NATIONAL CENTER FOR SCIENCE AND ENGINEERING STATISTICS

The National Center for Science and Engineering Statistics (NCSES) is the principal federal statistical agency providing data, analysis, and expertise on the state of science and engineering, often within a global context. NCSES's six core areas of interest include the science and engineering workforce; research and development; higher education research and development; government funding for science and engineering; science, technology, engineering and mathematics (STEM) education; and innovation and global competitiveness. Among its many products is the congressionally mandated Science and Engineering Indicators (S&E Indicators) report, produced in collaboration with the National Science Board (NSB). S&E Indicators is a high-profile report delivered to the President and Congress biennially, which provides high-quality data and analysis on the conditions of the nation's science and engineering enterprise. S&E Indicators is highly anticipated and regularly used by policymakers at all levels, industry leaders, university administrators, current and potential students, parents, finance companies, and economic development entities, among others. It also enjoys visibility internationally as an accessible and reliable source of data on U.S. science and engineering in an international context. NCSES also produces the biennial, congressionally mandated STEM and Diversity: Women, Minorities and Persons with Disability report, which provides statistical information about the representation of these three groups in STEM employment and S&E education. The statistics and analyses generated from NCSES's 17 nationally representative surveys, alongside these highly cited congressional reports, are critical inputs to measuring the nation's progress on science, technology, and innovation.

NCSES's robust and objective data and analysis support the National Science Foundation's (NSF's) ability to inform its work, including ensuring a strong and diverse U.S. STEM workforce and the promotion of the progress of science in order to advance national health, prosperity, and welfare. Many of NCSES's targeted populations of study, such as the S&E workforce, academia, and doctoral recipients, overlap with NSF's key interest groups. Understanding the critical experiences and outcomes of these populations could provide further support for NSF's informed decision-making for research investments and outreach relevant to its core mission. The leadership role that NCSES plays within the federal statistical system, including implementation of the legislatively mandated requirements of the Standard Application Process (SAP) and the National Secure Data Service (NSDS) Demonstration Project, also provides increased visibility for NSF's leadership role within the entire federal data ecosystem.

**The following is based on publicly available information, information from former agency leadership, and selected information from our questionnaire.

STRENGTH OF NCSES'S SUPPORT†

Autonomy: Mixed. NCSES lacks full decision authority for hiring and for IT systems required for its computational and data dissemination activities, inhibiting its agility. NCSES also lacks professional autonomy protections in statute.

Parent agency: Mixed. NSF has provided consistent budget support for NCSES over the last dozen years and generally respects the professional autonomy necessary for a federal statistical agency. The services that NSF provides (e.g., HR, contracting, IT, security clearance, physical space) can sometimes impede NCSES's ability to be a nimble statistical agency.

Budget: Mixed. NSF has provided consistent increases to NCSES over the last dozen years, but NCSES still struggles to fulfill its expanding mandates, responsibilities, and publications.

Staffing level: Challenging. Compared with other federal statistical agencies, NCSES's staffing level is not commensurate with its budget. Its budget-to-staff ratio is roughly three times the median of the other federal statistical agencies.

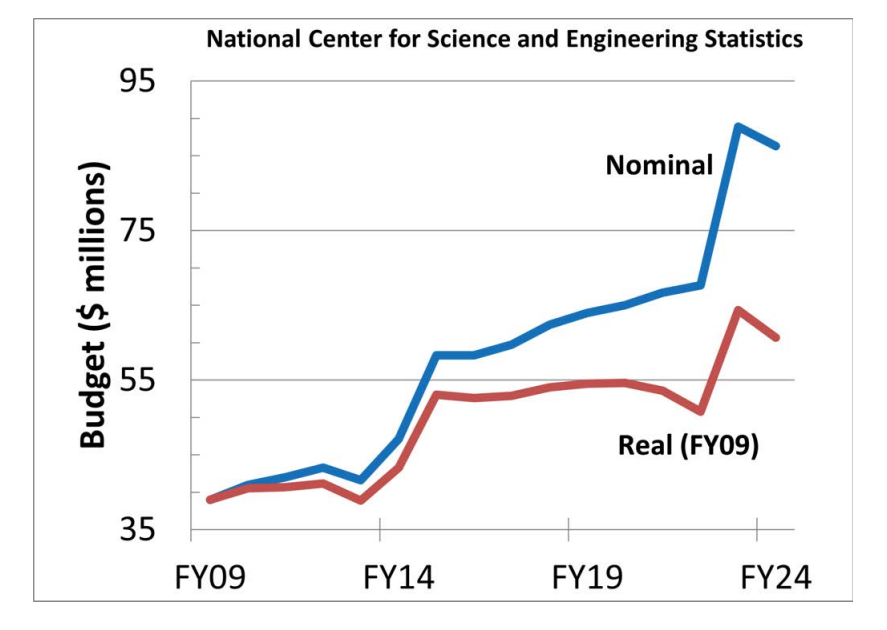
† See Supporting Materials F for an explanation of the support ratings.

