

Estimating college enrollment rates for Virginia public high school graduates





Estimating college enrollment rates for Virginia public high school graduates

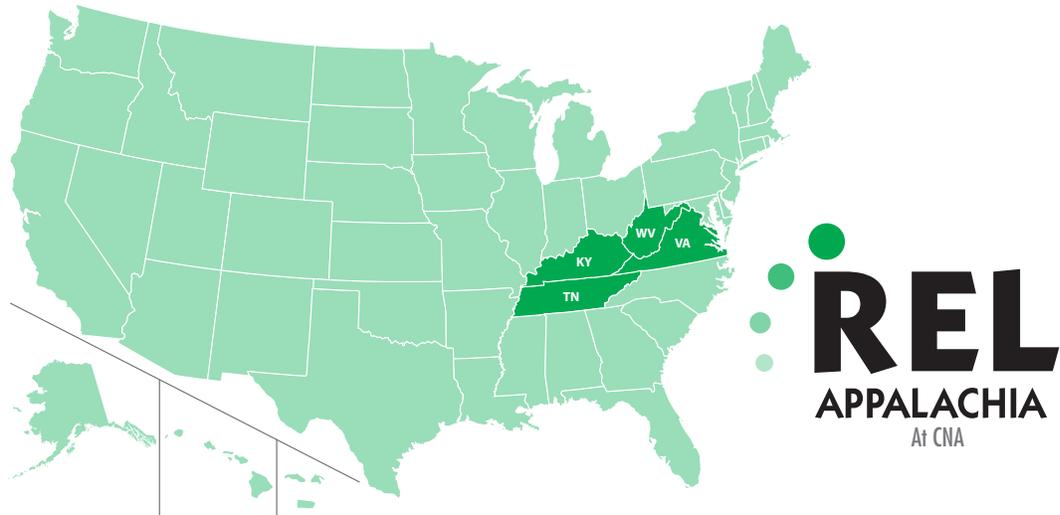
February 2011

Prepared by

**Laura Holian
CNA Education**

and

**Christine Mokher
CNA Education**



Issues & Answers is an ongoing series of reports from short-term Fast Response Projects conducted by the regional educational laboratories on current education issues of importance at local, state, and regional levels. Fast Response Project topics change to reflect new issues, as identified through lab outreach and requests for assistance from policymakers and educators at state and local levels and from communities, businesses, parents, families, and youth. All Issues & Answers reports meet Institute of Education Sciences standards for scientifically valid research.

February 2011

This report was prepared for the Institute of Education Sciences (IES) under Contract ED-06-CO-0021 by Regional Educational Laboratory Appalachia administered by CNA Education. The content of the publication does not necessarily reflect the views or policies of IES or the U.S. Department of Education nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

This report is in the public domain. While permission to reprint this publication is not necessary, it should be cited as:

Holian, L., and Mokher, C. (2011). *Estimating college enrollment rates for Virginia public high school graduates*. (Issues & Answers Report, REL 2011–No. 104). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Appalachia. Retrieved from <http://ies.ed.gov/ncee/edlabs>.

This report is available on the regional educational laboratory website at <http://ies.ed.gov/ncee/edlabs>.

Estimating college enrollment rates for Virginia public high school graduates

Using data from the National Student Clearinghouse and the Virginia Department of Education, this report examines college enrollment rates overall and by student academic and demographic characteristics for the Virginia public high school class of 2008.

College enrollment is an issue of national concern. And many states, including Virginia, use college enrollment data to understand what types of students are ready for college—to prepare them for enrollment and improve their outcomes when they get there. But historically, Virginia state and local officials have had to rely on limited information (such as the state and national average percentages of high school students who enroll in college immediately after graduation) to identify enrollment patterns. These averages can be informative, but they mask substantial demographic variation and say little about what types of students enroll.

This report uses the best available data on college enrollment from the National Student Clearinghouse (NSC) and on high school graduates from the Virginia Department of Education to disaggregate enrollment by academic characteristics (diploma type, career and technical education [CTE] completer

status, proficiency on state end-of-course assessments) and by demographic characteristics (race/ethnicity, sex, economically disadvantaged status, limited English proficiency status). It compares these data for enrollment in both two- and four-year colleges within one year of high school graduation. Cross-group differences identified in this report can serve as a benchmark for assessing rates of change over time as new data become available.

Four research questions guided this study:

- Within one year of public high school graduation (by the following June), what percentage of 2008 Virginia public high school graduates enrolled in college, and what was the split between enrollment in two- and four-year colleges?
- How do college enrollment rates vary by the academic characteristics of high school diploma type, CTE completer status, and proficiency level on end-of-course assessments in high school reading and algebra II?
- How do college enrollment rates vary by the demographic characteristics of race/ethnicity, sex, economically disadvantaged status, and limited English proficiency status?

- Do gaps in overall enrollment rates, disaggregated by demographic characteristics, narrow after controlling for the two most common diploma types in Virginia (Advanced Studies Diploma and Standard Diploma)?

The findings indicate that:

- Sixty-two percent of 2008 Virginia public high school graduates enrolled in degree-granting institutions within one year of graduation: 25 percent in two-year colleges and 37 percent in four-year colleges.
- Advanced Studies Diploma graduates had higher rates of total enrollment in two- or four-year colleges (85 percent) than did Standard Diploma graduates (46 percent).
- CTE completers and non-CTE completers had similar overall rates of enrollment, but a greater percentage of CTE completers enrolled in two-year colleges.
- Students who scored advanced proficient on end-of-course assessments in reading or algebra II had higher rates of enrollment in four-year colleges than did students who scored proficient.
- Economically disadvantaged students had lower overall rates of enrollment than did non-economically disadvantaged students.
- Limited English proficient students had lower overall rates of enrollment than did non-limited English proficient students.

- The enrollment gaps between Black and White, male and female, and economically disadvantaged and non-economically disadvantaged students narrowed for students with the same diploma type.

The findings are underestimates of actual enrollment rates. The undercount, possibly as high as 12 percentage points overall, was caused by:

- *Students enrolled in college as reported in the NSC database but not matched by the NSC algorithm to the Virginia Department of Education records on students who graduated from Virginia public high schools.* The NSC estimates the reliability of the match at approximately 90 percent overall. However, match rates may vary by demographic group.
- *Students enrolled in institutions not participating in the NSC.* The NSC database includes only 92 percent of students enrolled in U.S. colleges and 96 percent of students enrolled in Virginia colleges.
- *Students whose records were blocked.* Some colleges that report enrollment data to the NSC, and some students who attend participating schools, do not allow these data to be shared. This caused the study to lose 502 of the 86,194 Virginia graduates (0.6 percent) from an unknown number of colleges.

