## Issue Brief: Academic Tutoring in High Schools

## Introduction

In 2014-15, the high school graduation rate reached a record high of 83 percent (U.S. Department of Education 2016). Despite the gains, over half a million students still drop out of high school each year (U.S. Department of Education 2015). High schools have adopted various strategies designed to keep students who are at risk of not graduating in school and on track for earning the credits required to graduate. "At-risk" students are defined as those failing to achieve basic proficiency in key subjects or exhibiting behaviors that can lead to failure and/or dropping out of school. Dropout prevention strategies are diverse; they vary in type of program, services offered, frequency, intensity, and duration of contact with target students.

The U.S. Department of Education (Department) sponsored the National Survey on High School Strategies Designed to Help At-Risk Students Graduate (HSS), which aimed to provide descriptive information on the prevalence and characteristics of dropout prevention strategies for at-risk students. The survey collected data in the 2014-15 school year from a nationally representative sample of 2,142 public high schools and focused on 13 specific high school improvement strategies ${ }^{1}$ identified by a panel of external experts and senior Department officials. This brief on academic tutoring is the sixth in a series of briefs being released this year with key findings about these high school improvement strategies.

## Definition of Academic Tutoring

The HSS defined academic tutoring as supplemental instruction that is required for high school students who have fallen behind academically. The HSS distinguished required academic tutoring, in which students must participate, from voluntary tutoring, in which students have the option to participate. Academic tutoring provides students with additional instruction and enrichment opportunities to help them master academic content.

## Research on Academic Tutoring

Evidence suggests that academic tutoring may be an effective way to help students improve their academic skills, stay in school, and/or graduate from high school. One experimental study of the Match tutoring program, ${ }^{2}$ an intensive small group math tutoring program in which students receive one hour of tutoring each day from primarily recent college graduates, found that students participating in Match tutoring had higher math test scores and math grades than those who did not participate (Cook et al.

[^0]2015). Research also suggests that some comprehensive programs that may include academic tutoring and also other services, such as test taking and study skills assistance, academic advising, mentoring, community service, and financial incentives for school performance, may help students stay in school and graduate (Dynarski et al. 2008). Two quasi-experimental studies on Talent Search, a program that provides several academic supports to students from disadvantaged backgrounds and features academic tutoring as one of its supports, found that students participating in Talent Search were more likely to graduate from high school than students who did not participate in the program (Constantine et al. 2006).

## Survey Findings on Academic Tutoring

This brief describes the prevalence of academic tutoring as a high school dropout prevention strategy. It does not measure the effectiveness of the strategy but instead describes the kinds of schools that offer academic tutoring and their approaches to implementing it. This analysis included an examination of four school characteristics: (1) size, (2) poverty, (3) locale, and (4) graduation rate. Only statistically significant differences within school characteristics (at $p<$. 05) are discussed; non-statistically significant differences are not reported. School characteristics were defined in the following ways:

School size. School size categories consisted of small schools (fewer than 500 students), medium schools (500-1,199 students), and large schools (1,200 or more students) based on 2013-14 Common Core of Data (CCD) student enrollment data.

School poverty. Poverty levels were based on 2013-14 free or reduced-price lunch (FRPL) and total CCD school enrollment data. The poverty categories were low-poverty schools (below 35 percent students with FRPL), medium-poverty schools (35-49 percent students with FRPL), and high-poverty schools ( 50 percent or more students with FRPL).

School locale. School locale included three mutually exclusive locales from the CCD: rural schools, suburban/town schools, and city schools.

Graduation rate. School classification by graduation rate was based on three categories: low graduation rate ( 67 percent or lower graduation rate), medium graduation rate ( 68 to 89 percent graduation rate), and high graduation rate ( 90 percent or higher graduation rate).

## Summary of Key Findings

- One-third of all high schools (32 percent) required academic tutoring for at least some students in 2014-15; 8 percent of all high school students participated in required academic tutoring, according to school principals.
- High-poverty schools were more likely than low-poverty schools to require academic tutoring for struggling students, and city schools were more likely than suburban or rural schools to require academic tutoring.
- Among high schools with required academic tutoring, most assigned tutoring on the basis of students' academic performance (95 percent), followed by staff referrals ( 66 percent) and attendance problems (53 percent).
- High schools used different approaches to providing academic tutoring to different students. Most commonly, academic tutoring was provided in person ( 95 percent), followed by a blended model with an in-person facilitator and online tools (14 percent), and then online tutoring only (6 percent).
- Required academic tutoring was most commonly provided to students in small groups of 10 students or fewer (75 percent) compared with one-on-one tutoring (14 percent) or large groups of more than 10 students (11 percent).
- The most common academic tutors were teachers licensed in a core academic subject (90 percent of schools); most tutors were offered supplemental pay out of the school/district budget (83 percent).


