

# STATS IN BRIEF

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## Changes in America's Public School Facilities: From School Year 1998–99 to School Year 2012–13

### AUTHORS

Steven Bahr  
Dinah Sparks  
Activate Research, Inc.

### PROJECT OFFICER

John Ralph  
National Center for Education Statistics

**Statistics in Brief** publications present descriptive data in tabular formats to provide useful information to a broad audience, including members of the general public. They address topical issues and questions. They do not investigate more complex hypotheses, account for interrelationships among variables, or support causal inferences. We encourage readers who are interested in more complex questions and in-depth analysis to explore other NCES resources, including publications, online data tools, and public- and restricted-use datasets. See [nces.ed.gov](http://nces.ed.gov) and references noted in the body of this document for more information.

During the first decade of the 21st century, public school systems in the United States spent, on average, over \$20 billion annually on school construction (Baker and Bernstein 2012). Scholars agree that the maintenance of and investment in school facilities is an important element of the school experience in the United States. Further, research indicates that the environmental and physical condition of schools relates to teacher turnover, student performance, and the individual health of those who are in school buildings on a daily basis (Branham 2004; Buckley, Schneider, and Shang 2004; Crampton 2009; Earthman 2002; Earthman and Lemasters 2009; Schneider 2002; Tanner 2009).

This Statistics in Brief summarizes the changes from the 1998–99 to the 2012–13 school years in the average age of public schools, ratings of satisfaction of the environmental quality of school facilities, the cost to put school buildings in good overall condition, and short-range plans to improve school facilities. In addition to providing results for all schools, selected comparisons are made within 2012–13 by school level<sup>1</sup> (elementary, secondary, and combined) and school size (less than 300, 300–599, and 600 or more students).

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<sup>1</sup> As defined in this report, “elementary” schools have grade 6 or lower and no grade higher than grade 8, “secondary” schools have no grade lower than grade 7 and have grade 7 or higher, and “combined” schools have grades lower than grade 7 and higher than grade 8.

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This Statistics in Brief uses data from two surveys on the condition of public school facilities conducted by the National Center for Education Statistics (NCES) through its Fast Response Survey System (FRSS). The first survey on this topic was conducted in the 1998–99 school year, and the second was conducted during the 2012–13 school year.<sup>2</sup> Although the surveys

sampled individual schools, the questionnaires were mailed to the districts with which the schools were associated, with a separate questionnaire enclosed for each school included in the sample. The survey was designed to be completed by district-level personnel familiar with the school facilities in the district, often a district facilities coordinator (although the title of the position varied).

The differences reported in this brief are statistically significant at the  $p < .05$  level to ensure that they are larger than might be expected due to sampling variation. No adjustments were made for multiple comparisons. For more information about the data, measures, and methods used in this brief, please see the [Technical Notes](#) section of the report.

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<sup>2</sup> In addition to the information available in this report, more detailed information on the 1999 and 2012–13 FRSS surveys can be found in Lewis et al. (2000) and Alexander and Lewis (2014). The questionnaires can be found in Appendix C of these reports.

# STUDY QUESTIONS

Comparing public schools in the 1998–99 and 2012–13 school years.<sup>3</sup>

1

How did the average functional age of schools' main instructional buildings change?

3

Was there a difference in the percentages of schools that needed money for repairs, renovations, and modernizations to put onsite buildings in good overall condition, and what was the estimated cost of these projects, in total and per school?

2

How did dissatisfaction with schools' environmental factors change?

4

Was there a difference in the percentages of schools with plans for building improvements in the next 2 years?

## KEY FINDINGS

- In the 2012–13 school year, the average functional age<sup>4</sup> of schools' main instructional buildings was 19 years, which was older than the average functional age of 16 years in the 1998–99 school year.
- Of all the environmental factors in schools, lighting was the factor that the highest percentage of public schools rated as unsatisfactory in 2012–13 and the only factor rated as unsatisfactory for a higher percentage of public schools in 2012–13 than in the 1998–99 school year. Interestingly, lighting was the factor least rated as unsatisfactory in 1998–99.
- In the 2012–13 school year, the percentage of public schools that needed money for repairs, renovations, and modernizations to put onsite buildings in good overall condition was 23 percentage points less than in 1998–99. However, the average cost of these projects was estimated to be \$1.4 million more per school, adjusted for inflation, in 2012–13 than in 1998–99.
- A lower percentage of public schools in the 2012–13 school year than in the 1998–99 school year had plans for building improvements in the next 2 years. However, approximately 39 percent of public schools in the 2012–13 school year had plans for major repairs, renovations, or replacements to at least one building feature in the next 2 years.

<sup>3</sup> In the 1998–99 school year, there were approximately 80,200 regular public schools, and in the 2012–13 school year, there were approximately 86,800 regular public schools.

<sup>4</sup> Functional age is defined as the age of the school based on the year of the most recent major renovation or the year of construction of the main instructional building if no renovation has occurred.

