

Do College and Career Readiness and Early College Success in Indiana Vary Depending on Whether Students Attend Public, Charter, or Private Voucher High Schools?

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Do College and Career Readiness and Early College Success in Indiana Vary Depending on Whether Students Attend Public, Charter, or Private Voucher High Schools?

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Indiana has a robust portfolio of high school options, including traditional public schools, charter schools, and private schools that accept Indiana Choice Scholarships (private voucher schools). This study identified the type of high school enrollment (type of high school and voucher status) among the student populations of four cohorts (who were in grade 9 in 2010/11–2013/14) and examined those students' performance on indicators of college and career readiness and early college success. The study found that charter school students and recipients of private school vouchers (voucher recipients) were more likely than other students to be Black or to be eligible for the national school lunch program (an indicator of low socioeconomic status). In addition, students in private voucher schools who did not receive vouchers (nonvoucher students) performed similarly to or better than students in traditional public schools and charter school students on most indicators of college and career readiness, after other factors were adjusted for. And voucher recipients performed similarly to or better than students in traditional public schools on most indicators of college and career readiness, after other factors were adjusted for, whereas charter school students performed similarly to or worse than students in traditional public schools. Finally, nonvoucher students performed better than students in all other types of high school enrollment on one indicator of early college success, completing all attempted credits in the first year, after other factors were adjusted for. District administrators, charter school leaders and authorizers, and leaders of private voucher schools could use these findings to inform the design of policies to improve college and career readiness and early college success.

Why this study?

Indiana has a robust portfolio of high school options, including traditional public schools, charter schools, and private schools that accept Indiana Choice Scholarships (private voucher schools; see box 1 for definitions of key terms used in the report). But little research is available on the characteristics of students who attend different types of Indiana high schools or how their college and career readiness and early college success vary. This study responds to a request from the Indiana Department of Education for help in better understanding the characteristics of students with different types of high school enrollment (type of high school and voucher status) and the association between type of high school enrollment and several indicators of college and career readiness and early college success.

Research suggests that high school choice could be associated with college and career readiness and early college success. Studies have found that attending a public charter high school is associated with higher rates of high school graduation and enrollment in college than attending a traditional public high school (Angrist et al., 2016; Booker et al., 2011; Sass et al., 2016). Studies have also found that students who attend a private school with a voucher are more likely to graduate from high school, enroll in college, and persist in college than otherwise similar students who attend a traditional public school (Cowen et al., 2013; Wolf et al., 2010).

Other research has found that private school voucher recipients in Indiana and Louisiana have lower achievement than students in traditional public schools, though that research focused on elementary school students (Abdulkadiroglu et al., 2016; Waddington & Berends, 2018). In Indiana 90 percent of schools that

For additional information, including background on the study, technical methods, and supporting analyses, access the report appendixes at <https://go.usa.gov/xsZk7>.

Box 1. Key terms

Adjusted probability. The probability of achieving an outcome after student and high school background characteristics are taken into account. It is calculated by estimating the probability of achieving an outcome for each student in the sample using that student's characteristics and treating each student as if that student had each of the four types of high school enrollment. For each type of high school enrollment, the resulting probabilities of each outcome are then averaged across all students in the sample.

Charter school. A public high school that does not need to follow the same local and state regulations as traditional public schools. Charter schools are held to accountability standards through their operating charter, as approved by a charter authorizer, which might be an independent chartering board, a local education agency, a state education agency, a higher education institution, or a nonprofit organization. The study examined only students who attended brick-and-mortar charter schools; it did not examine students who attended virtual charter schools.

Honors diploma. Includes Indiana's Core 40 with Academic Honors high school diploma and Core 40 with Technical Honors high school diploma. Earning an honors diploma signifies that a student has completed all the requirements for Core 40 (Indiana's core requirements for secondary graduation), completed additional credits, earned a grade of C or higher in courses that count toward the diploma, earned a cumulative grade point average of B or higher, and either completed one of a set of advanced or dual course requirements or met minimum score thresholds on the SAT or ACT (for Core 40 with Academic Honors) or SAT, ACT, WorkKeys, Accuplacer, or Compass examinations (for Core 40 with Technical Honors).

Meaningful difference. A difference of 5 percentage points or higher after rounding in adjusted probability between students with different types of high school enrollment.

Nonvoucher student. A student who attended a private voucher school and did not receive a voucher. Nonvoucher students may come from higher-income households that do not qualify for the voucher based on their annual household income.

Private voucher school. A private school that participates in the statewide voucher program, the Indiana Choice Scholarship Program. Private schools that do not participate were not included in the study. Private schools are not run by local, state, or federal governments and are funded in part or in full by student tuition payments. About 90 percent of the private schools that participate in Indiana's voucher program are Catholic schools. Private schools can choose whether to participate and must be accredited to do so. Private schools that participate enroll students who receive a voucher (voucher recipients) and students who do not receive a voucher (nonvoucher students). About 80 percent of private schools in Indiana, including 65 percent of private high schools, participated in the program during the study period; of those that did not participate, nearly all served grades K–12, and 58 percent enrolled 45 or fewer students.

Traditional public school. A high school accredited by the state board of education, run by a school district, and governed by a school board. Traditional public schools must follow local, state, and federal regulations.

Type of high school enrollment. Whether a grade 9 student was enrolled in a traditional public school, a charter school, a private voucher school and received a voucher, or a private voucher school and did not receive a voucher.

Voucher recipient. A student who attended a private voucher school and received a voucher through the Indiana Choice Scholarship Program to apply to the cost of tuition. Voucher recipients come from low-income or moderate-income households. To qualify for a voucher, students must live in a household with an annual income equal to or less than 150 percent of the amount that would qualify them for the national school lunch program.

participate in the statewide voucher program are Catholic schools (Austin, 2015; Austin et al., 2019). Research on Catholic schools also tends to focus on the elementary school years, but some studies have examined high school students. One study found that students who attend Catholic schools have higher math achievement in high school than students who attend traditional public schools, after their background characteristics and prior achievement are adjusted for, at least in part because they had greater access to advanced math courses (Carbonaro & Covay, 2010). However, other research shows less evidence of larger achievement gains for Catholic school students (Altonji et al., 2005). In addition, research has found that students who attend Catholic schools have a higher probability of graduating from high school and enrolling in college (Altonji et al., 2005; Freeman & Berends, 2016).