February 2011

TABLE OF CONTENTS

Why this study?	1
Findings	4
Percentage of high school graduates enrolled in two- or four-year colleges	5
How enrollment rates vary by academic characteristics	6
How enrollment rates vary by demographic characteristics	7
Analyzing demographic characteristics after controlling for the two most common diploma types	8
Study limitations	11
Appendix A Data sources and methodology	12
Notes	16
References	17
Boxes	
1 Key terms	2
2 Study methodology	5
Figures	
1 College continuation rates for Virginia and the United States, 1986–2006	1
2 Class of 2008 Virginia public high school graduates enrolled in a two- or four-year college within one year of graduation	5
3 Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by diploma or completer type	6
4 Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by career and technical education completer status	6
5 Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by proficiency level on the Virginia Standards of Learning grade 11 end-of-course reading assessment	7
6 Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by proficiency level on the Virginia Standards of Learning end-of-course algebra II assessment	7
7 Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by race/ethnicity	7
8 Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by sex, economically disadvantaged status, and limited English proficiency status	8
9 Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by race/ethnicity and controlling for the two most common diploma types awarded to Virginia students	9
10 Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by sex and controlling for the two most common diploma types awarded to Virginia students	9

- 11** Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by economically disadvantaged status and controlling for the two most common diploma types awarded to Virginia students 9
- 12** Class of 2008 Virginia public high school students enrolled in college within one year of high school graduation, by limited English proficiency status and controlling for the two most common diploma types awarded to Virginia students 10

Tables

- 1** College enrollment gap by demographic groups and diploma type, class of 2008 10
- A1** Ratio of National Student Clearinghouse college enrollment data to State Council of Higher Education for Virginia college enrollment data, 2009 13
- A2** Undergraduate students enrolled in college in Virginia and neighboring jurisdictions, by type of college and jurisdiction, 2009 15

Using data from the National Student Clearinghouse and the Virginia Department of Education, this report examines college enrollment rates overall and by student academic and demographic characteristics for the Virginia public high school class of 2008.

WHY THIS STUDY?

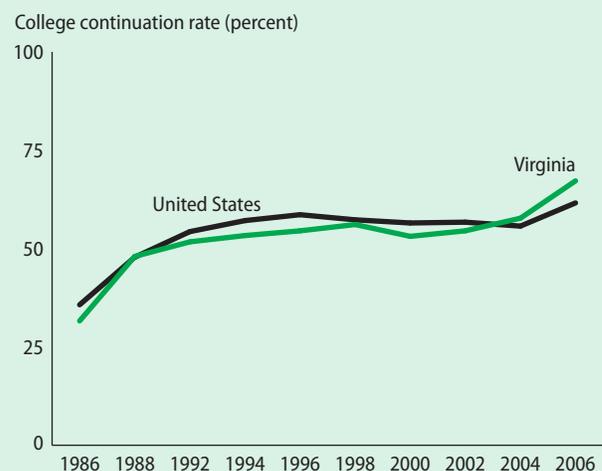
College enrollment is an issue of national concern. And many states, including Virginia, use college enrollment data to understand what types of students are ready for college—to prepare them for enrollment and improve their outcomes when they get there. But historically, Virginia state and local officials have had to rely on limited information to identify student enrollment patterns (see box 1

for definitions of key terms). For example, data indicate that the percentage of Virginia and U.S. high school graduates who enroll in college the subsequent fall (the college continuation rate) has increased over the past 20 years (figure 1).¹ While such state and national averages can be informative, they mask substantial demographic variation and say little about who enrolls in postsecondary institutions.

This report uses the best available data to describe enrollment in two- and four-year colleges in Virginia by the high school class of 2008 and to disaggregate the data by student characteristics. Cross-group differences in enrollment rates for the class of 2008 can serve as a benchmark for assessing rates of change over time as new data become available.

The report first examines college enrollment rates by academic characteristics: diploma type, career and technical education (CTE) completer status, and proficiency on state end-of-course high school assessments. At a January 2010 summit in Richmond, Virginia, then-Governor Timothy M. Kaine said, “Virginia is working to make the high school diploma signal that students are better prepared to

FIGURE 1
College continuation rates for Virginia and the United States, 1986–2006



Source: Authors' calculations based on data from Postsecondary Education Opportunity (2010).

enter college and career training than ever before” (Kaine 2010).

In informing state efforts to improve college and career readiness, it is important to know whether diploma type is associated with college enrollment. The Virginia Board of Education awards four types of high school diplomas, but most students receive either the Advanced Studies Diploma (49 percent in 2008) or the Standard Diploma (41 percent in 2008). The Advanced Studies Diploma is often considered a “college

prep” diploma, as it requires additional credits in math, science, history and social studies, and foreign language.

In addition to varying by diploma type, college enrollment rates may also differ by CTE completer status because of the emphasis on integrating academic courses and CTE programs (Castellano, Stringfield, and Stone 2003; Stone 2004). In high school, CTE consists of “a sequence of courses that provides individuals with the academic and technical knowledge and skills the

BOX 1

Key terms

Advanced Studies Diploma. One of four types of diplomas offered in Virginia. For an Advanced Studies Diploma, a student must earn at least four credits each in English, math, laboratory science, and history and social studies; three credits in foreign language; two credits in health and physical education; one credit in fine arts or career and technical education; and two credits in electives (<http://www.doe.virginia.gov/instruction/graduation/>).

Career and technical education (CTE) completer. A student who has met the requirements for a CTE concentration and all requirements for high school graduation. All CTE completers are graduates.

Certificate of Program Completion. One of three completer credentials offered in Virginia. It is conferred on students who complete prescribed programs of study defined by a local school board but do not qualify for diplomas (<http://www.doe.virginia.gov/instruction/graduation/>).

Economically disadvantaged student. A student who is eligible for free or reduced-price meals at any point during the school year, receives Temporary Assistance for Needy Families, or is eligible for Medicaid.

Enrollment rate. The percentage of high school graduates shown as enrolled in a degree-granting institution in the National Student Clearinghouse database within one year of high school graduation (by the following June).

General Education Development (GED) certificate. One of three completer credentials offered in Virginia (http://www.doe.virginia.gov/administrators/superintendents_memos/2006/inf131.html).

General Education Development (GED) as part of the Individual Student Alternative Education Plan (ISAEP). One of three completer credentials offered in Virginia. The ISAEP is designed for students ages 16–18 enrolled in high school programs who are having difficulty in a classroom environment. ISAEP programs require passing the GED tests and completing a CTE

program (http://www.doe.virginia.gov/instruction/high_school/isaep/index.shtml).

Graduates and completers. The Virginia Board of Education has approved four main high school diploma types and three types of completer credentials. Although Virginia distinguishes between graduates earning diplomas and completers earning certificates, this report considers all students earning a terminal credential as having graduated from high school.

Limited English proficiency. Describes students who are enrolled in secondary school, who were not born in the United States or whose native language is a language other than English, who come from an environment where a language other than English is dominant, and whose difficulties speaking, reading, writing, or understanding the English language may be sufficient to deny their ability to meet the state’s proficient level of achievement, their ability to achieve successfully in classrooms where the language of instruction is English, or the opportunity to participate fully in society.

BOX 1 (CONTINUED)

Key terms

Modified Standard Diploma. One of four diploma types offered in Virginia, the Modified Standard Diploma is intended for students at the secondary level who have a disability and are unlikely to meet the credit requirements of a standard diploma. Program participation is determined by the student's Individualized Education Program team and the student, when appropriate. Decisions about eligibility and participation may be made any time after grade 8. (<http://www.doe.virginia.gov/instruction/graduation/>).

Non-career and technical education (CTE) completer. Any graduate who has not met the requirements for a CTE concentration. This includes graduates who took no CTE courses

as well as those who may have taken one or two courses but did not complete a CTE concentration.

Not found enrolled in a two- or four-year college in National Student Clearinghouse (NSC) database. Students not identified as enrolled in college because they did not enroll, the institution in which they enrolled does not participate in the NSC, Virginia administrative data did not match the NSC data, or the student enrolled in a less-than-two-year college.

School division. The term Virginia uses for school district.