# 1

## How did the average functional age of schools' main instructional buildings change?

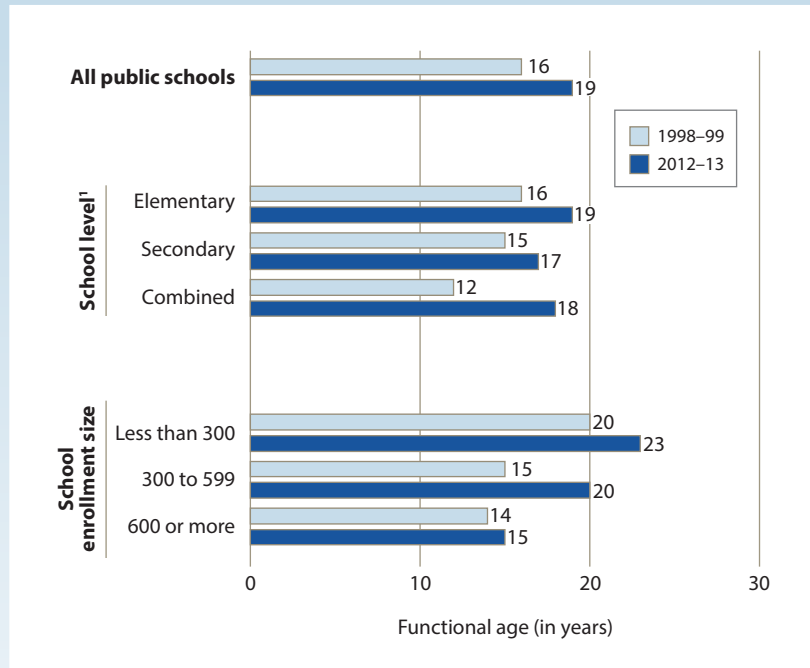
Functional age is based on the year of the most recent major renovation or the year of construction of the main instructional building, if no renovation has occurred (Alexander and Lewis 2014; Lewis et al. 2000). In the 2012–13 school year, the average functional age of the main instructional buildings for all public schools was 19 years, which was older than the average functional age in 1998–99 (16 years) (figure 1).

In particular, medium-sized public schools (i.e., those with 300 to 599 students) were older, on average, in 2012–13 than in 1998–99. Among these schools, the average functional age of the main instructional buildings was 20 years in 2012–13, compared to 15 years in 1998–99. In contrast, the average functional ages of both large schools (i.e., those with 600 or more students) and small schools (i.e., those with less than 300 students) in 2012–13 were not measurably different from the functional ages in 1998–99.

On average, large schools were newer than small schools (by 8 years) and medium-sized schools (by 5 years) in 2012–13.

### FIGURE 1.

Average functional age of public schools' main instructional building, by school level and size: School years 1998–99 and 2012–13



<sup>1</sup> Elementary schools had grade 6 or lower and no grade higher than grade 8. Secondary schools had no grade lower than grade 7 and had grade 7 or higher. Combined schools had grades lower than grade 7 and higher than grade 8.

NOTE: Functional age is defined as the age of the school on the year of the most recent major renovation or the year of construction of the main instructional building if no renovation has occurred.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.

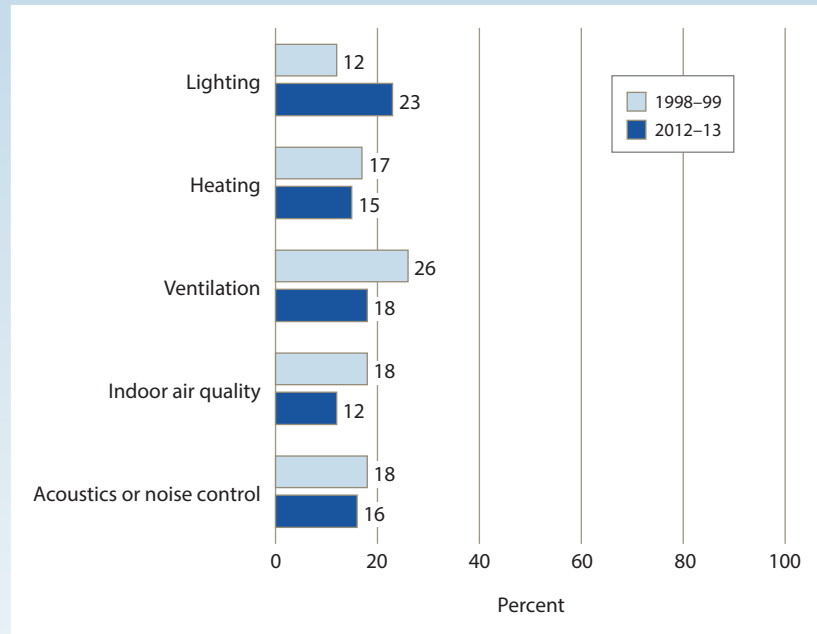
# 2

## How did dissatisfaction with schools' environmental factors change?

The school environmental factors assessed in the surveys included lighting, heating, ventilation, indoor air quality, and acoustics or noise control.<sup>5</sup> In the 1998–99 school year, the factor rated as unsatisfactory for the highest percentage of public schools was ventilation (26 percent) and the factor rated as unsatisfactory for the lowest percentage of public schools was lighting (12 percent) (figure 2). However, by the 2012–13 school year, the percentage of public schools for which ventilation was rated as unsatisfactory had dropped to 18 percent, while the percentage for which lighting was rated as unsatisfactory had risen to 23 percent. In fact, lighting was the only environmental factor that was rated as unsatisfactory for a higher percentage of public schools in 2012–13 than in 1998–99. In addition, indoor air quality was rated as unsatisfactory for a lower percentage of public schools in 2012–13 (12 percent) than in 1998–99 (18 percent).

**FIGURE 2.**

**Percentage of public schools with unsatisfactory ratings for selected environmental factors: School years 1998–99 and 2012–13**



NOTE: Respondents were asked to rate the satisfaction of environmental factors in the school's onsite buildings. Onsite buildings include both permanent and portable (temporary) buildings. Ratings of unsatisfactory include the ratings of unsatisfactory and very unsatisfactory.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.

<sup>5</sup> Respondents were asked to rate the satisfaction of environmental factors in the school's onsite buildings. Onsite buildings include both permanent and portable (temporary) buildings.

# 3

## Was there a difference in the percentages of schools that needed money for repairs, renovations, and modernizations to put onsite buildings in good overall condition, and what was the estimated cost of these projects, in total and per school?

Compared to the 1998–99 school year, a lower percentage of public schools in the 2012–13 school year needed money for repairs, renovations, and modernizations to put onsite buildings in good overall condition.<sup>6</sup> In 2012–13, about 53 percent of all public schools needed money for these projects, which is 23 percentage points lower than in 1998–99 (76 percent) (figure 3).

