

## Implementing and Revising NCES Statistical Standards

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### Abstract

The National Center for Education Statistics (NCES) statistical standards are designed to ensure information quality before release to the public. NCES standards describe agency policy and procedures for data collection, processing, analysis and review. NCES adopted statistical standards in 1987. These standards were revised in 1992 and 2002. The 2002 standards included topics found in OMB's 2006 *Statistical Standards and Guidelines for Statistical Surveys*. NCES is now revising its 2002 standards in direct comparison to the 2006 OMB standards. Other standards will be revised to account for what the agency has learned during this review process and over the past 8 years. NCES also monitors the implementation of and compliance with its standards through a review process. The paper presents the history and implementation of NCES standards with information on current standard revisions.

**Key Words:** Data Quality, Statistical Standards, National Center for Education Statistics, Compliance

### Introduction

NCES provides the public with a wide variety of information about the condition of American education. This information is based on both administrative and survey data. The administrative data are universe collections of data from elementary, secondary, and postsecondary institutions. These universe collections are based on reports of aggregated records from schools, school districts, and states. NCES also conducts a number of sample survey data collections. NCES supports ongoing cross-sectional and longitudinal sample surveys and special purpose surveys that are designed to fill data gaps or information needs that are identified through internal review, legislative mandates, or input from data users outside the Department. Information quality is important to NCES because educators, researchers, policymakers, and the public use NCES products to inform decisions about educational programs and policies. Thus, the information products that NCES disseminates must be accurate and reliable. Most of the agency's information products are available both as print and electronic documents and are available for download directly from NCES's website (<http://nces.ed.gov/>).

The primary goal of NCES statistical standards and guidelines is to provide high quality, reliable, useful, and informative statistical information to public policy makers and the general public. The standards and guidelines are designed to fulfill that goal, and are intended for use by NCES staff and contractors to guide them in their data collection, analysis, and dissemination activities.<sup>1</sup> These standards and guidelines also present a clear statement to data users regarding how data should be collected in NCES surveys

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<sup>1</sup> NCES data collections are all conducted through contracts or interagency agreements, thus written detailed statistical standards and guidelines are essential to ensuring comparability across NCES data collections, analyses, and related products.

and the limits of acceptable applications and use. NCES is committed to a periodic evaluation of its standards and to reviewing the standards' operational feasibility.

### **Background and History of NCES Standards**

Data quality is the cornerstone of all official statistics programs. In the United States, there are two national committees that have been working for more than a quarter of a century to improve statistical methods and data quality: the Federal Committee on Statistical Methodology (FCSM) and the Committee on National Statistics (CNSTAT).

The Office of Management and the Budget (OMB) convenes FCSM to provide a forum for communicating and disseminating information about statistical practices among all Federal statistical agencies. The FCSM also recommends the introduction of new methodologies in Federal statistical programs to improve data quality.

CNSTAT monitors the statistical policy and coordinating activities of the Federal government, reviews the statistical programs of federal agencies and suggests improvements. CNSTAT publishes the monograph *Principles and Practices for a Federal Agency* to assist Federal statistical agencies. The main principles include relevance of data, credibility among data users, confidentiality of data, and trust among data providers. The CNSTAT monograph is one of the tools used by NCES staff in assessing revisions to the agency's statistical standards.

In the mid 1980s, CNSTAT recommended that NCES undertake development of statistical standards. With this recommendation, a statistical standards program was initiated at NCES in 1985. Using the Energy Information Administration's Standards Manual and the Census Bureau's technical paper on "Standards for Discussion and Presentation of Errors in Survey and Census Data," NCES staff, in consultation with outside experts, developed the 1987 version of NCES statistical standards. These standards were implemented in the same year.

After the implementation of the 1987 standards, the agency's Commissioner called for a formal evaluation to ensure that the standards were fully implemented and to identify any issues with them. In 1989, NCES undertook a full-scale revision of the 1987 standards. The NCES staff developed revisions based on their first-hand experiences in using them. After multiple reviews of interim drafts by NCES staff and the NCES Advisory Council of Education Statistics, NCES senior staff accepted revised standards in 1992. At that time, the Acting Commissioner of NCES emphasized that NCES was committed to periodic evaluations of the implementation of the standards and to a periodic review of the standards' operational feasibility.