## What was the prevalence of academic tutoring in high schools?

In 2014-15, 32 percent of high schools nationwide required academic tutoring for at least some students; 8 percent of high school students participated in required academic tutoring, according to school principals. The prevalence of required academic tutoring varied by school poverty level and school locale (Exhibit 1), but there were no significant differences by school size and graduation rate.

Exhibit 1. Percentage of high schools that required academic tutoring by selected school characteristics, 2014-15


Exhibit reads: In 2014-15, 32 percent of high schools required at least some students to participate in academic tutoring.

* $p<.05$.

NOTE: The asterisk is placed on one case per comparison. Differences across school characteristics with two categories were based on comparisons between the two groups. Differences across school characteristics with three categories were based on goodness-of-fit across all three categories. Unweighted $n=1,925$.

SOURCE: HSS survey of high school administrators, 2015 (Question 62).

Differences by school poverty. High-poverty schools were more likely than low-poverty schools to require academic tutoring ( 36 percent versus 26 percent).

Differences by school locale. Larger proportions of city schools than suburban or rural schools required academic tutoring ( 41 percent versus 28 percent and 31 percent, respectively).

How did high schools target students for participation in academic tutoring?
High schools most frequently assigned academic tutoring to specific students on the basis of their academic performance ( 95 percent), followed by staff referrals ( 66 percent), and attendance problems ( 53 percent). Fewer schools assigned tutoring to English Learners (ELs) (19 percent) and reentry ${ }^{3}$ students ( 13 percent). The criteria schools used to require students to participate in academic tutoring differed by school size, school poverty level, school locale, and graduation rate (Exhibit 2).

Exhibit 2. Percentage of high schools that targeted specific student subgroups or issues for participation in academic tutoring, 2014-15

| Subgroup | All schools <br> with required academic tutoring | Low grad rate | High grad rate | Large | Small | High poverty | Low poverty | City | Suburban | Rural |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Performing below standards | 95\% | 94\% | 96\% | 94\% | 96\% | 95\% | 95\% | 95\% | 92\% | 97\% |
| Staff referrals | 66\% | 64\% | 70\% | 65\% | 65\% | 66\% | 59\% | 73\% | 61\% | 65\% |
| Attendance issues | 53\% | 57\% | 53\% | 48\% | 57\% | 56\%* | 44\% | 52\% | 50\% | 56\% |
| Discipline issues | 30\% | 32\% | 28\% | 28\% | 30\% | 30\% | 27\% | 29\% | 29\% | 31\% |
| English learners | 19\% | 23\% | 15\% | 27\%* | 16\% | 22\%* | 11\% | 28\%* | 18\% | 12\% |
| Particular grade level | 18\% | 28\%* | 14\% | 16\% | 16\% | 20\% | 15\% | 23\% | 15\% | 15\% |
| Reentry students | 13\% | 18\% | 10\% | 16\% | 11\% | 13\% | 9\% | 16\% | 14\% | 8\% |

Exhibit reads: Among high schools that required at least some students to participate in academic tutoring in 2014-15, 95 percent targeted students performing below standards for tutoring.

* $p<.05$.

NOTE: The asterisk is placed on one case per comparison. Differences across school characteristics with two categories were based on comparisons between the two groups. Differences across school characteristics with three categories were based on goodness-of-fit across all three categories.
Unweighted $n=635$.
SOURCE: HSS survey of high school administrators, 2015 (Question 64).

Differences by school size. Large schools were more likely than small schools to target EL students for required academic tutoring ( 27 percent versus 16 percent) after examining the differences across selected student subgroups and issues.

Differences by school poverty. High-poverty schools were more likely than low-poverty schools to target students with attendance issues ( 56 percent versus 44 percent) and EL students ( 22 percent versus 11 percent) for required academic tutoring.

[^1]Differences by school locale. Larger proportions of city schools than suburban or rural schools reported targeting EL students for required academic tutoring ( 28 percent in city schools versus 18 percent in suburban schools and 12 percent in rural schools).