Research also shows that students with different characteristics have different outcomes related to college and career readiness and early college success. Students from disadvantaged groups, such as low-income households and racial/ethnic minority groups, have lower college and career readiness, on average, as indicated by lower achievement on standardized tests and lower rates of taking advanced high school courses (Roderick et al., 2009). Recent evidence from Indiana shows that these students also have lower rates of early college success on multiple measures (Davis et al., 2018). Black students are less likely than White students to take only nonremedial courses in their first semester of college, complete all attempted credits in their first semester of college, and persist to a second year of college. Students who are eligible for the national school lunch program are less likely to achieve these three early college success outcomes than students who were not eligible. Students from low-income households and racial/ethnic minority groups might perform better when they attend certain types of high schools. Students from low-income households and racial/ethnic minority groups who attend Catholic schools have higher achievement than students in those groups who attended other schools (Hoffer, 2009; Morgan, 2001). Similarly, charter school students from low-income households and racial/ethnic minority groups have higher achievement outcomes than students in those groups who attend traditional public schools despite there being no overall differences between traditional public schools and charter schools (Center for Research on Education Outcomes, 2013, 2017; Gleason et al., 2010).

In 2017 the Indiana Department of Education spent approximately \$305 million to support public charter schools and \$174 million on Indiana’s private school voucher program (Carden, 2017; see appendix A for additional background on types of high school enrollment in Indiana). The Indiana Department of Education¹ and school leaders in the state need information about the college and career readiness and early college success of Indiana students who attended different types of Indiana high schools to know whether the state’s investment in school choice has paid off for students. Further, with this information school leaders in Indiana can identify which outcomes related to college and career readiness and early college success they should target for improvement for students in each type of high school enrollment (students in a traditional public school, charter school students, students in a private voucher school who received a voucher, and students in a private voucher school who did not receive a voucher). If students in one type of high school enrollment do better on a particular outcome than students in another, school leaders might want to look to that type of high school enrollment for examples of potentially effective practices. In addition, the findings might be of interest to researchers, policymakers, and practitioners outside Indiana who, in light of the increasing national conversation about expanding school choice, are interested in better understanding differences among high school students in different types of high school enrollment.

Research questions

This study examined Indiana students who were in grade 9 between 2010/11 and 2013/14 and were on track to begin college between 2014/15 and 2017/18. These students were enrolled in traditional public schools, charter schools, and private voucher schools. The students who were enrolled in private voucher schools either received a voucher (voucher recipients) or did not receive a voucher (nonvoucher students).

The study identified how student background characteristics, high school background characteristics, indicators of college and career readiness, and indicators of early college success varied by type of high school enrollment. The student background characteristics were gender, race/ethnicity, eligibility for the national school lunch program, English learner student status, special education status, grade 8 achievement on state tests, and grade 8 school type (public, private, or charter). The high school background characteristics were school size and locale (urban, suburban, town, or rural). The indicators of college and career readiness were whether students ever failed a course, were ever suspended, were absent more than 15 days a year, took at least one Advanced Placement

1. The senior staff at the Indiana Department of Education who requested this study included former Indiana Superintendent of Public Instruction Jennifer McCormick and former Chief of Staff Lee Ann Kwiatkowski.

examination, passed at least one Advanced Placement examination, took a college entrance examination, graduated from high school within four years, earned an honors diploma in high school, enrolled in college within one year of high school graduation, and, for students who enrolled in an Indiana public college or university, enrolled in a four-year college rather than a two-year college. The indicators of early college success (for students who enrolled in an Indiana public college or university) were whether students took only nonremedial courses in the first year, completed all attempted credits in the first year, and persisted to a second year.

The study addressed four research questions:

1. How did student and high school background characteristics vary by type of high school enrollment?
2. What was the relationship between type of high school enrollment and students' college and career readiness, after student and high school background characteristics were adjusted for?
3. What was the relationship between type of high school enrollment and students' early college success, after student and high school background characteristics were adjusted for?
4. Did the relationships between type of high school enrollment and students' college and career readiness and early college success vary by student background characteristics?²

Box 2 summarizes the data sources, sample, and methods; see appendix B for additional details.

Box 2. Data sources, sample, and methods

Data sources. The study team obtained student-level data from the Indiana Department of Education and the Indiana Commission for Higher Education. The study team then combined the student-level data with school-level data from the Common Core of Data and the Private School Universe Surveys from 2009/10 to 2014/15 compiled by the National Center for Education Statistics at the U.S. Department of Education (U.S. Department of Education, n.d.). The Common Core of Data collects information from public schools annually, and the Private School Universe Survey collects information from private schools every other year. The outcomes were selected in consultation with the Indiana Department of Education and align with prior Regional Educational Laboratory Midwest research in Indiana that stakeholders used as a reference point (for a review of the indicators of early college success used in this report, see Davis et al., 2018). The variables used were as follows:

- Key independent variables
 - Type of high school enrollment: whether students were enrolled in a traditional public school, a charter school, or a private voucher school as either a voucher recipient or a nonvoucher student.
- Student background characteristics
 - Student demographic characteristics: gender, race/ethnicity, eligibility for the national school lunch program (an indicator of low socioeconomic status), English learner student status, and special education status.
 - Grade 8 academic characteristics: students' math and English language arts scores on the Indiana Statewide Testing for Educational Progress–Plus, which is the state assessment administered to students in grades 3–8, and grade 8 school type (public, charter, or private).
- High school background characteristics
 - High school size and locale (city, suburb, town, or rural).

(continued)

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2. For research question 4 the study team added interactions between type of high school enrollment and all student background characteristics except other race/ethnicity and grade 8 school type because of statistical constraints. See appendix B for details.

Box 2. Data sources, sample, and methods *(continued)*

- College and career readiness outcomes
 - High school course failures, suspensions, and absences; whether a student took an Advanced Placement examination, passed an Advanced Placement examination, took a college entrance examination, graduated from high school within four years, earned an honors diploma in high school, enrolled in college within one year of high school graduation, and enrolled in an Indiana public four-year college or university within one year of high school graduation.
- Early college success outcomes (for students who enrolled in an Indiana public college or university)
 - Whether students took only nonremedial courses in the first year, completed all attempted credits in the first year, and persisted to a second year in the same college or university or a college or university of the same or a higher level.

