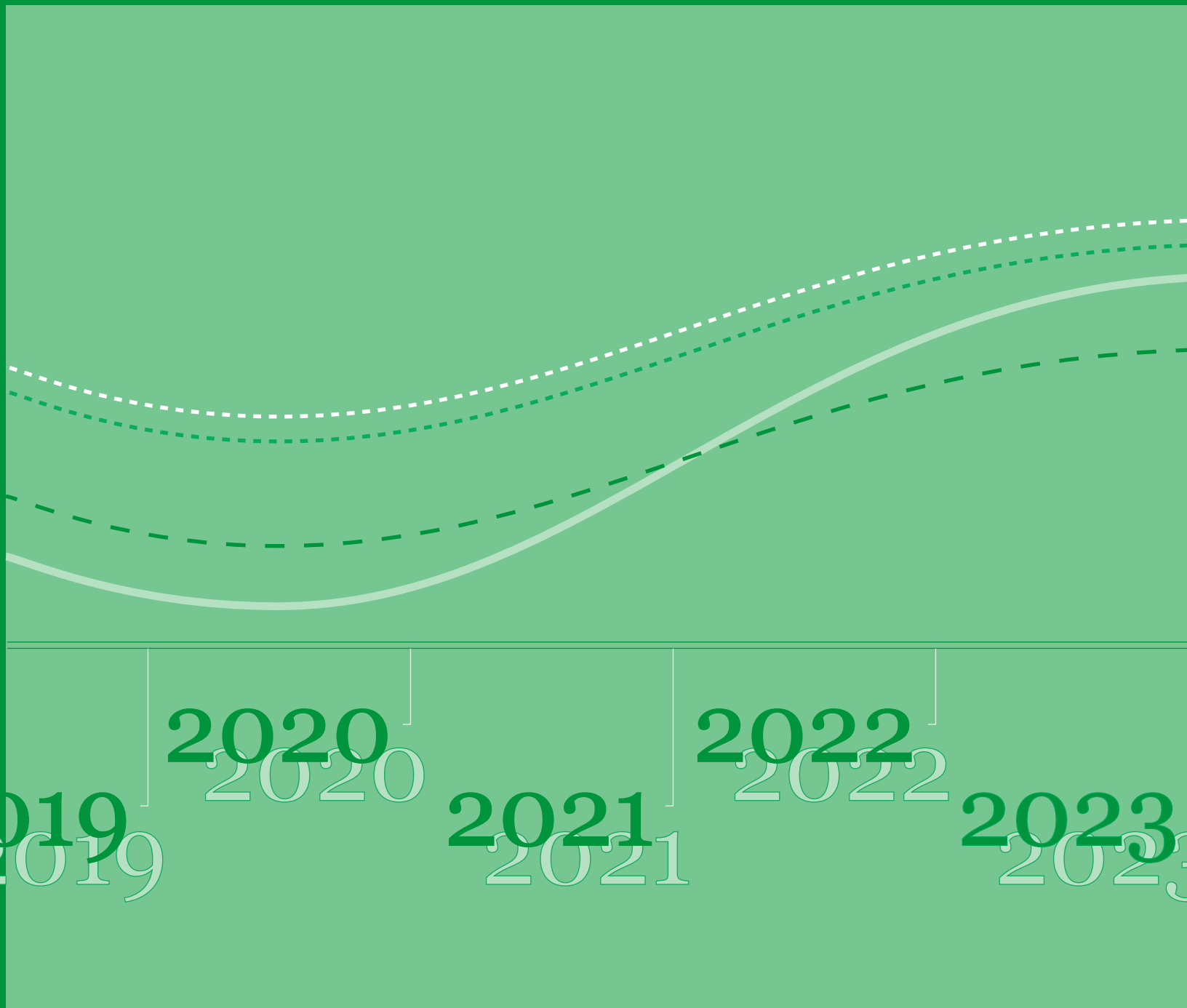


# Projections of Education Statistics to 2023

Forty-second Edition



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Forty-second Edition

**April 2016**

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# Foreword

*Projections of Education Statistics to 2023* is the 42nd report in a series begun in 1964. It includes statistics on elementary and secondary schools and postsecondary degree-granting institutions. This report provides revisions of projections shown in *Projections of Education Statistics to 2022* and projections of enrollment, graduates, teachers, and expenditures to the year 2023.

In addition to projections at the national level, the report includes projections of public elementary and secondary school enrollment and public high school graduates to the year 2023 at the state level. The projections in this report were produced by the National Center for Education Statistics (NCES) to provide researchers, policy analysts, and others with state-level projections developed using a consistent methodology. They are not intended to supplant detailed projections prepared for individual states.

Assumptions regarding the population and the economy are the key factors underlying the projections of education statistics. NCES projections do not reflect changes in national, state, or local education policies that may affect education statistics.

Appendix A of this report outlines the projection methodology and describes the models and assumptions used to develop the national and state projections. The enrollment models use enrollment data and population estimates and projections from NCES and the U.S. Census Bureau. The models are based on the mathematical projection of past data patterns into the future. The models also use projections of economic variables from IHS Global Inc., an economic forecasting service.

The projections presented in this report are based on the 2010 census and assumptions for the fertility rate, internal migration, net immigration, and mortality rate from the Census Bureau. For further information, see appendix A.

**Thomas D. Snyder, Program Director**  
Annual Reports and Information  
National Center for Education Statistics

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# About This Report

## PROJECTIONS

This edition of *Projections of Education Statistics* provides projections for key education statistics, including enrollment, graduates, teachers, and expenditures in elementary and secondary public and private schools, as well as enrollment and degrees conferred at postsecondary degree-granting institutions. Included are national data on enrollment and graduates for the past 15 years and projections to the year 2023. Also included are state-level data on enrollment in public elementary and secondary schools and public high schools from 2005, with projections to 2023. This report is organized by the level of schooling with sections 1, 2, 3, and 4 covering aspects of elementary and secondary education and sections 5 and 6 covering aspects of postsecondary education.

There are a number of limitations in projecting some statistics. First, state-level data on enrollment and graduates in private elementary and secondary schools and on enrollment and degrees conferred in postsecondary degree-granting institutions are not included. Neither the actual numbers nor the projections of public and private elementary and secondary school enrollment include homeschooled students. Projections of elementary and secondary school enrollment and public high school graduates by age, state, and race/ethnicity are not included as the projections of the population by age, state, and race/ethnicity are not presently available. While there were enough years of data to produce projections of public elementary and secondary enrollment separately for Asians and Pacific Islanders, there were not enough years of data to produce separate projections for Asians and Pacific Islanders for either public high school graduates or enrollment in degree-granting postsecondary institutions.

Similar methodologies were used to obtain a uniform set of projections for each of the 50 states and the District of Columbia. These projections are further adjusted to agree with the national projections of public elementary and secondary school enrollment and public high school graduates contained in this report.

The summary of projections provides highlights of the national and state data, while the reference tables and figures present more detail. All calculations within *Projections of Education Statistics* are based on unrounded estimates. Therefore, the reader may find that a calculation, such as a difference or percentage change, cited in the text or figure

may not be identical to the calculation obtained by using the rounded values shown in the accompanying tables. Most figures in this report present historical and forecasted data from 1998 through 2023. The shaded area of these figures highlights the projected data and begins at the last year of actual data and ends in 2023. As the last year of historical data differs by survey, the year in which the shaded area begins also differs.

Most statements in sections 1 through 6 examine a single statistic over a period of time. In each case, a trend test using linear regression was conducted to test for structure in the data over that time period. If the  $p$  value for the trend variable was less than 0.05, the text states that the statistic has either increased or decreased. Alternatively, if the  $p$  value was greater than 0.05, the text only compares the first and last years in the time period.

Appendix A describes the methodology and assumptions used to develop the projections; appendix B presents supplementary tables; appendix C describes data sources; appendix D is a list of the references; appendix E presents a list of abbreviations; and appendix F is a glossary of terms.

## LIMITATIONS OF PROJECTIONS

Projections of a time series usually differ from the final reported data due to errors from many sources, such as the properties of the projection methodologies, which depend on the validity of many assumptions.

The mean absolute percentage error is one way to express the forecast accuracy of past projections. This measure expresses the average of the absolute values of errors in percentage terms, where errors are the differences between past projections and actual data. For example, based on past editions of *Projections of Education Statistics*, the mean absolute percentage errors of public school enrollment in grades prekindergarten through 12 for lead times of 1, 2, 5, and 10 years were 0.3, 0.6, 1.3, and 2.5 percent, respectively. In contrast, mean absolute percentage errors of private school enrollment in grades prekindergarten through 8 for lead times of 1, 2, 5, and 10 years were 1.9, 3.9, 8.0, and 14.7 percent, respectively. For more information on mean absolute percentage errors, see table A-2 in appendix A.

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# Section 1

## Elementary and Secondary Enrollment

### INTRODUCTION

Total public and private elementary and secondary school enrollment was 55 million in fall 2011, representing a 4 percent increase since fall 1998 (table 1). Between fall 2011, the last year of actual public school data, and fall 2023, a further increase of 4 percent in total enrollment is expected. Public school enrollment is projected to be higher in 2023 than in 2011 while private school enrollment is projected to be lower. Public school enrollments are projected to be higher in 2023 than in 2011 for Hispanics, Asians/Pacific Islanders, and students of Two or more races. Enrollment is projected to be lower for Whites, American Indians/Alaska Natives, and about the same for Blacks (table 6). Public school enrollments are projected to be higher in 2023 than in 2011 for the South and West, and lower in the Northeast and Midwest (table 3).

#### Factors affecting the projections

The grade progression rate method was used to project school enrollments. This method assumes that future trends in factors affecting enrollments will be consistent with past patterns. It implicitly includes the net effect of factors such as dropouts, deaths, nonpromotion, transfers to and from public schools, and, at the state level, migration. See appendixes A.0 and A.1 for more details.

#### Factors that were not considered

The projections do not assume changes in policies or attitudes that may affect enrollment levels. For example, they do not account for changing state and local policies on prekindergarten (preK) and kindergarten programs. Continued expansion of these programs could lead to higher enrollments at the elementary school level. Projections exclude the number of students who are homeschooled.

#### Students of Two or more races

This is the third edition of *Projections of Education Statistics* to include actual and projected numbers for enrollment in public elementary and secondary school for students of Two or more races. Collection of enrollment data for this racial/ethnic group began in 2008. The actual values from 2008 through 2011 and all the projected values for enrollments of the other racial/ethnic groups are lower than they would have been if this racial/ethnic category had not been added.

### Accuracy of Projections

An analysis of projection errors from the past 30 editions of *Projections of Education Statistics* indicates that the mean absolute percentage errors (MAPEs) for lead times of 1, 2, 5, and 10 years out for projections of public school enrollment in grades preK–12 were 0.3, 0.6, 1.3, and 2.5 percent, respectively. For the 1-year-out prediction, this means that the methodology used by the National Center for Education Statistics (NCES) has produced projections that have, on average, deviated from actual observed values by 0.3 percent. For projections of public school enrollment in grades preK–8, the MAPEs for lead times of 1, 2, 5, and 10 years out were 0.3, 0.6, 1.5, and 3.1 percent, respectively, while the MAPEs for projections of public school enrollment in grades 9–12 were 0.4, 0.7, 1.2, and 2.5 percent, respectively, for the same lead times. An analysis of projection errors from the past 12 editions of *Projections of Education Statistics* indicates that the mean absolute percentage errors (MAPEs) for lead times of 1, 2, 5, and 10 years out for projections of private school enrollment in grades preK–12 were 2.2, 5.5, 8.3, and 15.2 percent, respectively. For projections of private school enrollment in grades preK–8, the MAPEs for lead times of 1, 2, 5, and 10 years out were 1.9, 3.9, 8.0, and 14.7 percent, respectively, while the MAPEs for projections of private school enrollment in grades 9–12 were 2.7, 2.4, 2.6, and 6.4 percent, respectively, for the same lead times. For more information, see table A-2 in appendix A.



# NATIONAL

Total elementary and secondary enrollment

- ▲ increased 4 percent between 1998 and 2011; and
- ▲ is projected to increase 4 percent between 2011 and 2023.

Enrollment in prekindergarten through grade 8

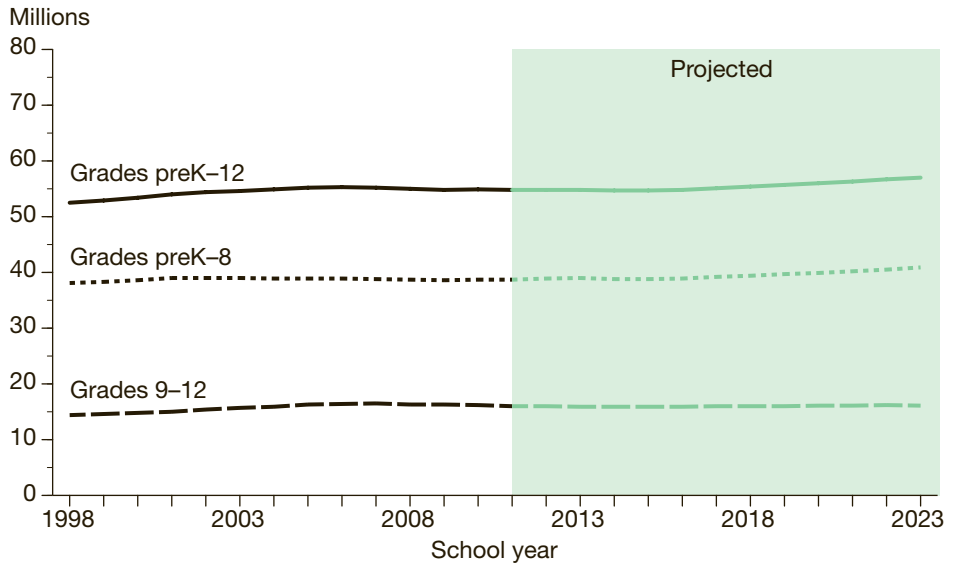
- ▲ was 2 percent higher in 2011 than in 1998; and
- ▲ is projected to increase 6 percent between 2011 and 2023.

Enrollment in grades 9–12

- ▲ increased 11 percent between 1998 and 2011; and
- ▲ is projected to increase 1 percent between 2011 and 2023.

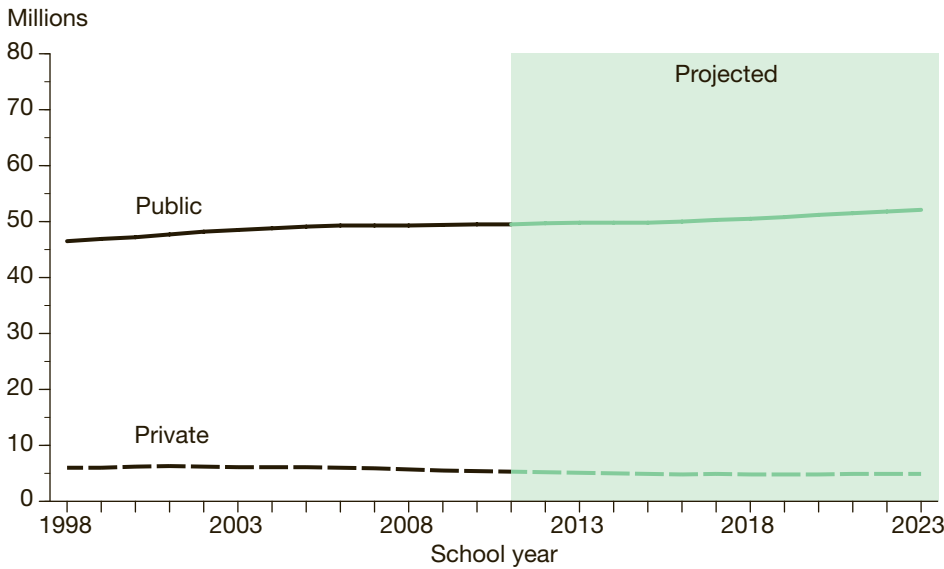
*For more information:  
Table 1*

**Figure 1. Actual and projected numbers for enrollment in elementary and secondary schools, by grade level: Fall 1998 through fall 2023**



NOTE: PreK = prekindergarten. Enrollment numbers for prekindergarten through 12th grade and prekindergarten through 8th grade include private nursery and prekindergarten enrollment in schools that offer kindergarten or higher grades. Since the biennial Private School Universe Survey (PSS) is collected in the fall of odd-numbered years, private school numbers for alternate years are estimated based on data from the PSS. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A.  
SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1998–99 through 2011–12; Private School Universe Survey (PSS), selected years 1999–2000 through 2011–12; and National Elementary and Secondary Enrollment Projection Model, 1972 through 2023. (This figure was prepared August 2014.)

**Figure 2. Actual and projected numbers for enrollment in elementary and secondary schools, by control of school: Fall 1998 through fall 2023**



NOTE: Private school numbers include private nursery and prekindergarten enrollment in schools that offer kindergarten or higher grades. Since the biennial Private School Universe Survey (PSS) is collected in the fall of odd-numbered years, private school numbers for alternate years are estimated based on data from the PSS. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1998–99 through 2011–12; Private School Universe Survey (PSS), selected years 1999–2000 through 2011–12; and National Elementary and Secondary Enrollment Projection Model, 1972 through 2023. (This figure was prepared August 2014.)

### Enrollment by control of school

Enrollment in public elementary and secondary schools

- ▲ increased 6 percent between 1998 and 2011; and
- ▲ is projected to increase 5 percent between 2011 and 2023.

Enrollment in private elementary and secondary schools

- ▼ decreased 12 percent between 1998 and 2011; and
- ▼ is projected to be 7 percent lower in 2023 than in 2011.

*For more information:  
Table 1*

# STATE AND REGIONAL (PUBLIC SCHOOL DATA)

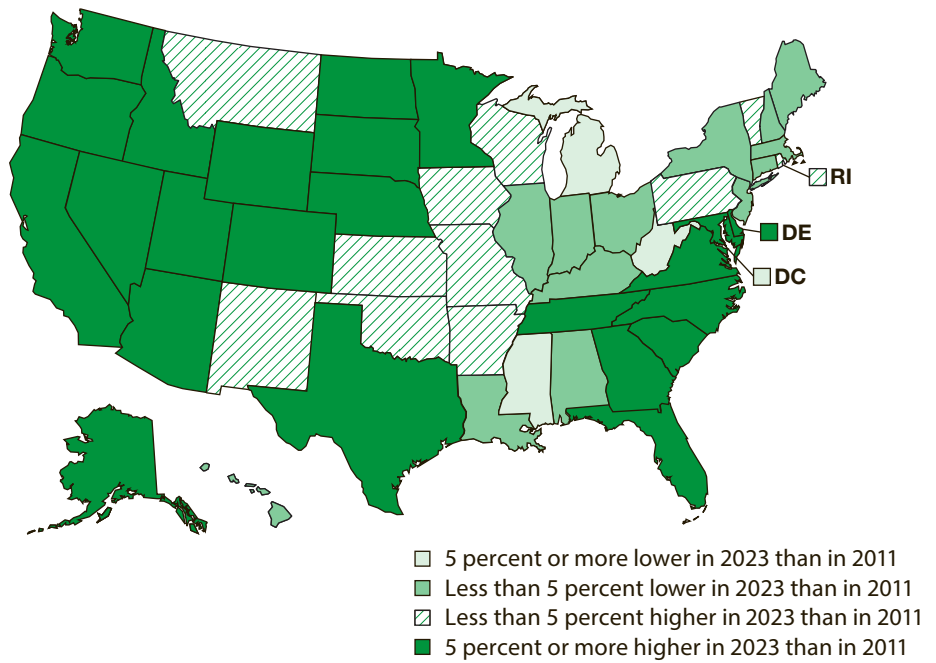
## Enrollment by state

The expected 5 percent national increase in public school enrollment between 2011 and 2023 plays out differently among the states.

- ▲ Enrollments are projected to be higher in 2023 than in 2011 for 34 states, with projected enrollments
  - 5 percent or more higher in 23 states; and
  - less than 5 percent higher in 11 states.
- ▼ Enrollments are projected to be lower in 2023 than in 2011 for 16 states and the District of Columbia, with projected enrollments
  - 5 percent or more lower in 3 states and the District of Columbia; and
  - less than 5 percent lower in 13 states.

*For more information:  
Tables 3 through 5*

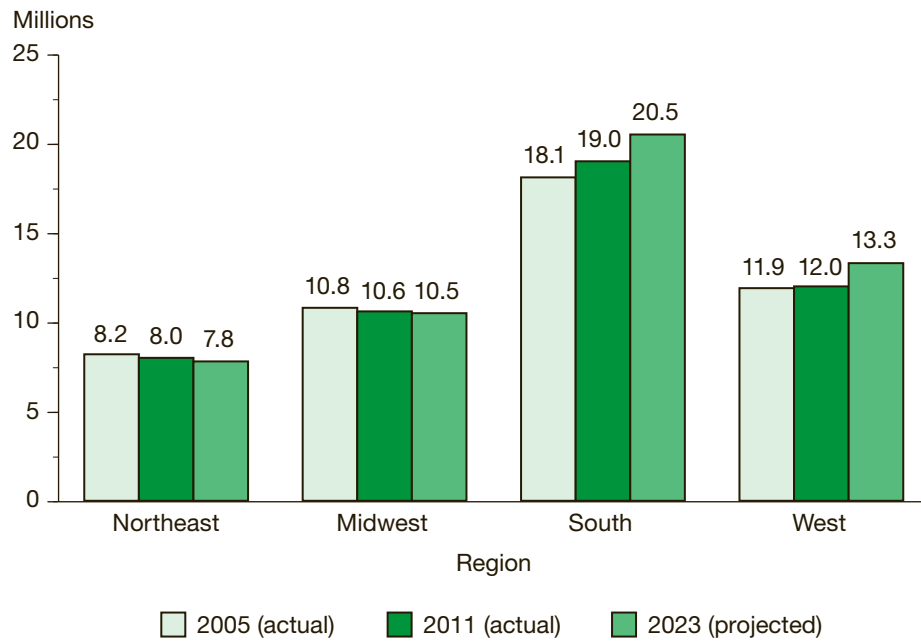
**Figure 3. Projected percentage change in enrollment in public elementary and secondary schools, by state: Fall 2011 through fall 2023**



NOTE: Calculations are based on unrounded numbers. Mean absolute percentage errors of enrollment in public elementary and secondary schools by state and region can be found in table A-7, appendix A.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 2011–12; and State Public Elementary and Secondary Enrollment Projection Model, 1980 through 2023. (This figure was prepared August 2014.)

**Figure 4. Actual and projected numbers for enrollment in public elementary and secondary schools, by region: Fall 2005, fall 2011, and fall 2023**



NOTE: Calculations are based on unrounded numbers. See the glossary for a list of the states in each region. Mean absolute percentage errors of enrollment in public elementary and secondary schools by state and region can be found in table A-7, appendix A. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 2005–06 and 2011–12; and State Public Elementary and Secondary Enrollment Projection Model, 1980 through 2023. (This figure was prepared August 2014.)

### Enrollment by region

Public elementary and secondary enrollment is projected to

- ▼ decrease 2 percent between 2011 and 2023 in the Northeast;
- ▼ be 1 percent lower in 2023 than in 2011 in the Midwest;
- ▲ increase 8 percent between 2011 and 2023 in the South; and
- ▲ increase 10 percent between 2011 and 2023 in the West.

*For more information:  
Tables 3 through 5*

# RACE/ETHNICITY (PUBLIC SCHOOL DATA)

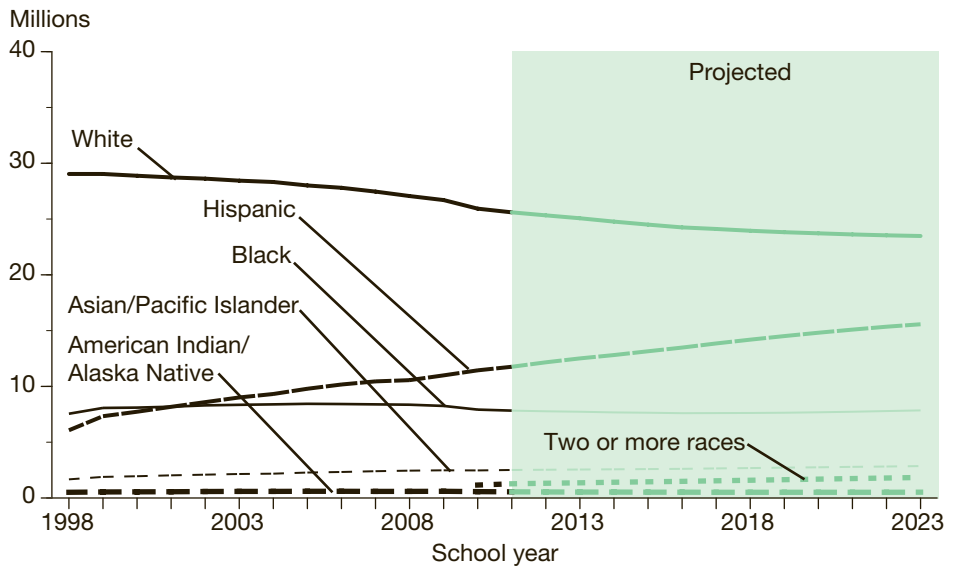
## Enrollment by race/ethnicity

Enrollment in public elementary and secondary schools is projected to

- ▼ decrease 8 percent between 2011 and 2023 for students who are White;
- be about the same number in 2011 and 2023 for students who are Black;
- ▲ increase 32 percent between 2011 and 2023 for students who are Hispanic;
- ▲ increase 14 percent between 2011 and 2023 for students who are Asian/Pacific Islander;
- ▼ decrease 6 percent between 2011 and 2023 for students who are American Indian/Alaska Native; and
- ▲ increase 44 percent between 2011 and 2023 for students who are of Two or more races. (The line for this racial/ethnic group in figure 5 begins in 2010 because that is the first year when data for that group is available for all 50 states and the District of Columbia.)

*For more information:  
Tables 6 and 7*

**Figure 5. Actual and projected numbers for enrollment in public elementary and secondary schools, by race/ethnicity: Fall 1998 through fall 2023**



NOTE: Race categories exclude persons of Hispanic ethnicity. Enrollment data for students not reported by race/ethnicity were prorated by state and grade to match state totals. Data on students of Two or more races were not collected separately prior to 2008 and data on students of Two or more races from 2008 and 2009 were not reported by all states. Only in 2010 and later years were those data available for all 50 states. Total counts of ungraded students were prorated to prekindergarten through grade 8 and grades 9 through 12 based on prior reports. Some data have been revised from previously published figures. Detail may not sum to totals because of rounding. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1997-98 through 2011-12; and National Public Elementary and Secondary Enrollment by Race/Ethnicity Projection Model, 1994 through 2023. (This figure was prepared August 2014.)

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# Section 2

## *Elementary and Secondary Teachers*

### INTRODUCTION

Between fall 2011, the last year of actual public school data, and fall 2023, the number of teachers in elementary and secondary schools is projected to rise (table 8). The increase is projected to occur in public schools. The number of teachers in private schools in 2023 is projected to be lower than the number in 2011. Public and private schools are projected to experience a decline in pupil/teacher ratios. The annual number of new teacher hires is projected to be higher in 2023 than in 2011 in both public and private schools.

#### Factors affecting the projections

The projections of the number of elementary and secondary teachers are related to projected levels of enrollments and education revenue receipts from state sources per capita. For more details, see appendixes A. 0 and A.3.

#### *Factors that were not considered*

The projections do not take into account possible changes in the number of teachers due to the effects of government policies.

#### *About pupil/teacher ratios*

The overall elementary and secondary pupil/teacher ratio and pupil/teacher ratios for public and private schools were computed based on elementary and secondary enrollment and the number of classroom teachers by control of school.

#### *About new teacher hires*

A teacher is considered to be a new teacher hire for a certain control of school (public or private) for a given year if the teacher teaches in that control that year but had not taught in that control in the previous year. A teacher who moves from teaching in one control of school to the other control is considered a new teacher hire, but a teacher who moves from one school to another school in the same control is not considered a new teacher hire.

### Accuracy of Projections

An analysis of projection errors from the past 23 editions of *Projections of Education Statistics* indicates that the mean absolute percentage errors (MAPEs) for projections of classroom teachers in public elementary and secondary schools were 0.8 percent for 1 years out, 1.6 percent for 2 years out, 3.0 percent for 5 years out, and 5.2 percent for 10 years out. For the 1-year-out prediction, this means that one would expect the projection to be within 0.8 percent of the actual value, on average. For more information on the MAPEs of different National Center for Education Statistics (NCES) projection series, see table A-2 in appendix A.

# TEACHERS IN ELEMENTARY AND SECONDARY SCHOOLS

## Number of teachers

The total number of elementary and secondary teachers

- ▲ increased 9 percent between 1998 and 2011, a period of 13 years; and
- ▲ is projected to increase 8 percent between 2011 and 2023, a period of 12 years.

The number of teachers in public elementary and secondary schools

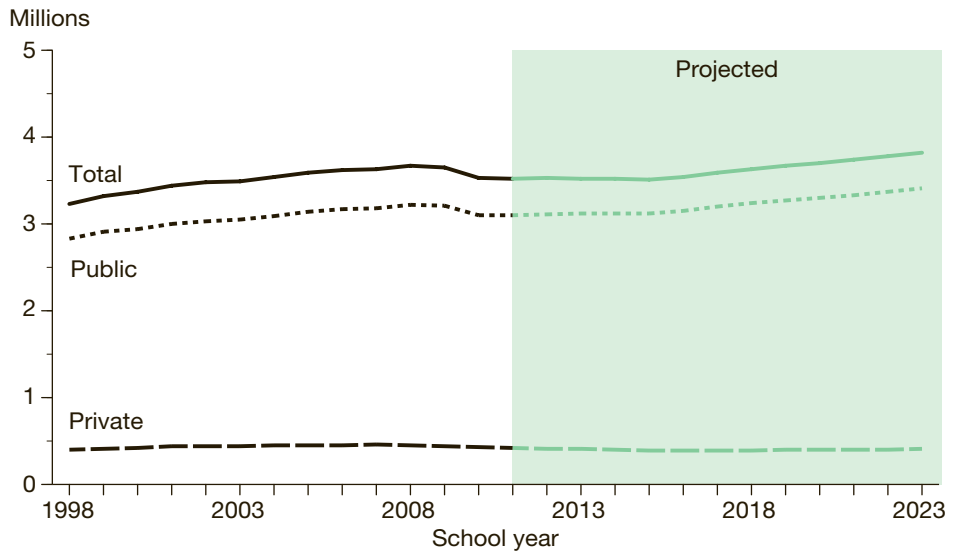
- ▲ increased 10 percent between 1998 and 2011; and
- ▲ is projected to increase 10 percent between 2011 and 2023.

The number of teachers in private elementary and secondary schools

- ▲ was 5 percent higher in 2011 than in 1998; and
- ▼ is projected to be 3 percent lower in 2023 than in 2011.

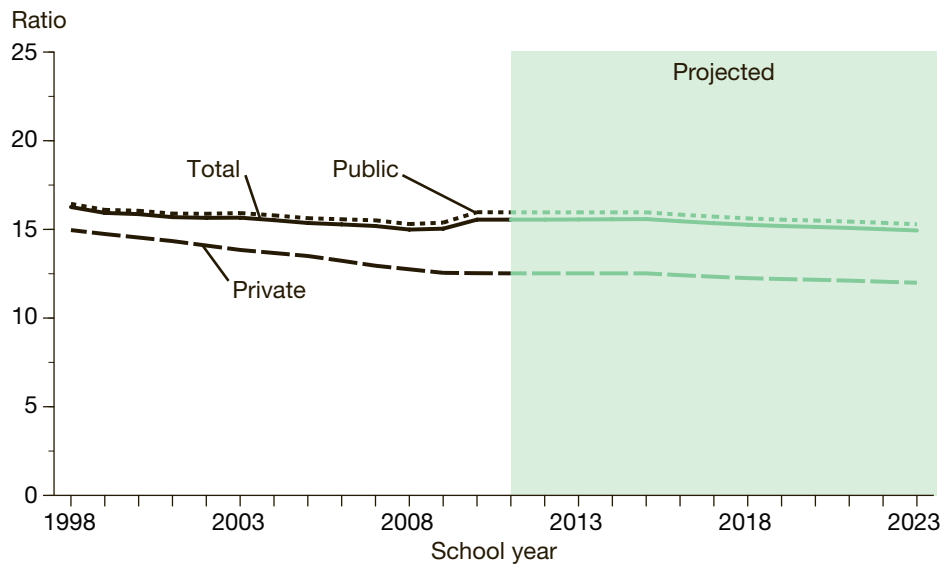
*For more information:  
Table 8*

**Figure 6. Actual and projected numbers for elementary and secondary teachers, by control of school: Fall 1998 through fall 2023**



NOTE: Since the biennial Private School Universe Survey (PSS) is collected in the fall of odd-numbered years, private school numbers for alternate years are estimated based on data from the PSS. Data for teachers are expressed in full-time equivalents (FTE). Counts of private school teachers include prekindergarten through grade 12 in schools offering kindergarten or higher grades. Counts of public school teachers include prekindergarten through grade 12. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A.  
SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1998–99 through 2011–12; Private School Universe Survey (PSS), selected years, 1999–2000 through 2011–12; Elementary and Secondary Teacher Projection Model, 1973 through 2023. (This figure was prepared August 2014.)

**Figure 7. Actual and projected numbers for the pupil/teacher ratios in elementary and secondary schools, by control of school: Fall 1998 through fall 2023**



NOTE: Since the biennial Private School Universe Survey (PSS) is collected in the fall of odd-numbered years, private school numbers for alternate years are estimated based on data from the PSS. Data for teachers are expressed in full-time equivalents (FTE). Counts of private school teachers and enrollment include prekindergarten through grade 12 in schools offering kindergarten or higher grades. Counts of public school teachers and enrollment include prekindergarten through grade 12. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1998-99 through 2011-12; Private School Universe Survey (PSS), selected years, 1999-2000 through 2011-12; National Elementary and Secondary Enrollment Projection Model, 1972 through 2023; and Elementary and Secondary Teacher Projection Model, 1973 through 2023. (This figure was prepared August 2014.)

### Pupil/teacher ratios

The pupil/teacher ratio in elementary and secondary schools

- ▼ decreased from 16.3 to 15.5 between 1998 and 2011; and
- ▼ is projected to decrease to 14.9 in 2023.

The pupil/teacher ratio in public elementary and secondary schools

- ▼ decreased from 16.4 to 16.0 between 1998 and 2011; and
- ▼ is projected to decrease to 15.3 in 2023.

The pupil/teacher ratio in private elementary and secondary schools

- ▼ decreased from 15.0 to 12.5 between 1998 and 2011; and
- ▼ is projected to decrease to 12.0 in 2023.

*For more information:  
Table 8*



## New teacher hires

The number of new teacher hires in public schools

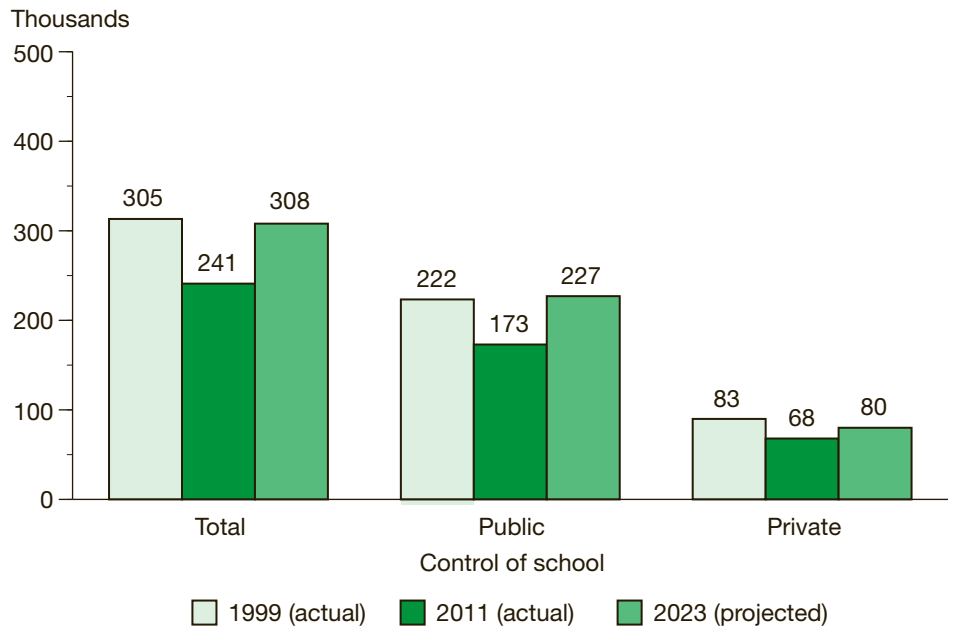
- ▼ was 22 percent lower in 2011 than in 1999 (173,000 versus 222,000); and
- ▲ is projected to increase 32 percent between 2011 and 2023, to 227,000.

The number of new teacher hires in private schools

- ▼ was 18 percent lower in 2011 than in 1999 (68,000 versus 83,000); and
- ▲ is projected to increase 19 percent between 2011 and 2023, to 80,000.

*For more information:  
Table 8*

**Figure 8. Actual and projected numbers for elementary and secondary new teacher hires, by control of school: Fall 1999, fall 2011, and fall 2023**



NOTE: Data for teachers are expressed in full-time equivalents (FTE). A teacher is considered to be a new hire for a public or private school if the teacher had not taught in that control of school in the previous year. A teacher who moves from a public to private or a private to public school is considered a new teacher hire, but a teacher who moves from one public school to another public school or one private school to another private school is not considered a new teacher hire. For more information about the New Teacher Hires Model, see appendix A.3. Calculations are based on unrounded numbers. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1999–2000 and 2011–12; Private School Universe Survey (PSS), 1999–2000 and 2011–12; Schools and Staffing Survey (SASS), "Public School Teacher Data File," and "Private School Teacher Data File," 1999–2000 and 2011–12; Elementary and Secondary Teacher Projection Model, 1973 through 2023 and New Teacher Hires Projection Model, 1988 through 2023. (This figure was prepared August 2014.)

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# Section 3

## High School Graduates

### INTRODUCTION

The number of high school graduates increased nationally by 25 percent between 1998–99 and 2011–12, the last year of actual data for public schools (table 9). The number of high school graduates is projected to be 2 percent lower in 2023–24 than in 2011–12. The number of public high school graduates is projected to be higher in 2023–24 than in 2011–12 while the number of private high school graduates is projected to be lower. The numbers of high school graduates are projected to be higher in 2023–24 than in 2009–10 in the South and West and lower in the Northeast and Midwest (table 10).

#### Factors affecting the projections

The projections of high school graduates are related to projections of 12th-graders and the historical relationship between the number of 12th-graders and the number of high school graduates. The methodology implicitly includes the net effect of factors such as dropouts, transfers to and from public schools, and, at the state level, migration. For more details, see appendixes A.0 and A.3.

#### About high school graduates

A high school graduate is defined as an individual who has received formal recognition from school authorities, by the granting of a diploma, for completing a prescribed course of study. This definition does not include other high school completers or high school equivalency recipients. Projections of graduates could be affected by changes in policies influencing graduation requirements.

#### High school graduates of Two or more races

This is the first edition of *Projections of Education Statistics* to include actual and projected numbers for high school graduates of Two or more races. Collection of high school graduate data for this racial/ethnic group began in 2008–09. The actual values from 2008–09 through 2011–12 and all the projected values for high school graduates of the other racial/ethnic groups are lower than they would have been if this racial/ethnic category had not been added.

### Accuracy of Projections

For National Center for Education Statistics (NCES) projections of public high school graduates produced over the last 22 years, the mean absolute percentage errors (MAPEs) for lead times of 1, 2, 5, and 10 years out were 1.0, 1.1, 2.2, and 5.0, respectively. For the 1-year-out prediction, this means that one would expect the projection to be within 1.0 percent of the actual value, on average. For NCES projections of private high school graduates produced over the last 11 years, the MAPEs for lead times of 1, 2, 5, and 10 years out were 0.9, 1.2, 4.1, and 4.9 percent, respectively. For more information, see table A-2 in appendix A.

# NATIONAL

The total number of high school graduates

- ▲ increased 25 percent between 1998–99 and 2011–12, a period of 13 years; and
- ▼ is projected to be 2 percent lower in 2023–24 than in 2011–12.

The number of public high school graduates

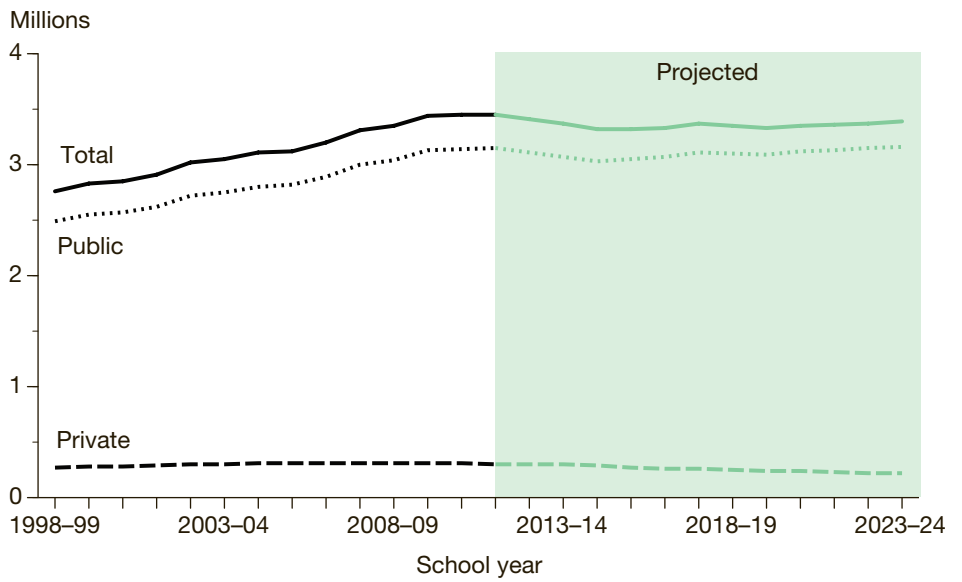
- ▲ increased 27 percent between 1998–99 and 2011–12; and
- ▲ is projected to be 1 percent higher in 2023–24 than in 2011–12.

The number of private high school graduates

- ▲ increased 12 percent between 1998–99 and 2011–12; and
- ▼ is projected to decrease 26 percent between 2011–12 and 2023–24.

*For more information:  
Table 9*

**Figure 9. Actual and projected numbers for high school graduates, by control of school: School years 1998–99 through 2023–24**

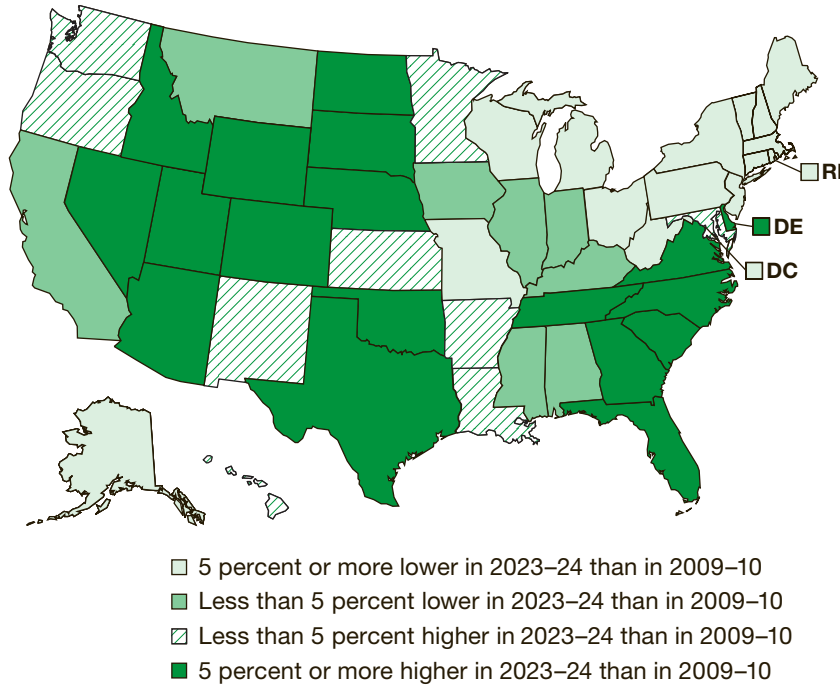


NOTE: Since the biennial Private School Universe Survey (PSS) is collected in the fall of odd-numbered years and the numbers collected for high school graduates are for the preceding year, private school numbers for odd years are estimated based on data from the PSS. Includes graduates of regular day school programs. Excludes graduates of other programs, when separately reported, and recipients of high school equivalency certificates. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1999–2000 through 2009–10; "State Dropout and Completion Data File," 2010–11 and 2011–12; Private School Universe Survey (PSS), selected years, 1999–2000 through 2011–12; and National High School Graduates Projection Model, 1972–73 through 2023–24. (This figure was prepared August 2014.)

## STATE AND REGIONAL (PUBLIC SCHOOL DATA)

**Figure 10. Projected percentage change in the number of public high school graduates, by state: School years 2009–10 through 2023–24**



NOTE: Includes graduates of regular day school programs. Excludes graduates of other programs, when separately reported, and recipients of high school equivalency certificates. Calculations are based on unrounded numbers. Mean absolute percentage errors of public high school graduates by state and region can be found in table A-14, appendix A.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 2010–11; and State Public High School Graduates Projection Model, 1980–81 through 2023–24. (This figure was prepared August 2014.)

### High school graduates by state

The number of public high school graduates is projected to be higher in 2023–24 than in 2009–10. This plays out differently among the states.

- ▲ High school graduates are projected to be higher in 2023–24 than in 2009–10 for 27 states, with projected high school graduates
  - 5 percent or more higher in 18 states; and
  - less than 5 percent higher in 9 states.
- ▼ High school graduates are projected to be lower in 2023–24 than in 2009–10 for 23 states and the District of Columbia, with projected high school graduates
  - 5 percent or more lower in 15 states and the District of Columbia; and
  - less than 5 percent lower in 8 states.

*For more information:  
Table 10*

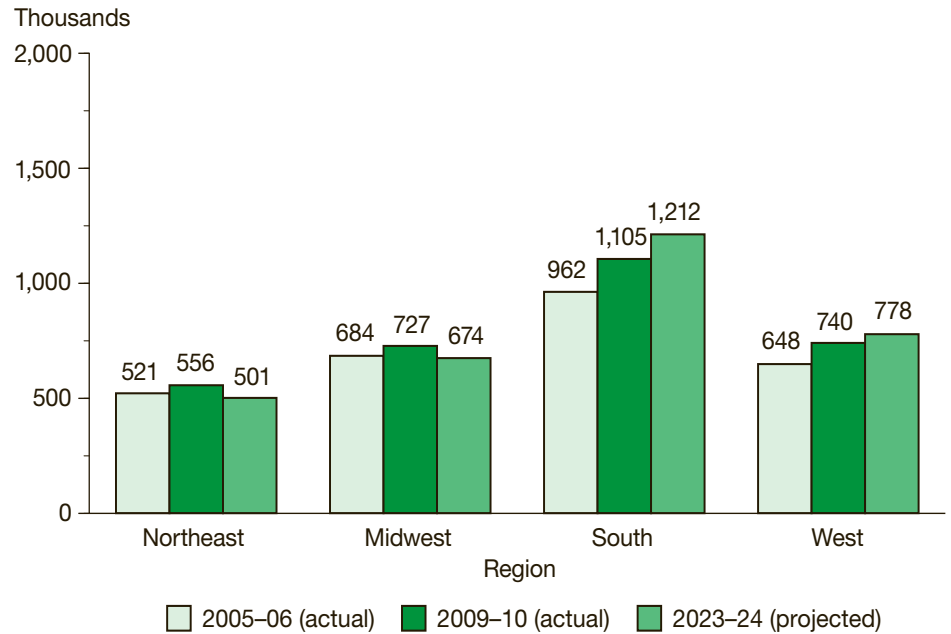
## High school graduates by region

The number of public high school graduates is projected to

- ▼ decrease 10 percent between 2009–10 and 2023–24 in the Northeast;
- ▼ decrease 7 percent between 2009–10 and 2023–24 in the Midwest;
- ▲ increase 10 percent between 2009–10 and 2023–24 in the South; and
- ▲ be 5 percent higher in 2023–24 than in 2009–10 in the West.

*For more information:  
Table 10*

**Figure 11. Actual and projected numbers for public high school graduates, by region: School years 2005–06, 2009–10, and 2023–24**

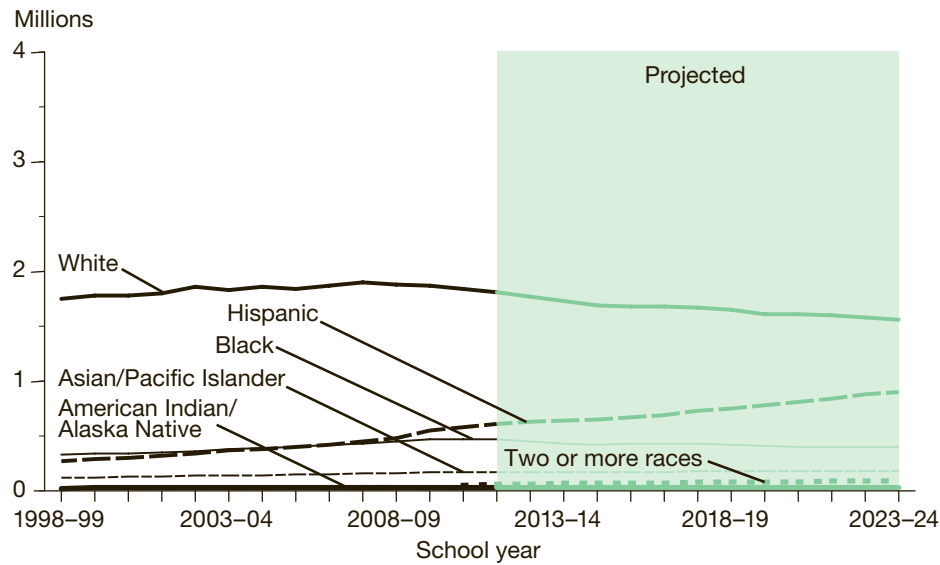


NOTE: Includes graduates of regular day school programs. Excludes graduates of other programs, when separately reported, and recipients of high school equivalency certificates. See the glossary for a list of states in each region. Mean absolute percentage errors of public high school graduates by state and region can be found in table A-14, appendix A. Calculations are based on unrounded numbers. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), “State Nonfiscal Survey of Public Elementary/Secondary Education,” 2006–07 and 2010–11; and State Public High School Graduates Projection Model, 1980–81 through 2023–24. (This figure was prepared August 2014.)

## RACE/ETHNICITY (PUBLIC SCHOOL DATA)

**Figure 12. Actual and projected numbers for public high school graduates, by race/ethnicity: School years 1998–99 through 2023–24**



NOTE: Race categories exclude persons of Hispanic ethnicity. Data on students of Two or more races were not collected separately prior to 2007–08 and data on students of Two or more races from 2007–08 through 2009–10 were not reported by all states. Therefore, the data are not comparable to figures for 2010–11 and later years. Detail may not sum to totals because of rounding. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), “State Nonfiscal Survey of Public Elementary/Secondary Education,” 1998–99 through 2009–10; “State Dropout and Completion Data File,” 2010–11 and 2011–12; and National Public High School Graduates by Race/Ethnicity Projection Model, 1995–96 through 2023–24. (This figure was prepared August 2014.)

### High school graduates by race/ethnicity

The number of public high school graduates is projected to

- ▼ decrease 13 percent between 2011–12 and 2023–24 for students who are White;
- ▼ decrease 14 percent between 2011–12 and 2023–24 for students who are Black;
- ▲ increase 49 percent between 2011–12 and 2023–24 for students who are Hispanic;
- ▲ increase 3 percent between 2011–12 and 2023–24 for students who are Asian/Pacific Islander;
- ▼ decrease 21 percent between 2011–12 and 2023–24 for students who are American Indian/Alaska Native; and
- ▲ increase 48 percent between 2011–12 and 2023–24 for students who are of Two or more races.

*For more information:  
Table 11*

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# Section 4

## *Expenditures for Public Elementary and Secondary Education*

### INTRODUCTION

Current expenditures for public elementary and secondary education are projected to increase 20 percent in constant dollars between school years 2010–11, the last year of actual data, and 2023–24 (table 12).

#### Factors affecting the projections

The projections of current expenditures are related to projections of economic growth as measured by disposable income per capita and assistance by state governments to local governments. For more details, see appendixes A.0 and A.4.

#### *Factors that were not considered*

Many factors that may affect future school expenditures were not considered in the production of these projections. Such factors include policy initiatives as well as potential changes in the age distribution of elementary and secondary teachers as older teachers retire and are replaced by younger teachers, or as older teachers put off retirement for various reasons.

#### *About constant dollars and current dollars*

Throughout this section, projections of current expenditures are presented in constant 2012–13 dollars. The reference tables, later in this report, present these data both in constant 2012–13 dollars and in current dollars. The projections were developed in constant dollars and then placed in current dollars using projections for the Consumer Price Index (CPI) (table B-6 in appendix B). Projections of current expenditures in current dollars are not shown after 2015–16 due to the uncertain behavior of inflation over time.

### Accuracy of Projections

An analysis of projection errors from similar models used in the past 23 editions of *Projections of Education Statistics* that contained expenditure projections indicates that mean absolute percentage errors (MAPEs) for total current expenditures in constant dollars were 1.4 percent for 1 year out, 2.1 percent for 2 years out, 2.6 percent for 5 years out, and 4.0 percent for 10 years out. For the 1-year-out prediction, this means that one would expect the projection to be within 1.4 percent of the actual value, on average. MAPEs for current expenditures per pupil in fall enrollment in constant dollars were 1.4 percent for 1 year out, 2.1 percent for 2 years out, 2.8 percent for 5 years out, and 5.2 percent for 10 years out. See appendix A for further discussion of the accuracy of recent projections of current expenditures, and see table A-2 in appendix A for the mean absolute percentage errors (MAPEs) of these projections.



## CURRENT EXPENDITURES

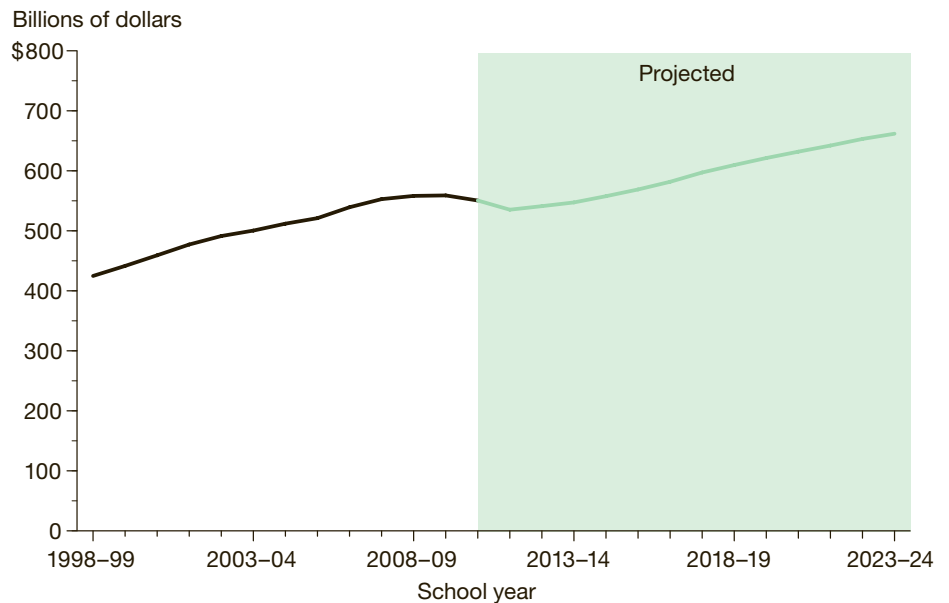
### Current expenditures

Current expenditures in constant 2012–13 dollars

- ▲ increased 30 percent from 1998–99 to 2010–11, a period of 12 years; and
- ▲ are projected to increase 20 percent, to \$663 billion, from 2010–11 to 2023–24, a period of 13 years.

*For more information:  
Table 12*

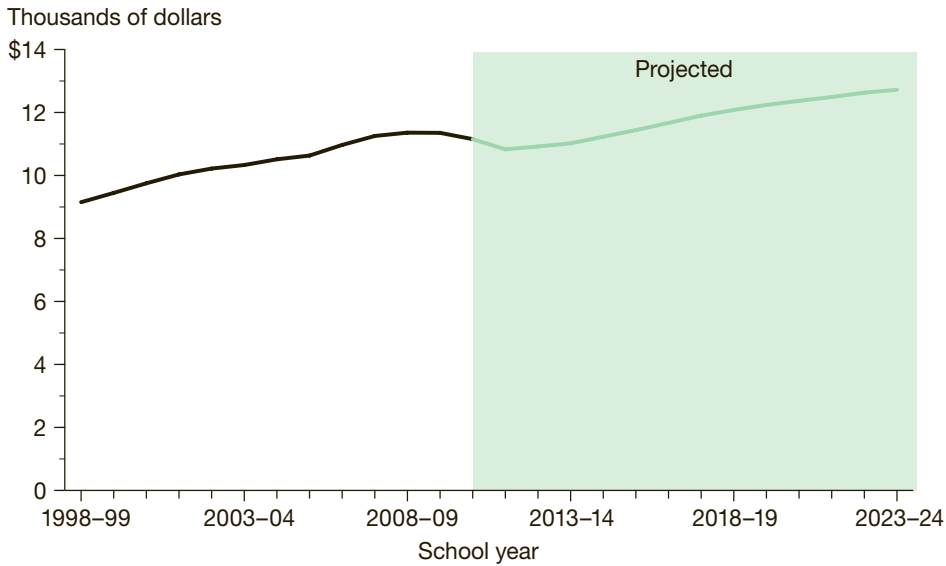
**Figure 13. Actual and projected current expenditures for public elementary and secondary schools (in constant 2012–13 dollars): School years 1998–99 through 2023–24**



NOTE: Numbers were placed in constant dollars using the Consumer Price Index (CPI) for all urban consumers, Bureau of Labor Statistics, U.S. Department of Labor. For more detail about CPI, see table B-6 in appendix B. Current expenditures include instruction, support services, food services, and enterprise operations. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), “National Public Education Financial Survey,” 1998–99 through 2010–11; Public Elementary and Secondary School Current Expenditures Projection Model, 1969–70 through 2023–24. (This figure was prepared August 2014.)

**Figure 14. Actual and projected current expenditures per pupil in fall enrollment in public elementary and secondary schools (in constant 2012–13 dollars): School years 1998–99 through 2023–24**



NOTE: Numbers were placed in constant dollars using the Consumer Price Index (CPI) for all urban consumers, Bureau of Labor Statistics, U.S. Department of Labor. For more detail about CPI, see table B-6 in appendix B. Current expenditures include instruction, support services, food services, and enterprise operations. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. Fall enrollment pertains only to students for whom finance data were collected. This enrollment count differs slightly from enrollment counts reported on some tables.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1998–99 through 2011–12; "National Public Education Financial Survey," 1998–99 through 2010–11; National Elementary and Secondary Enrollment Projection Model, 1972 through 2023; and Elementary and Secondary School Current Expenditures Projection Model, 1969–70 through 2023–24. (This figure was prepared August 2014.)

### Current expenditures per pupil

Current expenditures per pupil in fall enrollment in constant 2012–13 dollars

- ▲ increased 22 percent from 1998–99 to 2010–11; and
- ▲ are projected to increase 14 percent, to \$12,700, from 2009–10 to 2023–24.

*For more information:  
Table 12*

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# Section 5

## Enrollment in Postsecondary Degree-Granting Institutions

### INTRODUCTION

Total enrollment in postsecondary degree-granting institutions is expected to increase 15 percent between fall 2012, the last year of actual data, and fall 2023 (table 13). Degree-granting institutions are postsecondary institutions that provide study beyond secondary school and offer programs terminating in an associate’s, baccalaureate, or higher degree and participate in federal financial aid programs. Differential growth is expected by student characteristics such as age, sex, and attendance status (part-time or full-time). Enrollment is expected to increase in both public and private postsecondary degree-granting institutions.

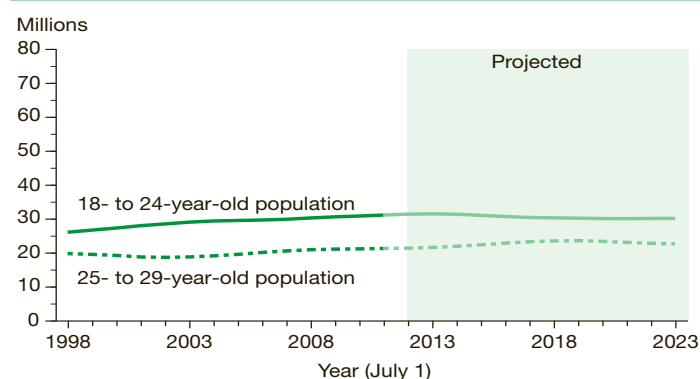
#### Factors affecting the projections

The projections of enrollment levels are related to projections of college-age populations, disposable income, and unemployment rates. For more details, see appendixes A.0 and A.5. An important factor in the enrollment projections is the expected increase in the population of 25- to 29-year-olds (table B-4 in appendix B).

#### Factors that were not considered

The enrollment projections do not take into account such factors as the cost of a college education, the economic value of an education, and the impact of distance learning due to technological changes. These factors may produce changes in enrollment levels. The racial/ethnic backgrounds of nonresident aliens are not known.

**Figure 15. Actual and projected population numbers for 18- to 24-year-olds and 25- to 29-year-olds: 1998 through 2023**



NOTE: Some data have been revised from previously published figures. Projections are from the U.S. Census Bureau’s 2012 National Population Projections, ratio-adjusted to line up with the most recent historical estimate. SOURCE: U.S. Department of Commerce, Census Bureau, Population Estimates, retrieved December 19, 2012, from <http://www.census.gov/popest/data/index.html>; and 2012 National Population Projections, retrieved December 12, 2012, from <http://www.census.gov/population/projections/data/national/2012/downloadablefiles.html>. (This figure was prepared August 2014.)

### Accuracy of Projections

For projections of total enrollment in postsecondary degree-granting institutions, an analysis of projection errors based on the past 16 editions of *Projections of Education Statistics* indicates that the mean absolute percentage errors (MAPEs) for lead times of 1, 2, 5, and 10 years out were 1.6, 2.6, 5.8, and 12.4 percent, respectively. For the 1-year-out prediction, this means that one would expect the projection to be within 1.6 percent of the actual value, on average. For more information, see table A-2 in appendix A.

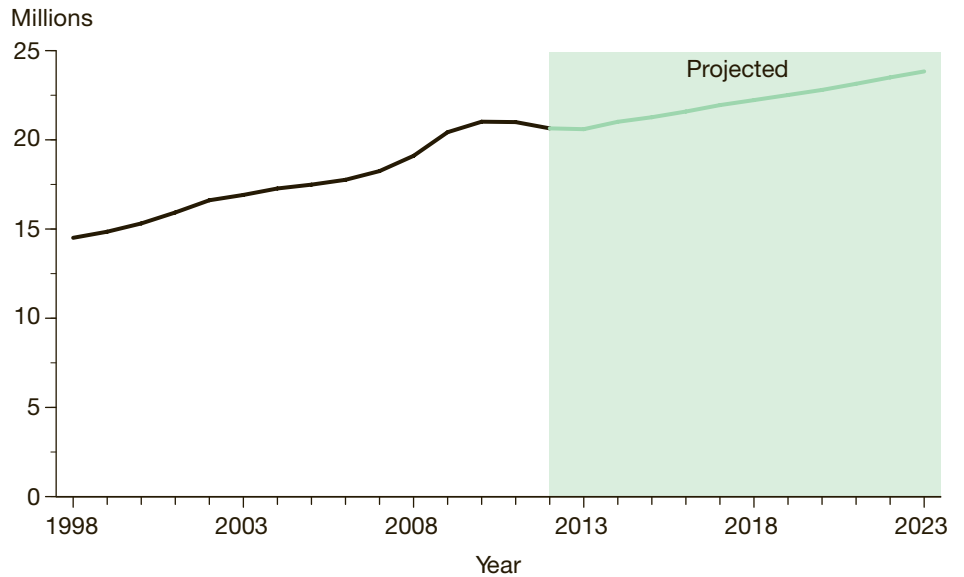
# TOTAL ENROLLMENT

## Total enrollment in postsecondary degree-granting institutions

- ▲ increased 42 percent from 1998 to 2012, a period of 14 years; and
- ▲ is projected to increase 15 percent, to 24 million, from 2012 to 2023, a period of 11 years.