Special Diploma. One of four diploma types offered in Virginia, the Special

Diploma is available to students with disabilities who complete their Individualized Education Program requirements but do not meet the requirements for other diplomas (<http://www.doe.virginia.gov/instruction/graduation/>).

Standard Diploma. One of four diploma types offered in Virginia. For a Standard Diploma, a student must earn at least four credits in English; three credits each in math, laboratory science, and history and social studies; two credits in health and physical education; one credit in fine arts or career and technical education; and six credits in electives (<http://www.doe.virginia.gov/instruction/graduation/>).

individuals need to prepare for further education and for careers in current or emerging employment sectors" (U.S. Department of Education 2008, p. 1). Nationally, there is some evidence from the 1990s that the number of CTE courses completed in high school is negatively associated with college enrollment (Levesque et al. 2008). The 2006 reauthorization of the 1998 Carl D. Perkins Vocational and Technical Education Act places a new focus on academic achievement and transition to college (Carl D. Perkins Career and Technical Education Improvement Act of 2006). Its measures include developing programs that incorporate "rigorous and challenging" academic and technical skills and linking CTE programs at high schools and two-year colleges with baccalaureate degree programs at four-year colleges. It is important that CTE coordinators know the postsecondary outcomes of CTE completers and how CTE completers compare with other graduates so they can prepare students for postsecondary success.

Virginia is working to determine whether scores on the state's end-of-course assessments are indicators of college readiness—if there is an association between proficiency level on state assessments and college enrollment. For accountability, Virginia uses end-of-course assessments called the Standards of Learning, which have three levels of proficiency: fail, proficient, and advanced proficient. Students take an end-of-course reading assessment in grade 11. There are also end-of-course math assessments in algebra I, geometry, and algebra II.² Students planning to attend college are encouraged to complete algebra II in high school. An association between the proficient or advanced proficient levels and college enrollment might suggest minimum thresholds for college readiness.

Next, the report considers demographic characteristics: race/ethnicity, sex, economically disadvantaged status, and limited English proficiency status. Examining college enrollment rates by demographic characteristics could help state officials better

College enrollment rates among 2008 Virginia public high school graduates varied by student academic and demographic characteristics

understand secondary to postsecondary transitions. According to the National Center for Education Statistics *Condition of Education 2009*, the percentage of students who enroll in college the fall following high school graduation has increased by 20 percentage points over the past 35 years, but enrollment gaps remain by race/ethnicity and household income (Planty et al. 2009).³ In 2007, the national gap between enrollment rates of Black and White students was 13.9 percentage points; the gap between students from high- and low-income households was 23.2 percentage points (Planty et al. 2009). It is important to know whether this pattern holds in Virginia and whether it differs between two- and four-year colleges.

Four research questions drive the report:

- Within one year of public high school graduation (by the following June), what percentage of 2008 Virginia public high school graduates enrolled in college, and what was the split between enrollment in two- and four-year colleges?
- How do college enrollment rates vary by the academic characteristics of high school diploma type, CTE completer status, and proficiency level on end-of-course assessments in high school reading and algebra II?
- How do college enrollment rates vary by the demographic characteristics of race/ethnicity, sex, economically disadvantaged status, and limited English proficiency status?
- Do gaps in overall enrollment rates, disaggregated by demographic characteristics, narrow after controlling for the two most common diploma types (Advanced Studies Diploma and Standard Diploma)?

Though the data for this study were the most comprehensive available, they underestimate actual college enrollment by as much as 12 percentage points.

One reason is the unreliability of the National Student Clearinghouse's (NSC) matching algorithm, which attempts to match students enrolled in college with students who graduated from a public high school in Virginia. The NSC estimates the reliability of its matching algorithm at 90 percent.

Another reason is that nationwide, only 92 percent of students attend colleges that participate in the NSC. Three Virginia colleges—Christendom, Mary Baldwin, and Richard Bland—do not participate, but less than 1 percent of undergraduate students in Virginia attends one of those colleges.⁴ Across Virginia and its surrounding states, approximately 91 percent of students attend colleges that participate. Nonparticipating colleges may contribute to the undercount, but not by more than 9 percentage points.

A third reason is that some students and colleges do not allow the NSC to share their information. In this study, records were blocked for 502 of the 86,194 Virginia graduates, so all total college enrollment estimates are underestimated by 0.6 percentage points.

The study methodology is summarized in box 2 and detailed in appendix A.

FINDINGS

College enrollment varied by student academic and demographic characteristics. Advanced Studies Diploma graduates had higher rates of total enrollment in two- or four-year colleges (85 percent) than did Standard Diploma graduates (46 percent). Overall rates of enrollment were similar for CTE completers and non-CTE completers, but a greater share of CTE completers enrolled in two-year colleges and a greater share of non-CTE completers enrolled in four-year colleges. Students who scored advanced proficient on end-of-course assessments in reading or algebra II had higher rates of enrollment in four-year colleges than did students who scored proficient.

BOX 2

Study methodology

The report provides tables and figures that describe the enrollment rates of Virginia's 2008 public high school graduates in two- and four-year colleges, by student academic and demographic characteristics. The enrollment rate is the percentage of graduates enrolled in a two- or four-year college between June 2008 and June 2009 according to the National Student Clearinghouse database.

The Virginia Department of Education provided data from the following sources:

- *The National Student Clearinghouse*, on date of college enrollment, institution enrolled in, state where institution is located, and institution sector (two- or four-year).
- *The Virginia Department of Education Student Record Collection*, on school division, diploma type, career and technical education completer status, race/ethnicity, sex, economically disadvantaged status, and limited English proficient status.
- *The Virginia Department of Education Standards of Learning*, on proficiency level on the

end-of-course assessments in reading and algebra II.

The National Student Clearinghouse algorithm was used to match students enrolled in college with students who graduated from a Virginia public high school.

For students enrolled in more than one institution within one year of high school graduation, only the institution first enrolled in was counted because it represents the first secondary to postsecondary transition.

Data limitations are discussed in detail in appendix A.

Higher college enrollment rates were also associated with graduates who were Asian or female. Economically disadvantaged students had lower rates of total and four-year college enrollment than did non-economically disadvantaged students, as did limited English proficient students compared with non-limited English proficient students.

The largest college enrollment gap was found between Standard Diploma graduates and Advanced Studies Diploma graduates. This pattern remained regardless of demographic subgroup. Controlling for the two most common diploma types narrowed the enrollment gaps between racial/ethnic groups, male and female students, and economically disadvantaged and non-economically disadvantaged students.

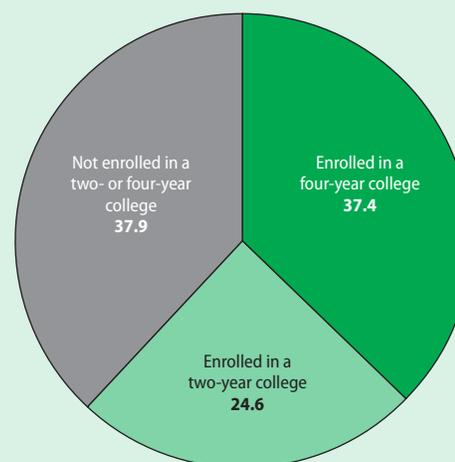
Percentage of high school graduates enrolled in two- or four-year colleges

In 2008, Virginia public high schools awarded terminal credentials to 86,194 graduates. Of these students, 62.1 percent⁵ enrolled in college within one year of graduating, and more enrolled in four-year colleges (37.4 percent) than in two-year

colleges (24.6 percent; figure 2). The 62.1 percent is consistent with, but slightly lower than, the college continuation rate estimates shown in figure 1. The graduates not found enrolled in a two- or four-year

FIGURE 2

Class of 2008 Virginia public high school graduates enrolled in a two- or four-year college within one year of graduation



Note: $n = 86,194$; percentages do not sum to 100 because of rounding.