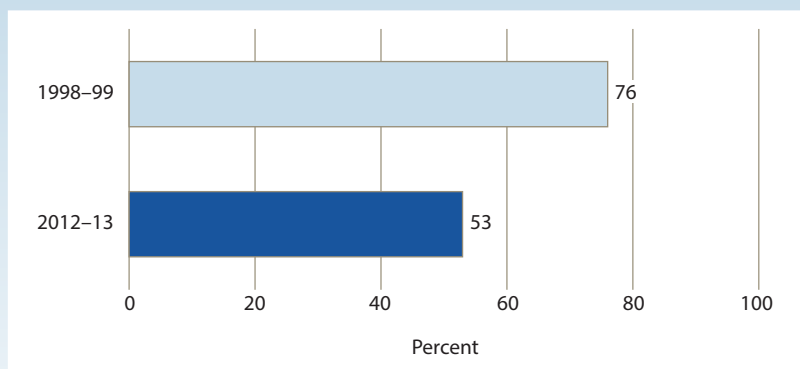
The total amount that public schools needed for repairs, renovations, and modernizations was estimated to be \$197 billion in 2012–13, which was not measurably different from the amount needed in 1998–99 (\$179 billion, adjusted for inflation, table A-3). However, among schools that needed to spend money on these projects, the average cost was \$4.5 million per school in 2012–13, which was \$1.4 million higher than the average amount needed in 1998–99 (\$3.1 million, adjusted for inflation)<sup>7</sup> (figure 4).

<sup>6</sup> The 1998–99 survey defined “good overall condition” as “only routine maintenance or minor repair required.” The 2012–13 survey defined “good overall condition” as “the facility meets all the reasonable needs for normal school performance, is most often in good condition, and generally meets some, but not all, of the characteristics of an excellent facility.”

<sup>7</sup> The average dollar amount in 1998–99 was adjusted for inflation using the Consumer Price Index (CPI). For more information on the CPI, please visit <http://www.bls.gov/cpi/>.

### FIGURE 3.

Percentage of public schools that needed money for repairs, renovations, and modernizations to put the school’s onsite buildings in good overall condition: School years 1998–99 and 2012–13

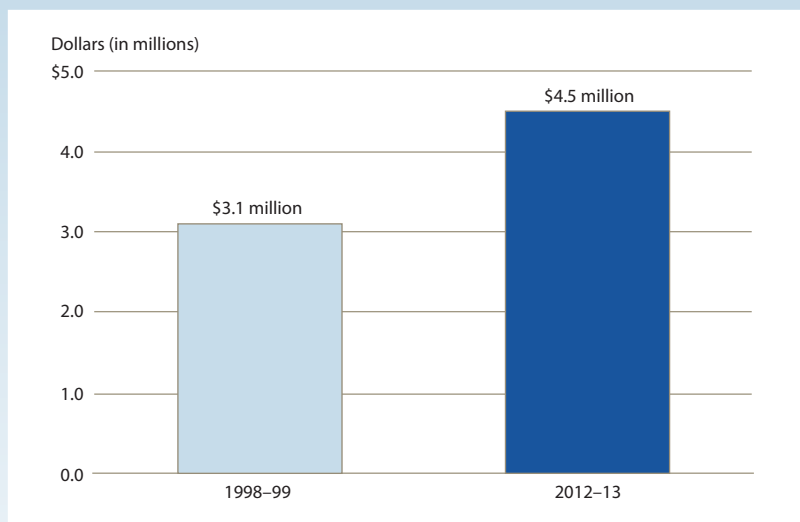


NOTE: Onsite buildings include both permanent and portable (temporary) buildings.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), “Condition of Public School Facilities,” 1998–99 and 2012–13.

### FIGURE 4.

Average amount needed per public school for repairs, renovations, and modernizations to put the school’s onsite buildings in good overall condition: School years 1998–99 and 2012–13



NOTE: The average dollar amount in 1998–99 has been adjusted for inflation using the Consumer Price Index (CPI). For more information on the CPI, please visit <http://www.bls.gov/cpi/>. Onsite buildings include both permanent and portable (temporary) buildings.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), “Condition of Public School Facilities,” 1998–99 and 2012–13.

# 4 Was there a difference in the percentages of schools with plans for building improvements in the next 2 years?

A lower percentage of public schools in the 2012–13 school year than in the 1998–99 school year had plans for building improvements in the next 2 years (tables A-4 and A-5). Looking at the 2012–13 results by school level, a higher percentage of secondary schools than of elementary schools had plans for building improvements. Building improvements include new permanent buildings or additions as well as major repairs, renovations, or replacements to a building feature. Both types of improvements are explored in this research question.

## *New permanent buildings or additions*

In the 2012–13 school year, 9 percent of public schools had plans for building new permanent buildings or additions in the next 2 years. This is 11 percentage points lower than what was reported in the 1998–99 school year (20 percent) (table A-4).

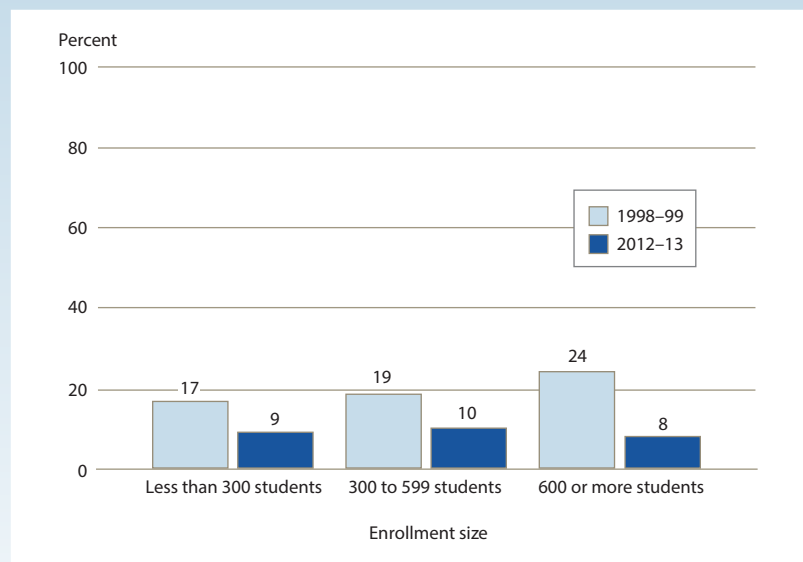
Plans for new construction were also less prevalent across all three school size categories and across both elementary and secondary schools in 2012–13 than in 1998–99. For example, in 2012–13, about 8 percent of large

