



EDUCATION COMMISSION
OF THE STATES



Advanced Placement Access and Success: How do rural schools stack up?

AUG 2017

Rural schools face many of the same challenges as inner city schools – poverty, overcrowding, limited resources – as well as additional obstacles unique to rural areas. These challenges are oftentimes obscured because, on average, rural schools are smaller and more isolated than urban and suburban schools (full definitions of rural, urban and suburban can be found in the [technical appendix](#)). But on a national scale, rural areas are significant: nearly 30 percent of all American public schools are rural, serving nearly one-fifth of all public school students.¹

URBANICITY: the concentration of population in the local geography of a high school.

The three relevant urbanicities for this report are defined as:

- **Urban:** Territory that is both inside a principal city and inside an urbanized area of 50,000 or more people.
- **Suburban:** Territory that is outside a principal city, but inside an urbanized area of 50,000 or more people.
- **Rural:** Territory that is both outside an urbanized area of 50,000 or more people and outside a cluster of towns and cities with 2,500 to 50,000 people each.

Existing within population centers containing less than 2,500 residents, rural schools struggle to attract and retain high-quality teachers.² The staffing challenges associated with geographic remoteness are compounded by shortcomings in infrastructure. For example, significant portions of rural America lack access to broadband internet,³ thereby limiting access to important learning resources. Even issues such as transportation are more complicated for students attending rural schools; for many, the long, daily commuting process takes time away from classroom learning and homework.⁴

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Despite these limitations, rural students perform well on certain key measures of school performance. Rural high school graduation rates are on par with those found among suburban students, and surpass the graduation rates of students from urban schools by nearly 10 percentage points.⁵ Yet after high school graduation, as they transition to postsecondary education, rural students fall behind their urban and suburban peers.

Data from the Department of Education's Schools and Staffing Survey indicate that in 2011, only 45 percent of high school graduates from rural schools attended four-year colleges immediately after graduating from high school, compared to 49 percent of urban high school graduates and 52 percent of suburban high school graduates.⁶ Even with the inclusion of two-year college attendance, the survey results indicate that on-time college-going rates of rural high school graduates fell short of their urban and suburban peers.⁷

The receipt of credit-granting AP scores increases the probability of earning a bachelor's degree on-time.

Accelerated learning options, which provide students the opportunity to take college courses while in high school and include programs such as Advanced Placement (AP), International Baccalaureate (IB), and dual and concurrent enrollment, are associated with higher college enrollment

and completion rates.⁸ Such programs offer the possibility of two types of benefits. First, they can help students build skills in preparation for college, which fuels their postsecondary ambitions by increasing confidence and decreasing apprehension about college attendance. Second, for students who earn college credit through these programs, they can represent a savings in both time and money in the pursuit of a postsecondary degree.

Compelling research demonstrates that the receipt of credit-granting AP scores increases an individual's probability of earning a bachelor's degree on-time.⁹ This report investigates how the availability of AP – the most widespread type of accelerated learning – has changed over time across rural, urban and suburban areas.

Methods

Urbanicity refers to the concentration of population in the local geography of a particular high school. This study examines student results from three urbanities: from least to most populous, they are rural, suburban and urban (full definitions are available in the [technical appendix](#)). Across the three urbanities, this report examines trends in four metrics:

- **Student access to AP**, defined as attending a high school where at least one AP is offered.
- **Student participation in AP exams.**
- **Student performance on AP exams.**
- **Postsecondary success for high-performing students**, defined as postsecondary enrollment and persistence of students recommended to receive college credit based on AP exam scores.¹⁰

This report examines trends in access to at least one AP, as well as access to at least one science, technology, engineering and math (STEM) AP. Prior work on this topic relied on school-level data from U.S. Department of Education datasets¹¹; this report expands on these analyses by using student-level data from the College Board to account for the relationship between school size and AP offerings.

Combining total school membership data from the U.S. Department of Education's Common Core of Data and student-level AP exam data from College Board, this report documents increasing access to and participation in the AP program over the past 15 years. It also identifies existing inequities in AP access and participation across urbanities, and provides recommendations to state policymakers for addressing such inequities.

To simplify, this report utilizes the text to highlight major findings, with data and methodology details provided in figure descriptions and in the technical appendix.

Results

Access to AP

Over the past 15 years, AP access increased for rural students, and gaps between rural students and their urban and suburban peers narrowed substantially.

Students in urban and suburban schools have nearly universal access to at least one AP, with rates near or exceeding 90 percent throughout the past 15 years.¹² A similar trend applies for access to at least one STEM AP. Rural schools, on the other hand, are still catching up in terms of providing universal student access to AP. This trend analysis shows the gap narrowing between 2001 and 2015, with AP access rates for rural high school seniors increasing from 56 percent to 73 percent for at least one AP (Figure 1), and from 42 percent to 62 percent for at least one STEM AP (Figure 2). If this rate of progress continues, rural students will soon have access to AP at the same rate as their urban and suburban peers.

