

Beginning Teacher Longitudinal Study (BTLS)

Website: <http://nces.ed.gov/surveys/btls/>

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1. OVERVIEW

The Beginning Teacher Longitudinal Study (BTLS) is sponsored by the National Center for Education Statistics (NCES) on behalf of the U.S. Department of Education and was conducted by the U.S. Census Bureau. BTLS is a longitudinal study of a nationally representative cohort of beginning public school teachers who were initially interviewed as part of the 2007–08 Schools and Staffing Survey (SASS). For BTLS, “beginning public school teachers” were teachers who began teaching in 2007 or 2008 in a traditional public or public charter school that offered any of grades K–12 or comparable ungraded levels. The study was conducted on a yearly basis through academic year 2011–12, and it followed the same group of individuals as they moved in and out of elementary- and secondary-level teaching.

Purpose

The purpose of BTLS was to collect data that could enable researchers to determine the rate of beginning teachers’ attrition from, and reentry into, the K–12 teaching profession as well as the characteristics of those who stayed in the teaching profession, moved from one school to another, left the profession, or returned to the teaching profession. BTLS also collected data on the activities and occupations of those who left the teaching profession and data on the career patterns of those who remained in the profession. BTLS allows for an in-depth examination of the career development of the teachers in the cohort as they continued with elementary- or secondary-level teaching or transitioned into a different career.

Components

The first wave of data collection was conducted as part of the 2007–08 SASS (see the SASS chapter for details). Although SASS was administered to a sample of teachers across the United States, only respondents who indicated that their first year of teaching was in 2007 or 2008 were included in BTLS. The second wave of data collection was conducted as part of the 2008–09 Teacher Follow-Up Survey (TFS; see the TFS chapter for details). The third, fourth, and fifth waves of data collection are known as BTLS and represent a stand-alone study, separate from SASS and TFS.

Base year (wave 1). The first wave of BTLS was administered using the Teacher Questionnaire of the 2007–08 SASS. The purpose of the SASS Teacher Questionnaire was to obtain information about teachers’ education and training, teaching assignment, certification, workload, and perceptions and attitudes about teaching. The 2007–08 SASS Teacher Questionnaire had nine sections: (1) general information about teaching status, teaching experience, and other professional experience; (2) class organization, such as class enrollments, students with an Individualized Education Program, students of limited-English proficiency, organization of classes, and subjects taught; (3) educational background, including academic degrees, teacher assessments, and teacher preparation programs;

LONGITUDINAL SAMPLE SURVEY OF BEGINNING PUBLIC SCHOOL TEACHERS:

BTLS includes:

- Teacher Questionnaire of the 2007–08 Schools and Staffing Survey
- Questionnaire for Current Teachers and Questionnaire for Former Teachers of the 2008–09 Teacher Follow-Up Survey
- BTLS Questionnaires

(4) types of teaching certification, and content area and grades covered by the certification (for new teachers, information was collected on their attitudes toward preparation for teaching, participation in an induction program, and mentoring); (5) professional development activities and their impact; (6) working conditions, including information on hours worked, money spent on classroom supplies without reimbursement, and methods used to communicate with parents or students outside of the regular school day; (7) school climate and teacher attitudes (for example, attitudinal information on teacher influence on planning and teaching, collaboration between teachers, satisfaction with teaching, student problems, and school safety); (8) general employment and background information, including information about teacher salary, supplemental income, union affiliation, gender, age, and race/ethnicity; and (9) contact information for teachers, as well as contact information for two people who would be able to reach them if they relocated before the mailing of the TFS.

First follow-up (wave 2). The second wave of BTLS was conducted using the longitudinal versions of the Questionnaire for Current Teachers and the Questionnaire for Former Teachers of the 2008–09 TFS. The major objectives of the TFS questionnaires for current and former teachers were to measure the attrition rate of K–12 teachers, examine the characteristics of teachers who stayed in the teaching profession and those who changed professions or retired, obtain activity or occupational data for those who left the teaching profession, obtain reasons for moving to a new school or leaving the teaching profession, and collect data on job satisfaction.

The TFS questionnaires for current and former teachers are described below.

TFS Questionnaire for Current Teachers. The Questionnaire for Current Teachers obtained information on respondents to the previous year's SASS who continued to teach students in any of grades pre-K–12 in the current school year. This included teachers who continued to teach in the same school as in the previous year and those who changed schools. The questionnaire collected information on teachers' current teaching assignment, satisfaction with teaching, reasons for moving to a new school (if applicable), current teaching position in relation to their position in the previous year, and demographic characteristics that may have changed since the previous year.

The 2008–09 Questionnaire for Current Teachers had seven sections: (1) assignments at current school, full-time/part-time status, grades taught, main teaching

assignment, class organization, and Highly Qualified Teacher status; (2) information about the teaching position in the 2007–08 school year; (3) information about changes from the previous school year to the current school year (e.g., on whether or not the teacher was teaching at the same school as in the previous year and, if the teacher changed schools, information about the new school and factors that influenced the decision to leave the previous school); (4) current school conditions and experiences, including ratings of the current teaching position relative to the previous year's teaching position, overall satisfaction with being a teacher at the current school, and assignment to a mentor; (5) general employment information, such as earnings from summer school, non-teaching jobs, and non-school jobs; various additional forms of compensation received during the 2008–09 school year; base teaching salary; and receipt of a teacher pension; (6) background information, including information about work history, citizenship status, renting/owning a residence, family household income, marital status, and how many people the respondent and spouse/partner supported; and (7) contact information.

