call for cost-benefit analysis in decisions about an appropriate confidentiality protection system for a census or survey, with explicit consideration of the loss to society from data that are unusable or only marginally useful due to noise injection.

¹³ See Standard Application Process, which includes a question on remote access: <https://www.census.gov/topics/research/guidance/restricted-use-microdata/standard-application-process.html>

and academia, but also people in government agencies and their contractors (e.g., such a provision would preclude reengineering statistical data products for criminal justice or immigration enforcement).

The Education Sciences Reform Act of 2002 provides relevant language (20 U.S.C., section 9573), which NCES cites on its website for specific datasets and which could be extended to all federal statistical data:

Any person who uses any data provided by the Director, in conjunction with any other information or technique, to identify any individual student, teacher, administrator, or other individual and who knowingly discloses, publishes, or uses such data for a purpose other than a statistical purpose [or otherwise violates these provisions], shall be found guilty of a class E felony and imprisoned for not more than five years, or fined [or] both.

Laws of member states that implemented the European Union's General Data Protection Regulation of 2018 also provide relevant language. For example, Section 171 of the UK Data Protection Act of 2018, "Re-identification of de-identified personal data," states "(1) It is an offense for a person knowingly or recklessly to re-identify information that is de-identified personal data."¹⁴

Finding: Because of increased threats that traditional publicly available data products

could be reverse engineered to identify individual respondents, statistical agencies are experimenting with newer confidentiality protection methods that inject noise into every data output. They are also considering making some data products available only through secure enclaves or through use of "synthesized" data products with subsequent validation. The challenge is how to balance confidentiality protection with the agencies' mission to provide accurate, usable data to users in all sectors—Congress, federal, state, and local governments, businesses, NGOs, academia, the media, and the general public. Solutions may require legislation to make confidentiality protection a shared responsibility of statistical agencies and data users.

¹⁴ See <https://www.legislation.gov.uk/ukpga/2018/12/section/171/enacted>

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