*For more information:  
Table 13*

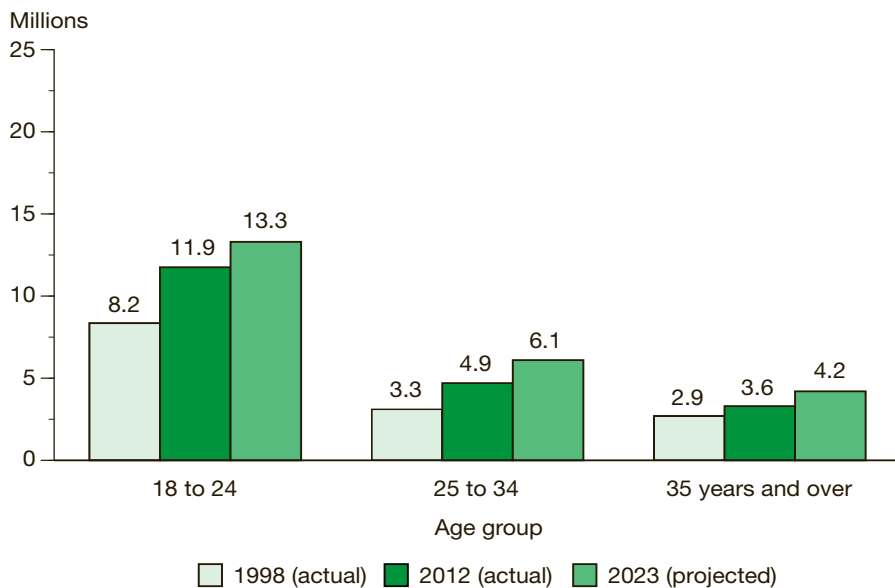
**Figure 16. Actual and projected numbers for total enrollment in all postsecondary degree-granting institutions: Fall 1998 through fall 2023**



NOTE: Degree-granting institutions grant associate's or higher degrees and participate in Title IV federal financial aid programs. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS) "Fall Enrollment Survey" (IPEDS-EF:98-99); IPEDS Spring 2001 through Spring 2013, Enrollment component; and Enrollment in Degree-Granting Institutions Projection Model, 1980 through 2023. (This figure was prepared August 2014.)

# ENROLLMENT BY SELECTED CHARACTERISTICS AND CONTROL OF INSTITUTION

**Figure 17. Actual and projected numbers for total enrollment in all postsecondary degree-granting institutions, by age group: Fall 1998, fall 2012, and fall 2023**



NOTE: Degree-granting institutions grant associate's or higher degrees and participate in Title IV federal financial aid programs. Distributions by age are estimates based on samples of the civilian noninstitutional population from the U.S. Census Bureau's Current Population Survey. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. Calculations are based on unrounded numbers.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS) "Fall Enrollment Survey" (IPEDS-EF:98); IPEDS Spring 2013, Enrollment component; Enrollment in Degree-Granting Institutions Projection Model, 1980 through 2023; and U.S. Department of Commerce, Census Bureau, Current Population Reports, "Social and Economic Characteristics of Students," various years. (This figure was prepared August 2014.)

## Enrollment by age of student

Enrollment in postsecondary degree-granting institutions of students who are 18 to 24 years old

- ▲ increased 45 percent between 1998 and 2012; and
- ▲ is projected to increase 12 percent between 2012 and 2023.

Enrollment in postsecondary degree-granting institutions of students who are 25 to 34 years old

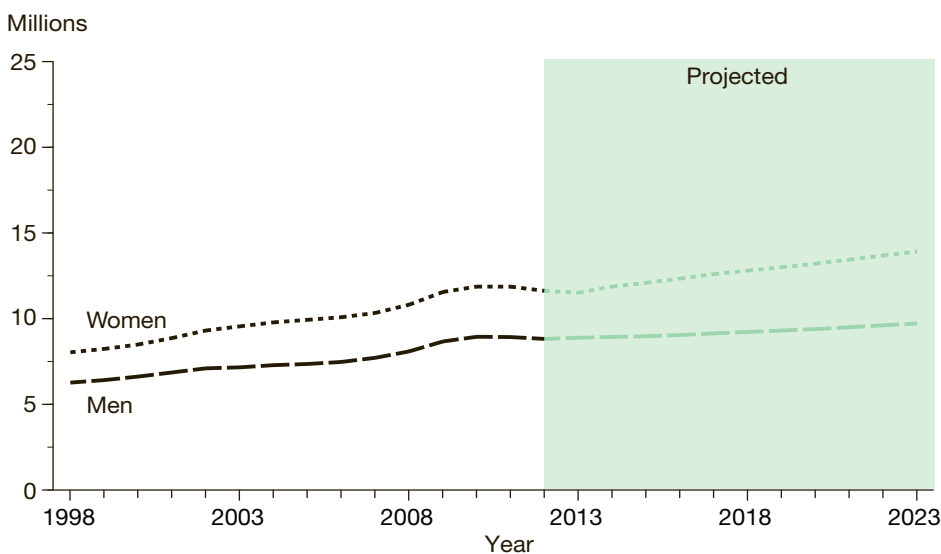
- ▲ increased 52 percent between 1998 and 2012; and
- ▲ is projected to increase 23 percent between 2012 and 2023.

Enrollment in postsecondary degree-granting institutions of students who are 35 years old and over

- ▲ increased 24 percent between 1998 and 2012; and
- ▲ is projected to increase 17 percent between 2012 and 2023.

*For more information:  
Table 15*

**Figure 18 Actual and projected numbers for enrollment in all postsecondary degree-granting institutions, by sex: Fall 1998 through fall 2023**



NOTE: Degree-granting institutions grant associate's or higher degrees and participate in Title IV federal financial aid programs. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS) "Fall Enrollment Survey" (IPEDS-EF:98-99); IPEDS Spring 2001 through Spring 2013, Enrollment component; and Enrollment in Degree-Granting Institutions Projection Model, 1980 through 2023. (This figure was prepared August 2014.)

## Enrollment by sex of student

Enrollment of men in postsecondary degree-granting institutions

- ▲ increased 40 percent between 1998 and 2012; and
- ▲ is projected to increase 10 percent between 2012 and 2023.

Enrollment of women in postsecondary degree-granting institutions

- ▲ increased 44 percent between 1998 and 2012; and
- ▲ is projected to increase 20 percent between 2012 and 2023.

*For more information:  
Tables 13 through 15*

## Enrollment by attendance status

Enrollment of full-time students in postsecondary degree-granting institutions

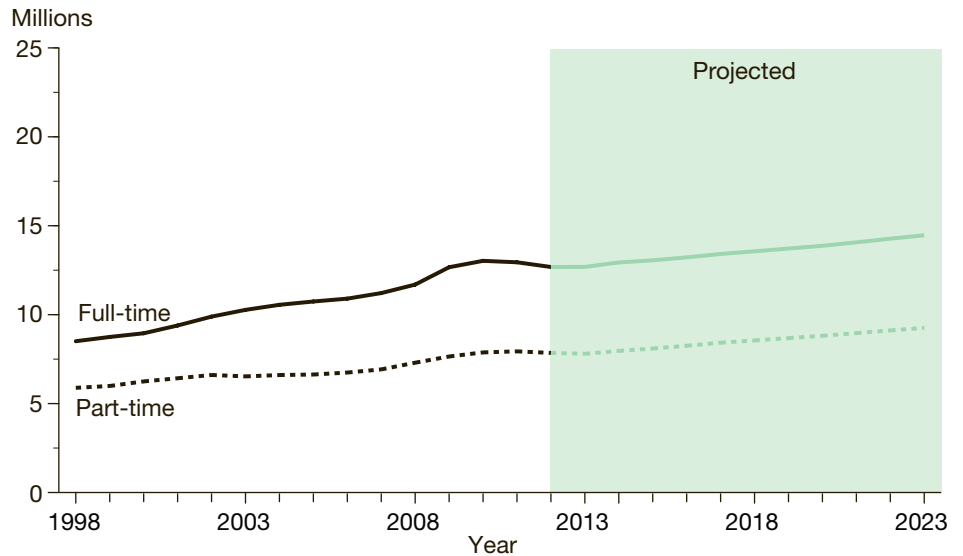
- ▲ increased 49 percent between 1998 and 2012; and
- ▲ is projected to increase 14 percent between 2012 and 2023.

Enrollment of part-time students in postsecondary degree-granting institutions

- ▲ increased 33 percent between 1998 and 2012; and
- ▲ is projected to increase 18 percent between 2012 and 2023.

*For more information:  
Tables 13 through 15*

**Figure 19. Actual and projected numbers for enrollment in all postsecondary degree-granting institutions, by attendance status: Fall 1998 through fall 2023**



NOTE: Degree-granting institutions grant associate's or higher degrees and participate in Title IV federal financial aid programs. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS) "Fall Enrollment Survey" (IPEDS-EF:98-99); IPEDS Spring 2001 through Spring 2013, Enrollment component; and Enrollment in Degree-Granting Institutions Projection Model, 1980 through 2023. (This figure was prepared August 2014.)

## Enrollment by level of student

Enrollment of undergraduate students in postsecondary degree-granting institutions

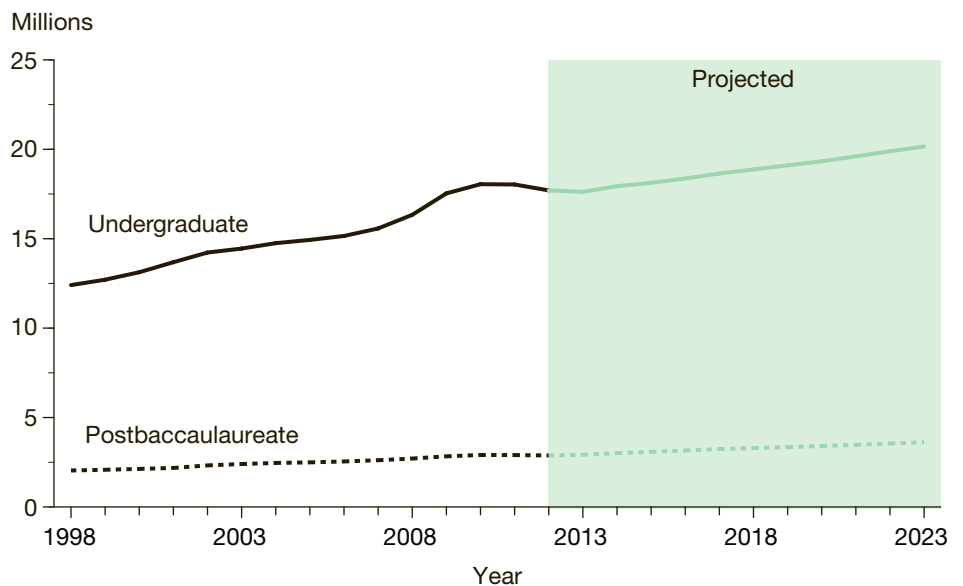
- ▲ increased 43 percent between 1998 and 2012; and
- ▲ is projected to increase 14 percent between 2012 and 2023.

Enrollment of postbaccalaureate students in postsecondary degree-granting institutions

- ▲ increased 41 percent between 1998 and 2012; and
- ▲ is projected to increase 25 percent between 2012 and 2023.

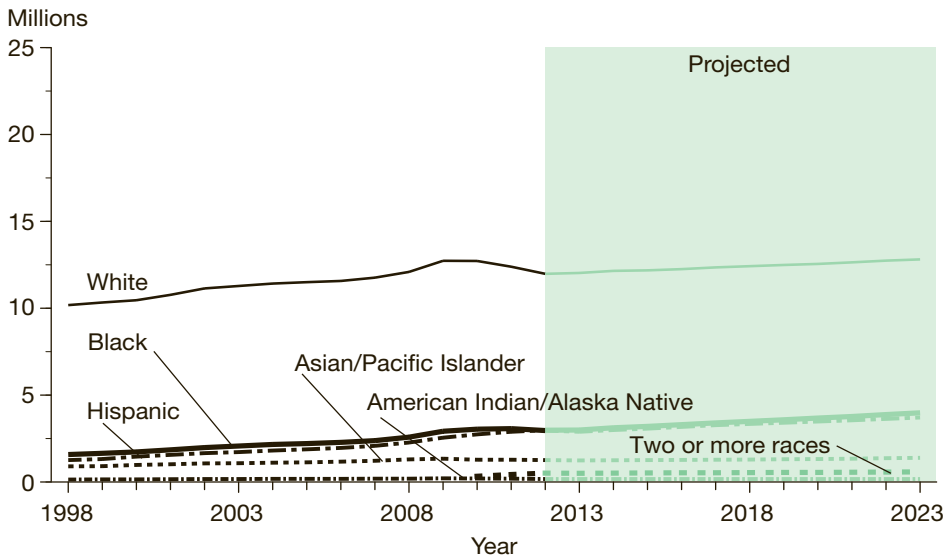
*For more information:  
Tables 16 and 17*

**Figure 20. Actual and projected numbers for enrollment in all postsecondary degree-granting institutions, by level of degree: Fall 1998 through fall 2023**



NOTE: Degree-granting institutions grant associate's or higher degrees and participate in Title IV federal financial aid programs. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS) "Fall Enrollment Survey" (IPEDS-EF:98-99); IPEDS Spring 2001 through Spring 2013, Enrollment component; and Enrollment in Degree-Granting Institutions Projection Model, 1980 through 2023. (This figure was prepared August 2014.)

**Figure 21. Actual and projected numbers for enrollment of U.S. residents in all postsecondary degree-granting institutions, by race/ethnicity: Fall 1998 through fall 2023**



NOTE: Race categories exclude persons of Hispanic ethnicity. Because of underreporting and nonreporting of racial/ethnic data and nonresident aliens, some estimates are slightly lower than corresponding data in other published tables. Enrollment data in the “race/ethnicity unknown” (all years) and “Two or more races” (2008 through 2012 only) categories of the IPEDS “Enrollment component” have been prorated to the other racial/ethnic categories at the institutional level. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Education Data System (IPEDS) “Fall Enrollment Survey” (IPEDS-EF:98–99); IPEDS Spring 2001 through Spring 2013, Enrollment component; and Degree-Granting Institutions by Race/Ethnicity Projection Model, 1980 through 2023. (This figure was prepared August 2014.)

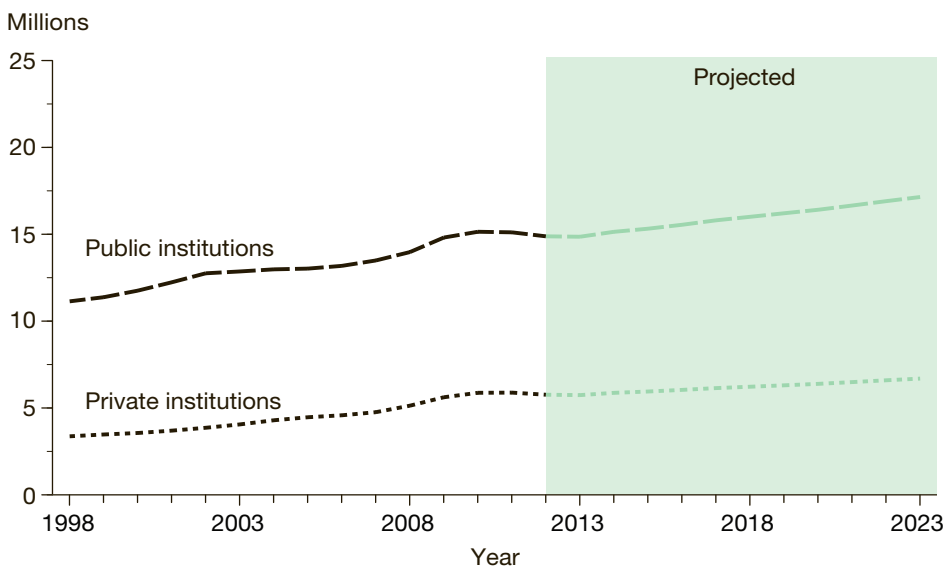
### Enrollment by race/ethnicity

Enrollment of U.S. residents is projected to

- ▲ increase 7 percent for students who are White between 2012 and 2023;
- ▲ increase 25 percent for students who are Black between 2012 and 2023;
- ▲ increase 34 percent for students who are Hispanic between 2012 and 2023;
- ▲ increase 11 percent for students who are Asian/Pacific Islander between 2012 and 2023;
- ▲ increase 1 percent for students who are American Indian/Alaska Native between 2012 and 2023; and
- ▲ increase 14 percent for students who are of Two or more races between 2012 and 2023.

*For more information:  
Table 19*

**Figure 22. Actual and projected numbers for enrollment in all postsecondary degree-granting institutions, by control of institution: Fall 1998 through fall 2023**



NOTE: Degree-granting institutions grant associate’s or higher degrees and participate in Title IV federal financial aid programs. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS) “Fall Enrollment Survey” (IPEDS-EF:98–99); IPEDS Spring 2001 through Spring 2013, Enrollment component; Enrollment in Degree-Granting Institutions Projection Model, 1980 through 2023. (This figure was prepared August 2014.)

### Enrollment in public and private institutions

Enrollment in public postsecondary degree-granting institutions

- ▲ increased 34 percent between 1998 and 2012; and
- ▲ is projected to increase 15 percent between 2012 and 2023.

Enrollment in private postsecondary degree-granting institutions

- ▲ increased 71 percent between 1998 and 2012; and
- ▲ is projected to increase 16 percent between 2012 and 2023.

*For more information:  
Table 13*



# FIRST-TIME FRESHMEN ENROLLMENT

## First-time freshmen fall enrollment

Total first-time freshmen fall enrollment in all postsecondary degree-granting institutions

- ▲ increased 35 percent from 1998 to 2012; and
- ▲ is projected to increase 14 percent between 2012 and 2023.

First-time freshmen fall enrollment of men in all postsecondary degree-granting institutions

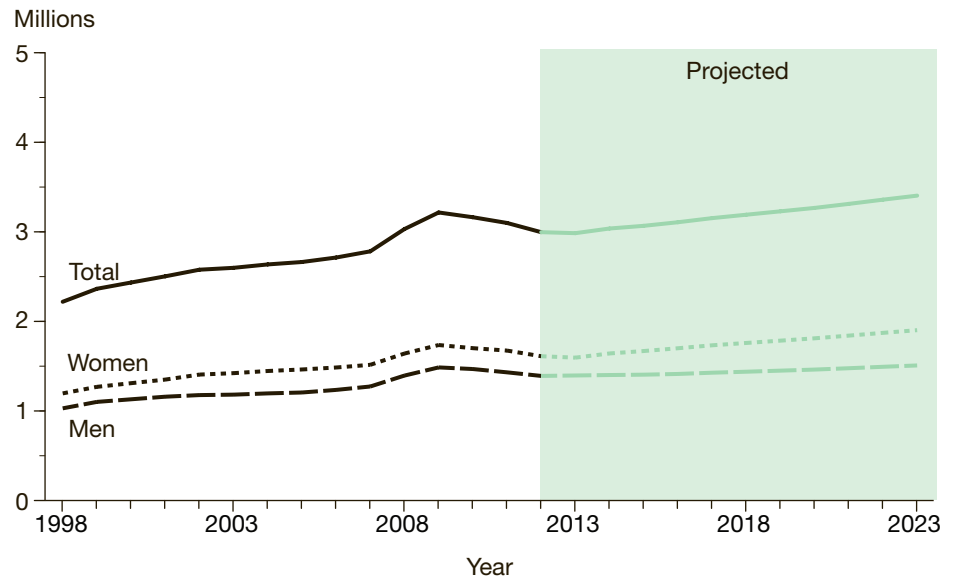
- ▲ increased 35 percent from 1998 to 2012; and
- ▲ is projected to increase 8 percent between 2012 and 2023.

Total first-time freshmen fall enrollment of women in all postsecondary degree-granting institutions

- ▲ increased 35 percent from 1998 to 2012; and
- ▲ is projected to increase 18 percent between 2012 and 2023.

*For more information:  
Table 18*

**Figure 23. Actual and projected numbers for total first-time freshmen fall enrollment in all postsecondary degree-granting institutions, by sex: Fall 1998 through fall 2023**



NOTE: Degree-granting institutions grant associate's or higher degrees and participate in Title IV federal financial aid programs. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS) "Fall Enrollment Survey" (IPEDS-EF:98-99); IPEDS Spring 2001 through Spring 2013, Enrollment component; Enrollment in Degree-Granting Institutions Projection Model, 1980 through 2023; and First-Time Freshmen Projection Model, 1975 through 2023. (This figure was prepared August 2014.)

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# Section 6

## *Postsecondary Degrees Conferred*

### INTRODUCTION

Long-term growth in enrollment in postsecondary degree-granting institutions has been reflected by increases in the numbers of associate's, bachelor's, master's and doctor's degrees conferred (tables 13 and 21). Increases in the number of degrees conferred are expected to continue between academic year 2011–12, the last year of actual data, and academic year 2023–24.

#### **Factors affecting the projections**

The projections of the number of degrees conferred are related to projections of the college-age populations developed by the Census Bureau and college enrollments from this report. For more details, see appendixes A.0 and A.6.

#### *Factors that were not considered*

Some factors that may affect future numbers of degrees, such as choice of degree and labor force requirements, were not included in the projection models.

#### *Changes in degree classifications*

The National Center for Education Statistics (NCES) no longer uses the first-professional degree classification. Most degrees formerly classified as first-professional—such as M.D., D.D.S., and law degrees—are now classified as doctor's degrees. However, master's of divinity degrees are now classified as master's degrees. This is the third edition of *Projections of Education Statistics* to use these new classifications. With this change, the actual numbers of master's and doctor's and degrees conferred are higher than the actual numbers in *Projections of Education Statistics to 2020* and earlier editions of this report. The revisions of actual numbers are reflected in the projections.

### **Accuracy of Projections**

An analysis of projection errors from the past 5 editions of *Projections of Education Statistics* indicates that the mean absolute percentage errors (MAPEs) for lead times of 1, 2, and 5 years out for projections of associate's degrees conferred were 2.5, 7.0, and 20.1 percent, respectively. For the 1-year-out prediction, this means that the methodology used by the National Center for Education Statistics (NCES) has produced projections that have, on average, deviated from actual observed values by 2.5 percent. For projections of bachelor's degrees conferred, the MAPEs for lead times of 1, 2, and 5 years out were 0.6, 0.3, and 4.7 percent. No MAPEs were calculated for master's and doctor's degrees as only two other editions of *Projections of Education Statistics* used the current model for producing their projections due to the changes in classifications described above. For more information, see table A-2 in appendix A.

## DEGREES, BY LEVEL OF DEGREE AND SEX OF RECIPIENT

### Associate's degrees

The total number of associate's degrees

- ▲ increased 80 percent between 1998–99 and 2011–12; and
- ▲ is projected to increase 39 percent between 2011–12 and 2023–24.

The number of associate's degrees awarded to men

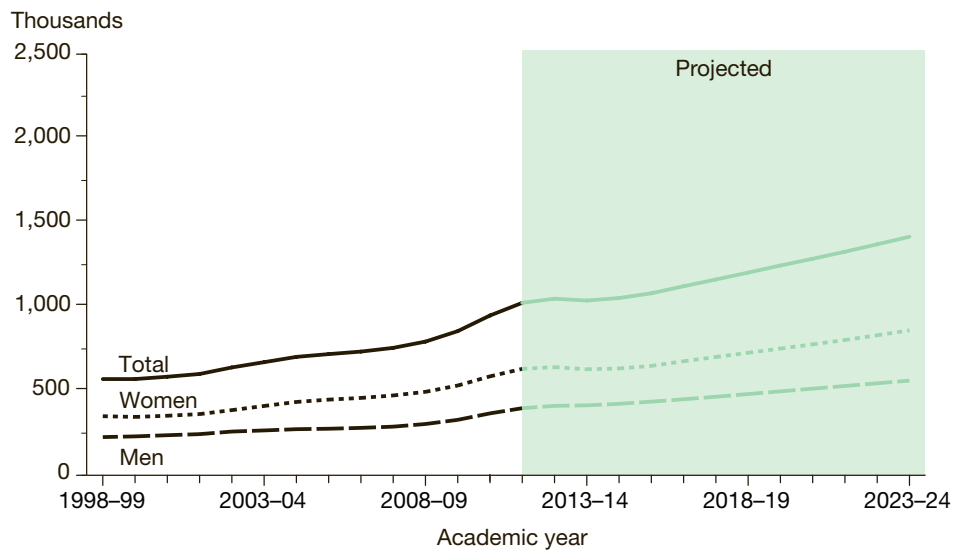
- ▲ increased 78 percent between 1998–99 and 2011–12; and
- ▲ is projected to increase 42 percent between 2011–12 and 2023–24.

The number of associate's degrees awarded to women

- ▲ increased 82 percent between 1998–99 and 2011–12; and
- ▲ is projected to increase 36 percent between 2011–12 and 2023–24.

*For more information:*  
Table 21

**Figure 24. Actual and projected numbers for associate's degrees conferred by postsecondary degree-granting institutions, by sex of recipient: Academic years 1998–99 through 2023–24**



NOTE: Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), "Completions Survey" (IPEDS-C:99); IPEDS Fall 2000 through Fall 2012 Completions component; and Degrees Conferred Projection Model, 1980–81 through 2023–24. (This figure was prepared August 2014.)

### Bachelor's degrees

The total number of bachelor's degrees

- ▲ increased 49 percent between 1998–99 and 2011–12; and
- ▲ is projected to increase 15 percent between 2011–12 and 2023–24.

The number of bachelor's degrees awarded to men

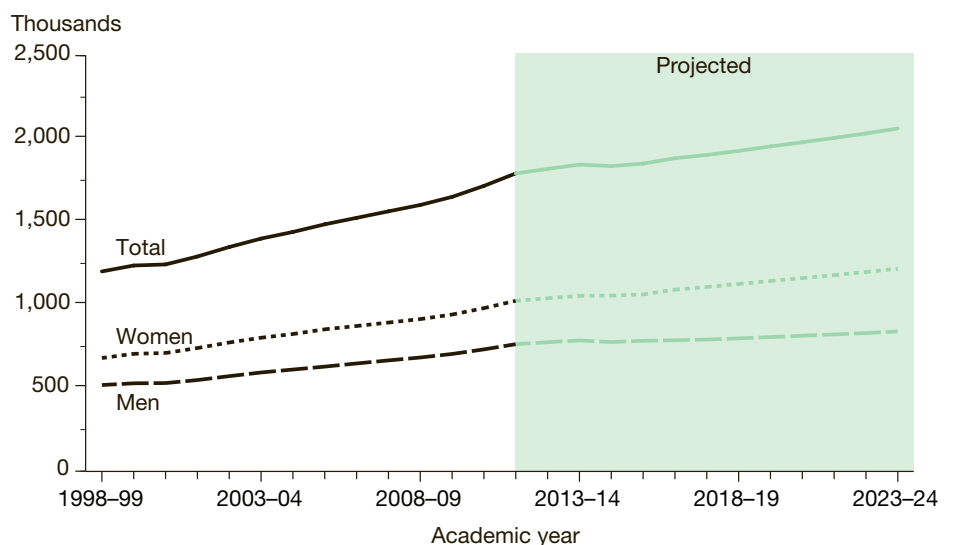
- ▲ increased 47 percent between 1998–99 and 2011–12; and
- ▲ is projected to increase 10 percent between 2011–12 and 2023–24.

The number of bachelor's degrees awarded to women

- ▲ increased 50 percent between 1998–99 and 2011–12; and
- ▲ is projected to increase 19 percent between 2011–12 and 2023–24.

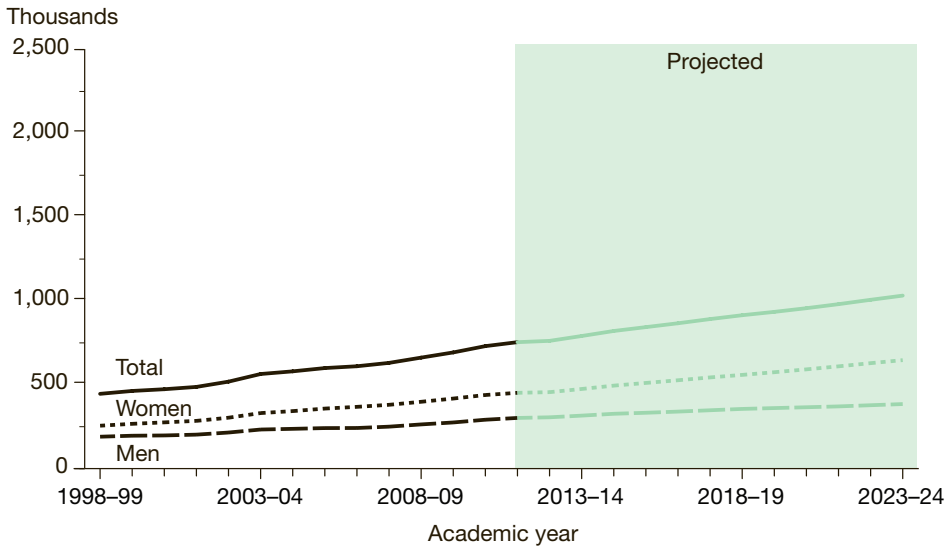
*For more information:*  
Table 21

**Figure 25. Actual and projected numbers for bachelor's degrees conferred by postsecondary degree-granting institutions, by sex of recipient: Academic years 1998–99 through 2023–24**



NOTE: Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), "Completions Survey" (IPEDS-C:99); IPEDS Fall 2000 through Fall 2012 Completions component; and Degrees Conferred Projection Model, 1980–81 through 2023–24. (This figure was prepared August 2014.)

**Figure 26. Actual and projected numbers for master's degrees conferred by postsecondary degree-granting institutions, by sex of recipient: Academic years 1998–99 through 2023–24**



NOTE: Includes some degrees formerly classified as first professional such as divinity degrees (M.Div. and M.H.L./Rav). Some data have been revised from previously published figures. SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), "Completions Survey" (IPEDS-C:99); IPEDS Fall 2000 through Fall 2012 Completions component; and Degrees Conferred Projection Model, 1980–81 through 2023–24. (This figure was prepared August 2014.)

## Master's degrees

The total number of master's degrees

- ▲ increased 69 percent between 1998–99 and 2011–12; and
- ▲ is projected to increase 37 percent between 2011–12 and 2023–24.

The number of master's degrees awarded to men

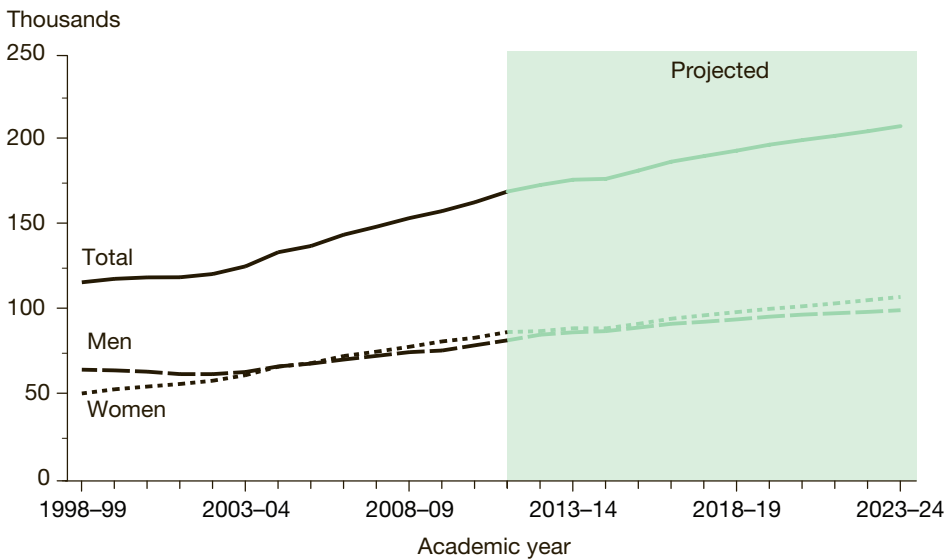
- ▲ increased 59 percent between 1998–99 and 2011–12; and
- ▲ is projected to increase 27 percent between 2011–12 and 2023–24.

The number of master's degrees awarded to women

- ▲ increased 77 percent between 1998–99 and 2011–12; and
- ▲ is projected to increase 43 percent between 2011–12 and 2023–24.

*For more information:*  
Table 21

**Figure 27. Actual and projected numbers for doctor's degrees conferred by postsecondary degree-granting institutions, by sex of recipient: Academic years 1998–99 through 2023–24**



NOTE: Doctor's degrees include Ph.D., Ed.D., and comparable degrees at the doctoral level. Includes most degrees formerly classified as first-professional, such as M.D., D.D.S., and law degrees. Some data have been revised from previously published figures. Mean absolute percentage errors of selected education statistics can be found in table A-2, appendix A. SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), "Completions Survey" (IPEDS-C:99); IPEDS Fall 2000 through Fall 2012 Completions component; and Degrees Conferred Projection Model, 1980–81 through 2023–24. (This figure was prepared August 2014.)

## Doctor's degrees

The total number of doctor's degrees

- ▲ increased 46 percent between 1998–99 and 2011–12; and
- ▲ is projected to increase 23 percent between 2011–12 and 2023–24.

The number of doctor's degrees awarded to men

- ▲ increased 26 percent between 1998–99 and 2011–12; and
- ▲ is projected to increase 21 percent between 2011–12 and 2023–24.

The number of doctor's degrees awarded to women

- ▲ increased 70 percent between 1998–99 and 2011–12; and
- ▲ is projected to increase 24 percent between 2011–12 and 2023–24.

*For more information:*  
Table 21

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# Reference Tables

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**Table 2. Enrollment in public elementary and secondary schools, by level and grade: Selected years, fall 1980 through fall 2023**  
[In thousands]

Year	Elementary													Secondary					
	All grades	Total	Pre-kindergarten	Kindergarten	1st grade	2nd grade	3rd grade	4th grade	5th grade	6th grade	7th grade	8th grade	Un-graded	Total	9th grade	10th grade	11th grade	12th grade	Un-graded
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1980.....	40,877	27,647	96	2,593	2,894	2,800	2,893	3,107	3,130	3,038	3,085	3,086	924	13,231	3,377	3,368	3,195	2,925	366
1985.....	39,422	27,034	151	3,041	3,239	2,941	2,895	2,771	2,776	2,789	2,938	2,982	511	12,388	3,439	3,230	2,866	2,550	303
1990.....	41,217	29,876	303	3,306	3,499	3,327	3,297	3,248	3,197	3,110	3,067	2,979	541	11,341	3,169	2,896	2,612	2,381	284
1991.....	42,047	30,503	375	3,311	3,556	3,360	3,334	3,315	3,268	3,239	3,181	3,020	542	11,544	3,313	2,915	2,645	2,392	278
1992.....	42,823	31,086	505	3,313	3,542	3,431	3,361	3,342	3,325	3,303	3,299	3,129	536	11,737	3,352	3,027	2,656	2,431	272
1993.....	43,465	31,502	545	3,377	3,529	3,429	3,437	3,361	3,350	3,356	3,355	3,249	513	11,963	3,487	3,050	2,751	2,424	250
1994.....	44,111	31,896	603	3,444	3,593	3,440	3,439	3,426	3,372	3,381	3,404	3,302	492	12,215	3,604	3,131	2,748	2,488	244
1995.....	44,840	32,338	637	3,536	3,671	3,507	3,445	3,431	3,438	3,395	3,422	3,356	500	12,502	3,704	3,237	2,826	2,487	247
1996.....	45,611	32,762	670	3,532	3,770	3,600	3,524	3,454	3,453	3,494	3,464	3,403	399	12,849	3,801	3,323	2,930	2,586	208
1997.....	46,127	33,071	695	3,503	3,755	3,689	3,597	3,507	3,458	3,492	3,520	3,415	440	13,056	3,819	3,376	2,972	2,673	216
1998.....	46,539	33,344	729	3,443	3,727	3,681	3,696	3,592	3,520	3,497	3,530	3,480	449	13,195	3,856	3,382	3,021	2,722	214
1999.....	46,857	33,486	751	3,397	3,684	3,656	3,691	3,686	3,604	3,564	3,541	3,497	415	13,371	3,935	3,415	3,034	2,782	205
2000.....	47,204	33,686	776	3,382	3,636	3,634	3,676	3,711	3,707	3,663	3,629	3,538	334	13,517	3,963	3,491	3,083	2,803	177
2001.....	47,672	33,936	865	3,379	3,614	3,593	3,653	3,695	3,727	3,769	3,720	3,616	304	13,736	4,012	3,528	3,174	2,863	159
2002.....	48,183	34,114	915	3,434	3,594	3,565	3,623	3,669	3,711	3,788	3,821	3,709	285	14,069	4,105	3,584	3,229	2,990	161
2003.....	48,540	34,201	950	3,503	3,613	3,544	3,611	3,619	3,685	3,772	3,841	3,809	255	14,339	4,190	3,675	3,277	3,046	150
2004.....	48,795	34,178	990	3,544	3,663	3,560	3,580	3,612	3,635	3,735	3,818	3,825	215	14,618	4,281	3,750	3,369	3,094	122
2005.....	49,113	34,204	1,036	3,619	3,691	3,606	3,586	3,578	3,633	3,670	3,777	3,802	205	14,909	4,287	3,866	3,454	3,180	121
2006.....	49,316	34,235	1,084	3,631	3,751	3,641	3,627	3,586	3,602	3,660	3,716	3,766	170	15,081	4,260	3,882	3,551	3,277	110
2007.....	49,293	34,205	1,081	3,609	3,750	3,704	3,659	3,624	3,600	3,628	3,701	3,709	139	15,087	4,200	3,863	3,558	3,375	92
2008.....	49,266	34,286	1,180	3,640	3,708	3,699	3,708	3,647	3,629	3,614	3,653	3,692	117	14,980	4,123	3,822	3,548	3,400	87
2009.....	49,361	34,409	1,223	3,678	3,729	3,665	3,707	3,701	3,652	3,644	3,641	3,651	119	14,952	4,080	3,809	3,541	3,432	90
2010.....	49,484	34,625	1,279	3,682	3,754	3,701	3,686	3,711	3,718	3,682	3,676	3,659	77	14,860	4,008	3,800	3,538	3,472	42
2011.....	49,522	34,773	1,291	3,746	3,773	3,713	3,703	3,672	3,699	3,724	3,696	3,679	77	14,749	3,957	3,751	3,546	3,452	43
Projected																			
2012.....	49,652	34,968	1,305	3,787	3,794	3,732	3,721	3,707	3,681	3,718	3,744	3,701	77	14,684	3,978	3,704	3,501	3,459	42
2013.....	49,750	35,111	1,302	3,777	3,834	3,754	3,741	3,725	3,716	3,699	3,738	3,749	77	14,639	4,003	3,724	3,456	3,415	42
2014.....	49,751	35,062	1,264	3,668	3,824	3,793	3,762	3,744	3,734	3,735	3,719	3,743	76	14,689	4,054	3,746	3,475	3,372	42
2015.....	49,839	35,069	1,267	3,677	3,713	3,783	3,801	3,766	3,754	3,753	3,755	3,725	76	14,770	4,048	3,795	3,496	3,390	42
2016.....	49,951	35,142	1,279	3,713	3,723	3,674	3,791	3,805	3,775	3,772	3,773	3,760	76	14,810	4,028	3,789	3,541	3,410	42
2017.....	50,280	35,412	1,342	3,895	3,759	3,683	3,682	3,795	3,814	3,794	3,793	3,779	77	14,868	4,066	3,770	3,535	3,454	42
2018.....	50,543	35,642	1,352	3,924	3,943	3,719	3,691	3,686	3,804	3,833	3,814	3,798	77	14,901	4,086	3,806	3,518	3,449	42
2019.....	50,834	35,878	1,361	3,951	3,973	3,901	3,727	3,695	3,695	3,823	3,854	3,820	78	14,957	4,107	3,825	3,552	3,432	42
2020.....	51,165	36,115	1,370	3,975	4,000	3,931	3,910	3,731	3,704	3,713	3,844	3,860	78	15,050	4,131	3,844	3,569	3,465	42
2021.....	51,485	36,335	1,377	3,997	4,025	3,958	3,939	3,914	3,740	3,722	3,733	3,850	79	15,151	4,174	3,866	3,587	3,482	42
2022.....	51,804	36,585	1,385	4,018	4,048	3,982	3,966	3,943	3,923	3,759	3,742	3,739	79	15,219	4,163	3,906	3,608	3,500	42
2023.....	52,113	36,967	1,391	4,037	4,069	4,005	3,991	3,970	3,953	3,943	3,779	3,748	80	15,146	4,043	3,896	3,645	3,520	42

NOTE: Due to changes in reporting and imputation practices, prekindergarten enrollment for years prior to 1992 represent an undercount compared to later years. The total ungraded counts of students were prorated to the elementary and secondary levels based on prior reports. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Statistics of Public Elementary and Secondary School Systems, 1980-81*; Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1985-86 through 2011-12; and National Elementary and Secondary Enrollment Projection Model, 1972 through 2023. (This table was prepared January 2014.)

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**Table 3. Enrollment in public elementary and secondary schools, by region, state, and jurisdiction: Selected years, fall 1990 through fall 2023—Continued**

Region, state, and jurisdiction	Percent change in total enrollment, 2006 to 2011	Projected total enrollment						Percent change in total enrollment, 2011 to 2023
		Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2020	Fall 2023	
1	15	16	17	18	19	20	21	22
<b>United States.....</b>	<b>0.4</b>	<b>49,651,900</b>	<b>49,750,400</b>	<b>49,751,300</b>	<b>49,839,400</b>	<b>51,165,200</b>	<b>52,112,800</b>	<b>5.2</b>
<b>Region</b>								
Northeast.....	-3.7	7,901,300	7,852,600	7,800,800	7,766,800	7,768,400	7,791,000	-2.0
Midwest.....	-2.3	10,556,400	10,536,700	10,496,200	10,479,600	10,504,000	10,515,400	-0.6
South.....	3.6	19,115,700	19,236,100	19,300,200	19,385,600	20,060,900	20,542,600	8.4
West.....	0.8	12,078,600	12,125,000	12,154,200	12,207,300	12,832,000	13,263,700	10.2
<b>State</b>								
Alabama.....	0.1	742,400	739,300	734,300	730,000	715,000	712,800	-4.3
Alaska.....	-1.1	131,000	132,300	133,400	135,000	147,200	155,200	18.3
Arizona.....	1.1	1,088,500	1,098,800	1,108,300	1,122,600	1,226,000	1,295,500	19.9
Arkansas.....	1.4	486,300	487,300	486,200	484,900	485,700	488,600	1.1
California.....	-1.9	6,282,200	6,278,800	6,268,600	6,271,000	6,543,800	6,742,400	7.2
Colorado.....	7.6	864,700	874,000	880,700	888,600	931,600	954,000	11.7
Connecticut.....	-3.6	548,000	542,700	536,500	532,100	528,500	533,500	-3.8
Delaware.....	5.5	129,500	130,400	131,100	132,100	138,200	140,100	8.7
District of Columbia.....	1.5	74,700	74,200	73,400	73,000	71,900	69,600	-5.8
Florida.....	-0.1	2,696,300	2,715,800	2,730,200	2,745,000	2,903,500	3,032,800	13.7
Georgia.....	3.4	1,695,700	1,704,600	1,707,500	1,712,200	1,760,500	1,809,700	7.4
Hawaii.....	1.1	182,600	182,600	182,600	181,500	180,600	178,000	-2.6
Idaho.....	4.7	283,000	286,600	289,200	292,500	307,800	314,000	12.2
Illinois.....	-1.7	2,084,100	2,077,500	2,069,700	2,067,400	2,061,600	2,053,000	-1.4
Indiana.....	-0.5	1,038,100	1,033,500	1,025,200	1,019,100	1,005,100	1,009,500	-3.0
Iowa.....	2.6	498,000	499,500	499,000	499,400	504,100	501,500	1.1
Kansas.....	3.5	488,000	489,700	490,200	491,700	498,900	499,300	2.7
Kentucky.....	-0.2	683,300	682,300	680,100	679,000	672,600	668,500	-2.0
Louisiana.....	4.1	710,400	712,000	709,700	709,200	697,900	686,300	-2.4
Maine.....	-2.6	187,500	186,900	186,200	185,900	187,300	187,200	-0.9
Maryland.....	0.3	857,600	862,300	866,600	873,000	934,200	969,000	13.5
Massachusetts.....	-1.6	950,300	945,200	938,200	932,600	923,300	926,100	-2.9
Michigan.....	-8.7	1,555,400	1,541,400	1,524,100	1,512,600	1,479,200	1,473,300	-6.4
Minnesota.....	-0.1	845,400	850,800	856,500	863,200	913,600	937,700	11.7
Mississippi.....	-0.9	491,700	489,400	486,100	482,900	468,200	458,600	-6.5
Missouri.....	-0.4	916,300	916,700	914,400	913,800	923,500	930,000	1.5
Montana.....	-1.4	143,100	143,800	143,900	144,300	147,100	146,800	3.1
Nebraska.....	4.8	304,100	306,200	307,000	308,700	316,700	316,400	5.0
Nevada.....	3.5	442,300	446,000	449,900	454,900	496,600	534,700	21.6
New Hampshire.....	-5.7	189,000	186,800	184,600	182,700	182,400	186,400	-2.9
New Jersey.....	-2.3	1,346,300	1,334,400	1,321,200	1,310,200	1,295,900	1,297,200	-4.4
New Mexico.....	2.7	337,800	339,400	340,200	340,800	342,900	339,600	0.7
New York.....	-3.7	2,691,100	2,676,500	2,662,400	2,654,700	2,657,700	2,652,600	-1.9
North Carolina.....	4.4	1,515,700	1,524,900	1,530,300	1,537,900	1,602,100	1,672,300	10.9
North Dakota.....	1.0	99,100	100,200	101,000	102,000	107,500	107,800	10.4
Ohio.....	-5.3	1,730,300	1,722,700	1,712,100	1,704,200	1,677,000	1,664,100	-4.4
Oklahoma.....	4.2	673,000	677,000	677,900	679,600	689,000	690,300	3.6
Oregon.....	1.0	569,900	572,500	573,800	576,600	603,600	626,600	10.3
Pennsylvania.....	-5.3	1,758,500	1,751,600	1,744,500	1,742,000	1,761,000	1,772,200	#
Rhode Island.....	-5.8	140,700	139,700	138,900	138,900	142,400	144,700	1.3
South Carolina.....	2.7	734,700	738,800	740,900	744,300	761,100	770,600	6.0
South Dakota.....	5.7	128,300	129,300	129,900	130,600	135,500	135,900	6.2
Tennessee.....	2.2	1,006,500	1,012,600	1,016,700	1,021,400	1,054,200	1,081,100	8.1
Texas.....	8.7	5,072,200	5,135,400	5,178,400	5,226,300	5,511,100	5,669,000	13.4
Utah.....	14.4	612,500	624,700	634,500	643,500	683,700	704,600	17.7
Vermont.....	-5.8	89,900	89,000	88,200	87,800	89,800	91,200	1.4
Virginia.....	3.1	1,263,200	1,269,100	1,272,700	1,279,200	1,333,000	1,370,300	8.9
Washington.....	1.8	1,049,200	1,052,400	1,055,500	1,061,300	1,124,200	1,177,400	12.6
West Virginia.....	0.3	282,600	280,800	278,000	275,400	262,700	253,100	-10.5
Wisconsin.....	-0.6	869,400	869,300	867,000	867,200	881,300	886,900	1.8
Wyoming.....	5.8	91,900	93,100	94,100	94,800	96,900	94,900	5.3
<b>Jurisdiction</b>								
Bureau of Indian Education.....	—	—	—	—	—	—	—	—
DoD, overseas.....	—	—	—	—	—	—	—	—
DoD, domestic.....	—	—	—	—	—	—	—	—
Other jurisdictions								
American Samoa.....	—	—	—	—	—	—	—	—
Guam.....	—	—	—	—	—	—	—	—
Northern Marianas.....	-5.8	—	—	—	—	—	—	—
Puerto Rico.....	-16.8	—	—	—	—	—	—	—
U.S. Virgin Islands.....	-3.5	—	—	—	—	—	—	—

—Not available.

#Rounds to zero.

NOTE: DoD = Department of Defense. Detail may not sum to totals because of rounding. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1990–91 through 2011–12; and State Public Elementary and Secondary Enrollment Projection Model, 1980 through 2023. (This table was prepared December 2013.)



**Table 4. Public school enrollment in prekindergarten through grade 8, by region, state, and jurisdiction: Selected years, fall 1990 through fall 2023—Continued**

Region, state, and jurisdiction	Percent change in enrollment, 2006 to 2011	Projected enrollment						Percent change in enrollment, 2011 to 2023
		Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2020	Fall 2023	
1	15	16	17	18	19	20	21	22
<b>United States.....</b>	<b>1.6</b>	<b>34,967,700</b>	<b>35,111,000</b>	<b>35,062,300</b>	<b>35,069,200</b>	<b>36,114,900</b>	<b>36,966,700</b>	<b>6.3</b>
<b>Region</b>								
Northeast.....	-1.7	5,470,500	5,459,800	5,424,200	5,396,400	5,411,600	5,477,400	#
Midwest.....	-0.6	7,363,300	7,363,700	7,323,300	7,288,400	7,316,500	7,356,600	#
South.....	4.5	13,707,500	13,795,700	13,791,500	13,804,700	14,313,400	14,716,800	8.4
West.....	1.1	8,426,300	8,491,700	8,523,300	8,579,700	9,073,400	9,415,900	12.7
<b>State</b>								
Alabama.....	-0.3	526,600	523,900	518,300	512,700	506,800	506,600	-3.9
Alaska.....	2.1	93,000	94,300	95,400	96,700	107,000	112,600	22.3
Arizona.....	#	773,000	786,400	796,200	806,100	879,000	936,700	23.3
Arkansas.....	-2.8	348,500	348,400	346,400	344,400	344,000	348,500	0.7
California.....	-2.3	4,327,800	4,349,200	4,356,000	4,384,400	4,627,600	4,779,300	10.9
Colorado.....	9.3	619,100	625,900	628,200	630,600	653,100	673,800	10.3
Connecticut.....	-3.7	379,300	376,400	372,400	369,500	373,400	382,200	-0.3
Delaware.....	6.6	92,000	93,300	93,900	94,400	97,400	98,700	8.9
District of Columbia.....	7.3	57,300	57,300	56,700	56,400	55,400	52,900	-5.9
Florida.....	0.5	1,895,200	1,910,400	1,918,000	1,927,500	2,068,500	2,167,500	15.5
Georgia.....	3.8	1,217,300	1,221,500	1,218,200	1,217,200	1,266,700	1,308,600	8.0
Hawaii.....	4.0	131,500	131,400	130,600	130,300	127,700	126,600	-3.4
Idaho.....	5.9	201,100	203,600	205,400	206,900	215,500	219,500	10.8
Illinois.....	-1.7	1,453,700	1,452,600	1,443,300	1,434,200	1,422,800	1,430,700	-1.5
Indiana.....	-0.8	722,700	719,500	712,800	704,200	702,600	712,200	-1.7
Iowa.....	7.3	353,200	354,800	353,700	353,500	353,500	349,100	-0.3
Kansas.....	6.4	349,000	350,700	350,000	349,500	351,700	352,300	1.5
Kentucky.....	0.3	490,800	490,500	486,300	481,900	474,700	474,200	-2.9
Louisiana.....	5.4	524,400	525,400	519,500	515,100	502,000	493,700	-4.8
Maine.....	-1.7	129,600	129,600	129,300	129,100	130,800	130,600	0.4
Maryland.....	2.6	600,600	608,600	613,200	620,100	663,300	690,400	16.2
Massachusetts.....	-0.6	663,900	660,700	654,300	648,700	644,400	655,600	-1.6
Michigan.....	-8.5	1,060,000	1,052,000	1,039,300	1,028,500	1,024,100	1,028,000	-4.0
Minnesota.....	3.1	583,000	589,400	593,400	597,300	628,700	649,700	12.9
Mississippi.....	-0.9	355,800	354,500	350,200	346,600	334,400	327,000	-7.4
Missouri.....	1.8	645,900	647,100	644,800	643,700	653,100	657,300	1.8
Montana.....	2.8	100,900	101,600	102,000	102,200	103,100	102,300	2.6
Nebraska.....	9.1	216,500	218,700	219,000	219,300	219,600	219,200	2.7
Nevada.....	2.1	312,500	315,800	318,700	321,500	358,900	390,900	26.4
New Hampshire.....	-4.8	127,600	126,500	125,200	124,400	128,000	132,900	2.5
New Jersey.....	-1.6	943,900	938,100	929,400	921,200	915,800	929,300	-1.9
New Mexico.....	4.1	240,800	241,700	241,300	240,800	240,100	237,300	-0.9
New York.....	-1.6	1,861,300	1,862,100	1,850,600	1,842,700	1,835,100	1,847,300	-0.6
North Carolina.....	4.6	1,080,300	1,086,100	1,085,700	1,085,400	1,148,900	1,208,500	12.5
North Dakota.....	5.4	69,400	70,600	71,700	72,500	74,200	73,100	7.7
Ohio.....	-2.9	1,214,500	1,210,500	1,199,800	1,190,000	1,175,500	1,169,800	-3.9
Oklahoma.....	6.6	495,600	497,700	495,900	494,900	495,500	497,800	1.6
Oregon.....	2.8	393,200	395,500	396,500	398,300	423,500	442,000	13.0
Pennsylvania.....	-1.2	1,205,800	1,206,600	1,202,900	1,201,000	1,219,100	1,230,500	#
Rhode Island.....	-4.3	96,100	97,100	97,500	97,300	99,900	102,200	4.6
South Carolina.....	3.6	527,100	530,300	529,400	528,800	540,100	546,900	5.3
South Dakota.....	8.9	91,000	92,100	92,700	93,400	95,000	94,400	4.3
Tennessee.....	3.0	718,900	722,500	721,900	722,200	748,000	770,600	8.1
Texas.....	9.6	3,686,800	3,729,600	3,744,100	3,763,300	3,946,000	4,077,700	12.1
Utah.....	17.0	444,100	451,200	455,000	458,900	478,500	493,900	13.7
Vermont.....	-2.5	62,900	62,800	62,500	62,500	65,200	66,800	7.5
Virginia.....	4.7	888,100	894,600	895,700	898,400	938,400	970,700	10.2
Washington.....	3.4	723,700	728,400	731,000	735,400	792,900	837,200	16.6
West Virginia.....	2.3	202,300	201,200	198,100	195,400	183,300	176,600	-12.6
Wisconsin.....	3.1	604,500	605,700	602,900	602,300	615,700	620,900	3.0
Wyoming.....	10.5	65,700	66,700	67,100	67,600	66,500	63,900	-0.2
<b>Jurisdiction</b>								
Bureau of Indian Education.....	—	—	—	—	—	—	—	—
DoD, overseas.....	—	—	—	—	—	—	—	—
DoD, domestic.....	—	—	—	—	—	—	—	—
Other jurisdictions								
American Samoa.....	—	—	—	—	—	—	—	—
Guam.....	—	—	—	—	—	—	—	—
Northern Marianas.....	-9.4	—	—	—	—	—	—	—
Puerto Rico.....	-16.7	—	—	—	—	—	—	—
U.S. Virgin Islands.....	-5.9	—	—	—	—	—	—	—

—Not available.

#Rounds to zero.

NOTE: DoD = Department of Defense. Detail may not sum to totals because of rounding. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), State Nonfiscal Survey of Public Elementary/Secondary Education, 1990–91 through 2011–12; and State Public Elementary and Secondary Enrollment Projection Model, 1980 through 2023. (This table was prepared January 2014.)



**Table 5. Public school enrollment in grades 9 through 12, by region, state, and jurisdiction: Selected years, fall 1990 through fall 2023—Continued**

Region, state, and jurisdiction	Percent change in enrollment, 2006 to 2011	Projected enrollment						Percent change in enrollment, 2011 to 2023
		Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2020	Fall 2023	
1	15	16	17	18	19	20	21	22
<b>United States.....</b>	<b>-2.2</b>	<b>14,684,200</b>	<b>14,639,400</b>	<b>14,689,000</b>	<b>14,770,200</b>	<b>15,050,300</b>	<b>15,146,100</b>	<b>2.7</b>
<b>Region</b>								
Northeast .....	-7.8	2,430,800	2,392,800	2,376,600	2,370,400	2,356,800	2,313,600	-6.5
Midwest .....	-5.8	3,193,000	3,173,000	3,172,900	3,191,200	3,187,500	3,158,800	-1.7
South .....	1.4	5,408,100	5,440,400	5,508,600	5,580,900	5,747,400	5,825,900	8.3
West .....	0.1	3,652,300	3,633,300	3,630,900	3,627,600	3,758,600	3,847,800	4.5
<b>State</b>								
Alabama .....	1.2	215,800	215,400	216,000	217,300	208,100	206,100	-5.3
Alaska .....	-7.8	38,000	38,000	38,100	38,300	40,200	42,600	8.9
Arizona .....	4.0	315,500	312,400	312,100	316,600	347,000	358,800	11.8
Arkansas .....	-2.0	137,800	139,000	139,700	140,500	141,700	140,100	2.2
California .....	-0.9	1,954,400	1,929,600	1,912,600	1,886,600	1,916,200	1,963,100	-0.8
Colorado.....	3.6	245,600	248,100	252,500	258,000	278,600	280,200	15.1
Connecticut.....	-3.4	168,700	166,200	164,100	162,600	155,100	151,300	-11.6
Delaware .....	2.9	37,500	37,100	37,200	37,700	40,700	41,400	8.0
District of Columbia.....	-13.4	17,400	16,800	16,700	16,600	16,500	16,800	-5.2
Florida .....	-1.6	801,000	805,400	812,200	817,500	835,000	865,300	9.2
Georgia .....	2.4	478,400	483,100	489,300	495,000	493,800	501,100	5.8
Hawaii .....	-5.5	51,100	51,100	51,400	51,100	52,900	51,400	-0.6
Idaho .....	1.8	82,000	83,000	83,900	85,600	92,400	94,500	15.5
Illinois.....	-1.7	630,400	624,900	626,300	633,200	638,800	622,300	-1.2
Indiana.....	0.1	315,300	314,000	312,500	314,800	302,500	297,300	-6.0
Iowa .....	-7.1	144,800	144,700	145,400	145,900	150,600	152,400	4.6
Kansas .....	-3.0	139,000	139,100	140,200	142,100	147,100	147,000	5.8
Kentucky.....	-1.3	192,500	191,800	193,800	197,200	197,900	194,400	0.4
Louisiana.....	0.5	186,100	186,600	190,200	194,100	195,900	192,600	4.3
Maine.....	-4.4	58,000	57,300	56,900	56,800	56,500	56,600	-3.9
Maryland .....	-4.7	257,000	253,700	253,400	252,900	270,800	278,600	7.2
Massachusetts.....	-3.7	286,400	284,500	283,800	283,900	278,900	270,500	-5.8
Michigan.....	-9.0	495,500	489,400	484,800	484,100	455,100	445,200	-11.4
Minnesota.....	-6.4	262,400	261,400	263,200	265,900	284,900	288,000	9.0
Mississippi.....	-0.7	135,900	134,900	136,000	136,300	133,800	131,600	-4.4
Missouri.....	-5.2	270,500	269,500	269,600	270,100	270,400	272,700	0.6
Montana.....	-10.1	42,200	42,200	41,900	42,100	44,000	44,500	4.4
Nebraska.....	-4.4	87,600	87,500	88,000	89,400	97,100	97,200	10.7
Nevada .....	6.9	129,800	130,200	131,300	133,400	137,700	143,800	10.4
New Hampshire .....	-7.6	61,400	60,300	59,400	58,200	54,400	53,500	-14.1
New Jersey .....	-3.9	402,400	396,400	391,800	389,000	380,100	368,000	-10.0
New Mexico.....	-0.4	97,000	97,700	98,900	99,900	102,900	102,300	4.7
New York.....	-8.2	829,800	814,400	811,800	812,000	822,700	805,300	-4.9
North Carolina.....	3.9	435,400	438,800	444,600	452,500	453,200	463,900	6.9
North Dakota.....	-7.8	29,700	29,600	29,300	29,500	33,300	34,700	16.6
Ohio.....	-10.4	515,800	512,200	512,300	514,200	501,600	494,300	-5.5
Oklahoma.....	-2.0	177,300	179,300	182,000	184,700	193,500	192,400	9.4
Oregon .....	-2.8	176,700	177,000	177,300	178,200	180,100	184,700	4.4
Pennsylvania.....	-13.0	552,700	545,000	541,700	541,000	542,000	541,600	-4.4
Rhode Island.....	-8.9	44,500	42,500	41,400	41,500	42,500	42,500	-6.0
South Carolina .....	0.5	207,600	208,500	211,500	215,600	221,000	223,700	7.7
South Dakota .....	-1.4	37,200	37,200	37,300	37,200	40,500	41,500	10.7
Tennessee.....	0.2	287,600	290,100	294,800	299,200	306,200	310,500	8.2
Texas .....	6.6	1,385,400	1,405,900	1,434,300	1,463,000	1,565,100	1,591,300	16.7
Utah.....	8.0	168,400	173,500	179,500	184,600	205,200	210,700	28.2
Vermont.....	-12.3	26,900	26,200	25,700	25,300	24,600	24,400	-12.1
Virginia .....	-0.6	375,100	374,500	377,000	380,800	394,600	399,600	6.1
Washington .....	-1.4	325,500	324,000	324,500	325,900	331,300	340,200	4.0
West Virginia.....	-4.2	80,300	79,600	80,000	80,000	79,400	76,500	-5.3
Wisconsin.....	-8.1	264,800	263,600	264,100	264,800	265,700	266,100	-0.8
Wyoming.....	-4.3	26,200	26,500	26,900	27,200	30,400	31,000	19.0
<b>Jurisdiction</b>								
Bureau of Indian Education .....	—	—	—	—	—	—	—	—
DoD, overseas.....	—	—	—	—	—	—	—	—
DoD, domestic.....	—	—	—	—	—	—	—	—
Other jurisdictions								
American Samoa.....	—	—	—	—	—	—	—	—
Guam .....	—	—	—	—	—	—	—	—
Northern Marianas .....	3.7	—	—	—	—	—	—	—
Puerto Rico.....	-17.1	—	—	—	—	—	—	—
U.S. Virgin Islands .....	1.7	—	—	—	—	—	—	—

—Not available.

NOTE: DoD = Department of Defense. Detail may not sum to totals because of rounding. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1990–91 through 2011–12; and State Public Elementary and Secondary Enrollment Projection Model, 1980 through 2023. (This table was prepared January 2014.)