TFS Questionnaire for Former Teachers. The Questionnaire for Former Teachers obtained information about teachers who left the position of a K–12 teacher after the previous school year. It obtained information about respondents' present occupation or activity, reasons for leaving teaching, a comparison of their current position to teaching, and demographic characteristics that may have changed since the previous year.

The 2008–09 Questionnaire for Former Teachers had six sections: (1) employment status, including general information about employment, salary, pension from a teacher retirement system, and retirement incentives; (2) information about the factors that influenced the respondent's decision to leave the position of a K–12 teacher and about whether or not the respondent applied for the position of a K–12 teacher for the 2008–09 school year; (3) information about aspects of the respondent's current position relative to teaching (e.g., salary, benefits, professional development and advancement opportunities, recognition, safety, and job security); (4) data on year and month when the respondent first began to teach at the elementary or secondary level, being assigned a mentor, and characteristics of an alternative certification program (if applicable); (5) background information, such as information about work history, citizenship status, renting/owning a residence, family household income, marital status, and how many people the respondent and spouse/partner supported; and (6) contact information.

Third, fourth, and fifth follow-ups (waves 3, 4, and 5).

The third, fourth, and fifth waves of BTLS were administered separately from SASS or TFS. The major objectives were to measure the attrition rate of beginning teachers; examine the characteristics of teachers who continued to stay in the teaching profession and those who returned to teaching after leaving the year before; obtain activity or occupational data for those who left the position of a K–12 teacher; obtain reasons for moving to a new school or leaving or coming back to the K–12 teaching profession; and obtain data on the development of teachers' educational and professional credentials.

The 2009–10, 2010–11, and 2011–12 BTLS questionnaires had three paths—for former teachers, current teachers, and returning teachers—each of which is discussed below.

Former teachers. The BTLS questionnaire path for former teachers obtained information on employment status, ratings of various aspects of teaching and the respondent's current job, information on the decision to leave teaching, and ratings of various strategies for retaining more teachers. It had five sections: (1) employment status including general information about employment, salary, pension from a teacher retirement system, and retirement incentives; (2) information on leaving the teaching profession and future plans; (3) information on education and training (e.g., on renewal of teaching certificate and course enrollment during the current school year); (4) background information (e.g., work history, citizenship status, renting/owning a residence, family household income, marital status, and how many people the respondent and spouse/partner supported); and (5) contact information.

Current teachers. The BTLS questionnaire path for current teachers obtained information about teaching status and assignments, ratings of various aspects of principal support, and reasons that influenced teachers' decision to change schools (if applicable). It had seven sections: (1) information about the current school, including location, grade level, and perception of principal support; (2) information about changes from the previous school year to the present school year (e.g., whether or not the teacher was teaching at the same school as in the previous year and, if the teacher changed schools, about the new school and factors that influenced the decision to leave the previous school); (3) information on assignments and activities at the current school including full-time/part-time status, grades taught, main teaching assignment, class organization, highly qualified teacher status, and activities and leadership roles; (4) information on education and training (teaching certificates, courses

enrolled in during the current school year, and assignment as a mentor); (5) general employment information including information about earnings from summer school, non-teaching jobs, and non-school jobs; various additional forms of compensation received during the current school year; base teaching salary; and receipt of a teacher pension; (6) background information (e.g., work history, citizenship status, renting/owning a residence, family household income, marital status, and how many people the respondent and spouse/partner supported); and (7) contact information.

Returning teachers. The BTLS questionnaire path for returning teachers obtained information on teaching status and assignments and ratings of various aspects of teaching and returning to teaching. It had seven sections: (1) information about the current school, including location, grade level, and perception of principal support; (2) information about returning to K–12 teaching, including factors that influenced the decision to return; (3) assignments and activities at the current school, including information on main activity, full-time/part-time status, grades taught, main teaching assignment, class organization, Highly Qualified Teacher status, and activities and leadership roles; (4) information on education and training (teaching certificate, courses enrolled in during the current school year, and assignment as a mentor); (5) general employment information (earnings from summer school, non-teaching jobs, and non-school jobs; various additional forms of compensation received during the current school year; base teaching salary; and receipt of a teacher pension); (6) background information, such as work history, citizenship status, renting/owning a residence, family household income, marital status, and how many people the respondent and spouse/partner supported; and (7) contact information.

Periodicity

The first wave of BTLS data collection was conducted in the 2007–08 school year as part of the 2007–08 SASS. The second wave of BTLS data collection was conducted during the 2008–09 school year as part of the 2008–09 TFS. The third, fourth, and fifth waves of BTLS data collection were conducted yearly thereafter. The fifth wave was the final wave for the 2007–08 cohort of BTLS. Research is being conducted on the 2011–12 SASS to determine the feasibility of launching a second cohort for BTLS from the 2015–16 National Teacher and Principal Survey (NTPS), which is a redesign of SASS.