Sample. The study included grade 9 students who attended an Indiana traditional public school, charter school, or private voucher school in 2010/11–2013/14. The study did not include grade 9 students who attended a virtual charter school or a private school that did not participate in Indiana’s voucher program. The full sample of 340,737 grade 9 students included 317,367 students in traditional public schools, 5,820 charter school students, 2,021 voucher recipients, and 15,529 nonvoucher students. These students were distributed across 523 Indiana high schools, including 405 traditional public schools, 34 charter schools, and 84 private voucher schools. The sample of students who enrolled in an Indiana public college or university and for whom early college success indicators were available included 120,649 students (111,174 students in traditional public schools, 1,876 charter school students, 779 voucher recipients, and 6,820 nonvoucher students).

Methodology. For research question 1 the study team calculated the percentages of students with different characteristics for each type of high school enrollment. For research questions 2, 3, and 4 the study team used regression models to examine the relationship between each type of high school enrollment in grade 9 and each outcome related to college and career readiness and early college success. The regression models adjusted for student and high school background characteristics and accounted for the fact that each outcome takes one of only two values (for example, achieved the outcome or did not achieve the outcome). Results are averaged across all students. When evaluating the results of the analyses, the study team defined meaningful differences in outcomes between types of high school enrollment as differences in adjusted probabilities of 5 percentage points or higher after rounding. The study team conducted analyses on all cases with nonmissing data. More detail on the methodology and missing data are in appendix B.

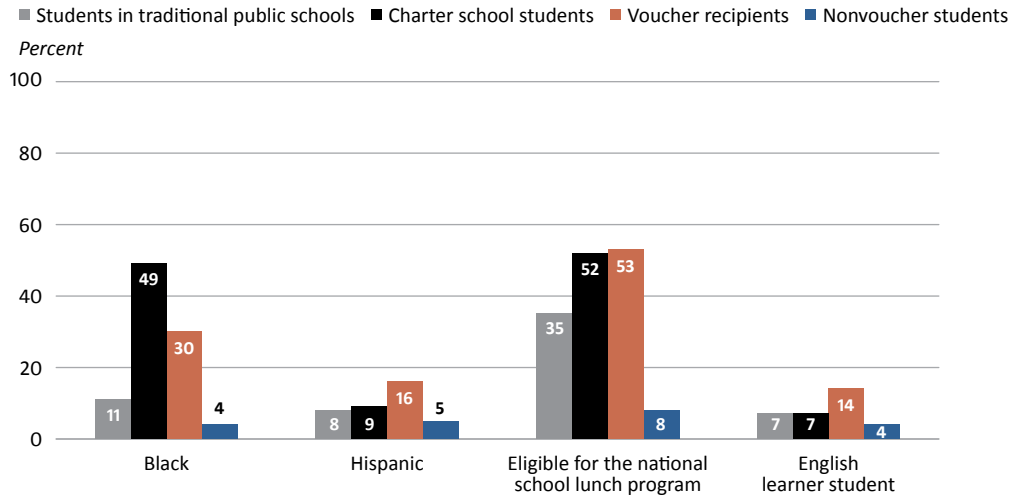
Findings

This section presents the main findings. Appendix C provides supporting analyses.

Charter school students and voucher recipients were more likely than other students to belong to disadvantaged groups

Between 2010/11 and 2013/14 charter school students and voucher recipients were more likely than students in traditional public schools and nonvoucher students to belong to disadvantaged groups. About 49 percent of charter school students were Black compared with 30 percent of voucher recipients, 11 percent of students in traditional public schools, and 4 percent of nonvoucher students (figure 1). About 16 percent of voucher recipients were Hispanic compared with 9 percent of charter school students, 8 percent of students in traditional public schools, and 5 percent of nonvoucher students. Charter school students and voucher recipients were more likely to be eligible for the national school lunch program: 52 percent of charter school students and 53 percent of voucher recipients were eligible compared with 35 percent of students in traditional public schools and 8 percent of nonvoucher students. Finally, voucher recipients were more likely than other students to be English learner students. About 14 percent of voucher recipients were English learner students compared with 7 percent of students in traditional public schools and charter school students and 4 percent of nonvoucher students.

Figure 1. Charter school students and voucher recipients in Indiana were more likely than students in traditional public schools to belong to disadvantaged groups, 2010/11–2013/14



Note: $n = 285,029$. See table C1 in appendix C for detailed results, including differences in the percentage of students who ever had an individualized education program by type of high school enrollment. That characteristic is not highlighted in the main report because private schools are not subject to laws governing the provision and servicing of an individualized education program in the same way as traditional public schools and charter schools.

Source: Authors' calculations using data provided by the Indiana Management Performance Hub.

Nonvoucher students had the highest percentage of students meeting or exceeding standards on the grade 8 state achievement test, and charter school students had the lowest percentage

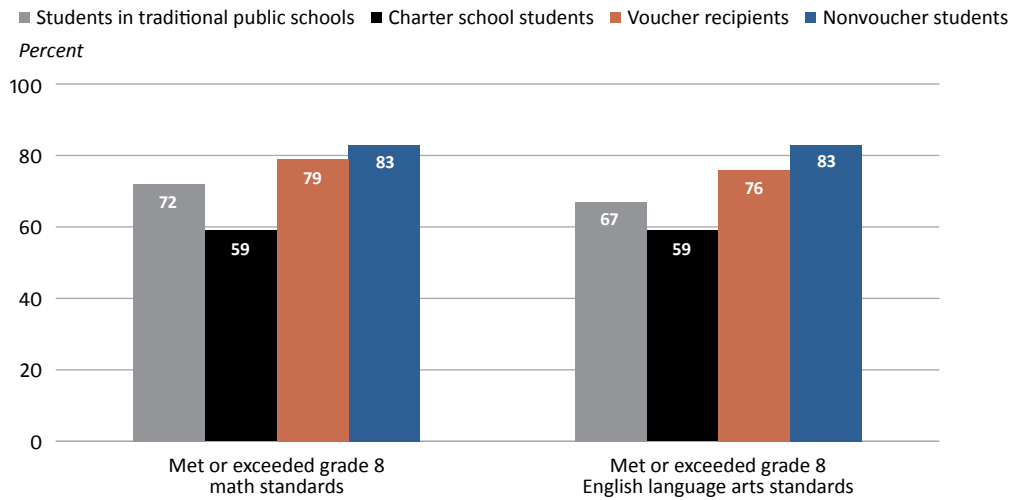
The percentage of students meeting or exceeding standards on the Indiana state assessment varied by type of high school enrollment. Nonvoucher students had the highest percentage of students whose grade 8 achievement scores met or exceeded state standards in both math and English language arts, and charter school students had the lowest percentage. In math 59 percent of charter school students met or exceeded standards compared with 72 percent of students in traditional public schools, 79 percent of voucher recipients, and 83 percent of nonvoucher students (figure 2).³ The pattern was similar in English language arts.