Source: Authors' calculations based on data provided by the Virginia Department of Education (2010).

college include those enrolled in less-than-two-year colleges and those who did not enroll in any postsecondary institution.

How enrollment rates vary by academic characteristics

This section disaggregates enrollment rates by diploma type, CTE completer status, and proficiency level on state end-of-course assessments.

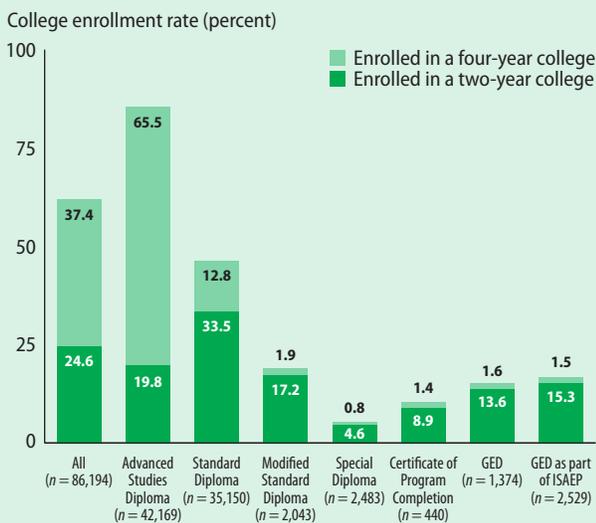
Advanced Studies Diploma graduates had higher total enrollment rates than Standard Diploma graduates. Of Advanced Studies Diploma graduates, 85.3 percent enrolled in college; of Standard Diploma graduates, 46.3 percent enrolled—a difference of 39 percentage points (figure 3). Of students enrolled in college, most Advanced Studies Diploma graduates enrolled in a four-year college, whereas most Standard Diploma graduates enrolled in a two-year college (although most Standard Diploma graduates were not enrolled in college).

CTE completers and non-CTE completers have similar overall enrollment rates, but non-CTE completers have higher enrollment rates in four-year colleges. The total enrollment rate was similar for CTE completers (61.1 percent) and non-CTE completers (62.8 percent). However, 29.0 percent of CTE completers enrolled in two-year colleges, compared with 21.6 percent of non-CTE completers (figure 4). The pattern reverses for four-year college enrollment: 32.1 percent of CTE completers enrolled in a four-year college compared with 41.2 percent of non-CTE completers.

Graduates scoring advanced proficient on state end-of-course assessments had higher college enrollment rates than lower scoring students. Of students who scored advanced proficient in reading, 79.5 percent enrolled in either a two- or four-year college within one year of graduating, compared with 55.4 percent of students who scored proficient (figure 5). Most (60.3 percent) students who scored advanced proficient enrolled in a four-year college, but less than a quarter (23.6 percent) of students who scored proficient did so.

Overall, 60.1 percent of graduates took the algebra II exam, and 54.6 percent scored proficient or advanced proficient. Of graduates who passed the

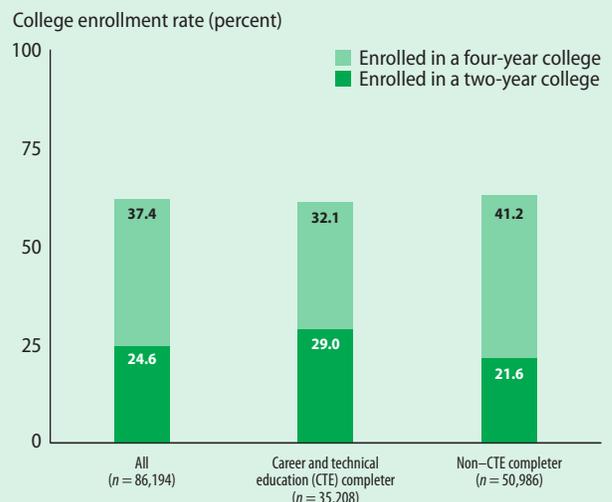
FIGURE 3
Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by diploma or completer type



Note: GED is General Education Development certificate; ISAEP is Individual Student Alternative Education Plan. The number of students with each diploma or completer credential type does not sum to the total number of students with a diploma or completer credential because one diploma type was not reported in order to protect the confidentiality of subgroups with fewer than 10 students.

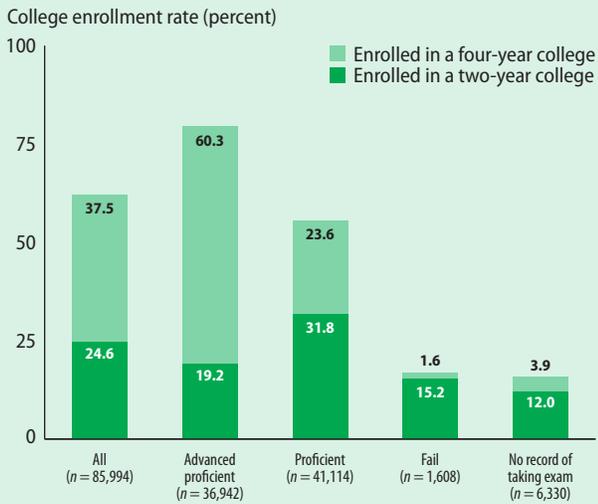
Source: Authors' calculations based on data provided by the Virginia Department of Education (2010).

FIGURE 4
Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by career and technical education completer status



Source: Authors' calculations based on data provided by the Virginia Department of Education (2010).

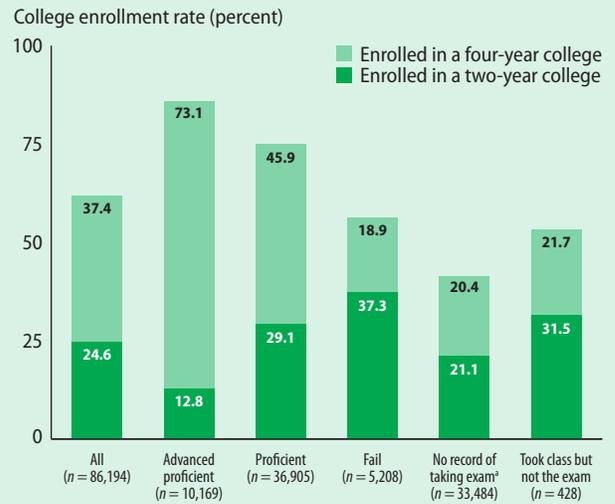
FIGURE 5
Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by proficiency level on the Virginia Standards of Learning grade 11 end-of-course reading assessment



Note: Two hundred students took the reading course but did not take the Virginia Standards of Learning assessment. The small cell sizes preclude displaying the enrollment rates for these students and reduce the sample size from 86,194 to 85,994.

Source: Authors' calculations based on data provided by the Virginia Department of Education (2010).

FIGURE 6
Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by proficiency level on the Virginia Standards of Learning end-of-course algebra II assessment



a. Approximately 39 percent of graduates had no record of taking the algebra II exam. Reasons for not having a record include never taking the course or transferring from another state.