public schools (i.e., those with 600 or more students) had plans for new construction in the next 2 years. This is about one-third of what was reported for large public schools in 1998–99 (24 percent) (figure 5).

In 2012–13, a higher percentage of public secondary schools (11 percent) than of public elementary schools (8 percent) had plans for building new permanent buildings or additions in the next 2 years (table A-4).

## FIGURE 5.

**Percentage of public schools with plans for building new permanent buildings/ additions for the school in the next 2 years, by school enrollment size: School years 1998–99 and 2012–13**



SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.

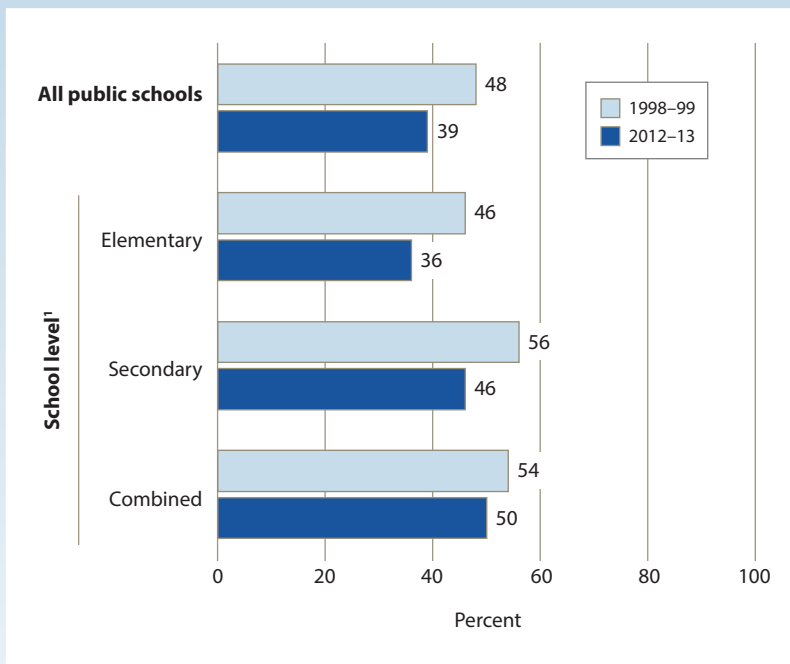
### Major repairs, renovations, or replacements

Compared to the 1998–99 school year, a lower percentage of public schools in the 2012–13 school year had plans for major repairs, renovations, or replacements to at least one building feature<sup>8</sup> in the next 2 years (39 percent in 2012–13 vs. 48 percent in 1998–99) (figure 6).

In the 2012–13 school year, a higher percentage of public secondary schools (46 percent) than of public elementary schools (36 percent) had plans for at least one major repair, renovation, or replacement to a building feature in the next 2 years.

## FIGURE 6.

Percentage of public schools with plans for making at least one major repair, renovation, or replacement to a building feature in the next 2 years, by school level: School years 1998–99 and 2012–13



<sup>1</sup> Elementary schools had grade 6 or lower and no grade higher than grade 8. Secondary schools had no grade lower than grade 7 and had grade 7 or higher. Combined schools had grades lower than grade 7 and higher than grade 8.

NOTE: Building features are roofs, framing, floors, foundations, exterior walls, finishes, windows, doors, interior finishes, trim, plumbing, heating, ventilation, air conditioning, and life safety features, such as sprinklers, fire alarms, and smoke detectors.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), “Condition of Public School Facilities,” 1998–99 and 2012–13.

<sup>8</sup> Building systems or features included roofs, framing, floors, foundations, exterior walls, finishes, windows, doors, interior finishes, trim, plumbing, heating, ventilation, air conditioning, and life safety features, such as sprinklers, fire alarms, and smoke detectors.



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<http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2016074>

Readers of this brief may be interested in other FRSS reports:

Alexander, D., and Lewis, L. (2014). *Condition of America's Public School Facilities: 2012–13* (NCES 2014-022). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Lewis, L., Snow, K., Farris, E., Smerdon, B., Cronen, S., and Kaplan, J. (2000). *Condition of America's Public School Facilities: 1999* (NCES 2000-032). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

U.S. Department of Education. National Center for Education Statistics. (1999). *How Old Are America's Public Schools?* NCES 1999-048. Washington, DC: Office of Educational Research and Improvement.

## TECHNICAL NOTES

### *Fast Response Survey System*

The Fast Response Survey System (FRSS) was established in 1975 by the National Center for Education Statistics (NCES), U.S. Department of Education. The FRSS is designed to collect issue-oriented data within a relatively short time frame. The FRSS collects data from state education agencies, local education agencies, public and private elementary and secondary schools, public school teachers, and public libraries. To ensure minimal burden on respondents, the surveys are generally limited to three pages of questions, with a response burden of about 30 minutes per respondent. Sample sizes are relatively small (usually about 1,200 to 1,800 respondents per survey) so that the data collection can be completed quickly. Data are weighted to produce national estimates of the sampled education sector. The sample size permits limited breakouts by analysis variables. However, as the number of categories within any single analysis variable increases, the sample size within categories decreases, which results in larger sampling errors for the breakouts by analysis variables.