2. USES OF DATA

BTLS allows a better understanding of the impact that different life events—such as getting married, moving to a new location, or starting a family—have on teachers' careers. It also helps to understand how school and/or district characteristics and policies affect teacher satisfaction and how teachers respond to transitions in their careers (such as moving to a different school, changing the grade level or subject that they teach, becoming a mentor, transitioning into a K–12 administrative position, or exiting the teaching field). The study contributes to policymakers' understanding of teachers and of teachers' careers as they enter, leave, or re-enter the teaching workforce and make important career and life decisions.

The BTLS data can be used to answer numerous questions, including the following:

- Are beginning teachers who received formal mentoring from their school or district less likely to leave the profession or change schools in the first few years of their teaching career?
- Do mobility rates of teachers both within and outside of school districts change over time?
- Why do teachers leave the teaching profession and which factors have greater importance at various stages in their careers and lives?
- What proportion of teachers return to teaching after a break in their teaching career?
- What motivating factors bring former teachers back to the profession?

3. KEY CONCEPTS

Some of the concepts and terms used in the BTLS data collection and analysis are defined below.

Beginning public school teachers. Beginning public school teachers are defined as teachers who began teaching in 2007 or 2008 in a traditional public or public charter school that offered any of grades K–12 or comparable ungraded levels. These teachers include regular full- and part-time teachers, itinerant teachers, and long-term substitutes as well as any administrators, support staff, librarians, or other professional staff who taught at least one regularly scheduled class in the 2007–08 school year, excluding library skills classes.

Current/former status. This created variable indicates whether teachers are currently teaching during the year

of data collection. Starting with the second wave of data collection, the instrument included screening questions that set different paths for current teachers, former teachers, and returning teachers.

Stayer/mover/leaver/returner status. This is a created variable indicating whether teachers stayed in the same school as in the previous year of data collection, moved to a new school, left the teaching profession, or returned to the teaching profession after a leave of absence.

4. SURVEY DESIGN

Target Population

The target population is all public school teachers in the 50 states and the District of Columbia who began teaching in 2007 or 2008 in a traditional public or public charter school that offered any of grades K–12 or comparable ungraded levels. These teachers include regular full- and part-time teachers, itinerant teachers, and long-term substitutes, as well as any administrators, support staff, librarians, or other professional staff who taught at least one regularly scheduled class in the 2007–08 school year (excluding library skills classes).

Sample Design

Teachers sampled for BTLS were part of the SASS teacher sample, which was based on the Schools and Staffing Survey (SASS) school sample. Because SASS and BTLS are so interrelated, the description of sampling frames and sample selection begins with SASS and then moves on to BTLS.

SASS public schools. The foundation for the 2007–08 SASS public school frame was the preliminary 2005–06 Common Core of Data (CCD) Nonfiscal School Universe data file. The CCD includes regular and nonregular schools (special education, alternative, vocational, or technical), public charter schools, and Bureau of Indian Education (BIE) schools. The SASS definition of a school was generally similar to the CCD definition, with some exceptions: for a detailed list of frame modifications, see Tourkin et al. (2010). After the adding, deleting, and collapsing of school records, the SASS public school sampling frame consisted of 90,410 traditional public schools, 3,850 public charter schools, and 180 BIE schools.

The SASS sample is a stratified probability proportionate to size (PPS) sample. All schools underwent multiple levels of stratification. The sample was allocated so that national-, regional-, and state-level elementary and secondary school estimates and national-level combined public school estimates could be made. The sample was allocated to each state by

grade range (elementary, secondary, and combined) and school type (traditional public, public charter, BIE-funded, and schools with high-American Indian enrollment). For a full description of the allocation procedure, see Tourkin et al. (2010).

Within each stratum, schools were systematically selected using a PPS algorithm. The measure of size used for the schools was the square root of the number of teachers reported or imputed for each school during the sampling frame creation. Any school with a measure of size greater than the sampling interval (the inverse of the rate at which the sample is selected) was included in the sample with certainty and thus automatically excluded from the probability sampling operation. This means that schools with an unusually high number of teachers relative to other schools in the same stratum were automatically included in the sample. If the pattern of probabilities (i.e., the sum of the probabilities of schools within school district and grade level) did not guarantee a sampled school for that school district, the school with the highest probability of selection was included in the sample with certainty. This guaranteed that all school districts in these states would have at least one school in the sample. This produced a non-BIE school sample of 9,790 schools in the 2007–08 SASS (450 high-American Indian enrollment schools, 370 public charter schools, 20 career technical center schools, and 8,950 other traditional public schools).

SASS teachers. Teachers in SASS are defined as those who teach regularly scheduled classes to students in any of grades K–12. This includes administrators, librarians, and other professional or support staff who teach regularly scheduled classes on a part-time basis. Itinerant teachers are also included, as well as long-term substitutes who are filling the role of a regular teacher on a long-term basis. An itinerant teacher is one who teaches at more than one school (e.g., a music teacher who teaches three days per week at one school and two days per week at another). Short-term substitute teachers and student teachers are not included. Teacher rosters (i.e., Teacher Listing Forms) were collected from sampled schools, primarily by mail, and compiled at the U.S. Census Bureau. This compilation was done on an ongoing basis throughout the roster collection period. Along with the names of teachers, respondents at the sampled schools were asked to provide information about each teacher's teaching experience (1–3 years, 4–19 years, and 20 or more years), teaching status (full or part time), and subject matter taught (special education, general elementary, math, science, English/language arts, social studies, vocational/technical, or other), as well as

whether the teacher was expected to be teaching at the same school in the following year.