AGENCY FAST FACTS

Budget inputs and FY23 levels

1. NCSES's budget is determined by NSF through a program line ($78.0M) and a staffing line ($10.8M). NCSES is one of three principal statistical agencies for which the budget is determined by the parent agency, as opposed to a Congressional appropriations line.
2. NCSES receives funding and in-kind support from multiple agencies for its surveys.

Funding history, inflation adjusted



*NCSES's increase from FY 2022 and FY 2023 is in support of its increased workload for Evidence Act implementation and the CHIPS and Science Act, as detailed below.

**Most if not all of NCSES's increase from FY13 to FY15 was to enhance the Survey of Doctorate Recipients (SDR). (Pierson, 2020)

Appointment of head & layers down in NSF org chart

NCSES is one of eight principal federal statistical agencies for which the head is a career senior executive service appointee.

Two: The NCSES director reports to the assistant director for Social, Behavioral, and Economic (SBE) Sciences, who reports to the NSF director.

Other	➔ NCSES uses distinct data sources on which it builds each year. Seventeen of these are surveys it conducts. ➔ NCSES tracks citations of its products through a limited sample of sources and found 3,240 citations for FY 2020–FY 2022. Most cited are the following (in order): • Survey of Earned Doctorates • Diversity and STEM: Women, Minorities, and Persons with Disabilities • Science and Engineering Indicators • National Survey of College Graduates • Higher Education Research and Development Survey • Survey of Doctorate Recipients
Recent successes	➔ Government-wide leadership in governance and implementation activities associated with the Evidence Act, CHIPS and Science Act, and other legislation or directives through chairing of the Advisory Committee on Data for Evidence Building (ACDEB), leading the implementation of the National Secure Data Service Demonstration Project (NSDS), serving as the Project Management Office for the Standard Application Process (SAP), and establishing the America's Data Hub Consortium (ADC), a national initiative for collaborative research and decision-making. ➔ Strong innovation culture, including collaboration, support, and professional engagement with other agencies and entities. In addition to the extensive and impactful work in the previous item, NCSES has added 80 data sources from broad categories since July 2018 and realigned its expanding set of responsibilities and priorities by implementing a strategic reorganization, thus proactively organizing itself to remain flexible and nimble to stakeholder needs. ➔ Engagement of Congress through several CHIPS and Science Act provisions.
NCSES strengths	➔ Produces high-profile biennial Science and Engineering Indicators report, for which it receives strong support from NSF and the NSB. ➔ Has long-standing collaborative partnerships with other agencies spanning intellectual, technical, and financial support, which helps NCSES to fulfill its mandate to produce relevant and timely information. ➔ Staff collaboration with the National Science Board supports a deep understanding of the relevant data and analyses needed to inform current and emerging policy areas. ➔ NSF, on whom NCSES is solely reliant for its budget and staffing allocations, has provided NCSES strong budgetary support over the years. As described below under Agency Challenges, however, NCSES is very low in staffing for a statistical agency of its size, and its budget does not cover its expanded mandates, responsibilities, and products.