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**Table 7. Enrollment and percentage distribution of enrollment in public elementary and secondary schools, by race/ethnicity and level of education: Fall 1998 through fall 2023—Continued**

Level of education and year	Enrollment (in thousands)									Percentage distribution								
	Total	White	Black	Hispanic	Asian/Pacific Islander			American Indian/Alaska Native	Two or more races	Total	White	Black	Hispanic	Asian/Pacific Islander			American Indian/Alaska Native	Two or more races
					Total	Asian	Pacific Islander							Total	Asian	Pacific Islander		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2013 <sup>2</sup>	14,639	7,724	2,289	3,373	767	710	56	158	329	100.0	52.8	15.6	23.0	5.2	4.9	0.4	1.1	2.2
2014 <sup>2</sup>	14,689	7,651	2,283	3,483	775	715	60	157	340	100.0	52.1	15.5	23.7	5.3	4.9	0.4	1.1	2.3
2015 <sup>2</sup>	14,770	7,598	2,271	3,610	782	719	63	157	353	100.0	51.4	15.4	24.4	5.3	4.9	0.4	1.1	2.4
2016 <sup>2</sup>	14,810	7,513	2,241	3,743	794	728	67	154	364	100.0	50.7	15.1	25.3	5.4	4.9	0.4	1.0	2.5
2017 <sup>2</sup>	14,868	7,440	2,208	3,886	812	741	71	150	373	100.0	50.0	14.8	26.1	5.5	5.0	0.5	1.0	2.5
2018 <sup>2</sup>	14,901	7,360	2,167	4,023	821	746	76	147	382	100.0	49.4	14.5	27.0	5.5	5.0	0.5	1.0	2.6
2019 <sup>2</sup>	14,957	7,271	2,139	4,176	831	749	82	144	396	100.0	48.6	14.3	27.9	5.6	5.0	0.5	1.0	2.6
2020 <sup>2</sup>	15,050	7,204	2,132	4,325	835	748	86	143	412	100.0	47.9	14.2	28.7	5.5	5.0	0.6	0.9	2.7
2021 <sup>2</sup>	15,151	7,135	2,148	4,463	836	745	90	142	427	100.0	47.1	14.2	29.5	5.5	4.9	0.6	0.9	2.8
2022 <sup>2</sup>	15,219	7,062	2,168	4,566	839	746	92	141	442	100.0	46.4	14.2	30.0	5.5	4.9	0.6	0.9	2.9
2023 <sup>2</sup>	15,146	6,960	2,166	4,586	837	745	92	140	457	100.0	46.0	14.3	30.3	5.5	4.9	0.6	0.9	3.0

—Not available.

†Not applicable.

<sup>1</sup>For this year, data on students of Two or more races were reported by only a small number of states. Therefore, the data are not comparable to figures for 2010 and later years.

<sup>2</sup>Projected.

NOTE: Race categories exclude persons of Hispanic ethnicity. Enrollment data for students not reported by race/ethnicity were prorated by state and grade to match state totals. Prior to 2008, data on students of Two or more races were not collected separately. Total counts

of ungraded students were prorated to prekindergarten through grade 8 and grades 9 through 12 based on prior reports. Some data have been revised from previously published figures. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary and Secondary Education," 1998–99 through 2011–12; and National Elementary and Secondary Enrollment by Race/Ethnicity Projection Model, 1972 through 2023. (This table was prepared April 2014.)











**Table 11. Public high school graduates, by race/ethnicity: 1998–99 through 2023–24**

Year	Number of high school graduates							Percentage distribution of graduates						
	Total	White	Black	Hispanic	Asian/ Pacific Islander	American Indian/ Alaska Native	Two or more races	Total	White	Black	Hispanic	Asian/ Pacific Islander	American Indian/ Alaska Native	Two or more races
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1998–99.....	2,485,630	1,749,561	325,708	270,836	115,216	24,309	—	100.0	70.4	13.1	10.9	4.6	1.0	—
1999–2000.....	2,553,844	1,778,370	338,116	289,139	122,344	25,875	—	100.0	69.6	13.2	11.3	4.8	1.0	—
2000–01.....	2,569,200	1,775,036	339,578	301,740	126,465	26,381	—	100.0	69.1	13.2	11.7	4.9	1.0	—
2001–02.....	2,621,534	1,796,110	348,969	317,197	132,182	27,076	—	100.0	68.5	13.3	12.1	5.0	1.0	—
2002–03.....	2,719,947	1,856,454	359,920	340,182	135,588	27,803	—	100.0	68.3	13.2	12.5	5.0	1.0	—
2003–04.....	2,753,438	1,829,177	383,443	374,492	137,496	28,830	—	100.0	66.4	13.9	13.6	5.0	1.0	—
2004–05.....	2,799,250	1,855,198	385,987	383,714	143,729	30,622	—	100.0	66.3	13.8	13.7	5.1	1.1	—
2005–06.....	2,815,544	1,838,765	399,406	396,820	150,925	29,628	—	100.0	65.3	14.2	14.1	5.4	1.1	—
2006–07.....	2,893,045	1,868,056	418,113	421,036	154,837	31,003	—	100.0	64.6	14.5	14.6	5.4	1.1	—
2007–08.....	3,001,337	1,898,367	429,840	448,887	159,410	32,036	32,797 <sup>1</sup>	100.0	63.3	14.3	15.0	5.3	1.1	1.1 <sup>1</sup>
2008–09.....	3,039,015	1,883,382	451,384	481,698	163,575	32,213	26,763 <sup>1</sup>	100.0	62.0	14.9	15.9	5.4	1.1	0.9 <sup>1</sup>
2009–10.....	3,128,022	1,871,980	472,261	545,518	167,840	34,131	36,292 <sup>1</sup>	100.0	59.8	15.1	17.4	5.4	1.1	1.2 <sup>1</sup>
2010–11.....	3,143,879	1,835,156	471,410	583,907	168,880	32,778	51,748	100.0	58.4	15.0	18.6	5.4	1.0	1.6
2011–12.....	3,147,790	1,807,104	467,419	605,674	173,762	32,423	61,408	100.0	57.4	14.8	19.2	5.5	1.0	2.0
2012–13 <sup>2</sup> .....	3,110,150	1,766,390	450,760	626,280	173,640	30,240	62,850	100.0	56.8	14.5	20.1	5.6	1.0	2.0
2013–14 <sup>2</sup> .....	3,070,440	1,730,560	433,110	638,840	173,900	28,860	65,170	100.0	56.4	14.1	20.8	5.7	0.9	2.1
2014–15 <sup>2</sup> .....	3,031,450	1,688,980	424,210	651,690	172,060	27,180	67,340	100.0	55.7	14.0	21.5	5.7	0.9	2.2
2015–16 <sup>2</sup> .....	3,047,830	1,682,000	428,920	670,420	168,750	28,380	69,350	100.0	55.2	14.1	22.0	5.5	0.9	2.3
2016–17 <sup>2</sup> .....	3,066,350	1,677,460	425,700	692,290	169,530	29,020	72,340	100.0	54.7	13.9	22.6	5.5	0.9	2.4
2017–18 <sup>2</sup> .....	3,105,970	1,669,320	428,510	726,090	178,840	28,190	75,020	100.0	53.7	13.8	23.4	5.8	0.9	2.4
2018–19 <sup>2</sup> .....	3,100,900	1,647,840	419,000	752,560	176,080	27,600	77,830	100.0	53.1	13.5	24.3	5.7	0.9	2.5
2019–20 <sup>2</sup> .....	3,085,600	1,613,600	408,910	777,990	177,630	26,880	80,590	100.0	52.3	13.3	25.2	5.8	0.9	2.6
2020–21 <sup>2</sup> .....	3,115,140	1,614,270	402,510	806,220	182,550	26,170	83,420	100.0	51.8	12.9	25.9	5.9	0.8	2.7
2021–22 <sup>2</sup> .....	3,130,360	1,601,380	397,650	835,880	183,600	25,860	85,980	100.0	51.2	12.7	26.7	5.9	0.8	2.7
2022–23 <sup>2</sup> .....	3,146,530	1,577,570	398,150	876,760	179,890	25,580	88,570	100.0	50.1	12.7	27.9	5.7	0.8	2.8
2023–24 <sup>2</sup> .....	3,164,540	1,564,210	403,960	901,510	178,380	25,600	90,880	100.0	49.4	12.8	28.5	5.6	0.8	2.9

—Not available.

<sup>1</sup>Data on students of Two or more races were not reported by all states; therefore, the data are not comparable to figures for 2010–11 and later years.

<sup>2</sup>Projected.

NOTE: Race categories exclude persons of Hispanic ethnicity. Prior to 2007–08, data on students of Two or more races were not collected separately. Some data have been revised from previously published figures. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1999–2000 through 2005–06; "State Dropout and Completion Data File," 2005–06 through 2011–12; and National Public High School Graduates by Race/Ethnicity Projection Model, 1995–96 through 2023–24. (This table was prepared May 2014.)

**Table 12. Current expenditures and current expenditures per pupil in public elementary and secondary schools: 1989–90 through 2023–24**

School year	Current expenditures in unadjusted dollars <sup>1</sup>			Current expenditures in constant 2012–13 dollars <sup>2</sup>					
	Total, in billions	Per pupil in fall enrollment	Per pupil in average daily attendance (ADA)	Total current expenditures		Per pupil in fall enrollment		Per pupil in average daily attendance (ADA)	
				In billions	Annual percentage change	Per pupil enrolled	Annual percentage change	Per pupil in ADA	Annual percentage change
1	2	3	4	5	6	7	8	9	10
1989–90.....	\$188.2	\$4,643	\$4,980	\$343.0	3.8	\$8,459	2.9	\$9,073	2.3
1990–91.....	202.0	4,902	5,258	349.0	1.8	8,468	0.1	9,083	0.1
1991–92.....	211.2	5,023	5,421	353.6	1.3	8,409	-0.7	9,075	-0.1
1992–93.....	220.9	5,160	5,584	358.7	1.4	8,375	-0.4	9,064	-0.1
1993–94.....	231.5	5,327	5,767	366.4	2.1	8,429	0.6	9,126	0.7
1994–95.....	243.9	5,529	5,989	375.1	2.4	8,504	0.9	9,212	0.9
1995–96.....	255.1	5,689	6,147	382.0	1.8	8,519	0.2	9,205	-0.1
1996–97.....	270.2	5,923	6,393	393.3	3.0	8,624	1.2	9,307	1.1
1997–98.....	285.5	6,189	6,676	408.4	3.8	8,853	2.7	9,549	2.6
1998–99.....	302.9	6,508	7,013	425.9	4.3	9,151	3.4	9,861	3.3
1999–2000.....	323.9	6,912	7,394	442.6	3.9	9,446	3.2	10,104	2.5
2000–01.....	348.4	7,380	7,904	460.3	4.0	9,751	3.2	10,443	3.4
2001–02.....	368.4	7,727	8,259	478.3	3.9	10,033	2.9	10,723	2.7
2002–03.....	387.6	8,044	8,610	492.4	3.0	10,219	1.9	10,938	2.0
2003–04.....	403.4	8,310	8,900	501.5	1.8	10,332	1.1	11,064	1.2
2004–05.....	425.0	8,711	9,316	513.0	2.3	10,513	1.8	11,243	1.6
2005–06.....	449.1	9,145	9,778	522.2	1.8	10,632	1.1	11,368	1.1
2006–07.....	476.8	9,679	10,336	540.4	3.5	10,969	3.2	11,714	3.0
2007–08.....	506.9	10,298	10,982	553.9	2.5	11,254	2.6	12,001	2.5
2008–09.....	518.9	10,540	11,239	559.3	1.0	11,359	0.9	12,113	0.9
2009–10.....	524.7	10,636	11,427	560.1	0.1	11,353	-0.1	12,198	0.7
2010–11.....	527.2	10,658	11,418	551.6	-1.5	11,153	-1.8	11,948	-2.0
2011–12 <sup>3</sup> .....	527.5	10,650	11,400	536.3	-2.8	10,830	-2.9	11,590	-3.0
2012–13 <sup>3</sup> .....	542.2	10,920	11,680	542.2	1.1	10,920	0.8	11,680	0.8
2013–14 <sup>3</sup> .....	556.6	11,190	11,970	548.4	1.1	11,020	0.9	11,790	0.9
2014–15 <sup>3</sup> .....	576.8	11,590	12,400	558.8	1.9	11,230	1.9	12,020	1.9
2015–16 <sup>3</sup> .....	—	—	—	570.0	2.0	11,440	1.8	12,240	1.8
2016–17 <sup>3</sup> .....	—	—	—	582.8	2.2	11,670	2.0	12,480	2.0
2017–18 <sup>3</sup> .....	—	—	—	598.3	2.7	11,900	2.0	12,730	2.0
2018–19 <sup>3</sup> .....	—	—	—	610.7	2.1	12,080	1.5	12,930	1.5
2019–20 <sup>3</sup> .....	—	—	—	622.4	1.9	12,240	1.3	13,100	1.3
2020–21 <sup>3</sup> .....	—	—	—	633.0	1.7	12,370	1.0	13,240	1.0
2021–22 <sup>3</sup> .....	—	—	—	643.2	1.6	12,490	1.0	13,370	1.0
2022–23 <sup>3</sup> .....	—	—	—	654.2	1.7	12,630	1.1	13,510	1.1
2023–24 <sup>3</sup> .....	—	—	—	662.9	1.3	12,720	0.7	13,610	0.7

—Not available.

<sup>1</sup>Unadjusted (or "current") dollars have not been adjusted to compensate for inflation.  
<sup>2</sup>Constant dollars based on the Consumer Price Index, prepared by the Bureau of Labor Statistics, U.S. Department of Labor, adjusted to a school-year basis.

<sup>3</sup>Projected.

NOTE: Current expenditures include instruction, support services, food services, and enterprise operations. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "National Public Education Financial Survey," 1989–90 through 2010–11; National Elementary and Secondary Enrollment Projection Model, 1972 through 2023; and Public Elementary and Secondary Education Current Expenditure Projection Model, 1973–74 through 2023–24. (This table was prepared May 2014.)



**Table 13. Total fall enrollment in degree-granting postsecondary institutions, by attendance status, sex of student, and control of institution: Selected years, 1947 through 2023—Continued**

Year	Total enrollment	Attendance status			Sex of student			Control of institution			
		Full-time	Part-time	Percent part-time	Male	Female	Percent female	Public	Private		
									Total	Nonprofit	For-profit
1	2	3	4	5	6	7	8	9	10	11	12
2015 <sup>5</sup>	21,266,000	13,112,000	8,154,000	38.3	9,073,000	12,193,000	57.3	15,319,000	5,947,000	—	—
2016 <sup>5</sup>	21,586,000	13,278,000	8,308,000	38.5	9,146,000	12,441,000	57.6	15,545,000	6,041,000	—	—
2017 <sup>5</sup>	21,946,000	13,468,000	8,478,000	38.6	9,243,000	12,703,000	57.9	15,802,000	6,144,000	—	—
2018 <sup>5</sup>	22,227,000	13,618,000	8,609,000	38.7	9,323,000	12,904,000	58.1	16,004,000	6,223,000	—	—
2019 <sup>5</sup>	22,512,000	13,774,000	8,737,000	38.8	9,408,000	13,104,000	58.2	16,208,000	6,304,000	—	—
2020 <sup>5</sup>	22,797,000	13,929,000	8,868,000	38.9	9,491,000	13,306,000	58.4	16,410,000	6,388,000	—	—
2021 <sup>5</sup>	23,141,000	14,122,000	9,020,000	39.0	9,599,000	13,543,000	58.5	16,652,000	6,489,000	—	—
2022 <sup>5</sup>	23,499,000	14,329,000	9,170,000	39.0	9,712,000	13,786,000	58.7	16,905,000	6,594,000	—	—
2023 <sup>5</sup>	23,834,000	14,520,000	9,314,000	39.1	9,817,000	14,017,000	58.8	17,143,000	6,691,000	—	—

—Not available.

<sup>1</sup>Degree-credit enrollment only.

<sup>2</sup>Includes part-time resident students and all extension students (students attending courses at sites separate from the primary reporting campus). In later years, part-time student enrollment was collected as a distinct category.

<sup>3</sup>Large increases are due to the addition of schools accredited by the Accrediting Commission of Career Schools and Colleges of Technology.

<sup>4</sup>Because of imputation techniques, data are not consistent with figures for other years.

<sup>5</sup>Projected.

NOTE: Data through 1995 are for institutions of higher education, while later data are for degree-granting institutions. Degree-granting institutions grant associate's or higher degrees and partici-

pate in Title IV federal financial aid programs. The degree-granting classification is very similar to the earlier higher education classification, but it includes more 2-year colleges and excludes a few higher education institutions that did not grant degrees.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Biennial Survey of Education in the United States; Opening Fall Enrollment in Higher Education, 1963 through 1965*; Higher Education General Information Survey (HEGIS), "Fall Enrollment in Colleges and Universities" surveys, 1966 through 1985; Integrated Postsecondary Education Data System (IPEDS), "Fall Enrollment Survey" (IPEDS-EF:86-99); IPEDS Spring 2001 through Spring 2013, Enrollment component; and Enrollment in Degree-Granting Institutions Projection Model, 1980 through 2023. (This table was prepared July 2014.)







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Table 16. Total undergraduate fall enrollment in degree-granting postsecondary institutions, by attendance status, sex of student, and control and level of institution: Selected years, 1970 through 2023—Continued

Table with 15 columns: Level and year, Total, Full-time, Part-time, Males, Females, Full-time, Part-time, Full-time, Part-time, Public, Total, Nonprofit, For-profit. Rows include years from 2005 to 2023, categorized into 4-year institutions and Private (Nonprofit/For-profit).

—Not available.

<sup>1</sup>Projected.

<sup>2</sup>Beginning in 1980, 2-year institutions include schools accredited by the Accrediting Commission of Career Schools and Colleges of Technology.

NOTE: Data include unclassified undergraduate students. Data through 1995 are for institutions of higher education, while later data are for degree-granting institutions. Degree-granting institutions grant associate's or higher degrees and participate in Title IV federal financial aid programs. The degree-granting classification is very similar to the earlier

higher education classification, but it includes more 2-year colleges and excludes a few higher education institutions that did not grant degrees.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Higher Education General Information Survey (HEGIS), "Fall Enrollment in Colleges and Universities" surveys, 1970 through 1985; Integrated Postsecondary Education Data System (IPEDS), "Fall Enrollment Survey" (IPEDS-EF:86-99); IPEDS Spring 2001 through Spring 2013, Enrollment component; and Enrollment in Degree-Granting Institutions Projection Model, 1980 through 2023. (This table was prepared July 2014.)





**Table 19. Fall enrollment of U.S. residents in degree-granting postsecondary institutions, by race/ethnicity: 1998 through 2023**

Year	Enrollment (in thousands)									Percentage distribution								
	Total	White	Black	Hispanic	Asian/Pacific Islander			American Indian/Alaska Native	Two or more races	Total	White	Black	Hispanic	Asian/Pacific Islander			American Indian/Alaska Native	Two or more races
					Total	Asian	Pacific Islander							Total	Asian	Pacific Islander		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1998.....	14,063	10,179	1,583	1,257	900	—	—	144	—	100.0	72.4	11.3	8.9	6.4	—	—	1.0	—
1999.....	14,361	10,329	1,649	1,324	914	—	—	146	—	100.0	71.9	11.5	9.2	6.4	—	—	1.0	—
2000.....	14,784	10,462	1,730	1,462	978	—	—	151	—	100.0	70.8	11.7	9.9	6.6	—	—	1.0	—
2001.....	15,363	10,775	1,850	1,561	1,019	—	—	158	—	100.0	70.1	12.0	10.2	6.6	—	—	1.0	—
2002.....	16,021	11,140	1,979	1,662	1,074	—	—	166	—	100.0	69.5	12.4	10.4	6.7	—	—	1.0	—
2003.....	16,314	11,281	2,068	1,716	1,076	—	—	173	—	100.0	69.1	12.7	10.5	6.6	—	—	1.1	—
2004.....	16,682	11,423	2,165	1,810	1,109	—	—	176	—	100.0	68.5	13.0	10.8	6.6	—	—	1.1	—
2005.....	16,903	11,495	2,215	1,882	1,134	—	—	176	—	100.0	68.0	13.1	11.1	6.7	—	—	1.0	—
2006.....	17,163	11,572	2,280	1,964	1,165	—	—	181	—	100.0	67.4	13.3	11.4	6.8	—	—	1.1	—
2007.....	17,624	11,756	2,383	2,076	1,218	—	—	190	—	100.0	66.7	13.5	11.8	6.9	—	—	1.1	—
2008.....	18,442	12,089	2,584	2,273	1,303	—	—	193	—	100.0	65.5	14.0	12.3	7.1	—	—	1.0	—
2009.....	19,743	12,731	2,920	2,547	1,338	—	—	208	—	100.0	64.5	14.8	12.9	6.8	—	—	1.1	—
2010.....	20,307	12,723	3,039	2,741	1,282	1,218	64	196	325	100.0	62.7	15.0	13.5	6.3	6.0	0.3	1.0	1.6
2011.....	20,254	12,394	3,068	2,890	1,282	1,217	66	186	433	100.0	61.2	15.1	14.3	6.3	6.0	0.3	0.9	2.1
2012.....	19,860	11,981	2,962	2,979	1,259	1,196	64	173	505	100.0	60.3	14.9	15.0	6.3	6.0	0.3	0.9	2.5
2013 <sup>1</sup> .....	19,806	12,025	2,887	2,985	1,236	—	—	169	504	100.0	60.7	14.6	15.1	6.2	—	—	0.9	2.5
2014 <sup>1</sup> .....	20,185	12,145	2,985	3,116	1,255	—	—	170	513	100.0	60.2	14.8	15.4	6.2	—	—	0.8	2.5
2015 <sup>1</sup> .....	20,408	12,181	3,073	3,204	1,261	—	—	170	519	100.0	59.7	15.1	15.7	6.2	—	—	0.8	2.5
2016 <sup>1</sup> .....	20,692	12,254	3,169	3,301	1,271	—	—	171	526	100.0	59.2	15.3	16.0	6.1	—	—	0.8	2.5
2017 <sup>1</sup> .....	21,015	12,354	3,268	3,404	1,284	—	—	171	534	100.0	58.8	15.6	16.2	6.1	—	—	0.8	2.5
2018 <sup>1</sup> .....	21,261	12,421	3,342	3,493	1,294	—	—	171	541	100.0	58.4	15.7	16.4	6.1	—	—	0.8	2.5
2019 <sup>1</sup> .....	21,508	12,490	3,409	3,583	1,308	—	—	172	547	100.0	58.1	15.8	16.7	6.1	—	—	0.8	2.5
2020 <sup>1</sup> .....	21,752	12,551	3,477	3,675	1,323	—	—	172	553	100.0	57.7	16.0	16.9	6.1	—	—	0.8	2.5
2021 <sup>1</sup> .....	22,049	12,642	3,554	3,774	1,345	—	—	173	561	100.0	57.3	16.1	17.1	6.1	—	—	0.8	2.5
2022 <sup>1</sup> .....	22,357	12,740	3,629	3,877	1,369	—	—	174	569	100.0	57.0	16.2	17.3	6.1	—	—	0.8	2.5
2023 <sup>1</sup> .....	22,642	12,813	3,705	3,981	1,391	—	—	175	576	100.0	56.6	16.4	17.6	6.1	—	—	0.8	2.5

—Not available.

<sup>1</sup>Projected.

NOTE: Race categories exclude persons of Hispanic ethnicity. Prior to 2010, institutions were not required to report separate data on Asians, Pacific Islanders, and students of Two or more races. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), "Fall Enrollment Survey" (IPEDS-EF:98–99); IPEDS Spring 2001 through Spring 2013, Enrollment component; and Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model, 1980 through 2023. (This table was prepared May 2014.)





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# Technical Appendixes



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# Appendix A

## *Introduction to Projection Methodology*

### A.0. INTRODUCTION TO PROJECTION METHODOLOGY

#### Content of appendix A

Since its inception in 1964, the *Projections of Education Statistics* series has been providing projections of key education statistics to policy makers, educators, researchers, the press, and the general public. This edition of *Projections of Education Statistics* is the forty-second in the series.

Appendix A contains this introduction, which provides a general overview of the projection methodology, as well as six additional sections, which discuss the specific methodology for the different statistics projected:

- » A.0. Introduction to Projection Methodology;
- » A.1. Elementary and Secondary Enrollment;
- » A.2. High School Graduates;
- » A.3. Elementary and Secondary Teachers;
- » A.4. Expenditures for Public Elementary and Secondary Education;
- » A.5. Enrollment in Postsecondary Degree-Granting Institutions; and
- » A.6. Postsecondary Degrees Conferred.

This introduction

- » outlines the two major techniques used to make the projections;
- » summarizes key demographic and economic assumptions underlying the projections;
- » examines the accuracy of the projections; and
- » introduces the subsequent sections of appendix A.

#### Projection techniques

Two main projection techniques were used to develop the projections presented in this publication:

- » Exponential smoothing was the technique used in the projections of elementary and secondary enrollments and high school graduates. This technique also played a role in the projections of teachers at the elementary and secondary level, as well as enrollments and degrees conferred at the postsecondary level.
- » Multiple linear regression was the primary technique used in the projections of teachers and expenditures at the elementary and secondary level, as well as enrollments and degrees conferred at the postsecondary level.

#### ***Exponential smoothing***

Two different types of exponential smoothing, single exponential smoothing and double exponential smoothing, were used in producing the projections presented in this publication.

Single exponential smoothing was used when the historical data had a basically horizontal pattern. Single exponential smoothing produces a single forecast for all years in the forecast period. In developing projections of elementary and secondary enrollments, for example, the rate at which students progress from one particular grade to the next (e.g., from grade 2 to grade 3) was projected using single exponential smoothing. Thus, this percentage was assumed to be constant over the forecast period.

In general, exponential smoothing places more weight on recent observations than on earlier ones. The weights for observations decrease exponentially as one moves further into the past. As a result, the older data have less influence on the projections. The rate at which the weights of older observations decrease is determined by the smoothing constant.

When using single exponential smoothing for a time series,  $P_t$ , a smoothed series,  $\hat{P}_t$ , is computed recursively by evaluating

$$\hat{P}_t = \alpha P_t + (1 - \alpha) \hat{P}_{t-1}$$

where  $0 < \alpha \leq 1$  is the smoothing constant.

By repeated substitution, we can rewrite the equation as

$$\hat{P}_t = \alpha \sum_{s=0}^{t-1} (1 - \alpha)^s P_{t-s}$$

where time,  $s$ , goes from the first period in the time series, 0, to time period  $t-1$ .

The forecasts are constant for all years in the forecast period. The constant equals

$$\hat{P}_{T+k} = \hat{P}_T$$

where  $T$  is the last year of actual data and  $k$  is the  $k$ th year in the forecast period where  $k > 0$ .

These equations illustrate that the projection is a weighted average based on exponentially decreasing weights. For higher smoothing constants, weights for earlier observations decrease more rapidly than for lower smoothing constants.

For each of the approximately 1,200 single exponential smoothing equations in this edition of *Projections of Education Statistics*, a smoothing constant was individually chosen to minimize the sum of squared forecast errors for that equation. The smoothing constants used to produce the projections in this report ranged from 0.001 to 0.999.

Double exponential smoothing is an extension of single exponential smoothing that allows the forecasting of data with trends. It produces different forecasts for different years in the forecast period. Double exponential smoothing with two smoothing constants was used to forecast the number of doctor's degrees awarded to men and women.

The smoothing forecast using double exponential smoothing is found using the three equations:

$$\hat{P}_{t+k} = a_t + b_t k$$

$$a_t = \alpha P_t + (1 - \alpha) (a_{t-1} + b_{t-1})$$

$$b_t = \beta (a_t - a_{t-1}) + (1 - \beta) b_{t-1}$$

where  $a_t$  denotes an estimate of the level of the series at time  $t$ ,  $b_t$  denotes an estimate of the level of the series at time  $t$ , and  $0 < \alpha, \beta < 1$  are the smoothing constants.

Forecasts from double smoothing are computed as

$$\hat{P}_{T+k} = a_T + b_T k$$

where  $T$  is the last year of actual data and  $k$  is the  $k$ th year in the forecast period where  $k > 0$ . The last expression shows that forecasts from double smoothing lie on a linear trend with intercept  $a_T$  and slope  $b_T$ . Single exponential smoothing can be viewed as a special case of double exponential smoothing where the impact that time has on the forecasts has been eliminated (i.e., requiring the slope term  $b_t$  to equal 0.0).

The smoothing constants for each of the two double exponential smoothing equations used for this report were selected using a search algorithm that finds the pair of smoothing constants that together minimizes the sum of forecast errors for their equation.

Beginning with the *Projections of Education Statistics to 2020*, each smoothing constant was chosen separately. In earlier editions all the smoothing constants had been set to 0.4. Also beginning with that edition, two smoothing constants, rather than one, were used for double exponential smoothing.

### **Multiple linear regression**

Multiple linear regression was used in cases where a strong relationship exists between the variable being projected (the dependent variable) and independent variables. This technique can be used only when accurate data and reliable projections of the independent variables are available. Key independent variables for this publication include demographic and economic factors. For example, current expenditures for public elementary and secondary education are related to economic factors such as disposable income and education revenues from state sources. The sources of the demographic and economic projections used for this publication are discussed below, under “Assumptions.”

The equations in this appendix should be viewed as forecasting rather than structural equations. That is, the equations are intended only to project values for the dependent variables, not to reflect all elements of underlying social, political, and economic structures. Lack of available data precluded the building of large-scale structural models. The particular equations shown were selected on the basis of their statistical properties, such as coefficients of determination ( $R^2$ s), the  $t$ -statistics of the coefficients, the Durbin-Watson statistic, the Breusch-Godfrey Serial Correlation LM test statistic, and residual plots.

The functional form primarily used is the multiplicative model. When used with two independent variables, this model takes the form:

$$Y = a \cdot X_1^{b_1} \cdot X_2^{b_2}$$

This equation can easily be transformed into the linear form by taking the natural log (ln) of both sides of the equation:

$$\ln(Y) = \ln(a) + b_1 \ln X_1 + b_2 \ln X_2$$

One property of this model is that the coefficient of an independent variable shows how responsive in percentage terms the dependent variable is to a one percent change in that independent variable (also called the elasticity). For example, a 1 percent change in  $X_1$  in the above equation would lead to a  $b_1$  percent change in  $Y$ .

## **Assumptions**

All projections are based on underlying assumptions, and these assumptions determine projection results to a large extent. It is important that users of projections understand the assumptions to determine the acceptability of projected time series for their purposes. All the projections in this publication are to some extent dependent on demographic and/or economic assumptions.

### **Demographic assumptions**

Many of the projections in this publication are demographically based on the U.S. Census Bureau’s 2012 National Population Projections (December 2012) and the Interim State Population Projections (April 2005).

The two sets of Census Bureau population projections are produced using cohort-component models. In order for the national-level population projections by age, sex, and race/ethnicity to be consistent with the most recent historical estimates released by the Census Bureau, the projections were ratio-adjusted by applying the ratio of the last historical estimate to the corresponding projections year to the projections for each age, sex, and race/ethnicity combination. This allows for a consistent set of historical estimates and projections. For more information on the methodology used for Census Bureau population projections, see appendix C, Data Sources.

The enrollment projections in this publication depend on Census Bureau population projections for the various age groups that attend school. The future fertility rate assumption (along with corresponding projections of female populations) determines projections of the number of births, a key factor for population projections. The fertility rate assumption plays a major role in determining population projections for the age groups enrolled in nursery school, kindergarten, and elementary grades. The effects of the fertility rate assumption are more pronounced toward the end of the forecast period, while immigration assumptions affect all years. For enrollments in secondary grades and college, the fertility rate assumption is of no consequence, since all the population cohorts for these enrollment ranges have already been born.

## Economic assumptions

Various economic variables are used in the forecasting models for numbers of elementary and secondary teachers, public elementary and secondary school expenditures, and postsecondary enrollment.

Projections of the economic variables were from the trend scenario of the “U.S. Quarterly Model 4th Quarter 2013 Short-Term Baseline Projections” developed by the economic consulting firm IHS Global Inc. This set of projections was IHS Global Inc.’s most recent set at the time the education projections in this report were produced. The trend scenario depicts a mean of possible paths that the economy could take over the forecast period, barring major shocks. The economy, in this scenario, evolves smoothly, without major fluctuations.

## More information about specific assumptions

For details about the primary assumptions used in this edition of *Projections of Education Statistics*, see table A-1 on page 73.

## Accuracy of the projections

Projections of time series usually differ from the final reported data due to errors from many sources. This is because of the inherent nature of the statistical universe from which the basic data are obtained and the properties of projection methodologies, which depend on the validity of many assumptions.

The mean absolute percentage error (MAPE) is one way to express the forecast accuracy of past projections. This measure expresses the average absolute value of errors over past projections in percentage terms. For example, an analysis of projection errors over the past 30 editions of *Projections of Education Statistics* indicates that the MAPEs for public school enrollment in grades preK–12 for lead times of 1, 2, 5, and 10 years were 0.3, 0.6, 1.3, and 2.5 percent, respectively. For the 1-year-out projection, this means that one would expect the projection to be within 0.3 percent of the actual value, on average.

For a list of MAPEs for selected national statistics in this publication, see table A-2 on page 74. Sections A.1 through A.5 each contains at least one text table (tables A through F) that presents the MAPEs for the key national statistics of that section. Each text table appears directly after the discussion of accuracy of that section’s national projections. For a list of MAPEs by state and region for public elementary and secondary enrollment, see tables A-7 through A-9 on pages 83–85 and for a list of MAPEs by state and region for the number of high school graduates in public schools, see table A-10 on page 91.

Tables A-3 and A-4 present an example of how the MAPEs were constructed using actual values for total enrollment in postsecondary degree-granting institutions projections for schools years 2009–10 through 2012–13 and enrollment projections from the last four editions of *Projections of Education Statistics*. The top two panels of table A-3 shows the actual values for school years 2009–10 through 2012–13 and enrollment projections for each year from *Projections of Education Statistics to 2019* with the number of projections generally decreasing by one for each subsequent edition. The bottom panel of table A-3 shows the percentage differences between the actual values and the projected values. For example, the projected value for 2009–10 presented in *Projections of Education Statistics to 2019* was 4.4 lower than the actual value for that year.

The top panel of table A-4 shows the absolute value of the percent differences from table A-3 arranged by lead time rather than year. For example, in the *Projections of Education Statistics to 2019*, the last year of actual data reported was 2009–10 and thus the lead time for the projection of 2009–10 data was 1 year. Thus, the 4.4 appearing in the 2008–09 column of Table A-3 for *Projections of Education Statistics to 2019* appears in the column for lead times of 1 year in Table A-4, indicating that projection of the one-year-out forecast from *Projections of Education Statistics to 2009* differed by 4.4 percent in absolute terms from its actual value. The MAPEs for each lead time shown in the bottom panel of table A-4 were calculated by computing the average of the absolute values of the percentage differences for that lead time. For example, actual values are available to calculate the absolute values of the percentage differences for a lead time of 3 years for the first three editions of the *Projections of Education Statistics* listed in table A-4. These absolute values are 6.5, 1.5, and 4.4. The MAPE for a lead time of 3 years was then calculated by taking the average of these numbers, or 4.1. This matches the MAPE that appears in the bottom panel for a lead time of 3 years. (Calculations for table A-3 are based on unrounded numbers.) These MAPEs are different from the MAPEs for public elementary and secondary enrollment projections elsewhere in this report because the MAPEs in the example were calculated using only the last 4 editions of *Projections of Education Statistics*.

The number of years used in the analyses of the projection errors differ both because projections of additional education statistics have been added to the report over time and because, in some cases, there have been substantial changes in the methodology used to produce the projections that the MAPEs for the earlier projections are no longer relevant. MAPEs are presented for a statistic only after it has been produced using substantially the same methodology in five previous editions of *Projections of Education Statistics* and there are at least three additional years of historical data for use in calculating the MAPEs.

**Table A-1. Summary of forecast assumptions to 2023**

Variable	Assumption
1	2
<b>Demographic assumptions</b>	
Population .....	Projections are consistent with the Census Bureau estimates <sup>1</sup>
18- to 24-year-old population .....	Census Bureau projection: average annual growth rate of -0.4%
25- to 29-year-old population .....	Census Bureau projection: average annual growth rate of 0.5%
30- to 34-year-old population .....	Census Bureau projection: average annual growth rate of 1.3%
35- to 44-year-old population .....	Census Bureau projection: average annual growth rate of 0.8%
<b>Economic assumptions</b>	
Disposable income per capita in constant dollars .....	Annual percent changes range between 1.1% and 2.7% with an annual growth rate of 1.9%
Education revenue receipts from state sources per capita in constant dollars .....	Annual percent changes range between -3.8% and 2.9% with an annual growth rate of 1.8%
Inflation rate .....	Inflation rate ranges between 1.5% and 2.0%
<b>Unemployment rate (men)</b>	
Ages 18 and 19 .....	Remains between 17.4% and 24.6%
Ages 20 to 24 .....	Remains between 9.6% and 14.3%
Age 25 and over .....	Remains between 4.2% and 6.2%
<b>Unemployment rate (women)</b>	
Ages 18 and 19 .....	Remains between 13.8% and 17.6%
Ages 20 to 24 .....	Remains between 8.5% and 11.0%
Age 25 and over .....	Remains between 4.3% and 5.9%

<sup>1</sup>As the Census Bureau projections were not updated to reflect the most recent 2012 Census Bureau population estimates, the Census Bureau age-specific population projections for each year were adjusted by multiplying the ratio of the total Census Bureau estimate for 2012 to the total Census Bureau projection for 2012.  
SOURCE: U.S. Department of Commerce, Census Bureau, Population Estimates, retrieved

December 19, 2012, from <http://www.census.gov/popest/data/index.html>; and Population Projections, retrieved December 12, 2012, from <http://www.census.gov/population/projections/data/national/2012/downloadablefiles.html>; and IHS Global Inc., "U.S. Quarterly Macroeconomic Model, 4th Quarter 2013 Short-Term Baseline Projections." (This table was prepared March 2014.)

**Table A-2. Mean absolute percentage errors (MAPEs), by lead time for selected statistics in all elementary and secondary schools and postsecondary degree-granting institutions: 2014**

Statistic	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
<b>Public elementary and secondary schools</b>										
Prekindergarten–12 enrollment <sup>1</sup> .....	0.3	0.6	0.8	1.1	1.3	1.5	1.7	1.9	2.2	2.5
Prekindergarten–8 enrollment <sup>1</sup> .....	0.3	0.6	1.0	1.2	1.5	1.7	2.0	2.3	2.7	3.1
9–12 enrollment <sup>1</sup> .....	0.4	0.7	0.9	1.1	1.2	1.4	1.8	2.1	2.3	2.5
Elementary and secondary teachers <sup>2</sup> .....	0.8	1.6	1.8	2.3	3.0	3.7	4.4	4.8	4.7	5.2
High school graduates <sup>3</sup> .....	1.0	1.1	1.8	2.3	2.2	2.6	3.2	4.1	4.7	5.0
Total current expenditures <sup>4</sup> .....	1.4	2.1	2.1	2.1	2.6	3.7	4.3	4.4	3.9	4.0
Current expenditures per pupil in fall enrollment <sup>4</sup> .....	1.4	2.1	2.1	2.0	2.8	3.8	4.6	4.9	5.1	5.2
<b>Private elementary and secondary schools<sup>5</sup></b>										
Prekindergarten–12 enrollment.....	2.2	5.5	3.7	8.4	8.3	11.7	12.1	15.1	16.2	15.2
Prekindergarten–8 enrollment.....	1.9	3.9	3.2	8.3	8.0	12.0	12.5	15.4	16.0	14.7
9–12 enrollment.....	2.7	2.4	2.9	3.5	2.6	3.1	3.6	5.9	6.0	6.4
High school graduates.....	0.9	1.2	1.6	2.8	4.1	5.2	3.3	5.6	4.6	4.9
<b>Postsecondary degree-granting institutions<sup>6</sup></b>										
Total enrollment.....	1.6	2.6	3.6	4.9	5.8	6.6	7.7	9.1	11.5	12.4
Men.....	1.6	3.0	4.0	5.6	6.6	7.5	8.7	9.8	11.8	13.0
Women.....	1.8	2.7	3.7	4.5	5.1	5.9	6.9	8.6	11.2	11.9
4-year institutions.....	1.6	2.9	4.2	5.7	6.7	7.7	8.9	10.6	13.1	14.5
2-year institutions.....	2.4	3.5	4.3	4.6	4.8	4.8	5.4	6.4	8.7	9.0
White.....	1.6	2.6	3.5	4.1	5.0	4.7	3.0	2.1	—	—
Black or African American.....	3.3	7.8	10.6	14.9	17.8	18.4	17.3	15.4	—	—
Hispanic or Latino.....	4.4	7.9	12.8	17.2	20.4	22.3	23.1	24.1	—	—
Asian/Hawaiian or other Pacific Islander.....	2.4	5.2	6.0	6.1	4.8	2.2	3.5	1.1	—	—
American Indian/Alaska Native.....	5.6	6.1	6.8	7.5	10.5	12.0	17.0	22.1	—	—
Nonresident alien.....	2.3	4.1	6.7	8.6	12.2	14.2	11.6	6.6	—	—
Total first-time freshman enrollment.....	4.6	6.5	5.6	3.8	0.8	—	—	—	—	—
Men.....	4.6	6.7	5.6	3.7	2.9	—	—	—	—	—
Women.....	4.6	6.3	5.6	4.0	1.0	—	—	—	—	—
Associate's degrees.....	2.5	7.0	11.2	16.7	20.1	—	—	—	—	—
Bachelor's degrees.....	0.6	0.3	0.6	3.2	4.7	—	—	—	—	—

— Not available.

<sup>1</sup>MAPEs for public prekindergarten–12 enrollments were calculated using the last 30 editions of *Projections of Education Statistics*.

<sup>2</sup>Data for teachers expressed in full-time equivalents. MAPEs for teachers were calculated from the past 21 editions containing teachers projections.

<sup>3</sup>MAPEs for public high school graduates were calculated from the past 22 editions of *Projections of Education Statistics*.

<sup>4</sup>In constant dollars based on the Consumer Price Index for all urban consumers, Bureau of Labor Statistics, U.S. Department of Labor. MAPEs for current expenditures were calculated using projections from the last 23 editions containing current expenditure projections.

<sup>5</sup>MAPEs for private prekindergarten–12 enrollments and high school graduates were calculated from the past 12 editions.

<sup>6</sup>MAPEs for postsecondary degree-granting institution enrollments were calculated using the last 16 editions of *Projections of Education Statistics*, with the exceptions of the enroll-

ment projections by race/ethnicity, which were calculated using the last 8 editions of *Projections of Education Statistics* and of the first-time freshmen fall enrollment, associate's degrees, and bachelor's degrees, which were calculated using the last 5 editions of *Projections of Education Statistics*.

NOTE: Mean absolute percentage error is the average value over past projections of the absolute values of errors expressed in percentage terms. No MAPEs are presented for master's and doctor's degrees conferred as the current models used for producing these projections have only been used for four other editions of *Projections of Education Statistics*. Calculations were made using unrounded numbers. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)

**Table A-3. Example of constructing mean absolute percentage errors (MAPEs) on fall enrollment in degree-granting institutions, part 1**

Source	Year of data			
	2009–10	2010–11	2011–12	2012–13
1	2	3	4	5
	Enrollment in thousands			
Actual.....	20,428	21,016	20,994	20,643
	Projected enrollment in thousands			
<i>Projections of Education Statistics to 2019</i> .....	19,525	19,641	19,713	19,892
<i>Projections of Education Statistics to 2020</i> .....	†	20,582	20,688	20,727
<i>Projections of Education Statistics to 2021</i> .....	†	†	21,294	21,556
<i>Projections of Education Statistics to 2022</i> .....	†	†	†	20,968
	Percentage difference between actual and projected values			
<i>Projections of Education Statistics to 2019</i> .....	-4.4	-6.5	-6.1	-3.6
<i>Projections of Education Statistics to 2020</i> .....	†	-2.1	-1.5	0.4
<i>Projections of Education Statistics to 2021</i> .....	†	†	1.4	4.4
<i>Projections of Education Statistics to 2022</i> .....	†	†	†	1.6

† Not applicable.

NOTE: In the last edition of *Projections of Education Statistics*, historical and projected data for national public elementary and secondary were used in the example for constructing mean absolute percentage errors (MAPEs) presented in tables A-3 and A-4. Calculations are based on unrounded numbers.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), IPEDS Spring 2009 through Spring 2013, Enrollment component; and *Projections of Education Statistics*, various editions. (This exhibit was prepared January 2014.)

**Table A-4. Example of constructing mean absolute percentage errors (MAPEs) on fall enrollment in degree-granting institutions, part 2**

Source	Lead time (years)			
	1	2	3	4
1	2	3	4	5
	Absolute value of percentage difference between actual and projected values			
<i>Projections of Education Statistics to 2019</i> .....	4.4	6.5	6.1	3.6
<i>Projections of Education Statistics to 2020</i> .....	2.1	1.5	0.4	†
<i>Projections of Education Statistics to 2021</i> .....	1.4	4.4	†	†
<i>Projections of Education Statistics to 2022</i> .....	1.6	†	†	†
	Mean absolute percentage error			
Example.....	2.4	4.1	3.3	3.6

† Not applicable.

NOTE: The mean absolute percentage errors presented in this table are for illustrative purpose only. In the last edition of *Projections of Education Statistics*, historical and projected data for national public elementary and secondary was used in the example for constructing mean absolute percentage errors (MAPEs) presented in tables A-3 and A-4.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), IPEDS Spring 2009 through Spring 2013, Enrollment component; and *Projections of Education Statistics*, various editions. (This exhibit was prepared January 2014.)



# A.1. ELEMENTARY AND SECONDARY ENROLLMENT

## Projections in this edition

This edition of *Projections of Education Statistics* presents projected trends in elementary and secondary enrollment from 2012 to 2023. These projections were made using three models:

- » The *National Elementary and Secondary Enrollment Projection Model* was used to project total, public, and private school enrollments for the nation by grade level and for ungraded elementary and ungraded secondary programs.
- » The *State Public Elementary and Secondary Enrollment Projection Model* was used to project total public school enrollments by grade level for individual states and regions.
- » The *National Public Elementary and Secondary Enrollment by Race/Ethnicity Projection Model* was used to project public school enrollments for the nation by race/ethnicity and grade level.

All three elementary and secondary enrollment models used the following same methods.

## Overview of approach

Two methods were used in all the elementary and secondary enrollment models:

- » The *grade progression rate method* was used to project enrollments in grades 2 through 12. In this method, a rate of progression from each grade (1 through 11) to the next grade (2 through 12) was projected using single exponential smoothing. (For example, the rate of progression from grade 2 to grade 3 is the current year's grade 3 enrollment expressed as a percentage of the previous year's grade 2 enrollment.) To calculate enrollment for each year in the forecast period, the progression rate for each grade was applied to the previous year's enrollment in the previous grade.
- » The *enrollment rate method* was used to project prekindergarten, kindergarten, and first-grade enrollments as well as elementary special and ungraded and secondary special and ungraded enrollments. For each of these enrollment categories, the enrollment rate for the last year of actual data was used as the projected enrollment rate. To calculate enrollment for each year in the forecast period, the enrollment rate for each category was applied to the projected population in the appropriate age group.

## Assumptions underlying these methods

The grade progression and enrollment rate methods assume that past trends in factors affecting public and private elementary and secondary school enrollments will continue over the forecast period. This assumption implies that all factors influencing enrollments will display future patterns consistent with past patterns. This method implicitly includes the net effect of such factors as migration, dropouts, deaths, nonpromotion, and transfers between public and private schools.

*For more details on the use of the grade progression and enrollment rate methods, see "Procedures and equations used in all three elementary and secondary enrollment projection models," below.*

## Procedures and equations used in all three elementary and secondary enrollment projection models

The notation and equations that follow describe the basic procedures used to project elementary and secondary enrollments in each of the three elementary and secondary enrollment projection models.

Let:

- $i$  = Subscript denoting age
- $j$  = Subscript denoting grade
- $t$  = Subscript denoting time
- $T$  = Subscript of the first year in the forecast period
- $N_t$  = Enrollment at the prekindergarten (nursery) level
- $K_t$  = Enrollment at the kindergarten level
- $G_{j,t}$  = Enrollment in grade  $j$
- $E_t$  = Enrollment in elementary special and ungraded programs

- $S_t$  = Enrollment in secondary special and ungraded programs
- $P_{i,t}$  = Population age  $i$
- $R_{j,t}$  = Progression rate for grade  $j$
- $RN_t$  = Enrollment rate for prekindergarten (nursery school)
- $RK_t$  = Enrollment rate for kindergarten
- $RG_{1,t}$  = Enrollment rate for grade 1
- $RE_t$  = Enrollment rate for elementary special and ungraded programs
- $RS_t$  = Enrollment rate for secondary special and ungraded programs.

**Step 1.** Calculate historical grade progression rates for each of grades 2 through 12. The first step in projecting the enrollments for grades 2 through 12 using the grade progression method was to calculate, for each grade, a progression rate for each year of actual data used to produce the projections except for the first year. The progression rate for grade  $j$  in year  $t$  equals

$$R_{j,t} = G_{j,t}/G_{j-1,t-1}$$

**Step 2.** Produce a projected progression rate for each of grades 2 through 12. Projections for each grade's progression rate were then produced for the forecast period using single exponential smoothing. A separate smoothing constant, chosen to minimize the sum of squared forecast errors, was used to calculate the projected progression rate for each grade. Single exponential smoothing produces a single forecast for all years in the forecast period. Therefore, for each grade  $j$ , the projected progression rate,  $\hat{R}_j$ , is the same for each year in the forecast period.

**Step 3.** Calculate enrollment projections for each of grades 2 through 12. For the first year in the forecast period,  $T$ , enrollment projections,  $\hat{G}_{j,t}$ , for grades 2 through 12, were produced using the projected progression rates and the enrollments of grades 1 through 11 from the last year of actual data,  $T-1$ . Specifically,

$$\hat{G}_{j,T} = \hat{R}_j \cdot G_{j-1,T-1}$$

This same procedure was then used to produce the projections for the following year,  $T+1$ , except that enrollment projections for year  $T$  were used rather than actual numbers:

$$\hat{G}_{j,T+1} = \hat{R}_j \cdot \hat{G}_{j,T}$$

The enrollment projections for grades 2 through 11 for year  $T$  were those just produced using the grade progression method. The projection for grade 1 for year  $T$  was produced using the enrollment rate method, as outlined in steps 4 and 5 below.

The same procedure was used for the remaining years in the projections period.

**Step 4.** For the last year of actual data, calculate enrollment rates for prekindergarten, kindergarten, grade 1, elementary special and ungraded, and secondary special and ungraded. The first step in projecting prekindergarten, kindergarten, first-grade, elementary special and ungraded, and secondary special and ungraded enrollments using the enrollment rate method was to calculate enrollment rates for each enrollment category for the last year of actual data,  $T-1$ , where:

$$\begin{aligned} RN_{T-1} &= N_{T-1}/P_{5,T-1} \\ RK_{T-1} &= K_{T-1}/P_{5,T-1} \\ RG_{1,T-1} &= G_{1,T-1}/P_{6,T-1} \\ RE_{T-1} &= E_{T-1}/\sum_{i=5}^{13} P_{i,T-1} \\ RS_{T-1} &= S_{T-1}/\sum_{i=14}^{17} P_{i,T-1} \end{aligned}$$

These enrollment rates were then used as the projected enrollment rates for each year in the forecast period ( $\widehat{RN}$ ,  $\widehat{RK}$ ,  $\widehat{RG}_1$ ,  $\widehat{RE}$ , and  $\widehat{RS}$ .)

**Step 5.** Using the rates for the last year of actual data as the projected enrollment rates, calculate enrollment projections for prekindergarten through grade 1 and the ungraded categories. For each year in the forecast period, the enrollment rates were then multiplied by the appropriate population projections from the U.S. Census Bureau ( $\hat{P}_{i,t}$ ) to calculate enrollment projections for prekindergarten (nursery school) ( $\hat{N}_t$ ), kindergarten ( $\hat{K}_t$ ), first grade ( $\hat{G}_{1,t}$ ), elementary ungraded ( $\hat{E}_t$ ), and secondary ungraded ( $\hat{S}_t$ )

$$\begin{aligned}\hat{N}_t &= \widehat{RN} \cdot \hat{P}_{5,t} \\ \hat{K}_t &= \widehat{RK} \cdot \hat{P}_{5,t} \\ \hat{G}_{1,t} &= \widehat{RG}_1 \cdot \hat{P}_{5,t} \\ \hat{E}_t &= \widehat{RE} \cdot \left( \sum_{i=5}^{13} \hat{P}_{i,t} \right) \\ \hat{S}_t &= \widehat{RS} \cdot \left( \sum_{i=14}^{17} \hat{P}_{i,t} \right)\end{aligned}$$

**Step 6.** Calculate total elementary and secondary enrollments by summing the projections for each grade and the ungraded categories. To obtain projections of total enrollment, projections of enrollments for the individual grades (prekindergarten through 12), elementary ungraded, and secondary ungraded were summed.

## National Elementary and Secondary Enrollment Projection Model

This model was used to project national total, public, and private school enrollments by grade level and for ungraded elementary and ungraded secondary programs. National enrollment projections for public and private schools were developed separately, then added together to yield total elementary and secondary enrollment projections for the nation. To develop these projections, enrollment data from NCES were used, along with population estimates and projections from the U.S. Census Bureau. Below is information about the specific data used to develop the public school projections and the private school projections, as well as information about the grade progression rates and enrollment rates specific to public schools and private schools.

For details on procedures used to develop the projections, see “Procedures and equations used in all three elementary and secondary enrollment projection models,” earlier in this section of appendix A.

### Data used to develop national elementary and secondary enrollment projections

**Public school enrollment data.** Public school enrollment data from the NCES *Statistics of Public Elementary and Secondary School Systems* for 1972 to 1980 and the NCES Common Core of Data (CCD) for 1981 to 2011 were used to develop the national public school enrollment projections.

**Private school enrollment data.** Private school enrollment data from the NCES Private School Universe Survey (PSS) for 1989–90, 1991–92, 1993–94, 1995–96, 1997–98, 1999–2000, 2001–02, 2003–04, 2005–06, 2007–08, 2009–10, and 2011–12 were used to develop the national private school enrollment projections. Since the PSS is collected in the fall of odd-numbered years, data for even-numbered years without a PSS collection were estimated by interpolating grade-by-grade progression data from PSS.

**Population estimates and projections used for public school enrollment projections.** Population estimates for 1972 to 2011 and population projections for 2012 to 2023 from the U.S. Census Bureau were also used to develop the public school enrollment projections. The set of population projections used in this year’s *Projections of Education Statistics* are the Census Bureau’s 2012 National Population Projections by age and sex (December 2012), adjusted to line up with the most recent historical estimates. This was done through the use of ratio adjustments in which, for each combination of state, age, and sex, the population projections from 2012 to 2023 were multiplied by the ratio of the population estimate for 2011 to the population projection for 2012.

**Population estimates and projections used for private school enrollment projections.** Population estimates for 1989 to 2011 and population projections for 2012 to 2023 from the U.S. Census Bureau were used to develop the private school enrollment projections. The population projections were ratio-adjusted to line up with the most recent historical estimates.

### Grade progression and enrollment rates for national elementary and secondary enrollment projections

**Public school grade progression and enrollment rates.** Table A-5 on page 82 shows the public school grade progression rates for 2011 and projections for 2012 through 2023. Table A-6 on page 82 shows the public school enrollment rates for 2011 and projections for 2012 through 2023.

## Accuracy of national elementary and secondary enrollment projections

Mean absolute percentage errors (MAPEs) for projections of public school enrollment were calculated using the last 30 editions of *Projections of Education Statistics*, while MAPEs for projections of private school enrollment were calculated using the last 12 editions. Table A, below, shows MAPEs for both public and private school enrollment projections.

**Table A. Mean absolute percentage errors (MAPEs) of enrollment projections, by lead time, control of school, and grade in elementary and secondary schools: 2014**

Statistic	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
<b>Public elementary and secondary schools</b>										
Prekindergarten–12 enrollment	0.3	0.6	0.8	1.1	1.3	1.5	1.7	1.9	2.2	2.5
Prekindergarten–8 enrollment	0.3	0.6	1.0	1.2	1.5	1.7	2.0	2.3	2.7	3.1
9–12 enrollment	0.4	0.7	0.9	1.1	1.2	1.4	1.8	2.1	2.3	2.5
<b>Private elementary and secondary schools</b>										
Prekindergarten–12 enrollment	2.2	5.5	3.7	8.4	8.3	11.7	12.1	15.1	16.2	15.2
Prekindergarten–8 enrollment	1.9	3.9	3.2	8.3	8.0	12.0	12.5	15.4	16.0	14.7
9–12 enrollment	2.7	2.4	2.9	3.5	2.6	3.1	3.6	5.9	6.0	6.4

NOTE: Mean absolute percentage error (MAPE) is the average value over past projections of the absolute values of errors expressed in percentage terms. MAPEs for public prekindergarten–12 enrollments were calculated using the last 30 editions of *Projections of Education Statistics*. MAPEs for private prekindergarten–12 enrollments were calculated from the past 12 editions. Calculations were made using unrounded numbers. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)

For more information about MAPEs, see Section A.0. Introduction, earlier in appendix A.

## State Public Elementary and Secondary Enrollment Projection Model

This edition of *Projections of Education Statistics* contains projected trends in public elementary and secondary enrollment by grade level from 2012 to 2023 for each of the 50 states and the District of Columbia, as well as for each region of the country. The state enrollment projections were produced in two stages:

- » first, an initial set of projections for each state was produced; and
- » second, these initial projections were adjusted to sum to the national public enrollment totals produced by the National Elementary and Secondary Enrollment Projection Model.

For each region, the enrollment projections equaled the sum of enrollment projections for the states within that region.

### Initial set of state projections

The same methods used to produce the national enrollment projections—namely, the grade progression rate method and the enrollment rate method—were used to produce the initial sets of public school enrollment projections for each state and the District of Columbia. A separate smoothing constant, chosen to minimize the sum of squared forecast errors, was used to calculate the projected progression rate for each combination of jurisdiction and grade.

For details on the procedures used to develop the initial sets of projections, see “Procedures and equations used in all three elementary and secondary enrollment projection models,” earlier in this section of appendix A.

### Limitations of the grade progression method for state projections

The grade progression rate method assumes that past trends in factors affecting public school enrollments will continue over the forecast period. This assumption implies that all factors influencing enrollments will display future patterns consistent with past patterns. Therefore, this method has limitations when applied to states with unanticipated changes in migration rates. This method implicitly includes the net effect of such factors as migration, dropouts, deaths, nonpromotion, and transfers to and from private schools.

## **Adjustments to the state projections**

The initial projections of state public school enrollments were adjusted to sum to the national projections of public school prekindergarten (preK)–12, preK–8, and 9–12 enrollments shown in table 1 on page 35. This was done through the use of ratio adjustments in which all the states' initial enrollment projections for each grade level were multiplied by the ratio of the national enrollment projection for that grade level to the sum of the state enrollment projections for that grade level.

## **Data used to develop state elementary and secondary enrollment projections**

**Public school enrollment data.** Public school enrollment data from the NCES *Statistics of Public Elementary and Secondary School Systems* for 1980 and from the NCES Common Core of Data (CCD) for 1981 to 2011 were used to develop these projections.

**Population estimates and projections.** Population estimates for 1980 to 2011 and population projections for 2012 to 2023 from the U.S. Census Bureau were used to develop the state-level enrollment projections. The set of population projections used in this year's *Projections of Education Statistics* are the Census Bureau's set of Interim State Population Projections by age and sex (April 2005). In order for the state-level population projections to be consistent with the most recent historical estimates released by the Census Bureau, these projections were adjusted to line up with the most recent historical estimate for each state. This was done through the use of ratio adjustments in which, for each combination of state, age, and sex, the population projections from 2012 to 2023 were multiplied by the ratio of the population estimate for 2011 to the population projection for 2011.

## **Accuracy of state elementary and secondary enrollment projections**

Mean absolute percentage errors (MAPEs) for projections of public school enrollment by state were calculated using the last 18 editions of *Projections of Education Statistics*. Tables A-7 through A-9 on pages 83–85 show MAPEs for preK–12, preK–8, and 9–12 enrollment in public elementary and secondary schools by state.

## **National Public Elementary and Secondary Enrollment by Race/Ethnicity Projection Model**

This edition of *Projections of Education Statistics* contains projected trends in national public elementary and secondary enrollment by race/ethnicity from 2012 to 2023.

This is the second edition to include enrollment projections for students of Two or more races. As 2010 is the first year in which all 50 states and the District of Columbia reported enrollment data for students of Two or more races, enrollment projections for this category were produced using a different method than that used for the other five racial/ethnic groups.

Prior to 2008, there was a single category for students of Asian and/or Native Hawaiian or Other Pacific Islander origin. In 2008 and 2009, states could choose to either place these students in either the single category, Asian and/or Native Hawaiian or Other Pacific Islander, or in one of three categories, (1) Asian, (2) Hawaiian or Other Pacific Islander, and (3) Two or more races (for students of both Asian and Hawaiian or Other Pacific Islander origin). Beginning in 2010, the option of using the single category was eliminated and states were required to place students in one of those three categories. For students of Asian and/or Native Hawaiian or Other Pacific Islander origin, projections were calculated for a single category, Asian/Pacific Islander. For 2008 and 2009, the count of the Asian/Pacific Islander students included the total of the Asian and/or Native Hawaiian or Other Pacific Islander students for states reporting one category and the counts for Asian students and Native Hawaiian or Other Pacific Islander students for states reporting three categories. Beginning in 2010, the count of the Asian/Pacific Islander students was the sum of the counts Asian students and Native Hawaiian or Other Pacific Islander students.

The enrollment projections by race/ethnicity were produced in two stages:

- » first, an initial set of projections by race/ethnicity was produced; and
- » second, these initial projections were adjusted to sum to the national totals.

## **Initial set of projections by race/ethnicity**

The same methods used to produce the national enrollment projections—namely, the grade progression rate method and the enrollment rate method—were used to produce initial sets of projections for each of the following five racial/ethnic groups: White, Black, Hispanic, Asian/Pacific Islander, and American Indian/Alaska Native. A separate smoothing constant, chosen to minimize the sum of squared forecast errors, was used to calculate the projected progression rate for each combination of race/ethnicity and grade.

*For details on the procedures used to develop the initial sets of projections, see “Procedures and equations used in all three elementary and secondary enrollment models,” earlier in this section of appendix A.*

National enrollment projections for students of Two or more races by grade level were produced by taking the 2011 grade level enrollment numbers for students of Two or more races and applying the growth rates from 2012 to 2023 of the U.S. Census Bureau’s age specific population projections for persons of Two or more races.

### ***Adjustments to the projections by race/ethnicity***

The initial projections of enrollments by race/ethnicity were adjusted to sum to the national projections of public school preK–12, preK–8, and 9–12 enrollments shown in table 1 on page 35. This was done through the use of ratio adjustments in which all the initial enrollment projections by race/ethnicity for each grade level were multiplied by the ratio of the national enrollment projection for that grade level to the sum of the initial enrollment projections by race/ethnicity for that grade level.

### ***Data and imputations used to develop enrollment projections by race/ethnicity***

**Public school enrollment data.** Public school enrollment data by grade level and race/ethnicity from the NCES Common Core of Data (CCD) for 1994 to 2011 were used to develop these projections. While projections by race/ethnicity were produced at the national level only, the national data used to develop these projections were constructed from state-level data on enrollment by grade level and race/ethnicity. In those instances where states did not report their enrollment data by grade level and race/ethnicity, the state-level data had to be examined and some imputations made in order to produce the national public school enrollment by grade level and race/ethnicity data. For example, in 1994, North Dakota did not report grade-level enrollment data by race/ethnicity. It did, however, report these numbers for 1995. So, to impute these numbers for 1994, North Dakota’s 1994 grade-level enrollment data were multiplied by the state’s 1995 racial/ethnic breakdowns at each grade level.

**Population estimates and projections.** Population estimates for 2000 to 2011 and population projections for 2012 to 2023 from the U.S. Census Bureau were used to develop the enrollment projections by race/ethnicity. The set of population projections used in this year’s *Projections of Education Statistics* are the Census Bureau’s 2012 National Population Projections by age, sex, and race/ethnicity (December 2012), ratio-adjusted to line up with the most recent historical estimates.

### ***Accuracy of enrollment projections by race/ethnicity***

Because this is the fifth edition of *Projections of Education Statistics* to include projections of elementary and secondary public school enrollments by race/ethnicity, the difference between the projections and actual data for a reasonable sample of time points cannot yet be determined.