Differences by graduation rate. Low-graduation-rate schools were more likely than high-graduation-rate schools to target students in a particular grade level for required academic tutoring ( 28 percent versus 14 percent).

How did schools deliver academic tutoring to students? High schools offered academic tutoring in different ways to different students. Most commonly, required academic tutoring was provided in person ( 95 percent), followed by a hybrid model blending online support with an in-person facilitator (14 percent), and then online tutoring only (6 percent). There were significant differences in this delivery mode for required academic tutoring by school size and graduation rate, but there were no differences by school poverty or school locale.

Differences by school size. Large schools were less likely than small schools to deliver required academic tutoring using a blended approach ( 9 percent compared with 16 percent).

Differences by graduation rate. Low-graduation-rate schools were more likely than high-graduation-rate schools to deliver required academic tutoring online (12 percent compared with 4 percent) or using a blended approach (24 percent compared with 12 percent) and less likely to deliver tutoring in person ( 89 percent compared with 96 percent).

## Who provided academic tutoring to students?

The most common tutors provided by high schools were teachers licensed in a core academic subject (90 percent), followed by teachers licensed in special education (41 percent), teachers licensed in a noncore subject (29 percent), professional tutors (13 percent), and unlicensed/provisional educators (11 percent). There were differences in the tutors' professional background by school size, school locale, and graduation rate. There were no differences by poverty level.

Differences by school size. Large schools were less likely than small schools to have an unlicensed/provisional educator provide academic tutoring (7 percent versus 14 percent).

Differences by school locale. Larger proportions of city schools than suburban or rural schools had a professional tutor provide academic tutoring ( 18 percent versus 13 percent and 8 percent, respectively), and larger proportions of rural schools than city or suburban schools had an unlicensed/provisional educator provide academic tutoring (16 percent versus 6 percent and 10 percent, respectively)

Differences by graduation rate. Low-graduation-rate schools were more likely than high-graduation-rate schools to have professional tutors provide academic tutoring (24 percent versus 9 percent).

## Was academic tutoring provided to students in groups or one on one?

High schools most frequently provided academic tutoring to students in small groups of 10 students or fewer ( 75 percent) and less frequently through one-on-one tutoring (14 percent) or in large groups of more than 10 students (11 percent). The groupings schools used varied by school size, school poverty level, and graduation rate, but there were no significant differences by school locale (Exhibit 3).

Exhibit 3. Percentage of high schools that delivered academic tutoring in groups or one on one, by selected school characteristics, 2014-15

| Delivery approach | All schools with required academic tutoring | Low <br> grad <br> rate | High grad rate | Large | Small | High poverty | Low poverty | City | Suburban | Rural |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Small groups | 75\% | 71\% | 77\% | 75\% | 75\% | 77\% | 75\% | 72\% | 75\% | 78\% |
| One on one | 14\% | 26\%* | 13\% | 8\%* | 18\% | 11\%* | 20\% | 14\% | 14\% | 15\% |
| Large groups | 11\% | 4\%* | 10\% | 17\%* | 7\% | 13\%* | 5\% | 14\% | 11\% | 7\% |

Exhibit reads: Among high schools that required at least some students to participate in academic tutoring, 75 percent provided tutoring to students in small groups (10 or fewer students).

* $p<.05$.

NOTE: The asterisk is placed on one case per comparison. Differences across school characteristics with two categories were based on comparisons between the two groups. Differences across school characteristics with three categories were based on goodness-of-fit across all three categories.
Unweighted $n=595$.
SOURCE: HSS survey of high school administrators, 2015 (Question 69).

Differences by school size. Large schools were less likely than small schools to offer one-on-one tutoring ( 8 percent compared with 18 percent) and more likely to offer tutoring in large groups (17 percent compared with 7 percent).

Differences by school poverty. High-poverty schools were less likely than low-poverty schools to offer one-on-one tutoring than low-poverty schools ( 11 percent compared with 20 percent) and more likely to offer tutoring in large groups ( 13 percent compared with 5 percent).

Differences by graduation rate. Low-graduation-rate schools were more likely than high-graduation-rate schools to offer one-on-one tutoring ( 26 percent compared with 13 percent) and were less likely to offer tutoring in large groups (4 percent compared with 10 percent).