### *Sample Design*

#### **Condition of Public School Facilities: 1999**

The sample for the 1999 FRSS survey on the condition of public school facilities consisted of 1,004 regular public elementary, middle, and high schools in the 50 states and the District of Columbia. The sample was selected from the 1996–97 NCES Common Core of Data (CCD) Public School Universe file. The sampling frame consisted

of 80,238 regular public schools and excluded special education, vocational, and alternative/other schools, schools in the territories, and schools with a high grade lower than 1 or ungraded. The frame contained 49,266 regular elementary schools, 14,808 regular middle schools, and 16,164 regular high/combined schools.

A school was defined as an elementary school if the lowest grade was less than or equal to grade 3 and the highest grade was less than or equal to grade 8. A middle school was defined as having a lowest grade greater than or equal to grade 4 and a highest grade less than or equal to grade 9. A school was considered a high school if its lowest grade was less than or equal to grade 9 and the highest grade was greater than or equal to grade 10. Combined schools were defined as having a lowest grade less than or equal to grade 3 and a highest grade greater than or equal to grade 9 (or a lowest grade in grades 4–8 and a highest grade in grades 10–12). High schools and combined schools were combined into one category for sampling.

The public school sampling frame was stratified by instructional level (elementary, middle, and high school/combined), locale (city, urban fringe, town, rural),<sup>9</sup> and enrollment size

<sup>9</sup> Locale—as defined in the 1996–97 Common Core of Data (CCD): Central city—a large or mid-size central city of a Metropolitan Statistical Area (MSA). Urban fringe/large town—urban fringe is a place within an MSA of a central city, but not primarily its central city; large town is an incorporated place not within an MSA, with a population greater than or equal to 25,000. Small town/rural—small town is an incorporated place not within an MSA, with a population less than 25,000 and greater than or equal to 2,500; rural is a place with a population less than 2,500 and/or a population density of less than 1,000 per square mile, and defined as rural by the U.S. Bureau of the Census.

(less than 300, 300–499, 500–999, and 1,500 or more students). Within the primary strata, schools were also sorted by geographic region and percent minority enrollment in the school to produce additional implicit stratification. Within each primary stratum, the specified sample size was then allocated to size classes in rough proportion to the aggregate square root of the enrollment of the schools in the class. After the stratum sample sizes were determined, a sample of 1,004 schools was then selected systematically from the sorted file using independent random starts. The sample contained 401 elementary schools, 301 middle schools, and 302 high/combined schools. The 1,004 schools were located in 838 school districts.

#### **Condition of Public School Facilities: 2012–13**

The sample for the 2012–13 FRSS survey on the condition of public school facilities consisted of approximately 1,800 regular public elementary, middle, and secondary/combined schools in the 50 states and the District of Columbia. The nationally representative sample was selected from the 2010–11 NCES CCD Public School Universe file. The sampling frame consisted of 86,767 regular public schools, including 50,995 regular elementary schools, 16,582 regular middle schools, and 19,190 regular secondary/combined schools. The sampling frame included charter schools in the count of “regular” schools; it excluded schools with a high grade of prekindergarten, kindergarten, or ungraded; schools

with zero, missing, or “not applicable” enrollment; special education, vocational, and alternative/other schools; and schools outside the 50 states and the District of Columbia.

A school was defined as an elementary school if the lowest grade was less than or equal to grade 3 and the highest grade was less than or equal to grade 8. A middle school was defined as having a lowest grade greater than or equal to grade 4 and a highest grade less than or equal to grade 9. A school was considered a secondary school if its lowest grade was greater than or equal to grade 9 and the highest grade was greater than or equal to grade 10. Combined schools were defined as having a lowest grade less than or equal to grade 3 and a highest grade greater than or equal to grade 9 (or a lowest grade in grades 4–8 and a highest grade in grades 10–12). Secondary and combined schools were combined into one category for sampling.

The public school sampling frame was stratified by instructional level (elementary, middle, secondary/combined), community type (city, suburban, town, rural), and enrollment size (less than 300, 300–499, 500–999, 1,000–1,499, and 1,500 or more students) to create 52 primary strata. Within the strata, schools were sorted by percent combined enrollment of students who were American Indian/Alaska Native, Asian, Black, Hawaiian Native/Pacific Islander, Hispanic, or of two or more races (missing, less than 6 percent, 6 to 20 percent, 21 to 49

percent, and 50 percent or more) and region (Northeast, Southeast, Central, West) prior to selection to produce additional implicit stratification. Within each primary stratum, schools were selected systematically at rates that depended on the size class of the school.

To remain consistent with reporting in the 1999 FRSS study on the condition of school facilities, data is reported by the following school levels: elementary—schools with grade 6 or lower and no grade higher than grade 8; secondary—schools with no grade lower than grade 7 and with a grade of grade 7 or higher; and combined—schools with grades lower than grade 7 and higher than grade 8. These reporting categories cover all schools, although differ somewhat from the definitions used for stratification in the sampling frame.

The sample contained approximately 1,800 schools—720 elementary, 540 middle, and 540 secondary/combined schools—in approximately 1,380 school districts. Approximately 16 percent of these districts contained more than one sampled school. While there was no limit on the number of schools that could be sampled within a district, most had only one sampled school.

### ***Data Collection and Response Rates***

#### **Condition of Public School Facilities: 1999**

Questionnaires and cover letters were mailed out in early July 1999. Although the survey sampled individual elementary, middle, and high schools,

the questionnaires were mailed to the districts with which the schools were associated, with a separate questionnaire enclosed for each sampled school.