With this commitment to periodic review, NCES undertook a standards revision project in 1999. This review of standards incorporated information from reviews of national and international statistical policy agencies and committees and other international and national statistical agencies. NCES staff were given a 30-day period to submit comments concerning potential revisions and additions to the NCES standards. Following these two activities, an agency-wide Steering Committee was formed to coordinate the standards revision process. The Steering Committee formed 15 Working Groups that involved the voluntary participation of more than one-half of the NCES staff to work on the various topics that developed out of the two review activities.

Quality management experts from Westat facilitated the meetings of the Steering committee and Working Groups. Each Working Group drafted their assigned standards. Each revised standard underwent a multi-step review process:

1. The Steering Committee reviewed the drafts, edited them and then submitted them to Senior Staff.
2. Senior Staff reviewed the drafts and modified them when necessary.
3. The draft standards were then sent to a group of 40 to 50 representatives (typically contractors) who work with NCES on data collection, analysis, and dissemination projects. Additional revisions were incorporated from this broad group.
4. The National Institute of Statistical Sciences (commissioned by NCES) convened an independent review panel of statistical experts to review and comment on the draft standards. The standards were revised based on suggestions from the expert panel.
5. This draft of the standards was posted on the NCES website and announced in the *Federal Register* as part of the Department of Education's 2002 implementation of Information Quality Guidelines, with a request for public comments.
6. Following the public review and comment period, the Steering Committee and Senior Management finalized and released the revised standards.

This review and approval process took over two years. NCES's current 2002 standards on the agency's website (<http://nces.ed.gov/statprog/2002/stdintro.asp>) are the result of these efforts that involved many persons participating in a multi-stage review process. Each standard includes a combination of requirements (standards) and guidelines that are best practices for implementing the requirements specified in the standards.

The 2002 standards are applicable to any information that NCES disseminated after October 1, 2002. Some previously released information products continue to be used for decision-making or are relied upon by the Department of Education and the public as official government data. These information products are constantly being re-disseminated and are subject to the standards. Previously released information products that do not meet these criteria are considered archived information and thus are not subject to the standards.

### **Principles of Data Quality and NCES Standards**

As the 2002 revision process for NCES standards was nearing completion, the Office of Management and Budget (OMB) was directed by law<sup>2</sup> to issue government-wide guidelines for ensuring the quality of information disseminated by Federal agencies. Specifically, OMB was to "provide policy and procedural guidance to Federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies." The OMB guidelines directed all agencies covered by the Paperwork Reduction Act (44 U.S.C. 35) to develop and implement procedures for reviewing and substantiating the quality of information disseminated by the agency. In order to meet these goals, each agency was required to develop and implement data quality guidelines.

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<sup>2</sup> See section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554); also known as the Information Quality Act.

In response to the OMB data quality guidelines, federal statistical agencies collaborated to identify a common set of goals that were essential to maintaining the quality and credibility of statistical data. The 2002 NCES standards are generally organized around this shared framework for federal statistical agencies. The NCES standards represent a means for achieving performance goals that are intended to improve the quality of the information NCES shares with the public. Thus, the 2002 standards provide a high standard when compared to the three OMB principles of utility, objectivity, and integrity. These principles are intended to ensure that information disseminated by the NCES is useful, accurate, reliable, unbiased, and secure from disclosures.

**Utility** refers to the usefulness of the information. The usefulness of information disseminated by NCES should be considered from the perspective of NCES, educators, education researchers, policymakers, and the public. Utility is achieved by staying informed of information needs and developing new products and services to meet user needs. Thus, NCES wants to ensure that the information it disseminates meets the needs of the intended users. NCES relies upon internal reviews and analyses, along with feedback from advisory committees, education researchers, policymakers, and the public to ensure that information disseminated by NCES meets the needs of intended users.