**Table A-5. Actual and projected national public school grade progression rates: Fall 2011, and fall 2012 through fall 2023**

Grade	Actual 2011	Projected 2012 through 2023
1	2	3
1 to 2.....	98.9	98.9
2 to 3.....	100.1	100.2
3 to 4.....	99.6	100.1
4 to 5.....	99.7	100.2
5 to 6.....	100.2	100.5
6 to 7.....	100.4	100.5
7 to 8.....	100.1	100.1
8 to 9.....	108.1	108.1
9 to 10.....	93.6	93.6
10 to 11.....	93.3	93.3
11 to 12.....	97.6	97.6

NOTE: The progression rate for a particular grade in a year equals the enrollment in the grade for that year divided by the enrollment in the previous grade in the previous year all multiplied by 100. For example, the progression rate for third-graders in 2011 equals the enrollment of third-graders in 2011 divided by the enrollment of second-graders in 2010, all multiplied by 100.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 2011–12; and National Elementary and Secondary Enrollment Projection Model, 1972 through 2023. (This table was prepared December 2013.)

**Table A-6. Actual and projected national enrollment rates in public schools, by grade level: Fall 2011, and fall 2012 through fall 2023**

Grade level	Actual 2011	Projected 2012 through 2023
1	2	3
Prekindergarten.....	31.6	31.6
Kindergarten.....	91.6	91.6
Grade 1.....	92.6	92.6
Elementary ungraded.....	0.2	0.2
Secondary ungraded.....	0.2	0.2

NOTE: The enrollment rate for each grade level equals the enrollment at that grade level divided by the population of that grade's base age, all multiplied by 100. The base age for each grade level is as follows: kindergarten, 5 years old; grade 1, 6 years old; elementary ungraded, 5 to 13 years olds; and secondary ungraded, 14 to 17 years olds. Projected values for 2012 through 2023 were held constant at the actual values for 2011.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 2011–12; and National Elementary and Secondary Enrollment Projection Model, 1972 through 2023. (This table was prepared December 2013.)

**Table A-7. Mean absolute percentage errors (MAPEs) for projected preK–12 enrollment in public elementary and secondary schools, by lead time, region, and state: 2014**

Region and state	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
<b>United States .....</b>	<b>0.3</b>	<b>0.6</b>	<b>0.8</b>	<b>1.1</b>	<b>1.3</b>	<b>1.5</b>	<b>1.7</b>	<b>1.9</b>	<b>2.2</b>	<b>2.5</b>
<b>Region</b>										
Northeast .....	0.5	0.5	0.8	0.9	0.6	0.7	0.9	0.7	0.7	1.2
Midwest .....	0.3	0.4	0.5	0.7	0.8	1.0	1.2	1.4	1.5	1.7
South .....	0.4	0.9	1.3	1.8	2.2	2.5	2.8	3.3	4.2	4.8
West .....	0.5	1.0	1.3	1.6	1.9	2.0	2.0	2.0	2.0	1.7
<b>State</b>										
Alabama .....	0.6	0.7	1.0	1.5	2.1	3.0	3.8	4.8	5.5	6.0
Alaska .....	1.1	1.8	2.4	2.7	3.0	4.0	5.3	6.7	8.7	10.6
Arizona .....	2.5	3.7	5.2	6.6	7.8	8.4	7.8	8.5	9.7	11.3
Arkansas .....	0.6	1.1	1.7	2.3	3.2	4.0	4.6	5.0	5.5	5.6
California .....	0.6	1.0	1.5	2.1	2.6	3.0	3.2	3.4	3.7	3.6
Colorado .....	0.6	0.9	1.3	1.7	2.2	3.1	4.0	4.8	5.7	6.8
Connecticut .....	0.6	0.8	1.0	1.4	2.0	2.5	3.3	4.1	5.1	6.1
Delaware .....	0.7	1.2	1.8	2.4	3.2	4.1	5.3	6.5	7.7	8.0
District of Columbia .....	5.4	4.8	6.1	6.9	6.7	6.8	6.1	4.7	6.7	5.9
Florida .....	1.0	1.8	2.5	3.3	4.5	5.2	5.5	5.9	6.8	8.3
Georgia .....	0.7	1.3	1.9	2.7	3.3	3.7	4.0	4.6	5.8	6.7
Hawaii .....	1.8	2.7	3.8	5.2	7.0	8.6	10.5	12.1	14.2	17.2
Idaho .....	0.7	1.4	2.1	2.9	3.6	4.0	4.2	4.2	4.2	4.1
Illinois .....	0.6	0.8	1.0	1.0	1.3	1.6	1.7	2.0	2.4	2.9
Indiana .....	0.3	0.6	0.9	1.2	1.7	2.2	2.6	2.9	3.1	3.4
Iowa .....	0.6	0.9	1.2	1.5	1.6	1.6	1.7	2.4	2.9	2.9
Kansas .....	0.8	1.1	1.5	1.7	1.8	2.0	2.1	2.4	2.3	2.4
Kentucky .....	1.6	1.5	2.1	2.3	2.3	3.0	3.2	3.4	4.3	4.5
Louisiana .....	2.0	3.2	3.9	4.9	5.8	6.5	6.1	5.9	7.2	8.6
Maine .....	0.8	1.3	1.4	1.8	2.0	1.9	1.6	2.0	2.6	2.6
Maryland .....	0.5	0.9	1.3	1.7	1.8	1.8	2.0	2.1	2.1	2.4
Massachusetts .....	0.4	0.5	0.7	0.7	0.7	0.8	0.9	1.2	1.6	2.0
Michigan .....	0.7	1.6	2.1	2.7	3.3	4.1	4.6	4.9	5.1	4.5
Minnesota .....	0.4	0.6	0.7	0.9	1.0	1.2	1.4	1.6	1.7	1.8
Mississippi .....	0.4	0.9	1.2	1.4	1.7	2.1	2.6	2.8	3.3	3.3
Missouri .....	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2	1.2	1.5
Montana .....	0.9	1.5	2.2	3.1	4.2	5.6	7.1	8.8	10.9	13.0
Nebraska .....	0.5	0.8	1.1	1.4	1.6	2.0	2.3	2.8	3.0	2.7
Nevada .....	1.1	2.0	3.1	4.6	6.1	7.5	8.9	10.5	12.6	15.6
New Hampshire .....	0.6	0.8	0.9	1.2	1.4	1.8	2.5	2.7	3.1	3.9
New Jersey .....	0.8	1.2	1.7	2.0	2.2	2.8	3.3	3.9	4.9	5.6
New Mexico .....	1.4	2.3	3.1	4.2	5.5	7.0	8.7	10.0	10.9	12.5
New York .....	0.9	1.0	1.4	1.8	1.8	2.1	2.3	2.5	2.8	3.1
North Carolina .....	0.9	1.5	2.3	3.2	3.5	4.1	4.6	5.5	6.9	7.8
North Dakota .....	0.8	1.4	2.1	2.7	3.4	4.3	5.6	6.9	8.0	9.1
Ohio .....	0.5	0.6	0.9	1.0	1.5	1.8	1.9	1.9	1.9	1.9
Oklahoma .....	0.9	1.4	2.0	2.5	3.2	3.9	4.8	5.8	6.6	7.1
Oregon .....	0.7	1.2	1.6	1.8	2.1	2.5	3.0	3.3	3.5	3.9
Pennsylvania .....	1.0	1.4	1.5	1.3	1.3	1.6	2.0	2.0	1.7	2.1
Rhode Island .....	1.0	1.7	2.5	3.1	3.2	3.1	3.2	3.4	3.5	3.6
South Carolina .....	0.7	1.2	1.6	2.2	2.7	3.2	4.0	4.9	5.7	5.7
South Dakota .....	1.3	2.2	3.3	4.6	5.6	6.5	6.9	7.5	8.1	9.2
Tennessee .....	1.0	1.4	1.8	2.2	2.4	2.6	3.2	3.9	4.1	3.7
Texas .....	0.8	1.4	2.0	2.6	3.2	3.8	4.6	5.7	7.1	8.3
Utah .....	1.7	1.8	2.0	3.1	3.3	4.3	5.4	6.6	7.3	7.1
Vermont .....	1.4	2.0	2.4	3.0	3.5	4.1	4.5	5.8	5.6	6.7
Virginia .....	0.4	0.7	0.9	1.2	1.6	2.1	2.6	3.1	3.7	3.9
Washington .....	0.5	0.8	1.1	1.4	1.8	2.1	2.6	2.8	2.8	3.2
West Virginia .....	0.6	0.7	1.0	1.5	2.0	2.7	3.5	4.5	5.1	5.1
Wisconsin .....	0.6	1.0	1.3	1.5	1.6	1.7	2.0	2.0	2.0	2.1
Wyoming .....	0.8	1.4	2.4	3.7	5.4	7.1	8.3	10.0	11.7	14.1

NOTE: Mean absolute percentage error (MAPE) is the average value over past projections of the absolute values of errors expressed in percentage terms. National MAPEs for public prekindergarten–12 enrollments were calculated using the last 30 editions of *Projections of Education Statistics* and state MAPEs were calculated using the last 18 edi-

tions of *Projections of Education Statistics*. Calculations were made using unrounded numbers. Some data have been revised from previously published figures. SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)



**Table A-8. Mean absolute percentage errors (MAPEs) for projected preK–8 enrollment in public elementary and secondary schools, by lead time, region, and state: 2014**

Region and state	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
<b>United States</b> .....	<b>0.3</b>	<b>0.6</b>	<b>1.0</b>	<b>1.2</b>	<b>1.5</b>	<b>1.7</b>	<b>2.0</b>	<b>2.3</b>	<b>2.7</b>	<b>3.1</b>
<b>Region</b>										
Northeast .....	0.4	0.7	0.8	0.9	0.7	0.6	0.9	0.8	0.6	1.0
Midwest .....	0.3	0.4	0.6	0.7	0.8	0.9	1.1	1.1	1.2	1.4
South .....	0.6	1.1	1.7	2.3	2.7	3.0	3.3	3.7	4.6	5.3
West .....	0.6	1.2	1.6	1.9	2.2	2.3	2.2	2.2	2.5	2.2
<b>State</b>										
Alabama .....	0.7	1.0	1.6	2.0	2.8	3.6	4.2	5.2	6.0	6.5
Alaska .....	1.3	1.9	2.8	3.4	4.3	6.0	7.8	10.1	12.7	14.9
Arizona .....	2.3	3.4	5.0	6.0	6.9	7.9	7.5	8.6	9.6	11.2
Arkansas .....	0.8	1.3	2.1	2.9	3.9	4.9	5.6	5.8	6.4	6.5
California .....	0.9	1.5	2.0	2.7	3.3	3.8	3.9	4.1	4.8	4.8
Colorado .....	0.7	1.2	1.5	2.0	2.7	3.6	4.7	5.9	7.1	8.3
Connecticut .....	0.6	0.9	1.3	1.7	2.3	2.9	3.8	4.3	5.2	5.6
Delaware .....	0.9	1.4	2.0	2.8	3.5	4.6	5.9	7.3	8.7	9.2
District of Columbia .....	4.8	4.8	5.4	6.1	6.0	6.1	6.1	4.4	6.7	6.0
Florida .....	1.1	2.1	3.2	4.3	5.6	6.2	6.4	6.8	7.7	9.1
Georgia .....	0.9	1.7	2.5	3.4	4.1	4.3	4.7	5.1	6.2	7.3
Hawaii .....	1.9	3.1	4.3	6.0	8.4	10.6	13.1	15.4	17.9	21.0
Idaho .....	0.9	2.0	3.0	3.8	4.6	4.9	5.0	4.9	5.0	4.8
Illinois .....	0.7	0.9	1.1	1.2	1.6	1.9	2.0	2.2	2.5	2.8
Indiana .....	0.4	0.7	1.0	1.3	1.6	2.0	2.4	2.5	2.8	3.4
Iowa .....	0.8	1.2	1.6	2.1	2.3	2.5	2.6	3.4	4.0	3.9
Kansas .....	0.9	1.2	1.5	1.8	2.1	2.4	2.6	3.1	3.1	3.2
Kentucky .....	1.7	1.9	2.8	3.0	3.4	3.2	3.5	3.6	4.5	5.0
Louisiana .....	1.8	3.0	3.4	4.1	4.8	5.5	5.5	5.1	6.1	7.5
Maine .....	0.6	0.9	1.2	1.7	2.1	2.8	3.4	4.3	5.5	6.6
Maryland .....	0.5	1.0	1.4	1.9	2.1	2.4	3.0	3.5	3.7	4.2
Massachusetts .....	0.3	0.6	0.9	1.1	1.0	1.2	1.5	1.6	1.9	2.2
Michigan .....	0.6	1.5	2.0	2.7	3.2	3.9	4.4	4.8	4.9	4.3
Minnesota .....	0.4	0.5	0.8	1.0	1.1	1.2	1.2	1.1	1.3	1.3
Mississippi .....	0.6	1.2	1.6	2.0	2.6	2.9	3.2	3.3	3.6	3.6
Missouri .....	0.5	0.8	1.0	1.2	1.4	1.5	1.5	1.3	1.1	1.3
Montana .....	1.1	1.9	2.9	4.2	5.7	7.8	10.1	12.6	15.3	17.8
Nebraska .....	0.7	1.0	1.3	1.6	1.9	2.3	2.6	3.2	3.4	3.2
Nevada .....	1.3	2.9	4.7	6.6	8.5	10.4	12.2	14.5	17.1	20.4
New Hampshire .....	0.7	1.0	1.2	1.8	2.6	3.2	4.0	4.2	4.7	5.5
New Jersey .....	0.9	1.3	1.7	1.9	2.0	2.4	2.9	3.3	4.0	4.4
New Mexico .....	1.3	2.1	2.6	3.5	4.8	6.6	8.5	10.4	11.2	12.6
New York .....	0.7	1.0	1.4	1.7	1.8	1.8	2.4	2.6	2.8	3.1
North Carolina .....	1.2	2.0	3.0	4.0	4.4	5.0	5.5	6.8	8.7	9.7
North Dakota .....	1.1	2.0	2.9	3.7	4.6	5.8	7.4	9.2	10.3	11.4
Ohio .....	0.5	0.5	0.7	0.7	1.0	1.1	1.2	1.1	1.2	1.4
Oklahoma .....	1.3	1.9	2.6	3.3	4.1	5.1	6.2	7.3	8.2	9.0
Oregon .....	0.8	1.2	1.4	1.4	2.1	2.5	2.7	3.2	3.7	4.2
Pennsylvania .....	0.6	1.0	1.1	1.0	1.1	1.3	1.8	1.7	1.5	1.6
Rhode Island .....	1.2	1.9	2.6	3.4	3.5	3.7	4.1	4.3	4.7	5.2
South Carolina .....	1.0	1.4	1.8	2.5	3.0	3.8	4.5	5.4	6.3	6.3
South Dakota .....	1.4	2.1	3.2	4.9	6.3	7.7	8.4	10.1	11.2	11.8
Tennessee .....	0.9	1.3	2.0	2.3	2.5	2.5	2.6	2.9	3.3	3.0
Texas .....	1.0	1.8	2.6	3.3	4.0	4.4	5.0	6.1	7.7	9.0
Utah .....	1.6	1.9	2.2	3.0	3.6	4.8	5.9	7.3	7.9	7.5
Vermont .....	1.8	2.2	2.6	3.4	4.4	5.4	6.8	8.7	8.4	9.9
Virginia .....	0.6	0.9	1.0	1.3	1.7	2.3	2.8	3.3	3.9	3.9
Washington .....	0.5	0.8	1.1	1.4	1.8	2.3	2.7	3.0	2.8	3.2
West Virginia .....	0.6	0.7	1.0	1.4	2.0	2.7	3.5	4.5	5.3	5.2
Wisconsin .....	0.7	0.9	1.1	1.5	1.6	1.8	1.9	2.0	1.9	1.9
Wyoming .....	1.0	1.6	2.9	4.5	6.8	9.1	10.8	13.6	15.7	18.3

NOTE: Mean absolute percentage error (MAPE) is the average value over past projections of the absolute values of errors expressed in percentage terms. National MAPEs for public prekindergarten–8 enrollments were calculated using the last 30 editions of *Projections of Education Statistics* and state MAPEs were calculated using the last 18 editions of *Projections of Education Statistics*.

Calculations were made using unrounded numbers. Some data have been revised from previously published figures.  
SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)

**Table A-9. Mean absolute percentage errors (MAPEs) for projected grades 9–12 enrollment in public schools, by lead time, region, and state: 2014**

Region and state	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
<b>United States .....</b>	<b>0.4</b>	<b>0.7</b>	<b>0.9</b>	<b>1.1</b>	<b>1.2</b>	<b>1.4</b>	<b>1.8</b>	<b>2.1</b>	<b>2.3</b>	<b>2.5</b>
Region	0.9	1.0	1.1	1.2	1.3	1.3	1.1	1.2	1.2	1.8
Northeast .....	1.6	1.9	2.2	3.0	3.6	4.8	5.9	7.3	7.9	7.5
Midwest .....	0.5	0.8	1.0	1.2	1.3	1.4	1.8	2.1	2.2	2.3
South .....	0.4	0.9	1.4	1.5	1.8	2.1	2.4	2.7	3.2	3.6
West .....	0.5	0.8	1.1	1.4	1.6	1.8	2.1	2.3	2.0	1.6
State										
Alabama .....	0.9	1.4	1.9	2.4	2.9	3.8	4.6	5.3	6.0	6.1
Alaska .....	1.1	2.3	3.1	3.4	3.5	3.4	3.6	3.8	3.7	3.9
Arizona .....	4.1	6.0	8.1	9.2	9.9	10.0	8.6	8.4	9.6	12.0
Arkansas .....	0.5	0.9	1.3	1.4	1.8	2.2	2.5	3.0	3.2	3.5
California .....	0.5	1.0	1.4	1.8	2.1	2.4	2.6	2.8	2.4	2.2
Colorado .....	0.7	1.3	1.9	2.4	2.5	2.9	3.0	2.7	3.0	3.7
Connecticut .....	0.7	1.0	1.0	1.2	1.9	2.6	3.5	4.4	5.9	7.6
Delaware .....	1.3	1.6	2.0	2.5	2.8	3.4	4.2	4.6	5.7	6.7
District of Columbia .....	7.5	8.2	11.3	13.8	15.6	16.5	14.7	15.1	17.0	16.9
Florida .....	0.8	1.2	1.6	1.7	2.0	3.2	4.2	5.0	5.5	6.6
Georgia .....	0.5	1.0	1.3	1.4	1.9	2.5	3.1	3.9	4.7	5.2
Hawaii .....	1.9	2.5	3.3	4.0	4.4	5.1	5.8	6.7	6.5	8.0
Idaho .....	0.7	1.0	1.5	2.1	2.7	3.2	3.8	4.3	4.2	3.8
Illinois .....	0.8	1.1	1.3	1.5	1.8	2.4	2.8	3.3	3.5	3.9
Indiana .....	0.5	1.0	1.5	1.9	2.3	2.8	3.4	4.0	4.4	4.7
Iowa .....	0.8	1.0	1.3	1.2	1.6	1.7	1.8	1.8	2.1	2.1
Kansas .....	1.2	1.8	2.3	2.6	2.4	2.1	1.8	1.7	1.6	1.0
Kentucky .....	1.6	2.0	2.1	2.1	2.2	3.5	4.2	4.5	5.3	4.8
Louisiana .....	3.0	4.2	5.6	7.3	8.7	9.6	8.3	8.2	10.2	11.7
Maine .....	1.8	3.1	3.8	4.9	5.8	6.6	7.4	8.4	9.3	8.5
Maryland .....	0.6	0.9	1.4	1.7	1.6	1.5	1.5	1.8	2.1	2.0
Massachusetts .....	0.6	1.0	1.5	1.8	2.3	2.7	2.8	2.4	2.5	2.6
Michigan .....	1.6	2.6	3.2	3.5	4.2	5.0	6.4	7.9	9.6	9.9
Minnesota .....	0.6	1.0	1.2	1.4	1.7	2.0	2.3	2.8	3.0	3.3
Mississippi .....	0.6	1.3	2.0	2.4	2.8	3.2	3.6	4.2	4.4	4.2
Missouri .....	0.4	0.8	1.0	1.4	1.6	1.7	1.8	1.8	2.0	2.3
Montana .....	0.6	1.0	1.4	1.9	2.5	3.2	3.7	4.1	3.5	3.3
Nebraska .....	0.4	0.8	1.2	1.4	1.7	2.1	2.5	3.1	3.3	3.2
Nevada .....	1.2	2.3	2.8	3.2	3.8	4.4	5.2	7.4	8.5	8.7
New Hampshire .....	0.6	1.1	1.5	1.8	2.0	2.4	2.9	4.0	4.7	5.0
New Jersey .....	0.7	1.4	2.1	2.3	2.8	4.0	5.1	6.1	7.5	8.5
New Mexico .....	2.7	4.6	5.9	7.1	8.7	9.6	10.8	12.0	12.6	13.8
New York .....	1.5	1.6	1.9	2.1	2.4	2.8	2.6	3.0	3.5	3.5
North Carolina .....	1.0	1.5	1.6	1.8	2.2	2.6	3.1	3.3	3.9	4.8
North Dakota .....	0.7	1.3	1.7	2.1	2.6	3.3	4.4	5.9	7.0	7.5
Ohio .....	1.1	1.8	2.3	2.5	2.7	3.2	3.7	3.8	3.6	3.2
Oklahoma .....	0.5	0.9	1.3	1.7	2.1	2.6	2.9	3.5	3.9	4.4
Oregon .....	1.1	1.8	2.4	2.9	3.1	3.8	4.3	4.9	4.8	4.9
Pennsylvania .....	1.8	2.3	2.3	2.2	2.4	2.4	2.6	2.6	2.1	3.5
Rhode Island .....	0.9	1.6	2.4	3.2	3.8	4.3	4.4	4.4	4.1	4.6
South Carolina .....	0.8	1.5	2.1	2.6	3.0	3.3	3.3	3.8	4.4	5.5
South Dakota .....	1.7	3.2	4.7	5.9	7.2	8.1	9.3	10.2	10.6	11.1
Tennessee .....	2.1	2.2	3.0	4.0	4.6	5.5	6.0	6.5	6.2	5.7
Texas .....	0.6	1.2	1.7	2.1	2.5	3.1	3.9	4.7	5.6	6.6
Utah .....	2.1	2.0	1.8	3.4	2.8	3.5	4.7	4.7	5.7	6.2
Vermont .....	1.0	2.5	3.0	3.6	3.9	4.2	4.2	4.4	4.3	3.6
Virginia .....	0.5	1.0	1.6	2.1	2.6	3.0	3.2	3.4	3.8	4.0
Washington .....	0.6	0.9	1.2	1.8	2.2	2.6	3.3	3.6	4.2	4.2
West Virginia .....	0.7	1.0	1.2	1.7	2.2	3.0	3.7	4.5	4.9	5.0
Wisconsin .....	0.8	1.3	1.5	1.8	2.0	2.2	2.4	2.3	2.1	2.3
Wyoming .....	0.8	1.3	2.1	3.2	4.3	5.6	6.9	8.1	8.6	8.5

NOTE: Mean absolute percentage error (MAPE) is the average value over past projections of the absolute values of errors expressed in percentage terms. National MAPEs for public 9–12 enrollments were calculated using the last 30 editions of *Projections of Education Statistics* and state MAPEs were calculated using the last 18 editions of *Projections of Edu-*

*cation Statistics*. Calculations were made using unrounded numbers. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)

## A.2. ELEMENTARY AND SECONDARY TEACHERS

### Projections in this edition

This edition of *Projections of Education Statistics* presents projected trends in elementary and secondary teachers, pupil/teacher ratios, and new teacher hires from 2012 to 2023. These projections were made using two models:

- » The *Elementary and Secondary Teacher Projection Model* was used to project the number of public school teachers, the number of private school teachers, and the total number of teachers for the nation. It was also used to project pupil/teacher ratios for public schools, private schools, and all elementary and secondary schools.
- » The *New Teacher Hires Projection Model* was used to project the number of new teacher hires in public schools, private schools, and all schools.

### Overview of approach

#### **Approach for numbers of teachers and pupil/teacher ratios**

**Public schools.** Multiple linear regression was used to produce initial projections of public school pupil/teacher ratios separately for elementary and secondary schools. The initial projections of elementary pupil/teacher ratios and secondary pupil/teacher ratios were applied to enrollment projections to project the numbers of elementary teachers and secondary teachers, which were summed to get the total number of public school teachers. Final projections of the overall public school pupil/teacher ratios were produced by dividing total projected public school enrollment by the total projected number of teachers.

#### **Assumptions underlying this method**

This method assumes that past relationships between the public school pupil/teacher ratio (the dependent variable) and the independent variables used in the regression analysis will continue throughout the forecast period. For more information about the independent variables, see “Elementary and Secondary Teacher Projection Model,” later in this section of appendix A.

**Private schools.** Private school pupil/teacher ratios were projected by applying each year’s projected annual percentage change in the overall public school pupil/teacher ratio to the previous year’s private school pupil/teacher ratio. The projected private school pupil/teacher ratios were then applied to projected enrollments at private schools to produce projected numbers of private school teachers.

#### **Assumptions underlying this method**

This method assumes that the future pattern in the trend of private school pupil/teacher ratios will be the same as that for public school pupil/teacher ratios. The reader is cautioned that a number of factors could alter the assumption of consistent patterns of change in ratios over the forecast period.

#### **Approach for new teacher hires**

The following numbers were projected separately for public schools and for private schools:

- » *The number of teachers needed to fill openings when there is an increase in the size of the teaching workforce from one year to the next and the decrease in the number of replacement teachers needed if there is a decrease in the size of the teaching workforce from one year to the next.* This number was estimated based on continuation rates of teachers by their age.
- » *The number of teachers needed to fill openings due to an increase in the size of the teaching workforce from one year to the next.* This number was estimated by subtracting the projected number of teachers in one year from the projected number of teachers in the next year.

These two numbers were summed to yield the total number of “new teacher hires” for each control of school—that is, teachers who will be hired in a given year, but who did not teach in that control the previous year. A teacher who moves from one control to the other control (i.e. from a public to private school or from a private to a public school) is considered a new teacher hire, but a teacher who moves from one school to another school in the same control is not considered a new teacher hire.

### Elementary and Secondary Teacher Projection Model

Projections for public schools were produced first. Projections for private schools were produced based partially on input from the public school projections. Finally, the public and private school projections were combined into total elementary and secondary school projections (not shown in the steps below).

## **Steps used to project numbers of teachers and pupil/teacher ratios**

**Public school teachers.** The following steps were used for the public school projections:

**Step 1.** *Produce projections of pupil/teacher ratios for public elementary schools and public secondary schools separately.* Two separate equations were used—one for elementary schools and one for secondary schools. The equations for elementary and secondary schools included an AR(1) term for correcting for autocorrelation and the following independent variables:

- » *Independent variables for public elementary school pupil/teacher ratios*—(1) average teacher wage relative to the overall economy-level wage, and (2) level of education revenue from state sources in constant dollars per public elementary student.
- » *Independent variables for public secondary school pupil/teacher ratios*—(1) level of education revenue from state sources in constant dollars per public secondary student, and (2) the number of students enrolled in public secondary schools relative to the secondary school–age population.

To estimate the models, they were first transformed into nonlinear models and then the coefficients were estimated simultaneously by applying a Marquardt nonlinear least squares algorithm to the transformed equation.

*For details on the equations, model statistics, and data used to project public school pupil/teacher ratios, see “Data and equations used for projections of teachers and pupil/teacher ratios,” below.*

**Step 2.** *Produce projections of the number of teachers for public elementary schools and public secondary schools separately.* The projections of the public elementary pupil/teacher ratio and public secondary pupil/teacher ratio were applied to projections of enrollments in elementary schools and secondary schools, respectively, to produce projections of public elementary teachers and public secondary teachers.

**Step 3.** *Produce projections of the total number of teachers for public elementary and secondary schools combined.* The projections of public elementary teachers and public secondary teachers were added together to produce the projections of the total number of public elementary and secondary teachers.

**Step 4.** *Produce projections of the pupil/teacher ratio for public elementary and secondary schools combined.* The projections of the total number of public elementary and secondary teachers were divided by projections of total enrollment in public elementary and secondary schools to produce projections of the overall pupil/teacher ratio in public elementary and secondary schools.

**Private school teachers.** The following steps were used for the private school projections:

**Step 1.** *Produce projections of the private school pupil/teacher ratio.* First, the projection of the private school pupil/teacher ratio for 2012 was calculated by multiplying the private school pupil/teacher ratio for 2011 (the last year of actual data) by the percentage change from 2010 to 2011 in the public school pupil/teacher ratio. The same method was used to calculate the projections of the private school pupil/teacher ratio for 2012 through 2023. That is, each year’s projected annual percentage change in the public school pupil/teacher ratio was applied to the previous year’s private school pupil/teacher ratio.

**Step 2.** *Produce projections of the number of private school teachers.* The projected pupil/teacher ratios were applied to projected private school enrollments to produce projections of private school teachers from 2012 through 2023.

*For information about the private school teacher and enrollment data used for the private school projections, see “Data and equations used for projections of teachers and pupil/teacher ratios,” below.*

## **Data and equations used for projections of teachers and pupil/teacher ratios**

Public school data used in these projections were by organizational level (i.e., school level), not by grade level. Thus, secondary school enrollment is not the same as enrollment in grades 9 through 12 because some jurisdictions count some grade 7 and 8 enrollment as secondary. For example, some jurisdictions may have 6-year high schools with grades 7 through 12.

**Data used to estimate the equation for public elementary school pupil/teacher ratios.** The following data were used to estimate the equation:

- » To compute the historical elementary school pupil/teacher ratios—Data on 1973–74 to 1980–81 enrollments in public elementary schools came from the NCES *Statistics of Public Elementary and Secondary Day Schools* and data on 1981–82 to 2011–12 enrollment came from the NCES Common Core of Data (CCD). The proportion of public school teachers who taught in elementary schools was taken from the National Education Association and then applied to the total number of public school teachers from the CCD to produce the number of teachers in elementary schools.

- » For 1973–74 and 1975–76, the education revenue from state sources data came from *Statistics of State School Systems*, published by NCES. For 1974–75 and 1976–77, the education revenue from state sources data came from *Revenues and Expenditures for Public Elementary and Secondary Education*, also published by NCES. For 1977–78 through 2009–10, these data came from the NCES Common Core of Data (CCD).

**Estimated equation and model statistics for public elementary school pupil/teacher ratios.** For the estimated equation and model statistics, see table A-10 on page 91. In the public elementary pupil/teacher ratio equation, the independent variables affect the dependent variable in the expected way:

- » As the average teacher wage relative to the overall economy-level wage increases, the pupil/teacher ratio increases; and
- » As the level of education revenue from state sources in constant dollars per public elementary student increases, the pupil/teacher ratio decreases.

**Data used to project public elementary school pupil/teacher ratios.** The estimated equation was run using projected values for teacher salaries and education revenues from state sources from 2011–12 through 2023–24. For more information, see Section A.0. Introduction, earlier in this appendix and Section A.4 Expenditures for Public Elementary and Secondary Education later in this appendix.

**Data used to estimate the equation for public secondary school pupil/teacher ratios.** The following data were used to estimate the equation:

- » To compute the historical secondary school pupil/teacher ratios—Data on 1973–74 to 1980–81 enrollments in public elementary schools came from the NCES *Statistics of Public Elementary and Secondary Day Schools* and data on 1981–82 to 2011–12 enrollment came from the NCES Common Core of Data (CCD). The proportion of public school teachers who taught in secondary schools was taken from the National Education Association and then applied to the total number of public school teachers from the CCD to produce the number of teachers in secondary schools.
- » For 1973–74 and 1975–76, the education revenue from state sources data came from *Statistics of State School Systems*, published by NCES. For 1974–75 and 1976–77, the education revenue from state sources data came from *Revenues and Expenditures for Public Elementary and Secondary Education*, also published by NCES. For 1977–78 through 2009–10, these data came from the NCES Common Core of Data (CCD).
- » To compute the historical secondary school enrollment rate—Data on the secondary school-age population from 1973–74 to 2011–12 came from the U.S. Census Bureau. Data on enrollments in public secondary schools during the same period came from the CCD, as noted above.

**Estimated equation and model statistics for public secondary school pupil/teacher ratios.** For the estimated equation and model statistics, see table A-10 on page 91. In the public secondary pupil/teacher ratio equation, the independent variables affect the dependent variable in the expected way:

- » As enrollment rates (number of enrolled students relative to the school-age population) increase, the pupil/teacher ratio increases; and
- » As the level of education revenue from state sources in constant dollars per public secondary student increases, the pupil/teacher ratio decreases.

**Data used to project public secondary school pupil/teacher ratios.** The estimated equation was run using projections for education revenues, public secondary enrollments, and secondary school-age populations from 2011–12 through 2023–24. Secondary enrollment projections were derived from the enrollment projections described in Section A.1. Elementary and Secondary Enrollment. Population projections were from the Census Bureau’s 2012 National Population Projections by age and sex (December 2012), ratio-adjusted to line up with the most recent historical estimates.

**Private school teacher and enrollment data.** Private school data for 1989–90, 1991–92, 1993–94, 1995–96, 1997–98, 1999–2000, 2001–02, 2003–04, 2005–06, 2007–08, 2009–10, and 2011–12 came from the biennial NCES Private School Universe Survey (PSS). Since the PSS is collected in the fall of odd-numbered years, data for years without a PSS collection were estimated using data from the PSS.

**Private school enrollment projections.** Private school enrollments from 2011 to 2023 came from the projections described in Section A.1. Elementary and Secondary Enrollment, earlier in this appendix.

### **Accuracy of projections of numbers of teachers**

Mean absolute percentage errors (MAPEs) for projections of public school teachers were calculated using the last 23 editions of *Projections of Education Statistics*. Table C, below, shows MAPEs for projections of the numbers of public school teachers. There was a change in the methodology for projecting private school teachers beginning with *Projections of Education Statistics to 2017*, and therefore there are too few years of data to present the MAPEs for private school teachers.

**Table B. Mean absolute percentage errors (MAPEs) of projections of number of public elementary and secondary school teachers, by lead time: 2014**

Statistic	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
Public elementary and secondary teachers	0.8	1.6	1.8	2.3	3.0	3.7	4.4	4.8	4.7	5.2

NOTE: MAPEs for teachers were calculated from the past 23 editions of *Projections of Education Statistics* containing teacher projections. Calculations were made using unrounded numbers. Some data have been revised from previously published figures. Number of teachers reported in full-time equivalents.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)

*For more information about MAPEs, see Section A.0. Introduction, earlier in this appendix.*

## New Teacher Hires Projection Model

The New Teacher Hires Projection Model was estimated separately for public and private school teachers. The model produces projections of the number of teachers who were not teaching in the previous year, but who will be hired in a given year.

### About new teacher hires

A teacher is considered to be a new teacher hire for a control of school (public or private) for a given year if the teacher teaches in that control that year but had not taught in that control in the previous year. Included among new teachers hires are: (1) teachers who are new to the profession; (2) teachers who had taught previously but had not been teaching the previous year; and (3) teachers who had been teaching in one control the previous year but have moved to the other control. Concerning the last category, if a teacher moves from one public school to a different public school, that teacher would not be counted as a new teacher hire for the purposes of this model. On the other hand, if a teacher moves from a public school to a private school, that teacher would be counted as a private school new teacher hire, since the teacher did not teach in a private school in the previous year.

The New Teacher Hires Projection Model measures the demand for teacher hires. Due to difficulties in defining and measuring the pool of potential teachers, no attempt was made to measure the supply of new teacher candidates.

### Steps used to project numbers of new teacher hires

The steps outlined below provide a general summary of how the New Teacher Hires Projection Model was used to produce projections of the need for new teacher hires.

*For more information about the New Teacher Hires Projection Model, see Hussar (1999).*

First, the series of steps outlined below was used to produce projections of public school new teacher hires. Then, the same steps were used to produce projections of private school new hires. Finally, the public and private new teacher hires were combined to produce projections of total new teacher hires.

**Step 1.** *Estimate the age distribution of full-time-equivalent (FTE) teachers in 2011.* For this estimate, the age distribution of the headcount of school teachers (including both full-time and part-time teachers) in 2011 was applied to the national number of FTE teachers in the same year.

**Step 2.** *Project the number of new FTE teacher hires needed to replace those who left teaching between 2011 and 2012.* In this step

- » Age-specific continuation rates for 2008 were applied to the FTE count of teachers by age for 2011, resulting in estimates of the number of FTE teachers who remained in teaching in 2012 by individual age.
- » The FTE teachers who remained in teaching by individual age were summed across all ages to produce a projection of the total number of FTE teachers who remained teaching in 2012.
- » The total projection of remaining FTE teachers in 2012 was subtracted from the total FTE teacher count for 2011 to produce the projected number of FTE teachers who left teaching.

**Step 3.** *Project the number of new FTE teacher hires needed due to the overall increase in the teacher workforce between 2011 and 2012.* The total number of FTE teachers in 2011 was subtracted from the total projected number of FTE teachers in 2012 to project the overall increase in the teaching workforce between 2011 and 2012.

**Step 4.** *Project the total number of new FTE teacher hires needed in 2012.* The number of FTE teachers who left teaching from step 2 was added to the projected net change in the number of FTE teachers from step 3 to project the total number of new FTE teacher hires needed in 2012.

**Step 5.** Project the FTE count of teachers by age for 2012. In this step

- » The age distribution for the headcount of newly hired teachers in 2011 was applied to the projected total number of new FTE teacher hires in 2012, resulting in the projected number of new FTE teacher hires by age.
- » For each individual age, the projected number of new FTE teacher hires was added to the projected number of remaining FTE teachers (from step 2, first bullet) to produce the projected FTE count of teachers by age for 2012.

**Step 6.** Repeat steps 2 to 5 for each year from 2013 through 2023.

- » In step 2
  - For public school teachers ages 22 through 66 and private school teachers ages 21 through 65, projections of age-specific continuation rates were used. A separate smoothing constant, chosen to minimize the sum of squared forecast errors, was used to calculate the projected progression rate for each age. (For a general description of the exponential smoothing technique, see Section A.0. Introduction, earlier in this appendix.)
  - For all other ages, the age-specific continuation rates for 2008 (the last year of actual data) were used.
- » In step 3, projections of the numbers of FTE teachers were used for all years in which there were no actual teacher numbers. The projections of FTE teachers are described under “Elementary and Secondary Teacher Projection Model,” earlier in this section of appendix A.

### **Assumptions underlying this method**

A number of assumptions are made in order to make these projections. They include that (1) the age distribution of FTE teachers in 2011 was similar to that of full-time and part-time teachers in that year (step 1); (2) the age-specific continuation rates for FTE teachers for each year from 2012 through 2023 are similar to either the projections produced using single exponential smoothing or the values for 2012, depending on the age of the teachers (step 2); (3) the age distribution for newly hired FTE teachers from 2012 through 2023 is similar to that of newly hired full-time and part-time teachers in 2011 (step 3); (4) the actual numbers of FTE teachers for each year from 2012 through 2023 are similar to projections of FTE teachers shown in table 8 on page 48; and (5) no economic or political changes further affect the size of the teaching force.

### **Data used for projections of new teacher hires**

**Data on numbers of public school teachers.** The number of FTE teachers for 2011 came from the NCES Common Core of Data (CCD).

**Data on numbers of private school teachers.** Private school data on the numbers of FTE teachers in 2003–04, 2005–06, 2007–08, 2009–10, and 2011–12 came from the biennial NCES Private School Universe Survey (PSS). Since the PSS is collected in the fall of odd-numbered years, data for years without a PSS collection were estimated using data from the PSS.

**Data on the age distribution of public and private school teachers.** Data on the age distribution of full-time and part-time public and private school teachers came from the 2011–12 NCES Schools and Staffing Survey (SASS). These data and their standard errors are shown in table A-11 on page 91.

**Data on the age distribution of public and private new teacher hires.** Data on the age distribution of newly hired full-time and part-time public and private school teachers came from the 2011–12 NCES Schools and Staffing Survey (SASS). These data and their standard errors are shown in table A-12 on page 91.

**Data on and projections of age-specific continuation rates of public and private school teachers.** The 2008 continuation rates came from the 2008–09 NCES Teacher Follow-Up Survey (TFS). Data from the 1994–95, 2000–01, and 2004–05 TFS were also used in the projection of age-specific continuation rates. The actual data, their standard errors, and the projections are shown in table A-13 on page 92.

**Projections of the numbers of public and private elementary and secondary school teachers.** These projections are described under “Elementary and Secondary Teacher Projection Model,” earlier in this section of appendix A.

### **Accuracy of projections of new teacher hires**

No MAPEs are presented for new teacher hires as there has only been one additional year of historical data (for 2011, which was added in this edition) for this statistic since it was first included in *Projections of Education Statistics to 2018*.

**Table A-10. Estimated equations and model statistics for public elementary and secondary teachers based on data from 1973 to 2011**

Dependent variable	Equation <sup>1</sup>	R <sup>2</sup>	Breusch-Godfrey Serial Correlation LM test statistic <sup>2</sup>	Time period
1	2	3	4	5
Elementary .....	ln (RELENRTCH) = 3.90 + .05 ln (RSALARY) - .24 ln (RSGRNTLEENR) + .49 AR (1) (26.203) (2.243) (-7.378) (2.680)	0.99	9.78 (0.008)	1973 to 2011
Secondary .....	ln (RSCENRTCH) = 4.16 - .23 ln (RSGRNTSCENR) + .57 ln (RSCENRPU) + .47 AR (1) (46.767) (-20.211) (4.595) (2.864)	0.98	1.72 (0.256)	1973 to 2011

<sup>1</sup>AR(1) indicates that the model was estimated using least squares with the AR(1) process for correcting for first-order autocorrelation. To estimate the model, it was first transformed into a nonlinear model and then the coefficients were estimated simultaneously by applying a Marquardt nonlinear least squares algorithm to the transformed equation. For a general discussion of the problem of autocorrelation, and the method used to forecast in the presence of autocorrelation, see Judge, G., Hill, W., Griffiths, R., Lutkepohl, H., and Lee, T. (1985). *The Theory and Practice of Econometrics*. New York: John Wiley and Sons, pp. 315–318. Numbers in parentheses are t-statistics.

<sup>2</sup>The number in parentheses is the probability of the Chi-Square associated with the Breusch-Godfrey Serial Correlation LM Test. A p value greater than 0.05 implies that we do not reject the null hypothesis of no autocorrelation at the 5 percent significance level for a two-tailed test and 10 percent significance level for a one-tailed test (i.e., there is no autocorrelation present). For an explanation of the Breusch-Godfrey Serial Correlation LM test statistic, see Greene, W. (2000). *Econometric Analysis*. New Jersey: Prentice-Hall.

NOTE: R<sup>2</sup> indicates the coefficient of determination.

RELENRTCH = Ratio of public elementary school enrollment to classroom teachers (i.e., pupil/teacher ratio).

RSCENRTCH = Ratio of public secondary school enrollment to classroom teachers (i.e., pupil/teacher ratio).

RSALARY = Average annual teacher salary relative to the overall economy wage in 2000 dollars.

RSGRNTLEENR = Ratio of education revenue receipts from state sources per capita to public elementary school enrollment in 2000 dollars.

RSGRNTSCENR = Ratio of education revenue receipts from state sources per capita to public secondary school enrollment in 2000 dollars.

RSCENRPU = Ln of the ratio of enrollment in public secondary schools to the 11- to 18-year-old population.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Elementary and Secondary Teacher Projection Model, 1973 through 2023. (This table was prepared February 2014.)

**Table A-11. Percentage distribution of full-time and part-time school teachers, by age, control of school, and teaching status: School year 2011–12**

Control of school and teaching status	Percent of total	Age distribution							
		Total	Less than 25 years	25–29 years	30–39 years	40–49 years	50–59 years	60–64 years	65 years or more
1	2	3	4	5	6	7	8	9	10
<b>Public-actual</b> .....	<b>100.0</b> (†)	<b>100.0</b>	<b>2.8</b> (0.24)	<b>12.5</b> (0.58)	<b>28.9</b> (0.79)	<b>25.1</b> (0.75)	<b>23.1</b> (0.72)	<b>6.1</b> (0.45)	<b>1.4</b> (0.20)
Full-time .....	93.1 (0.46)	100.0	2.9 (0.25)	12.8 (0.60)	29.3 (0.85)	24.9 (0.81)	22.8 (0.76)	6.0 (0.48)	1.3 (0.21)
Part-time .....	6.9 (0.46)	100.0	1.9 (0.59)	8.7 (2.04)	23.4 (2.92)	27.5 (3.22)	27.0 (2.58)	8.7 (1.80)	2.9 (0.99)
<b>Private-actual</b> .....	<b>100.0</b> (†)	<b>100.0</b>	<b>4.6</b> (1.35)	<b>12.2</b> (1.26)	<b>24.0</b> (1.58)	<b>23.8</b> (1.57)	<b>21.3</b> (1.57)	<b>9.6</b> (0.97)	<b>4.6</b> (0.93)
Full-time .....	79.4 (2.04)	100.0	4.7 (1.30)	12.5 (1.25)	25.6 (1.82)	23.8 (1.75)	21.1 (1.66)	9.0 (1.07)	3.3 (0.94)
Part-time .....	20.6 (2.04)	100.0	4.0 (1.90)	10.9 (3.14)	18.2 (4.31)	23.5 (3.39)	22.2 (3.15)	11.8 (3.09)	9.4 (2.60)

† Not applicable.

NOTE: Detail may not sum to totals because of rounding. Standard errors appear in parentheses. The 2011–12 data are the most recent data available.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), “Public School Teacher Questionnaire,” 2011–12 and “Private School Teacher Questionnaire,” 2011–12; and unpublished tabulations. (This table was prepared February 2014.)

**Table A-12. Percentage distribution of full-time and part-time newly hired teachers, by age and control of school: Selected school years, 1987–88 through 2011–12**

Control of school and school year	Total	Age distribution							
		Less than 25 years	25–29 years	30–39 years	40–49 years	50–59 years	60–64 years	65 years or more	
1	2	3	4	5	6	7	8	9	
<b>Public</b>									
1987–88 .....	100.0	17.7 (0.79)	23.7 (1.19)	33.0 (1.43)	21.2 (0.80)	4.0 (0.51)	0.3 ! (0.11)	‡ (†)	‡ (†)
1990–91 .....	100.0	17.5 (1.06)	24.0 (1.35)	30.6 (1.33)	21.4 (1.28)	5.6 (0.65)	0.6 (0.18)	‡ (†)	‡ (†)
1993–94 .....	100.0	16.2 (0.91)	28.7 (1.15)	24.9 (1.04)	24.6 (1.16)	5.0 (0.63)	0.5 (0.13)	0.2 ! (0.09)	0.6 ! (0.26)
1999–2000 .....	100.0	23.6 (1.28)	22.5 (0.97)	22.2 (1.10)	19.2 (0.90)	11.1 (0.88)	0.9 (0.23)	0.6 ! (0.26)	0.6 ! (0.26)
2003–04 .....	100.0	24.4 (1.21)	19.0 (1.23)	24.6 (1.10)	16.5 (1.18)	13.3 (0.93)	1.5 (0.29)	0.7 ! (0.29)	0.7 ! (0.29)
2007–08 .....	100.0	23.8 (1.75)	24.3 (1.79)	20.4 (1.56)	15.1 (0.94)	13.6 (1.22)	2.3 (0.39)	0.5 ! (0.22)	0.5 ! (0.22)
2011–12 .....	100.0	21.9 (2.46)	23.0 (2.93)	24.1 (2.79)	15.9 (2.79)	10.9 (2.58)	3.5 ! (1.35)	‡ (†)	‡ (†)
<b>Private</b>									
1987–88 .....	100.0	17.0 (1.27)	22.8 (1.68)	32.5 (2.17)	17.9 (1.61)	5.3 (1.09)	‡ (†)	1.8 ! (0.77)	1.8 ! (0.77)
1990–91 .....	100.0	15.8 (1.47)	26.3 (1.83)	29.1 (1.86)	21.1 (1.67)	5.6 (0.88)	1.1 ! (0.40)	1.0 ! (0.42)	1.0 ! (0.42)
1993–94 .....	100.0	19.3 (1.13)	24.4 (1.19)	24.9 (1.49)	22.6 (1.18)	7.3 (0.85)	0.9 (0.20)	0.6 ! (0.23)	0.6 ! (0.23)
1999–2000 .....	100.0	18.5 (0.89)	17.2 (0.87)	24.1 (1.24)	22.1 (1.19)	14.0 (1.01)	2.6 (0.39)	1.5 (0.38)	1.5 (0.38)
2003–04 .....	100.0	17.1 (1.59)	16.0 (2.13)	23.0 (2.19)	22.8 (3.32)	15.3 (1.77)	3.6 (0.83)	2.1 (0.58)	2.1 (0.58)
2007–08 .....	100.0	14.3 (1.26)	18.2 (1.36)	23.2 (1.97)	23.6 (1.92)	14.4 (1.49)	4.2 (0.84)	2.1 ! (0.69)	2.1 ! (0.69)
2011–12 .....	100.0	14.9 ! (5.78)	20.7 (4.29)	27.5 (4.62)	17.4 (4.74)	10.8 (2.51)	5.3 ! (2.32)	‡ (†)	‡ (†)

† Not applicable.

! Interpret with caution. The coefficient of variation (CV) for this estimate is 30 percent or greater.

‡ Reporting standards not met. The coefficient of variation (CV) for this estimate is 50 percent or greater.

NOTE: Detail may not sum to totals because of rounding. Standard errors appear in parentheses. The 2011–12 data are the most recent data available.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), “Public School Teacher Questionnaire,” 1987–88 through 2011–12 and “Private School Teacher Questionnaire,” 1987–88 through 2011–12; and unpublished tabulations. (This table was prepared February 2014.)



**Table A-13. Actual and projected continuation rates of full-time and part-time school teachers, by age and control of school: Selected school years, 1993–94 to 1994–95 through 2023–24 to 2024–25**

Control of school and school year	Continuation rates, by age															
	Total		Less than 25 years		25–29 years		30–39 years		40–49 years		50–59 years		60–64 years		65 years or more	
			3	4	5	6	7	8	9							
<b>Public actual</b>																
1993–94 to 1994–95.....	93.4	(0.36)	96.2	(1.09)	90.0	(1.22)	93.3	(1.03)	96.1	(0.54)	93.7	(0.77)	69.5	(4.79)	65.9	(8.81)
1999–2000 to 2000–01.....	92.4	(0.38)	95.8	(0.98)	89.3	(7.38)	93.2	(2.76)	94.5	(0.61)	92.9	(4.58)	76.8 !	(29.18)	†	(†)
2003–04 to 2004–05.....	91.4	(0.55)	94.9	(1.79)	90.1	(1.71)	92.6	(0.93)	94.5	(0.78)	90.8	(0.81)	77.2	(3.00)	70.3	(9.40)
2007–08 to 2008–09.....	91.8	(0.45)	92.2	(1.95)	89.0	(2.33)	92.4	(1.29)	95.1	(1.06)	92.3	(1.23)	82.8	(3.97)	88.9	(4.26)
<b>Public projected</b>																
2012–13 to 2013–14.....	91.4	(†)	91.1	(†)	90.2	(†)	91.5	(†)	95.5	(†)	91.3	(†)	81.7	(†)	73.0	(†)
2013–14 to 2014–15.....	91.3	(†)	91.1	(†)	90.1	(†)	91.5	(†)	95.6	(†)	91.2	(†)	81.5	(†)	72.7	(†)
2014–15 to 2015–16.....	91.2	(†)	91.0	(†)	90.3	(†)	91.6	(†)	95.5	(†)	91.2	(†)	80.6	(†)	70.8	(†)
2015–16 to 2016–17.....	91.2	(†)	91.0	(†)	90.3	(†)	91.5	(†)	95.5	(†)	91.2	(†)	81.0	(†)	70.0	(†)
2016–17 to 2017–18.....	91.2	(†)	91.1	(†)	90.2	(†)	91.4	(†)	95.5	(†)	91.2	(†)	81.0	(†)	71.6	(†)
2017–18 to 2018–19.....	91.2	(†)	91.0	(†)	90.2	(†)	91.5	(†)	95.4	(†)	91.3	(†)	81.0	(†)	69.5	(†)
2018–19 to 2019–20.....	91.1	(†)	91.0	(†)	90.2	(†)	91.4	(†)	95.3	(†)	91.2	(†)	81.0	(†)	69.4	(†)
2019–20 to 2020–21.....	91.1	(†)	91.0	(†)	90.2	(†)	91.4	(†)	95.4	(†)	91.3	(†)	80.8	(†)	69.0	(†)
2020–21 to 2021–22.....	91.2	(†)	91.0	(†)	90.2	(†)	91.4	(†)	95.5	(†)	91.4	(†)	81.2	(†)	69.4	(†)
2021–22 to 2022–23.....	91.2	(†)	91.0	(†)	90.2	(†)	91.4	(†)	95.4	(†)	91.4	(†)	81.1	(†)	69.2	(†)
2022–23 to 2023–24.....	91.2	(†)	91.0	(†)	90.2	(†)	91.4	(†)	95.4	(†)	91.5	(†)	81.0	(†)	68.3	(†)
2023–24 to 2024–25.....	91.3	(†)	91.0	(†)	90.2	(†)	91.5	(†)	95.4	(†)	91.5	(†)	80.9	(†)	68.7	(†)
<b>Private actual</b>																
1993–94 to 1994–95.....	88.1	(0.74)	80.0	(4.42)	86.9	(1.64)	85.1	(1.70)	91.3	(1.14)	91.8	(1.52)	86.9	(2.74)	58.1	(8.67)
1999–2000 to 2000–01.....	83.0	(0.72)	61.7	(4.90)	72.2	(2.76)	80.2	(1.57)	86.1	(1.47)	92.3	(1.00)	78.8	(4.79)	75.2	(5.17)
2003–04 to 2004–05.....	83.3	(2.06)	75.4	(5.97)	71.7	(3.62)	82.2	(2.30)	86.8	(2.28)	89.2	(9.17)	80.1	(4.15)	79.5	(6.07)
2007–08 to 2008–09.....	82.2	(1.69)	77.7	(8.33)	71.7	(6.44)	79.1	(3.43)	86.1	(2.92)	86.8	(2.17)	85.2	(4.21)	77.3	(8.23)
<b>Private projected</b>																
2012–13 to 2013–14.....	81.6	(†)	69.3	(†)	73.2	(†)	80.2	(†)	86.0	(†)	88.1	(†)	80.1	(†)	75.9	(†)
2013–14 to 2014–15.....	81.5	(†)	69.3	(†)	73.3	(†)	80.2	(†)	86.1	(†)	87.6	(†)	80.0	(†)	75.4	(†)
2014–15 to 2015–16.....	81.6	(†)	69.4	(†)	73.4	(†)	80.3	(†)	86.0	(†)	87.5	(†)	79.3	(†)	77.8	(†)
2015–16 to 2016–17.....	81.7	(†)	69.2	(†)	73.4	(†)	80.2	(†)	86.2	(†)	87.9	(†)	80.1	(†)	76.7	(†)
2016–17 to 2017–18.....	81.4	(†)	69.1	(†)	73.3	(†)	80.1	(†)	85.8	(†)	87.8	(†)	80.4	(†)	76.0	(†)
2017–18 to 2018–19.....	81.4	(†)	69.1	(†)	73.3	(†)	80.1	(†)	85.9	(†)	87.6	(†)	79.4	(†)	77.4	(†)
2018–19 to 2019–20.....	81.3	(†)	69.2	(†)	73.2	(†)	80.1	(†)	86.0	(†)	87.7	(†)	79.4	(†)	77.1	(†)
2019–20 to 2020–21.....	81.3	(†)	69.2	(†)	73.2	(†)	80.2	(†)	86.0	(†)	87.8	(†)	79.9	(†)	76.2	(†)
2020–21 to 2021–22.....	81.3	(†)	69.2	(†)	73.2	(†)	80.2	(†)	85.9	(†)	87.7	(†)	79.8	(†)	76.8	(†)
2021–22 to 2022–23.....	81.3	(†)	69.2	(†)	73.2	(†)	80.2	(†)	86.0	(†)	87.6	(†)	79.8	(†)	75.9	(†)
2022–23 to 2023–24.....	81.2	(†)	69.2	(†)	73.2	(†)	80.2	(†)	85.9	(†)	87.7	(†)	80.1	(†)	75.3	(†)
2023–24 to 2024–25.....	81.3	(†)	69.2	(†)	73.2	(†)	80.2	(†)	85.9	(†)	87.7	(†)	80.1	(†)	76.0	(†)

† Not applicable.

! Interpret with caution. The coefficient of variation (CV) for this estimate is 30 percent or greater.

‡ Reporting standards not met. The coefficient of variation (CV) for this estimate is 50 percent or greater.

NOTE: The continuation rate for teachers for each control of school (public schools and private schools) is the percentage of teachers in that control who continued teaching in the

same control from one year to the next. Standard errors appear in parentheses. The 2008–09 data are the most recent data available.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Teacher Follow up Survey (TFS), "Public School Teacher Questionnaire," 1994–95 through 2008–09 and "Private School Teacher Questionnaire," 1994–95 through 2008–09; and unpublished tabulations. (This tables was prepared February 2014.)

## A.3. HIGH SCHOOL GRADUATES

### Projections in this edition

This edition of *Projections of Education Statistics* presents projected trends in the number of high school graduates from 2012–13 to 2023–24. These projections were made using three models:

- » The *National High School Graduates Projection Model* was used to project the number of public high school graduates, the number of private high school graduates, and the total number of high school graduates for the nation.
- » The *State Public High School Graduates Projection Model* was used to project the number of public high school graduates for individual states and regions.
- » The *National Public High School Graduates by Race/Ethnicity Projection Model* was used to project the number of public high school graduates for the nation by race/ethnicity.

### Overview of approach

All the high school graduates models first calculated the number of high school graduates as a percentage of grade 12 enrollment based on historical data. Single exponential smoothing was used to project this percentage. The projected percentage was then applied to projections of grade 12 enrollment.

### Assumptions underlying this approach

The percentage of 12th-graders who graduate was assumed to remain constant at levels consistent with the most recent rates. This methodology assumes that past trends in factors affecting graduation rates, such as dropouts, migration, and public or private transfers, will continue over the forecast period. No specific assumptions were made regarding the dropout rate, retention rate, or the rate at which alternative credentials are awarded. The combined effect of these proportions is reflected implicitly in the graduate proportion. In addition to student behaviors, the projected number of graduates could be affected by changes in graduation requirements, but this is not considered in the projections in this report.

*For more details on the steps used for projections of high school graduates, see “Procedures used in all three high school graduates projection models,” below.*

### Procedures used in all three high school graduates projection models

The following steps were used to project the numbers of high school graduates:

**Step 1.** *For each year in the historic period, express the number of high school graduates as a percentage of grade 12 enrollment.* This value represents the approximate percentage of 12th graders who graduate. For information about the specific historical data and analysis periods used for the National High School Graduates Model, the State Public High School Graduates Model, and the National Public High School Graduates by Race/Ethnicity Model, see the description of the appropriate model, later in this section of appendix A.

**Step 2.** *Project the percentage of 12th-graders who graduate from step 1.* This percentage was projected using single exponential smoothing with a smoothing constant chosen to minimize the sum of squared forecast errors. Because single exponential smoothing produces a single forecast for all years in the forecast period, the same projected percentage of grade 12 enrollment was used for each year in the forecast period.

**Step 3.** *Calculate projections of the numbers of high school graduates.* For each year in the forecast period, the projected percentage from step 2 was applied to projections of grade 12 enrollment to yield projections of high school graduates.

### National High School Graduates Projection Model

This model was used to project the number of public high school graduates, the number of private high school graduates, and the total number of high school graduates for the nation. Public and private high school graduates were projected separately. The public and private projections were then summed to yield projections of the total number of high school graduates for the nation.

*For details of the procedures used to develop the projections, see “Procedures used in all three high school graduates projection models,” above.*

## Data used in the National High School Graduates Projection Model

**Public school data on graduates and grade 12 enrollment.** Data on public school 12th-grade enrollments and high school graduates from the NCES *Statistics of Public Elementary and Secondary School Systems* for 1972–73 to 1980–81 and the NCES Common Core of Data (CCD) for 1981–82 to 2009–10 were used to develop national projections of public high school graduates. Data for 2010–11 and 2011–12 became available after the projections were calculated.

**Private school data on graduates and grade 12 enrollment.** Data on private school 12th-grade enrollments for 1989–90 through 2010–11 and high school graduates for 1988–89 through 2009–10 were used to develop national projections of private high school graduates. The data were from the biennial NCES Private School Universe Survey (PSS) from 1989–90 to 2011–12 with data for 12th grade enrollment the same as the year of the survey and the data for high school graduates for the preceding year (i.e. the 2011–12 PSS presents high school graduates for 2010–11). Since the PSS is collected in the fall of odd-numbered years, data for missing years were estimated using data from the PSS. For 12th grade enrollment, estimates for missing years were linear interpolations of the prior year's and succeeding year's actual values. For high school graduates, estimates for the missing years were the interpolations of the high school graduates to estimated 12th grade enrollment percentages for the prior and succeeding years multiplied by the estimated enrollments for the current year.

**Public and private school enrollment projections for grade 12.** Projections of grade 12 enrollment in public schools and in private schools were used to develop projections of public high school graduates and private high school graduates, respectively. The grade 12 enrollment projections were made using the grade progression method. For more information, see Section A.1. Elementary and Secondary Enrollment, earlier in this appendix.

### Accuracy of national high school graduates projections

Mean absolute percentage errors (MAPEs) for projections of graduates from public high schools were calculated using the last 23 editions of *Projections of Education Statistics*, while MAPEs for projections of graduates from private high schools were calculated using the last 12 editions. Table C, below, shows MAPEs for both public and private school graduation projections.

**Table C. Mean absolute percentage errors (MAPEs) of projections of high school graduates, by lead time and control of school: 2014**

Statistic	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
Public high school graduates	1.0	1.1	1.8	2.3	2.2	2.6	3.2	4.1	4.7	5.0
Private high school graduates	0.9	1.2	1.6	2.8	4.1	5.2	3.3	5.6	4.6	4.9

NOTE: MAPEs for public high school graduates were calculated from the past 23 editions of *Projections of Education Statistics*. MAPEs for private high school graduates were calculated from the past 12 editions. Calculations were made using unrounded numbers. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)

For more information about MAPEs, see Section A.0. Introduction, earlier in appendix A.

## State Public High School Graduates Projection Model

This edition of *Projections of Education Statistics* contains projections of public high school graduates from 2010–11 to 2023–24 for each of the 50 states and the District of Columbia, as well as for each region of the country. The state projections of high school graduates were produced in two stages:

- » first, an initial set of projections for each state was produced; and
- » second, these initial projections were adjusted to sum to the national public school totals produced by the National High School Graduates Projection Model.

For each region, the high school graduate projections equaled the sum of high school graduate projections for the states within that region.

### **Initial set of state projections**

The same steps used to produce the national projections of high school graduates were used to produce an initial set of projections for each state and the District of Columbia. A separate smoothing constant, chosen to minimize the sum of squared forecast errors, was used to calculate the projected percentage of 12th grade enrollment for each jurisdiction.

*For details on the steps used to develop the initial sets of projections, see “Procedures used in all three high school graduate projection models,” earlier in this section of appendix A.*

### **Adjustments to the state projections**

The initial projections of state public high school graduates were adjusted to sum to the national projections of public high school graduates shown in table 9 on page 49. This was done through the use of ratio adjustments in which all the states’ high school graduate projections were multiplied by the ratio of the national public high school graduate projection to the sum of the state public high school graduate projections.

### **Data used in the State Public High School Graduates Projection Model**

**Public school data on graduates and grade 12 enrollment at the state level.** State-level data on public school 12th-grade enrollments and high school graduates from the NCES *Statistics of Public Elementary and Secondary School Systems, 1980–81* and the NCES Common Core of Data (CCD) for 1981–82 to 2009–10 were used to develop these projections.

**Public school projections for grade 12 enrollment at the state level.** State-level projections of grade 12 enrollment in public schools were used to develop the state-level projections of public high school graduates. The grade 12 enrollment projections were made using the grade progression method. For more information, see Section A.1. Elementary and Secondary Enrollment, earlier in this appendix.

### **Accuracy of state public high school graduate projections**

Mean absolute percentage errors (MAPEs) for projections of the number of public high school graduates by state were calculated using the last 18 editions of *Projections of Education Statistics*. Table A-14 on page 97 shows MAPEs for the number of high school graduates by state.