The cover letter indicated that the survey was designed to be completed by district-level personnel who were very familiar with the school facilities in the district. Often this was a district facilities coordinator (although the title of the position varied). The letter indicated that the respondent might want to consult with other district-level personnel or with school-level personnel, such as the principal of the selected school, to answer some questions. Similarly, the respondent section on the front of the questionnaire indicated that while most questionnaires were completed by district-level respondents, some were completed by school-level respondents (usually the school principal).

Telephone follow-up was conducted from late July through September 1999 with districts that did not respond to the initial questionnaire mailing. Of the 1,004 schools selected for the sample, 14 were found to be out of the scope of the survey—in most cases because the school was no longer in existence—leaving a total of 990 eligible schools. Completed questionnaires were received for 903, or 91 percent, of the eligible schools. The weighted response rate was also 91. Because the item nonresponse rate was so low, imputation for item nonresponse was not implemented.

### **Condition of Public School Facilities: 2012–13**

The questionnaires and cover letters were mailed out in January 2013. Although the survey sampled individual schools, the questionnaires were mailed to the districts with which the schools were associated, with a separate questionnaire enclosed for each sampled school. This is the same approach used in the 1999 FRSS survey on the condition of school facilities.

The cover letter indicated that the survey was designed to be completed by district-level personnel who were very familiar with the school facilities in the district. Often this was a district facilities coordinator (although the title of the position varied). The letter indicated that the respondent might want to consult with other district-level personnel or with school-level personnel, such as the principal of the sampled school, to answer some of the questions. Respondents were offered the option of completing the survey via the Web.

Telephone follow-up for survey nonresponse and data clarification was initiated in February 2013 and completed in June 2013. Of the approximately 1,800 public schools in the sample, approximately 40 were found to be ineligible because the school was closed or did not meet some other criteria for inclusion in the sample (e.g., was an alternative school).

For the eligible schools, the unweighted survey response rate was 90 percent (about 1,590 responding schools divided by the approximately

1,760 eligible schools in the sample). The corresponding weighted response rate, calculated using the initial base weights, was 90 percent. Of the schools that completed the survey, 62 percent completed it via the Web, 38 percent completed it by paper (sent by mail, fax, or e-mail), and less than 1 percent completed it by telephone.

The final weighted count of responding schools in the survey, after nonresponse adjustment, represents the estimated universe of eligible public schools in the 50 states and the District of Columbia—approximately 84,000 schools. The difference between the final weighted count of approximately 84,000 schools and the approximately 87,000 schools in the sampling frame reflects the relatively high percentage of ineligible schools in the sample.

### ***Imputation for Item Nonresponse***

#### **Condition of Public School Facilities: 1999**

In 1999, weighted item nonresponse rates for individual questionnaire items ranged from 0 percent to 0.7 percent. Because the item nonresponse rate was so low, imputation for item nonresponse was not implemented.

#### **Condition of Public School Facilities: 2012–13**

Cases with missing data were recontacted by telephone to collect the missing information. However, when this data retrieval was unsuccessful, the missing data were imputed. Although item nonresponse was less than 1 percent for any item, missing data were imputed for items with a

response rate of less than 100 percent. Data were missing for both numerical items, such as the total cost of all repairs/renovations/modernizations required to put the school's onsite buildings in good overall condition, and categorical items, such as whether there was a written long-range educational facilities plan for the school.

The missing categorical data were imputed using a "hot-deck" approach to obtain a "donor" school from which the imputed values were derived. Under the hot-deck approach, a donor school that matched selected characteristics of the school with missing data (the recipient school) was identified (Kalton 1983, pp. 65–104). The matching characteristics included instructional level, enrollment size, community type, region, percent eligible for free or reduced-price lunch, and percent combined enrollment of students who were American Indian/Alaska Native, Asian, Black, Hawaiian Native/Pacific Islander, Hispanic, or of two or more races. In addition, other relevant questionnaire items were used to form appropriate imputation groupings. Once a donor was found, the imputed value was simply the corresponding value from the donor school.

### ***Data Reliability***

Although the FRSS surveys on the condition of public school facilities were designed to account for sampling error and to minimize nonsampling error, estimates produced from the data collected are subject to both

types of error. Sampling error occurs because the data are collected from a sample rather than a census of the population, and nonsampling errors are errors made during the collection and processing of the data.

### Sampling Errors

In both FRSS surveys, the responses were weighted to produce national estimates. The weights were designed to reflect the probabilities of selection of the sampled schools and were adjusted for differential unit (questionnaire) nonresponse. The nonresponse weighting adjustments were made within classes defined by school instructional level, community type, and school enrollment size. Within the final weighting classes, the base weights (i.e., the reciprocal of schools' probabilities of selection) of the responding schools were inflated by the inverse of the weighted response rate for the class. The findings in this report are estimates based on the samples selected and, consequently, are subject to sampling variability.

Because the data from the FRSS surveys on the condition of public school facilities were collected using a complex sampling design, the variances of the estimates (e.g., estimates of proportions) are typically different from what would be expected from data collected with a simple random sample. Not taking the complex sample design into account can lead to an under- or overestimation of the standard errors associated with such estimates. To generate accurate standard errors for the estimates

in this report, standard errors were computed using a technique known as *jackknife replication* (Levy and Lemeshow 2008). A form of jackknife replication referred to as the JK1 method was used to construct the replicates. As with any replication method, jackknife replication involves constructing a number of subsamples (replicates) from the full sample and computing the statistic of interest for each replicate. The mean square error of the replicate estimates around the full sample estimate provides an estimate of the variance of the statistic. To construct the replications, 100 stratified subsamples of the full sample were created and then dropped one at a time to define 100 jackknife replicates.

The standard error is a measure of the variability of an estimate due to sampling. It indicates the variability of a sample estimate that would be obtained from all possible samples of a given design and size. Standard errors are used as a measure of the precision expected from a particular sample. If all possible samples were surveyed under similar conditions, intervals of 1.96 standard errors below to 1.96 standard errors above a particular statistic would include the true population parameter being estimated in about 95 percent of the samples. The 1.96 is the appropriate percentile from a standard normal distribution corresponding to a two-sided statistical test at the  $p < .05$  significance level (where .05 indicates the 5 percent of all possible samples that would be outside the range of the confidence interval).