Sampling was done on an ongoing basis throughout the roster collection period. The U.S. Census Bureau first stratified teachers into five teacher types within each sampled school: (1) new teachers expected to stay at their current school, (2) mid-career and highly experienced teachers expected to stay at their current school, (3) new teachers expected to leave their current school, (4) mid-career teachers expected to leave their current school, and (5) highly experienced teachers expected to leave their current school. Before teachers were allocated to these strata, schools were allocated an overall number of teachers to be selected within each school stratum.

Sampling rates for teachers varied among the strata listed above. All teachers in categories 3–5 were oversampled at different rates. So that a school would not be overburdened by sampling too large a proportion of its teachers, the maximum number of teachers per school was set at 20. About 13 percent of the eligible public schools did not provide teacher lists. For these schools, no teachers were selected. Within each teacher stratum in each school, teachers were selected systematically with equal probability.

BTLS teachers. All SASS traditional public or public charter school teachers who responded to the SASS Teacher Questionnaire and reported their first year of teaching as 2007 or 2008 were included in the BTLS sample. A total of 2,000 teachers were included.

Data Collection and Processing

The first wave of data collection for BTLS (i.e., the 2007–08 SASS) was primarily a mailout/mailback survey with telephone follow-up. The second wave of BTLS (i.e., the 2008–09 TFS) was an online collection, followed by email and telephone reminders, a hard-copy mailing, and telephone follow-up. The third, fourth, and fifth waves of data collection for BTLS was primarily internet-based with telephone reminders.

Reference dates. Most data items for the first wave refer to the 2007–08 school year. Data collection for the first wave of BTLS was part of the 2007–08 School and Staffing Survey (SASS), which began in August 2007 and ended in June 2008. Questions for teachers about current teaching loads refer to the most recent full week that school was in session, and questions on professional development refer to the past 12 months. For the second through fifth waves of BTLS, most data items refer to teacher status at the time of questionnaire completion. Some items refer to the past school year, the past 12 months, or the next school year. Data collection for the second wave was conducted together

with the 2008–09 Teacher Follow-Up Survey (TFS), which began in February 2009 and ended in August 2009. Data were collected for the third through fifth waves of BTLS during January through June in each of the subsequent 3 years. Besides respondents identified as new teachers in the initial SASS data collection during 2007–08, there is a group of retrospective respondents. A retrospective completed interview means that a sampled teacher who met the criteria for inclusion in BTLS (i.e., completed a 2007–08 SASS Teacher Questionnaire and began teaching in 2007 or 2008) was a noninterview during the second wave of BTLS, but completed the required second-wave questions during the third wave. Similarly, during the fourth and fifth waves, those who had not responded during the previous wave were asked selected items about the previous wave. These respondents are referred to as retrospective respondents.

Data collection. This section describes the data collection activities of BTLS.

First-wave data collection. The first-wave collection utilized a primarily mail-based methodology with telephone and field follow-up. At the beginning of data collection, the U.S. Census Bureau telephone centers attempted to establish a survey coordinator at each school. Nonrespondents were contacted by telephone interviewers and/or field representatives. A list of teachers was collected from each sampled school using the SASS Teacher Listing Form in order to select a sample of teachers to receive the Teacher Questionnaire. Data collection for the Teacher Listing Form consisted of mailing the form to the school principal, following up with a reminder telephone call, and mailing a second Teacher Listing Form, if necessary. Finally, field representatives followed up on the Teacher Listing Form with telephone calls and/or personal visits, when needed.

The sample of teachers for the SASS Teacher Questionnaire was selected on a weekly basis as the Teacher Listing Forms were received, beginning in September 2007. The Teacher Questionnaires were then mailed to the survey coordinators or to individual teachers, if survey coordinators had not been established. Follow-Up efforts began by contacting the coordinators or the teachers directly, if there was no survey coordinator. Follow-Up efforts included reminder telephone calls, reminder postcards, and a second questionnaire mailing. If the reminder telephone call was placed to a teacher, he or she was given the option of completing the questionnaire by telephone. Nonresponding teachers were contacted by field representatives during field follow-up, during February and March 2008. Because the response rate for teachers

was sufficiently high toward the end of data collection, the final phase of field follow-up was cancelled. Nonresponding teachers were sent a third questionnaire in lieu of the field follow-up operation in April 2008.

Second-wave data collection. The second-wave data were primarily collected using an internet instrument. In September 2008, the TFS Teacher Status Form was mailed to each school that had at least one teacher who participated in the 2007–08 SASS. A knowledgeable person at the school (e.g., a school administrator or a member of the office staff) was asked to complete the Teacher Status Form by indicating each teacher's current occupational status. This information was used to determine whether each teacher listed was still teaching in that school (stayer), was teaching in another school (mover), or had left teaching (leaver). One week after the Teacher Status Form mailing, reminder postcards were sent to the sampled schools. Nonresponse follow-up efforts additionally consisted of staff placing scripted telephone calls to the schools in order to obtain teacher status information. Staff documented each call attempt by entering an outcome code in a call record; this outcome code indicated what had happened during each follow-up attempt (e.g., a complete interview was collected, a partial interview was collected, the school refused to participate). The final 2008–09 TFS response rate for the Teacher Status Form operation was 98.5 percent.