## When was academic tutoring offered?

High schools offered academic tutoring to students at various times of the day; most commonly, academic tutoring was provided to students during the school day ( 67 percent), followed by after school ( 65 percent), before school ( 32 percent), and on weekends ( 14 percent). Tutoring times varied by school poverty level, school locale, and graduation rate, but there were no significant differences by school size.

Differences by school poverty. High-poverty schools were less likely than low-poverty schools to offer academic tutoring during the school day ( 63 percent versus 80 percent) and were more likely to offer academic tutoring after school ( 71 percent versus 56 percent) or on the weekend (19 percent versus 6 percent).

Differences by school locale. Larger proportions of city schools than suburban or rural schools offered academic tutoring after school ( 75 percent versus 61 percent and 60 percent, respectively) and on the weekend ( 27 percent versus 11 percent and 7 percent, respectively).

Differences by graduation rate. Low-graduation-rate schools were more likely than high-graduation-rate schools to offer academic tutoring on the weekends (19 percent compared with 10 percent).

## How frequently did high schools provide academic tutoring?

High schools provided academic tutoring more commonly on a weekly basis ( 52 percent) than on a daily basis (44 percent) (Exhibit 4). The frequency varied by school locale and graduation rate, and there were no significant differences by school size or school poverty level.

Differences by school locale. Larger proportions of rural schools than city or suburban schools provided academic tutoring on a daily basis ( 54 percent of rural schools versus 38 percent of city schools and 40 percent of suburban schools), while larger proportions of city and suburban schools than rural schools provided academic tutoring weekly ( 58 percent of city schools and 56 percent of suburban schools versus 42 percent of rural schools).

Differences by graduation rate. Low-graduation-rate schools were less likely than high-graduation-rate schools to provide academic tutoring on a daily basis (37 percent versus 49 percent) and were more likely to provide academic tutoring weekly ( 58 percent versus 47 percent).

Exhibit 4. Frequency of academic tutoring, 2014-15

| Frequency | All schools with required academic tutoring | Low grad rates | High grad rates | Large | Small | High poverty | Low poverty | City | Suburban | Rural |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Daily | 44\% | 37\%* | 49\% | 44\% | 46\% | 43\% | 39\% | 38\%* | 40\% | 54\% |
| Weekly | 52\% | 58\%* | 47\% | 51\% | 51\% | 53\% | 57\% | 58\%* | 56\% | 42\% |

Exhibit reads: Among high schools that required at least some students to participate in academic tutoring in 2014-15, 52 percent of schools had students meet weekly for academic tutoring.

NOTE: The asterisk is placed on one case per comparison. Differences across school characteristics with two categories were based on comparisons between the two groups. Differences across school characteristics with three categories were based on goodness-of-fit across all three categories.
Unweighted $n=633$.
SOURCE: HSS survey of high school administrators, 2015 (Question 71).

## How did tutors reinforce classroom learning?

High schools most frequently reported that tutors used the same materials as the classroom teacher to provide additional instructional time for students (74 percent). Schools also reported that tutors provided homework assistance ( 60 percent), used supplemental materials aligned with the regular core course ( 54 percent), and answered questions/held study sessions for upcoming tests ( 53 percent). The relationship between academic tutoring and classroom instruction varied by graduation rate, but there were no significant differences by school size, school poverty level, or school locale.

Differences by graduation rate. Low-graduation-rate schools were less likely than high-graduation-rate schools to answer questions/hold study sessions for upcoming tests (40 percent versus 56 percent) and provide homework assistance ( 39 percent versus 69 percent).

How did high schools pay for tutors?
Most tutors were offered supplemental pay out of the school/district budget ( 83 percent of schools), and fewer tutors were offered supplemental pay using funds from an outside organization (10 percent). In some schools, tutors were considered voluntary and were not offered any compensation (15 percent). Funding varied by school size, school poverty level, school locale, and graduation rate.

Differences by school size. Large schools were more likely than small schools to use unpaid tutors (23 percent versus 12 percent).

Differences by school poverty. High-poverty schools were more likely than low-poverty schools to pay tutors using funds from an outside organization (14 percent versus 3 percent).

Differences by school locale. Larger proportions of city schools than suburban or rural schools paid tutors using funds from an outside organization (15 percent versus 8 percent and 7 percent, respectively).

Differences by graduation rate. Low-graduation-rate schools were more likely than high-graduation-rate schools to pay tutors using funds from an outside organization (13 percent versus 4 percent) and less likely to use unpaid tutors (6 percent versus 17 percent).