Source: Authors' calculations based on data provided by the Virginia Department of Education (2010).

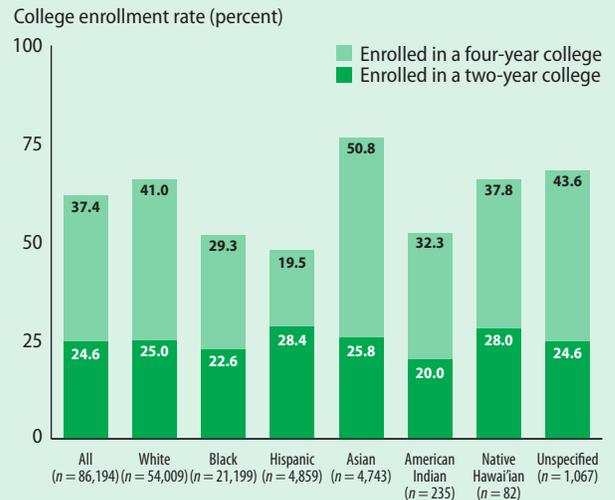
exam, 85.9 percent who scored advanced proficient and 75.0 percent who scored proficient enrolled in a two- or four-year college within one year of graduating (figure 6). Most of these graduates enrolled in four-year colleges. For students who took the course but failed the exam, the total college enrollment rate was lower (56.2 percent) than for students who passed (77.4 percent) but higher than for students who had no record of taking the course or the exam (41.5 percent).

How enrollment rates vary by demographic characteristics

This section disaggregates enrollment rates by race/ethnicity, sex, economically disadvantaged status, and limited English proficiency status.

By race/ethnicity, Asian students had the highest college enrollment rate at 76.6 percent, followed by White students at 66.0 percent (figure 7). Hispanic students had the lowest enrollment

FIGURE 7
Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by race/ethnicity



Source: Authors' calculations based on data provided by the Virginia Department of Education (2010).

rate, at 47.9 percent, followed by Black students at 51.9 percent.⁶ For all groups but Hispanic, more students enrolled in four-year institutions than in two-year institutions. (Undercounts may differ by race/ethnicity; see appendix A.)

For the three binary demographic characteristics:

- College enrollment rates were higher for female students (66.6 percent) than for male students (57.4 percent).
- College enrollment rates were higher for students who were not economically disadvantaged (66.6 percent) than for economically disadvantaged students (42.3 percent).
- College enrollment rates were higher for students who were not limited English proficient (62.7 percent) than for limited English proficient students (45.7 percent).

The differences in the four-year college enrollment rates drive the overall enrollment gaps (figure 8).

Between male and female students, there was a 1.2 percentage point difference for two-year college enrollment but an 8.0 percentage point difference for four-year college enrollment. There was no difference in the two-year college enrollment rate by economically disadvantaged status but a 24.8 percentage point difference favoring non-economically disadvantaged students in the four-year college enrollment rate. Two-year college enrollment rates differed by 4.8 percentage points between limited English proficient students and non-limited English proficient students, but four-year college enrollment rates differed by 21.8 percentage points.

Analyzing demographic characteristics after controlling for the two most common diploma types

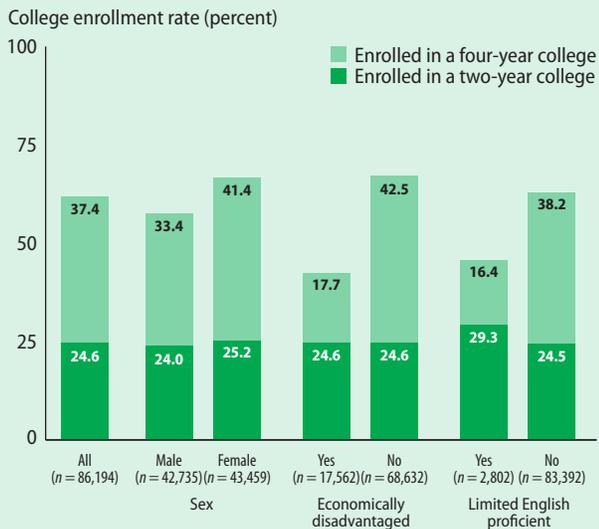
This section examines whether college enrollment gaps remain after controlling for the two most common diploma types awarded in Virginia. Nearly 90 percent of graduates earned either an Advanced Studies or Standard Diploma, so the analysis was limited to those graduates. Figures 9–12 show the results by race/ethnicity (for the four most prevalent racial/ethnic groups in the sample), sex, economically disadvantaged status, and limited English proficiency status.

The percentage point gaps in total college enrollment were calculated from figures 9–12 for demographic groups and disaggregated by the two most common diploma types (table 1).

By race/ethnicity, the overall enrollment gaps ranged from 4.0 percentage points between Black and Hispanic students to 28.0 percentage points between Asian and Hispanic students. In four of the six race/ethnicity comparisons (Asian and Black, Asian and Hispanic, White and Black, White and Hispanic), the gap was smaller after controlling for the two most common diploma types. The White and Black student college enrollment gap narrowed from 14.1 percentage points overall to 6.0 percentage points for Advanced Studies Diploma graduates and 0.7 percentage point for Standard Diploma graduates. The White

FIGURE 8

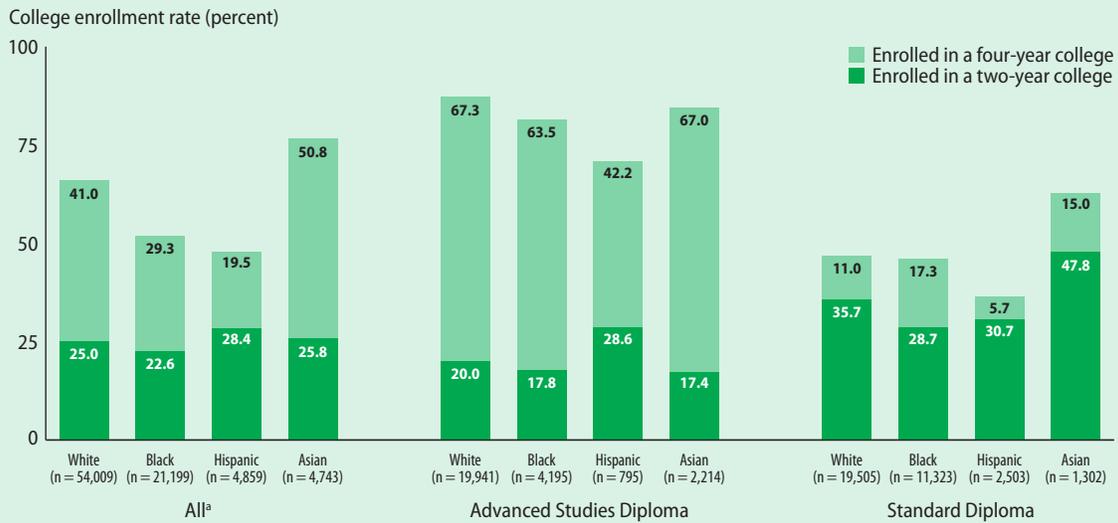
Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by sex, economically disadvantaged status, and limited English proficiency status



Source: Authors' calculations based on data provided by the Virginia Department of Education (2010).