BTLS teachers were assigned the longitudinal versions of the TFS questionnaires, which contained more questions than the nonlongitudinal TFS questionnaires. During data collection, the U.S. Census Bureau determined that there were 150 cases that either had a discrepancy between the first year of teaching reported in the first and second waves or had not reported, during the second wave, the year when they first began teaching. About 100 cases were confirmed to have begun teaching before 2007 and were removed from the sample. Telephone follow-up efforts were conducted to resolve cases with this discrepancy or to collect the missing data, as well as to encourage participation or to collect data over the phone from nonrespondents. Throughout the telephone follow-up, paper questionnaires were mailed upon request. Finally, paper questionnaires were mailed in June 2009 to teachers who had not yet completed the survey.

Third-, fourth-, and fifth-wave data collection. The Census Bureau conducted the third, fourth, and fifth waves of the BTLS during the 2009–10, 2010–11, and 2011–12 school years, respectively. The third wave of BTLS was conducted using solely an internet instrument. In November 2009, the U.S. Census Bureau mailed a pre-contact letter to all sampled individuals

informing them that they would be contacted shortly to participate in BTLS. A Contact Information Update Card was sent with the letter. The Contact Information Update Card was pre-printed with all the contact information that the respondents provided on their 2008–09 TFS survey or, if they were nonrespondents in TFS, the information provided on their 2007–08 SASS Teacher Questionnaire. The sampled individuals were asked to update their contact information as necessary, or to mark a box indicating that the pre-printed information was correct, and return the card to the U.S. Census Bureau. In December 2009 and January 2010, before the initial letters were mailed, U.S. Census Bureau staff researched cases where the pre-contact letter with the Contact Information Update Card was returned by the United States Postal Service (USPS) as “Undeliverable As Addressed.” Telephone follow-up efforts were conducted to encourage participation or to collect BTLS data over the phone from nonrespondents and have the data entered directly into the internet instrument by the telephone operator.

Similarly, the fourth- and fifth-wave of BTLS was also collected using a single internet instrument, so that all sample members responded to the same questionnaire, regardless of their teaching status during that year. For each of these waves, telephone follow-up efforts were conducted to encourage participation or to collect BTLS data over the phone from nonrespondents. During data collection for waves 3 and 4, the Census Bureau discovered that about 10 sample members were not first-year teachers in 2007 or 2008 and therefore were not eligible for BTLS. These cases were removed from the BTLS sample. No cases were removed from the sample during wave 5. Approximately 1,990 eligible teachers are included in the final BTLS sample.

Processing. Once the BTLS first-wave data collection (as part of the 2007–08 SASS) was complete, all SASS questionnaires were shipped to the U.S. Census Bureau clerical processing staff at the National Processing Center (NPC) in Jeffersonville, Indiana, where they were assigned a check-in code that indicated their completion status. The data from completed questionnaires were captured and sent to U.S. Census Bureau analysts in weekly waves of reformatted datasets, by questionnaire type. Since BTLS only included teachers who taught in a public school in the 2007–08 school year, the only SASS questionnaire type that is discussed is the Teacher Questionnaire. U.S. Census Bureau analysts began the data review process by assigning each case a preliminary interview status code. Then a series of computer edits were run on the data to identify and correct inconsistencies, assign a final interview status to each case, and impute items that were still categorized as “not answered” after

taking into account item responses that were blank due to a questionnaire skip pattern. After all of the SASS Teacher Questionnaire data were processed, the BTLS First-Wave data file was created.

The Automated Tracking and Control (ATAC) system was used to assign a check-in status code for each paper questionnaire received; questionnaires completed on the Internet were automatically assigned check-in codes by the internet instrument. The data from completed paper questionnaires were then captured (converted from paper to electronic format using manual data keying), combined with data from the internet instrument, and sent to U.S. Census Bureau analysts in reformatted SAS datasets for data review. Data processing was conducted within each questionnaire type: the Questionnaire for Current Teachers (form TFS-3L), which collected information on sampled teachers who were currently teaching students in any of grades pre-K–12; and the Questionnaire for Former Teachers (form TFS-2L), which collected information on sampled teachers who left the pre-K–12 teaching profession after the 2007–08 school year.

In the third wave, the completed internet questionnaires were automatically assigned check-in codes by the BTLS internet instrument. The internet instrument included questions for both current and former teachers. Several questions in the survey, designated as “critical,” needed to be completed because they served as screener questions, and the respondent’s answers determined which questionnaire path the respondent would follow: namely, the former teacher path, the current teacher path, or the returning teacher path. After data collection was complete, the third-wave data were formatted into SAS datasets.

For the third, fourth, and fifth waves of BTLS, data processing was conducted within each survey respondent type. A series of computer edits were then run on the data to identify and correct inconsistencies and delete extraneous entries in situations where skip patterns were not followed correctly or to assign the “not answered” code to items that should have been answered but were not. Once the Census Bureau reviewed all data for a wave, they created the edited BTLS data file for that wave in preparation for the next stage of data processing—imputation. Data collected retrospectively during the third wave were added into the second-wave data file. Similarly, data collected retrospectively during the fourth and fifth waves were added into the data file for the previous wave.