## Methodology

The National Survey on High School Strategies Designed to Help At-Risk Students Graduate was a survey of 13 high school strategies designed to improve graduation rates among students at risk of dropping out and was administered in the 2014-15 school year. The 13 strategies are: (1) academic support classes, (2) academic tutoring, (3) career-themed curriculum, (4) case management, (5) collegelevel coursework, (6) competency-based advancement, (7) credit recovery, (8) early warning systems, (9) high school transition activities, (10) mentoring, (11) personalized learning plans, (12) social services, and (13) student support teams.

The purpose of the survey was to inform education practitioners and policymakers about the prevalence, characteristics, and students served by these strategies in U.S. public high schools. The descriptive study did not measure the effectiveness of particular strategies but instead examined implementation factors in high schools across the country. The study team identified the 13 strategies and designed survey items for each strategy with input from a panel of external experts in the field and senior Department officials.
The researchers selected a nationally representative sample of high schools ${ }^{4}$ using a random sampling approach, stratifying high schools based on graduation rate (from EDFacts) ${ }^{5}$ and locale code (from NCES 2013-14 Common Core of Data). The survey collected data from high school principals (or designees knowledgeable about programs and strategies) at sampled schools. The survey response rate was 90 percent. The survey responses, after cleaning and processing, were analyzed in SAS and Stata using descriptive techniques that apply the appropriate statistical population weights to account for stratification by graduation rate and locale.

Results reported in this brief reflect the full survey sample unless otherwise noted and are representative of U.S. public high schools nationwide. References in the text to differences between subgroups based on sample data refer only to differences that are statistically significant using a significance level of 0.05 . Adjustments to the alpha level were not made for multiple comparisons.

[^2]
## References

Constantine, J. M., N. S. Seftor, E. S. Martin, T. Silva, and D. Myers. 2006. A Study of the Effect of the Talent Search Program on Secondary and Postsecondary Outcomes in Florida, Indiana, and Texas. Final Report from Phase II of the National Evaluation. Washington, DC: U.S. Department of Education, Office of Planning, Evaluation, and Policy Development, Policy and Program Studies Services.

Cook, P. J., K. Dodge, G. Farkas, R. G. Fryer, J. Guryan, J. Ludwig, and S. Mayer. 2015. Not Too Late: Improving Academic Outcomes for Disadvantaged Youth. Evanston, IL: Institute for Policy Research, Northwestern University.

Dynarski, M., L. Clarke, B. Cobb, J. Finn, R. Rumberger, and J. Smink. 2008. Dropout Prevention: A Practice Guide (NCEE 2008-4025). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.
U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. 2016. "Table 1. Public High School 4-Year Adjusted Cohort Graduation Rate (ACGR)." https://nces.ed.gov/ccd/tables/ACGR RE and characteristics 2014-15.asp
U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. 2015. "Table 219.57. Population of 15- to 24-Year Olds Enrolled in Grades 10 through 12, Number Who Dropped Out (Event Dropouts), Percentage Who Dropped Out (Event Dropout Rate), and Percentage Distribution, by Selected Characteristics: 2014." https://nces.ed.gov/programs/digest/d15/tables/dt15 219.57.asp

## Appendix: Academic Tutoring (Survey Excerpt)

## National Survey on High School Strategies Designed to Help At-Risk Students Graduate

This section asks about Academic Tutoring. For the purposes of this survey, academic tutoring is mandatory tutoring for students who have fallen behind academically.
62. In the 2014-15 school year, does your school have mandatory academic tutoring?
(Please select only one)
\{Only allow one selection\} Yes No

If user responds "Yes" to Q62, ask Q64 through Q74. Otherwise, skip to Q75
63. On average, approximately what percentage of high school
students in your school is participating in mandatory
academic tutoring in the 2014-15 school year?
64. Are any of the following subsets of students targeted for mandatory tutoring?
(Check all that apply)
Students with attendance issues (e.g., truancy)
Students with discipline or behavioral issues
Students performing below standards or grade level
Students in a particular grade level, regardless of performance
Students recommended by high school staff (e.g., counselor or teacher)
Re-entry students
English Language Learners
Other
$\qquad$
65. Who provides the academic tutoring in your school?
(Check all that apply)