## **National Public High School Graduates by Race/Ethnicity Projection Model**

The projections of public high school graduates by race/ethnicity were produced in two stages:

- » first, an initial set of projections for each racial/ethnic group was produced; and
- » second, these initial projections were adjusted to sum to the national public school totals produced by the National High School Graduates Projection Model.

### **Initial set of projections by race/ethnicity**

The same steps used to produce the national projections of high school graduates were used to produce an initial set of projections for each of the following five racial/ethnic groups: White, Black, Hispanic, Asian/Pacific Islander, and American Indian/Alaska Native. For example, the number of White public high school graduates was projected as a percentage of White grade 12 enrollment in public schools. A separate smoothing constant, chosen to minimize the sum of squared forecast errors, was used to calculate the projected percentage of 12th-grade enrollment for each racial/ethnic group. This is the first edition of *Projections of Education Statistics* to include projections for high school graduates of Two or more races. To produce an initial set of projections for this racial/ethnic group, the 2011–12 ratio of 12th-grade enrollment to high school graduates of the group were multiplied by the 12th-grade enrollment projections of the group from table 6.

### **Adjustments to the projections by race/ethnicity**

The projections of public high school graduates by race/ethnicity were adjusted to sum to the national projections of public high school graduates shown in table 9 on page 49. This was done through the use of ratio adjustments in which all high school graduate projections by race/ethnicity were multiplied by the ratio of the national high school graduate projection to the sum of the high school projections by race/ethnicity.

### ***Data and imputations used in the Public High School Graduates by Race/Ethnicity Projection Model***

**Public school data on graduates and grade 12 enrollment by race/ethnicity.** Data on public high school graduates and grade 12 enrollment by race/ethnicity from the NCES Common Core of Data (CCD) for 1994–95 to 2009–10 were used to develop these projections. In those instances where states did not report their high school graduate data by race/ethnicity, the state-level data had to be examined and some imputations made. For example, in 1994, Arizona did not report high school graduate data by race/ethnicity. It did, however, report grade 12 enrollment numbers by race/ethnicity for that year. So, to impute the high school graduate numbers by race/ethnicity for that year, Arizona’s total number of high school graduates for 1994 was multiplied by the state’s 1994 racial/ethnic distribution for grade 12 enrollment.

**Public enrollment projections for grade 12 by race/ethnicity.** Projections of grade 12 enrollment in public schools by race/ethnicity were used to develop the projections of public high school graduates by race/ethnicity. The grade 12 enrollment projections were made using the grade progression method. For more information, see Section A.1. Elementary and Secondary Enrollment, earlier in this appendix.

### ***Accuracy of enrollment projections by race/ethnicity***

Because this is the fifth edition of *Projections of Education Statistics* to include projections of public high school graduates by race/ethnicity, the difference between the projections and actual data for a reasonable sample of time points cannot yet be determined.

**Table A-14. Mean absolute percentage errors (MAPEs) for the projected number of high school graduates in public schools, by lead time, region, and state: 2014**

Region and state	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
<b>United States</b> .....	<b>1.0</b>	<b>1.1</b>	<b>1.8</b>	<b>2.3</b>	<b>2.2</b>	<b>2.6</b>	<b>3.2</b>	<b>4.1</b>	<b>4.7</b>	<b>5.0</b>
<b>Region</b>										
Northeast .....	1.3	1.7	1.7	1.8	2.1	2.6	2.8	3.3	4.4	4.6
Midwest .....	1.1	0.8	1.5	1.5	2.0	2.4	2.2	2.5	3.0	3.0
South .....	1.3	1.6	2.6	2.4	2.5	3.3	3.9	5.1	5.9	6.7
West .....	1.9	2.2	2.6	3.1	2.6	2.8	2.2	2.3	3.2	3.0
<b>State</b>										
Alabama .....	3.4	3.2	2.6	4.6	4.8	5.6	6.2	6.0	7.0	7.3
Alaska .....	2.7	2.3	2.8	4.2	4.2	5.4	6.1	6.3	6.4	6.1
Arizona .....	8.7	9.2	11.7	13.6	11.8	11.3	13.4	9.5	10.3	12.3
Arkansas .....	1.5	1.7	2.2	2.7	2.9	2.6	2.4	2.8	2.4	2.9
California .....	2.7	2.6	3.1	3.8	4.0	4.4	4.4	3.8	5.0	5.0
Colorado .....	1.8	2.2	2.5	1.7	2.1	2.1	2.4	3.1	3.8	3.8
Connecticut .....	2.6	2.3	2.1	2.8	3.1	3.4	4.0	3.6	4.9	4.5
Delaware .....	2.1	2.9	3.7	4.8	3.4	4.4	4.9	5.9	6.4	7.2
District of Columbia .....	6.9	7.2	11.2	12.5	14.1	15.3	16.3	19.2	17.9	19.7
Florida .....	2.0	4.1	5.3	3.7	3.9	4.3	5.9	7.7	8.7	8.5
Georgia .....	2.2	3.1	3.9	5.4	6.9	7.9	8.5	8.7	9.0	8.4
Hawaii .....	3.7	4.2	5.1	6.1	9.0	9.8	12.2	13.5	15.6	17.0
Idaho .....	1.1	1.4	1.3	1.6	2.1	2.8	3.3	4.1	5.2	5.4
Illinois .....	2.9	2.2	3.3	4.0	4.1	3.6	5.7	4.3	5.3	7.1
Indiana .....	1.7	2.1	1.7	1.8	1.9	2.3	3.1	3.8	4.1	3.9
Iowa .....	1.5	1.4	2.0	1.9	2.8	2.8	2.6	2.8	2.2	2.3
Kansas .....	1.3	1.7	2.4	2.4	3.2	4.1	4.7	5.0	5.7	5.3
Kentucky .....	2.3	3.6	3.5	4.4	5.2	6.2	6.9	6.9	5.9	6.1
Louisiana .....	1.8	2.7	4.3	6.0	6.3	3.5	3.3	3.6	4.0	5.8
Maine .....	2.8	4.3	4.4	5.4	5.7	6.1	7.1	8.2	10.2	11.1
Maryland .....	1.4	1.2	1.9	1.4	1.6	1.6	2.3	2.8	2.9	4.2
Massachusetts .....	0.9	1.4	2.2	2.6	2.7	2.7	2.9	2.2	2.1	1.7
Michigan .....	3.4	4.3	5.1	6.1	6.3	6.3	7.9	9.4	9.5	9.0
Minnesota .....	2.3	1.4	1.5	1.7	2.1	2.2	2.8	3.5	4.0	4.5
Mississippi .....	1.3	1.7	2.2	2.4	3.1	3.6	3.6	4.0	4.1	3.2
Missouri .....	1.0	1.5	2.6	2.8	3.0	3.9	4.4	5.0	6.1	5.7
Montana .....	0.9	0.9	1.4	1.2	2.3	3.5	4.6	6.3	7.7	8.9
Nebraska .....	1.8	2.4	2.6	2.3	2.5	2.7	2.3	2.2	1.8	1.7
Nevada .....	4.9	6.6	8.8	9.5	8.6	10.0	10.1	10.6	11.5	12.6
New Hampshire .....	1.2	2.2	2.5	2.7	3.2	4.1	4.8	5.8	6.2	5.4
New Jersey .....	2.3	4.0	4.8	4.7	4.9	6.1	7.0	8.2	8.9	10.2
New Mexico .....	3.3	2.7	4.4	4.0	5.6	5.6	6.3	7.4	9.6	9.5
New York .....	1.9	3.2	3.4	4.3	4.8	5.5	6.4	7.3	8.2	8.3
North Carolina .....	2.1	2.3	3.9	3.7	4.1	4.5	4.8	5.7	6.2	8.3
North Dakota .....	1.3	1.9	2.1	2.2	2.3	2.5	3.3	3.7	4.7	6.3
Ohio .....	2.3	1.5	2.7	2.9	3.3	3.3	2.9	3.7	4.2	5.3
Oklahoma .....	1.4	1.5	1.8	1.6	2.1	2.7	3.2	3.2	3.2	3.4
Oregon .....	2.0	2.3	3.0	4.3	5.2	5.3	5.6	6.5	7.2	6.6
Pennsylvania .....	1.7	2.8	3.0	2.4	1.5	2.0	2.3	2.9	3.4	3.6
Rhode Island .....	1.4	1.3	2.0	1.9	2.2	3.2	4.8	5.6	5.5	4.9
South Carolina .....	1.8	3.5	3.0	4.5	5.2	6.2	6.6	7.0	7.1	7.5
South Dakota .....	2.4	3.1	3.2	5.3	8.4	9.3	10.6	12.0	14.4	16.2
Tennessee .....	4.8	7.1	9.2	11.5	13.9	15.3	15.3	15.0	13.6	11.7
Texas .....	2.7	3.7	4.9	5.6	5.6	6.9	8.1	10.2	11.9	13.7
Utah .....	5.2	6.4	5.2	5.3	5.2	4.6	3.9	4.1	3.7	2.3
Vermont .....	2.1	2.3	3.7	4.6	6.4	6.6	7.0	8.0	9.4	9.5
Virginia .....	1.5	2.2	2.9	3.7	4.0	4.1	3.9	3.7	4.2	4.8
Washington .....	2.0	2.1	2.9	2.3	2.3	3.2	3.3	3.5	4.7	4.3
West Virginia .....	0.7	1.1	1.8	1.9	2.1	3.1	3.5	4.8	5.1	5.1
Wisconsin .....	1.3	1.6	2.7	2.8	3.1	3.9	4.0	4.8	5.4	5.1
Wyoming .....	1.7	2.2	2.4	2.8	4.0	5.4	7.1	8.1	9.5	10.3

NOTE: Mean absolute percentage error (MAPE) is the average value over past projections of the absolute values of errors expressed in percentage terms. National MAPEs for public high school graduates were calculated using the last 23 editions of *Projections of Education Statistics* and state MAPEs were calculated using the last 18 editions of *Projections of*

*Education Statistics*. Calculations were made using unrounded numbers. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)

## A.4. EXPENDITURES FOR PUBLIC ELEMENTARY AND SECONDARY EDUCATION

### Projections in this edition

This edition of *Projections of Education Statistics* presents projections of total current expenditures for public elementary and secondary education, current expenditures per pupil in fall enrollment, and current expenditures per pupil in average daily attendance for 2011–12 through 2023–24.

As the source of the elementary and secondary private school data, the NCES Private School Universe Survey, does not collect data for current expenditures, there are no projections for private school current expenditures.

### Overview of approach

#### ***Theoretical and empirical background***

The Public Elementary and Secondary Education Current Expenditure Projection Model used in this report is based on the theoretical and empirical literature on the demand for local public services such as education.<sup>1</sup> Specifically, it is based on a type of model that has been called a median voter model. In brief, a median voter model posits that spending for each public good in the community (in this case, spending for education) reflects the preferences of the “median voter” in the community. This individual is identified as the voter in the community with the median income and median property value. The amount of spending in the community reflects the price of education facing the voter with the median income, as well as his income and tastes. There are competing models in which the level of spending reflects the choices of others in the community, such as government officials.

In a median voter model, the demand for education expenditures is typically linked to four different types of independent variables: (1) measures of the income of the median voter; (2) measures of intergovernmental aid for education going indirectly to the median voter; (3) measures of the price to the median voter of providing one more dollar of education expenditures per pupil; and (4) any other variables that may affect one’s tastes for education. The Public Elementary and Secondary Education Current Expenditure Projection Model contains independent variables of the first two types. It uses multiple linear regression analysis to define the relationships between these independent variables and current expenditures (the dependent variable).

#### **Elementary and Secondary Education Current Expenditure Projection Model**

Projections for current expenditures per pupil in fall enrollment were produced first. These projections were then used in calculating total expenditures and expenditures per pupil in average daily attendance.

#### ***Steps used to project current expenditures for public elementary and secondary education***

**Step 1.** *Produce projections of education revenue from state sources.* The equation for education revenue included an AR(1) term for correcting for autocorrelation and the following independent variables:

- » disposable income per capita in constant dollars; and
- » the ratio of fall enrollment to the population.

To estimate the model, it was first transformed into a nonlinear model and then the coefficients were estimated simultaneously by applying a Marquardt nonlinear least squares algorithm to the transformed equation.

**Step 2.** *Produce projections of current expenditures per pupil in fall enrollment.* The equation for current expenditures per pupil for fall enrollment included an AR(1) term for correcting for autocorrelation and the following independent variables:

- » disposable income per capita in constant dollars; and
- » education revenue from state sources per capita in constant dollars. This variable was projected in step 1.

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<sup>1</sup> For a discussion of the theory together with a review of some of the older literature, see Inman (1979). More recent empirical work includes Gamkhar and Oates (1996) and Mitias and Turnbull (2001).

To estimate the models, they were first transformed into nonlinear models and then the coefficients were estimated simultaneously by applying a Marquardt nonlinear least squares algorithm to the transformed equation.

*For details on the equations used in steps 1 and 2, the data used to estimate these equations, and their results, see “Data and equations used for projections of current expenditures for public elementary and secondary education,” below.*

**Step 3.** *Produce projections of total current expenditures.* Projections of total current expenditures were made by multiplying the projections for current expenditures per pupil in fall enrollment by projections for fall enrollment.

**Step 4.** *Produce projections of current expenditures per pupil in average daily attendance.* The projections for total current expenditures were divided by projections for average daily attendance to produce projections of current expenditures per pupil in average daily attendance.

All the projections were developed in 1982–84 dollars and then placed in 2012–13 dollars using the projections of the Consumer Price Index. Current-dollar projections were produced by multiplying the constant-dollar projections by projections for the Consumer Price Index. The Consumer Price Index and the other economic variables used in calculating the projections presented in this report were placed in school year terms rather than calendar year terms.

### **Data and equations used for projections of current expenditures for public elementary and secondary education**

**Data used to estimate the equations for revenue from state sources and current expenditures per pupil.** The following data for the period from 1973–74 to 2010–11 were used to estimate the equations:

- » Current expenditures and revenues from state sources—For 1973–74 and 1975–76, the current expenditures data came from *Statistics of State School Systems*, published by NCES. For 1974–75 and 1976–77, the current expenditures data came from *Revenues and Expenditures for Public Elementary and Secondary Education*, also published by NCES. For 1977–78 through 2010–11, these data came from the NCES Common Core of Data (CCD) and unpublished data. For most years, the sources for the past values of revenue from state sources were identical to the sources for current expenditures.
- » Disposable personal income per capita—Disposable personal income from the Bureau of Economic Analysis were divided by population data from the U.S. Census Bureau.
- » The ratio of fall enrollment to population data—Fall enrollment data from the CCD were divided by population data from the U.S. Census Bureau.

**Estimated equations and model statistics for revenue from state sources and current expenditures per pupil.** For the results of the equations, see table A-15 on page 101. In each equation, the independent variables affect the dependent variable in the expected way. In the revenues from state sources equation:

- » All other things being equal, as disposable income per capita increases so does local governments’ education revenue from state sources per capita; and
- » As enrollment increases relative to the population, so does the local governments’ education revenue from state sources per capita.
- » In the current expenditures per pupil equation: All other things being equal, as disposable income per capita increases, so does current expenditures per pupil; and
- » As local governments’ education revenue from state sources per capita increases, so does current expenditures per pupil.

**Projections for economic variables.** Projections for economic variables, including disposable income and the Consumer Price Index, were from the “U.S. Quarterly Model: 4th Quarter 2013 Short-Term Baseline Projections” from the economic consulting firm, IHS Global Inc. (see supplemental table B-6). This set of projections was IHS Global Inc.’s most recent set at the time the education projections in this report were produced. The values of all the variables from IHS Global Inc. were placed in school-year terms. The school-year numbers were calculated by taking the average of the last two quarters of one year and the first two quarters of the next year.

**Projections for fall enrollment.** The projections for fall enrollment are those presented in section 1 of this publication. The methodology for these projections is presented in Section A.1. Elementary and Secondary Enrollment, earlier in this appendix.

**Projections for population.** Population estimates for 1973 to 2011 and population projections for 2012 to 2023 from the U.S. Census Bureau were used to develop the public school current expenditure projections. The set of population projections used in this year’s *Projections of Education Statistics* are the Census Bureau’s 2012 National Population Projections (December 2012).



**Historical data for average daily attendance.** For 1973–74 and 1975–76, these data came from *Statistics of State School Systems*, published by NCES. For 1974–75 and 1976–77, the current expenditures data came from *Revenues and Expenditures for Public Elementary and Secondary Education*, also published by NCES. For 1977–78 through 2010–11, these data came from the CCD and unpublished NCES data.

**Projections for average daily attendance.** These projections were made by multiplying the projections for enrollment by the average value of the ratios of average daily attendance to enrollment from 1993–94 to 2010–11; this average value was approximately 0.94.

## Accuracy of projections

Mean absolute percentage errors (MAPEs) for projections of current expenditures for public elementary and secondary education were calculated using the last 23 editions of *Projections of Education Statistics*. Table D, below, shows the MAPEs for projections of current expenditures.

**Table D. Mean absolute percentage errors (MAPEs) of projections for total and per pupil current expenditures for public elementary and secondary education, by lead time: 2014**

Statistic	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
Total current expenditures	1.4	2.1	2.1	2.1	2.6	3.7	4.3	4.4	3.9	4.0
Current expenditures per pupil in fall enrollment	1.4	2.1	2.1	2.0	2.8	3.8	4.6	4.9	5.1	5.2

NOTE: Expenditures were in constant dollars based on the Consumer Price Index for all urban consumers, Bureau of Labor Statistics, U.S. Department of Labor. MAPEs for current expenditures were calculated using projections from the last 23 editions of *Projections of Education Statistics* containing current expenditure projections. Calculations were made using unrounded numbers. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)

*For more information about MAPEs, see Section A.0. Introduction, earlier in this appendix.*

**Table A-15. Estimated equations and model statistics for current expenditures per pupil in fall enrollment for public elementary and secondary schools, and education revenue from state sources per capita based on data from 1973–74 to 2010–11**

Dependent variable	Equation <sup>1</sup>	R <sup>2</sup>	Breusch-Godfrey Serial Correlation LM test statistic <sup>2</sup>	Time period
1	2	3	4	5
Current expenditures per pupil.....	ln(CUREXP) = 1.92 + 0.55ln(PCI) + 0.14ln(SGRANT) + 0.95AR(1) (1.010) (2.774) (1.697) (27.949)	0.997	3.25 (0.02)	1973–74 to 2010–11
Education revenue from state sources per capita...	ln(SGRANT) = 4.07 + 1.01ln(PCI) + 0.99ln(ENRPOP) + 0.74AR(1) (1.311) (10.740) (2.694) (6.665)	0.985	2.44 (0.30)	1973–74 to 2010–11

<sup>1</sup>AR(1) indicates that the model was estimated using least squares with the AR(1) process for correcting for first-order autocorrelation. To estimate the model, it was first transformed into a nonlinear model and then the coefficients were estimated simultaneously by applying a Marquardt nonlinear least squares algorithm to the transformed equation. For a general discussion of the problem of autocorrelation, and the method used to forecast in the presence of autocorrelation, see Judge, G., Hill, W., Griffiths, R., Lutkepohl, H., and Lee, T. (1985). *The Theory and Practice of Econometrics*. New York: John Wiley and Sons, pp. 315–318. Numbers in parentheses are *t*-statistics.

<sup>2</sup>The number in parentheses is the probability of the Chi-Square associated with the Breusch-Godfrey Serial Correlation LM Test. A *p* value greater than 0.05 implies that we do not reject the null hypothesis of no autocorrelation at the 5 percent significance level for a two-tailed test and 10 percent significance level for a one-tailed test (i.e., there is no

autocorrelation present). For an explanation of the Breusch-Godfrey Serial Correlation LM test statistic, see Greene, W. (2000). *Econometric Analysis*. New Jersey: Prentice-Hall.

NOTE: R<sup>2</sup> indicates the coefficient of determination.  
CUREXP = Current expenditures of public elementary and secondary schools per pupil in fall enrollment in constant 1982–84 dollars.

SGRANT = Local governments' education revenue from state sources, per capita, in constant 1982–84 dollars.

PCI = Disposable income per capita in constant 2000 chained dollars.

ENRPOP = Ratio of fall enrollment to the population.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Public Elementary and Secondary Education Current Expenditure Projection Model, 1973–74 through 2023–24. (This table was prepared February 2014.)

## A.5. ENROLLMENT IN POSTSECONDARY DEGREE-GRANTING INSTITUTIONS

### Projections in this edition

This edition of *Projections of Education Statistics* presents projections of enrollment in postsecondary degree-granting institutions for fall 2013 through fall 2023. Three different models were used to produce these enrollment projections:

- » The *Enrollment in Degree-Granting Institutions Projection Model* produced projections of enrollments by attendance status, level of student, level of institution, control of institution, sex, and age. It also produced projections of full-time-equivalent enrollments by level of student, level of institution, and control of institution.
- » The *Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model* produced projections of enrollments by race/ethnicity.
- » The *First-Time Freshmen Projection Model* produced projections of enrollments of first-time freshmen by sex.

### Overview of approach

#### **Basic features of the three degree-granting enrollment projection models**

The Enrollment in Degree-Granting Institutions Projection Model is the primary model for projecting enrollment in postsecondary degree-granting institutions. For this model, enrollment rates by attendance status and sex are projected for various age categories using either the pooled seemingly unrelated regression method or the pooled seemingly unrelated regression method with a first-order autocorrelation correction. These rates are applied to projections of populations of the same sex and age to produce projections of enrollment by attendance status, sex, and age. To project enrollments by level of student, level of institution, and control of institution, rates for these characteristics are projected using single exponential smoothing and applied to enrollment projections previously produced by the model.

The Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model takes an approach similar to that of the Enrollment in Degree-Granting Institutions Projection Model. Enrollment rates by attendance status, sex, and race/ethnicity are projected for the age categories using either the pooled seemingly unrelated regression method or the pooled seemingly unrelated regression method with a first-order autocorrelation correction. The resulting rates are iteratively corrected to ensure consistency with those projected by the Enrollment in Degree-Granting Institutions Projection Model. The adjusted rates are then applied to projections of populations of the same sex, age, and race/ethnicity.

The First-Time Freshmen Enrollment in Degree-Granting Institutions Projection Model uses single exponential smoothing to project the ratio of freshmen enrollment to undergraduate enrollment separately for males and for females. It then applies the projected ratios to the projections of undergraduate enrollment by sex that were produced by the Enrollment in Degree-Granting Institutions Projection Model.

#### **The Enrollment in Degree-Granting Institutions Projection Model**

The Enrollment in Degree-Granting Institutions Projection Model produces projections of enrollment counts by six levels of detail, as well as projections of full-time-equivalent enrollments by level of student, level of institution, and control of institution.

#### **Steps used in the Enrollment in Degree-Granting Institutions Projection Model**

**Step 1.** *Adjust age-specific enrollment counts from the U.S. Census Bureau to make them agree with the more highly aggregated NCES enrollment counts that do not include age.* The Enrollment in Degree-Granting Institutions Projection Model projects enrollments by six levels of detail: attendance status, level of student, level of institution, control of institution, sex, and age. While NCES does produce enrollment counts by the first five levels of detail, it does not produce data by the sixth level of detail, age, every year. However, the U.S. Census Bureau does produce age-specific enrollment counts.

In step 1, the age distributions from the Census Bureau counts for 1980 to 2012 were applied to the NCES counts to produce a set of enrollment data that breaks enrollments down by age while being consistent with NCES counts. Specifically, the most detailed level of Census Bureau data (by attendance status, level of student, level of institution, control of institution, sex, and age) was iteratively changed using proportions based on the more highly aggregated NCES enrollment numbers to ensure that all sums across this most detailed level of Census enrollment data equaled the more highly aggregated NCES enrollment totals that did not include age.

**Step 2.** *Calculate enrollment rates by attendance status, sex, and age category.* The enrollment data were broken up into 14 age categories, with separate age categories for individual ages 14 through 24 as well as for the age groups 25 to 29, 30 to 34, and 35 and over. For each of the 14 age categories, 4 enrollment rates were calculated—part-time male, full-time male, part-time female, and full-time female—resulting in a total of 56 enrollment rates. Each of the 56 enrollment rates was calculated by dividing the enrollment count for that combination of attendance status, sex, and age category by the total population for the corresponding combination of sex and age category. For each combination of attendance and sex, the enrollment rate for the oldest age category was calculated by dividing the enrollment count for those 35 and over by the total population for those 35 to 44.

**Step 3.** *Produce projections of enrollment rates by attendance status, sex, and age category.* Enrollment rates for most of the age groups were projected using multiple linear regression. However, because enrollment in postsecondary degree-granting institutions is negligible for ages 14, 15, and 16, these ages were not included in the multiple linear regression models. Instead, projections for individual ages 14, 15, and 16 were produced by double exponential smoothing.

The following 11 age categories were modeled: individual ages 17 through 24 and age groups 25 to 29, 30 to 34, and 35 and over. For each of these age categories, enrollment rates by attendance status and sex were produced using four pooled time-series models—one for each combination of attendance status and sex. Each model was pooled across age categories. Each equation contained two independent variables, which were measures of

- » disposable income; and
- » the unemployment rate.

Either the pooled seemingly unrelated regression method or the pooled seemingly unrelated regression method with a first-order autocorrelation correction was used to estimate each equation.

*For more details on the equations used in step 3, the data used to estimate these equations, and their results, see tables A-16 through A-18 on pages 109–111.*

**Step 4.** *Produce projections of enrollments by attendance status, sex, and age category.* For each combination of attendance status, sex, and age category, enrollment projections were produced by multiplying the projected enrollment rate for that combination by projections of the total population with the corresponding combination of sex and age category.

**Step 5.** *Add two additional levels of detail—level of student and level of institution—to the projected enrollments by attendance status, sex, and age category.* For this step, the 14 age categories used in the previous steps were collapsed into the following 8 categories: ages 14 to 16, 17, 18 and 19, 20 and 21, 22 to 24, 25 to 29, 30 to 34, and 35 and over. Step 5 can be broken into three parts:

First, the historic data were used to calculate the percentage distribution of enrollment by level of student and level of institution for each combination of attendance status, sex, and age category. Because it was assumed that there was no enrollment in 2-year institutions at the postbaccalaureate level, three combinations of student level and institution type were used: undergraduates at 4-year institutions, undergraduates at 2-year institutions, and postbaccalaureate students at 4-year institutions.

Second, for each combination of attendance status, sex, and age category, the percentage distribution by level of student and level of institution was projected using single exponential smoothing. A separate smoothing constant, chosen to minimize the sum of squared forecast errors, was used in each case. The percentages were then adjusted so the sum of the categories by attendance status, level of student, level of institution, sex, and age category would equal 100 percent.

*For the projected percentage distributions from step 5 and the actual 2012 distributions, see tables A-19 and A-20 on pages 112 and 113.*

Third, the projected distributions by level of student and type of institution were applied to the projected enrollments by attendance status, sex, and age category from step 4 to obtain the enrollment projections by attendance status, level of student, level of institution, sex, and age category.

**Step 6.** *Add the sixth level of detail—control of institutions—to the projected enrollments in postsecondary degree-granting institutions.* In this step, the data on enrollment by age category were not used. Control of institutions was added in the following manner:

First, the historic data were used to calculate the percentage of enrollment in public institutions for each combination of attendance status, level of student, level of institution, and sex.

Second, the percentages of enrollment in public institutions were projected using single exponential smoothing. A separate smoothing constant, chosen to minimize the sum of squared forecast errors, was used for each percentage.

*For the projected percentages from step 6 and the actual 2012 percentages, see table A-21 on page 114.*

Third, the projected percentages were applied to the projected enrollments in each corresponding enrollment combination to obtain projections for public institutions by attendance status, level of student, level of institution, and sex.

Fourth, the projected enrollments for public institutions were subtracted from the total to produce the projected enrollments for private institutions.

**Step 7. Produce projections of full-time-equivalent enrollment by level of student, level of institution, and control of institution.**

Full-time-equivalent enrollment represents total full-time and part-time enrollment as if it were enrollment on a full-time basis. It equals the sum of full-time enrollment plus the full-time-equivalent of part-time enrollment. Full-time-equivalent enrollment projections were produced in the following manner:

First, for each combination of level of student, level of institution, and control of institution, the historic data were used to calculate the full-time-equivalent of part-time enrollment as a percentage of part-time enrollment.

Second, for each combination of level of student, level of institution, and control of institution, the full-time equivalent of part-time enrollment as a percentage of part-time enrollment was projected using single exponential smoothing. A separate smoothing constant, chosen to minimize the sum of squared forecast errors, was used for each percentage.

Third, for each combination of level of student, level of institution, and control of institution, the projected percentages were applied to the projections of part-time enrollment to project the full-time equivalent of the part-time enrollment.

Fourth, the projections of full-time equivalents of part-time enrollment were added to projections of full-time enrollment to obtain projections of full-time-equivalent enrollment.

### **Data and equation results for the Enrollment in Degree-Granting Institutions Projection Model**

**Enrollment data for postsecondary degree-granting institutions.** Enrollment data for 1981 to 2012 by attendance status, level of student, level of institution, control of institution, and sex came from the NCES Integrated Postsecondary Education Data System (IPEDS). These are universe counts. The U.S. Census Bureau was the source for enrollment estimates for 1981 to 2012 by the characteristics listed above, as well as age of student.

**Population data and projections.** Population counts for 1980 to 2011 came from the U.S. Census Bureau. Population projections for 2012 to 2023 are the Census Bureau's 2012 National Population Projections of the population by sex and age (December 2012), ratio-adjusted to line up with the most recent historical estimates. For more information, see Section A.0. Introduction, earlier in this appendix.

**Projections for economic variables.** The economic variables used in developing these projections were from the "U.S. Quarterly Model: 4th Quarter 2013 Short-Term Baseline Projections" from the economic consulting firm, IHS Global Inc. This set of projections was IHS Global Inc.'s most recent set at the time the education projections in this report were produced.

**Data and results for the equations.** The following details for the equations are shown on pages 109–114:

- » Table A-16 shows enrollment rates by sex, attendance status, and age for fall 2012 and projected enrollment rates for fall 2018 and fall 2023.
- » Table A-17 shows the estimated equations and model statistics used to project enrollments for men by attendance status, and table A-18 shows the estimated equations and model statistics used to project enrollment rates for women by attendance status. The particular equations shown were selected on the basis of their statistical properties, such as coefficients of determination ( $R^2$ s), the  $t$ -statistics of the coefficients, the Durbin-Watson statistic, the Breusch-Godfrey Serial Correlation LM test statistic, and residual plots.
- » Table A-19 shows actual and projected percentage distributions of full-time students, and table A-20 shows actual and projected percentage distributions of part-time students.
- » Table A-21 shows actual and projected data for enrollment in public degree-granting institutions as a percentage of total enrollment by sex, attendance status, student level, and level of institution.

## Accuracy of projections for the Enrollment in Degree-Granting Institutions Projection Model

Mean absolute percentage errors (MAPEs) for enrollment in degree-granting institutions were calculated using the last 16 editions of *Projections of Education Statistics*. Table E, below, shows MAPEs for key projections of the Enrollment in Degree-Granting Institutions Model.

**Table E. Mean absolute percentage errors (MAPEs) of projected enrollment in postsecondary degree-granting institutions, by lead time, sex, and level of institution: 2014**

Statistic	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
<b>Total enrollment</b>	<b>1.6</b>	<b>2.6</b>	<b>3.6</b>	<b>4.9</b>	<b>5.8</b>	<b>6.6</b>	<b>7.7</b>	<b>9.1</b>	<b>11.5</b>	<b>12.4</b>
Men	1.6	3.0	4.0	5.6	6.6	7.5	8.7	9.8	11.8	13.0
Women	1.8	2.7	3.7	4.5	5.1	5.9	6.9	8.6	11.2	11.9
4-year institutions	1.6	2.9	4.2	5.7	6.7	7.7	8.9	10.6	13.1	14.5
2-year institutions	2.4	3.5	4.3	4.6	4.8	4.8	5.4	6.4	8.7	9.0

NOTE: MAPEs for degree-granting institution enrollments were calculated using the last 16 editions of *Projections of Education Statistics*.

Calculations were made using unrounded numbers. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)

For more information about MAPEs, see Section A.0. Introduction, earlier in this appendix.

## The Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model

The Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model projects enrollments in degree-granting institutions by attendance status, sex, age, and race/ethnicity. The following groups are projected in this model:

- » White;
- » Black;
- » Hispanic;
- » Asian/Pacific Islander;
- » American Indian/Alaska Native; and
- » nonresident alien.

See the glossary for definitions of the five racial/ethnic categories and the nonresident alien category. (The race/ethnicity of nonresident aliens is unknown, but they are considered a separate group for purposes of this analysis.)

### Steps used in the Degree-Granting Institutions by Race/Ethnicity Projection Model

**Step 1.** Adjust U.S. Census Bureau enrollment counts by attendance status, sex, age, and race/ethnicity to make them sum to NCES enrollment counts by attendance status, sex, and race/ethnicity. For 1981 to 2012, the most detailed levels of Census Bureau enrollment data (by enrollment status, sex, age, and race/ethnicity) were iteratively changed using proportions that were based on the more highly aggregated NCES enrollment numbers to ensure that the sums across these most detailed levels of enrollment data equaled the more highly aggregated NCES enrollment numbers that did not include age.

**Step 2.** Calculate enrollment rates by attendance status, sex, age category, and race/ethnicity. The enrollment data were broken up into 14 age categories, with separate age categories for individual ages 14 through 24 as well as for the age groups 25 to 29, 30 to 34, and 35 and over. For each of the 14 age categories, enrollment rates were calculated for each combination of attendance status, sex, and the six racial/ethnic groups, resulting in a total of 336 enrollment rates. Each of the 336 enrollment rates was calculated by dividing the enrollment count for that combination of attendance status, sex, age category, and race/ethnicity by the total population for the corresponding combination of sex, age category, and race/ethnicity. For each combination of attendance status, sex and racial/ethnic group, the enrollment rate for the oldest age category was calculated by dividing the enrollment count for those 35 and over by the total population for those 35 to 44.

**Step 3.** *Produce projections of enrollment rates by attendance status, sex, age category, and race/ethnicity.* Enrollment rates for most of the age groups and racial/ethnic groups were projected using multiple linear regression. However, there were several exceptions:

- » Due to negligible enrollments for ages 14, 15, and 16, these ages were not included in the multiple linear regression models. Instead, projections of enrollment rates for individual ages 14, 15, and 16 were produced by single exponential smoothing.
- » Due to the relatively large fluctuations in the historical enrollment rates resulting from small sample sizes, American Indian/Alaska Native enrollments were projected using single exponential smoothing.
- » Since there were no applicable population counts to compute enrollment rates for nonresident aliens, their enrollments were projected using patterns in recent historical growth.

Four racial/ethnic groups were modeled: White, Black, Hispanic, and Asian/Pacific Islander. Eleven age categories were modeled: individual ages 17 through 24 and age groups 25 to 29, 30 to 34, and 35 to 44. For each of the age categories, projected enrollment rates by attendance status, sex, and race/ethnicity were produced using 16 pooled time-series models—one for each combination of attendance status, sex, and the four racial/ethnic groups. Each equation included variables measuring

- » recent trends;
- » economic conditions (such as disposable income); and
- » demographic changes.

*For more information on the equations used to project enrollment rates for the combinations of attendance status, sex, and race/ethnicity, see tables A-22 through A-29, under “Data and equations used for the Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model,” below.*

The final set of projected rates by attendance status, sex, age, and race/ethnicity were controlled to enrollment rates by attendance status, sex, and age produced by the Enrollment in Degree-Granting Institutions Projection Model to ensure consistency across models.

**Step 4.** *Produce projections of enrollments by attendance status, sex, age category, and race/ethnicity.* For each combination of attendance status, sex, age category, and race/ethnicity, enrollment projections were produced by multiplying the projected enrollment rate for that combination by projections of the total population with the corresponding combination of sex, age category, and race/ethnicity.

### **Data and equations used for the Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model**

**Enrollment data for degree-granting institutions by race/ethnicity.** Enrollment data for 1981 to 2012 by attendance status, sex, and race/ethnicity came from the NCES Integrated Postsecondary Education Data System (IPEDS). These are universe counts. The U.S. Census Bureau, Current Population Survey was the source for enrollment estimates for 1981 to 2012 by the characteristics listed above, as well as age of student.

**Population data and projections by race/ethnicity.** Population counts for 1981 to 2011 came from the U.S. Census Bureau, Population Estimates series. Population projections for 2012 to 2023 are the Census Bureau’s 2012 National Population Projections of the population by sex, age and race/ethnicity (December 2012), ratio-adjusted to line up with most recent historical estimates.

**Projections for economic variables.** The economic variables used in developing these projections were from the “U.S. Quarterly Model: 4th Quarter 2013 Short-Term Baseline Projections” from the economic consulting firm, IHS Global Inc. This set of projections was IHS Global Inc.’s most recent set at the time the education projections in this report were produced.

**Estimated equations and model statistics.** Tables A-22 through A-29 show the estimated equations and model statistics used to project enrollment rates for the various combinations of attendance status, sex, and race/ethnicity.

## Accuracy of projections for the Degree-Granting Institutions by Race/Ethnicity Projection Model

Mean absolute percentage errors (MAPEs) for enrollment in degree-granting institutions by race/ethnicity were calculated using the last eight editions of *Projections of Education Statistics*. Table F, below, shows MAPEs for key projections of the Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model.

**Table F. Mean absolute percentage errors (MAPEs) of projected enrollment in postsecondary degree-granting institutions, by lead time and race/ethnicity: 2014**

Statistic	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
<b>Total enrollment</b>	<b>1.6</b>	<b>2.6</b>	<b>3.6</b>	<b>4.9</b>	<b>5.8</b>	<b>6.6</b>	<b>7.7</b>	<b>9.1</b>	<b>11.5</b>	<b>12.4</b>
White	1.6	2.6	3.5	4.1	5.0	4.7	3.0	2.1	—	—
Black	3.3	7.8	10.6	14.9	17.8	18.4	17.3	15.4	—	—
Hispanic	4.4	7.9	12.8	17.2	20.4	22.3	23.1	24.1	—	—
Asian/Pacific Islander	2.4	5.2	6.0	6.1	4.8	2.2	3.5	1.1	—	—
American Indian/Alaska Native	5.6	6.1	6.8	7.5	10.5	12.0	17.0	22.1	—	—
Nonresident alien	2.3	4.1	6.7	8.6	12.2	14.2	11.6	6.6	—	—

— Not available.

NOTE: MAPEs for total postsecondary degree-granting institution enrollments were calculated using the last 16 editions of *Projections of Education Statistics*, and MAPEs for degree-granting institution enrollments by race/ethnicity were calculated using the last eight editions of *Projections of Education Statistics*. Calculations were made using unrounded numbers. Some data have been revised from previously published figures. Race categories exclude persons of Hispanic ethnicity.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)

## The First-Time Freshmen Enrollment in Degree-Granting Institutions Projection Model

The First-Time Freshmen Enrollment in Degree-Granting Institutions Projection Model produced projections of first-time freshmen enrollment in degree-granting institutions by sex.

### Steps used in the First-Time Freshmen Enrollment in Degree-Granting Institutions Projection Model

The projections were produced in the following manner:

**Step 1.** Calculate the ratio of first-time freshmen enrollment to undergraduate enrollment. For 1975 to 2012, the ratio of first-time freshmen enrollment to undergraduate enrollment was calculated for males and females.

**Step 2.** Project the ratio of first-time freshmen enrollment to undergraduate enrollment. The percentages of undergraduate enrollment for both males and females were projected using single exponential smoothing. A separate smoothing constant, chosen to minimize the sum of squared forecast errors, was used for each percentage.

**Step 3.** Apply the projected ratio to projected undergraduate enrollment. The projected ratios were applied to projections of undergraduate enrollment by sex from the Enrollment in Degree-Granting Institutions Model to yield projections of first-time freshmen enrollment.

### Assumptions underlying this method

This method assumes that the future pattern in the trend of first-time freshmen enrollment will be the same as that for undergraduate enrollment.

### Data used in the First-Time Freshmen Enrollment in Degree-Granting Institutions Projection Model

**Undergraduate and freshmen enrollment data for degree-granting institutions.** Undergraduate and freshmen enrollment data by sex for 1975 to 2012 came from the NCES Integrated Postsecondary Education Data System (IPEDS).

**Projections of undergraduate enrollment.** Projections of undergraduate enrollment by sex came from the Enrollment in Degree-Granting Institutions Model, discussed earlier in this section of appendix A.

### Accuracy of projections for the First-Time Freshmen Enrollment Projection Model

Mean absolute percentage errors (MAPEs) for enrollment in degree-granting institutions by race/ethnicity were calculated using the last five editions of *Projections of Education Statistics*. Table G, below, shows MAPEs for key projections of the First-Time Freshmen Enrollment in Degree-Granting Institutions Model.



**Table G. Mean absolute percentage errors (MAPEs) of projected first-time freshmen enrollment in postsecondary degree-granting institutions, by lead time and sex: 2014**

Statistic	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
<b>Total first-time freshmen enrollment</b>	<b>4.6</b>	<b>6.5</b>	<b>5.6</b>	<b>3.8</b>	<b>0.8</b>	—	—	—	—	—
Men	4.6	6.7	5.6	3.7	2.9	—	—	—	—	—
Women	4.6	6.3	5.6	4.0	1.0	—	—	—	—	—

— Not available.

NOTE: MAPEs for first-time freshmen enrollment in postsecondary degree-granting institutions were calculated using the last five editions of *Projections of Education Statistics*. Calculations were made using unrounded numbers. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)

**Table A-16. Actual and projected numbers for enrollment rates of all students at postsecondary degree-granting institutions, by sex, attendance status and age: Fall 2012, fall 2018, and fall 2023**

Sex, attendance status, and age	Actual 2012	Projected	
		2018	2023
1	2	3	4
<b>Men</b>			
Full-time			
16 years old .....	0.5	0.7	0.7
17 years old .....	3.0	3.3	3.5
18 years old .....	27.9	28.9	30.4
19 years old .....	37.5	39.7	41.3
20 years old .....	34.0	36.0	37.5
21 years old .....	32.7	34.6	36.1
22 years old .....	22.7	24.2	25.4
23 years old .....	17.4	18.7	19.7
24 years old .....	14.2	15.4	16.2
25 to 29 years old .....	6.3	6.8	7.3
30 to 34 years old .....	2.7	2.9	3.1
35 to 44 years old .....	1.6	1.7	1.9
Part-time			
16 years old .....	0.1	0.1	0.1
17 years old .....	0.9	1.0	1.0
18 years old .....	4.8	4.9	5.0
19 years old .....	8.2	8.2	8.3
20 years old .....	10.0	10.0	10.1
21 years old .....	10.9	11.0	11.1
22 years old .....	10.2	10.4	10.6
23 years old .....	9.8	9.9	10.2
24 years old .....	8.1	8.3	8.5
25 to 29 years old .....	5.7	5.8	6.0
30 to 34 years old .....	3.4	3.4	3.5
35 to 44 years old .....	3.8	4.0	4.1
<b>Women</b>			
Full-time			
16 years old .....	0.5	0.7	0.7
17 years old .....	3.0	3.6	4.0
18 years old .....	38.6	42.2	44.6
19 years old .....	46.7	49.9	52.1
20 years old .....	46.0	49.1	51.3
21 years old .....	40.1	43.2	45.4
22 years old .....	25.9	29.5	31.6
23 years old .....	18.9	20.7	22.3
24 years old .....	15.1	17.0	18.4
25 to 29 years old .....	7.5	8.6	9.4
30 to 34 years old .....	4.1	4.7	5.2
35 to 44 years old .....	3.2	3.7	4.1
Part-time			
16 years old .....	0.2	#	#
17 years old .....	0.9	1.1	1.2
18 years old .....	7.5	8.2	8.6
19 years old .....	11.6	12.4	12.8
20 years old .....	11.3	12.2	12.6
21 years old .....	12.1	13.1	13.7
22 years old .....	11.4	9.9	10.5
23 years old .....	10.3	13.5	14.4
24 years old .....	10.5	11.8	12.7
25 to 29 years old .....	9.3	10.5	11.4
30 to 34 years old .....	5.5	6.1	6.7
35 to 44 years old .....	7.4	8.2	8.9

# Rounds to zero.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Spring 2012; Enrollment in Degree-Grant-

ing Institutions Projection Model, 1980 through 2023; and U.S. Department of Commerce, Census Bureau, Current Population Reports, "Social and Economic Characteristics of Students," 2012. (This table was prepared January 2014.)

**Table A-17. Estimated equations and model statistics for full-time and part-time enrollment rates of men at postsecondary degree-granting institutions based on data from 1981 to 2012**

Independent variable	Coefficient	Standard error	t-statistic	R <sup>2</sup>	D.W. statistic		
1	2	3	4	5	6		
<b>Full-time</b>							
Intercept term for 17-year-olds.....	-7.68	0.331	-23.24	1.00	1.99*		
Intercept term for 18-year-olds.....	-4.96	0.345	-14.38				
Intercept term for 19-year-olds.....	-4.45	0.286	-15.56				
Intercept term for 20-year-olds.....	-4.51	0.289	-15.64				
Intercept term for 21-year-olds.....	-4.65	0.287	-16.20				
Intercept term for 22-year-olds.....	-5.09	0.290	-17.60				
Intercept term for 23-year-olds.....	-5.57	0.288	-19.37				
Intercept term for 24-year-olds.....	-5.90	0.307	-19.23				
Intercept term for 25- to 29-year-olds .....	-6.61	0.294	-22.50				
Intercept term for 30- to 34-year-olds .....	-7.58	0.317	-23.87				
Intercept term for 35- to 44-year-olds .....	-8.07	0.318	-25.40				
Log of three-period weighted average of per capita disposable income in 2000 dollars, using the present period and the previous two periods .....	0.71	0.047	15.06				
Log age-specific unemployment rate for men .....	0.21	0.022	9.81				
Autocorrelation coefficient for 17-year-olds.....	0.87	0.044	19.99				
Autocorrelation coefficient for 18-year-olds.....	0.92	0.041	22.50				
Autocorrelation coefficient for 19-year-olds.....	0.51	0.132	3.87				
Autocorrelation coefficient for 20-year-olds.....	0.66	0.107	6.14				
Autocorrelation coefficient for 21-year-olds.....	0.61	0.122	5.03				
Autocorrelation coefficient for 22-year-olds.....	0.75	0.105	7.11				
Autocorrelation coefficient for 23-year-olds.....	0.67	0.120	5.56				
Autocorrelation coefficient for 24-year-olds.....	0.86	0.095	8.99				
Autocorrelation coefficient for 25- to 29-year-olds ...	0.76	0.081	9.34				
Autocorrelation coefficient for 30- to 34-year-olds ...	0.89	0.062	14.29				
Autocorrelation coefficient for 35- to 44-year-olds ...	0.86	0.067	12.93				
<b>Part-time</b>							
Intercept term for 17-year-olds.....	-7.96	0.340	-23.42			0.98	1.92*
Intercept term for 18-year-olds.....	-5.62	0.299	-18.76				
Intercept term for 19-year-olds.....	-5.09	0.362	-14.05				
Intercept term for 20-year-olds.....	-5.04	0.312	-16.15				
Intercept term for 21-year-olds.....	-5.06	0.342	-14.78				
Intercept term for 22-year-olds.....	-5.33	0.307	-17.38				
Intercept term for 23-year-olds.....	-5.39	0.295	-18.24				
Intercept term for 24-year-olds.....	-5.45	0.295	-18.47				
Intercept term for 25- to 29-year-olds .....	-5.86	0.312	-18.81				
Intercept term for 30- to 34-year-olds .....	-6.41	0.311	-20.64				
Intercept term for 35- to 44-year-olds .....	-6.28	0.298	-21.09				
Log of three-period weighted average of per capita disposable income in 2000 dollars, using the present period and the previous two periods .....	0.44	0.047	9.37				
Log unemployment rate .....	0.17	0.022	7.83				
Autocorrelation coefficient for 17-year-olds.....	0.68	0.107	6.31				
Autocorrelation coefficient for 18-year-olds.....	0.63	0.089	7.08				
Autocorrelation coefficient for 19-year-olds.....	0.90	0.060	15.03				
Autocorrelation coefficient for 20-year-olds.....	0.81	0.076	10.63				
Autocorrelation coefficient for 21-year-olds.....	0.89	0.087	10.23				
Autocorrelation coefficient for 22-year-olds.....	0.74	0.099	7.52				
Autocorrelation coefficient for 23-year-olds.....	0.44	0.099	4.48				
Autocorrelation coefficient for 24-year-olds.....	0.43	0.108	3.96				
Autocorrelation coefficient for 25- to 29-year-olds ...	0.85	0.048	17.77				
Autocorrelation coefficient for 30- to 34-year-olds ...	0.91	0.043	20.97				
Autocorrelation coefficient for 35- to 44-year-olds ...	0.61	0.090	6.80				

\*  $p < .05$ .  
 NOTE:  $R^2$  = Coefficient of determination. D.W. statistic = Durbin-Watson statistic, a test for autocorrelation among regression residuals. For more details see Johnston, J., and Dinardo, J. (1996). *Econometric Methods*. New York: McGraw-Hill. The regression method used to estimate the full-time and part-time equations was the pooled seemingly unrelated regression method with a first-order autocorrelation correction. The time period used to estimate both

equations is from 1981 to 2012, and the number of observations is 352 after the correction for autocorrelation. For additional information, see Intriligator, M.D. (1978). *Econometric Models, Techniques, & Applications*. New Jersey: Prentice-Hall, Inc., pp. 165–173.  
 SOURCE: U.S. Department of Education, National Center for Education Statistics, Enrollment in Degree-Granting Institutions Projection Model, 1980 through 2023. (This table was prepared January 2014.)

**Table A-18. Estimated equations and model statistics for full-time and part-time enrollment rates of women at postsecondary degree-granting institutions based on data from 1980 to 2012**

Independent variable	Coefficient	Standard error	t-statistic	R <sup>2</sup>	D.W. statistic
1	2	3	4	5	6
<b>Full-time</b>					
Intercept term for 17-year-olds.....	-9.52	0.151	-62.87	1.00	1.22~
Intercept term for 18-year-olds.....	-6.71	0.132	-50.90		
Intercept term for 19-year-olds.....	-6.56	0.126	-51.96		
Intercept term for 20-year-olds.....	-6.64	0.129	-51.60		
Intercept term for 21-year-olds.....	-6.86	0.129	-53.26		
Intercept term for 22-year-olds.....	-7.51	0.130	-57.68		
Intercept term for 23-year-olds.....	-7.99	0.132	-60.36		
Intercept term for 24-year-olds.....	-8.38	0.133	-62.96		
Intercept term for 25- to 29-year-olds .....	-8.94	0.137	-65.25		
Intercept term for 30- to 34-year-olds .....	-9.64	0.135	-71.24		
Intercept term for 35- to 44-year-olds .....	-9.86	0.136	-72.66		
Log of three-period weighted average of per capita disposable income in 2000 dollars, using the present period and the previous two periods .....	1.16	0.022	52.63		
Log age-specific unemployment rate for women .....	0.33	0.030	10.99		
<b>Part-time</b>					
Intercept term for 17-year-olds.....	-11.42	0.497	-23.00	0.99	1.86*
Intercept term for 18-year-olds.....	-8.78	0.325	-27.02		
Intercept term for 19-year-olds.....	-8.22	0.310	-26.51		
Intercept term for 20-year-olds.....	-8.37	0.305	-27.45		
Intercept term for 21-year-olds.....	-8.39	0.303	-27.72		
Intercept term for 22-year-olds.....	-8.58	0.303	-28.34		
Intercept term for 23-year-olds.....	-8.64	0.304	-28.46		
Intercept term for 24-year-olds.....	-8.71	0.306	-28.48		
Intercept term for 25- to 29-year-olds .....	-9.11	0.311	-29.31		
Intercept term for 30- to 34-year-olds .....	-9.61	0.314	-30.55		
Intercept term for 35- to 44-year-olds .....	-9.28	0.329	-28.24		
Log of three-period weighted average of per capita disposable income in 2000 dollars, using the present period and the previous two periods .....	1.03	0.048	21.35		
Log unemployment rate .....	0.17	0.022	7.83		
Autocorrelation coefficient for 17-year-olds.....	0.83	0.062	13.42		
Autocorrelation coefficient for 18-year-olds.....	0.80	0.073	10.96		
Autocorrelation coefficient for 19-year-olds.....	0.78	0.070	11.19		
Autocorrelation coefficient for 20-year-olds.....	0.63	0.108	5.83		
Autocorrelation coefficient for 21-year-olds.....	0.45	0.119	3.80		
Autocorrelation coefficient for 22-year-olds.....	0.47	0.094	5.00		
Autocorrelation coefficient for 23-year-olds.....	0.48	0.083	5.73		
Autocorrelation coefficient for 24-year-olds.....	0.73	0.059	12.43		
Autocorrelation coefficient for 25- to 29-year-olds ...	0.87	0.037	23.49		
Autocorrelation coefficient for 30- to 34-year-olds ...	0.90	0.024	37.70		
Autocorrelation coefficient for 35- to 44-year-olds ...	0.90	0.026	33.98		

\*  $p < .05$ .

~ Inconclusive

NOTE:  $R^2$  = Coefficient of determination. D.W. statistic = Durbin-Watson statistic, a test for autocorrelation among regression residuals. For more details see Johnston, J., and Dinardo, J. (1996). *Econometric Methods*. New York: McGraw-Hill. The regression method used to estimate the full-time and part-time equations was the pooled seemingly unrelated regression method with a first-order autocorrelation correction. The time period used to estimate the full-time equation was from 1980 to 2012 and that for the part-time equation was from 1981 to

2012. The number of observations for the full-time equation is 363 and the number of observations for the part-time equation, after the correction for autocorrelation, is 352. For additional information, see Intriligator, M.D. (1978). *Econometric Models, Techniques, & Applications*. New Jersey: Prentice-Hall, Inc., pp. 165–173.  
SOURCE: U.S. Department of Education, National Center for Education Statistics, Enrollment in Degree-Granting Institutions Projection Model, 1980 through 2023. (This table was prepared January 2014.)

**Table A-19. Actual and projected percentages of full-time students at postsecondary degree-granting institutions, by sex, age group, student level, and level of institution: Fall 2012, and fall 2013 through fall 2023**

Age group, student level, and institution level	Men		Women	
	Actual 2012	Projected 2013 through 2023	Actual 2012	Projected 2013 through 2023
1	2	3	4	5
<b>18 and 19 years old</b>				
Undergraduate, 4-year institutions .....	65.6	66.7	70.7	70.8
Undergraduate, 2-year institutions .....	34.0	32.9	29.0	28.9
Postbaccalaureate, 4-year institutions .....	0.4	0.4	0.3	0.3
<b>20 and 21 years old</b>				
Undergraduate, 4-year institutions .....	76.9	75.2	77.9	78.9
Undergraduate, 2-year institutions .....	21.3	23.0	20.1	18.8
Postbaccalaureate, 4-year institutions .....	1.8	1.8	2.0	2.3
<b>22 to 24 years old</b>				
Undergraduate, 4-year institutions .....	63.7	66.1	60.8	62.0
Undergraduate, 2-year institutions .....	16.7	14.5	17.3	16.6
Postbaccalaureate, 4-year institutions .....	19.6	19.4	21.9	21.4
<b>25 to 29 years old</b>				
Undergraduate, 4-year institutions .....	41.8	42.8	40.5	41.0
Undergraduate, 2-year institutions .....	19.7	18.4	25.6	24.4
Postbaccalaureate, 4-year institutions .....	38.5	38.8	33.9	34.6
<b>30 to 34 years old</b>				
Undergraduate, 4-year institutions .....	44.4	46.7	49.2	47.1
Undergraduate, 2-year institutions .....	23.1	23.0	28.3	30.0
Postbaccalaureate, 4-year institutions .....	32.4	30.3	22.5	23.0
<b>35 years and over</b>				
Undergraduate, 4-year institutions .....	48.0	41.2	41.7	40.2
Undergraduate, 2-year institutions .....	22.1	25.3	31.7	29.4
Postbaccalaureate, 4-year institutions .....	29.9	33.5	26.6	30.4

NOTE: Detail may not sum to totals because of rounding.  
 SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Spring 2013; Enrollment in Degree-

Granting Institutions Projection Model, 1980 through 2023; and U.S. Department of Commerce, Census Bureau, Current Population Reports, "Social and Economic Characteristics of Students," 2012. (This table was prepared January 2014.)

**Table A-20. Actual and projected percentages of part-time students at postsecondary degree-granting institutions, by sex, age group, student level, and level of institution: Fall 2012, and fall 2013 through fall 2023**

Age, student level, and level of institution	Men		Women	
	Actual 2012	Projected 2013 through 2023	Actual 2012	Projected 2013 through 2023
1	2	3	4	5
<b>18 and 19 years old</b>				
Undergraduate, 4-year institutions .....	23.2	24.3	22.1	17.8
Undergraduate, 2-year institutions .....	75.9	74.9	77.5	81.7
Postbaccalaureate, 4-year institutions .....	0.8	0.8	0.4	0.5
<b>20 and 21 years old</b>				
Undergraduate, 4-year institutions .....	25.1	27.4	26.7	31.3
Undergraduate, 2-year institutions .....	74.2	71.9	72.0	67.4
Postbaccalaureate, 4-year institutions .....	0.8	0.7	1.3	1.3
<b>22 to 24 years old</b>				
Undergraduate, 4-year institutions .....	31.9	33.6	34.4	36.1
Undergraduate, 2-year institutions .....	59.0	57.5	54.3	52.7
Postbaccalaureate, 4-year institutions .....	9.1	8.9	11.3	11.2
<b>25 to 29 years old</b>				
Undergraduate, 4-year institutions .....	30.7	32.1	35.6	31.4
Undergraduate, 2-year institutions .....	50.6	50.0	44.3	48.5
Postbaccalaureate, 4-year institutions .....	18.7	17.9	20.1	20.1
<b>30 to 34 years old</b>				
Undergraduate, 4-year institutions .....	38.4	35.1	32.8	33.2
Undergraduate, 2-year institutions .....	40.8	42.7	44.8	44.7
Postbaccalaureate, 4-year institutions .....	20.9	22.2	22.4	22.1
<b>35 years and over</b>				
Undergraduate, 4-year institutions .....	30.0	31.2	25.5	28.4
Undergraduate, 2-year institutions .....	41.1	38.7	49.4	46.5
Postbaccalaureate, 4-year institutions .....	28.8	30.1	25.1	25.1

NOTE: Detail may not sum to totals because of rounding. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Spring 2013; Enrollment in Degree-

Granting Institutions Projection Model, 1980 through 2023; and U.S. Department of Commerce, Census Bureau, Current Population Reports, "Social and Economic Characteristics of Students," 2012. (This table was prepared January 2014.)

**Table A-21. Actual and projected enrollment in public postsecondary degree-granting institutions as a percentage of total postsecondary enrollment, by sex, attendance status, student level, and level of institution: Fall 2012, and fall 2013 through fall 2023**

Attendance status, student level, and level of institution	Men		Women	
	Actual 2012	Projected 2013 through 2023	Actual 2012	Projected 2013 through 2023
Full-time, undergraduate, 4-year institutions.....	64.9	65.3	60.4	61.1
Part-time, undergraduate, 4-year institutions.....	66.2	66.4	62.1	62.6
Full-time, undergraduate, 2-year institutions.....	90.6	91.7	85.7	86.7
Part-time, undergraduate, 2-year institutions.....	99.2	99.2	98.5	98.5
Full-time, postbaccalaureate, 4-year institutions .....	48.8	48.8	45.4	45.4
Part-time, postbaccalaureate, 4-year institutions.....	50.9	50.9	50.2	50.2

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Spring 2013; and Enrollment in Degree-

Granting Institutions Projection Model, 1980 through 2023. (This table was prepared January 2014.)

**Table A-22. Estimated equations and model statistics for full-time and part-time enrollment rates of White men at postsecondary degree-granting institutions based on data from 1980 to 2012**

Independent variable	Coefficient	Standard error	t-statistic	R <sup>2</sup>	D.W. statistic
1	2	3	4	5	6
<b>Full-time</b>					
Intercept term for 17-year-olds.....	-9.74	0.193	-50.33	0.99	1.40-
Intercept term for 18-year-olds.....	-6.72	0.178	-37.77		
Intercept term for 19-year-olds.....	-6.47	0.174	-37.22		
Intercept term for 20-year-olds.....	-6.65	0.175	-38.09		
Intercept term for 21-year-olds.....	-6.79	0.174	-38.90		
Intercept term for 22-year-olds.....	-7.28	0.174	-41.73		
Intercept term for 23-year-olds.....	-7.83	0.174	-44.92		
Intercept term for 24-year-olds.....	-8.23	0.177	-46.49		
Intercept term for 25- to 29-year-olds .....	-9.09	0.175	-51.83		
Intercept term for 30- to 34-year-olds .....	-10.12	0.178	-56.83		
Intercept term for 35- to 44-year-olds .....	-10.74	0.179	-60.10		
Log of White per capita disposable income in current dollars .....	0.31	0.009	35.06		
<b>Part-time</b>					
Intercept term for 17-year-olds.....	-4.80	0.155	-31.05	0.94	1.42-
Intercept term for 18-year-olds.....	-1.53	0.096	-15.86		
Intercept term for 19-year-olds.....	-1.11	0.107	-10.35		
Intercept term for 20-year-olds.....	-1.08	0.097	-11.12		
Intercept term for 21-year-olds.....	-1.10	0.100	-11.00		
Intercept term for 22-year-olds.....	-1.30	0.097	-13.48		
Intercept term for 23-year-olds.....	-1.35	0.093	-14.58		
Intercept term for 24-year-olds.....	-1.36	0.092	-14.74		
Intercept term for 25- to 29-year-olds .....	-1.69	0.092	-18.30		
Intercept term for 30- to 34-year-olds .....	-2.15	0.094	-22.74		
Intercept term for 35- to 44-year-olds .....	-2.18	0.091	-23.99		
Log of real total private compensation employment cost index .....	1.43	0.119	11.97		

- Inconclusive.

NOTE: R<sup>2</sup> = Coefficient of determination. D.W. statistic = Durbin-Watson statistic, a test for autocorrelation among regression residuals. For more details see Johnston, J., and Dinardo, J. (1996). *Econometric Methods*. New York: McGraw-Hill. The regression method used to estimate the full-time and part-time equations was the pooled seemingly unrelated regression method. The time period used to estimate the equations is from 1980 to 2012. The number of

observations is 363. For additional information, see Intriligator, M.D. (1978). *Econometric Models, Techniques, & Applications*. New Jersey: Prentice-Hall, Inc., pp. 165-173. Race categories exclude persons of Hispanic ethnicity.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model, 1980 through 2023. (This table was prepared February 2014.)

**Table A-23. Estimated equations and model statistics for full-time and part-time enrollment rates of White women at postsecondary degree-granting institutions based on data from 1980 to 2012**

Independent variable	Coefficient	Standard error	t-statistic	R <sup>2</sup>	D.W. statistic		
1	2	3	4	5	6		
<b>Full-time</b>							
Intercept term for 17-year-olds.....	-14.32	0.241	-59.45	0.99	1.45-		
Intercept term for 18-year-olds.....	-11.34	0.224	-50.64				
Intercept term for 19-year-olds.....	-11.19	0.220	-50.76				
Intercept term for 20-year-olds.....	-11.42	0.221	-51.76				
Intercept term for 21-year-olds.....	-11.67	0.221	-52.80				
Intercept term for 22-year-olds.....	-12.41	0.222	-55.98				
Intercept term for 23-year-olds.....	-12.96	0.223	-58.10				
Intercept term for 24-year-olds.....	-13.36	0.223	-59.87				
Intercept term for 25- to 29-year-olds .....	-14.16	0.222	-63.66				
Intercept term for 30- to 34-year-olds .....	-14.89	0.221	-67.22				
Intercept term for 35- to 44-year-olds .....	-15.06	0.222	-67.81				
Log of White per capita disposable income in current dollars .....	0.57	0.011	50.52				
<b>Part-time</b>							
Intercept term for 17-year-olds.....	-9.79	0.369	-26.50			0.79	1.50-
Intercept term for 18-year-olds.....	-6.44	0.324	-19.84				
Intercept term for 19-year-olds.....	-5.97	0.326	-18.32				
Intercept term for 20-year-olds.....	-6.05	0.326	-18.58				
Intercept term for 21-year-olds.....	-6.13	0.324	-18.89				
Intercept term for 22-year-olds.....	-6.34	0.323	-19.61				
Intercept term for 23-year-olds.....	-6.38	0.324	-19.72				
Intercept term for 24-year-olds.....	-6.42	0.323	-19.87				
Intercept term for 25- to 29-year-olds .....	-6.73	0.322	-20.87				
Intercept term for 30- to 34-year-olds .....	-7.08	0.323	-21.88				
Intercept term for 35- to 44-year-olds .....	-6.75	0.322	-20.95				
Log of real total private compensation employment cost index .....	0.22	0.017	13.05				

~ Inconclusive.