Estimation Methods

National estimates produced using BTLS data are weighted to adjust for sampling and unit nonresponse.

Many estimates are subject to missing data because BTLS is not a fully imputed dataset. However, several variables in each BTLS wave were identified as “key variables” and were imputed. Weighting and imputation procedures are discussed below.

Weighting. For the first wave of BTLS, weights were obtained directly from the 2007–08 SASS. For the second, third, fourth, and fifth waves of BTLS, an initial basic weight (the inverse of the sampled teacher’s probability of selection in SASS) is used as the starting point. A weighting adjustment is then applied that reflects the impact of the SASS teacher weighting procedure. Next, a nonresponse adjustment factor is calculated and applied using information that is known about the respondents and nonrespondents from the sampling frame data. Finally, a ratio adjustment factor is calculated and applied to the sample to adjust the sample totals to the First Wave totals (excluding out-of-scopes found in the later waves) in order to reduce sampling variability. The products of these factors are the analysis weights for the second through fifth waves of BTLS.

For longitudinal analysis over multiple waves, longitudinal weights are provided for waves 1 through 3, waves 1 through 4, and waves 1 through 5. Longitudinal weights are used when change over time within a single population is being examined by using more than one wave of data. Only sample units with unit response in all waves are viewed as longitudinal respondents and are given positive longitudinal weights. Because all BTLS sample members responded to wave 1, the wave 2 analysis weights may be used when change between wave 1 and 2 is being examined using data from the two waves. For each wave where retrospective response was possible, a second version of both the analysis and longitudinal weights, incorporating retrospective responses, was calculated. The same procedures described above were followed. Both sets of weights are present on the BTLS file.

More specifically, 14 final weights are included in the first- through fifth-wave BTLS data file: the first-wave analysis weight, second-wave analysis weight, second-wave retrospective analysis weight, third-wave analysis weight, third-wave retrospective analysis weight, third-wave longitudinal weight, third-wave retrospective longitudinal weight, fourth-wave analysis weight, fourth-wave retrospective analysis weight, fourth-wave longitudinal weight, fourth-wave retrospective longitudinal weight, fifth-wave analysis weight, fifth-wave longitudinal weight, and fifth-wave retrospective longitudinal weight. Each weight corresponds to particular analytic questions and, when applied, adjusts for nonresponse and oversampling of certain subgroups.

Imputation. The first wave of BTLS differs from the subsequent waves because it was originally processed as part of SASS, which is a fully imputed dataset. Missing data in SASS were imputed using hot deck imputation or mean or mode imputation. However, for BTLS, key variables in the first wave were reimputed using the cross-wave imputation method, if possible. Cases with missing data that could not be resolved in this way retained their original SASS imputed value. The imputation that occurred for the BTLS first wave during SASS data processing was specific to that wave and did not occur during data processing for the BTLS second, third, fourth and fifth waves.

For each of the second through fifth waves of BTLS, only variables identified as key analytical variables were imputed. During the imputation stage of processing, two main approaches were used to fill “not answered” items with data. In one approach, called “cross-wave imputation,” data were imputed, whenever possible, from the same case, either from the preceding or the subsequent BTLS wave; cross-wave imputation was used for all waves. In the second method, known as “weighted sequential hot deck imputation,” data were imputed using items from other cases that had certain predetermined characteristics in common, while keeping the means and distributions of the full set of data, including imputed values, consistent with those of the unimputed respondent data.

As the BTLS data went through the different stages of imputation, a numerical flag corresponding to type of imputation was assigned to each imputed item. By looking at the flag values, users of the data are able to identify which items were imputed and how the imputations were performed. Users can also utilize this imputation flag to decide whether or not to include imputed data in their analysis and which types of imputed data to employ.

After the imputation of the key variables was completed, data from the five waves were then combined into one five-wave BTLS file for release by NCES as a restricted-use data file to licensed users. This file is called the *First Through Fifth Waves of the 2007–08 Restricted-use Beginning Teacher Longitudinal Study Data File* (NCES 2014-338).

5. DATA QUALITY AND COMPARABILITY

BTLS estimates are based on samples. The sample estimates may differ somewhat from the values that would be obtained from administering a complete census using the same questionnaires, instructions, and

enumerators. The differences occur because a sample survey estimate is subject to two types of error: sampling and nonsampling.

Sampling Error

In surveys with complex sample designs, such as BTLS, direct estimates of sampling errors that assume a simple random sample will typically underestimate the variability in the estimates. The BTLS sample design and estimation include procedures that deviate from the assumption of simple random sampling, such as stratifying the school sample, oversampling new teachers, and sampling with differential probabilities. Therefore, to accurately estimate variance, users must employ special calculations. For BTLS, the complex sample design is accounted for by using a replication method to calculate the sampling errors.

Replication methods involve constructing a number of subsamples (i.e., replicates) from the full sample and computing the statistic of interest for each replicate. The mean square error of the replicate estimates around the full sample estimate provides an estimate of the variance of the statistic. Since the BTLS sample was a subset of the SASS teacher sample, the SASS teacher replicates were used as the replicate weights for the BTLS sample. The BTLS base weight for each BTLS teacher was multiplied by each of the 88 SASS replicate weights divided by the SASS teacher full-sample base weight for that teacher. To calculate 88 replicate weights, which should be used for variance calculations, these BTLS replicate basic weights were processed through the remainder of the BTLS weighting system. All of the replicate weights were produced using a bootstrap procedure.