NCES data collections are designed to fill data gaps or information needs that are identified through internal review, legislative mandates, or input from data users outside the Department. All statistical reports and related products are reviewed to ensure their usefulness to the intended users. Where appropriate, contact information is available on each publication to facilitate feedback and questions by users. Some of the 2002 standards that contribute directly to the utility of information include *Initial Planning of Surveys* (1-1), *Publication and Product Planning* (1-2), and the *Release and Dissemination of Reports and Data Products* (7-3).

**Objectivity** refers to whether information is accurate, reliable, unbiased, and is presented in a clear and unbiased manner. It involves both the content of the information and the format of the information. This includes complete, accurate, and easily understood documentation of the source of the information, with a description of the sources of any errors that may affect the quality of the data. Objectivity is achieved by using reliable information sources and appropriate techniques to prepare information products. The 2002 standards help NCES present information to the public in an accurate, clear, complete, and unbiased manner. Prior to dissemination to the public, all products are reviewed for objectivity using sound statistical methods and the principles of transparency and reproducibility, as delineated in the OMB Information Quality Guidelines. In addition, all products undergo editorial and technical peer review to assist NCES in meeting this goal. Specific standards are directly related to the principle of objectivity. For example:

- The goals of the study should be clearly described, the subjects to be studied and the data to be collected should be clearly defined: *Initial Planning of Surveys* (1-1), *Design of Surveys* (2-1), *Developing a Request for Proposal (RFP) for Surveys* (2-3), *Codes and Abbreviations*

(1-4), *Defining Race and Ethnicity* (1-5), and *Maintaining Data Series* (2-5).

- Data collection techniques should be designed using state of the art methodologies: *Pretesting Survey Systems* (2-4), *Educational Testing* (2-6), *Survey Response Rate Parameters* (2-2), and *Coverage for Frames and Samples* (3-1).
- Response rates should be monitored during data collection: *Computation of Response Rates* (1-3) and *Achieving Acceptable Response Rates* (3-2).
- The method of data processing should ensure accuracy and reliability: *Editing and Imputation of Item Nonresponse* (4-1), *Nonresponse Bias Analysis* (4-4), and *Evaluation of Surveys* (4-3).
- Findings should be capable of being reproduced or replicated based on information included in the documentation: *Monitoring and Documenting Survey Contracts* (3-3) *Documenting a Survey System* (3-4), *Machine Readable Products* (7-1), and *Survey Documentation in Reports* (7-2).
- The analysis should be selected and implemented to ensure that the data are correctly analyzed using modern statistical techniques suitable for hypothesis testing: *Statistical Analysis, Inference, and Comparisons* (5-1), *Variance Estimation* (5-2), *Rounding* (5-3), *Tabular and Graphic Presentations of Data* (5-4).
- All reports, data, and documentation should undergo editorial and technical review to ensure accuracy and clarity prior to dissemination: *Review of Reports and Data Products* (6-1).
- To ensure the utility of the work, all work must be conducted and released in a timely manner. There should be established procedures to correct any identified errors: *Publication and Product Planning* (1-2), *Release and Dissemination of Reports and Data Products* (7-3).

A complete listing of all 2002 standards that address the principle of objectivity can be found at: <http://nces.ed.gov/statprog/2002/stdintro4.asp> .

**Integrity** refers to the security or protection of information from unauthorized access or revision. Integrity also ensures that the information is not compromised through corruption or falsification. NCES uses security procedures for protecting confidential information that is contained in all identified systems of records. In accordance with law and administrative procedures, NCES protects administrative records and sample survey data that include personally identifiable information, especially survey data that are collected under a non-disclosure pledge. Applicable law that governs the protection of information include:

- Privacy Act of 1974,
- Computer Security Act of 1987,
- E-Government Act of 2002 (specifically the Confidential Information Protection and Statistical Efficiency Act – CIPSEA), and
- Education Sciences Reform Act of 2002.

The 2002 standard that directly implements the principle of integrity is *Maintaining Confidentiality* (4-2).