Comparisons can be tested for statistical significance at the  $p < .05$  level using Student's  $t$  statistic to ensure that the differences are larger than those that might be expected due to sampling variation. Student's  $t$  values are computed to test the difference between estimates with the following formula:

$$t = \frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2}}$$

where  $E_1$  and  $E_2$  are the estimates to be compared and  $se_1$  and  $se_2$  are their corresponding standard errors.

### Nonsampling Errors

Nonsampling error is the term used to describe variations in the estimates that may be caused by population coverage limitations and data collection, processing, and reporting procedures. The sources of nonsampling errors are typically problems like unit and item nonresponse, differences in respondents' interpretations of the meaning of questions, response differences related to the particular time when the survey was conducted, and mistakes made during data preparation. It is difficult to identify and estimate either the amount of nonsampling error or the bias caused by this error.

To minimize the potential for nonsampling error, a variety of procedures were used, including a pretest of the questionnaires with district-level personnel who were very familiar with the school facilities in the district. The pretest provided the

opportunity to check for consistency of interpretation of questions and definitions and to eliminate ambiguous items. The questionnaires and instructions were also extensively reviewed by NCES. In addition, extensive editing of the questionnaire responses was conducted to check the data for accuracy and consistency. Cases with missing or inconsistent data were recontacted by telephone to resolve problems. Data entered for all surveys received by mail, fax, or telephone were verified to ensure accuracy.

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## APPENDIX A: DATA TABLES

**Table A-1. Average years since original construction of public schools' main instructional building, average years since the most recent major renovation of the main instructional building, and average functional age of the main instructional building, by school level and size: School years 1998–99 and 2012–13**

School level and size	1998–99			2012–13		
	Years since most recent			Years since most recent		
	Years since construction of the main instructional building	major renovation of the main instructional building	Functional age of the main instructional building <sup>1</sup>	Years since construction of the main instructional building	major renovation of the main instructional building	Functional age of the main instructional building <sup>1</sup>
<b>All public schools</b>	<b>40</b>	<b>11</b>	<b>16</b>	<b>44</b>	<b>12</b>	<b>19</b>
<b>School level<sup>2</sup></b>						
Elementary	40	11	16	45	12	19
Secondary	40	11	15	43	11	17
Combined	41	8	12	50	12	18
<b>School enrollment size</b>						
Less than 300	43	15	20	49	13	23
300 to 599	42	11	15	47	12	20
600 or more	35	9	14	38	10	15

<sup>1</sup> Functional age is defined as the age of the school on the year of the most recent major renovation or the year of construction of the main instructional building if no renovation has occurred.

<sup>2</sup> Elementary schools had grade 6 or lower and no grade higher than grade 8. Secondary schools had no grade lower than grade 7 and had grade 7 or higher. Combined schools had grades lower than grade 7 and higher than grade 8.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.

**Table A-2. Percentage of public schools for which the condition of environmental factors was rated as unsatisfactory, by factor, school level, and size: School years 1998–99 and 2012–13**

School level and size	1998–99					2012–13				
	Lighting	Heating	Ventilation	Indoor air quality	Acoustics or noise control	Lighting	Heating	Ventilation	Indoor air quality	Acoustics or noise control
<b>All public schools</b>	<b>12.0</b>	<b>16.7</b>	<b>26.3</b>	<b>18.3</b>	<b>17.5</b>	<b>23.1</b>	<b>15.1</b>	<b>18.3</b>	<b>11.7</b>	<b>16.1</b>
<b>School level<sup>1</sup></b>										
Elementary	11.6	15.6	24.7	18.2	16.6	23.5	13.9	17.9	11.9	16.2
Secondary	11.9	19.1	30.6	18.4	19.6	22.2	18.5	18.7	11.1	14.6
Combined	19.5 !	28.2	34.7	19.3 !	25.6 !	20.7	19.2 !	26.9	12.6 !	25.5
<b>School enrollment size</b>										
Less than 300	11.6	16.4	26.6	19.2	21.9	24.8	19.6	24.1	14.9	20.6
300 to 599	13.6	17.9	31.0	20.1	19.5	23.3	16.7	18.9	11.9	15.4
600 or more	10.4	15.7	20.6	15.6	12.5	21.6	9.9	13.7	9.3	13.8

! Interpret data with caution. Estimate is unstable because the standard error represents more than 30 percent of the estimate.

<sup>1</sup> Elementary schools had grade 6 or lower and no grade higher than grade 8. Secondary schools had no grade lower than grade 7 and had grade 7 or higher. Combined schools had grades lower than grade 7 and higher than grade 8.

NOTE: Respondents were asked to rate the satisfaction of environmental factors in the school's onsite buildings. Onsite buildings include both permanent and portable (temporary) buildings. Ratings of unsatisfactory include the ratings of unsatisfactory and very unsatisfactory.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.

**Table A-3. Percentage of public schools that needed money for repairs, renovations, and modernizations to bring the school into good overall condition, total amount needed, and the average amount needed per school: School years 1998–99 and 2012–13**

Statistic	1998–99	2012–13
Percent of schools that needed money	75.9	52.5
Total amount needed	\$179 billion	\$197 billion
Average amount needed per school	\$3.1 million	\$4.5 million

NOTE: The average amount in 1998–99 has been adjusted for inflation using the Consumer Price Index (CPI). For more information on the CPI, please visit <http://www.bls.gov/cpi/>.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.