Nonsampling Error

One important source of non-sampling errors in BTLS is nonresponse. Other sources of nonsampling errors include definitional difficulties, the inability or unwillingness of respondents to provide correct information, the inability of respondents to recall information, errors made in data collection, differences in the interpretation of questions, and other instances of human error occurring during the multiple stages of a survey cycle.

Nonresponse error. The unit response rate is the rate at which the sampled units respond by substantially completing the questionnaire. Note that the first wave of BTLS consisted of public school teachers who indicated on the SASS Teacher Questionnaire that they began teaching in either 2007 or 2008; whether or not a teacher was a first-year teacher was not known prior to the collection of the SASS teacher data. Therefore, the unit response rate for first-year teachers in SASS cannot

be calculated. Unit response rates can, however, be calculated as unweighted or weighted using broader categories of teachers' experience: 3 years or less, 4 to 19 years, or 20 or more years. Thus, the response rates are those of the 2007–08 SASS public school teachers with 1 to 3 years of experience, not just the first-year teachers included in BTLS (see Table BTLS-1).

The unweighted response rates are the number of 2007–08 SASS public school teachers with 1 to 3 years of experience who were interviewed divided by the number of eligible (in-scope) sampled units, which includes respondents plus nonrespondents but excludes ineligible (out-of-scope) units. The weighted response rates are the base-weighted number of interviewed cases divided by the base-weighted number of eligible cases. The base weight for each sampled unit is the initial basic weight multiplied by the sampling adjustment factor.

The overall response rate represents the response rate to the survey, taking into consideration each stage of data collection (i.e., BTLS wave, SASS Teacher Listing Form, and SASS public school teachers with 1 to 3 years experience). The overall response rate for the BTLS first wave is the product of the survey response rates: (SASS Teacher Listing Form response rate) \times (SASS public school teachers with 1 to 3 years of experience response rate). The overall response rate for each of the remaining waves (second through fifth) is the product of three factors: (1) SASS Teacher Listing Form response rate; (2) response rate of SASS public school teachers with 1 to 3 years of experience; and (3) BTLS unit response rate for that wave.

The NCES Statistical Standards require a nonresponse bias analysis when base-weighted unit and item response rates fall below 85 percent. For BTLS, the base-weighted unit response rates were as follows: not applicable for the first wave; 84.5 percent for the second wave without retrospective cases included (i.e., respondents who were noninterviews during the second wave but who subsequently provided responses to second wave items during the third wave interview); 91.9 percent for the second wave with retrospective cases included; 86.1 percent for the third wave without retrospective cases included; 91.4 percent for the third wave with retrospective cases included; 83.7 percent for the fourth wave without retrospective cases included; 84.6 percent for the fourth wave with retrospective cases included; and 77.7 percent for the fifth wave.

Even though the BTLS achieved close to an 85 percent base-weighted response rate in most stages, all waves of BTLS data files were evaluated for potential bias.

Table BTLS-1. Unweighted and base-weighted response rates for BTLS first through fifth waves by stage of data collection, wave, and type of weighting: 2007–08 through 2011–12

Type of response rate	BTLS wave	2007–08 SASS Teacher Listing Form	2007–08 SASS public school teachers with 1 to 3 years of experience	Overall response rate
First wave				
Unweighted	†	86.7	84.6	73.4
Base-weighted	†	86.2	84.3	72.7
Second wave without retrospective cases				
Unweighted	84.7	86.7	84.6	62.1
Base-weighted	84.5	86.2	84.3	61.4
Second wave with retrospective cases				
Unweighted	91.8	86.7	84.6	67.4
Base-weighted	91.9	86.2	84.3	66.8
Third wave without retrospective cases				
Unweighted	86.2	86.7	84.6	63.3
Base-weighted	86.1	86.2	84.3	62.5
Third wave with retrospective cases				
Unweighted	91.2	86.7	84.6	66.9
Base-weighted	91.4	86.2	84.3	66.4
Fourth wave without retrospective cases				
Unweighted	83.7	86.7	84.6	61.4
Base-weighted	83.7	86.2	84.3	60.8
Fourth wave with retrospective cases				
Unweighted	84.8	86.7	84.6	62.2
Base-weighted	84.6	86.2	84.3	61.4
Fifth wave				
Unweighted	77.3	86.7	84.6	56.7
Base-weighted	77.7	86.2	84.3	56.5

† Not applicable.

NOTE: Second-wave retrospective cases are sample members who did not respond during the second wave, but provided replies to second-wave survey items during the third wave. Similarly, third-wave and fourth-wave retrospective cases did not respond during the collection wave but answered retrospectively during the subsequent wave. Base-weighted response rates use the inverse of the probability of selection and the sampling adjustment factor.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Beginning Teacher Longitudinal Study (BTLS), "First Through Fifth Waves Data File, 2007–08, 2008–09, 2009–10, 2010–11, and 2011–12".

Comparisons between the eligible respondents (i.e., respondents plus nonrespondents) and the respondents were made before and after the noninterview weighting adjustments were applied in order to evaluate the extent to which the adjustments reduced or eliminated nonresponse bias.