FIGURE 9

Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by race/ethnicity and controlling for the two most common diploma types awarded to Virginia students

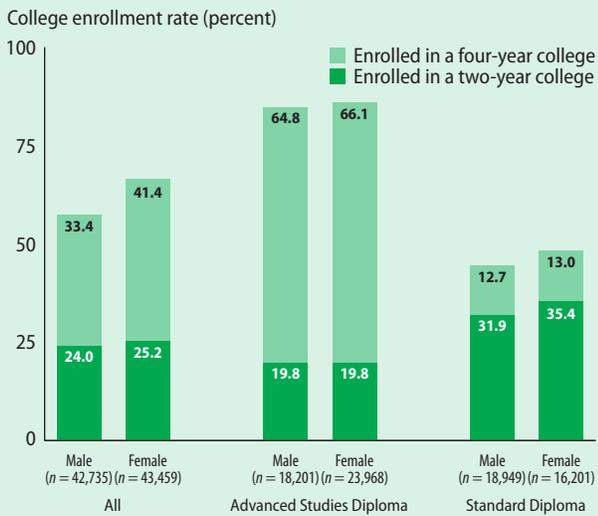


a. Includes recipients of all types of diplomas and other high school completers.

Source: Authors' calculations based on data provided by the Virginia Department of Education (2010).

FIGURE 10

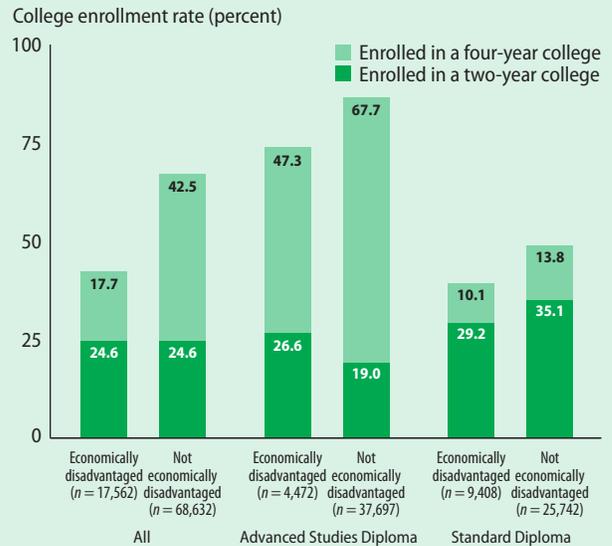
Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by sex and controlling for the two most common diploma types awarded to Virginia students



Source: Authors' calculations based on data provided by the Virginia Department of Education (2010).

FIGURE 11

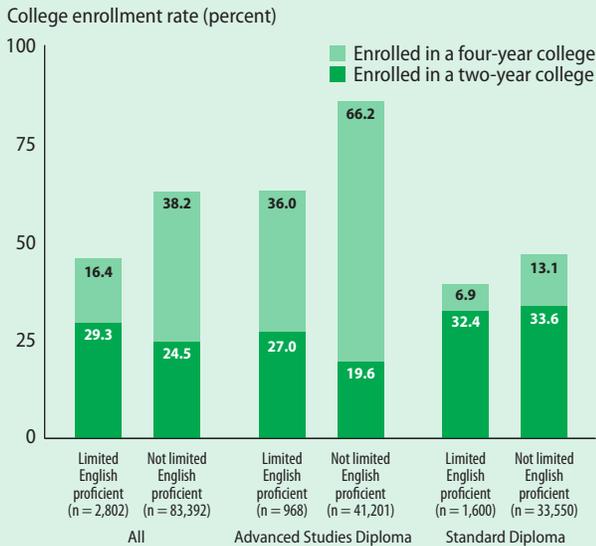
Class of 2008 Virginia public high school students enrolled in college within one year of graduation, by economically disadvantaged status and controlling for the two most common diploma types awarded to Virginia students



Source: Authors' calculations based on data provided by the Virginia Department of Education (2010).

FIGURE 12

Class of 2008 Virginia public high school students enrolled in college within one year of high school graduation, by limited English proficiency status and controlling for the two most common diploma types awarded to Virginia students



Source: Authors' calculations based on data provided by the Virginia Department of Education (2010).

and Hispanic student gap narrowed from 18.1 percentage points overall to 16.5 percentage points for Advanced Studies Diploma graduates and 10.3 percentage points for Standard Diploma graduates.

After controlling for the two most common diploma types, the overall 9.9 percentage point gap favoring Asian over White students became a 2.9 percentage point gap favoring White students for Advanced Studies Diploma graduates, but the gap favoring Asian students increased to 16.1 percentage points for Standard Diploma graduates. The college enrollment gap between Black and Hispanic students (4.0 percentage points) widened for both types of diplomas (10.5 percentage points for Advanced Studies Diploma graduates; 9.6 percentage points for Standard Diploma graduates).

For the three binary demographic characteristics:

- The overall 9.2 percentage point gap favoring female students fell to 1.3 percentage points for Advanced Studies Diploma graduates and

TABLE 1

College enrollment gap by demographic groups and diploma type, class of 2008

Comparison groups (group with higher enrollment rate listed first)	College enrollment gap (percentage points)		
	All	Advanced Studies Diploma	Standard Diploma
Asian and Black	24.0	3.1	16.8
Asian and Hispanic	28.0	13.6	26.4
White and Black	14.1	6.0	0.7
White and Hispanic	18.1	16.5	10.3
Asian and White	9.9	-2.9	16.1
Black and Hispanic	4.0	10.5	9.6
Female and male	9.2	1.3	3.8
Not economically disadvantaged and economically disadvantaged	24.8	12.8	9.6
Not limited English proficient and limited English proficient	17.0	23.0	7.4

Source: Authors' calculations based on data provided by the Virginia Department of Education (2010).

to 3.8 percentage points for Standard Diploma graduates.

- The overall 24.8 percentage point gap favoring non–economically disadvantaged students fell to 12.8 percentage points for Advanced Studies Diploma graduates and to 9.6 percentage points for Standard Diploma graduates.
- The overall 17.0 percentage point gap favoring non–limited English proficient students rose to 23.0 percentage points for Advanced Studies Diploma graduates but fell to 7.4 percentage points for Standard Diploma graduates.

STUDY LIMITATIONS

Findings in this report should be interpreted with caution because they underestimate actual college enrollment within one year of high school graduation. The sources of the bias were students enrolled in college but not matched by the NSC algorithm to the Virginia Department of Education data, students who attended institutions that

do not participate in the NSC, and students whose records were blocked. The degree of bias is unknown. (See appendix A for a more detailed description of these sources of bias.)

Caution must also be used because only the first college in which a student enrolled was examined. Students may enroll in college but drop out or transfer to another type of institution during the first year after high school graduation. For students with multiple NSC records, the record for the institution first enrolled in was used since it represents the transition the student made directly after high school. Similarly, the first college that dual enrollment students—those taking college courses while still in high school—enrolled in after high school graduation was used. This limitation affects only the analysis of enrollment disaggregated by institution sector (two- and four-year colleges), not the overall enrollment rate.

Findings should be interpreted with caution because they underestimate actual college enrollment

APPENDIX A

DATA SOURCES AND METHODOLOGY

This appendix describes the three sources of data used in the study, explains how the data were used, and addresses the methodological limitations. The data represent the universe of Virginia's public high school graduates for the class of 2008.