NOTE: R<sup>2</sup> = Coefficient of determination. D.W. statistic = Durbin-Watson statistic, a test for autocorrelation among regression residuals. For more details see Johnston, J., and Dinardo, J. (1996). *Econometric Methods*. New York: McGraw-Hill. The regression method used to estimate the full-time and part-time equations was the pooled seemingly unrelated regression method. The time period used to estimate the equations is from 1980 to 2012. The number of

observations is 363. For additional information, see Intriligator, M.D. (1978). *Econometric Models, Techniques, & Applications*. New Jersey: Prentice-Hall, Inc., pp. 165–173. Race categories exclude persons of Hispanic ethnicity.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model, 1980 through 2023. (This table was prepared February 2014.)



**Table A-24. Estimated equations and model statistics for full-time and part-time enrollment rates of Black men at postsecondary degree-granting institutions based on data from 1980 to 2012**

Independent variable	Coefficient	Standard error	t-statistic	R <sup>2</sup>	D.W. statistic		
1	2	3	4	5	6		
<b>Full-time</b>							
Intercept term for 17-year-olds.....	-11.27	0.684	-16.49	0.96	1.83*		
Intercept term for 18-year-olds.....	-8.97	0.679	-13.22				
Intercept term for 19-year-olds.....	-8.70	0.678	-12.83				
Intercept term for 20-year-olds.....	-8.77	0.679	-12.92				
Intercept term for 21-year-olds.....	-9.01	0.680	-13.26				
Intercept term for 22-year-olds.....	-9.23	0.679	-13.59				
Intercept term for 23-year-olds.....	-9.68	0.682	-14.20				
Intercept term for 24-year-olds.....	-9.98	0.680	-14.67				
Intercept term for 25- to 29-year-olds .....	-10.75	0.680	-15.80				
Intercept term for 30- to 34-year-olds .....	-11.53	0.683	-16.88				
Intercept term for 35- to 44-year-olds .....	-11.88	0.682	-17.43				
Log of Black per capita disposable income in current dollars .....	0.40	0.036	10.91				
<b>Part-time</b>							
Intercept term for 17-year-olds.....	-11.80	0.593	-19.90			0.61	1.83*
Intercept term for 18-year-olds.....	-10.89	0.607	-17.93				
Intercept term for 19-year-olds.....	-10.09	0.596	-16.93				
Intercept term for 20-year-olds.....	-10.06	0.596	-16.88				
Intercept term for 21-year-olds.....	-10.04	0.591	-16.99				
Intercept term for 22-year-olds.....	-10.06	0.598	-16.81				
Intercept term for 23-year-olds.....	-10.26	0.602	-17.03				
Intercept term for 24-year-olds.....	-10.32	0.602	-17.15				
Intercept term for 25- to 29-year-olds .....	-10.40	0.590	-17.62				
Intercept term for 30- to 34-year-olds .....	-10.66	0.589	-18.09				
Intercept term for 35- to 44-year-olds .....	-10.70	0.587	-18.22				
Log of Black per capita disposable income in current dollars .....	0.39	0.032	12.24				

\*  $p < .05$ .

NOTE: R<sup>2</sup> = Coefficient of determination. D.W. statistic = Durbin-Watson statistic, a test for autocorrelation among regression residuals. For more details see Johnston, J., and Dinardo, J. (1996). *Econometric Methods*. New York: McGraw-Hill. The regression method used to estimate the full-time and part-time equations was the pooled seemingly unrelated regression method. The time period used to estimate the equations is from 1980 to 2012. The number of

observations is 363. For additional information, see Intriligator, M.D. (1978). *Econometric Models, Techniques, & Applications*. New Jersey: Prentice-Hall, Inc., pp. 165–173. Race categories exclude persons of Hispanic ethnicity. SOURCE: U.S. Department of Education, National Center for Education Statistics, Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model, 1980 through 2023. (This table was prepared February 2014.)

**Table A-25. Estimated equations and model statistics for full-time and part-time enrollment rates of Black women at postsecondary degree-granting institutions based on data from 1980 to 2012**

Independent variable	Coefficient	Standard error	t-statistic	R <sup>2</sup>	D.W. statistic		
1	2	3	4	5	6		
<b>Full-time</b>							
Intercept term for 17-year-olds.....	-15.98	0.626	-25.51	0.97	1.76*		
Intercept term for 18-year-olds.....	-13.72	0.620	-22.14				
Intercept term for 19-year-olds.....	-13.50	0.618	-21.84				
Intercept term for 20-year-olds.....	-13.74	0.619	-22.20				
Intercept term for 21-year-olds.....	-13.93	0.618	-22.53				
Intercept term for 22-year-olds.....	-14.36	0.618	-23.22				
Intercept term for 23-year-olds.....	-14.64	0.619	-23.64				
Intercept term for 24-year-olds.....	-15.00	0.620	-24.19				
Intercept term for 25- to 29-year-olds .....	-15.77	0.620	-25.42				
Intercept term for 30- to 34-year-olds .....	-16.22	0.620	-26.18				
Intercept term for 35- to 44-year-olds .....	-16.57	0.621	-26.68				
Log of Black per capita disposable income in current dollars .....	0.69	0.033	20.72				
<b>Part-time</b>							
Intercept term for 17-year-olds.....	-14.81	0.633	-23.38			0.59	1.71*
Intercept term for 18-year-olds.....	-13.18	0.625	-21.10				
Intercept term for 19-year-olds.....	-12.74	0.625	-20.37				
Intercept term for 20-year-olds.....	-12.78	0.624	-20.47				
Intercept term for 21-year-olds.....	-12.71	0.624	-20.37				
Intercept term for 22-year-olds.....	-12.72	0.623	-20.40				
Intercept term for 23-year-olds.....	-12.72	0.623	-20.41				
Intercept term for 24-year-olds.....	-12.86	0.624	-20.61				
Intercept term for 25- to 29-year-olds .....	-13.03	0.620	-21.03				
Intercept term for 30- to 34-year-olds .....	-13.18	0.620	-21.25				
Intercept term for 35- to 44-year-olds .....	-13.02	0.620	-21.00				
Log of Black per capita disposable income in current dollars .....	0.56	0.033	16.70				

\*  $p < .05$ .

NOTE: R<sup>2</sup> = Coefficient of determination. D.W. statistic = Durbin-Watson statistic, a test for autocorrelation among regression residuals. For more details see Johnston, J., and Dinardo, J. (1996). *Econometric Methods*. New York: McGraw-Hill. The regression method used to estimate the full-time and part-time equations was the pooled seemingly unrelated regression method. The time period used to estimate the equations is from 1980 to 2012. The number of

observations is 363. For additional information, see Intriligator, M.D. (1978). *Econometric Models, Techniques, & Applications*. New Jersey: Prentice-Hall, Inc., pp. 165-173. Race categories exclude persons of Hispanic ethnicity. SOURCE: U.S. Department of Education, National Center for Education Statistics, Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model, 1980 through 2023. (This table was prepared February 2014.)

**Table A-26. Estimated equations and model statistics for full-time and part-time enrollment rates of Hispanic men at postsecondary degree-granting institutions based on data from 1980 to 2012**

Independent variable	Coefficient	Standard error	t-statistic	R <sup>2</sup>	D.W. statistic
1	2	3	4	5	6
<b>Full-time</b>					
Intercept term for 17-year-olds.....	-12.11	0.844	-14.35	0.93	1.91*
Intercept term for 18-year-olds.....	-10.07	0.839	-12.00		
Intercept term for 19-year-olds.....	-9.84	0.839	-11.73		
Intercept term for 20-year-olds.....	-10.04	0.839	-11.97		
Intercept term for 21-year-olds.....	-10.27	0.841	-12.21		
Intercept term for 22-year-olds.....	-10.73	0.840	-12.77		
Intercept term for 23-year-olds.....	-11.03	0.840	-13.13		
Intercept term for 24-year-olds.....	-11.20	0.840	-13.34		
Intercept term for 25- to 29-year-olds .....	-12.02	0.840	-14.31		
Intercept term for 30- to 34-year-olds .....	-12.84	0.841	-15.27		
Intercept term for 35- to 44-year-olds .....	-13.32	0.843	-15.80		
Log of Hispanic per capita disposable income in current dollars .....	0.45	0.046	9.73		
<b>Part-time</b>					
Intercept term for 17-year-olds.....	-11.37	0.570	-19.94	0.67	1.74*
Intercept term for 18-year-olds.....	-9.76	0.568	-17.20		
Intercept term for 19-year-olds.....	-9.44	0.572	-16.50		
Intercept term for 20-year-olds.....	-9.32	0.568	-16.41		
Intercept term for 21-year-olds.....	-9.37	0.568	-16.50		
Intercept term for 22-year-olds.....	-9.75	0.566	-17.22		
Intercept term for 23-year-olds.....	-9.71	0.572	-16.95		
Intercept term for 24-year-olds.....	-9.87	0.568	-17.37		
Intercept term for 25- to 29-year-olds .....	-10.16	0.561	-18.10		
Intercept term for 30- to 34-year-olds .....	-10.63	0.562	-18.90		
Intercept term for 35- to 44-year-olds .....	-10.65	0.561	-19.00		
Log of Hispanic per capita disposable income in current dollars .....	0.37	0.031	12.10		

\*  $p < .05$ .  
 NOTE:  $R^2$  = Coefficient of determination. D.W. statistic = Durbin-Watson statistic, a test for autocorrelation among regression residuals. For more details see Johnston, J., and Dinardo, J. (1996). *Econometric Methods*. New York: McGraw-Hill. The regression method used to estimate the full-time and part-time equations was the pooled seemingly unrelated regression method. The time period used to estimate the equations is from 1980 to 2012. The number of

observations is 363. For additional information, see Intriligator, M.D. (1978). *Econometric Models, Techniques, & Applications*. New Jersey: Prentice-Hall, Inc., pp. 165–173.  
 SOURCE: U.S. Department of Education, National Center for Education Statistics, Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model, 1980 through 2023. (This table was prepared February 2014.)

**Table A-27. Estimated equations and model statistics for full-time and part-time enrollment rates of Hispanic women at postsecondary degree-granting institutions based on data from 1980 to 2012**

Independent variable	Coefficient	Standard error	t-statistic	R <sup>2</sup>	D.W. statistic		
1	2	3	4	5	6		
<b>Full-time</b>							
Intercept term for 17-year-olds.....	-19.03	0.725	-26.23	0.94	1.83*		
Intercept term for 18-year-olds.....	-16.49	0.715	-23.07				
Intercept term for 19-year-olds.....	-16.37	0.713	-22.95				
Intercept term for 20-year-olds.....	-16.69	0.714	-23.38				
Intercept term for 21-year-olds.....	-16.81	0.715	-23.53				
Intercept term for 22-year-olds.....	-17.40	0.716	-24.30				
Intercept term for 23-year-olds.....	-17.69	0.715	-24.75				
Intercept term for 24-year-olds.....	-18.18	0.718	-25.33				
Intercept term for 25- to 29-year-olds .....	-18.81	0.713	-26.37				
Intercept term for 30- to 34-year-olds .....	-19.49	0.715	-27.25				
Intercept term for 35- to 44-year-olds .....	-19.83	0.716	-27.68				
Log of Hispanic per capita disposable income in current dollars .....	0.83	0.039	21.33				
<b>Part-time</b>							
Intercept term for 17-year-olds.....	-15.95	0.566	-28.20			0.69	1.87*
Intercept term for 18-year-olds.....	-13.78	0.556	-24.77				
Intercept term for 19-year-olds.....	-13.40	0.553	-24.22				
Intercept term for 20-year-olds.....	-13.69	0.558	-24.52				
Intercept term for 21-year-olds.....	-13.53	0.558	-24.25				
Intercept term for 22-year-olds.....	-13.84	0.559	-24.75				
Intercept term for 23-year-olds.....	-13.72	0.554	-24.75				
Intercept term for 24-year-olds.....	-13.99	0.557	-25.14				
Intercept term for 25- to 29-year-olds .....	-14.30	0.550	-26.02				
Intercept term for 30- to 34-year-olds .....	-14.68	0.549	-26.71				
Intercept term for 35- to 44-year-olds .....	-14.56	0.549	-26.51				
Log of Hispanic per capita disposable income in current dollars .....	0.62	0.030	20.61				

\*  $p < .05$ .

NOTE:  $R^2$  = Coefficient of determination. D.W. statistic = Durbin-Watson statistic, a test for autocorrelation among regression residuals. For more details see Johnston, J., and Dinardo, J. (1996). *Econometric Methods*. New York: McGraw-Hill. The regression method used to estimate the full-time and part-time equations was the pooled seemingly unrelated regression method. The time period used to estimate the equations is from 1980 to 2012. The number of

observations is 363. For additional information, see Intriligator, M.D. (1978). *Econometric Models, Techniques, & Applications*. New Jersey: Prentice-Hall, Inc., pp. 165-173.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model, 1980 through 2023. (This table was prepared February 2014.)

**Table A-28. Estimated equations and model statistics for full-time and part-time enrollment rates of Asian/Pacific Islander men at postsecondary degree-granting institutions based on data from 1989 to 2012**

Independent variable	Coefficient	Standard error	t-statistic	R <sup>2</sup>	D.W. statistic
1	2	3	4	5	6
<b>Full-time</b>					
Intercept term for 17-year-olds.....	-5.74	0.568	-14.87	0.94	1.97*
Intercept term for 18-year-olds.....	-2.98	0.554	-10.11		
Intercept term for 19-year-olds.....	-2.75	0.556	-9.69		
Intercept term for 20-year-olds.....	-2.87	0.555	-9.94		
Intercept term for 21-year-olds.....	-2.86	0.554	-9.87		
Intercept term for 22-year-olds.....	-3.22	0.555	-10.48		
Intercept term for 23-year-olds.....	-3.47	0.556	-10.88		
Intercept term for 24-year-olds.....	-3.83	0.558	-11.46		
Intercept term for 25- to 29-year-olds .....	-4.67	0.555	-13.19		
Intercept term for 30- to 34-year-olds .....	-5.67	0.555	-14.98		
Intercept term for 35- to 44-year-olds .....	-6.46	0.555	-16.47		
Log of Asian/Pacific Islander per capita disposable income in current dollars.....	0.15	0.028	5.36		
Log unemployment rate for Asian/Pacific Islanders .	0.10	0.045	2.19		
<b>Part-time</b>					
Intercept term for 17-year-olds.....	-1.92	0.654	-2.94	0.66	1.90*
Intercept term for 18-year-olds.....	-0.93	0.665	-1.39		
Intercept term for 19-year-olds.....	-0.14	0.650	-0.21		
Intercept term for 20-year-olds.....	-0.22	0.659	-0.34		
Intercept term for 21-year-olds.....	-0.34	0.660	-0.52		
Intercept term for 22-year-olds.....	-0.38	0.666	-0.57		
Intercept term for 23-year-olds.....	-0.41	0.652	-0.62		
Intercept term for 24-year-olds.....	-0.54	0.650	-0.84		
Intercept term for 25- to 29-year-olds .....	-0.97	0.639	-1.51		
Intercept term for 30- to 34-year-olds .....	-1.59	0.642	-2.48		
Intercept term for 35- to 44-year-olds .....	-1.92	0.639	-3.01		
Log of Asian/Pacific Islander level of educational attainment per household .....	0.09	0.040	2.16		

\*  $p < .05$ .  
 NOTE: R<sup>2</sup> = Coefficient of determination. D.W. statistic = Durbin-Watson statistic, a test for autocorrelation among regression residuals. For more details see Johnston, J., and Dinardo, J. (1996). *Econometric Methods*. New York: McGraw-Hill. The regression method used to estimate the full-time and part-time equations was the pooled seemingly unrelated regression method. The time period used to estimate the part-time equation is from 1989 to 2012.

The number of observations equal to 264. For additional information, see Intriligator, M.D. (1978). *Econometric Models, Techniques, & Applications*. New Jersey: Prentice-Hall, Inc., pp. 165–173. Race categories exclude persons of Hispanic ethnicity.  
 SOURCE: U.S. Department of Education, National Center for Education Statistics, Enrollment in Degree-Granting Institutions by Race/Ethnicity Projection Model, 1980 through 2023. (This table was prepared February 2014.)

**Table A-29. Estimated equations and model statistics for full-time and part-time enrollment rates of Asian/Pacific Islander women at postsecondary degree-granting institutions based on data from 1989 to 2012**

Independent variable	Coefficient	Standard error	t-statistic	R <sup>2</sup>	D.W. statistic
1	2	3	4	5	6
<b>Full-time</b>					
Intercept term for 17-year-olds.....	-8.71	0.587	-14.82	0.97	1.92*
Intercept term for 18-year-olds.....	-6.31	0.574	-11.00		
Intercept term for 19-year-olds.....	-5.82	0.578	-10.07		
Intercept term for 20-year-olds.....	-6.10	0.575	-10.60		
Intercept term for 21-year-olds.....	-6.13	0.574	-10.68		
Intercept term for 22-year-olds.....	-6.64	0.576	-11.52		
Intercept term for 23-year-olds.....	-6.96	0.575	-12.11		
Intercept term for 24-year-olds.....	-7.50	0.584	-12.84		
Intercept term for 25- to 29-year-olds.....	-8.41	0.572	-14.70		
Intercept term for 30- to 34-year-olds.....	-9.65	0.576	-16.75		
Intercept term for 35- to 44-year-olds.....	-10.21	0.577	-17.69		
Log of Asian/Pacific Islander per capita disposable income in current dollars.....	0.32	0.030	10.75		
<b>Part-time</b>					
Intercept term for 17-year-olds.....	-6.55	0.653	-10.03	0.74	2.00*
Intercept term for 18-year-olds.....	-4.74	0.647	-7.33		
Intercept term for 19-year-olds.....	-4.12	0.672	-6.13		
Intercept term for 20-year-olds.....	-4.51	0.662	-6.81		
Intercept term for 21-year-olds.....	-3.92	0.652	-6.01		
Intercept term for 22-year-olds.....	-4.21	0.653	-6.45		
Intercept term for 23-year-olds.....	-4.41	0.648	-6.80		
Intercept term for 24-year-olds.....	-4.55	0.656	-6.94		
Intercept term for 25- to 29-year-olds.....	-5.08	0.639	-7.95		
Intercept term for 30- to 34-year-olds.....	-5.69	0.640	-8.89		
Intercept term for 35- to 44-year-olds.....	-5.56	0.637	-8.73		
Log of Asian/Pacific Islander per capita disposable income in current dollars.....	0.14	0.033	4.28		

\*  $p < .05$ .

NOTE: R<sup>2</sup> = Coefficient of determination. D.W. statistic = Durbin-Watson statistic, a test for autocorrelation among regression residuals. For more details see Johnston, J., and Dinardo, J. (1996). *Econometric Methods*. New York: McGraw-Hill. The regression method used to estimate the full-time and part-time equations was the pooled seemingly unrelated regression method. The time period used to estimate the equations is from 1989 to 2012.

The number of observations is 264. For additional information, see Intriligator, M.D. (1978). *Econometric Models, Techniques, & Applications*. New Jersey: Prentice-Hall, Inc., pp. 165–173. Race categories exclude persons of Hispanic ethnicity.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Enrollment in Degree-Granting Institutions by Race/Ethnicity Model, 1980–2012. (This table was prepared February 2014.)

## A.6. POSTSECONDARY DEGREES CONFERRED

### Projections in this edition

This edition of *Projections of Education Statistics* presents projections of postsecondary degrees conferred by level of degree and sex of recipient for 2012–13 through 2023–24.

### Overview of approach

#### **Basic approach**

Projections of associate's, bachelor's, master's, and doctor's degrees for men and women were produced using forecasting equations that relate degrees conferred to full-time enrollment in degree-granting institutions by sex, student level (undergraduate or postbaccalaureate), and institution level (2-year or 4-year).

### Degrees Conferred Projection Model

#### **Procedures used to project degrees**

For all degree levels, projections of degrees conferred were made separately for men and for women. The projections for men and women were then summed to get projections of the total number of degrees.

Multiple linear regression was used to project associate's, bachelor's, master's, and doctor's degrees based on enrollment variables for men and women. The enrollment variables used for the different levels of degrees are briefly described below.

*For details and results of the regression analyses used to project associate's, bachelor's, master's, and doctor's degrees, see table A-30, under "Data and equations used to project degrees," later in this section.*

**Associate's degrees.** *Projections were based on full-time undergraduate enrollment in 2-year institutions by sex.* Men's projections of associate's degrees were based on current full-time enrollment and full-time enrollment lagged 2 years. Women's projections of associate's degrees were based on current full-time enrollment and full-time enrollment lagged 1 and 2 years.

**Bachelor's degrees.** *Projections were based on full-time undergraduate enrollment in 4-year institutions by sex.* For men and for women, bachelor's degree projections were based on current full-time enrollment and full-time enrollment lagged 2 years.

**Master's degrees.** *Projections were based on full-time postbaccalaureate enrollment by sex.* Men's projections of master's degrees were based on current full-time enrollment and full-time enrollment lagged 1 year. Women's projections of master's degrees were based on current full-time enrollment.

**Doctor's degrees.** *Projections were based on full-time postbaccalaureate enrollment by sex.* For men and for women, doctor's degree projections were based on current full-time postbaccalaureate enrollment and full-time postbaccalaureate enrollment lagged 1 and 2 years.

#### **Data and equations used to project degrees**

**Enrollment data and projections for degree-granting institutions.** Historical enrollment data by sex, level of student, and level of institution came from the NCES Integrated Postsecondary Education Data System (IPEDS). For the time period used for each level of degree, see table A-30 on page 124. The enrollment projections used are those produced for this edition of *Projections of Education Statistics*. For more information about the enrollment projections, see Section A.5. Enrollment in Postsecondary Degree-Granting Institutions, earlier in this appendix.

**Data on degrees awarded at all levels.** Historical data by level of degree and sex of recipient came from the NCES Integrated Postsecondary Education Data System (IPEDS). All degrees were projected using data for 1980–81 to 2011–12.

**Estimated equations and model statistics.** For details on the equations used to project associate's, bachelor's, master's, and doctor's degrees, see table A-30 on page 124. The equations shown were selected on the basis of their statistical properties, such as coefficients of determination ( $R^2$ s), the  $t$ -statistics of the coefficients, the Durbin-Watson statistic, the Breusch-Godfrey Serial Correlation LM test statistic, and residual plots.

## Accuracy of projections

Mean absolute percentage errors (MAPEs) for associate's and bachelor's degrees conferred by degree-granting institutions were calculated using the last five editions of *Projections of Education Statistics*. Table H, below, shows MAPEs projections of associate's and bachelor's degrees conferred. No MAPEs were calculated for master's and doctor's degrees as currently defined because the current models have only been used for two other editions.

**Table H. Mean absolute percentage errors (MAPEs) of projected associate's and bachelor's degrees conferred by degree-granting institutions, by lead time: 2014**

Statistic	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
Associate's degrees conferred	2.5	7.0	11.2	16.7	20.1	—	—	—	—	—
Bachelor's degrees conferred	0.6	0.3	0.6	3.2	4.7	—	—	—	—	—

— Not available.

NOTE: MAPEs for associate's and bachelor's degrees conferred were calculated using the last five editions of *Projections of Education Statistics*. No MAPEs were calculated for master's and doctor's degrees as currently defined because the current models have only been used for two other editions. Calculations were made using unrounded numbers.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2014.)

*For more information about MAPEs, see Section A.0. Introduction, earlier in this appendix.*



**Table A-30. Estimated equations and model statistics for degrees conferred, by degree type and sex based on data from 1980–81 to 2011–12**

Dependent variable	Equation <sup>1</sup>	R <sup>2</sup>	Breusch-Godfrey Serial Correlation LM test statistic <sup>2</sup>	Time period
1	2	3	4	5
Associate's degrees, men.....	DASSOCM = 2,783 + 85DUGFT2M + 104DUGFT2ML2 (2.2) (4.3) (5.2)	0.52	6.57 (0.037)	1980–81 to 2011–12
Associate's degrees, women.....	DLOGASSOCW = # + 0.9DLOGUGFT2WS3 + .5MA(1) † (7.81) (4.16)	0.80	3.98 (0.137)	1980–81 to 2011–12
Bachelor's degrees, men.....	DBACHM = 232 + 62DUGFT4M + 147DUGFT4ML2 (0.20) (3.3) (8.1)	0.75	0.70 (0.706)	1980–81 to 2011–12
Bachelor's degrees, women.....	DBACHW = 2973 + 49DUGFT4W + 145DUGFT4WL2 (1.6) (2.4) (7.0)	0.67	1.41 (0.494)	1980–81 to 2011–12
Master's degrees, men.....	PCHMASTM = # + 0.6PCHPBFTM + 0.5PCHPBFTML1 † (4.28) (3.24)	0.66	1.00 (0.608)	1980–81 to 2011–12
Master's degrees, women.....	PCHMASTW = # + 0.4PCHPBFTW + 0.6AR(1) † (2.32) (4.32)	0.56	3.81 (0.149)	1980–81 to 2011–12
Doctor's degrees, men.....	DDOCM = -365 + 55DPBFTML1 + 61DPBFTML2 (-1.6) (2.6) (2.5)	0.53	1.20 (0.549)	1980–81 to 2011–12
Doctor's degrees, women.....	DDOCW = 487 + 25DPBFTWL1 + 45DPBFTWL2 (1.6) (2.1) (3.7)	0.50	0.43 (0.809)	1980–81 to 2011–12

† Not applicable.  
# Rounds to zero.

<sup>1</sup>AR(1) indicates that the model was estimated to account for first-order autocorrelation. To estimate the model, it was first transformed into a nonlinear model and then the coefficients were estimated simultaneously by applying a Marquardt nonlinear least squares algorithm to the transformed equation. MA(1) indicates that the model was estimated to incorporate moving average of the residual into model fit. For a general discussion of the problem of autocorrelation, and the method used to forecast in the presence of autocorrelation, see Judge, G., Hill, W., Griffiths, R., Lutkepohl, H., and Lee, T. (1985). *The Theory and Practice of Econometrics*. New York: John Wiley and Sons, pp. 315–318. Numbers in parentheses are *t*-statistics.

<sup>2</sup>The number in parentheses is the probability of the Chi-Square associated with the Breusch-Godfrey Serial Correlation LM Test. A *p* value greater than 0.05 implies that we do not reject the null hypothesis of no autocorrelation at the 5 percent significance level for a two-tailed test or 10 percent significance level for a one-tailed test (i.e., there is no autocorrelation present). For an explanation of the Breusch-Godfrey Serial Correlation LM test statistic, see Greene, W. (2000). *Econometric Analysis*. New Jersey: Prentice-Hall.

NOTE: R<sup>2</sup> is the coefficient of determination.

DASSOCM = First difference of associate's degrees awarded to men.  
DLOGASSOCW = First difference of the log of associate's degrees awarded to women.  
DBACHM = First difference of bachelor's degrees awarded to men.  
DBACHW = First difference of bachelor's degrees awarded to women.  
PCHMASTM = Percentage change in master's degrees awarded to men.  
PCHMASTW = Percentage change in master's degrees awarded to women.

DDOCM = First difference of doctor's degrees awarded to men.  
DDOCW = First difference of doctor's degrees awarded to women.  
DUGFT2M = First difference of full-time undergraduate enrollment of men in 2-year institutions.  
DUGFT2ML2 = First difference of full-time undergraduate enrollment of men in 2-year institutions, lagged two periods.  
DLOGUGFT2WS3 = First difference of the sum of the full-time undergraduate enrollment of women in 2-year institutions over the present year and the previous 2 years.  
DUGFT4M = First difference of full-time undergraduate enrollment of men in 4-year institutions.  
DUGFT4ML2 = First difference of full-time undergraduate enrollment of men in 4-year institutions, lagged two periods.  
DUGFT4W = First difference of full-time undergraduate enrollment of women in 4-year institutions.  
DUGFT4WL2 = First difference of full-time undergraduate enrollment of women in 4-year institutions, lagged two periods.  
PCHPBFTM = Percentage change in full-time undergraduate enrollment of men.  
PCHPBFTML1 = Percentage change in full-time undergraduate enrollment of men, lagged 1 year.  
PCHPBFTW = Percentage change in full-time postbaccalaureate enrollment of women.  
DPBFTML1 = First difference of full-time postbaccalaureate enrollment of men, lagged 1 year.  
DPBFTML2 = First difference of full-time postbaccalaureate enrollment of men, lagged 2 years.  
DPBFTWL1 = First difference of full-time postbaccalaureate enrollment of women, lagged 1 year.  
DPBFTWL2 = First difference of full-time postbaccalaureate enrollment of women, lagged 2 years.  
SOURCE: U.S. Department of Education, National Center for Education Statistics, Degrees Conferred Projection Model, 1980–81 through 2023–24. (This table was prepared March 2014.)

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# Appendix B

## *Supplementary Tables*

**Table B-1. Annual number of births: 1946 through 2012**

Calendar year	Number of births, in thousands	Calendar year	Number of births, in thousands
1	2	1	2
1946.....	3,426	1980.....	3,612
1947.....	3,834	1981.....	3,629
1948.....	3,655	1982.....	3,681
1949.....	3,667	1983.....	3,639
1950.....	3,645	1984.....	3,669
1951.....	3,845	1985.....	3,761
1952.....	3,933	1986.....	3,757
1953.....	3,989	1987.....	3,809
1954.....	4,102	1988.....	3,910
1955.....	4,128	1989.....	4,041
1956.....	4,244	1990.....	4,158
1957.....	4,332	1991.....	4,111
1958.....	4,279	1992.....	4,065
1959.....	4,313	1993.....	4,000
1960.....	4,307	1994.....	3,953
1961.....	4,317	1995.....	3,900
1962.....	4,213	1996.....	3,891
1963.....	4,142	1997.....	3,881
1964.....	4,070	1998.....	3,942
1965.....	3,801	1999.....	3,959
1966.....	3,642	2000.....	4,059
1967.....	3,555	2001.....	4,026
1968.....	3,535	2002.....	4,022
1969.....	3,626	2003.....	4,090
1970.....	3,739	2004.....	4,112
1971.....	3,556	2005.....	4,138
1972.....	3,258	2006.....	4,266
1973.....	3,137	2007.....	4,317
1974.....	3,160	2008.....	4,248
1975.....	3,144	2009.....	4,131
1976.....	3,168	2010.....	3,999
1977.....	3,327	2011.....	3,954
1978.....	3,333	2012.....	3,953
1979.....	3,494		

NOTE: Some data have been revised from previously published figures.  
 SOURCE: U.S. Department of Health and Human Services, National Center for Health Sta-

tistics (NCHS), *National Vital Statistics Reports*, various years. (This table was prepared December 2013.)

**Table B-2. Actual and projected prekindergarten- and kindergarten-age populations, by age: 1998 through 2023**  
[In thousands]

Year (July 1)	3- to 5-year-olds	3-year-olds	4-year-olds	5-year-olds
1	2	3	4	5
<b>Actual</b>				
1998.....	11,880	3,862	3,979	4,040
1999.....	11,768	3,827	3,946	3,996
2000.....	11,691	3,821	3,902	3,968
2001.....	11,540	3,803	3,827	3,910
2002.....	11,454	3,804	3,813	3,837
2003.....	11,501	3,861	3,817	3,824
2004.....	11,714	4,008	3,877	3,830
2005.....	11,866	3,943	4,030	3,893
2006.....	11,987	3,966	3,971	4,051
2007.....	11,996	4,004	3,998	3,993
2008.....	12,058	3,992	4,041	4,024
2009.....	12,129	4,026	4,033	4,070
2010.....	12,255	4,112	4,078	4,065
2011.....	12,313	4,102	4,122	4,088
<b>Projected</b>				
2012.....	12,228	3,983	4,113	4,133
2013.....	12,107	3,992	3,993	4,122
2014.....	12,035	4,031	4,002	4,002
2015.....	12,282	4,229	4,041	4,012
2016.....	12,550	4,260	4,239	4,051
2017.....	12,809	4,288	4,271	4,250
2018.....	12,896	4,314	4,300	4,282
2019.....	12,975	4,338	4,326	4,311
2020.....	13,048	4,360	4,350	4,338
2021.....	13,115	4,380	4,373	4,362
2022.....	13,176	4,398	4,393	4,385
2023.....	13,230	4,413	4,411	4,405

NOTE: Some data have been revised from previously published figures. Detail may not sum to totals because of rounding. As the Census Bureau projections were not updated to reflect the most recent 2012 Census Bureau population estimates, the Census Bureau age-specific population projections for each year were adjusted by multiplying the ratio of the total Census Bureau estimate for 2012 to the total Census Bureau projection for 2012.

SOURCE: U.S. Department of Commerce, Census Bureau, Population Estimates, retrieved December 19, 2012, from <http://www.census.gov/popest/data/index.html>; and Population Projections, retrieved December 12, 2012, from <http://www.census.gov/population/projections/data/national/2012/downloadablefiles.html>. (This table was prepared February 2014.)

**Table B-3. Actual and projected school-age populations, by selected ages: 1998 through 2023**

[In thousands]

Year (July 1)	5-year-olds	6-year-olds	5- to 13-year-olds	14- to 17-year-olds
1	2	3	4	5
<b>Actual</b>				
1998.....	4,040	4,112	36,454	15,829
1999.....	3,996	4,045	36,804	16,007
2000.....	3,968	4,004	37,054	16,144
2001.....	3,910	3,973	37,093	16,280
2002.....	3,837	3,913	37,001	16,506
2003.....	3,824	3,838	36,814	16,694
2004.....	3,830	3,822	36,458	17,054
2005.....	3,893	3,828	36,248	17,358
2006.....	4,051	3,891	36,269	17,549
2007.....	3,993	4,046	36,296	17,597
2008.....	4,024	3,988	36,438	17,395
2009.....	4,070	4,018	36,657	17,232
2010.....	4,065	4,073	36,867	17,064
2011.....	4,088	4,075	36,910	16,862
<b>Projected</b>				
2012.....	4,133	4,098	36,995	16,707
2013.....	4,122	4,141	37,037	16,616
2014.....	4,002	4,130	36,884	16,681
2015.....	4,012	4,011	36,799	16,713
2016.....	4,051	4,021	36,847	16,654
2017.....	4,250	4,060	37,070	16,614
2018.....	4,282	4,259	37,289	16,534
2019.....	4,311	4,291	37,540	16,510
2020.....	4,338	4,321	37,796	16,600
2021.....	4,362	4,348	38,035	16,710
2022.....	4,385	4,373	38,308	16,772
2023.....	4,405	4,395	38,720	16,717

NOTE: Some data have been revised from previously published figures. As the Census Bureau projections were not updated to reflect the most recent 2012 Census Bureau population estimates, the Census Bureau age-specific population projections for each year were adjusted by multiplying the ratio of the total Census Bureau estimate for 2012 to the total Census Bureau projection for 2012.

SOURCE: U.S. Department of Commerce, Census Bureau, Population Estimates, retrieved December 19, 2012, from <http://www.census.gov/popest/data/index.html>; and Population Projections, retrieved December 12, 2012, from <http://www.census.gov/population/projections/data/national/2012/downloadablefiles.html>. (This table was prepared February 2014.)

**Table B-4. Actual and projected college-age populations, by selected ages: 1998 through 2023**  
[In thousands]

Year (July 1)	18-year-olds	18- to 24-year-olds	25- to 29-year-olds	30- to 34-year-olds	35- to 44-year-olds
1	2	3	4	5	6
<b>Actual</b>					
1998.....	3,984	26,155	19,863	20,999	44,802
1999.....	3,993	26,780	19,632	20,647	45,130
2000.....	4,082	27,390	19,328	20,560	45,217
2001.....	4,106	28,081	18,866	20,689	45,101
2002.....	4,087	28,598	18,752	20,705	44,706
2003.....	4,206	29,121	18,872	20,545	44,251
2004.....	4,218	29,474	19,193	20,220	43,881
2005.....	4,228	29,609	19,629	19,787	43,594
2006.....	4,303	29,758	20,200	19,343	43,325
2007.....	4,397	29,973	20,640	19,231	42,879
2008.....	4,590	30,355	21,003	19,365	42,275
2009.....	4,537	30,687	21,184	19,708	41,573
2010.....	4,492	30,916	21,249	20,132	41,062
2011.....	4,397	31,212	21,385	20,575	40,706
<b>Projected</b>					
2012.....	4,353	31,466	21,465	20,954	40,562
2013.....	4,282	31,560	21,650	21,315	40,495
2014.....	4,204	31,457	22,019	21,539	40,442
2015.....	4,185	31,130	22,447	21,643	40,451
2016.....	4,187	30,780	22,928	21,810	40,449
2017.....	4,197	30,500	23,356	21,926	40,749
2018.....	4,277	30,398	23,595	22,130	41,244
2019.....	4,224	30,293	23,667	22,517	41,753
2020.....	4,135	30,170	23,466	22,963	42,298
2021.....	4,163	30,152	23,162	23,462	42,947
2022.....	4,204	30,194	22,899	23,908	43,486
2023.....	4,207	30,238	22,736	24,167	44,082

NOTE: Some data have been revised from previously published figures. As the Census Bureau projections were not updated to reflect the most recent 2012 Census Bureau population estimates, the Census Bureau age-specific population projections for each year were adjusted by multiplying the ratio of the total Census Bureau estimate for 2012 to the total Census Bureau projection for 2012.

SOURCE: U.S. Department of Commerce, Census Bureau, Population Estimates, retrieved December 19, 2012, from <http://www.census.gov/popest/data/index.html>; and Population Projections, retrieved December 12, 2012, from <http://www.census.gov/population/projections/data/national/2012/downloadablefiles.html>. (This table was prepared February 2014.)

**Table B-5. Actual and projected fall enrollment in public elementary and secondary schools, change in fall enrollment from previous year, resident population, and fall enrollment as a ratio of the population: School years 1998–99 through 2023–24**

School year	Fall enrollment (in thousands)	Change in fall enrollment from previous year (in thousands)	Resident population (in millions)	Fall enrollment as a ratio of the population
1	2	3	4	5
<b>Actual</b>				
1998–99.....	46,539	412	276.1	0.169
1999–2000.....	46,857	319	279.3	0.168
2000–01.....	47,204	346	282.4	0.167
2001–02.....	47,672	468	285.2	0.167
2002–03.....	48,183	511	287.9	0.167
2003–04.....	48,540	357	290.6	0.167
2004–05.....	48,795	255	293.2	0.166
2005–06.....	49,113	318	295.9	0.166
2006–07.....	49,316	203	298.8	0.165
2007–08.....	49,293	-23	301.7	0.163
2008–09.....	49,266	-27	304.5	0.162
2009–10.....	49,361	95	307.2	0.161
2010–11.....	49,484	123	309.7	0.160
2011–12.....	49,522	37	312.0	0.159
<b>Projected</b>				
2012–13.....	49,652	130	314.3	0.158
2013–14.....	49,750	99	316.7	0.157
2014–15.....	49,751	1	319.2	0.156
2015–16.....	49,839	88	321.6	0.155
2016–17.....	49,951	112	324.1	0.154
2017–18.....	50,280	328	326.6	0.154
2018–19.....	50,543	263	329.1	0.154
2019–20.....	50,834	292	331.7	0.153
2020–21.....	51,165	331	334.2	0.153
2021–22.....	51,485	320	336.7	0.153
2022–23.....	51,804	319	339.2	0.153
2023–24.....	52,113	309	341.7	0.153

NOTE: Resident population includes civilian population and armed forces personnel residing with the United States; it excludes armed forces personnel overseas. Calculations were made using unrounded numbers. Some data have been revised from previously published figures. Detail may not sum to totals because of rounding. As the Census Bureau projections were not updated to reflect the most recent 2012 Census Bureau population estimates, the Census Bureau age-specific population projections for each year were adjusted by multiplying the ratio of the total Census Bureau estimate for 2012 to the total Census Bureau projection for 2012.

SOURCE: U.S. Department of Commerce, Census Bureau, Population Estimates, retrieved December 19, 2012 from <http://www.census.gov/popest/data/index.html>; and Population Projections, retrieved December 12, 2012, from <http://www.census.gov/population/projections/data/national/2012/downloadablefiles.html>. U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1995–96 through 2011–12; and National Elementary and Secondary Enrollment Projection Model, 1972 through 2023. (This table was prepared February 2014.)

**Table B-6. Actual and projected macroeconomic measures of the economy: School years 1998–99 through 2023–24**

School year	Disposable income per capita in constant 2012–13 dollars <sup>1</sup>	Education revenue receipts from state sources per capita in constant 2012–13 dollars <sup>2</sup>	Consumer Price Index <sup>3</sup>
1	2	3	4
<b>Actual</b>			
1998–99.....	\$32,269	\$862	0.711
1999–2000.....	33,151	903	0.732
2000–01.....	34,101	934	0.757
2001–02.....	34,854	941	0.770
2002–03.....	35,220	946	0.787
2003–04.....	36,276	930	0.804
2004–05.....	36,813	941	0.828
2005–06.....	37,479	952	0.860
2006–07.....	38,284	1,000	0.882
2007–08.....	38,688	1,024	0.915
2008–09.....	38,366	979	0.928
2009–10.....	37,983	900	0.937
2010–11.....	38,650	902	0.955
2011–12.....	39,010	867	0.984
2012–13 <sup>4</sup> .....	39,316	881	1.000
<b>Projected</b>			
2013–14.....	39,732	893	1.015
2014–15.....	40,733	915	1.032
2015–16.....	41,727	937	1.051
2016–17.....	42,864	961	1.071
2017–18.....	44,005	988	1.091
2018–19.....	44,904	1,008	1.112
2019–20.....	45,689	1,026	1.134
2020–21.....	46,292	1,039	1.157
2021–22.....	46,882	1,052	1.180
2022–23.....	47,540	1,066	1.202
2023–24.....	47,985	1,075	1.220

<sup>1</sup>Based on the price deflator for personal consumption expenditures, Bureau of Labor Statistics, U.S. Department of Labor.

<sup>2</sup>Based on the Consumer Price Index for all urban consumers, Bureau of Labor Statistics, U.S. Department of Labor.

<sup>3</sup>Consumer Price Index adjusted to a school-year basis (July through June).

<sup>4</sup>Education revenue receipts from state sources per capita is a projection.

NOTE: Calculations were made using unrounded numbers. Some data have been revised from previously published figures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "National Public Education Financial Survey," 1997–98 through 2010–11; Revenue Receipts From State Sources Projections Model, 1971–72 through 2023–24; and IHS Global Inc., "U.S. Quarterly Macroeconomic Model, 4th Quarter 2013 Short-Term Baseline Projections." (This table was prepared February 2014.)



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# Appendix C

## Data Sources

### SOURCES AND COMPARABILITY OF DATA

The information in this report was obtained from many sources, including federal and state agencies, private research organizations, and professional associations. The data were collected by many methods, including surveys of a universe (such as all colleges) or of a sample, and compilations of administrative records. Care should be used when comparing data from different sources. Differences in procedures, such as timing, phrasing of questions, and interviewer training, mean that the results from the different sources are not strictly comparable. More extensive documentation of one survey's procedures than of another's does not imply more problems with the data, only that more information is available on the survey.

### ACCURACY OF DATA

The accuracy of any statistic is determined by the joint effects of “sampling” and “nonsampling” errors. Estimates based on a sample will differ from the figures that would have been obtained if a complete census had been taken using the same survey instruments, instructions, and procedures. Besides sampling errors, both of the surveys, universe and sample, are subject to errors of design, reporting, and processing, and errors due to nonresponse. To the extent possible, these nonsampling errors are kept to a minimum by methods built into the survey procedures. In general, however, the effects of nonsampling errors are more difficult to gauge than those produced by sampling variability.

### SAMPLING ERRORS

The standard error is the primary measure of the sampling variability of an estimate. Standard errors can be used to produce confidence intervals. For example, from table A-12, an estimated 91.8 percent of public school teachers reported that they worked full time in 2007–08. This figure has an estimated standard error of 0.29 percent. Therefore, the estimated 95 percent confidence interval for this statistic is approximately 91.27 to 92.41 percent ( $91.8 \pm 1.96 (0.29)$ ). That is, if the processes of selecting a sample, collecting the data, and constructing the confidence interval were repeated, it would be expected that in 95 out of 100 samples from the same population, the confidence interval would contain the true full-time working rate.

Analysis of standard errors can help assess how valid a comparison between two estimates might be. The *standard error of a difference* between two independent sample estimates is equal to the square root of the sum of the squared standard errors of the estimates. The standard error ( $se$ ) of the difference between independent sample estimates  $a$  and  $b$  is

$$se_{a-b} = (se_a^2 + se_b^2)^{1/2}$$

Note that some of the standard errors in the original documents are approximations. That is, to derive estimates of standard errors that would be applicable to a wide variety of items and could be prepared at a moderate cost, a number of approximations were required. As a result, most of the standard errors presented provide a general order of magnitude rather than the exact standard error for any specific item.

### NONSAMPLING ERRORS

Both universe and sample surveys are subject to nonsampling errors. Nonsampling errors are of two kinds—random and nonrandom. Random nonsampling errors may arise when respondents or interviewers interpret questions differently, when respondents must estimate values, or when coders, keyers, and other processors handle answers differently. Nonrandom nonsampling errors result from total nonresponse (no usable data obtained for a sampled unit), partial or item nonresponse (only a portion of a response may be usable), inability or unwillingness on the part of respondents to provide information, difficulty interpreting questions, mistakes in recording or keying data, errors of collection or processing, and overcoverage or undercoverage of the target universe. Random nonresponse errors usually, but not always, result in an understatement

of sampling errors and thus an overstatement of the precision of survey estimates. Because estimating the magnitude of nonsampling errors would require special experiments or access to independent data, these magnitudes are seldom available.

To compensate for suspected nonrandom errors, adjustments of the sample estimates are often made. For example, adjustments are frequently made for nonresponse, both total and partial. Imputations are usually made separately within various groups of sample members that have similar survey characteristics. Imputation for item nonresponse is usually made by substituting for a missing item the response to that item of a respondent having characteristics similar to those of the respondent.

Although the magnitude of nonsampling errors in the data used in *Projections of Education Statistics* is frequently unknown, idiosyncrasies that have been identified are noted on the appropriate tables.

## FEDERAL AGENCY SOURCES

### National Center for Education Statistics (NCES)

#### **Common Core of Data**

The Common Core of Data (CCD) is NCES's primary database on public elementary and secondary education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts containing data designed to be comparable across all states. This database can be used to select samples for other NCES surveys and provide basic information and descriptive statistics on public elementary and secondary schools and schooling in general.

The CCD collects statistical information annually from approximately 100,000 public elementary and secondary schools and approximately 18,000 public school districts (including supervisory unions and regional education service agencies) in the 50 states, the District of Columbia, Department of Defense (DoD) dependents schools, the Bureau of Indian Education, Puerto Rico, American Samoa, Guam, the Northern Mariana Islands, and the U.S. Virgin Islands. Three categories of information are collected in the CCD survey: general descriptive information on schools and school districts; data on students and staff; and fiscal data. The general descriptive information includes name, address, phone number, and type of locale; the data on students and staff include selected demographic characteristics; and the fiscal data pertain to revenues and current expenditures.

The *EDFacts* data collection system is the primary collection tool for the CCD. NCES works collaboratively with the Department of Education's Performance Information Management Service to develop the CCD collection procedures and data definitions. Coordinators from State Education Agencies (SEAs) submit the CCD data at different levels (school, agency, and state) to the *EDFacts* collection system. Prior to submitting CCD files to *EDFacts*, SEAs must collect and compile information from their respective Local Education Agencies (LEAs) through established administrative records systems within their state or jurisdiction.

Once SEAs have completed their submissions, the CCD survey staff analyzes and verifies the data for quality assurance. Even though the CCD is a universe collection and thus not subject to sampling errors, nonsampling errors can occur. The two potential sources of nonsampling errors are nonresponse and inaccurate reporting. NCES attempts to minimize nonsampling errors through the use of annual training of SEA coordinators, extensive quality reviews, and survey editing procedures. In addition, each year, SEAs are given the opportunity to revise their state-level aggregates from the previous survey cycle.

The CCD survey consists of six components: The Public Elementary/Secondary School Universe Survey, the Local Education Agency (School District) Universe Survey, the State Nonfiscal Survey of Public Elementary/Secondary Education, the National Public Education Financial Survey (NPEFS), the School District Fiscal Data Survey (F-33), and the Teacher Compensation Survey.

#### **Public Elementary/Secondary School Universe Survey**

The Public Elementary/Secondary School Universe Survey includes all public schools providing education services to prekindergarten, kindergarten, grade 1–12, and ungraded students. The CCD Public Elementary/Secondary School Universe Survey includes records for each public elementary and secondary school in the 50 states, the District of Columbia, American Samoa, Guam, Puerto Rico, the Commonwealth of the Northern Mariana Islands, the U.S. Virgin Islands, the Bureau of Indian Education, and the DoD dependents schools (overseas and domestic).

The Public Elementary/Secondary School Universe Survey includes data for the following variables: NCES school ID number, state school ID number, name of the school, name of the agency that operates the school, mailing address, physical location address, phone number, school type, operational status, locale code, latitude, longitude, county number, county name, full-time-equivalent (FTE) classroom teacher count, low/high grade span offered, congressional district code, school

level, students eligible for free lunch, students eligible for reduced-price lunch, total students eligible for free and reduced-price lunch, and student totals and detail (by grade, by race/ethnicity, and by sex). The survey also contains flags indicating whether a school is Title I eligible, schoolwide Title I eligible, a magnet school, a charter school, a shared-time school, or a BIE school, as well as which grades are offered at the school.

### *Local Education Agency (School District) Universe*

The coverage of the Local Education Agency Universe Survey includes all school districts and administrative units providing education services to prekindergarten, kindergarten, grade 1–12, and ungraded students. The CCD Local Education Agency Universe Survey includes records for the 50 states, the District of Columbia, Puerto Rico, the Bureau of Indian Education, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the U.S. Virgin Islands, and the DoD dependents schools (overseas and domestic).

The Local Education Agency Universe Survey includes the following variables: NCES agency ID number, state agency ID number, agency name, phone number, mailing address, physical location address, agency type code, supervisory union number, American National Standards Institute (ANSI) state and county code, county name, core based statistical area (CBSA) code, metropolitan/micropolitan code, metropolitan status code, district locale code, congressional district code, operational status code, BIE agency status, low/high grade span offered, agency charter status, number of schools, number of full-time-equivalent (FTE) teachers, number of ungraded students, number of PK–12 students, number of special education/Individualized Education Program (IEP) students, number of English language learner (ELL) students, instructional staff fields, support staff fields, and a flag indicating whether student counts by race/ethnicity were reported by five or seven racial/ethnic categories.

### *State Nonfiscal Survey of Public Elementary/Secondary Education*

The State Nonfiscal Survey of Public Elementary/Secondary Education for the 2011–12 school year provides state-level, aggregate information about students and staff in public elementary and secondary education. It includes data from the 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, the Commonwealth of the Northern Mariana Islands, and Guam. The DoD dependents schools (overseas and domestic), the Bureau of Indian Education, and American Samoa did not report data for the 2011–12 school year. This survey covers public school student membership by grade, race/ethnicity, and state or jurisdiction and covers number of staff in public schools by category and state or jurisdiction. Beginning with the 2006–07 school year, the number of diploma recipients and other high school completers are no longer included in the State Nonfiscal Survey of Public Elementary/Secondary Education file. These data are now published in the public-use Common Core of Data State Dropout and Completion Data File.

### *National Public Education Financial Survey*

The purpose of the National Public Education Financial Survey (NPEFS) is to provide district, state, and federal policymakers, researchers, and other interested users with descriptive information about revenues and expenditures for public elementary and secondary education. The data collected are useful to (1) chief officers of state education agencies; (2) policymakers in the executive and legislative branches of federal and state governments; (3) education policy and public policy researchers; and (4) the public, journalists, and others.

Data for NPEFS are collected from SEAs in the 50 states, the District of Columbia, Puerto Rico, and four other jurisdictions (American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, and the U.S. Virgin Islands). The data file is organized by state or jurisdiction and contains revenue data by funding source; expenditure data by function (the activity being supported by the expenditure) and object (the category of expenditure); average daily attendance data; and total student membership data from the CCD State Nonfiscal Survey of Public Elementary/Secondary Education.

### *School District Finance Survey*

The purpose of the School District Finance Survey (F-33) is to provide finance data for all local education agencies (LEAs) that provide free public elementary and secondary education in the United States. National and state totals are not included (national- and state-level figures are presented, however, in the National Public Education Financial Survey [NPEFS]).

Both NCES and the Governments Division of the U.S. Census Bureau collect public school system finance data, and they collaborate in their efforts to gather these data. The Census Bureau acts as the primary collection agent and produces two data files: one for distribution and reporting by the Census Bureau and the other for distribution and reporting by NCES.

The data file for the fiscal year (FY) 2009 CCD School District Finance Survey (F-33) contains 16,563 records representing the public elementary and secondary education agencies in the 50 states and the District of Columbia. The F-33 file includes variables for revenues by source, expenditures by function, indebtedness, assets, student membership counts, as well as identification variables.

The FY 2011 F-33 data file contains 18,297 records representing the public elementary and secondary education agencies in the 50 states and the District of Columbia. The file includes variables for revenues by source, expenditures by function and object, indebtedness, assets, student membership counts, as well as identification variables.

### ***Teacher Compensation Survey***

The Teacher Compensation Survey (TCS) collects total compensation, teacher status, and demographic data about individual teachers from multiple states. Twenty-three (23) states participated in the TCS for school year 2008–09. Participating states provided data on salaries, years of teaching experience, highest degree earned, race/ethnicity, and gender for each public school teacher.

Further information on the nonfiscal CCD data may be obtained from

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Further information on the fiscal CCD data may be obtained from

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### ***Integrated Postsecondary Education Data System***

The Integrated Postsecondary Education Data System (IPEDS) surveys approximately 7,500 postsecondary institutions, including universities and colleges, as well as institutions offering technical and vocational education beyond the high school level. IPEDS, an annual universe collection that began in 1986, replaced the Higher Education General Information Survey (HEGIS). In order to present data in a timely manner, *Digest of Education Statistics* tables use “provisional” IPEDS data. These data have been fully reviewed, edited, and imputed, but do not incorporate data revisions submitted by institutions after the close of data collection.

IPEDS consists of interrelated survey components that provide information on postsecondary institutions, student enrollment, programs offered, degrees and certificates conferred, and both the human and financial resources involved in the provision of institutionally based postsecondary education. Prior to 2000, the IPEDS survey had the following subject-matter components: Graduation Rates; Fall Enrollment; Institutional Characteristics; Completions; Salaries, Tenure, and Fringe Benefits of Full-Time Faculty; Fall Staff; Finance; and Academic Libraries (in 2000, the Academic Libraries component became a survey separate from IPEDS). Since 2000, IPEDS survey components occurring in a particular collection year have been organized into three seasonal collection periods: fall, winter, and spring. The Institutional Characteristics and Completions components first took place during the fall 2000 collection; the Employees by Assigned Position (EAP), Salaries, and Fall Staff components first took place during the winter 2001–02 collection; and the Enrollment, Student Financial Aid, Finance, and Graduation Rates components first took place during the spring 2001 collection. In the winter 2005–06 data collection, the Employees by Assigned Position, Fall Staff, and Salaries components were merged into the Human Resources component. During the 2007–08 collection year, the Enrollment component was broken into two separate components: 12-Month Enrollment (taking place in the fall collection) and Fall Enrollment (taking place in the spring collection). In the 2011–12 IPEDS data collection year, the Student Financial Aid component was moved to the winter data collection to aid in the timing of the net price of attendance calculations displayed on the College Navigator (<http://nces.ed.gov/collegenavigator>). In the 2012–13 IPEDS data collection year, the Human Resources component was moved to the spring data collection.

Beginning in 2008–09, the first-professional degree category was combined with the doctor’s degree category. However, some degrees formerly identified as first-professional that take more than two full-time-equivalent academic years to complete, such as those in Theology (M.Div, M.H.L./Rav), are included in the Master’s degree category. Doctor’s degrees were broken out into three distinct categories: research/scholarship, professional practice, and other doctor’s degrees.

IPEDS race/ethnicity data collection also changed in 2008–09. The “Asian” race category is now separate from a “Native Hawaiian or Other Pacific Islander” category. Survey takers also have the option of identifying themselves as being of “Two or more races.” To reflect the recognition that “Hispanic” refers to ethnicity, not race, the new Hispanic category reads “Hispanics of any race.”

The degree-granting institutions portion of IPEDS is a census of colleges that award associate’s or higher degrees and are eligible to participate in Title IV financial aid programs. Prior to 1993, data from technical and vocational institutions were collected through a sample survey. Beginning in 1993, all data are gathered in a census of all postsecondary institutions. Beginning in 1997, the survey was restricted to institutions participating in Title IV programs. The tabulations on “institutional characteristics” developed for editions of the *Digest of Education Statistics* from 1993 forward are based on lists of all institutions and are not subject to sampling errors.

The classification of institutions offering college and university education changed as of 1996. Prior to 1996, institutions that had courses leading to an associate’s or higher degree or that had courses accepted for credit toward those degrees were considered higher education institutions. Higher education institutions were accredited by an agency or association that was recognized by the U.S. Department of Education or were recognized directly by the Secretary of Education. Tables, or portions of tables, that use only this standard are noted as “higher education” in the *Digest of Education Statistics*. The newer standard includes institutions that award associate’s or higher degrees and that are eligible to participate in Title IV federal financial aid programs. Tables that contain any data according to this standard are titled “degree-granting” institutions. Time-series tables may contain data from both series, and they are noted accordingly. The impact of this change on data collected in 1996 was not large. For example, tables on faculty salaries and benefits were only affected to a very small extent. Also, degrees awarded at the bachelor’s level or higher were not heavily affected. The largest impact was on private 2-year college enrollment. In contrast, most of the data on public 4-year colleges were affected to a minimal extent. The impact on enrollment in public 2-year colleges was noticeable in certain states, such as Arizona, Arkansas, Georgia, Louisiana, and Washington, but was relatively small at the national level. Overall, total enrollment for all institutions was about one-half of a percent higher in 1996 for degree-granting institutions than for higher education institutions.

Prior to the establishment of IPEDS in 1986, HEGIS acquired and maintained statistical data on the characteristics and operations of institutions of higher education. Implemented in 1966, HEGIS was an annual universe survey of institutions accredited at the college level by an agency recognized by the Secretary of the U.S. Department of Education. These institutions were listed in NCES’s *Education Directory, Colleges and Universities*.

HEGIS surveys collected information on institutional characteristics, faculty salaries, finances, enrollment, and degrees. Since these surveys, like IPEDS, were distributed to all higher education institutions, the data presented are not subject to sampling error. However, they are subject to nonsampling error, the sources of which varied with the survey instrument.

The NCES Taskforce for IPEDS Redesign recognized that there were issues related to the consistency of data definitions as well as the accuracy, reliability, and validity of other quality measures within and across surveys. The IPEDS redesign in 2000 provided institution-specific web-based data forms. While the new system shortened data processing time and provided better data consistency, it did not address the accuracy of the data provided by institutions.

Beginning in 2003–04 with the Prior Year Data Revision System, prior-year data have been available to institutions entering current data. This allows institutions to make changes to their prior-year entries either by adjusting the data or by providing missing data. These revisions allow the evaluation of the data’s accuracy by looking at the changes made.

NCES conducted a study (NCES 2005-175) of the 2002–03 data that were revised in 2003–04 to determine the accuracy of the imputations, track the institutions that submitted revised data, and analyze the revised data they submitted. When institutions made changes to their data, it was assumed that the revised data were the “true” data. The data were analyzed for the number and type of institutions making changes, the type of changes, the magnitude of the changes, and the impact on published data.

Because NCES imputes for missing data, imputation procedures were also addressed by the Redesign Taskforce. For the 2003–04 assessment, differences between revised values and values that were imputed in the original files were compared (i.e., revised value minus imputed value). These differences were then used to provide an assessment of the effectiveness of imputation procedures. The size of the differences also provides an indication of the accuracy of imputation procedures. To

assess the overall impact of changes on aggregate IPEDS estimates, published tables for each component were reconstructed using the revised 2002–03 data. These reconstructed tables were then compared to the published tables to determine the magnitude of aggregate bias and the direction of this bias.

The fall 2011 and spring 2012 data collections were entirely web-based. Data were provided by “keyholders,” institutional representatives appointed by campus chief executives, who were responsible for ensuring that survey data submitted by the institution were correct and complete. Because Title IV institutions are the primary focus of IPEDS and because these institutions are required to respond to the survey, response rates for Title IV institutions in the fall 2011 IPEDS collection were high. The Institutional Characteristics (IC) component response rate among all Title IV entities was 100.0 percent (all 7,479 Title IV entities responded). In addition, the response rates for the Completions and 12-Month Enrollment components were also 100.0 percent. More details on the accuracy and reliability of IPEDS data can be found in the *Integrated Postsecondary Education Data System Data Quality Study* (NCES 2005-175).

Further information on IPEDS may be obtained from

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<http://nces.ed.gov/ipeds>

#### *Fall (12-Month Enrollment)*

Data on 12-month enrollment are collected for award levels ranging from postsecondary certificates of less than 1 year to doctoral degrees. The 12-month period during which data are collected is July 1 through June 30. Data are collected by race/ethnicity and gender and include unduplicated headcounts and instructional activity (contact or credit hours). These data are also used to calculate a full-time-equivalent (FTE) enrollment based on instructional activity. FTE enrollment is useful for gauging the size of the educational enterprise at the institution. Prior to the 2007–08 IPEDS data collection, the data collected in the 12-Month Enrollment component were part of the Fall Enrollment component, which is conducted during the spring data collection period. However, to improve the timeliness of the data, a separate 12-Month Enrollment survey component was developed in 2007. These data are now collected in the fall for the previous academic year. Of the 7,407 Title IV entities that were expected to respond to the 12-Month Enrollment component of the fall 2012 data collection, 7,403 responded, for an approximate response rate of 100.0 percent.

Further information on the IPEDS 12-Month Enrollment component may be obtained from

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Postsecondary Branch  
National Center for Education Statistics  
Potomac Center Plaza  
550 12th Street SW  
Washington, DC 20202  
<http://nces.ed.gov/ncestaff/SurvDetl.asp?surveyID=010>

#### *Fall (Completions)*

This survey was part of the HEGIS series throughout its existence. However, the degree classification taxonomy was revised in 1970–71, 1982–83, 1991–92, 2002–03, and 2009–10. Collection of degree data has been maintained through IPEDS.

Degrees-conferred trend tables arranged by the 2009–10 classification are included in the *Digest of Education Statistics* to provide consistent data from 1970–71 through the most recent year. Data in this edition on associate’s and other formal awards below the baccalaureate degree, by field of study, cannot be made comparable with figures from years prior to 1982–83. The nonresponse rate does not appear to be a significant source of nonsampling error for this survey. The response rate over the years has been high; for the fall 2012 Completions component, it was about 100.0 percent. Because of the high response rate, there was no need to conduct a nonresponse bias analysis. Imputation methods for the fall 2012 Completions component are discussed in *Postsecondary Institutions and Cost of Attendance in 2012–13; Degrees and Other Awards Conferred*,

2011–12; and 12-Month Enrollment, 2011–12 (NCES 2013-289rev). The *Integrated Postsecondary Education Data System Data Quality Study* (NCES 2005-175) indicated that most Title IV institutions supplying revised data on completions in 2003–04 were able to supply missing data for the prior year. The small differences between imputed data for the prior year and the revised actual data supplied by the institution indicated that the imputed values produced by NCES were acceptable.