**Table A-4. Percentage of public schools with plans for building new permanent buildings/additions for the school in the next 2 years, by school level and size: School years 1998–99 and 2012–13**

School level and size	1998–99	2012–13
<b>All public schools</b>	<b>20.0</b>	<b>9.1</b>
<b>School instructional level<sup>1</sup></b>		
Elementary	18.9	7.8
Secondary	23.0	11.5
Combined	27.1	24.2
<b>School enrollment size</b>		
Less than 300	16.6	8.6
300 to 599	18.8	10.2
600 or more	23.5	8.1

<sup>1</sup> Elementary schools had grade 6 or lower and no grade higher than grade 8. Secondary schools had no grade lower than grade 7 and had grade 7 or higher. Combined schools had grades lower than grade 7 and higher than grade 8.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.

**Table A-5. Percentage of public schools with plans for making at least one major repair, renovation, or replacement to a building feature in the next 2 years, by school level and size: School years 1998–99 and 2012–13**

School level and size	1998–99	2012–13
<b>All public schools</b>	<b>48.4</b>	<b>38.6</b>
<b>School instructional level<sup>1</sup></b>		
Elementary	46.2	36.0
Secondary	55.5	45.6
Combined	54.2	50.1
<b>School enrollment size</b>		
Less than 300	42.9	40.0
300 to 599	50.2	39.8
600 or more	49.8	36.0

<sup>1</sup> Elementary schools had grade 6 or lower and no grade higher than grade 8. Secondary schools had no grade lower than grade 7 and had grade 7 or higher. Combined schools had grades lower than grade 7 and higher than grade 8.

NOTE: Building features are roofs, framing, floors, foundations, exterior walls, finishes, windows, doors, interior finishes, trim, plumbing, heating, ventilation, air conditioning, and life safety features.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.

## APPENDIX B: STANDARD ERROR TABLES

**Table B-1. Standard errors for table A-1: Average years since original construction of public schools' main instructional building, average years since the most recent major renovation of the main instructional building, and average functional age of the main instructional building, by school level and size: School years 1998–99 and 2012–13**

School level and size	1998–99			2012–13		
	Years since construction of the main instructional building	Years since most recent major renovation of the main instructional building	Functional age of the main instructional building	Years since construction of the main instructional building	Years since most recent major renovation of the main instructional building	Functional age of the main instructional building
<b>All public schools</b>	<b>0.8</b>	<b>0.6</b>	<b>0.6</b>	<b>0.7</b>	<b>0.4</b>	<b>0.5</b>
<b>School level</b>						
Elementary	1.0	0.6	0.8	0.9	0.5	0.6
Secondary	1.6	0.9	0.8	1.2	0.7	0.9
Combined	3.8	1.9	2.7	4.2	2.0	3.1
<b>School enrollment size</b>						
Less than 300	1.7	1.4	1.6	1.7	1.0	1.5
300 to 599	1.5	1.0	1.1	1.1	0.6	0.9
600 or more	1.0	0.6	0.8	0.9	0.5	0.7

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.

**Table B-2. Standard errors for table A-2: Percentage of public schools for which the condition of environmental factors was rated as unsatisfactory, by factor, school level, and size: School years 1998–99 and 2012–13**

School level and size	1998–99					2012–13				
	Lighting	Heating	Ventilation	Indoor air quality	Acoustics or noise control	Lighting	Heating	Ventilation	Indoor air quality	Acoustics or noise control
<b>All public schools</b>	<b>1.43</b>	<b>1.34</b>	<b>1.39</b>	<b>1.30</b>	<b>1.10</b>	<b>1.20</b>	<b>0.94</b>	<b>1.19</b>	<b>1.00</b>	<b>1.08</b>
<b>School level</b>										
Elementary	1.80	1.61	1.66	1.56	1.41	1.58	1.20	1.47	1.22	1.36
Secondary	1.95	2.47	2.80	2.36	2.75	1.98	2.08	1.89	1.44	1.70
Combined	7.20	7.53	8.53	6.67	8.31	5.86	5.98	7.13	4.79	6.12
<b>School enrollment size</b>										
Less than 300	2.89	3.28	3.89	3.37	3.80	2.71	2.47	2.74	2.41	2.58
300 to 599	2.39	2.50	2.81	2.27	2.15	1.99	1.73	2.00	1.64	1.76
600 or more	1.43	1.62	2.10	1.65	1.85	1.67	1.19	1.36	1.19	1.43

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.

**Table B-3. Standard errors for table A-3: Percentage of public schools that needed money for repairs, renovations, and modernizations to bring the school into good overall condition, total amount needed, and the average amount needed per school: School years 1998–99 and 2012–13**

Statistic	1998–99	2012–13
Percent of schools that needed money	1.51	1.25
Total amount needed	\$10 billion	\$12 billion
Average amount needed per school	\$165,000	\$264,000

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.

**Table B-4. Standard errors for table A-4: Percentage of public schools with plans for building new permanent buildings/additions for the school in the next 2 years, by school level and size: School years 1998–99 and 2012–13**

School level and size	1998–99	2012–13
<b>All public schools</b>	<b>1.35</b>	<b>0.79</b>
<b>School instructional level</b>		
Elementary	1.67	0.95
Secondary	2.76	1.26
Combined	7.45	6.35
<b>School enrollment size</b>		
Less than 300	3.04	2.05
300 to 599	2.44	1.26
600 or more	1.69	1.10

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.

**Table B-5. Standard errors for table A-5: Percentage of public schools with plans for making at least one major repair, renovation, or replacement to a building feature in the next 2 years, by school level and size: School years 1998–99 and 2012–13**

School level and size	1998–99	2012–13
<b>All public schools</b>	<b>1.68</b>	<b>1.21</b>
<b>School instructional level</b>		
Elementary	2.27	1.51
Secondary	3.13	2.41
Combined	9.02	7.49
<b>School enrollment size</b>		
Less than 300	4.15	3.16
300 to 599	2.89	2.20
600 or more	2.46	1.59

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), "Condition of Public School Facilities," 1998–99 and 2012–13.