Most grade 9 charter school and private voucher school students attended schools in cities

Charter school and private voucher school enrollment options were available almost exclusively in cities and suburbs. Among charter school students, 85 percent attended schools in cities and 15 percent attended schools in suburbs (figure 3). There were only slight differences between voucher recipients and nonvoucher students. Among voucher recipients, 77 percent attended schools in cities, 15 percent attended schools in suburbs, 4 percent attended schools in rural areas, and 3 percent attended schools in towns. Among nonvoucher students, 72 percent attended schools in cities, 20 percent attended schools in suburbs, 5 percent attended schools in rural areas, and 3 percent attended schools in towns. In contrast, students in traditional public schools were about equally likely to attend schools in cities, suburbs, and rural areas and less likely to attend schools in towns. Among students in traditional public schools, 28 percent attended schools in cities, 28 percent attended schools in suburbs, 26 percent attended schools in rural areas, and 17 percent attended schools in towns.

3. Charter school students had the highest rate of missing assessment data (13 percent), followed by nonvoucher students (11 percent). The assessment findings should thus be interpreted with caution.

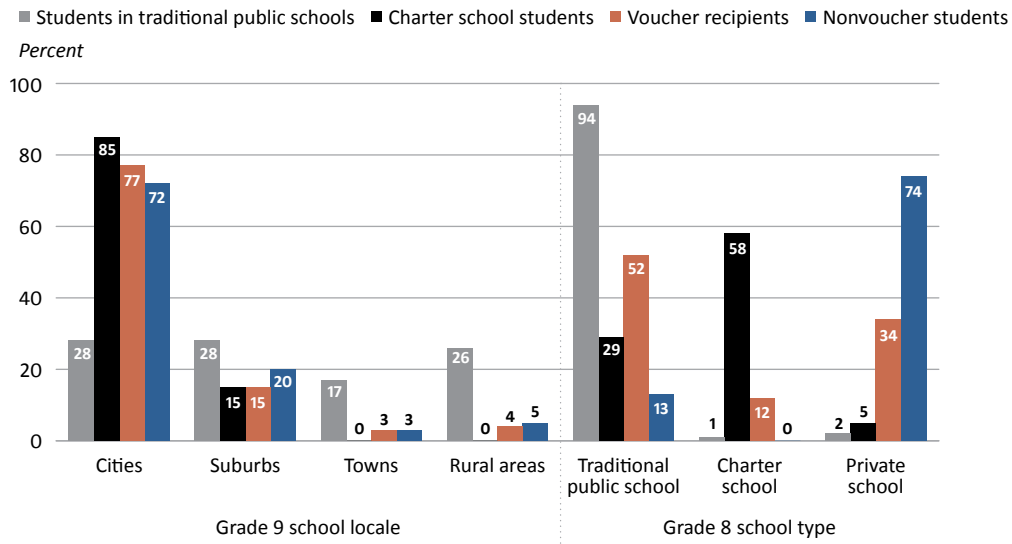
Figure 2. A higher percentage of Indiana grade 9 nonvoucher students and voucher recipients than of students in traditional public schools and charter schools had grade 8 achievement scores that met or exceeded standards, 2010/11–2013/14



Note: $n = 285,029$. See table C1 in appendix C for detailed results.

Source: Authors' calculations using data provided by the Indiana Management Performance Hub.

Figure 3. Most grade 9 charter school students and students in private voucher schools in Indiana attended schools in cities, and most students attended the same type of school in grades 8 and 9, 2010/11–2013/14



Note: $n = 285,029$. See table C1 in appendix C for detailed results. Grade 8 school type was missing for 4 percent of grade 9 students in traditional public schools, 9 percent of grade 9 students in charter schools, 2 percent of grade 9 voucher recipients, and 12 percent of grade 9 nonvoucher students. Values may not sum to 100 due to rounding.

Source: Authors' calculations using data provided by the Indiana Management Performance Hub.

Except voucher recipients, most students attended the same type of school in grades 8 and 9

The type of high school that students attended in grade 9 was generally similar to the type of school they attended in grade 8. About 94 percent of grade 9 students in traditional public schools attended a public school in grade 8 (see figure 3). About 58 percent of grade 9 charter school students attended a charter school in grade 8,

and 74 percent of grade 9 nonvoucher students attended a private school in grade 8. But only 34 percent of grade 9 voucher recipients attended a private school in grade 8. Among voucher recipients in grade 9, 52 percent attended a traditional public school in grade 8 and 12 percent attended a charter school in grade 8.

Nonvoucher students performed similarly to or better than students in traditional public schools and charter school students on most indicators of college and career readiness, after student and high school background characteristics were adjusted for, and voucher recipients performed similarly to or better than students in traditional public schools

The study examined differences in performance on 10 indicators of college and career readiness by type of high school enrollment, after student and high school background characteristics were adjusted for. Nonvoucher students performed better than students in traditional public schools on five indicators and similarly on four indicators (table 1). Nonvoucher students also performed better than charter school students on five indicators and similarly on five indicators. And nonvoucher students performed better than voucher recipients on two indicators and similarly on eight indicators.