Further information on the IPEDS Completions component may be obtained from

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Potomac Center Plaza  
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<http://nces.ed.gov/ncestaff/SurvDetl.asp?surveyID=010>

### *Fall (Institutional Characteristics)*

This survey collects the basic information necessary to classify institutions, including control, level, and types of programs offered, as well as information on tuition, fees, and room and board charges. Beginning in 2000, the survey collected institutional pricing data from institutions with first-time, full-time, degree/certificate-seeking undergraduate students. Unduplicated full-year enrollment counts and instructional activity are now collected in the Fall Enrollment survey. Beginning in 2008–09, student financial aid data collected include greater detail. The overall unweighted response rate was 100.0 percent for Title IV degree-granting institutions for 2009 data. In the fall 2012 data collection, the response rate for the Institutional Characteristics component among all Title IV entities was about 100.0 percent. Of the 7,476 Title IV entities expected to respond to the Institutional Characteristics component, 7,474 responded. In addition, data from 10 institutions that responded to the Institutional Characteristics component contained item nonresponse, and these missing items were imputed. Imputation methods for the fall 2012 Institutional Characteristics component are discussed in the 2012–13 *Integrated Postsecondary Education Data System (IPEDS) Methodology Report* (NCES 2013-293). The *Integrated Postsecondary Education Data System Data Quality Study* (NCES 2005-175) looked at tuition and price in Title IV institutions. Only 8 percent of institutions in 2002–03 and 2003–04 reported the same data to IPEDS and Thomson Peterson consistently across all selected data items. Differences in wordings or survey items may account for some of these inconsistencies.

Further information on the IPEDS Institutional Characteristics component may be obtained from

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### *Winter (Student Financial Aid)*

This component was part of the spring data collection from IPEDS data collection years 2000–01 to 2010–11, but it moved to the winter data collection starting with the 2011–12 IPEDS data collection year. This move will aid in the timing of the net price of attendance calculations displayed on College Navigator (<http://nces.ed.gov/collegenavigator>).

Financial aid data are collected for undergraduate students. Data are collected regarding federal grants, state and local government grants, institutional grants, and loans. The collected data include the number of students receiving each type of financial assistance and the average amount of aid received by type of aid. Beginning in 2008–09, student financial aid data collected includes greater detail on types of aid offered.

In the winter 2012–13 data collection, the Student Financial Aid component presented data on the number of first-time, full-time degree- and certificate-seeking undergraduate financial aid recipients for the 2011–12 academic year. Of the 7,064 Title IV institutions expected to respond to the Student Financial Aid component, 7,058 Title IV institutions responded, resulting in a response rate of about 99.9 percent.



Further information on the IPEDS Student Financial Aid component may be obtained from

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### *Spring (Fall Enrollment)*

This survey has been part of the HEGIS and IPEDS series since 1966. Response rates for this survey have been relatively high, generally exceeding 85 percent. Beginning in 2000, with web-based data collection, higher response rates were attained. In the spring 2013 data collection, where the Fall Enrollment component covered fall 2012, the response rate was 99.9 percent. Data collection procedures for the Fall Enrollment component of the spring 2013 data collection are presented in *Enrollment in Postsecondary Institutions, Fall 2012; Financial Statistics, Fiscal Year 2012; Graduation Rates, Selected Cohorts, 2004–09; and Employees in Postsecondary Institutions, Fall 2012* (NCES 2013-183).

Beginning with the fall 1986 survey and the introduction of IPEDS (see above), the survey was redesigned. The survey allows (in alternating years) for the collection of age and residence data. Beginning in 2000, the survey collected instructional activity and unduplicated headcount data, which are needed to compute a standardized, full-time-equivalent (FTE) enrollment statistic for the entire academic year. As of 2007–08, the timeliness of the instructional activity data has been improved by collecting these data in the fall as part of the 12-Month-Enrollment component instead of in the spring as part of the Fall Enrollment component.

The *Integrated Postsecondary Education Data System Data Quality Study* (NCES 2005-175) showed that public institutions made the majority of changes to enrollment data during the 2004 revision period. The majority of changes were made to unduplicated headcount data, with the net differences between the original data and the revised data at about 1 percent. Part-time students in general and enrollment in private not-for-profit institutions were often underestimated. The fewest changes by institutions were to Classification of Instructional Programs (CIP) code data. (The CIP is a taxonomic coding scheme that contains titles and descriptions of primarily postsecondary instructional programs.)

Further information on the IPEDS Fall Enrollment component may be obtained from

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### *Spring (Finance)*

This survey was part of the HEGIS series and has been continued under IPEDS. Substantial changes were made in the financial survey instruments in fiscal year (FY) 1976, FY 82, FY 87, FY 97, and FY 02. While these changes were significant, considerable effort has been made to present only comparable information on trends in this report and to note inconsistencies. The FY 76 survey instrument contained numerous revisions to earlier survey forms, which made direct comparisons of line items very difficult. Beginning in FY 82, Pell Grant data were collected in the categories of federal restricted grant and contract revenues and restricted scholarship and fellowship expenditures. Finance tables for this publication have been adjusted by subtracting the largely duplicative Pell Grant amounts from the later data to maintain comparability with pre-FY 82 data. The introduction of IPEDS in the FY 87 survey included several important changes to the survey instrument and data processing procedures. Beginning in FY 97, data for private institutions were collected using new financial concepts consistent with Financial Accounting Standards Board (FASB) reporting standards, which provide a more comprehensive view of college finance activities. The data for public institutions continued to be collected using the older survey form. The data for public and private institutions were no longer comparable and, as a result, no longer presented together in analysis tables. In FY 01, public institutions had

the option of either continuing to report using Government Accounting Standards Board (GASB) standards or using the new FASB reporting standards. Beginning in FY 02, public institutions had three options: the original GASB standards, the FASB standards, or the new GASB Statement 35 standards (GASB35). Because of the complexity of the multiple forms used by public institutions, finance data for public institutions for some recent years are not presented in the *Digest of Education Statistics*.

Possible sources of nonsampling error in the financial statistics include nonresponse, imputation, and misclassification. The unweighted response rate has been about 85 to 90 percent for most of the historic years presented in the *Digest of Education Statistics*; however, in more recent years, response rates have been much higher because Title IV institutions are required to respond. The 2002 IPEDS data collection was a full-scale web-based collection, which offered features that improved the quality and timeliness of the data. The ability of IPEDS to tailor online data entry forms for each institution based on characteristics such as institutional control, level of institution, and calendar system, and the institutions' ability to submit their data online, were two such features that improved response.

The response rate for the FY 2012 Finance survey component was 99.8 percent. Data collection procedures for the FY 2012 survey are discussed in *Enrollment in Postsecondary Institutions, Fall 2012*; *Financial Statistics, Fiscal Year 2012*; *Graduation Rates, Selected Cohorts, 2004–09*; and *Employees in Postsecondary Institutions, Fall 2012: First Look (Provisional Data)* (NCES 2013-183).

Two general methods of imputation were used in HEGIS. If prior-year data were available for a nonresponding institution, they were inflated using the Higher Education Price Index and adjusted according to changes in enrollments. If prior-year data were not available, current data were used from peer institutions selected for location (state or region), control, level, and enrollment size of institution. In most cases, estimates for nonreporting institutions in HEGIS were made using data from peer institutions.

Beginning with FY 87, IPEDS included all postsecondary institutions, but maintained comparability with earlier surveys by allowing 2- and 4-year institutions to be tabulated separately. For FY 87 through FY 91, in order to maintain comparability with the historical time series of HEGIS institutions, data were combined from two of the three different survey forms that make up IPEDS. The vast majority of the data were tabulated from form 1, which was used to collect information from public and private not-for-profit 2- and 4-year colleges. Form 2, a condensed form, was used to gather data for 2-year for-profit institutions. Because of the differences in the data requested on the two forms, several assumptions were made about the form 2 reports so that their figures could be included in the degree-granting institution totals.

In IPEDS, the form 2 institutions were not asked to separate appropriations from grants and contracts, nor were they asked to separate state from local sources of funding. For the form 2 institutions, all federal revenues were assumed to be federal grants and contracts, and all state and local revenues were assumed to be restricted state grants and contracts. All other form 2 sources of revenue, except for tuition and fees and sales and services of educational activities, were included under "other." Similar adjustments were made to the expenditure accounts. The form 2 institutions reported instruction and scholarship and fellowship expenditures only. All other educational and general expenditures were allocated to academic support.

The *Integrated Postsecondary Education Data System Data Quality Study* (NCES 2005-175) found that only a small percentage (2.9 percent, or 168) of postsecondary institutions either revised 2002–03 data or submitted data for items they previously left unreported. Though relatively few institutions made changes, the changes made were relatively large—greater than 10 percent of the original data. With a few exceptions, these changes, large as they were, did not greatly affect the aggregate totals.

Further information on the IPEDS Finance component may be obtained from

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### *Spring (Graduation Rates and Graduation Rates 200 Percent)*

Graduation rates data are collected for full-time, first-time degree- and certificate-seeking undergraduate students. Data included are the number of students entering the institution as full-time, first-time degree- or certificate-seeking students in a particular year (cohort), by race/ethnicity and gender; the number of students completing their program within a time period equal to 1½ times (150 percent) the normal period of time; and the number of students who transferred to other institutions.

In the spring 2013 data collection, the Graduation Rates component collected counts of full-time, first-time degree- and certificate-seeking undergraduate students entering an institution in the cohort year (4-year institutions used the cohort year 2006; less-than-4-year institutions used the cohort year 2009), and their completion status as of August 31, 2012 (150 percent of normal program completion time) at the institution initially entered. The response rate for this component was 99.9 percent.

The 200 Percent Graduation Rates component collected counts of full-time, first-time degree- and certificate-seeking undergraduate students beginning their postsecondary education in the reference period and their completion status as of August 31, 2012 (200 percent of normal program completion time) at the same institution where the students started. Four-year institutions report on bachelor's or equivalent degree-seeking students and use cohort year 2004 as the reference period, while less-than-4-year institutions report on all students in the cohort and use cohort year 2008 as the reference period. The response rate for this component was 99.9 percent.

Further information on the IPEDS Graduation component may be obtained from

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National Center for Education Statistics  
Potomac Center Plaza  
550 12th Street SW  
Washington, DC 20202  
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### *Spring (Human Resources)*

The IPEDS Human Resources (HR) component was part of the winter data collection from IPEDS data collection years 2000–01 to 2011–12. For the 2012–13 data collection year, the HR component was moved to the spring 2013 data collection, in order to give institutions more time to prepare their survey responses (the spring and winter collections begin on the same date, but the reporting deadline for the spring collection is several weeks later than the reporting deadline for the winter collection).

### **Human Resources, 2012–13 Collection Year**

In 2012–13, new occupational categories replaced the primary function/occupational activity categories previously used in the IPEDS HR component. This change was required in order to align the IPEDS HR categories with the 2010 Standard Occupational Classification (SOC) system. In tandem with the change in 2012–13 from using primary function/occupational activity categories to using the new occupational categories, the sections making up the IPEDS HR component (which previously had been Employees by Assigned Position [EAP], Fall Staff, and Salaries) were changed to Full-Time Instructional Staff, Full-time Noninstructional Staff, Salaries, Part-Time Staff, and New Hires.

The webpage “Changes to the 2012–13 IPEDS Data Collection and Changes to Occupational Categories for the 2012–13 Human Resources Data Collection” (<http://nces.ed.gov/ipeds/surveys/datacollection2012-13.asp>) provides information on the redesigned IPEDS Human Resources component. “Resources for Implementing Changes to the IPEDS Human Resources (HR) Survey Component Due to Updated 2010 Standard Occupational Classification (SOC) System” (<http://nces.ed.gov/ipeds/resource/soc.asp>) is a webpage containing additional information, including notes comparing the new classifications with the old (“Comparison of New IPEDS Occupational Categories with Previous Categories”), a crosswalk from the new IPEDS occupational categories to the 2010 SOC occupational categories (“New IPEDS Occupational Categories and 2010 SOC”), answers to frequently asked questions, and a link to current IPEDS HR survey screens.

### **Human Resources, Collection Years Prior to 2012–13**

In IPEDS collection years prior to 2012–13, the Human Resources component was composed of three sections: Employees by Assigned Position (EAP), Fall Staff, and Salaries.

Data gathered by the Employees by Assigned Position (EAP) section categorizes all employees by full- or part-time status, faculty status, and primary function/occupational activity. Institutions with M.D. or D.O. programs are required to report their medical school employees separately. A response to the EAP was required of all 6,858 Title IV institutions and administrative offices in the United States and other jurisdictions for winter 2008–09, and 6,845, or 99.8 percent unweighted, responded. Of the 6,970 Title IV institutions and administrative offices required to respond to the winter 2009–10 EAP, 6,964, or 99.9 percent, responded. And of the 7,256 Title IV institutions and administrative offices required to respond to the EAP for winter 2010–11, 7,252, or 99.9 percent, responded.

The main functions/occupational activities of the EAP section are primarily instruction, instruction combined with research and/or public service, primarily research, primarily public service, executive/administrative/managerial, other professionals (support/service), graduate assistants, technical and paraprofessionals, clerical and secretarial, skilled crafts, and service/maintenance.

All full-time instructional faculty classified in the EAP full-time non-medical school part as either (1) primarily instruction or (2) instruction combined with research and/or public service are included in the Salaries section, unless they are exempt.

The Fall Staff section categorizes all staff on the institution's payroll as of November 1 of the collection year by employment status (full time or part time), primary function/occupational activity, gender, and race/ethnicity. These data elements are collected from degree-granting and non-degree-granting institutions; however, additional data elements are collected from degree-granting institutions and related administrative offices with 15 or more full-time staff. These elements include faculty status, contract length/teaching period, academic rank, salary class intervals, and newly hired full-time permanent staff.

The Fall Staff section, which is required only in odd-numbered reporting years, was not required during the 2008–09 HR data collection. However, of the 6,858 Title IV institutions and administrative offices in the United States and other jurisdictions, 3,295, or 48.0 percent unweighted, did provide data in the Fall Staff section that year. During the 2009–10 HR data collection, when all 6,970 Title IV institutions and administrative offices were required to respond to the Fall Staff section, 6,964, or 99.9 percent, did so. A response to the Fall Staff section of the 2010–11 HR collection was optional, and 3,364 Title IV institutions and administrative offices responded that year (a response rate of 46.3 percent).

The *Integrated Postsecondary Education Data System Data Quality Study* (NCES 2005-175) found that for 2003–04 employee data items, changes were made by 1.2 percent (77) of the institutions that responded. All who made changes made changes that resulted in different employee counts. For both institutional and aggregate differences, the changes had little impact on the original employee count submissions. A large number of institutions reported different staff data to IPEDS and Thomson Peterson; however, the magnitude of the differences was small—usually no more than 17 faculty members for any faculty variable.

The Salaries section collects data for full-time instructional faculty (except those in medical schools in the EAP section, described above) on the institution's payroll as of November 1 of the collection year by contract length/teaching period, gender, and academic rank. The reporting of data by faculty status in the Salaries section is required from 4-year degree-granting institutions and above only. Salary outlays and fringe benefits are also collected for full-time instructional staff on 9/10- and 11/12-month contracts/teaching periods. This section is applicable to degree-granting institutions unless exempt.

This institutional survey was conducted for most years from 1966–67 to 1987–88; it has been conducted annually since 1989–90, except for 2000–01. Although the survey form has changed a number of times during these years, only comparable data are presented.

Between 1966–67 and 1985–86, this survey differed from other HEGIS surveys in that imputations were not made for nonrespondents. Thus, there is some possibility that the salary averages presented in this report may differ from the results of a complete enumeration of all colleges and universities. Beginning with the surveys for 1987–88, the IPEDS data tabulation procedures included imputations for survey nonrespondents. The unweighted response rate for the 2008–09 Salaries survey section was 99.9 percent. The response rate for the 2009–10 Salaries section was 100.0 percent (4,453 of the 4,455 required institutions responded), and the response rate for 2010–11 was 99.9 percent (4,561 of the 4,565 required institutions responded). Imputation methods for the 2010–11 Salaries survey section are discussed in *Employees in Postsecondary Institutions, Fall 2010, and Salaries of Full-Time Instructional Staff, 2010–11* (NCES 2012-276).

Although data from this survey are not subject to sampling error, sources of nonsampling error may include computational errors and misclassification in reporting and processing. The electronic reporting system does allow corrections to prior-year reported or missing data, and this should help with these problems. Also, NCES reviews individual institutions' data for internal and longitudinal consistency and contacts institutions to check inconsistent data.

The *Integrated Postsecondary Education Data System Data Quality Study* (NCES 2005-175) found that only 1.3 percent of the responding Title IV institutions in 2003–04 made changes to their salaries data. The differences between the imputed data and the revised data were small and found to have little impact on the published data.

Further information on the Human Resources component may be obtained from

IPEDS Staff  
Administrative Data Division  
Postsecondary Branch  
National Center for Education Statistics  
Potomac Center Plaza  
550 12th Street SW  
Washington, DC 20202  
<http://nces.ed.gov/ncestaff/SurvDetl.asp?surveyID=010>

### **Private School Universe Survey**

The purposes of the Private School Universe Survey (PSS) data collection activities are (1) to build an accurate and complete list of private schools to serve as a sampling frame for NCES sample surveys of private schools and (2) to report data on the total number of private schools, teachers, and students in the survey universe. Begun in 1989 under the U.S. Census Bureau, the PSS has been conducted every 2 years, and data for the 1989–90, 1991–92, 1993–94, 1995–96, 1997–98, 1999–2000, 2001–02, 2003–04, 2005–06, 2007–08, and 2009–10 school years have been released. A First Look report of the 2011–12 PSS data, *Characteristics of Private Schools in the United States: Results From the 2011–12 Private School Universe Survey* (NCES 2013-316) was published in July 2013.

The PSS produces data similar to that of the CCD for public schools, and can be used for public-private comparisons. The data are useful for a variety of policy- and research-relevant issues, such as the growth of religiously affiliated schools, the number of private high school graduates, the length of the school year for various private schools, and the number of private school students and teachers.

The target population for this universe survey is all private schools in the United States that meet the PSS criteria of a private school (i.e., the private school is an institution that provides instruction for any of grades K through 12, has one or more teachers to give instruction, is not administered by a public agency, and is not operated in a private home).

The survey universe is composed of schools identified from a variety of sources. The main source is a list frame initially developed for the 1989–90 PSS. The list is updated regularly by matching it with lists provided by nationwide private school associations, state departments of education, and other national guides and sources that list private schools. The other source is an area frame search in approximately 124 geographic areas, conducted by the U.S. Census Bureau.

Of the 40,302 schools included in the 2009–10 sample, 10,229 were found ineligible for the survey. Those not responding numbered 1,856, and those responding numbered 28,217. The unweighted response rate for the 2009–10 PSS survey was 93.8 percent.

Of the 39,325 schools included in the 2011–12 sample, 10,030 cases were considered as out-of-scope (not eligible for the PSS). A total of 26,983 private schools completed a PSS interview (15.8 percent completed online), while 2,312 schools refused to participate, resulting in an unweighted response rate of 92.1 percent.

Further information on the PSS may be obtained from

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### **Schools and Staffing Survey**

The Schools and Staffing Survey (SASS) is a set of related questionnaires that collect descriptive data on the context of public and private elementary and secondary education. Data reported by districts, schools, principals, and teachers provide a variety of statistics on the condition of education in the United States that may be used by policymakers and the general public. The SASS system covers a wide range of topics, including teacher demand, teacher and principal characteristics, teachers' and principals' perceptions of school climate and problems in their schools, teacher and principal compensation, district hiring and retention practices, general conditions in schools, and basic characteristics of the student population.

SASS data are collected through a mail questionnaire with telephone and in-person field follow-up. SASS has been conducted by the Census Bureau for NCES since the first administration of the survey, which was conducted during the 1987–88 school year. Subsequent SASS administrations were conducted in 1990–91, 1993–94, 1999–2000, 2003–04, 2007–08, and 2011–12.

SASS is designed to produce national, regional, and state estimates for public elementary and secondary schools, school districts, principals, teachers, and school library media centers and national and regional estimates for public charter schools, as well as principals, teachers, and school library media centers within these schools. For private schools, the sample supports national, regional, and affiliation estimates for schools, principals, and teachers.

From its inception, SASS has had four core components: school questionnaires, teacher questionnaires, principal questionnaires, and school district (prior to 1999–2000, “teacher demand and shortage”) questionnaires. A fifth component, school library media center questionnaires, was introduced in the 1993–94 administration and has been included in every subsequent administration of SASS. School library data were also collected in the 1990–91 administration of the survey through the school and principal questionnaires.

School questionnaires used in SASS include the Public and Private School Questionnaires; teacher questionnaires include the Public and Private School Teacher Questionnaires; principal questionnaires include the Public and Private School Principal (or School Administrator) Questionnaires; and school district questionnaires include the School District (or Teacher Demand and Shortage) Questionnaires.

Although the four core questionnaires and the school library media questionnaires have remained relatively stable over the various administrations of SASS, the survey has changed to accommodate emerging issues in elementary and secondary education. Some items have been added, some have been deleted, and some questionnaire items have been reworded.

During the 1990–91 SASS cycle, NCES worked with the Office of Indian Education to add an Indian School Questionnaire to SASS, and it remained a part of SASS through 2007–08. The Indian School Questionnaire explores the same school-level issues that the Public and Private School Questionnaires explore, allowing comparisons among the three types of schools. The 1990–91, 1993–94, 1999–2000, 2003–04, and 2007–08 administrations of SASS obtained data on Bureau of Indian Education (BIE) schools (schools funded or operated by the BIE), but the 2011–12 administration did not obtain BIE data. SASS estimates for all survey years presented in this report exclude BIE schools, and as a result, estimates in this report may differ from those in previously published reports.

School library media center questionnaires were administered in public, private, and BIE schools as part of the 1993–1994 and 1999–2000 SASS. During the 2003–04 administration of SASS, only library media centers in public schools were surveyed, and in 2007–08 only library media centers in public schools and BIE and BIE-funded schools were surveyed. The 2011–12 survey collected data only on school library media centers in traditional public schools and in public charter schools. School library questions focused on facilities, services and policies, staffing, technology, information literacy, collections and expenditures, and media equipment. New or revised topics included access to online licensed databases, resource availability, and additional elements on information literacy. The Student Records and Library Media Specialist/Librarian Questionnaires were administered only in 1993–94.

As part of the 1999–2000 SASS, the Charter School Questionnaire was sent to the universe of charter schools in operation in 1998–99. In 2003–04 and in subsequent administrations of SASS, there was no separate questionnaire for charter schools—charter schools were included in the public school sample instead. Another change in the 2003–04 administration of SASS was a revised data collection procedure using a primary in-person contact within the school intended to reduce the field follow-up phase.

The SASS teacher surveys collect information on the characteristics of teachers, such as their age, race/ethnicity, years of teaching experience, average number of hours per week spent on teaching activities, base salary, average class size, and highest degree earned. These teacher-reported data may be combined with related information on their school’s characteristics, such as school type (e.g., public traditional, public charter, Catholic, private other religious, and private nonsectarian), community type, and school enrollment size. The teacher questionnaires also ask for information on teacher opinions regarding the school and teaching environment. In 1993–94, about 53,000 public school teachers and 10,400 private school teachers were sampled. In 1999–2000, about 56,300 public school teachers, 4,400 public charter school teachers, and 10,800 private school teachers were sampled. In 2003–04, about 52,500 public school teachers and 10,000 private school teachers were sampled. In 2007–08, about 48,400 public school teachers and 8,200 private school teachers were sampled. In 2011–12, about 51,100 public school teachers and 7,100 private school teachers were sampled. Weighted overall response rates in 2011–12 were 61.8 percent for public school teachers and 50.1 percent for private school teachers.

The SASS principal surveys focus on such topics as age, race/ethnicity, sex, average annual salary, years of experience, highest degree attained, perceived influence on decisions made at the school, and hours spent per week on all school activities. These data on principals can be placed in the context of other SASS data, such as the type of the principal's school (e.g., public traditional, public charter, Catholic, other religious, or nonsectarian), enrollment, and percentage of students eligible for free or reduced price lunch. In 2003–04, about 10,200 public school principals were sampled, and in 2007–08, about 9,800 public school principals were sampled. In 2011–12, about 11,000 public school principals and 3,000 private school principals were sampled. Weighted response rates in 2011–12 for public school principals and private school principals were 72.7 percent and 64.7 percent, respectively.

The SASS 2011–12 sample of schools was confined to the 50 states and the District of Columbia and excludes the other jurisdictions, the Department of Defense overseas schools, the BIE schools, and schools that do not offer teacher-provided classroom instruction in grades 1–12 or the ungraded equivalent. The SASS 2011–12 sample included 10,250 traditional public schools, 750 public charter schools, and 3,000 private schools.

The public school sample for the 2011–12 SASS was based on an adjusted public school universe file from the 2009–10 Common Core of Data (CCD), a database of all the nation's public school districts and public schools. The private school sample for the 2011–12 SASS was selected from the 2009–10 Private School Universe Survey (PSS), as updated for the 2011–12 PSS. This update collected membership lists from private school associations and religious denominations, as well as private school lists from state education departments. The 2011–12 SASS private school frame was further augmented by the inclusion of additional schools that were identified through the 2009–10 PSS area frame data collection.

Additional resources available regarding SASS include the methodology report *Quality Profile for SASS, Rounds 1–3: 1987–1995, Aspects of the Quality of Data in the Schools and Staffing Surveys (SASS)* (NCES 2000-308), as well as these reports: *Survey Documentation for the 2011–12 Schools and Staffing Survey* (Chambers et al. forthcoming) and *User's Manual for the 2011–12 Schools and Staffing Survey, Volumes 1–6* (Goldring et al. 2013) (NCES 2013-330 through 2013-335).

Further information on SASS may be obtained from

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<http://nces.ed.gov/surveys/sass>

### **Teacher Follow-Up Survey**

The Teacher Follow-Up Survey (TFS) is a SASS survey whose purpose is to determine how many teachers remain at the same school, move to another school, or leave the profession in the year following a SASS administration. It is administered to elementary and secondary teachers in the 50 states and the District of Columbia. The TFS uses two questionnaires, one for teachers who left teaching since the previous SASS administration and another for those who are still teaching either in the same school as last year or in a different school. The objective of the TFS is to focus on the characteristics of each group in order to answer questions about teacher mobility and attrition.

The 2008–09 TFS is different from any previous TFS administration in that it also serves as the second wave of a longitudinal study of first-year teachers. Because of this, the 2008–09 TFS consists of four questionnaires. Two are for respondents who were first-year public school teachers in the 2007–08 SASS and two are for the remainder of the sample.

Further information on the TFS may be obtained from

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<http://nces.ed.gov/surveys/sass>

## Bureau of Labor Statistics

### **Consumer Price Indexes**

The Consumer Price Index (CPI) represents changes in prices of all goods and services purchased for consumption by urban households. Indexes are available for two population groups: a CPI for All Urban Consumers (CPI-U) and a CPI for Urban Wage Earners and Clerical Workers (CPI-W). Unless otherwise specified, data are adjusted for inflation using the CPI-U. These values are generally adjusted to a school-year basis by averaging the July through June figures. Price indexes are available for the United States, the four Census regions, size of city, cross-classifications of regions and size classes, and 26 local areas. The major uses of the CPI include as an economic indicator, as a deflator of other economic series, and as a means of adjusting income.

Also available is the Consumer Price Index research series using current methods (CPI-U-RS), which presents an estimate of the CPI-U from 1978 to the present that incorporates most of the improvements that the Bureau of Labor Statistics has made over that time span into the entire series. The historical price index series of the CPI-U does not reflect these changes, though these changes do make the present and future CPI more accurate. The limitations of the CPI-U-RS include considerable uncertainty surrounding the magnitude of the adjustments and the several improvements in the CPI that have not been incorporated into the CPI-U-RS for various reasons. Nonetheless, the CPI-U-RS can serve as a valuable proxy for researchers needing a historical estimate of inflation using current methods. This series has not been used in NCES tables.

Further information on consumer price indexes may be obtained from

Bureau of Labor Statistics  
U.S. Department of Labor  
2 Massachusetts Avenue NE  
Washington, DC 20212  
<http://www.bls.gov/cpi>

### **Employment and Unemployment Surveys**

Statistics on the employment and unemployment status of the population and related data are compiled by the Bureau of Labor Statistics (BLS) using data from the Current Population Survey (CPS) (see below) and other surveys. The Current Population Survey, a monthly household survey conducted by the U.S. Census Bureau for the Bureau of Labor Statistics, provides a comprehensive body of information on the employment and unemployment experience of the nation's population, classified by age, sex, race, and various other characteristics.

Further information on unemployment surveys may be obtained from

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U.S. Department of Labor  
2 Massachusetts Avenue NE  
Washington, DC 20212  
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<http://www.bls.gov/bls/employment.htm>

## Census Bureau

### **Current Population Survey**

The Current Population Survey (CPS) is a monthly survey of about 60,000 households conducted by the U.S. Census Bureau for the Bureau of Labor Statistics. The CPS is the primary source of information of labor force statistics for the U.S. noninstitutionalized population (e.g., it excludes military personnel and their families living on bases and inmates of correctional institutions). In addition, supplemental questionnaires are used to provide further information about the U.S. population. Specifically, in October, detailed questions regarding school enrollment and school characteristics are asked. In March, detailed questions regarding income are asked.

The current sample design, introduced in July 2001, includes about 72,000 households. Each month about 58,900 of the 72,000 households are eligible for interview, and of those, 7 to 10 percent are not interviewed because of temporary absence or unavailability. Information is obtained each month from those in the household who are 15 years of age and older, and demographic data are collected for children 0–14 years of age. In addition, supplemental questions regarding school enrollment are asked about eligible household members ages 3 and older in the October survey. Prior to July 2001, data were collected in the CPS from about 50,000 dwelling units. The samples are initially selected based on the decennial census files and are periodically updated to reflect new housing construction.



A major redesign of the CPS was implemented in January 1994 to improve the quality of the data collected. Survey questions were revised, new questions were added, and computer-assisted interviewing methods were used for the survey data collection. Further information about the redesign is available in *Current Population Survey, October 1995: (School Enrollment Supplement) Technical Documentation* at <http://www.census.gov/prod/techdoc/cps/cpsoct95.pdf>.

Caution should be used when comparing data from 1994 through 2001 with data from 1993 and earlier. Data from 1994 through 2001 reflect 1990 census-based population controls, while data from 1993 and earlier reflect 1980 or earlier census-based population controls. Caution should also be used when comparing data from 1994 through 2001 with data from 2002 onward, as data from 2002 reflect 2000 census-based controls. Changes in population controls generally have relatively little impact on summary measures such as means, medians, and percentage distributions. They can have a significant impact on population counts. For example, use of the 1990 census-based population controls resulted in about a 1 percent increase in the civilian noninstitutional population and in the number of families and households. Thus, estimates of levels for data collected in 1994 and later years will differ from those for earlier years by more than what could be attributed to actual changes in the population. These differences could be disproportionately greater for certain subpopulation groups than for the total population.

Beginning in 2003, race/ethnicity questions expanded to include information on people of Two or more races. Native Hawaiian/Pacific Islander data are collected separately from Asian data. The questions have also been worded to make it clear that self-reported data on race/ethnicity should reflect the race/ethnicity with which the responder identifies, rather than what may be written in official documentation.

The estimation procedure employed for monthly CPS data involves inflating weighted sample results to independent estimates of characteristics of the civilian noninstitutional population in the United States by age, sex, and race. These independent estimates are based on statistics from decennial censuses; statistics on births, deaths, immigration, and emigration; and statistics on the population in the armed services. Generalized standard error tables are provided in the Current Population Reports; methods for deriving standard errors can be found within the CPS technical documentation at <http://www.census.gov/cps/methodology/techdocs.html>. The CPS data are subject to both nonsampling and sampling errors.

Prior to 2009, standard errors were estimated using the generalized variance function. The generalized variance function is a simple model that expresses the variance as a function of the expected value of a survey estimate. Beginning with March 2009 CPS data, standard errors were estimated using replicate weight methodology. Those interested in using CPS household-level supplement replicate weights to calculate variances may refer to *Estimating Current Population Survey (CPS) Household-Level Supplement Variances Using Replicate Weights* at <http://thedataweb.rm.census.gov/pub/cps/supps/HH-level Use of the Public Use Replicate Weight File.doc>.

Further information on CPS may be obtained from

Education and Social Stratification Branch  
Population Division  
Census Bureau  
U.S. Department of Commerce  
4600 Silver Hill Road  
Washington, DC 20233  
<http://www.census.gov/cps>

### *Dropouts*

Each October, the Current Population Survey (CPS) includes supplemental questions on the enrollment status of the population ages 3 years and over as part of the monthly basic survey on labor force participation. In addition to gathering the information on school enrollment, with the limitations on accuracy as noted below under “School Enrollment,” the survey data permit calculations of dropout rates. Both status and event dropout rates are tabulated from the October CPS. Event rates describe the proportion of students who leave school each year without completing a high school program. Status rates provide cumulative data on dropouts among all young adults within a specified age range. Status rates are higher than event rates because they include all dropouts ages 16 through 24, regardless of when they last attended school.

In addition to other survey limitations, dropout rates may be affected by survey coverage and exclusion of the institutionalized population. The incarcerated population has grown more rapidly and has a higher dropout rate than the general population. Dropout rates for the total population might be higher than those for the noninstitutionalized population if the prison and jail populations were included in the dropout rate calculations. On the other hand, if military personnel, who tend to be high school graduates, were included, it might offset some or all of the impact from the theoretical inclusion of the jail and prison population.

Another area of concern with tabulations involving young people in household surveys is the relatively low coverage ratio compared to older age groups. CPS undercoverage results from missed housing units and missed people within sample households. Overall CPS undercoverage for October 2012 is estimated to be about 14 percent. CPS coverage varies with age, sex, and race. Generally, coverage is larger for females than for males and larger for non-Blacks than for Blacks. For example, in October 2012 the coverage ratio for Black 20- to 24-year-old males was 63 percent. The CPS weighting procedure partially corrects for the bias due to undercoverage. Further information on CPS methodology may be obtained from <http://www.census.gov/cps>.

Further information on the calculation of dropouts and dropout rates may be obtained from *Trends in High School Dropout and Completion Rates in the United States: 1972–2009* (NCES 2012-006) at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2012006> or by contacting

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### *Educational Attainment*

Reports documenting educational attainment are produced by the Census Bureau using March CPS supplement (Annual Social and Economic Supplement [ASEC]) results. The sample size for the 2013 ASEC supplement (including basic CPS) was about 99,000 households. The latest release is *Educational Attainment in the United States: 2013*; the tables may be downloaded at <http://www.census.gov/hhes/socdemo/education/data/cps/2013/tables.html>.

In addition to the general constraints of CPS, some data indicate that the respondents have a tendency to overestimate the educational level of members of their household. Some inaccuracy is due to a lack of the respondent's knowledge of the exact educational attainment of each household member and the hesitancy to acknowledge anything less than a high school education. Another cause of nonsampling variability is the change in the numbers in the armed services over the years.

Further information on CPS's educational attainment data may be obtained from

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Census Bureau  
U.S. Department of Commerce  
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Washington, DC 20233  
<http://www.census.gov/hhes/socdemo/education>

### *School Enrollment*

Each October, the Current Population Survey (CPS) includes supplemental questions on the enrollment status of the population ages 3 years and over. Prior to 2001, the October supplement consisted of approximately 47,000 interviewed households. Beginning with the October 2001 supplement, the sample was expanded by 9,000 to a total of approximately 56,000 interviewed households. The main sources of nonsampling variability in the responses to the supplement are those inherent in the survey instrument. The question of current enrollment may not be answered accurately for various reasons. Some respondents may not know current grade information for every student in the household, a problem especially prevalent for households with members in college or in nursery school. Confusion over college credits or hours taken by a student may make it difficult to determine the year in which the student is enrolled. Problems may occur with the definition of nursery school (a group or class organized to provide educational experiences for children) where respondents' interpretations of "educational experiences" vary.

For the October 2012 basic CPS, the household-level nonresponse rate was 9.6 percent. The person-level nonresponse rate for the school enrollment supplement was an additional 9.2 percent. Since the basic CPS nonresponse rate is a household-level rate and the school enrollment supplement nonresponse rate is a person-level rate, these rates cannot be combined to derive an overall nonresponse rate. Nonresponding households may have fewer persons than interviewed ones, so combining these rates may lead to an overestimate of the true overall nonresponse rate for persons for the school enrollment supplement.

Further information on CPS methodology may be obtained from <http://www.census.gov/cps>.

Further information on the CPS School Enrollment Supplement may be obtained from

Education and Social Stratification Branch  
Census Bureau  
U.S. Department of Commerce  
4600 Silver Hill Road  
Washington, DC 20233  
<http://www.census.gov/hhes/school/index.html>

### ***Decennial Census, Population Estimates, and Population Projections***

The Decennial Census is a universe survey mandated by the U.S. Constitution. It is a questionnaire sent to every household in the country, and it is composed of seven questions about the household and its members (name, sex, age, relationship, Hispanic origin, race, and whether the housing unit is owned or rented). The Census Bureau also produces annual estimates of the resident population by demographic characteristics (age, sex, race, and Hispanic origin) for the nation, states, and counties, as well as national and state projections for the resident population. The reference date for population estimates is July 1 of the given year. With each new issue of July 1 estimates, the Census Bureau revises estimates for each year back to the last census. Previously published estimates are superseded and archived.

Census respondents self-report race and ethnicity. In the 2000 Census, they were first asked, “Is this person Spanish/Hispanic/Latino?” and then given the following options: No, not Spanish/Hispanic/Latino; Yes, Puerto Rican; Yes, Mexican, Mexican American, Chicano; Yes, Cuban; and Yes, other Spanish/Hispanic/Latino (with space to print the specific group). The next question was “What is this person’s race?” The options were White; Black, African American, or Negro; American Indian or Alaska Native (with space to print the name of enrolled or principal tribe); Asian Indian; Japanese; Native Hawaiian; Chinese; Korean; Guamanian or Chamorro; Filipino; Vietnamese; Samoan; Other Asian; Other Pacific Islander; and Some other race. The last three options included space to print the specific race. The 2000 Census was also the first time that respondents were given the option of choosing more than one race. The Census population estimates program modified the enumerated population from the 2000 Census to produce the population estimates base for 2000 and onward. As part of the modification, the Census Bureau recoded the “Some other race” responses from the 2000 Census to one or more of the five OMB race categories used in the estimates program (for more information, see <http://www.census.gov/popest/methodology/2008-nat-meth.pdf>). Prior to 2000, the Census Bureau combined the categories Asian and Native Hawaiian or Other Pacific Islander. For all years, all persons of Hispanic origin were included in the Hispanic category regardless of the race option(s) chosen. Therefore, persons of Hispanic origin may be of any race.

Further information on the Decennial Census may be obtained from <http://www.census.gov>.

### ***National Population Projections***

The 2012 National Population Projections, the first based on the 2010 Census, provide projections of resident population and projections of the United States resident population by age, sex, race, and Hispanic origin from 2012 through 2060. The following is a general description of the methods used to produce the 2012 National Population Projections.

The projections were produced using a cohort-component method beginning with an estimated base population for July 1, 2011. First, components of population change (mortality, fertility, and net international migration) were projected. Next, for each passing year, the population is advanced one year of age and the new age categories are updated using the projected survival rates and levels of net international migration for that year. A new birth cohort is then added to form the population under one year of age by applying projected age-specific fertility rates to the average female population aged 10 to 54 years and updating the new cohort for the effects of mortality and net international migration.

The assumptions for the components of change were based on time series analysis. Initially, demographic models were used to summarize historical trends. Further information on the methodologies used to produce the 2012 National Population Projections may be obtained from <http://www.census.gov/population/projections/methodology/>.

### ***State Population Projections***

These state population projections were prepared using a cohort-component method by which each component of population change—births, deaths, state-to-state migration flows, international in-migration, and international out-migration—was projected separately for each birth cohort by sex, race, and Hispanic origin. The basic framework was the same as in past Census Bureau projections.

Detailed components necessary to create the projections were obtained from vital statistics, administrative records, census data, and national projections. The cohort-component method is based on the traditional demographic accounting system:

$$P_t = P_0 + B - D + DIM - DOM + IIM - IOM$$

where:

$P_t$  = population at the end of the period

$P_0$  = population at the beginning of the period

$B$  = births during the period

$D$  = deaths during the period

$DIM$  = domestic in-migration during the period

$DOM$  = domestic out-migration during the period

$IIM$  = international in-migration during the period

$IOM$  = international out-migration during the period

To generate population projections with this model, the Census Bureau created separate datasets for each of these components. In general, the assumptions concerning the future levels of fertility, mortality, and international migration are consistent with the assumptions developed for the national population projections of the Census Bureau.

Once the data for each component were developed the cohort-component method was applied to produce the projections. For each projection year, the base population for each state was disaggregated into eight race and Hispanic categories (non-Hispanic White; non-Hispanic Black; non-Hispanic American Indian, Eskimo, and Aleut; non-Hispanic Asian and Pacific Islander; Hispanic White; Hispanic Black; Hispanic American Indian, Eskimo, and Aleut; and Hispanic Asian and Pacific Islander), by sex, and single year of age (ages 0 to 85+). The next step was to survive each age-sex-race-ethnic group forward 1 year using the pertinent survival rate. The internal redistribution of the population was accomplished by applying the appropriate state-to-state migration rates to the survived population in each state. The projected out-migrants were subtracted from the state of origin and added to the state of destination (as in-migrants). Next, the appropriate number of immigrants from abroad was added to each group. The population under age 1 was created by applying the appropriate age-race-ethnic-specific birth rates to females of childbearing age (ages 15 to 49). The number of births by sex and race/ethnicity were survived forward and exposed to the appropriate migration rate to yield the population under age 1. The final results of the projection process were proportionally adjusted to be consistent with the national population projections by single years of age, sex, race, and Hispanic origin. The entire process was then repeated for each year of the projection.

More information on Census Bureau projections may be obtained from

Population Division  
Census Bureau  
U.S. Department of Commerce  
Washington, DC 20233  
<http://www.census.gov>

## OTHER SOURCES

### ***IHS Global Inc.***

IHS Global Inc. provides an information system that includes databases of economic and financial information; simulation and planning models; regular publications and special studies; data retrieval and management systems; and access to experts on economic, financial, industrial, and market activities. One service is the IHS Global Inc. Model of the U.S. Economy, which contains annual projections of U.S. economic and financial conditions, including forecasts for the federal government, incomes, population, prices and wages, and state and local governments, over a long-term (10- to 25-year) forecast period.

Additional information is available from

IHS Global Inc.  
1000 Winter Street  
Suite 4300N  
Waltham, MA 02451-124  
<http://www.ihsglobalinsight.com>

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# Appendix D

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# Appendix E

## *List of Abbreviations*

<b>ADA</b>	Average daily attendance
<b>CCD</b>	Common Core of Data
<b>CPI</b>	Consumer Price Index
<b>CPS</b>	Current Population Survey
<b>CV</b>	Coefficient of Variation
<b>D.W. statistic</b>	Durbin-Watson statistic
<b>FTE</b>	Full-time-equivalent
<b>HEGIS</b>	Higher Education General Information Survey
<b>IPEDS</b>	Integrated Postsecondary Education Data System
<b>IPEDS-C</b>	Integrated Postsecondary Education Data System, Completions Survey
<b>IPEDS-EF</b>	Integrated Postsecondary Education Data System, Fall Enrollment Survey
<b>MAPE</b>	Mean absolute percentage error
<b>NCES</b>	National Center for Education Statistics
<b>PreK</b>	Prekindergarten
<b>PreK–8</b>	Prekindergarten through grade 8
<b>PreK–12</b>	Prekindergarten through grade 12
<b>PSS</b>	Private School Survey
<b>SASS</b>	Schools and Staffing Survey



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# Appendix F

## Glossary

### A

**Academic support** This category of college expenditures includes expenditures for support services that are an integral part of the institution's primary missions of instruction, research, or public service. It also includes expenditures for libraries, galleries, audio/visual services, academic computing support, ancillary support, academic administration, personnel development, and course and curriculum development.

**Achievement gap** Occurs when one group of students outperforms another group, and the difference in average scores for the two groups is statistically significant (that is, larger than the margin of error).

**Achievement levels, NAEP** Specific achievement levels for each subject area and grade to provide a context for interpreting student performance. At this time they are being used on a trial basis.

**Basic**—denotes partial mastery of the knowledge and skills that are fundamental for *proficient* work at a given grade.

**Proficient**—represents solid academic performance. Students reaching this level have demonstrated competency over challenging subject matter.

**Advanced**—signifies superior performance.

**Achievement test** An examination that measures the extent to which a person has acquired certain information or mastered certain skills, usually as a result of specific instruction.

**ACT** The ACT (formerly the American College Testing Program) assessment program measures educational development and readiness to pursue college-level coursework in English, mathematics, natural science, and social studies. Student performance on the tests does not reflect innate ability and is influenced by a student's educational preparedness.

**Administrative support staff** Staff whose activities are concerned with support of teaching and administrative duties of the office of the principal or department chairpersons, including clerical staff and secretaries.

**Advanced Placement (AP)** A program of tertiary-level courses and examinations, taught by specially qualified teachers, that provides opportunities for secondary school students to earn undergraduate credits for first-year university courses. The schools and teachers offering AP programs must meet College Board requirements and are monitored.

**Agriculture** Courses designed to improve competencies in agricultural occupations. Included is the study of agricultural production, supplies, mechanization and products, agricultural science, forestry, and related services.

**Alternative school** A public elementary/secondary school that serves students whose needs cannot be met in a regular, special education, or vocational school; may provide nontraditional education; and may serve as an adjunct to a regular school. Although alternative schools fall outside the categories of regular, special education, and vocational education, they may provide similar services or curriculum. Some examples of alternative schools are schools for potential dropouts; residential treatment centers for substance abuse (if they provide elementary or secondary education); schools for chronic truants; and schools for students with behavioral problems.

**Appropriation (federal funds)** Budget authority provided through the congressional appropriation process that permits federal agencies to incur obligations and to make payments.

**Appropriation (institutional revenues)** An amount (other than a grant or contract) received from or made available to an institution through an act of a legislative body.

**Associate's degree** A degree granted for the successful completion of a sub-baccalaureate program of studies, usually requiring at least 2 years (or equivalent) of full-time college-level study. This includes degrees granted in a cooperative or work-study program.

**Autocorrelation** Correlation of the error terms from different observations of the same variable. Also called Serial correlation.

**Auxiliary enterprises** This category includes those essentially self-supporting operations which exist to furnish a service to students, faculty, or staff, and which charge a fee that is directly related to, although not necessarily equal to, the cost of the service. Examples are residence halls, food services, college stores, and intercollegiate athletics.

**Average daily attendance (ADA)** The aggregate attendance of a school during a reporting period (normally a school year) divided by the number of days school is in session during this period. Only days on which the pupils are under the guidance and direction of teachers should be considered days in session.

**Average daily membership (ADM)** The aggregate membership of a school during a reporting period (normally a school year) divided by the number of days school is in session during this period. Only days on which the pupils are under the guidance and direction of teachers should be

considered as days in session. The average daily membership for groups of schools having varying lengths of terms is the average of the average daily memberships obtained for the individual schools. Membership includes all pupils who are enrolled, even if they do not actually attend.

**Averaged freshman graduation rate (AFGR)** A measure of the percentage of the incoming high school freshman class that graduates 4 years later. It is calculated by taking the number of graduates with a regular diploma and dividing that number by the estimated count of incoming freshman 4 years earlier, as reported through the NCES Common Core of Data (CCD). The estimated count of incoming freshman is the sum of the number of 8th-graders 5 years earlier, the number of 9th-graders 4 years earlier (when current seniors were freshman), and the number of 10th-graders 3 years earlier, divided by 3. The purpose of this averaging is to account for the high rate of grade retention in the freshman year, which adds 9th-grade repeaters from the previous year to the number of students in the incoming freshman class each year. Ungraded students are allocated to individual grades proportional to each state's enrollment in those grades. The AFGR treats students who transfer out of a school or district in the same way as it treats students from that school or district who drop out.

## B

**Bachelor's degree** A degree granted for the successful completion of a baccalaureate program of studies, usually requiring at least 4 years (or equivalent) of full-time college-level study. This includes degrees granted in a cooperative or work-study program.

**Books** Nonperiodical printed publications bound in hard or soft covers, or in loose-leaf format, of at least 49 pages, exclusive of the cover pages; juvenile nonperiodical publications of any length found in hard or soft covers.

**Breusch-Godfrey serial correlation LM test** A statistic testing the independence of errors in least-squares regression against alternatives of first-order and higher degrees of serial correlation. The test belongs to a class of asymptotic tests known as the Lagrange multiplier (LM) tests.

**Budget authority (BA)** Authority provided by law to enter into obligations that will result in immediate or future outlays. It may be classified by the period of availability (1-year, multiple-year, no-year), by the timing of congressional action (current or permanent), or by the manner of determining the amount available (definite or indefinite).

**Business** Program of instruction that prepares individuals for a variety of activities in planning, organizing, directing, and controlling business office systems and procedures.

## C

**Capital outlay** Funds for the acquisition of land and buildings; building construction, remodeling, and additions; the initial installation or extension of service systems and other built-in equipment; and site improvement. The category also encompasses architectural and engineering services including the development of blueprints.

**Career/technical education (CTE)** In high school, encompasses occupational education, which teaches skills required in specific occupations or occupational clusters, as well as nonoccupational CTE, which includes family and consumer sciences education (i.e., courses that prepare students for roles outside the paid labor market) and general labor market preparation (i.e., courses that teach general employment skills such as word processing and introductory technology skills).

**Carnegie unit** The number of credits a secondary student received for a course taken every day, one period per day, for a full year; a factor used to standardize all credits indicated on secondary school transcripts across studies.

**Catholic school** A private school over which a Roman Catholic church group exercises some control or provides some form of subsidy. Catholic schools for the most part include those operated or supported by a parish, a group of parishes, a diocese, or a Catholic religious order.

**Central cities** The largest cities, with 50,000 or more inhabitants, in a Metropolitan Statistical Area (MSA). Additional cities within the metropolitan area can also be classified as "central cities" if they meet certain employment, population, and employment/residence ratio requirements.

**Certificate** A formal award certifying the satisfactory completion of a postsecondary education program. Certificates can be awarded at any level of postsecondary education and include awards below the associate's degree level.

**Charter school** A school providing free public elementary and/or secondary education to eligible students under a specific charter granted by the state legislature or other appropriate authority, and designated by such authority to be a charter school.

**City school** See Locale codes.

**Class size** The membership of a class at a given date.

**Classification of Instructional Programs (CIP)** The CIP is a taxonomic coding scheme that contains titles and descriptions of primarily postsecondary instructional programs. It was developed to facilitate NCES' collection and reporting of postsecondary degree completions by major field of study using standard classifications that capture the majority of reportable program activity. It was originally published in 1980 and was revised in 1985, 1990, 2000, and 2010.

**Classification of Secondary School Courses (CSSC)** A modification of the Classification of Instructional Programs used for classifying high school courses. The CSSC contains over 2,200 course codes that help compare the thousands of high school transcripts collected from different schools.

**Classroom teacher** A staff member assigned the professional activities of instructing pupils in self-contained classes or courses, or in classroom situations; usually expressed in full-time equivalents.

**Coefficient of variation (CV)** Represents the ratio of the standard error to the estimate. For example, a CV of 30 percent indicates that the standard error of the estimate is equal to 30 percent of the estimate's value. The CV is used to compare the amount of variation relative to the magnitude of the estimate. A CV of 30 percent or greater indicates that an estimate should be interpreted with caution. For a discussion of standard errors, see Appendix A: Guide to Sources.

**Cohort** A group of individuals that have a statistical factor in common, for example, year of birth.

**Cohort-component method** A method for estimating and projecting a population that is distinguished by its ability to preserve knowledge of an age distribution of a population (which may be of a single sex, race, and Hispanic origin) over time.

**College** A postsecondary school that offers general or liberal arts education, usually leading to an associate's, bachelor's, master's, or doctor's degree. Junior colleges and community colleges are included under this terminology.

**Combined school** A school that encompasses instruction at both the elementary and the secondary levels; includes schools starting with grade 6 or below and ending with grade 9 or above.

**Combined school (2007–08 Schools and Staffing Survey)** A school with at least one grade lower than 7 and at least one grade higher than 8; schools with only ungraded classes are included with combined schools.

**Combined Statistical Area (CSA)** A combination of Core Based Statistical Areas (see below), each of which contains a core with a substantial population nucleus as well as adjacent communities having a high degree of economic and social integration with that core. A CSA is a region with social and economic ties as measured by commuting, but at lower levels than are found within each component area. CSAs represent larger regions that reflect broader social and economic interactions, such as wholesaling, commodity distribution, and weekend recreation activities.

**Computer science** A group of instructional programs that describes computer and information sciences, including computer programming, data processing, and information systems.

**Constant dollars** Dollar amounts that have been adjusted by means of price and cost indexes to eliminate inflationary factors and allow direct comparison across years.

**Consumer Price Index (CPI)** This price index measures the average change in the cost of a fixed market basket of goods and services purchased by consumers. Indexes vary for specific areas or regions, periods of time, major groups of consumer expenditures, and population groups. The CPI reflects spending patterns for two population groups: (1) all urban consumers and urban wage earners and (2) clerical workers. CPIs are calculated for both the calendar year and the school year using the U.S. All Items CPI for All Urban Consumers (CPI-U). The calendar year CPI is the same as the annual CPI-U. The school year CPI is calculated by adding the monthly CPI-U figures, beginning with July of the first year and ending with June of the following year, and then dividing that figure by 12.

**Consumption** That portion of income which is spent on the purchase of goods and services rather than being saved.

**Control of institutions** A classification of institutions of elementary/secondary or postsecondary education by whether the institution is operated by publicly elected or appointed officials and derives its primary support from public funds (public control) or is operated by privately elected or appointed officials and derives its major source of funds from private sources (private control).

**Core Based Statistical Area (CBSA)** A population nucleus and the nearby communities having a high degree of economic and social integration with that nucleus. Each CBSA includes at least one urban area of 10,000 or more people and one or more counties. In addition to a "central county" (or counties), additional "outlying counties" are included in the CBSA if they meet specified requirements of commuting to or from the central counties.

**Credit** The unit of value, awarded for the successful completion of certain courses, intended to indicate the quantity of course instruction in relation to the total requirements for a diploma, certificate, or degree. Credits are frequently expressed in terms such as "Carnegie units," "semester credit hours," and "quarter credit hours."

**Current dollars** Dollar amounts that have not been adjusted to compensate for inflation.

**Current expenditures (elementary/secondary)** The expenditures for operating local public schools, excluding capital outlay and interest on school debt. These expenditures include such items as salaries for school personnel, benefits, student transportation, school books and materials, and energy costs. Beginning in 1980–81, expenditures for state administration are excluded.

**Instruction expenditures** Includes expenditures for activities related to the interaction between teacher and students. Includes salaries and benefits for teachers and instructional aides, textbooks, supplies, and purchased services such as instruction via television. Also included are tuition expenditures to other local education agencies.

**Administration expenditures** Includes expenditures for school administration (i.e., the office of the principal, full-time department chairpersons, and graduation expenses), general administration (the superintendent and board of education and their immediate staff), and other support services expenditures.

**Transportation** Includes expenditures for vehicle operation, monitoring, and vehicle servicing and maintenance.

**Food services** Includes all expenditures associated with providing food to students and staff in a school or school district. The services include preparing and serving regular and incidental meals or snacks in connection with school activities, as well as the delivery of food to schools.

**Enterprise operations** Includes expenditures for activities that are financed, at least in part, by user charges, similar to a private business. These include operations funded by sales of products or services, together with amounts for direct program support made by state education agencies for local school districts.

**Current expenditures per pupil in average daily attendance** Current expenditures for the regular school term divided by the average daily attendance of full-time pupils (or full-time equivalency of pupils) during the term. See also Current expenditures and Average daily attendance.

**Current-fund expenditures (postsecondary education)** Money spent to meet current operating costs, including salaries, wages, utilities, student services, public services, research libraries, scholarships and fellowships, auxiliary enterprises, hospitals, and independent operations; excludes loans, capital expenditures, and investments.

**Current-fund revenues (postsecondary education)** Money received during the current fiscal year from revenue which can be used to pay obligations currently due, and surpluses reappropriated for the current fiscal year.

## D

**Deaf-blindness** See Disabilities, children with.

**Deafness** See Disabilities, children with.

**Default rate** The percentage of loans that are in delinquency and have not been repaid according to the terms of the loan. According to the federal government, a federal student loan is in default if there has been no payment on the loan in 270 days. The Department of Education calculates a 2-year cohort default rate, which is the percentage of students who entered repayment in a given fiscal year (from October 1 to September 30) and then defaulted within the following two fiscal years.

**Degree** An award conferred by a college, university, or other postsecondary education institution as official recognition for the successful completion of a program of studies.

Refers specifically to associate's or higher degrees conferred by degree-granting institutions. See also Associate's degree, Bachelor's degree, Master's degree, and Doctor's degree.

**Degree/certificate-seeking student** A student enrolled in courses for credit and recognized by the institution as seeking a degree, certificate, or other formal award. High school students also enrolled in postsecondary courses for credit are not considered degree/certificate-seeking. See also Degree and Certificate.

**Degree-granting institutions** Postsecondary institutions that are eligible for Title IV federal financial aid programs and grant an associate's or higher degree. For an institution to be eligible to participate in Title IV financial aid programs it must offer a program of at least 300 clock hours in length, have accreditation recognized by the U.S. Department of Education, have been in business for at least 2 years, and have signed a participation agreement with the Department.

**Degrees of freedom** The number of free or linearly independent sample observations used in the calculation of a statistic. In a time series regression with  $t$  time periods and  $k$  independent variables including a constant term, there would be  $t$  minus  $k$  degrees of freedom.

**Department of Defense (DoD) dependents schools** Schools that are operated by the Department of Defense Education Activity (a civilian agency of the U.S. Department of Defense) and provide comprehensive prekindergarten through 12th-grade educational programs on military installations both within the United States and overseas.

**Dependency status** A designation of whether postsecondary students are financially dependent on their parents or financially independent of their parents. Undergraduates are assumed to be dependent unless they meet one of the following criteria: are age 24 or older, are married or have legal dependents other than a spouse, are veterans, are orphans or wards of the court, or provide documentation that they self-supporting.

**Dependent variable** A mathematical variable whose value is determined by that of one or more other variables in a function. In regression analysis, when a random variable,  $y$ , is expressed as a function of variables  $x_1, x_2, \dots, x_k$ , plus a stochastic term, then  $y$  is known as the "dependent variable."

**Disabilities, children with** Those children evaluated as having any of the following impairments and needing special education and related services because of these impairments. (These definitions apply specifically to data from the U.S. Office of Special Education and Rehabilitative Services presented in this publication.)

**Deaf-blindness** Having concomitant hearing and visual impairments which cause such severe communication and other developmental and educational problems that the student cannot be accommodated in special education programs solely for deaf or blind students.

**Deafness** Having a hearing impairment which is so severe that the student is impaired in processing linguistic information through hearing (with or without amplification) and which adversely affects educational performance.

**Hearing impairment** Having a hearing impairment, whether permanent or fluctuating, which adversely affects the student's educational performance, but which is not included under the definition of "deaf" in this section.

**Intellectual disability** Having significantly subaverage general intellectual functioning, existing concurrently with defects in adaptive behavior and manifested during the developmental period, which adversely affects the child's educational performance.

**Multiple disabilities** Having concomitant impairments (such as intellectually disabled-blind, intellectually disabled-orthopedically impaired, etc.), the combination of which causes such severe educational problems that the student cannot be accommodated in special education programs solely for one of the impairments. Term does not include deaf-blind students.

**Orthopedic impairment** Having a severe orthopedic impairment which adversely affects a student's educational performance. The term includes impairment resulting from congenital anomaly, disease, or other causes.

**Other health impairment** Having limited strength, vitality, or alertness due to chronic or acute health problems, such as a heart condition, tuberculosis, rheumatic fever, nephritis, asthma, sickle cell anemia, hemophilia, epilepsy, lead poisoning, leukemia, or diabetes which adversely affect the student's educational performance.

**Serious emotional disturbance** Exhibiting one or more of the following characteristics over a long period of time, to a marked degree, and adversely affecting educational performance: an inability to learn which cannot be explained by intellectual, sensory, or health factors; an inability to build or maintain satisfactory interpersonal relationships with peers and teachers; inappropriate types of behavior or feelings under normal circumstances; a general pervasive mood of unhappiness or depression; or a tendency to develop physical symptoms or fears associated with personal or school problems. This term does not include children who are socially maladjusted, unless they also display one or more of the listed characteristics.

**Specific learning disability** Having a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. The term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing, or environmental, cultural, or economic disadvantage.

**Speech/language impairment** Having a communication disorder, such as stuttering, impaired articulation, language impairment, or voice impairment, which adversely affects the student's educational performance.

**Visual impairment** Having a visual impairment which, even with correction, adversely affects the student's educational performance. The term includes partially seeing and blind children.

**Discipline divisions** Degree programs that include breakouts to the 6-digit level of the Classification of Instructional Programs (CIP). See also Fields of study.

**Disposable personal income** Current income received by people less their contributions for social insurance, personal tax, and nontax payments. It is the income available to people for spending and saving. Nontax payments include passport fees, fines and penalties, donations, and tuitions and fees paid to schools and hospitals operated mainly by the government. See also Personal income.

**Distance education** Education that uses one or more technologies to deliver instruction to students who are separated from the instructor and to support regular and substantive interaction between the students and the instructor synchronously or asynchronously. Technologies used for instruction may include the following: Internet; one-way and two-way transmissions through open broadcasts, closed circuit, cable, microwave, broadband lines, fiber optics, and satellite or wireless communication devices; audio conferencing; and video cassette, DVDs, and CD-ROMs, if the cassette, DVDs, and CD-ROMs are used in a course in conjunction with the technologies listed above.

**Doctor's degree** The highest award a student can earn for graduate study. Includes such degrees as the Doctor of Education (Ed.D.); the Doctor of Juridical Science (S.J.D.); the Doctor of Public Health (Dr.P.H.); and the Doctor of Philosophy (Ph.D.) in any field, such as agronomy, food technology, education, engineering, public administration, ophthalmology, or radiology. The doctor's degree classification encompasses three main subcategories—research/scholarship degrees, professional practice degrees, and other degrees—which are described below.

**Doctor's degree—research/scholarship** A Ph.D. or other doctor's degree that requires advanced work beyond the master's level, including the preparation and defense of a dissertation based on original research, or the planning and execution of an original project demonstrating substantial artistic or scholarly achievement. Examples of this type of degree may include the following and others, as designated by the awarding institution: the Ed.D. (in education), D.M.A. (in musical arts), D.B.A. (in business administration), D.Sc. (in science), D.A. (in arts), or D.M. (in medicine).

**Doctor's degree—professional practice** A doctor's degree that is conferred upon completion of a program providing the knowledge and skills for the recognition, credential, or license required for professional practice. The degree is awarded after a period of study such that the total time to the degree, including both preprofessional and professional preparation, equals at least 6 full-time-equivalent academic years. Some doctor's degrees of this type were formerly classified as first-professional degrees. Examples of this type of degree may include the following and others, as designated by the awarding institution: the D.C. or D.C.M. (in chiropractic); D.D.S. or D.M.D. (in dentistry); L.L.B. or J.D. (in law); M.D. (in medicine); O.D. (in optometry); D.O. (in osteopathic medicine); Pharm.D. (in pharmacy); D.P.M., Pod.D., or D.P. (in podiatry); or D.V.M. (in veterinary medicine).

**Doctor's degree—other** A doctor's degree that does not meet the definition of either a doctor's degree—research/scholarship or a doctor's degree—professional practice.

**Double exponential smoothing** A method that takes a single smoothed average component of demand and smoothes it a second time to allow for estimation of a trend effect.