The OMB guidelines for implementing information quality recognized that some government information needs to meet higher quality standards than a basic standard of quality. The level of effort required to ensure the quality of information is tied to the intended uses of the information. Information that is defined as “influential” requires a higher level of effort to ensure its quality and reproducibility. The Federal Government and others use influential information as a basis for actions that affect people’s lives and well-being. It is essential that they be collected, processed, and published in a manner that guarantees and inspires confidence in their reliability. Hence, a major purpose of NCES standards is to support the production of influential information. All information collected and disseminated by NCES is held to standards of quality, reproducibility, and documentation that are required for influential information.

### **Implementing NCES Standards**

NCES statistical standards and guidelines provide the foundation for data quality practices at NCES. As such, they are the essential starting point in maintaining and improving the quality, reliability, and usefulness of publicly disseminated information. At NCES, the NCES Statistical Standards Program (SSP) in the Office of the Deputy Commissioner guides the standards and data quality monitoring efforts. However, the implementation of the standards and guidelines and the attainment of the goals of quality improvement can only be done through the efforts of all NCES staff and contractor employees.

There are seven statisticians on the SSP team who provide statistical consulting services to NCES and other offices in the Department of Education. They consult on survey sampling, design, methodology, error measurement, analysis, privacy, data confidentiality and disclosure avoidance. The SSP team strives to support the use of the NCES statistical standards in these consultations. The SSP team is responsible for the review of all NCES products, including a review for adherence to the standards. The SSP team also leads several ongoing data quality monitoring activities that are intended to support NCES standards. These projects include:

- measurement of survey response rates,
- analysis of nonresponse bias,
- use of incentives,
- use of imputations,
- timeliness of NCES data collections, and
- uses of NCES products by various NCES constituencies.

The SSP team also leads work on privacy, confidentiality, and disclosure avoidance in NCES. This work includes:

- the IES Disclosure Review Board,
- Restricted-use Data Licensing Program,
- review of informed consent and confidentiality statements for NCES data collections,
- review of data sharing agreements required for data collections,
- coordinating reports to the United States Computer Emergency Readiness Team (US-CERT) in the event of data breaches, and

- initiating security clearances for all contractor employees whose work requires access to personally identifiable information.

SSP also consults on matters concerning privacy, confidentiality, and disclosure avoidance for other offices in the Department of Education.

### **Technical Review Process**

The technical review of NCES data products, documentation, and reports plays an important role in monitoring the implementation of the standards. The NCES standard *Establishment of Review Procedures* (6-1) outlines the review process. The review begins in the program office (branch) where the product originates. Following staff review, the Program Director (Branch Chief) reviews and approves the product. It is then sent to the Associate Commissioner (Division director) and SSP for review. Within SSP, the product is assigned to an SSP statistician and a contractor support staff for technical review. Comments from the technical review are compiled and vetted by the SSP statistician and then sent to the program office for product revision. The technical review focuses on both the presentation of the results and the documentation of the survey methodology. The standards on *Statistical Analysis, Inference, and Comparisons*; *Variance Estimation*; *Tabular and Graphic Presentations of Data*; and *Survey Documentation in Reports* are of particular relevance to the technical reviews. The *Survey Documentation in Reports* standard captures much of the content of many other standards since it enumerates the various aspects of survey design, methodology, and measurement error that should be summarized in NCES reports.

Over the past eight years since the adoption of the 2002 standards some standards have received more attention than others and some have had a noticeable impact on survey operations. Some of these instances are provided below in more detail.

### **Response Rates**

The standards on the *Computation of Response Rates* and on *Survey Response Rate Parameters* helped to harmonize the use of response rates in the design and monitoring across NCES surveys. NCES data collections include both universe (census) collections from institutions and sample surveys. The sample surveys range from single stage to multistage surveys and cross-sectional to longitudinal surveys. The standard on computing response rates addresses these differences, while ensuring that the response rates for comparable surveys are computed consistently across types of surveys. Prior to the 2002 standards, there was not much comparability in the calculation of response rates across NCES surveys. With the implementation of the 2002 standards, this important dimension of survey quality can be compared across NCES data collections.