Students in private voucher schools, regardless of whether they received a voucher, were less likely than students in traditional public schools and charter school students to ever fail a course or to ever be suspended in high school, after student and high school background characteristics were adjusted for. Voucher recipients had a

Table 1. Comparisons across type of high school enrollment on all indicators of college and career readiness

Indicator	Nonvoucher students			Voucher recipients		Charter school students
	Compared with students in traditional public schools	Compared with charter school students	Compared with voucher recipients	Compared with students in traditional public schools	Compared with charter school students	Compared with students in traditional public schools
Ever failed a course in high school	▲	▲	▲	▲	▲	▼
Ever suspended in high school	▲	▲	—	▲	▲	▼
Absent more than 15 days a year	—	▲	—	—	—	—
Took at least one Advanced Placement examination	▼	—	—	▼	▼	▼
Passed at least one Advanced Placement examination	—	—	—	—	—	▼
Took a college entrance examination	—	—	—	—	▼	▲
Graduated from high school within four years	—	▲	—	—	—	—
Earned an honors diploma in high school	▲	—	▲	—	▼	—
Enrolled in college within one year of high school graduation	▲	▲	—	▲	▲	—
Enrolled in a four-year college or university rather than a two-year college ^a	▲	—	—	▲	—	▲
Total better	5	5	2	4	3	2
Total similar	4	5	8	5	4	4
Total worse	1	0	0	1	3	4

▲: The type of high school enrollment in the top row performs better than the compared type of high school enrollment in the second row on the indicator.
 —: The two types of high school enrollment perform similarly to one another on the indicator.
 ▼: The type of high school enrollment in the top row performs worse than the compared type of high school enrollment in the second row on the indicator.

a. Among students who enrolled in an Indiana public college or university.

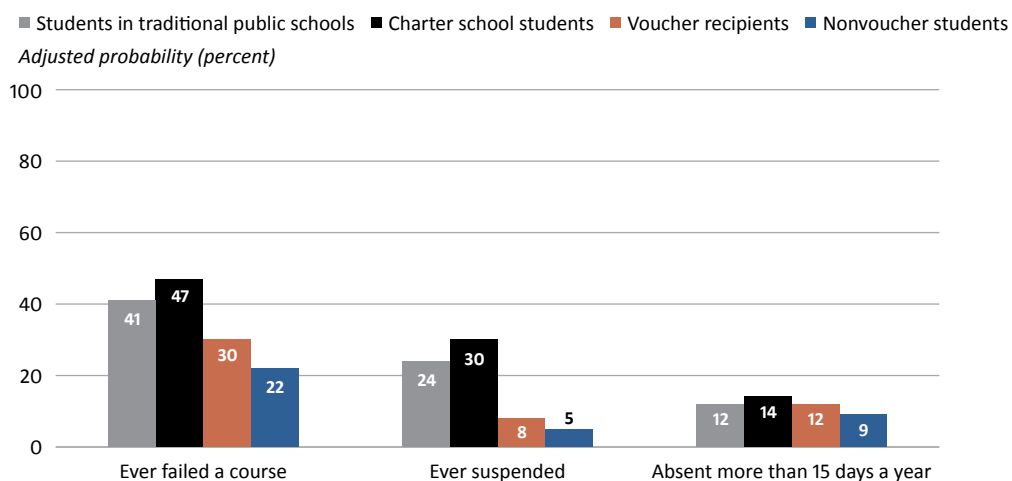
Source: Authors' compilation based on data provided by the Indiana Management Performance Hub.

30 percent probability of ever failing a course, and nonvoucher students had a 22 percent probability compared with a 41 percent probability for students in traditional public schools and a 47 percent probability for students in charter schools (figure 4). Similarly, nonvoucher students had a 5 percent probability of ever being suspended, and voucher recipients had an 8 percent probability compared with a 24 percent probability for students in traditional public schools and a 30 percent probability for charter school students. Nonvoucher students also had a lower probability of averaging more than 15 absences a year (9 percent) than charter school students (14 percent).

Students in traditional public schools were more likely than students in all other types of high school enrollment to take an Advanced Placement examination and more likely than charter school students to pass one. The findings related to taking and passing Advanced Placement examinations and taking college entrance examinations did not follow a consistent pattern. Students in traditional public schools were more likely than students in all other types of high school enrollment to take an Advanced Placement examination, and charter school students were more likely than voucher recipients to do so, after student and high school background characteristics were adjusted for. Traditional public school students had a 28 percent probability of taking at least one Advanced Placement examination in high school compared with 23 percent for charter school students, 22 percent for nonvoucher students, and 18 percent for voucher recipients (figure 5). Few students with any type of high school enrollment passed an Advanced Placement examination, but students in traditional public schools were more likely to do so (12 percent probability) than charter school students (7 percent probability). Finally, students in traditional public schools and voucher recipients were less likely than charter school students to take a college entrance examination. Students in traditional public schools and voucher recipients had a 62 percent probability of taking a college entrance examination compared with 67 percent for charter school students.

After student and high school background characteristics were adjusted for, both types of students in private voucher schools were as likely as students in traditional public schools to graduate from high school within four years, but nonvoucher students were more likely than charter school students to graduate within four years. Voucher recipients had a 93 percent probability of graduating from high school within four years, and nonvoucher students had a 94 percent probability compared with 90 percent for students in traditional public schools (figure 6). Charter school students were less likely than voucher recipients to graduate within four years, with an 89 percent probability.

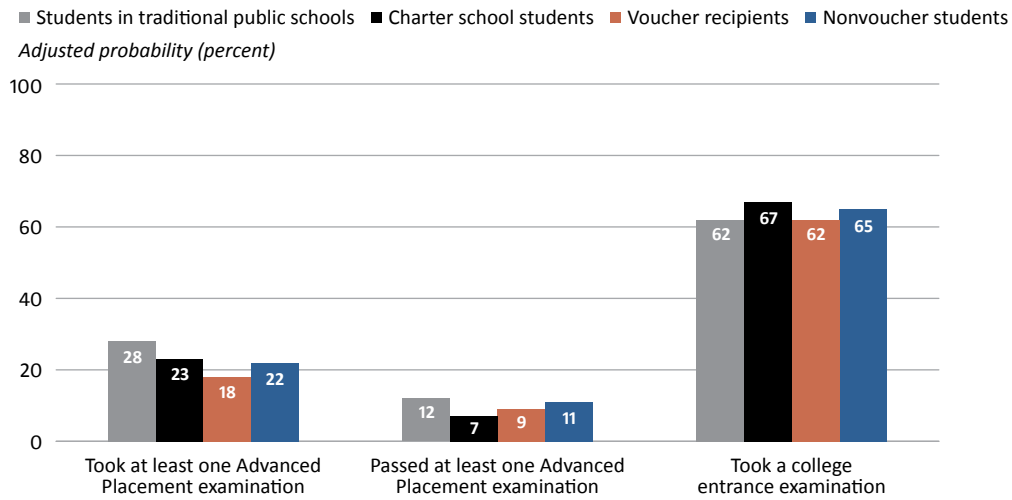
Figure 4. Students in private voucher schools in Indiana were less likely than students in traditional public schools and charter school students to ever fail a course or to ever be suspended in high school, after student and high school background characteristics were adjusted for, 2010/11–2013/14



Note: $n = 285,029$. Adjusted probabilities are predicted probabilities for each student averaged across all students in the sample, based on regressions that control for student and high school background characteristics (see appendix B for details). See tables C4 and C9 in appendix C for detailed results.