A teacher licensed in a core academic subject
A teacher licensed in a non-core subject
A licensed special education teacher
A professional tutor
An unlicensed educator
Other
(Please specify $\qquad$
66. Who pays the academic tutors in your school?
(Check all that apply)
Tutors are paid by the school/district budget
Tutors are paid by an outside organization
Tutors are unpaid
Other
(Please specify $\qquad$
67. Do the individuals who provide mandatory tutoring in your school also teach other classes?
(Check all that apply)

Tutors do not have other teaching duties in my school
Tutors also teach core academic subject classes (e.g., mathematics, English, science)
Tutors also teach non-core subject classes (e.g., art, music)
Tutors also teach special education students
68. How is mandatory tutoring typically delivered?
(Check all that apply)

Online
In person
Blended learning (e.g., online with an in-person facilitator)
If user responds "in person" to Q68, ask Q69. Otherwise, skip to Q70.
69. Is mandatory tutoring offered one-on-one or in groups?
(Please select only one)
\{Only allow one selection\}

One-on-one
In small groups (10 or fewer students)
In large groups (more than 10 students)
70. When is mandatory tutoring typically offered to your students?
(Check all that apply)

Before school
After school
During the school day (e.g., lunch, study hall)
On the weekend
71. On average, how often do students meet to receive mandatory tutoring?
(Please select only one)
\{Only allow one selection\}
Daily
Weekly
Every other week
Once a month
Less frequently than once a month
I don't know
72. What is the relationship between mandatory tutoring and classroom instruction?
(Check all that apply)

Tutors use similar materials as the classroom teacher to provide additional instructional time
Tutors use supplemental materials aligned with the regular core course
Tutors answer questions and hold study sessions for upcoming tests
Tutors provide homework assistance
Other
(Please specify _____)
73. In the 2014-15 school year, does your school
also offer students voluntary tutoring options
(e.g., academic tutoring that students have the option to utilize)? Yes No

If user responds "Yes" to Q73, ask Q74. Otherwise skip to Q75.
74. On average, approximately what percentage of high $\quad$ \{Slide bar for $0 \%$ to 100\%\} school students in your school utilizes voluntary academic tutoring?

The full survey is available at: http://www2.ed.gov/about/offices/list/opepd/ppss/reports-high-school.html


[^0]:    ${ }^{1}$ The survey examined 13 strategies designed to improve high school outcomes for at-risk students. These strategies are: (1) academic support classes, (2) academic tutoring, (3) career-themed curriculum, (4) case management, (5) college-level coursework, (6) competency-based advancement, (7) credit recovery, (8) early warning systems, (9) high school transition activities, (10) mentoring, (11) personalized learning plans, (12) social services, and (13) student support teams. See http://www2.ed.gov/about/offices/list/opepd/ppss/reports-high-school.html for the series of briefs.
    2 The Match tutoring program is now known as SAGA Innovations.

[^1]:    ${ }^{3}$ Reentry students are those who dropped out of high school and then reenrolled, as defined by the HSS.

[^2]:    ${ }^{4}$ All U.S. public high schools providing instruction to 12 th grade students in the fall of 2010 were included in the sampling frame unless (1) the lowest offered grade was 11th grade or higher, (2) there were fewer than five students in grades 9 through 12, (3) the percentage of students enrolled in grades 9 through 12 was under 20 percent of the total school enrollment and the total number of students in grades 9 through 12 was fewer than 20 , or (4) the school name contained one of nine keywords indicating juvenile detention center or hospital. Of the 103,813 total schools listed in the 2010-11 CCD, 22,447 high schools met the criteria to be included in the sampling frame.
    5 There were 3,302 schools without graduation rate information in the 2010-11 EDFacts public use data set. The researchers used an imputation approach to assign these schools to either the high- or low-graduation-rate stratum. The imputation process began by examining the distribution of the high/low graduation rate classification for the 19,145 schools by sampling locale. The percentage of schools classified as high graduation rate was calculated separately for each locale sampling stratum; 68.4 percent of rural schools were classified as high graduation rate, 63.0 percent of suburban schools were classified as high graduation rate, and 41.0 percent of city schools were classified as high graduation rate. The research team randomly assigned each of the 3,302 schools with unknown graduation rates to the high graduation rate stratum with probability 68.4 if the school was classified as rural, with probability 63.0 if the school was classified as suburban, and with probability 41.0 if the school was classified as urban. The sample size was adjusted upwards to account for potential misclassification due to this method. In analysis, the researchers used the restricted-use 2013-14 EDFacts data and graduation rates published on school and district websites to fill in this missing data.