In anticipation of the 2002 standards revision, response rates were recomputed for extant NCES data collections using a consistent set of formulas. A review of the recomputed response rates showed that the levels of the response rates varied across surveys with different designs. This information was used to establish the target response rates included in the standard on *Survey Response Rate Parameters*. For example, experience showed that response rates are typically highest for universe data collections, followed by those for cross-sectional sample surveys, with the lowest response rates observed in initial recruitment stage in the first year of longitudinal sample surveys and in the screener stage of random digit dial (RDD) household surveys. The 1992 NCES standards did not differentiate between types of data collections, and as a result data collection

contracts at the time included unrealistic, and in some cases, unattainable response rates targets. The 2002 standards recognize these differences, with more realistic targets established for different types of surveys:

- 95 percent for universe data collections,
- 85 percent for each stage of cross-sectional sample surveys,
- 70 percent for the initial recruitment stage and 90 percent for all other stages and waves of longitudinal sample surveys, and
- 70 percent for the screener and 90 percent for the interviews in RDD household surveys.

These targets were set at the upper end of response rates observed for the different types of data collections. This change has resulted in more accurate cost estimates of data collection contracts.

### **Nonresponse Bias Analysis**

The standard on *Nonresponse Bias Analysis* also marked a significant change in practice at NCES. While the 1992 standards included a requirement for conducting a nonresponse bias analysis, it was required when the overall response rate fell below 70 percent. Since the overall response rate is typically the product of two or more survey stage rates in NCES data collections, it frequently came as a surprise at the end of a data collection when it was discovered that a series of two or more single stage rates just above 80 percent or one stage with a higher response rate and a second stage with a lower rate yielded an overall response rate of less than 70 percent. When these surprises occurred, it was often the case that a nonresponse bias analysis had not been budgeted for and as a result was at best done on a tight budget as an afterthought. The focus on the overall rate had the further complication that the analysis was not necessarily focused at the stage where the lowest response rate occurred. Recognizing these problems, during the review of the 2002 revisions, NCES senior managers decided to focus nonresponse bias analysis on unit level response rates and to set the requirement for nonresponse bias analysis in instances where the unit rate falls below 85 percent. These decisions focus the analysis on the stages of a data collection where response rates are the lowest.

The NCES standard on *Nonresponse Bias Analysis* discusses the need for adjusting the level of effort involved in the analysis to reflect the severity of the amount of nonresponse and the amount of bias initially identified, with the extreme being the use of a nonresponse followup survey. The decision to set the bar on the nonresponse bias analysis requirement at or above the target response rate used in survey design for a number of NCES data collections was intentional, as it would require most survey budgets to include the cost of a nonresponse bias analysis.

### **Low Response Rates and Survey Redesign**

The NCES standard for *Survey Response Rate Parameters* includes a requirement that NCES Project Directors notify NCES senior management when a data collection has an expected overall response rate of less than 50 percent. When this occurs the Project Director and Program Director (Branch Chief) consult with their Associate Commissioner (Division Director), the Chief Statistician, and the NCES Commissioner on the decision to proceed with data collection.

As an example, a response rate of 70 percent for the screener stage and 90 percent for the resulting surveys was not unattainable in the NCES National Household Education



Survey (NHES) that relied on an RDD household screener with follow-up surveys of eligible household members. However, the intervening years saw a precipitous drop in the screener response rate from rates between 69 and 74 percent between 1995 and 2001 (73, 70, 74, 69) to rates of 65 percent in 2003, 67 percent in 2005, and 53 percent in 2007.<sup>3</sup> The unit response rate for the follow-up extended interviews with eligible household members also declined in recent survey administrations from rates of 89 to 90 percent for parents of sampled children and rates of 80 to 85 percent for adults sampled for the Adult Education survey to the 2007 unit response rates of 74 and 77 percent for the two parent surveys and 62 percent for the Adult Education survey. These rates yielded overall rates of 41 percent for the School Readiness survey, 39 percent for the Parental and Family Involvement survey, and 33 percent for the Adult Education for Work-related Reasons survey.