NCSES strengths	→ NSF support for NCSES's production and rollout of the congressionally mandated biennial STEM and Diversity: Women, Minorities and Persons with Disabilities report. → Parent agency has expressed appreciation for the agency's work and rewarded it for excellence in federal statistical accomplishments through, for example, employees receiving NSF Director's awards. → Very strong data user engagement: 27 conferences of users or other types of user engagements organized in the last three years; 10 sessions at relevant conferences; showed responsiveness to feedback by making changes. → Numerous and diverse data sources used in its analytical products: ~50 and growing. → Strong support of staff through training and recognition. → History of senior-level engagement across the federal statistical system in response to emerging opportunities and challenges. → Staff have direct access to, and often collaborate with, leading researchers across all mission-relevant areas.
NCSES threats/ vulnerabilities	→ NCSES's enabling legislation does not include autonomy protections. → While a strength and sign of NCSES's broader engagement, financial support of some surveys from other agencies also puts the survey at risk of cuts/cutbacks if the external agency withdraws support. → Annual budgeting occasionally is a challenge with biennial data collection, especially in years of contract renewal. Greater latitude in year-to-year funding carry-over would be very helpful in such cases. → Staffing mix is heavily weighted toward senior-level experts in survey methods, statistical analysis, and data management. There are few junior-level staff, introducing knowledge management risks stemming from attrition or retirement.
Agency challenges	→ Serious staffing limitations, owing to staffing being determined through an NSF-wide account. NCSES's budget-to-staff ratio is roughly three times the median of the other federal statistical agencies and is compounded by its expanded responsibilities under the CHIPS and Science Act and the Evidence Act. → The staffing limitations makes NCSES overly reliant on contractors, which inhibits the ability of NCSES to be agile and innovative and risks the transfer of technical and subject matter expertise and leadership from NCSES to contract staff and potential role reversal. → Due to lack of budget and staffing, for example, the 2020 National Training, Education, and Workforce Survey was delayed to 2022.

Agency challenges	➔ Agency opportunities and challenges are rarely addressed or included as topics in department leadership meetings. ➔ NCSES's role and responsibilities in the broader federal statistical community are rarely acknowledged by NSF. ➔ Budget opaqueness in that NCSES's budget is not publicly available until the President's Budget Release (PBR) a year or two later (the latter if Congress hasn't finalized the current year's government in time to be included in PBR). ➔ NCSES has limited opportunity to engage in relevant internal budget development discussions within NSF, particularly at the later stages. ➔ Parent agency retains a role in the administrative review of statistical products. ➔ NCSES must obtain approval and/or coordinate closely with NSF for outreach activities with select stakeholders and other audiences, particularly within the Executive Branch and social media outlets.
Agency opportunities	➔ Continued leadership with Evidence Act initiatives, including serving as the Project Management Office for the Standard Application Process (SAP) to build consensus for shared services for the federal data ecosystem, as well as the expanded role of the Statistical Official to inform NSF efforts. ➔ Continued leadership, coordination, and support of the National Secure Data Service (NSDS) Demonstration project and coordination with NCSES's America's Data Hub Consortium Initiative. ➔ Strengthen public trust in NCSES's data by continuing to improve survey workflow and business processes for transparency and reproducibility in accord with recommendations in the 2022 consensus study report of the National Academies of Sciences, Engineering, and Medicine in Statistical Information for the National Center for Science and Engineering Statistics and All Federal Statistical Agencies. ➔ Continue engagement with the Interagency Council on Statistical Policy (ICSP) and work closely with research communities (academic, government, and for profit) and other sectors to promote the vision of a National Secure Data Service, to identify and evaluate specific use cases, and to cultivate ongoing partnerships. ➔ Continue development of a robust research portfolio to explore privacy and data protection, statistical and methodological innovations to improve surveys, and uses of auxiliary data.
Agency-specific recommendations	In addition to the all-agency recommendations in the body of the report, we recommend that: ➔ NSF should explore with OMB and Congress ways to give NCSES more staff, thereby contributing to its agility and professional autonomy. A potential option would be to align with the practices of most other federal statistical agencies by consolidating NCSES's two budget lines, programs and staffing, and giving NCSES authority to optimize the combined budget across salaries and expenses.

Agency-specific recommendations	➔ Some portion of the NCSES budget should be allowed to be multiyear funding. This is essential for supporting and fostering innovation as well as survey development and administration. This would be particularly beneficial to surveys and other programmatic activities that do not operate on an annual cycle. ➔ NSF should take steps to ensure NCSES professional autonomy is aligned with the 10 components of professional autonomy discussed here, including publication of statistical products. ➔ NSF should continue to explore how to leverage its Statistical Official to support NSF-wide data and analytical initiatives in line with the requirements set forth in the Evidence Act. ➔ For the shared services it provides to NCSES, NSF should work to ensure they are provided to NCSES in a manner as timely and efficient as possible so as not to impede NCSES's agility and ability to meet its mission. ➔ To the extent possible, within the myriad demands with its limited budget, NSF could discuss with NCSES and the Office of the Chief Statistician of the United States what could be achieved with additional funding and staffing and the overall benefit to both NCSES and NSF.

See also

- State of the Science and Engineering Data Infrastructure: National Center for Science and Engineering Statistics—what three experts have to say about the state of NCSES.