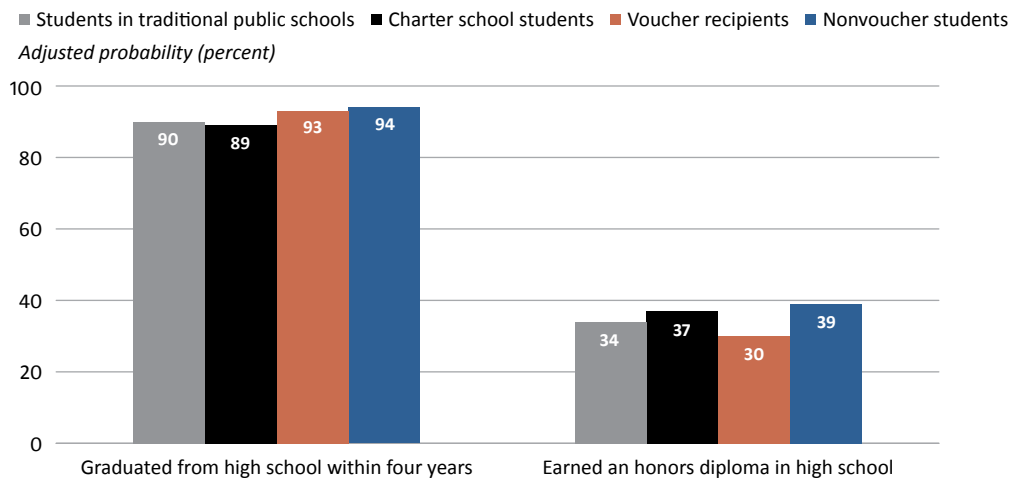
Source: Authors' calculations using data provided by the Indiana Management Performance Hub.

Figure 5. Students in traditional public schools in Indiana were more likely than students in all other types of high school enrollment to take an Advanced Placement examination and more likely than charter school students to pass one, 2010/11–2013/14



Note: $n = 285,029$. Adjusted probabilities are predicted probabilities for each student averaged across all students in the sample, based on regressions that control for student and high school background characteristics (see appendix B for details). See tables C5 and C9 in appendix C for detailed results. Source: Authors' calculations using data provided by the Indiana Management Performance Hub.

Figure 6. Both types of students in private voucher schools in Indiana were as likely as students in traditional public schools to graduate from high school within four years, but nonvoucher students were more likely than students in traditional public schools to earn an honors diploma in high school, after student and high school background characteristics were adjusted for, 2010/11–2013/14

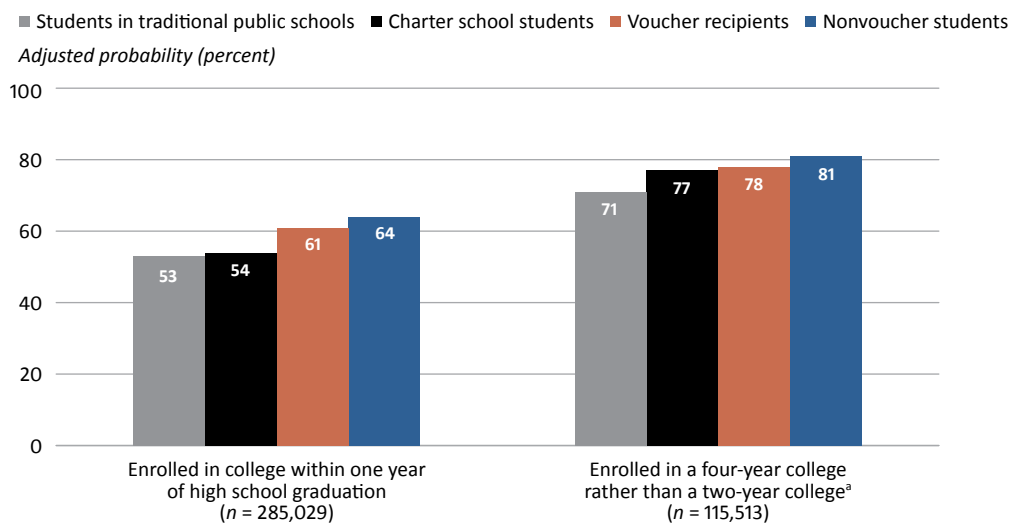


Note: $n = 285,029$. Adjusted probabilities are predicted probabilities for each student averaged across all students in the sample, based on regressions that control for student and high school background characteristics (see appendix B for details). See tables C6 and C9 in appendix C for detailed results. Source: Authors' calculations using data provided by the Indiana Management Performance Hub.

Nonvoucher students were more likely than students in traditional public schools and voucher recipients to earn an honors diploma in high school, and charter school students were more likely than voucher recipients to do so, after student and high school background characteristics were adjusted for. Nonvoucher students had a 39 percent probability of earning an honors diploma in high school, and charter school students had a 37 percent probability compared with 30 percent for voucher recipients. Nonvoucher students were also more likely to earn an honors diploma than students in traditional public schools, who had a 34 percent probability.

Both types of students in private voucher schools were more likely than students in traditional public schools to enroll in college within one year of high school graduation, and along with charter school students, were more likely than students in traditional public schools to enroll in an Indiana public four-year college rather than an Indiana public two-year college, after student and high school background characteristics were adjusted for. Students in private voucher schools were more likely to enroll in college and, for those who enrolled in an Indiana public college or university, to enroll in a four-year college rather than a two-year college within one year of expected high school graduation, after student and high school background characteristics were adjusted for. Nonvoucher students had a 64 percent probability of enrolling in college, and voucher recipients had a 61 percent probability compared with 54 percent for charter school students and 53 percent for students in traditional public schools (figure 7). Among students who enrolled in an Indiana public college or university,⁴ the probability of enrolling in a four-year college rather than a two-year college was 81 percent for nonvoucher students, 78 percent for voucher recipients, 77 percent for charter school students, and 71 percent for students in traditional public schools.