Data sources

Data from three sources were compiled in one file by the Virginia Department of Education:

- *The National Student Clearinghouse (NSC)*, on date of college enrollment, institution enrolled in, state where institution is located, and institution sector (two-year or four-year).
- *The Virginia Department of Education Student Record Collection*, on school division, diploma type, career and technical education completer status, race/ethnicity, sex, economically disadvantaged status, and limited English proficiency status.
- *The Virginia Department of Education Standards of Learning assessment database*, on proficiency level on the end-of-course assessments in reading and algebra II.

To protect confidentiality, Virginia Department of Education officials stripped the names and state-testing identifiers from the file and created a new research identifier for each student before releasing the data for the study.

Methodology

This report uses cross-tabulations to present information on the college enrollment rates of Virginia's 2008 public high school graduates. The enrollment rate is the percentage of graduates found in the NSC database between June 2008 and June 2009 who were enrolled in either a two- or four-year college. Tables and figures were constructed to compare enrollment rates in two- and four-year

colleges by student academic and demographic characteristics.

For students enrolled in more than one institution within one year of high school graduation, only the institution first enrolled in was considered. Students may enroll in college but transfer to another type of institution during the first year after high school graduation. To understand the scope of this phenomenon, 2008 graduates who enrolled in college but changed schools during the year were examined. Of the 53,493 graduates who enrolled in college, 973 (1.8 percent) enrolled in two or more colleges during the year and changed from a two-year to a four-year college or vice versa. Students within one year of graduating from high school more commonly switched from a four- to a two-year college (681) than from a two- to a four-year college (292). Total enrollment rates were not affected by including only the first college attended in the data.

Limitations

This study had several methodological limitations.

NSC algorithm did not find a match. The NSC matching algorithm was used to match students enrolled in college with students who graduated from a public high school in Virginia. It used student last name, student first name, date of birth, sex, race/ethnicity, and high school, but not a unique identifier such as Social Security number, so it is possible that the NSC algorithm did not return a match for some graduates. Full and partial matches were returned to the NSC, where staff reviewed all partial matches to determine whether it was due to an error in data entry (for example, if a "1" was typed instead of an "I") or in spelling. NSC staff were cautious with the matches, and if a partial match was questionable, they removed it from the data file sent back to the Virginia Department of Education. As such, the 90 percent reliability claimed by the NSC is primarily a function of false negatives (showing a student as not enrolled in college when in he or she was enrolled).

To address this limitation, the number of in-state, first-time freshmen enrolled in Virginia two-year public, four-year public, and four-year private schools, as reported by the State Council of Higher Education for Virginia (SCHEV) in 2009, was examined and compared with the NSC data (table A1). The SCHEV data include private high school graduates and students who have been out of school for more than one year, so they differ

from the NSC data but provide the closest comparison. As seen in the NSC to SCHEV ratio, the NSC estimates are closest to the SCHEV figures for public four-year colleges (0.86, compared with 0.74 for private four-year and 0.72 for public two-year colleges). The lower ratio for public two-year college could be due to delayed enrollment. National findings suggest that students who delay enrollment are more likely to enroll in two-year colleges

TABLE A1

Ratio of National Student Clearinghouse college enrollment data to State Council of Higher Education for Virginia college enrollment data, 2009

Enrollment category	Data source				Ratio of NSC data to SCHEV data
	National Student Clearinghouse (NSC)		State Council of Higher Education for Virginia (SCHEV) ^a		
	Number of 2008 graduates in-state, July 2008–June 2009	Percent within data source and college type	Number of in-state, first-time freshmen, fall 2008	Percent within data source and college type	
Public two-year college students	20,252	100.0	27,967	100.0	0.72
White	12,938	63.9	17,189	61.5	0.75
Black	4,480	22.1	6,272	22.4	0.71
Hispanic	1,332	6.6	1,798	6.4	0.74
Asian	1,191	5.9	1,478	5.3	0.81
Public four-year college students	20,576	100.0	23,889	100.0	0.86
White	14,133	68.7	14,828	62.1	0.95
Black	3,607	17.5	3,727	15.6	0.97
Hispanic	600	2.9	917	3.8	0.65
Asian	1,872	9.1	2,110	8.8	0.89
Private four-year college students	4,065	100.0	5,527	100.0	0.74
White	2,645	65.1	3,372	61.0	0.78
Black	1,167	28.7	1,423	25.7	0.82
Hispanic	129	3.2	174	3.1	0.74
Asian	79	1.9	111	2.0	0.71
All four-year college students	24,614	100.0	29,416	100.0	0.84
White	16,778	68.2	18,200	61.9	0.92
Black	4,774	19.4	5,150	17.5	0.93
Hispanic	729	3.0	1,091	3.7	0.67
Asian	1,951	7.9	2,221	7.6	0.88

a. The enrollment counts from the three colleges in Virginia that do not participate in the National Student Clearinghouse were subtracted.

Source: Authors' calculations based on data provided by SCHEV (2009) and the Virginia Department of Education (2010).

(Horn, Cataldi, and Sikora 2005). Bozick and DeLuca (2005) found that, on average, students who attend two-year schools enter college more than a year after high school graduation; students who attend four-year schools enter college within five months of graduation.

Data were then disaggregated by race/ethnicity to see whether the NSC to SCHEV ratio was similar across student subgroups and institution sectors. For public two-year colleges, the overall ratio was 0.72 (lower, at 0.71 for Black students; higher at 0.74 for Hispanic, 0.75 for White, and 0.81 for Asian students). For public four-year colleges, the overall ratio was 0.86 (lower, at 0.65 for Hispanic students; higher, at 0.89 for Asian, 0.95 for White, and 0.97 for Black students). For private four-year colleges, the overall ratio was 0.74 (lower, at 0.71 for Asian students; higher, at 0.78 for White and 0.82 for Black students). Across all four-year colleges in Virginia, the NSC to SCHEV ratio was lower for Hispanic students (0.67) than for the other racial/ethnic groups (0.88 for Asian, 0.92 for White, and 0.93 for Black students).

Not all institutions of higher education participate in NSC. The NSC data do not include all institutions of higher education: students who enrolled in institutions not participating in the NSC are not represented. The data include 92 percent of students enrolled in U.S. colleges, but the percentage varies by state, institution sector (two- or four-year), and institution control (public, private, or for-profit). The institutions not represented are primarily for-profit colleges not receiving federal funding or participating in federal reporting requirements. It is assumed that most Virginia graduates remain in-state⁷ or attend college in a nearby state. The percentage of undergraduate students represented in the NSC data at each type of institution in Virginia and neighboring jurisdictions (District of Columbia, Kentucky, Maryland

North Carolina, Tennessee, and West Virginia) is presented in table A2.

Approximately 96 percent of all undergraduate students studying in Virginia attend a two- or four-year college that reports data to the NSC. For Virginia and its neighboring jurisdictions, 91 percent of all undergraduate students attend a two- or four-year college that reports data to the NSC.

The number of 2008 Virginia public high school graduates enrolled in nonparticipating institutions is unknown. This report could have missed as much as 8 percent of students enrolled in a two- or four-year college. An analysis of NSC data on Chicago Public Schools graduates showed the undercount to be only about 3 percent, rather than 9 percent based on the 91 percent coverage of U.S. colleges (Roderick, Nagaoka, and Allensworth 2006). If similar data were available for Virginia, the undercount could be more accurately estimated.