**Dropout** The term is used to describe both the event of leaving school before completing high school and the status of an individual who is not in school and who is not a high school completer. High school completers include both graduates of school programs as well as those completing high school through equivalency programs such as the General Educational Development (GED) program. Transferring from a public school to a private school, for example, is not regarded as a dropout event. A person who drops out of school may later return and graduate but is called a "dropout" at the time he or she leaves school. Measures to describe these behaviors include the event dropout rate (or the closely related school persistence rate), the status dropout rate, and the high school completion rate.

**Durbin-Watson statistic** A statistic testing the independence of errors in least squares regression against the alternative of first-order serial correlation. The statistic is a simple linear transformation of the first-order serial correlation of residuals and, although its distribution is unknown, it is tested by bounding statistics that follow R. L. Anderson's distribution.

## E

**Early childhood school** Early childhood program schools serve students in prekindergarten, kindergarten, transitional (or readiness) kindergarten, and/or transitional first (or prefirst) grade.

**Econometrics** The quantitative examination of economic trends and relationships using statistical techniques, and the development, examination, and refinement of those techniques.

**Education specialist/professional diploma** A certificate of advanced graduate studies that advance educators in their instructional and leadership skills beyond a master's degree level of competence.

**Educational and general expenditures** The sum of current funds expenditures on instruction, research, public service, academic support, student services, institutional support, operation and maintenance of plant, and awards from restricted and unrestricted funds.

**Educational attainment** The highest grade of regular school attended and completed.

**Educational attainment (Current Population Survey)** This measure uses March CPS data to estimate the percentage of civilian, noninstitutionalized people who have achieved certain levels of educational attainment. Estimates of educational attainment do not differentiate between those who graduated from public schools, those who graduated from private schools, and those who earned a GED; these estimates also include individuals who earned their credential or completed their highest level of education outside of the United States.

**1972–1991** During this period, an individual's educational attainment was considered to be his or her last fully completed year of school. Individuals who completed 12 years of schooling were deemed to be high school graduates, as were those who began but did not complete the first year of college. Respondents who completed 16 or more years of schooling were counted as college graduates.

**1992–present** Beginning in 1992, CPS asked respondents to report their highest level of school completed or their highest degree received. This change means that some data collected before 1992 are not strictly comparable with data collected from 1992 onward and that care must be taken when making comparisons across years. The revised survey question emphasizes credentials received rather than the last grade level attended or completed. The new categories include the following:

- High school graduate, high school diploma, or the equivalent (e.g., GED)
- Some college but no degree
- Associate's degree in college, occupational/vocational program
- Associate's degree in college, academic program (e.g., A.A., A.S., A.A.S.)
- Bachelor's degree (e.g., B.A., A.B., B.S.)
- Master's degree (e.g., M.A., M.S., M.Eng., M.Ed., M.S.W., M.B.A.)
- Professional school degree (e.g., M.D., D.D.S., D.V.M., LL.B., J.D.)
- Doctor's degree (e.g., Ph.D., Ed.D.)

**Elementary education/programs** Learning experiences concerned with the knowledge, skills, appreciations, attitudes, and behavioral characteristics which are considered to be needed by all pupils in terms of their awareness of life within our culture and the world of work,

and which normally may be achieved during the elementary school years (usually kindergarten through grade 8 or kindergarten through grade 6), as defined by applicable state laws and regulations.

**Elementary school** A school classified as elementary by state and local practice and composed of any span of grades not above grade 8.

**Elementary/secondary school** Includes only schools that are part of state and local school systems, and also most nonprofit private elementary/secondary schools, both religiously affiliated and nonsectarian. Includes regular, alternative, vocational, and special education schools. U.S. totals exclude federal schools for American Indians, and federal schools on military posts and other federal installations.

**Employees in degree-granting institutions** Persons employed by degree-granting institutions, who are classified into the following occupational categories in this publication:

**Executive/administrative/managerial staff** Employees whose assignments require management of the institution or of a customarily recognized department or subdivision thereof. These employees perform work that is directly related to management policies or general business operations and that requires them to exercise discretion and independent judgment.

**Faculty (instruction/research/public service)** Employees whose principal activities are for the purpose of providing instruction or teaching, research, or public service. These employees may hold such titles as professor, associate professor, assistant professor, instructor, or lecturer. Graduate assistants are not included in this category.

**Graduate assistants** Graduate-level students who are employed on a part-time basis for the primary purpose of assisting in classroom or laboratory instruction or in the conduct of research.

**Nonprofessional staff** Employees whose primary activities can be classified as one of the following: technical and paraprofessional work (which generally requires less formal training and experience than required for professional status); clerical and secretarial work; skilled crafts work; or service/maintenance work.

**Other professional staff** Employees who perform academic support, student service, and institutional support and who need either a degree at the bachelor's or higher level or experience of such kind and amount as to provide a comparable background.

**Professional staff** Employees who are classified as executive/administrative/managerial staff, faculty, graduate assistants, or other professional staff.

**Employment** Includes civilian, noninstitutional people who: (1) worked during any part of the survey week as paid employees; worked in their own business, profession, or farm; or worked 15 hours or more as unpaid workers in a family-

owned enterprise; or (2) were not working but had jobs or businesses from which they were temporarily absent due to illness, bad weather, vacation, labor-management dispute, or personal reasons whether or not they were seeking another job.

**Employment (Current Population Survey)** According to the October Current Population Survey (CPS), employed persons are persons age 16 or older who, during the reference week, (1) did any work at all (at least 1 hour) as paid employees; or (2) were not working but had jobs or businesses from which they were temporarily absent because of vacation, illness, bad weather, child care problems, maternity or paternity leave, labor-management dispute, job training, or other family or personal reasons, whether or not they were paid for the time off or were seeking other jobs.

**Employment status** A classification of individuals as employed (either full or part time), unemployed (looking for work or on layoff), or not in the labor force (due to being retired, having unpaid employment, or some other reason).

**Endowment** A trust fund set aside to provide a perpetual source of revenue from the proceeds of the endowment investments. Endowment funds are often created by donations from benefactors of an institution, who may designate the use of the endowment revenue. Normally, institutions or their representatives manage the investments, but they are not permitted to spend the endowment fund itself, only the proceeds from the investments. Typical uses of endowments would be an endowed chair for a particular department or for a scholarship fund. Endowment totals tabulated in this book also include funds functioning as endowments, such as funds left over from the previous year and placed with the endowment investments by the institution. These funds may be withdrawn by the institution and spent as current funds at any time. Endowments are evaluated by two different measures, book value and market value. Book value is the purchase price of the endowment investment. Market value is the current worth of the endowment investment. Thus, the book value of a stock held in an endowment fund would be the purchase price of the stock. The market value of the stock would be its selling price as of a given day.

**Engineering** Instructional programs that describe the mathematical and natural science knowledge gained by study, experience, and practice and applied with judgment to develop ways to utilize the materials and forces of nature economically. Include programs that prepare individuals to support and assist engineers and similar professionals.

**English** A group of instructional programs that describes the English language arts, including composition, creative writing, and the study of literature.

**English language learner (ELL)** An individual who, due to any of the reasons listed below, has sufficient difficulty speaking, reading, writing, or understanding the English language to be denied the opportunity to learn successfully in classrooms where the language of instruction is English or to participate fully in the larger U.S. society. Such an individual



(1) was not born in the United States or has a native language other than English; (2) comes from environments where a language other than English is dominant; or (3) is an American Indian or Alaska Native and comes from environments where a language other than English has had a significant impact on the individual's level of English language proficiency.

**Enrollment** The total number of students registered in a given school unit at a given time, generally in the fall of a year.

**Estimate** A numerical value obtained from a statistical sample and assigned to a population parameter. The particular value yielded by an estimator in a given set of circumstances or the rule by which such particular values are calculated.

**Estimating equation** An equation involving observed quantities and an unknown that serves to estimate the latter.

**Estimation** Estimation is concerned with inference about the numerical value of unknown population values from incomplete data, such as a sample. If a single figure is calculated for each unknown parameter, the process is called point estimation. If an interval is calculated within which the parameter is likely, in some sense, to lie, the process is called interval estimation.

**Executive/administrative/managerial staff** See Employees in degree-granting institutions.

**Expenditures, Total** For elementary/secondary schools, these include all charges for current outlays plus capital outlays and interest on school debt. For degree-granting institutions, these include current outlays plus capital outlays. For government, these include charges net of recoveries and other correcting transactions other than for retirement of debt, investment in securities, extension of credit, or as agency transactions. Government expenditures include only external transactions, such as the provision of perquisites or other payments in kind. Aggregates for groups of governments exclude intergovernmental transactions among the governments.

**Expenditures per pupil** Charges incurred for a particular period of time divided by a student unit of measure, such as average daily attendance or fall enrollment.

**Exponential smoothing** A method used in time series analysis to smooth or to predict a series. There are various forms, but all are based on the supposition that more remote history has less importance than more recent history.

**Extracurricular activities** Activities that are not part of the required curriculum and that take place outside of the regular course of study. They include both school-sponsored (e.g., varsity athletics, drama, and debate clubs) and community-sponsored (e.g., hobby clubs and youth organizations like the Junior Chamber of Commerce or Boy Scouts) activities.

## F

**Faculty (instruction/research/public service)** See Employees in degree-granting institutions.

**Family** A group of two or more people (one of whom is the householder) related by birth, marriage, or adoption and residing together. All such people (including related subfamily members) are considered as members of one family.

**Family income** Includes all monetary income from all sources (including jobs, businesses, interest, rent, and social security payments) over a 12-month period. The income of nonrelatives living in the household is excluded, but the income of all family members age 15 or older (age 14 or older in years prior to 1989), including those temporarily living outside of the household, is included. In the October CPS, family income is determined from a single question asked of the household respondent.

**Federal funds** Amounts collected and used by the federal government for the general purposes of the government. There are four types of federal fund accounts: the general fund, special funds, public enterprise funds, and intragovernmental funds. The major federal fund is the general fund, which is derived from general taxes and borrowing. Federal funds also include certain earmarked collections, such as those generated by and used to finance a continuing cycle of business-type operations.

**Federal sources (postsecondary degree-granting institutions)** Includes federal appropriations, grants, and contracts, and federally funded research and development centers (FFRDCs). Federally subsidized student loans are not included.

**Fields of study** The primary field of concentration in postsecondary certificates and degrees. In the Integrated Postsecondary Education Data System (IPEDS), refers to degree programs that are broken out only to the 2-digit level of the Classification of Instructional Programs (CIP). See also Discipline divisions.

**Financial aid** Grants, loans, assistantships, scholarships, fellowships, tuition waivers, tuition discounts, veteran's benefits, employer aid (tuition reimbursement), and other monies (other than from relatives or friends) provided to students to help them meet expenses. Except where designated, includes Title IV subsidized and unsubsidized loans made directly to students.

**First-order serial correlation** When errors in one time period are correlated directly with errors in the ensuing time period.

**First-professional degree** NCES no longer uses this classification. Most degrees formerly classified as first-professional (such as M.D., D.D.S., Pharm.D., D.V.M., and J.D.) are now classified as doctor's degrees—professional practice. However, master's of divinity degrees are now classified as master's degrees.

**First-time student (undergraduate)** A student who has no prior postsecondary experience (except as noted below) attending any institution for the first time at the undergraduate level. Includes students enrolled in the fall term who attended college for the first time in the prior summer term, and students who entered with advanced standing (college credits earned before graduation from high school).

**Fiscal year** A period of 12 months for which accounting records are compiled. Institutions and states may designate their own accounting period, though most states use a July 1 through June 30 accounting year. The yearly accounting period for the federal government begins on October 1 and ends on the following September 30. The fiscal year is designated by the calendar year in which it ends; e.g., fiscal year 2006 begins on October 1, 2005, and ends on September 30, 2006. (From fiscal year 1844 to fiscal year 1976, the federal fiscal year began on July 1 and ended on the following June 30.)

**Forecast** An estimate of the future based on rational study and analysis of available pertinent data, as opposed to subjective prediction.

**Forecasting** Assessing the magnitude that a quantity will assume at some future point in time, as distinct from “estimation,” which attempts to assess the magnitude of an already existent quantity.

**Foreign languages** A group of instructional programs that describes the structure and use of language that is common or indigenous to people of a given community or nation, geographical area, or cultural traditions. Programs cover such features as sound, literature, syntax, phonology, semantics, sentences, prose, and verse, as well as the development of skills and attitudes used in communicating and evaluating thoughts and feelings through oral and written language.

**For-profit institution** A private institution in which the individual(s) or agency in control receives compensation other than wages, rent, or other expenses for the assumption of risk.

**Free or reduced-price lunch** See National School Lunch Program.

**Full-time enrollment** The number of students enrolled in postsecondary education courses with total credit load equal to at least 75 percent of the normal full-time course load. At the undergraduate level, full-time enrollment typically includes students who have a credit load of 12 or more semester or quarter credits. At the postbaccalaureate level, full-time enrollment includes students who typically have a credit load of 9 or more semester or quarter credits, as well as other students who are considered full time by their institutions.

**Full-time-equivalent (FTE) enrollment** For postsecondary institutions, enrollment of full-time students, plus the full-time equivalent of part-time students. The full-time equivalent of the part-time students is estimated using different factors depending on the type and control of institution and level of student.

**FTE staff** Full-time staff, plus the full-time equivalent of the part-time staff.

**FTE teacher** See Instructional staff.

**Full-time instructional faculty** Those members of the instruction/research staff who are employed full time as defined by the institution, including faculty with released time for research and faculty on sabbatical leave. Full-time counts exclude faculty who are employed to teach less than two semesters, three quarters, two trimesters, or two 4-month sessions; replacements for faculty on sabbatical leave or those on leave without pay; faculty for preclinical and clinical medicine; faculty who are donating their services; faculty who are members of military organizations and paid on a different pay scale from civilian employees; those academic officers whose primary duties are administrative; and graduate students who assist in the instruction of courses.

**Full-time worker** In educational institutions, an employee whose position requires being on the job on school days throughout the school year at least the number of hours the schools are in session. For higher education, a member of an educational institution’s staff who is employed full time, as defined by the institution.

**Function** A mathematical correspondence that assigns exactly one element of one set to each element of the same or another set. A variable that depends on and varies with another.

**Functional form** A mathematical statement of the relationship among the variables in a model.

## G

**General administration support services** Includes salary, benefits, supplies, and contractual fees for boards of education staff and executive administration. Excludes state administration.

**General Educational Development (GED) program** Academic instruction to prepare people to take the high school equivalency examination. See also GED recipient.

**GED certificate** This award is received following successful completion of the General Educational Development (GED) test. The GED program—sponsored by the GED Testing Service (a joint venture of the American Council on Education and Pearson)—enables individuals to demonstrate that they have acquired a level of learning comparable to that of high school graduates. See also High school equivalency certificate.

**GED recipient** A person who has obtained certification of high school equivalency by meeting state requirements and passing an approved exam, which is intended to provide an appraisal of the person’s achievement or performance in the broad subject matter areas usually required for high school graduation.

**General program** A program of studies designed to prepare students for the common activities of a citizen, family member, and worker. A general program of studies may include instruction in both academic and vocational areas.

**Geographic region** One of the four regions of the United States used by the U.S. Census Bureau, as follows:

**Northeast**

Connecticut (CT)  
Maine (ME)  
Massachusetts (MA)  
New Hampshire (NH)  
New Jersey (NJ)  
New York (NY)  
Pennsylvania (PA)  
Rhode Island (RI)  
Vermont (VT)

**South**

Alabama (AL)  
Arkansas (AR)  
Delaware (DE)  
District of Columbia (DC)  
Florida (FL)  
Georgia (GA)  
Kentucky (KY)  
Louisiana (LA)  
Maryland (MD)  
Mississippi (MS)  
North Carolina (NC)  
Oklahoma (OK)  
South Carolina (SC)  
Tennessee (TN)  
Texas (TX)  
Virginia (VA)  
West Virginia (WV)

**Midwest**

Illinois (IL)  
Indiana (IN)  
Iowa (IA)  
Kansas (KS)  
Michigan (MI)  
Minnesota (MN)  
Missouri (MO)  
Nebraska (NE)  
North Dakota (ND)  
Ohio (OH)  
South Dakota (SD)  
Wisconsin (WI)

**West**

Alaska (AK)  
Arizona (AZ)  
California (CA)  
Colorado (CO)  
Hawaii (HI)  
Idaho (ID)  
Montana (MT)  
Nevada (NV)  
New Mexico (NM)  
Oregon (OR)  
Utah (UT)  
Washington (WA)  
Wyoming (WY)

**Government appropriation** An amount (other than a grant or contract) received from or made available to an institution through an act of a legislative body.

**Government grant or contract** Revenues received by a postsecondary institution from a government agency for a specific research project or other program. Examples are research projects, training programs, and student financial assistance.

**Graduate** An individual who has received formal recognition for the successful completion of a prescribed program of studies.

**Graduate assistants** See Employees in degree-granting institutions.

**Graduate enrollment** The number of students who are working towards a master's or doctor's degree and students who are in postbaccalaureate classes but not in degree programs.

**Graduate Record Examination (GRE)** Multiple-choice examinations administered by the Educational Testing Service and taken by college students who are intending to attend certain graduate schools. There are two types of testing

available: (1) the general exam which measures critical thinking, analytical writing, verbal reasoning, and quantitative reasoning skills, and (2) the subject test which is offered in eight specific subjects and gauges undergraduate achievement in a specific field. The subject tests are intended for those who have majored in or have extensive background in that specific area.

**Graduation** Formal recognition given to an individual for the successful completion of a prescribed program of studies.

**Gross domestic product (GDP)** The total national output of goods and services valued at market prices. GDP can be viewed in terms of expenditure categories which include purchases of goods and services by consumers and government, gross private domestic investment, and net exports of goods and services. The goods and services included are largely those bought for final use (excluding illegal transactions) in the market economy. A number of inclusions, however, represent imputed values, the most important of which is rental value of owner-occupied housing.

**Group quarters** Living arrangements where people live or stay in a group situation that is owned or managed by an entity or organization providing housing and/or services for the residents. Group quarters include such places as college residence halls, residential treatment centers, skilled nursing facilities, group homes, military barracks, correctional facilities, and workers' dormitories.

**Noninstitutionalized group quarters** Include college and university housing, military quarters, facilities for workers and religious groups, and temporary shelters for the homeless.

**Institutionalized group quarters** Include adult and juvenile correctional facilities, nursing facilities, and other health care facilities.

## H

**Handicapped** See Disabilities, children with.

**Head Start** A local public or private nonprofit or for-profit entity authorized by the Department of Health and Human Services' Administration for Children and Families to operate a Head Start program to serve children age 3 to compulsory school age, pursuant to section 641(b) and (d) of the Head Start Act.

**Hearing impairment** See Disabilities, children with.

**High school** A secondary school offering the final years of high school work necessary for graduation, usually includes grades 10, 11, 12 (in a 6-3-3 plan) or grades 9, 10, 11, and 12 (in a 6-2-4 plan).

**High school (2007–08 Schools and Staffing Survey)** A school with no grade lower than 7 and at least one grade higher than 8.

**High school completer** An individual who has been awarded a high school diploma or an equivalent credential, including a General Educational Development (GED) certificate.

**High school diploma** A formal document regulated by the state certifying the successful completion of a prescribed secondary school program of studies. In some states or communities, high school diplomas are differentiated by type, such as an academic diploma, a general diploma, or a vocational diploma.

**High school equivalency certificate** A formal document certifying that an individual has met the state requirements for high school graduation equivalency by obtaining satisfactory scores on an approved examination and meeting other performance requirements (if any) set by a state education agency or other appropriate body. One particular version of this certificate is the General Educational Development (GED) test. The GED test is a comprehensive test used primarily to appraise the educational development of students who have not completed their formal high school education and who may earn a high school equivalency certificate by achieving satisfactory scores. GEDs are awarded by the states or other agencies, and the test is developed and distributed by the GED Testing Service (a joint venture of the American Council on Education and Pearson).

**High school program** A program of studies designed to prepare students for employment and postsecondary education. Three types of programs are often distinguished—academic, vocational, and general. An academic program is designed to prepare students for continued study at a college or university. A vocational program is designed to prepare students for employment in one or more semiskilled, skilled, or technical occupations. A general program is designed to provide students with the understanding and competence to function effectively in a free society and usually represents a mixture of academic and vocational components.

**Higher education** Study beyond secondary school at an institution that offers programs terminating in an associate's, bachelor's, or higher degree.

**Higher education institutions (basic classification and Carnegie classification)** See Postsecondary institutions (basic classification by level) and Postsecondary institutions (Carnegie classification of degree-granting institutions)

**Higher Education Price Index** A price index which measures average changes in the prices of goods and services purchased by colleges and universities through current-fund education and general expenditures (excluding expenditures for sponsored research and auxiliary enterprises).

**Hispanic serving institutions** Pursuant to 302 (d) of Public Law 102-325 (20 U.S.C. 1059c), most recently amended December 20, 1993, in 2(a)(7) of Public Law 103-208, where Hispanic serving institutions are defined as those with full-time-equivalent undergraduate enrollment of Hispanic students at 25 percent or more.

**Historically black colleges and universities** Accredited institutions of higher education established prior to 1964 with the principal mission of educating black Americans.

Federal regulations (20 USC 1061 (2)) allow for certain exceptions of the founding date.

**Hours worked per week** According to the October CPS, the number of hours a respondent worked in all jobs in the week prior to the survey interview.

**Household** All the people who occupy a housing unit. A house, an apartment, a mobile home, a group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters, that is, when the occupants do not live and eat with any other people in the structure, and there is direct access from the outside or through a common hall.

**Housing unit** A house, an apartment, a mobile home, a group of rooms, or a single room that is occupied as separate living quarters.

**Income tax** Taxes levied on net income, that is, on gross income less certain deductions permitted by law. These taxes can be levied on individuals or on corporations or unincorporated businesses where the income is taxed distinctly from individual income.

**Independent operations** A group of self-supporting activities under control of a college or university. For purposes of financial surveys conducted by the National Center for Education Statistics, this category is composed principally of federally funded research and development centers (FFRDC).

**Independent variable** In regression analysis, a random variable,  $y$ , is expressed as a function of variables  $x_1, x_2, \dots, x_k$ , plus a stochastic term; the  $x$ 's are known as "independent variables."

**Individuals with Disabilities Education Act (IDEA)** IDEA is a federal law requiring services to children with disabilities throughout the nation. IDEA governs how states and public agencies provide early intervention, special education, and related services to eligible infants, toddlers, children, and youth with disabilities. Infants and toddlers with disabilities (birth–age 2) and their families receive early intervention services under IDEA, Part C. Children and youth (ages 3–21) receive special education and related services under IDEA, Part B.

**Inflation** A rise in the general level of prices of goods and services in an economy over a period of time, which generally corresponds to a decline in the real value of money or a loss of purchasing power. See also Constant dollars and Purchasing Power Parity indexes.

***Institutional support*** The category of higher education expenditures that includes day-to-day operational support for colleges, excluding expenditures for physical plant operations. Examples of institutional support include general administrative services, executive direction and planning, legal and fiscal operations, and community relations.

***Instruction (colleges and universities)*** That functional category including expenditures of the colleges, schools, departments, and other instructional divisions of higher education institutions and expenditures for departmental research and public service which are not separately budgeted; includes expenditures for both credit and noncredit activities. Excludes expenditures for academic administration where the primary function is administration (e.g., academic deans).

***Instruction (elementary and secondary)*** Instruction encompasses all activities dealing directly with the interaction between teachers and students. Teaching may be provided for students in a school classroom, in another location such as a home or hospital, and in other learning situations such as those involving co-curricular activities. Instruction may be provided through some other approved medium, such as the Internet, television, radio, telephone, and correspondence.

***Instructional staff*** Full-time-equivalent number of positions, not the number of different individuals occupying the positions during the school year. In local schools, includes all public elementary and secondary (junior and senior high) day-school positions that are in the nature of teaching or in the improvement of the teaching-learning situation; includes consultants or supervisors of instruction, principals, teachers, guidance personnel, librarians, psychological personnel, and other instructional staff, and excludes administrative staff, attendance personnel, clerical personnel, and junior college staff.

***Instructional support services*** Includes salary, benefits, supplies, and contractual fees for staff providing instructional improvement, educational media (library and audiovisual), and other instructional support services.

***Intellectual disability*** See Disabilities, children with.

***Interest on debt*** Includes expenditures for long-term debt service interest payments (i.e., those longer than 1 year).

***International baccalaureate (IB)*** A recognized international program of primary, middle, and secondary studies leading to the International Baccalaureate (IB) Diploma. This diploma (or certificate) is recognized in Europe and elsewhere as qualifying holders for direct access to university studies. Schools offering the IB program are approved by the International Baccalaureate Organization (IBO) and their regional office and may use IBO instructional materials, local school materials, or a combination.

***International finance data*** Include data on public and private expenditures for educational institutions. Educational institutions directly provide instructional programs (i.e.,

teaching) to individuals in an organized group setting or through distance education. Business enterprises or other institutions that provide short-term courses of training or instruction to individuals on a “one-to-one” basis are not included. Where noted, international finance data may also include publicly subsidized spending on education-related purchases, such as school books, living costs, and transportation.

***Public expenditures*** Corresponds to the nonrepayable current and capital expenditures of all levels of the government directly related to education. Expenditures that are not directly related to education (e.g., cultures, sports, youth activities) are, in principle, not included. Expenditures on education by other ministries or equivalent institutions (e.g., Health and Agriculture) are included. Public subsidies for students’ living expenses are excluded to ensure international comparability of the data.

***Private expenditures*** Refers to expenditures funded by private sources (i.e., households and other private entities). “Households” means students and their families. “Other private entities” includes private business firms and nonprofit organizations, including religious organizations, charitable organizations, and business and labor associations. Private expenditures are composed of school fees, the cost of materials (such as textbooks and teaching equipment), transportation costs (if organized by the school), the cost of meals (if provided by the school), boarding fees, and expenditures by employers on initial vocational training.

***Current expenditures*** Includes final consumption expenditures (e.g., compensation of employees, consumption of intermediate goods and services, consumption of fixed capital, and military expenditures); property income paid; subsidies; and other current transfers paid.

***Capital expenditures*** Includes spending to acquire and improve fixed capital assets, land, intangible assets, government stocks, and nonmilitary, nonfinancial assets, as well as spending to finance net capital transfers.

***International Standard Classification of Education (ISCED)*** Used to compare educational systems in different countries. ISCED is the standard used by many countries to report education statistics to the United Nations Educational, Scientific, and Cultural Organization (UNESCO) and the Organization for Economic Cooperation and Development (OECD). ISCED divides educational systems into the following seven categories, based on six levels of education.

***ISCED Level 0*** Education preceding the first level (early childhood education) usually begins at age 3, 4, or 5 (sometimes earlier) and lasts from 1 to 3 years, when it is provided. In the United States, this level includes nursery school and kindergarten.

***ISCED Level 1*** Education at the first level (primary or elementary education) usually begins at age 5, 6, or 7 and continues for about 4 to 6 years. For the United States, the first level starts with 1st grade and ends with 6th grade.

**ISCED Level 2** Education at the second level (lower secondary education) typically begins at about age 11 or 12 and continues for about 2 to 6 years. For the United States, the second level starts with 7th grade and typically ends with 9th grade. Education at the lower secondary level continues the basic programs of the first level, although teaching is typically more subject focused, often using more specialized teachers who conduct classes in their field of specialization. The main criterion for distinguishing lower secondary education from primary education is whether programs begin to be organized in a more subject-oriented pattern, using more specialized teachers conducting classes in their field of specialization. If there is no clear breakpoint for this organizational change, lower secondary education is considered to begin at the end of 6 years of primary education. In countries with no clear division between lower secondary and upper secondary education, and where lower secondary education lasts for more than 3 years, only the first 3 years following primary education are counted as lower secondary education.

**ISCED Level 3** Education at the third level (upper secondary education) typically begins at age 15 or 16 and lasts for approximately 3 years. In the United States, the third level starts with 10th grade and ends with 12th grade. Upper secondary education is the final stage of secondary education in most OECD countries. Instruction is often organized along subject-matter lines, in contrast to the lower secondary level, and teachers typically must have a higher level, or more subject-specific, qualification. There are substantial differences in the typical duration of programs both across and between countries, ranging from 2 to 5 years of schooling. The main criteria for classifications are (1) national boundaries between lower and upper secondary education and (2) admission into educational programs, which usually requires the completion of lower secondary education or a combination of basic education and life experience that demonstrates the ability to handle the subject matter in upper secondary schools.

**ISCED Level 4** Education at the fourth level (postsecondary nontertiary education) straddles the boundary between secondary and postsecondary education. This program of study, which is primarily vocational in nature, is generally taken after the completion of secondary school and typically lasts from 6 months to 2 years. Although the content of these programs may not be significantly more advanced than upper secondary programs, these programs serve to broaden the knowledge of participants who have already gained an upper secondary qualification.

**ISCED Level 5** Education at the fifth level (first stage of tertiary education) includes programs with more advanced content than those offered at the two previous levels. Entry into programs at the fifth level normally requires successful completion of either of the two previous levels.

**ISCED Level 5A** Tertiary-type A programs provide an education that is largely theoretical and is intended to provide sufficient qualifications for gaining entry into advanced research programs and professions with high skill requirements. Entry into these programs normally requires the successful completion of an upper secondary education; admission is competitive in most cases. The minimum cumulative theoretical duration at this level is 3 years of full-time enrollment. In the United States, tertiary-type A programs include first university programs that last approximately 4 years and lead to the award of a bachelor's degree and second university programs that lead to a master's degree.

**ISCED Level 5B** Tertiary-type B programs are typically shorter than tertiary-type A programs and focus on practical, technical, or occupational skills for direct entry into the labor market, although they may cover some theoretical foundations in the respective programs. They have a minimum duration of 2 years of full-time enrollment at the tertiary level. In the United States, such programs are often provided at community colleges and lead to an associate's degree.

**ISCED Level 6** Education at the sixth level (advanced research qualification) is provided in graduate and professional schools that generally require a university degree or diploma as a minimum condition for admission. Programs at this level lead to the award of an advanced, postgraduate degree, such as a Ph.D. The theoretical duration of these programs is 3 years of full-time enrollment in most countries (for a cumulative total of at least 7 years at levels five and six), although the length of the actual enrollment is often longer. Programs at this level are devoted to advanced study and original research.

**Interpolation** See Linear interpolation.

## J

**Junior high school** A separately organized and administered secondary school intermediate between the elementary and senior high schools, usually includes grades 7, 8, and 9 (in a 6-3-3 plan) or grades 7 and 8 (in a 6-2-4 plan).

## L

**Labor force** People employed (either full time or part time) as civilians, unemployed but looking for work, or in the armed services during the survey week. The "civilian labor force" comprises all civilians classified as employed or unemployed. See also Unemployed.

**Lag** An event occurring at time  $t + k$  ( $k > 0$ ) is said to lag behind an event occurring at time  $t$ , the extent of the lag being  $k$ . An event occurring  $k$  time periods before another may be regarded as having a negative lag.

**Land-grant colleges** The First Morrill Act of 1862 facilitated the establishment of colleges through grants of land or funds in lieu of land. The Second Morrill Act in 1890 provided for money grants and for the establishment of land-grant colleges and universities for blacks in those states with dual systems of higher education.

**Lead time** When forecasting a statistic, the number of time periods since the last time period of actual data for that statistic used in producing the forecast.

**Level of school** A classification of elementary/secondary schools by instructional level. Includes elementary schools, secondary schools, and combined elementary and secondary schools. See also Elementary school, Secondary school, and Combined elementary and secondary school.

**Limited-English proficient** Refers to an individual who was not born in the United States and whose native language is a language other than English, or who comes from an environment where a language other than English has had a significant impact on the individual's level of English language proficiency. It may also refer to an individual who is migratory, whose native language is a language other than English, and who comes from an environment where a language other than English is dominant; and whose difficulties in speaking, reading, writing, or understanding the English language may be sufficient to deny the individual the ability to meet the state's proficient level of achievement on state assessments as specified under the No Child Left Behind Act, the ability to successfully achieve in classrooms where the language of instruction is English, or the opportunity to participate fully in society. See also English language learner.

**Linear interpolation** A method that allows the prediction of an unknown value if any two particular values on the same scale are known and the rate of change is assumed constant.

**Local education agency (LEA)** See School district.

**Locale codes** A classification system to describe a type of location. The "Metro-Centric" locale codes, developed in the 1980s, classified all schools and school districts based on their county's proximity to a Metropolitan Statistical Area (MSA) and their specific location's population size and density. In 2006, the "Urban-Centric" locale codes were introduced. These locale codes are based on an address's proximity to an urbanized area. For more information see [http://nces.ed.gov/ccd/rural\\_locales.asp](http://nces.ed.gov/ccd/rural_locales.asp).

#### **Pre-2006 Metro-Centric Locale Codes**

**Large City:** A central city of a consolidated metropolitan statistical area (CMSA) or MSA, with the city having a population greater than or equal to 250,000.

**Mid-size City:** A central city of a CMSA or MSA, with the city having a population less than 250,000.

**Urban Fringe of a Large City:** Any territory within a CMSA or MSA of a Large City and defined as urban by the Census Bureau.

**Urban Fringe of a Mid-size City:** Any territory within a CMSA or MSA of a Mid-size City and defined as urban by the Census Bureau.

**Large Town:** An incorporated place or Census-designated place with a population greater than or equal to 25,000 and located outside a CMSA or MSA.

**Small Town:** An incorporated place or Census-designated place with a population less than 25,000 and greater than or equal to 2,500 and located outside a CMSA or MSA.

**Rural, Outside MSA:** Any territory designated as rural by the Census Bureau that is outside a CMSA or MSA of a Large or Mid-size City.

**Rural, Inside MSA:** Any territory designated as rural by the Census Bureau that is within a CMSA or MSA of a Large or Mid-size City.

#### **2006 Urban-Centric Locale Codes**

**City, Large:** Territory inside an urbanized area and inside a principal city with population of 250,000 or more.

**City, Midsize:** Territory inside an urbanized area and inside a principal city with population less than 250,000 and greater than or equal to 100,000.

**City, Small:** Territory inside an urbanized area and inside a principal city with population less than 100,000.

**Suburb, Large:** Territory outside a principal city and inside an urbanized area with population of 250,000 or more.

**Suburb, Midsize:** Territory outside a principal city and inside an urbanized area with population less than 250,000 and greater than or equal to 100,000.

**Suburb, Small:** Territory outside a principal city and inside an urbanized area with population less than 100,000.

**Town, Fringe:** Territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area.

**Town, Distant:** Territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area.

**Town, Remote:** Territory inside an urban cluster that is more than 35 miles from an urbanized area.

**Rural, Fringe:** Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster.

**Rural, Distant:** Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster.

**Rural, Remote:** Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster.

## M

**Magnet school or program** A special school or program designed to reduce, prevent, or eliminate racial isolation and/or to provide an academic or social focus on a particular theme.

**Mandatory transfer** A transfer of current funds that must be made in order to fulfill a binding legal obligation of the institution. Included under mandatory transfers are debt service provisions relating to academic and administrative buildings, including (1) amounts set aside for debt retirement and interest and (2) required provisions for renewal and replacement of buildings to the extent these are not financed from other funds.

**Master's degree** A degree awarded for successful completion of a program generally requiring 1 or 2 years of full-time college-level study beyond the bachelor's degree. One type of master's degree, including the Master of Arts degree, or M.A., and the Master of Science degree, or M.S., is awarded in the liberal arts and sciences for advanced scholarship in a subject field or discipline and demonstrated ability to perform scholarly research. A second type of master's degree is awarded for the completion of a professionally oriented program, for example, an M.Ed. in education, an M.B.A. in business administration, an M.F.A. in fine arts, an M.M. in music, an M.S.W. in social work, and an M.P.A. in public administration. Some master's degrees—such as divinity degrees (M.Div. or M.H.L./Rav), which were formerly classified as “first-professional”—may require more than 2 years of full-time study beyond the bachelor's degree.

**Mathematics** A group of instructional programs that describes the science of numbers and their operations, interrelations, combinations, generalizations, and abstractions and of space configurations and their structure, measurement, transformations, and generalizations.

**Mean absolute percentage error (MAPE)** The average value of the absolute value of errors expressed in percentage terms.

**Mean test score** The score obtained by dividing the sum of the scores of all individuals in a group by the number of individuals in that group for which scores are available.

**Median earnings** The amount which divides the income distribution into two equal groups, half having income above that amount and half having income below that amount. Earnings include all wage and salary income. Unlike mean earnings, median earnings either do not change or change very little in response to extreme observations.

**Middle school** A school with no grade lower than 5 and no higher than 8.

**Migration** Geographic mobility involving a change of usual residence between clearly defined geographic units, that is, between counties, states, or regions.

**Minimum-competency testing** Measuring the acquisition of competence or skills to or beyond a certain specified standard.

**Model** A system of postulates, data, and inferences presented as a mathematical description of a phenomenon, such as an actual system or process. The actual phenomenon is represented by the model in order to explain, predict, and control it.

**Montessori school** A school that provides instruction using Montessori teaching methods.

**Multiple disabilities** See Disabilities, children with.

## N

**National Assessment of Educational Progress (NAEP)** See Appendix A: Guide to Sources.

**National School Lunch Program** Established by President Truman in 1946, the program is a federally assisted meal program operated in public and private nonprofit schools and residential child care centers. To be eligible for free lunch, a student must be from a household with an income at or below 130 percent of the federal poverty guideline; to be eligible for reduced-price lunch, a student must be from a household with an income between 130 percent and 185 percent of the federal poverty guideline.

**Newly qualified teacher** People who: (1) first became eligible for a teaching license during the period of the study referenced or who were teaching at the time of survey, but were not certified or eligible for a teaching license; and (2) had never held full-time, regular teaching positions (as opposed to substitute) prior to completing the requirements for the degree which brought them into the survey.

**Non-degree-granting institutions** Postsecondary institutions that participate in Title IV federal financial aid programs but do not offer accredited 4-year or 2-year degree programs. Includes some institutions transitioning to higher level program offerings, though still classified at a lower level.

**Nonprofessional staff** See Employees in degree-granting institutions.

**Nonprofit institution** A private institution in which the individual(s) or agency in control receives no compensation other than wages, rent, or other expenses for the assumption of risk. Nonprofit institutions may be either independent nonprofit (i.e., having no religious affiliation) or religiously affiliated.

**Nonresident alien** A person who is not a citizen of the United States and who is in this country on a temporary basis and does not have the right to remain indefinitely.

**Nonsectarian school** Nonsectarian schools do not have a religious orientation or purpose and are categorized as regular, special program emphasis, or special education schools. See also Regular school, Special program emphasis school, and Special education school.

**Nonsupervisory instructional staff** People such as curriculum specialists, counselors, librarians, remedial specialists, and others possessing education certification, but not responsible for day-to-day teaching of the same group of pupils.



**Nursery school** An instructional program for groups of children during the year or years preceding kindergarten, which provides educational experiences under the direction of teachers. See also Prekindergarten and Preschool.

## O

**Obligations** Amounts of orders placed, contracts awarded, services received, or similar legally binding commitments made by federal agencies during a given period that will require outlays during the same or some future period.

**Occupational home economics** Courses of instruction emphasizing the acquisition of competencies needed for getting and holding a job or preparing for advancement in an occupational area using home economics knowledge and skills.

**Occupied housing unit** Separate living quarters with occupants currently inhabiting the unit. See also Housing unit.

**Off-budget federal entities** Organizational entities, federally owned in whole or in part, whose transactions belong in the budget under current budget accounting concepts, but that have been excluded from the budget totals under provisions of law. An example of an off-budget federal entity is the Federal Financing Bank, which provides student loans under the Direct Loan Program.

**On-budget funding** Federal funding for education programs that is tied to appropriations. On-budget funding does not include the Direct Loan Program, under which student loans are provided by the Federal Financing Bank, an off-budget federal entity. See also Off-budget federal entities.

**Operation and maintenance services** Includes salary, benefits, supplies, and contractual fees for supervision of operations and maintenance, operating buildings (heating, lighting, ventilating, repair, and replacement), care and upkeep of grounds and equipment, vehicle operations and maintenance (other than student transportation), security, and other operations and maintenance services.

**Ordinary least squares (OLS)** The estimator that minimizes the sum of squared residuals.

**Organization for Economic Cooperation and Development (OECD)** An intergovernmental organization of industrialized countries that serves as a forum for member countries to cooperate in research and policy development on social and economic topics of common interest. In addition to member countries, partner countries contribute to the OECD's work in a sustained and comprehensive manner.

**Orthopedic impairment** See Disabilities, children with.

**Other foreign languages and literatures** Any instructional program in foreign languages and literatures not listed in the table, including language groups and individual languages, such as the non-Semitic African languages, Native American languages, the Celtic languages, Pacific language groups, the Ural-Altaic languages, Basque, and others.

**Other health impairment** See Disabilities, children with.

**Other professional staff** See Employees in degree-granting institutions.

**Other religious school** Other religious schools have a religious orientation or purpose, but are not Roman Catholic. Other religious schools are categorized according to religious association membership as Conservative Christian, other affiliated, or unaffiliated.

**Other support services** Includes salary, benefits, supplies, and contractual fees for business support services, central support services, and other support services not otherwise classified.

**Other support services staff** All staff not reported in other categories. This group includes media personnel, social workers, bus drivers, security, cafeteria workers, and other staff.

**Outlays** The value of checks issued, interest accrued on the public debt, or other payments made, net of refunds and reimbursements.

## P

**Parameter** A quantity that describes a statistical population.

**Part-time enrollment** The number of students enrolled in postsecondary education courses with a total credit load less than 75 percent of the normal full-time credit load. At the undergraduate level, part-time enrollment typically includes students who have a credit load of less than 12 semester or quarter credits. At the postbaccalaureate level, part-time enrollment typically includes students who have a credit load of less than 9 semester or quarter credits.

**Pass-through transaction** A payment that a postsecondary institution applies directly to a student's account. The payment "passes through" the institution for the student's benefit. Most private institutions treat Pell grants as pass-through transactions. At these institutions, any Pell grant funds that are applied to a student's tuition are reported as tuition revenues. In contrast, the vast majority of public institutions report Pell grants both as federal revenues and as allowances that reduce tuition revenues.

**Personal income** Current income received by people from all sources, minus their personal contributions for social insurance. Classified as "people" are individuals (including owners of unincorporated firms), nonprofit institutions serving individuals, private trust funds, and private noninsured welfare funds. Personal income includes transfers (payments not resulting from current production) from government and business such as social security benefits and military pensions, but excludes transfers among people.

**Physical plant assets** Includes the values of land, buildings, and equipment owned, rented, or utilized by colleges. Does not include those plant values which are a part of endowment or other capital fund investments in real estate; excludes construction in progress.

**Postbaccalaureate enrollment** The number of students working towards advanced degrees and of students enrolled in graduate-level classes but not enrolled in degree programs. See also Graduate enrollment.

**Postsecondary education** The provision of formal instructional programs with a curriculum designed primarily for students who have completed the requirements for a high school diploma or equivalent. This includes programs of an academic, vocational, and continuing professional education purpose, and excludes avocational and adult basic education programs.

**Postsecondary institutions (basic classification by level)**

**4-year institution** An institution offering at least a 4-year program of college-level studies wholly or principally creditable toward a baccalaureate degree.

**2-year institution** An institution offering at least a 2-year program of college-level studies which terminates in an associate degree or is principally creditable toward a baccalaureate degree. Data prior to 1996 include some institutions that have a less-than-2-year program, but were designated as institutions of higher education in the Higher Education General Information Survey.

**Less-than-2-year institution** An institution that offers programs of less than 2 years' duration below the baccalaureate level. Includes occupational and vocational schools with programs that do not exceed 1,800 contact hours.

**Postsecondary institutions (Carnegie classification of degree-granting institutions)**

**Doctorate-granting** Characterized by a significant level and breadth of activity in commitment to doctoral-level education as measured by the number of doctorate recipients and the diversity in doctoral-level program offerings. These institutions are assigned to one of the three subcategories listed below based on level of research activity (for more information on the research activity index used to assign institutions to the subcategories, see <http://classifications.carnegiefoundation.org/methodology/basic.php>):

**Research university, very high** Characterized by a very high level of research activity.

**Research university, high** Characterized by a high level of research activity.

**Doctoral/research university** Awarding at least 20 doctor's degrees per year, but not having a high level of research activity.

**Master's** Characterized by diverse postbaccalaureate programs but not engaged in significant doctoral-level education.

**Baccalaureate** Characterized by primary emphasis on general undergraduate, baccalaureate-level education. Not significantly engaged in postbaccalaureate education.

**Special focus** Baccalaureate or postbaccalaureate institution emphasizing one area (plus closely related specialties), such as business or engineering. The programmatic emphasis is measured by the percentage of degrees granted in the program area.

**Associate's** Institutions conferring at least 90 percent of their degrees and awards for work below the bachelor's level. In NCES tables, excludes all institutions offering any 4-year programs leading to a bachelor's degree.

**Tribal** Colleges and universities that are members of the American Indian Higher Education Consortium, as identified in IPEDS Institutional Characteristics.

**Poverty** The U.S. Census Bureau uses a set of money income thresholds that vary by family size and composition. A family, along with each individual in it, is considered poor if the family's total income is less than that family's threshold. The poverty thresholds do not vary geographically and are adjusted annually for inflation using the Consumer Price Index. The official poverty definition counts money income before taxes and does not include capital gains and noncash benefits (such as public housing, Medicaid, and food stamps).

**Prekindergarten** Preprimary education for children typically ages 3–4 who have not yet entered kindergarten. It may offer a program of general education or special education and may be part of a collaborative effort with Head Start.

**Preschool** An instructional program enrolling children generally younger than 5 years of age and organized to provide children with educational experiences under professionally qualified teachers during the year or years immediately preceding kindergarten (or prior to entry into elementary school when there is no kindergarten). See also Nursery school and Prekindergarten.

**Primary school** A school with at least one grade lower than 5 and no grade higher than 8.

**Private institution** An institution that is controlled by an individual or agency other than a state, a subdivision of a state, or the federal government, which is usually supported primarily by other than public funds, and the operation of whose program rests with other than publicly elected or appointed officials.

**Private nonprofit institution** An institution in which the individual(s) or agency in control receives no compensation other than wages, rent, or other expenses for the assumption of risk. These include both independent nonprofit institutions and those affiliated with a religious organization.

**Private for-profit institution** An institution in which the individual(s) or agency in control receives compensation other than wages, rent, or other expenses for the assumption of risk (e.g., proprietary schools).

**Private school** Private elementary/secondary schools surveyed by the Private School Universe Survey (PSS) are assigned to one of three major categories (Catholic, other religious, or nonsectarian) and, within each major category, one of three subcategories based on the school's religious affiliation provided by respondents.

**Catholic** Schools categorized according to governance, provided by Catholic school respondents, into parochial, diocesan, and private schools.

**Other religious** Schools that have a religious orientation or purpose but are not Roman Catholic. Other religious schools are categorized according to religious association membership, provided by respondents, into Conservative Christian, other affiliated, and unaffiliated schools. Conservative Christian schools are those "Other religious" schools with membership in at least one of four associations: Accelerated Christian Education, American Association of Christian Schools, Association of Christian Schools International, and Oral Roberts University Education Fellowship. Affiliated schools are those "Other religious" schools not classified as Conservative Christian with membership in at least 1 of 11 associations— Association of Christian Teachers and Schools, Christian Schools International, Evangelical Lutheran Education Association, Friends Council on Education, General Conference of the Seventh-Day Adventist Church, Islamic School League of America, National Association of Episcopal Schools, National Christian School Association, National Society for Hebrew Day Schools, Solomon Schechter Day Schools, and Southern Baptist Association of Christian Schools—or indicating membership in "other religious school associations." Unaffiliated schools are those "Other religious" schools that have a religious orientation or purpose but are not classified as Conservative Christian or affiliated.

**Nonsectarian** Schools that do not have a religious orientation or purpose and are categorized according to program emphasis, provided by respondents, into regular, special emphasis, and special education schools. Regular schools are those that have a regular elementary/secondary or early childhood program emphasis. Special emphasis schools are those that have a Montessori, vocational/technical, alternative, or special program emphasis. Special education schools are those that have a special education program emphasis.

**Professional staff** See Employees in degree-granting institutions.

**Program for International Student Assessment (PISA)** A system of international assessments organized by the OECD that focuses on 15-year-olds' capabilities in reading literacy, mathematics literacy, and science literacy. PISA also includes measures of general, or cross-curricular, competencies such as learning strategies. The measures emphasize functional skills that students have acquired as they near the end of mandatory schooling. PISA

was administered for the first time in 2000, when 43 countries participated. Forty-one countries participated in the 2003 administration of PISA; 57 jurisdictions (30 OECD members and 27 nonmembers) participated in 2006; and 65 jurisdictions (34 OECD members and 31 nonmembers) participated in 2009.

**Projection** In relation to a time series, an estimate of future values based on a current trend.

**Property tax** The sum of money collected from a tax levied against the value of property.

**Proprietary (for profit) institution** A private institution in which the individual(s) or agency in control receives compensation other than wages, rent, or other expenses for the assumption of risk.

**Public school or institution** A school or institution controlled and operated by publicly elected or appointed officials and deriving its primary support from public funds.

**Pupil/teacher ratio** The enrollment of pupils at a given period of time, divided by the full-time-equivalent number of classroom teachers serving these pupils during the same period.

**Purchasing Power Parity (PPP) indexes** PPP exchange rates, or indexes, are the currency exchange rates that equalize the purchasing power of different currencies, meaning that when a given sum of money is converted into different currencies at the PPP exchange rates, it will buy the same basket of goods and services in all countries. PPP indexes are the rates of currency conversion that eliminate the difference in price levels among countries. Thus, when expenditures on gross domestic product (GDP) for different countries are converted into a common currency by means of PPP indexes, they are expressed at the same set of international prices, so that comparisons among countries reflect only differences in the volume of goods and services purchased.

## R

**R<sup>2</sup>** The coefficient of determination; the square of the correlation coefficient between the dependent variable and its ordinary least squares (OLS) estimate.

**Racial/ethnic group** Classification indicating general racial or ethnic heritage. Race/ethnicity data are based on the *Hispanic* ethnic category and the race categories listed below (five single-race categories, plus the *Two or more races* category). Race categories exclude persons of Hispanic ethnicity unless otherwise noted.

**White** A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.

**Black or African American** A person having origins in any of the black racial groups of Africa. Used interchangeably with the shortened term *Black*.

**Hispanic or Latino** A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race. Used interchangeably with the shortened term *Hispanic*.

**Asian** A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam. Prior to 2010–11, the Common Core of Data (CCD) combined Asian and Pacific Islander categories.

**Native Hawaiian or Other Pacific Islander** A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands. Prior to 2010–11, the Common Core of Data (CCD) combined Asian and Pacific Islander categories. Used interchangeably with the shortened term *Pacific Islander*.

**American Indian or Alaska Native** A person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.

**Two or more races** A person identifying himself or herself as of two or more of the following race groups: White, Black, Asian, Native Hawaiian or Other Pacific Islander, or American Indian or Alaska Native. Some, but not all, reporting districts use this category. “Two or more races” was introduced in the 2000 Census and became a regular category for data collection in the Current Population Survey (CPS) in 2003. The category is sometimes excluded from a historical series of data with constant categories. It is sometimes included within the category “Other.”

**Region** See Geographic region.

**Regression analysis** A statistical technique for investigating and modeling the relationship between variables.

**Regular school** A public elementary/secondary or charter school providing instruction and education services that does not focus primarily on special education, vocational/technical education, or alternative education.

**Related children** Related children in a family include own children and all other children in the household who are related to the householder by birth, marriage, or adoption.

**Remedial education** Instruction for a student lacking those reading, writing, or math skills necessary to perform college-level work at the level required by the attended institution.

**Resident population** Includes civilian population and armed forces personnel residing within the United States; excludes armed forces personnel residing overseas.

**Revenue** All funds received from external sources, net of refunds, and correcting transactions. Noncash transactions, such as receipt of services, commodities, or other receipts in kind are excluded, as are funds received from the issuance of debt, liquidation of investments, and nonroutine sale of property.

**Revenue receipts** Additions to assets that do not incur an obligation that must be met at some future date and do not represent exchanges of property for money. Assets must be available for expenditures.

**Rho** A measure of the correlation coefficient between errors in time period  $t$  and time period  $t$  minus 1.

**Rural school** See Locale codes.

## S

**Salary** The total amount regularly paid or stipulated to be paid to an individual, before deductions, for personal services rendered while on the payroll of a business or organization.

**Sales and services** Revenues derived from the sales of goods or services that are incidental to the conduct of instruction, research, or public service. Examples include film rentals, scientific and literary publications, testing services, university presses, and dairy products.

**Sales tax** Tax imposed upon the sale and consumption of goods and services. It can be imposed either as a general tax on the retail price of all goods and services sold or as a tax on the sale of selected goods and services.

**SAT** An examination administered by the Educational Testing Service and used to predict the facility with which an individual will progress in learning college-level academic subjects. It was formerly called the Scholastic Assessment Test.

**Scholarships and fellowships** This category of college expenditures applies only to money given in the form of outright grants and trainee stipends to individuals enrolled in formal coursework, either for credit or not. Aid to students in the form of tuition or fee remissions is included. College work-study funds are excluded and are reported under the program in which the student is working.

**School** A division of the school system consisting of students in one or more grades or other identifiable groups and organized to give instruction of a defined type. One school may share a building with another school or one school may be housed in several buildings. Excludes schools that have closed or are planned for the future.

**School administration support services** Includes salary, benefits, supplies, and contractual fees for the office of the principal, full-time department chairpersons, and graduation expenses.

**School climate** The social system and culture of the school, including the organizational structure of the school and values and expectations within it.

**School district** An education agency at the local level that exists primarily to operate public schools or to contract for public school services. Synonyms are “local basic administrative unit” and “local education agency.”

**Science** The body of related courses concerned with knowledge of the physical and biological world and with the processes of discovering and validating this knowledge.

**Secondary enrollment** The total number of students registered in a school beginning with the next grade following an elementary or middle school (usually 7, 8, or 9) and ending with or below grade 12 at a given time.

**Secondary instructional level** The general level of instruction provided for pupils in secondary schools (generally covering grades 7 through 12 or 9 through 12) and any instruction of a comparable nature and difficulty provided for adults and youth beyond the age of compulsory school attendance.

**Secondary school** A school comprising any span of grades beginning with the next grade following an elementary or middle school (usually 7, 8, or 9) and ending with or below grade 12. Both junior high schools and senior high schools are included.

**Senior high school** A secondary school offering the final years of high school work necessary for graduation.

**Serial correlation** Correlation of the error terms from different observations of the same variable. Also called Autocorrelation.

**Serial volumes** Publications issued in successive parts, usually at regular intervals, and as a rule, intended to be continued indefinitely. Serials include periodicals, newspapers, annuals, memoirs, proceedings, and transactions of societies.

**Serious emotional disturbance** See Disabilities, children with.

**Social studies** A group of instructional programs that describes the substantive portions of behavior, past and present activities, interactions, and organizations of people associated together for religious, benevolent, cultural, scientific, political, patriotic, or other purposes.

**Socioeconomic status (SES)** The SES index is a composite of often equally weighted, standardized components, such as father's education, mother's education, family income, father's occupation, and household items. The terms high, middle, and low SES refer to ranges of the weighted SES composite index distribution.

**Special education** Direct instructional activities or special learning experiences designed primarily for students identified as having exceptionalities in one or more aspects of the cognitive process or as being underachievers in relation to general level or model of their overall abilities. Such services usually are directed at students with the following conditions: (1) physically handicapped; (2) emotionally disabled; (3) culturally different, including compensatory education; (4) intellectually disabled; and (5) students with learning disabilities. Programs for the mentally gifted and talented are also included in some special education programs. See also Disabilities, children with.

**Special education school** A public elementary/secondary school that focuses primarily on special education for children with disabilities and that adapts curriculum, materials, or instruction for students served. See also Disabilities, children with.

**Special program emphasis school** A science/mathematics school, a performing arts high school, a foreign language immersion school, and a talented/gifted school are examples of schools that offer a special program emphasis.

**Specific learning disability** See Disabilities, children with.

**Speech/language impairment** See Disabilities, children with.

**Standard error of estimate** An expression for the standard deviation of the observed values about a regression line. An estimate of the variation likely to be encountered in making predictions from the regression equation.

**Standardized test** A test composed of a systematic sampling of behavior, administered and scored according to specific instructions, capable of being interpreted in terms of adequate norms, and for which there are data on reliability and validity.

**Standardized test performance** The weighted distributions of composite scores from standardized tests used to group students according to performance.

**Status dropout rate** The percentage of individuals within a given age range who are not enrolled in school and lack a high school credential, irrespective of when they dropped out.

**Status dropout rate (American Community Survey)** Similar to the status dropout rate (Current Population Survey), except that institutionalized persons, incarcerated persons, and active duty military personnel living in barracks in the United States may be included in this calculation.

**Status dropout rate (Current Population Survey)** The percentage of civilian, noninstitutionalized young people ages 16–24 who are not in school and have not earned a high school credential (either a diploma or equivalency credential such as a General Educational Development [GED] certificate). The numerator of the status dropout rate for a given year is the number of individuals ages 16–24 who, as of October of that year, have not completed a high school credential and are not currently enrolled in school. The denominator is the total number of individuals ages 16–24 in the United States in October of that year. Status dropout rates count as dropouts individuals who never attended school and immigrants who did not complete the equivalent of a high school education in their home country.

**STEM fields** Science, Technology, Engineering, and Mathematics (STEM) fields of study that are considered to be of particular relevance to advanced societies. For the purposes of *The Condition of Education 2015*, STEM fields include agriculture and natural resources, biological and biomedical sciences, computer and information sciences and support services, engineering and engineering technologies, mathematics and statistics, physical sciences, and science technologies.

**Student** An individual for whom instruction is provided in an educational program under the jurisdiction of a school, school system, or other education institution. No distinction is made between the terms “student” and “pupil,” though “student” may refer to one receiving instruction at any level while “pupil” refers only to one attending school at the elementary or secondary level. A student may receive instruction in a school facility or in another location, such as at home or in a hospital. Instruction may be provided by direct student-teacher interaction or by some other approved medium such as television, radio, telephone, and correspondence.

**Student membership** Student membership is an annual headcount of students enrolled in school on October 1 or the school day closest to that date. The Common Core of Data (CCD) allows a student to be reported for only a single school or agency. For example, a vocational school (identified as a “shared time” school) may provide classes for students from a number of districts and show no membership.

**Student support services** Includes salary, benefits, supplies, and contractual fees for staff providing attendance and social work, guidance, health, psychological services, speech pathology, audiology, and other support to students.

**Study abroad population** U.S. citizens and permanent residents, enrolled for a degree at an accredited higher education institution in the United States, who received academic credit for study abroad from their home institutions upon their return. Students studying abroad without receiving academic credit are not included, nor are U.S. students enrolled for a degree overseas.

**Subject-matter club** Organizations that are formed around a shared interest in a particular area of study and whose primary activities promote that interest. Examples of such organizations are math, science, business, and history clubs.

**Supervisory staff** Principals, assistant principals, and supervisors of instruction; does not include superintendents or assistant superintendents.

## T

**Tax base** The collective value of objects, assets, and income components against which a tax is levied.

**Tax expenditures** Losses of tax revenue attributable to provisions of the federal income tax laws that allow a special exclusion, exemption, or deduction from gross income or provide a special credit, preferential rate of tax, or a deferral of tax liability affecting individual or corporate income tax liabilities.

**Teacher** see Instructional staff.

**Technical education** A program of vocational instruction that ordinarily includes the study of the sciences and mathematics underlying a technology, as well as the methods, skills, and materials commonly used and the services performed in the technology. Technical education

prepares individuals for positions—such as draftsman or lab technician—in the occupational area between the skilled craftsman and the professional person.

**Three-year moving average** An arithmetic average of the year indicated, the year immediately preceding, and the year immediately following. Use of a 3-year moving average increases the sample size, thereby reducing the size of sampling errors and producing more stable estimates.

**Time series** A set of ordered observations on a quantitative characteristic of an individual or collective phenomenon taken at different points in time. Usually the observations are successive and equally spaced in time.

**Time series analysis** The branch of quantitative forecasting in which data for one variable are examined for patterns of trend, seasonality, and cycle.

**Title I school** A school designated under appropriate state and federal regulations as a high-poverty school that is eligible for participation in programs authorized by Title I of the Reauthorization of the Elementary and Secondary Education Act, P.L. 107-110.

**Title IV** Refers to a section of the Higher Education Act of 1965 that covers the administration of the federal student financial aid program.

**Title IV eligible institution** A postsecondary institution that meets the criteria for participating in federal student financial aid programs. An eligible institution must be any of the following: (1) an institution of higher education (with public or private, nonprofit control), (2) a proprietary institution (with private for-profit control), and (3) a postsecondary vocational institution (with public or private, nonprofit control). In addition, it must have acceptable legal authorization, acceptable accreditation and admission standards, eligible academic program(s), administrative capability, and financial responsibility.

**Total expenditure per pupil in average daily attendance** Includes all expenditures allocable to per pupil costs divided by average daily attendance. These allocable expenditures include current expenditures for regular school programs, interest on school debt, and capital outlay. Beginning in 1980–81, expenditures for state administration are excluded and expenditures for other programs (summer schools and designated subsidies for community colleges and private schools) are included.

**Town school** See Locale codes.

**Trade and industrial occupations** The branch of vocational education which is concerned with preparing people for initial employment or with updating or retraining workers in a wide range of trade and industrial occupations. Such occupations are skilled or semiskilled and are concerned with layout designing, producing, processing, assembling, testing, maintaining, servicing, or repairing any product or commodity.

**Traditional public school** Publicly funded schools other than public charter schools. See also Public school or institution and Charter school.

**Transcript** An official list of all courses taken by a student at a school or college showing the final grade received for each course, with definitions of the various grades given at the institution.

**Trust funds** Amounts collected and used by the federal government for carrying out specific purposes and programs according to terms of a trust agreement or statute, such as the social security and unemployment trust funds. Trust fund receipts that are not anticipated to be used in the immediate future are generally invested in interest-bearing government securities and earn interest for the trust fund.

**Tuition and fees** A payment or charge for instruction or compensation for services, privileges, or the use of equipment, books, or other goods. Tuition may be charged per term, per course, or per credit.

**Type of school** A classification of public elementary and secondary schools that includes the following categories: regular schools, special education schools, vocational schools, and alternative schools. See also Regular school, Special education school, Vocational school, and Alternative school.

## U

**Unadjusted dollars** See Current dollars.

**Unclassified students** Students who are not candidates for a degree or other formal award, although they are taking higher education courses for credit in regular classes with other students.

**Undergraduate students** Students registered at an institution of postsecondary education who are working in a baccalaureate degree program or other formal program below the baccalaureate, such as an associate's degree, vocational, or technical program.

**Unemployed** Civilians who had no employment but were available for work and: (1) had engaged in any specific job seeking activity within the past 4 weeks; (2) were waiting to be called back to a job from which they had been laid off; or (3) were waiting to report to a new wage or salary job within 30 days.

**Ungraded student (elementary/secondary)** A student who has been assigned to a school or program that does not have standard grade designations.

**Urban fringe school** See Locale codes.

**U.S. Service Academies** These institutions of higher education are controlled by the U.S. Department of Defense and the U.S. Department of Transportation. The five institutions counted in the NCES surveys of degree-granting institutions include: the U.S. Air Force Academy, U.S. Coast Guard Academy, U.S. Merchant Marine Academy, U.S. Military Academy, and the U.S. Naval Academy.

## V

**Variable** A quantity that may assume any one of a set of values.

**Visual and performing arts** A group of instructional programs that generally describes the historic development, aesthetic qualities, and creative processes of the visual and performing arts.

**Visual impairment** See Disabilities, children with.

**Vocational education** Organized educational programs, services, and activities which are directly related to the preparation of individuals for paid or unpaid employment, or for additional preparation for a career, requiring other than a baccalaureate or advanced degree.

**Vocational school** A public school that focuses primarily on providing formal preparation for semiskilled, skilled, technical, or professional occupations for high school-age students who have opted to develop or expand their employment opportunities, often in lieu of preparing for college entry.

## Y

**Years out** In forecasting by year, the number of years since the last year of actual data for that statistic used in producing the forecast.



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