Figure 7. One year after high school graduation, both types of students in private voucher schools were more likely than students in traditional public schools and charter schools to enroll in college, and along with charter school students, were more likely than students in traditional public schools to enroll in an Indiana public four-year college rather than an Indiana public two-year college, after student and high school background characteristics were adjusted for, 2010/11–2013/14



a. Applies only to students who enrolled in an Indiana public college or university.

Note: Adjusted probabilities are predicted probabilities for each student averaged across all students in the sample, based on regressions that control for student and high school background characteristics (see appendix B for details). See tables C7 and C9 in appendix C for detailed results.

Source: Authors' calculations using data provided by the Indiana Management Performance Hub.

4. Three-fourths of students who graduated from high school within four years and enrolled in college within one year of graduation enrolled in an Indiana public college or university (see figure C2 and table C10 in appendix C).

Nonvoucher students were more likely than other students to complete all attempted credits in the first year of college and were more likely than charter school students to persist to a second year of college, after student and high school background characteristics were adjusted for

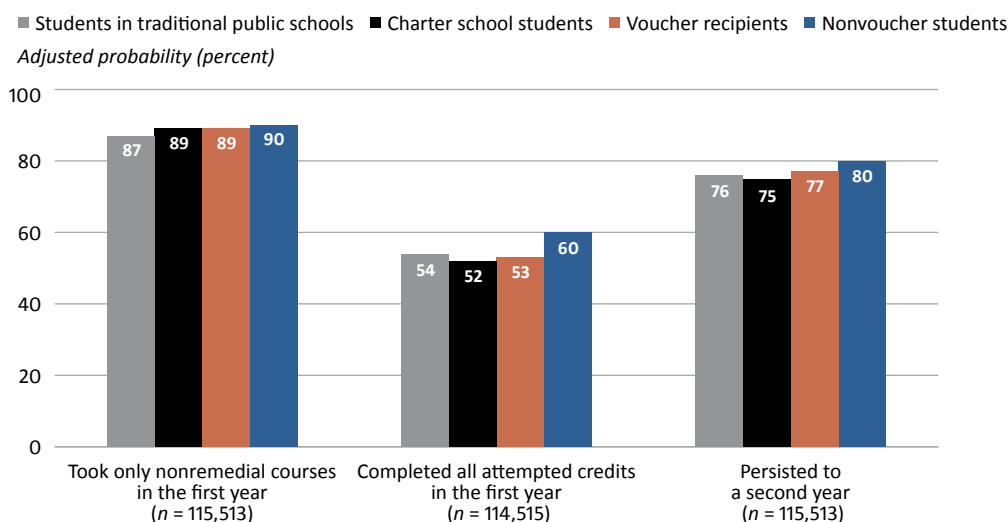
Among students who enrolled in an Indiana public college or university, nonvoucher students were more likely than students in traditional public schools, charter school students, and voucher recipients to complete all attempted credits in the first year. Nonvoucher students had a 60 percent probability of completing all attempted credits compared with 54 percent for students in traditional public schools, 52 percent for charter school students, and 53 percent for voucher recipients (figure 8). Nonvoucher students were more likely than charter school students to persist to a second year (80 percent probability compared with 75 percent probability). Finally, there were no differences in the likelihood of taking only nonremedial courses in the first year by type of high school enrollment.

Differences in outcomes by eligibility for the national school lunch program were smaller for charter school students and voucher recipients than for students in traditional public schools, after student and high school background characteristics were adjusted for

Overall, students who were not eligible for the national school lunch program performed better on indicators of college and career readiness and early college success than students who were eligible (see tables C4–C8 in appendix C). But the difference between students who were eligible and those who were not eligible was smaller for charter school students and voucher recipients than for students in traditional public schools (see tables C11–C16 in appendix C). Differences by eligibility for the national school lunch program were similar for nonvoucher students and students in traditional public schools.

For most indicators of college and career readiness and early college success for which differences by eligibility for the national school lunch program were smaller for charter school students than for other students, the

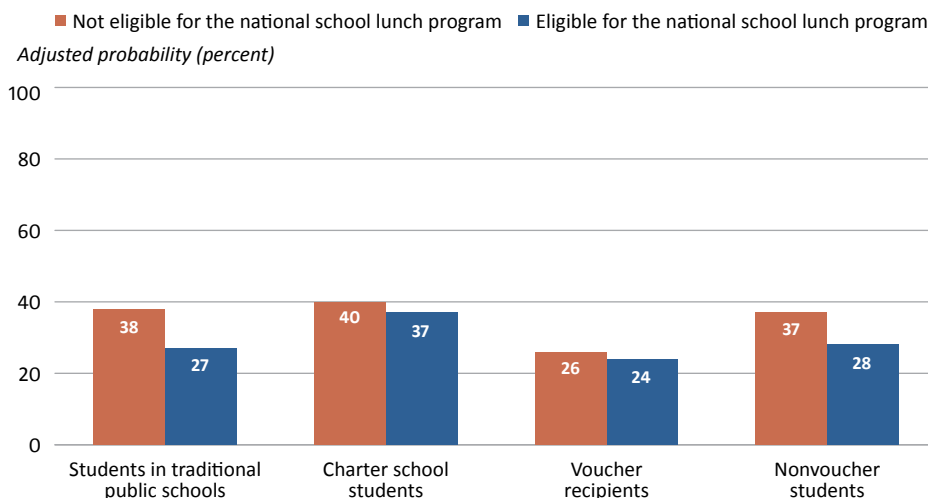
Figure 8. Among students who enrolled in an Indiana public college or university, nonvoucher students were more likely than other students to complete all attempted credits in the first year and were more likely than charter school students to persist to a second year, after student and high school background characteristics were adjusted for, 2010/11–2013/14



Note: Adjusted probabilities are predicted probabilities for each student averaged across all students in the sample, based on regressions that control for student and high school background characteristics. See appendix B for details. See tables C8 and C9 in appendix C for detailed results.

Source: Authors' calculations using data provided by the Indiana Management Performance Hub.

Figure 9. The difference in the probability of earning an honors diploma in high school between students in Indiana who were eligible for the national school lunch program and those who were not eligible was smaller for charter school students and voucher recipients than for students in traditional public schools, 2010/11–2013/14



Note: $n = 285,029$. Adjusted probabilities are predicted probabilities for each student averaged across all students in the sample, based on regressions that control for student and high school background characteristics. See appendix B for details.