The degree of nonresponse bias is a function of two factors: the nonresponse rate and how much the respondents and nonrespondents differ on survey variables of interest. In the nonresponse bias for the first wave, a variable-free estimate of the bias, referred to as a relative bias, was used to compare biases across

all variables included in the analysis. Relative bias was estimated for variables known for respondents and nonrespondents. Note that for the first wave, first-year teachers were not identifiable from the sampling frame, although teachers in the first 3 years of their career were identified on the SASS Teacher Listing Form. For the first-wave nonresponse bias analysis, the following variables were available for both nonrespondents and respondents: full-time/part-time status, subject taught, teaching status at current school, school type, grade level, percent minority, percent free or reduced-price lunch, total enrollment, locale, level, and Title I status. For the nonresponse bias analysis of data from the second through fifth waves and the longitudinal datasets, extensive data are available for all teachers from the 2007–08 SASS sampling frame and teacher data files (both nonrespondents and respondents), and 42 items were used in the unit nonresponse bias analysis for these waves.

The following steps were followed to compute the relative bias. First, the nonresponse bias was estimated and tested to determine if the bias is significant at the 5-percent level. Second, noninterview adjustments were computed. The noninterview adjustments, which are included in the weights, were designed to significantly reduce or eliminate unit nonresponse bias for variables included in the models. Third, after the weights were computed, any remaining bias was estimated and statistical tests were performed to check the remaining significant nonresponse bias. For this comparison, nonresponse bias was calculated as the difference between the base-weighted sample mean and the nonresponse-adjusted respondent mean, which evaluates the effectiveness of each noninterview adjustment in mitigating nonresponse bias. Sampled teachers found to be ineligible for BTLS were excluded from the analysis. Following these efforts, the weighting adjustments eliminated some, but not all, significant nonresponse bias from each wave of BTLS.

Item response rates indicate the percentage of respondents who answered a given survey question or item. Weighted item response rates are produced by dividing the number of sampled cases responding to an item by the number of sampled cases eligible to answer the item and adjusting by either the base or final weight. The base weight for each sampled unit is the initial basic weight multiplied by the sampling adjustment factor. The final weight for each sampled unit is the base weight adjusted for unit nonresponse and then ratio adjusted to the frame total.

For first-year SASS public school teachers, the base- and final-weighted item response rates ranged from 0 to 100 percent: 82.5 percent of items had a base-weighted

response rate of 85 percent or higher, and 83.3 percent of items had a final-weighted response rate of 85 percent or higher.

For the second wave of BTLS, the base-weighted item response rates without retrospective cases ranged from 4.3 to 100 percent and the final-weighted item response rates ranged from 3.8 to 100 percent: 87.2 percent of items had a base-weighted response rate of 85 percent or more, and 86.8 percent of items had a final-weighted response rate of 85 percent or more. The base-weighted item response rates with retrospective cases for the second wave ranged from 4.3 to 100 percent, and the final-weighted item response rates ranged from 3.9 to 100 percent: 87.8 percent of items had a base-weighted response rate of 85 percent or more and 87.8 percent had a final-weighted response rate of 85 percent or more.

For the third wave of BTLS, the base- and final-weighted item response rate without retrospective cases ranged from 0 to 100 percent: 86.3 percent of items had a base-weighted response rate of 85 percent or more, and 86.7 percent of items had a final-weighted response rate of 85 percent or more. The base- and final-weighted item response rate with retrospective cases ranged from 0 to 100 percent: 85.5 percent of items had a base-weighted response rate of 85 percent or more, and 85.9 percent of items had a final-weighted response rate of 85 percent or more.

For the fourth wave of BTLS, the base-weighted item response rate without retrospective cases ranged from 46.6 to 100 percent and the final-weighted item response rates ranged from 47.9 to 100 percent: 85.6 percent of items had a base-weighted response rate of 85 percent or more, and 84.7 percent of items had a final-weighted response rate of 85 percent or more. The base- and final-weighted item response rate with retrospective cases ranged from 0 to 100 percent: 84.9 percent of items had a base-weighted response rate of 85 percent or more, and 84.5 percent of items had a final-weighted response rate of 85 percent or more.

For the fifth wave of BTLS, the base-weighted item response rate ranged from 50.3 to 100 percent and the final-weighted item response rates ranged from 50.8 to 100 percent: 87.6 percent of items had a base-weighted response rate of 85 percent or more, and 86.5 percent of items had a final-weighted response rate of 85 percent or more.

For waves 1-3, the nonresponse bias analysis conducted at the item level did not reveal substantial evidence of item bias in the data files. For waves 4 and 5, none of the items used in this report have an item response rate less than 85 percent.

Measurement error. Measurement errors are attributed to many sources, including the inability or unwillingness of respondents to provide correct information, the inability of respondents to recall information, differences in the interpretation of questions, errors made in recording or coding the data, errors made in processing the data, and errors made in estimating values for missing data. Quality control and edit procedures were used to reduce errors made by respondents, coders, and interviewers.

Data comparability. The BTLS data were released as a restricted-use data file. No comparable data are currently available.

6. CONTACT INFORMATION

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7. METHODOLOGY AND EVALUATION REPORTS

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