Not all students and colleges that participate in the NSC allow sharing of information. Some colleges that report enrollment data to the NSC, and some students who attend participating schools, block these data from being shared. Students with blocked records are attending college, but their academic and demographic characteristics and whether they are at a two- or four-year college are unclear. The study lost 502 of the 86,194 Virginia graduates to blocked records, which means the overall enrollment rate is 0.6 percentage points higher than reported.

Only one year of data was analyzed. This report uses data from only the first year after high school graduation, so it cannot answer questions about ultimate enrollment, persistence, transfer, or college graduation. Rates may fluctuate from year to year.

TABLE A2

Undergraduate students enrolled in college in Virginia and neighboring jurisdictions, by type of college and jurisdiction, 2009

College type and enrollment	District of Columbia	Kentucky	Maryland	North Carolina	Tennessee	Virginia	West Virginia	All
Public four-year colleges								
Enrolled	5,137	95,575	111,267	164,762	106,653	150,491	56,333	690,218
Enrolled in NSC colleges	5,137	95,575	98,836	140,506	106,653	150,491	52,497	649,695
Percent enrolled in NSC colleges	100	100	89	85	100	100	93	94
Public two-year colleges								
Enrolled	na	92,428	122,754	208,617	76,416	162,331	19,738	682,284
Enrolled in NSC colleges	na	92,428	119,023	200,927	76,416	160,924	9,485	659,203
Percent enrolled in NSC colleges	na	100	97	96	100	99	48	97
Private four-year colleges								
Enrolled	63,195	34,662	30,251	71,046	60,068	76,492	31,220	366,934
Enrolled in NSC colleges	59,748	27,409	22,964	56,882	46,052	68,238	9,104	289,397
Percent enrolled in NSC colleges	95	79	76	80	75	89	29	79
Private two-year colleges								
Enrolled	na	5,516	2,152	2,131	9,479	7,810	1,964	29,052
Enrolled in NSC colleges	na	1,955	0	767	0	702	0	3,424
Percent enrolled in NSC colleges	na	35	0	36	0	9	0	12
All colleges								
Enrolled	68,332	228,181	266,424	446,556	252,616	397,124	109,255	1,768,488
Enrolled in NSC colleges	64,885	218,367	240,823	399,082	228,121	380,355	71,086	1,601,719
Percent enrolled in NSC colleges	95	95	90	89	90	96	65	91

na is not applicable.

Note: NSC is National Student Clearinghouse.

Source: Authors' calculations based on data from the National Student Clearinghouse (2009) and Integrated Postsecondary Education Data System (2009).

NOTES

1. Postsecondary Education Opportunity produces the estimate using fall college freshmen by state of residence as a percentage of that state's high school graduates the previous spring.
2. For simplicity of presentation, only algebra II is used in this report.
3. *Condition of Education* (Planty et al. 2009) is an annual report produced by the National Center for Education Statistics providing summary information on enrollment trends by age, student achievement in reading and math from the National Assessment of Educational Progress, annual earnings of young adults, public high school graduation rates, status dropout rates, rates of immediate transition to college, postsecondary graduation rates, and degrees earned.
4. In 2008/09, 98.7 percent of first-time freshmen were in-state at Richard Bland; 25.0 percent were in-state at Christendom; and 73.5 percent were in-state at Mary Baldwin.
5. Assuming 10 percent of graduates enroll in college but are not matched by the NSC algorithm, and 8 percent of college enrollees are not reported to the NSC because they attend nonparticipating colleges, the true overall enrollment rate is likely closer to 73.8 percent ($.621 \times 1.10 \times 1.08 = .738$) than to 62.1 percent, a difference of 11.7 percentage points.
6. Based on the calculations in appendix A, it is likely that Hispanic students had a higher false positive or failure-to-match rate between the NSC and Virginia Department of Education datasets for four-year college enrollment. Results should be interpreted with caution.
7. This assumption is based on the fact that in fall 2008, 88.5 percent of undergraduates at Virginia two-year public, four-year public, and four-year private colleges were in-state. The SCHEV E2 *Fall Headcount Enrollments* report shows 57,383 in-state, first-time freshmen at Virginia colleges in fall 2008, 66.5 percent of all 2008 public high school graduates.

REFERENCES

- Bozick, B., and DeLuca, S. (2005). Better late than never? Delayed enrollment in the high school to college transition. *Social Forces*, 84(1), 527–550.
- Bureau of Labor Statistics. (2009). *College enrollment and work activity of 2008 high school graduates*. Retrieved March 1, 2010, from www.bls.gov/news.release/pdf/hsgec.pdf.
- Carl D. Perkins Career and Technical Education Improvement Act of 2006. (2006). Pub. L. No. 109–270, 120 Stat. 683. Retrieved April 1, 2008, from http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_bills&docid=f:s250enr.txt.pdf.
- Castellano, M., Stringfield, S., and Stone III, J. R. (2003). Secondary career and technical education and comprehensive school reform: implications for research and practice. *Review of Educational Research*, 73, 231–272.
- Horn, L., Cataldi, E. F., and Sikora, A. (2005). *Waiting to attend college: undergraduates who delay their postsecondary enrollment* (NCES 2005-152). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.
- Integrated Postsecondary Education Data System. (2009). IPEDS custom data files. Retrieved September 1, 2009, from <http://nces.ed.gov/ipeds/datacenter/CDS.aspx>.
- Kaine, T. (2010, January). Governors College and Career Readiness Summit, co-sponsored by Southern Regional Education Board, Richmond, VA.
- Levesque, K., Laird, J., Hensley, E., Choy, S. P., Cataldi, E. F., and Hudson, L. (2008). *Career and technical education in the United States: 1990 to 2005* (NCES 2008-035). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.
- Planty, M., Hussar, W., Snyder, T., Kena, G., KewalRamani, A., Kemp, J., Bianco, K., and Dinkes, R. (2009). *The condition of education 2009* (NCES 2009-081). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. Retrieved March 1, 2010, from <http://nces.ed.gov/pubs2009/2009081.pdf>.
- National Student Clearinghouse. (2009). *Enrollment Verify School Participants*. Retrieved September 1, 2009, from www.studentclearinghouse.org/colleges/coreserv/docs/CoreParticipants.xls.
- Postsecondary Education Opportunity. (2010). *Chance for college by age 19, 1986–2006*. Retrieved March 26, 2010, from www.postsecondary.org/SpreadsheetsPW/State-Data/ChanceCollegeAge19.xls.
- Roderick, M., Nagaoka, J., and Allensworth, E. (2006). *From high school to the future: a first look at Chicago Public School graduates' college enrollment, college preparation, and graduation from 4-year colleges*. Chicago: Consortium on Chicago School Research at the University of Chicago.
- State Council of Higher Education for Virginia. (2009). *Fall headcount enrollments*. Retrieved September 2, 2009, from http://research.schev.edu/enrollment/public_totals.asp.
- Stone III, J. R. (2004). Math course taking for CTE concentrators: evidence from three studies of the impact of a decade of education reform. *Journal of Career and Technical Education*, 21, 49–68.
- U.S. Department of Education. (2008). *Perkins IV—frequently asked questions*. Retrieved August 19, 2009, from <http://www.ed.gov/about/offices/list/ovae/pi/cte/factsh/faq-080528.pdf>.
- Virginia Department of Education. (2010). Data file combining data from the National Student Clearinghouse, Virginia Department of Education Student Record Collection, and Virginia Department of Education Standards of Learning.