Source: Authors' calculations using data provided by the Indiana Management Performance Hub.

differences were smaller because charter school students who were eligible had probabilities of success that were similar to those of charter school students who were not eligible. In other words, in charter schools both students who were eligible for the national school lunch program and those who were not eligible were doing relatively well (figure 9, on probability of earning an honors diploma in high school, illustrates this pattern). This was the case for whether students took at least one Advanced Placement examination, took a college entrance examination, earned an honors diploma in high school, or enrolled in college, but it was not the case for whether students persisted to a second year of college.

Differences in the adjusted probabilities of achieving an outcome by eligibility for the national school lunch program were smaller for voucher recipients than for other students because voucher recipients who were eligible and those who were not eligible were doing less well (see figure 9 for an illustration of this pattern). This was the case for the following indicators: whether students were absent for more than 15 days a year, took a college entrance examination, and persisted to a second year of college. The exceptions were whether students were ever suspended and whether they enrolled in college, where the difference was narrower because voucher recipients who were eligible for the national school lunch program had probabilities of success that were more similar to voucher recipients who were not eligible.

Implications

The results of this study suggest the need for future research that can generate causal evidence of the impact of type of high school enrollment on the college and career readiness and early college success of students in Indiana. The study found meaningful differences in outcomes among grade 9 students with different types of high school enrollment but could not determine whether these differences are due to the education provided in each type of school or whether students who chose each type of school differed from each other in ways that contributed to the different outcomes. The study design was meant to identify relationships between types of high school enrollment and student outcomes after adjusting for student high school background characteristics but not to establish causality.

Examples of the differences found include that students in private voucher schools who did not receive vouchers (nonvoucher students) and recipients of private school vouchers (voucher recipients) were less likely than students in traditional public schools and charter schools to ever fail a course or ever be suspended in high school and that traditional public school students were more likely than other students to take at least one Advanced Placement examination and more likely than charter school students to pass one. Although the study adjusted for many observed characteristics of students and schools, unobserved factors might have contributed to the differences in outcomes for students in each type of high school enrollment.

If future research finds that the differences in college and career readiness and early college success outcomes are caused by students' type of high school enrollment, further research could provide insights into the policies, practices, or resources that might account for different outcomes. For example, private voucher schools tend to be smaller than traditional public schools and might not be able to offer a wide selection of Advanced Placement courses, which could explain the lower probabilities of taking an Advanced Placement examination among students in private voucher schools. But private voucher schools might have smaller student–teacher ratios, allowing them to provide more personalized support to students applying to college.

Although the findings in this study are not causal, school leaders still might use its results to identify which college and career readiness and early college success outcomes to target for improvement in their type of high school. For example, students in traditional public schools and charter schools were less likely than nonvoucher students and voucher recipients to enroll in college. After identifying these outcomes, school leaders could gather or conduct causal research to identify practices that improve these outcomes. Existing causal research has shown multiple effective approaches for improving college and career readiness and early college success outcomes. For example, dual enrollment and early college high school programs have been shown to improve high school attendance, high school graduation, and college enrollment (What Works Clearinghouse, 2017). Mentoring that supports the college and financial aid application processes has also been shown to improve college enrollment on average (Carrell & Sacerdote, 2013) and for historically disadvantaged groups (Bettinger & Evans, 2019).

Leaders of private schools might want to consider strategies to improve outcomes in cases where voucher recipients had meaningfully lower probabilities of success than nonvoucher students. Voucher recipients had a 30 percent adjusted probability of ever failing a course compared with 22 percent for nonvoucher students, 30 percent probability of earning an honors diploma in high school compared with a 39 percent probability for nonvoucher students, and a 53 percent probability of completing all attempted credits in their first year of college compared with a 60 percent probability for nonvoucher students. School leaders might want to gather or conduct causal research on practices shown to support students from lower-income backgrounds that could reduce voucher recipients' probability of failing a course in high school or failing or dropping courses in their first year of college or that could increase their chances of earning an honors diploma in high school. The leaders could then decide whether to adopt those strategies in their schools as strategies for increasing voucher recipients' college and career readiness and early college success. These examples illustrate opportunities to use the study findings as a starting point for school leaders to identify potential opportunities to improve outcomes for their students.

Limitations

The study had three main limitations. First, it was not designed to provide causal estimates of the impact of different types of high school enrollment on student outcomes. Unobserved variables at the student, teacher, school, district, and community levels might influence the relationship between type of high school enrollment and student outcomes. For example, households with more financial or social capital might be more likely to enroll their children in private voucher or charter schools and might also be able to provide additional benefits to make their children more likely to be college- and career-ready and enroll in college.

Second, data were missing on at least one student and high school background characteristic for 16 percent of the sample, including 16 percent of students in traditional public schools, 23 percent of students in charter schools, 13 percent of voucher recipients, and 17 percent of nonvoucher students. Comparisons of the full sample with the analytic sample show that the analytic sample has somewhat higher achievement outcomes, with higher percentages of students taking a college entrance examination, graduating from high school within four years, earning an honors diploma in high school, and enrolling in college within one year of expected high school graduation. The difference appears particularly for students in traditional public schools and charter school students. The findings for college and career readiness indicators should be interpreted with this in mind. For example, students in private voucher schools had higher adjusted probabilities of graduating from high school within four years and enrolling in college than did students in traditional public schools. To the extent that students in private voucher schools were being compared with a higher-achieving sample of students in traditional public schools, the differences might represent a lower bound for how much more likely students in private voucher schools are to achieve success on these indicators.

Third, analyses of four-year versus two-year college enrollment and indicators of early college success are limited to students who enrolled in the state's public colleges and universities. So, the study team could not examine four-year versus two-year college enrollment or indicators of early college success for students who attended private Indiana colleges or out-of-state colleges. But the study team did have student and school characteristics for the full sample of Indiana grade 9 students, so it was able to compare the student background characteristics and types of high school enrollment of the sample of grade 9 students who later enrolled in an Indiana public college or university and the sample of Indiana grade 9 students who later enrolled in an Indiana private college or an out-of-state college. Students who enrolled in an Indiana private college or an out-of-state college were less likely than students who enrolled in an Indiana public college to be students in traditional public schools and more likely to be nonvoucher students in grade 9. They also were less likely to be eligible for the national school lunch program and more likely to exceed standards on the Indiana state assessment in math and English language arts. Their likelihoods of being female, from a racial/ethnic minority group, an English learner student, or in special education were similar (see table C10 in appendix C for more details).

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