Bivariate analysis of the telephone numbers and the demographic and socio-economic characteristics of their geographic areas showed a number of possible differences between screener respondents and nonrespondents. As a result, a multivariate analysis was done using a categorical search algorithm called Chi-Square Automatic Interaction Detection (CHAID) to better understand the complex relationships among the characteristics by examining the characteristics simultaneously with regard to unit response rates and the complex relationships among the characteristics by examining the characteristics simultaneously with regard to unit response. Response variation was observed on a number of key demographic and socioeconomic variables (i.e., race/ethnicity, Census region, Census Division, education level, median home values, percent renters, income, metropolitan status, answering machines, and mailable status).

Bivariate analysis of the follow-up extended interview samples were conducted using information from the screener. Census region and age or grade of the sampled child showed no measurable differences in the School Readiness survey. Grade level of the child and type of school showed no measurable differences, but participation was higher in the South and West than in the Northeast in the Parental and Family Involvement survey. Females and respondents who were the screener respondents had higher response rates, but no measurable differences were apparent between those who had or had not participated in adult education classes in the previous 12 month.

As a result of these observed differences between screened and other households and between respondents and nonrespondents and the overall response rates, a decision was reached to not continue processing the results from the 2007 adult education survey. Also, a bias study was conducted using field interviews, and ultimately a decision was reached to suspend the survey and undergo an extensive survey redesign.

### **Imputation**

Two additional difficulties came to light as a result of data quality monitoring, both involving imputation. In one instance, a survey program that had previously only used imputations for item nonresponse in limited circumstances took the requirement for imputing missing cases on key reporting variables in cross-sectional analysis to an extreme and imputed missing items for nonrespondents. Typically, nonrespondents are

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<sup>3</sup> Hagedorn, M., Roth, S.B., Carver, P., Van de Kerckhove, W., and Smith, S. (2009). *National Household Education Surveys Program of 2007: Methodology Report*. (NCES 2009-047). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

handled through a nonresponse adjustment rather than whole case item imputation. This procedure was stopped when identified. A review of the 2002 NCES standards found that although weighting is discussed in a number of specific standards on survey design, evaluation, nonresponse, and variance estimation, there is not a standard on survey weights. This shortcoming will be corrected in the next revision of the NCES standards.

The second instance involved an NCES survey that is able to obtain a sufficient number of the key variables for a sample case from administrative records to allow some students who do not respond to the student interview to be included as respondents in the data collection. When this happens, the item response rates on the student survey are lowered as a result of the inclusion of cases who did not participate in the survey. These missing survey items are imputed using information about the student from administrative record data and the sample frame. Having concluded that this unique circumstance was not addressed in the standards, program staff and the data collection contractor staff decided to take advantage of the fact that their student survey has a number of embedded skip patterns, and treat the cases whose imputed values skipped them out of a set of questions as legitimate skips (i.e., not as nonrespondents).

This came to light during the review of the technical documentation. In this case, this issue is addressed in the standard on the *Computation of Response Rates*, where the standard on item response rates states that when an abbreviated questionnaire is used to convert refusals, the eliminated questions are treated as item nonresponse. Although the nonrespondents were not converted per se, the administrative record and sample frame data serve the same purpose as the abbreviated questionnaire, and the unanswered questions are to be treated as nonresponse. In this case the item response rates were recomputed and the related item nonresponse bias analysis was redone to more accurately reflect the amount of nonresponse and to provide a basis for comparison across different NCES data collections.

### **Data Quality Monitoring**

The SSP data quality monitoring activities mentioned above play several important roles in the implementation of NCES standards. In addition to highlighting specific data problems, the data resulting from these monitoring activities are used to produce aggregate summary statistics across one or more of these monitored activities to get a measure of how well the agency is doing as a whole, either at one point in time or over time. The resulting data are used to develop quality summaries across all data collections. And, these data have provided the basis for agency performance measures resulting from the Government Performance and Results Act (GPRA).

## **Current Standards Revision Project**

In September of 2006, OMB issued *Standards and Guidelines for Statistical Surveys*, replacing the 1974 OMB Statistical Policy Directives Nos. 1 and 2 on Standards for Statistical Surveys, and Standards for Publishing Statistics. In the 2006 OMB standards, each standard is accompanied by guidelines that present recommended best practices to fulfill the goals of the standards. Taken together, the OMB standards and guidelines are intended to provide a means of ensuring consistency in statistical activities conducted across the Federal Government. They document the professional principles and practices that Federal agencies are required to adhere to and the level of quality and effort expected in all statistical activities.

In 2008, NCES initiated a standards review effort for revising the 2002 standards. All NCES staff members were invited to biweekly meetings to participate in the review process. This review focused primarily on a comparison of the NCES 2002 standards to the 2006 OMB standards. An extensive effort was undertaken to crosswalk the 2002 NCES standards to the 2006 OMB standards. The purpose was to ascertain any missing standards or guidelines. Through this crosswalk exercise, the *2002 NCES Statistical Standards* that overlapped substantively were found to be consistent with the OMB standards. However, there were areas in the OMB standards that were not sufficiently covered in the NCES standards. The missing topics in the NCES standards were weighting and confidence intervals. In addition, NCES staff identified a need to update the NCES standard on educational assessment and testing. Two smaller groups of NCES staff were assigned the task of authoring standards on weighting and on educational assessment and testing. Existing standards will be revised to include the use of confidence intervals.

The 2008 standards review also incorporated other changes:

- 1) The review process undertook the effort to identify technical changes that have been made to the standards between 2002 and 2008. For example, in late 2002 the Confidential Information Protection and Statistical Efficiency Act and reauthorizing law for NCES were both passed, resulting in changes in the applicable confidentiality laws. Also, a few standards had a clear meaning when first authored, but upon implementation were found to be ambiguous. As a result, between 2002 and 2008 several minor changes were made to the standards to correct for ambiguities. These changes needed to be formally captured and documented.
- 2) NCES staff participation provided the opportunity to fully vet all standards based on staff experiences in their use and implementation. Staff members were given the opportunity to suggest revisions. The review process also captured these suggestions for change.
- 3) The NCES standard on review of NCES products was modified to reflect changes implemented as a result of the 2002 establishment of the Institute of Education Sciences under the Education Sciences Reform Act.
- 4) In 2005, the Director of the Institute of Education Sciences requested that NCES commission an independent evaluation of the NCES confidentiality and data protection procedures. That review led to the inclusion of a measure of the data utility (Hellinger distance) that assesses the effect of data perturbations on the resulting data in the NCES data protection procedures. That change required a modification in the NCES confidentiality standard.
- 5) In 2008, the Department of Education issued a *Federal Register* notice on the collection and reporting of race and ethnicity in federal education data collections, and the 2002 NCES standard was revised to reflect the Department's guidance.

The revisions that reflect changes in law and regulations have been incorporated in the online version of the *2002 NCES Statistical Standards*. NCES plans to move forward with the final review and adoption of the other changes in the revised standards following the confirmation of a new Commissioner of Education Statistics.

## **Conclusion**

The importance of statistical standards and the need for all employees to accept and assume responsibility for their implementation within Federal agencies cannot be overemphasized. This is particularly important in an agency like NCES where the data collection effort is distributed across other Federal agencies and multiple contractors. Written detailed standards help to ensure consistency, reproducibility, and quality. The information that NCES produces for use by Federal and State governments, policymakers, and others is the basis for policy and actions that affect people's lives and well-being. It is essential that NCES collect, process, and publish information in a manner that guarantees and inspires confidence in their reliability. Hence, the overarching purpose of the NCES standards is to produce information that is held to a high standard of quality and reproducibility. This ensures that the information is useful, accurate, reliable, unbiased, and secure from disclosures.