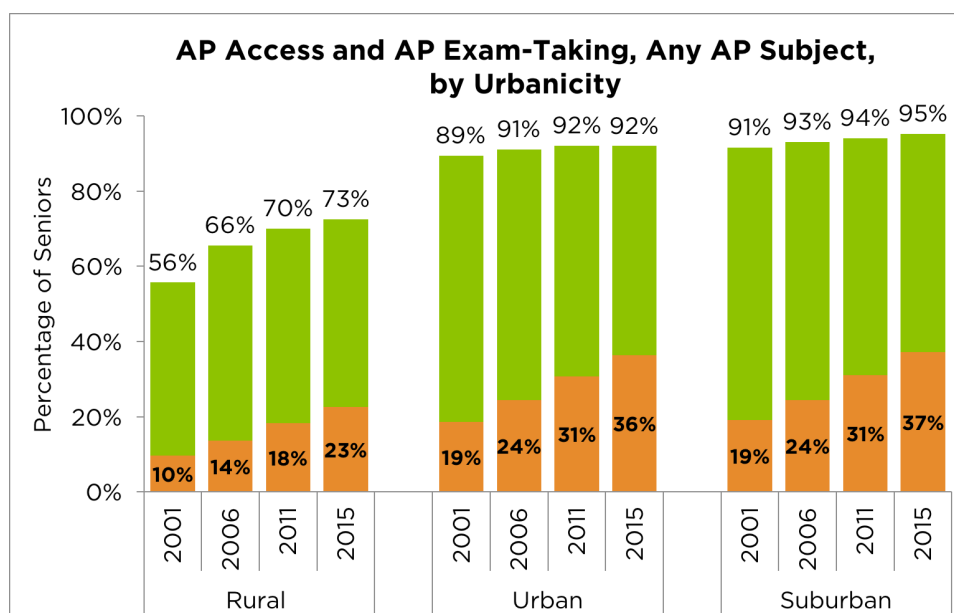


Figure 1. AP Access and AP Exam-Taking in Any AP Subject, by Urbanicity. Green bars show trends over time (2001-15) in the percentage of high school seniors in rural, suburban, and urban high schools that have access to at least one AP. Orange bars show trends over time (2001-15) in the percentage of all seniors in rural, suburban, and urban high schools who took at least one AP exam.

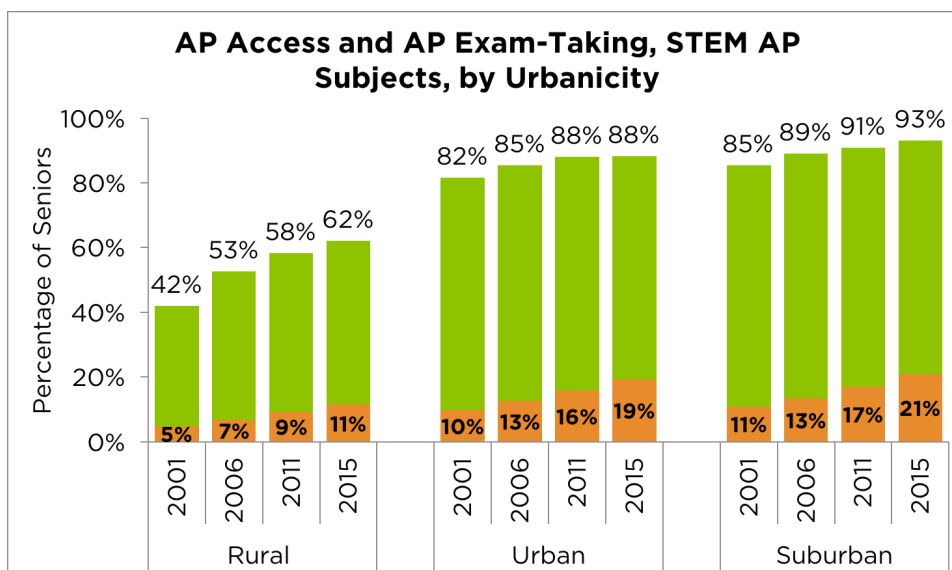


Figure 2. AP Access and AP Exam-Taking, STEM Subjects, by Urbanicity. Green bars show trends over time (2001-15) in the percent of seniors in rural, suburban and urban high schools that have access to at least one STEM AP. Orange bars show trends over time (2001-15) in the percentage of all seniors in rural, suburban and urban high schools who took at least one STEM AP exam (for a list of AP exams classified as STEM, please refer to the technical appendix).

Participation in AP

AP exam participation roughly doubled between 2001-15 for rural, urban and suburban students. While access does not mean that all students will take advantage of available AP opportunities, participation numbers are also growing: AP exam-taking rates nearly doubled across all urbanities for public high school seniors between the 2000-01 and the 2014-15 academic years. For example, the percentage of rural high school seniors who took at least one AP exam during high school increased from 10 percent in 2000-01 to 23 percent in 2014-15. Among students in urban schools, the percentage increased from 19 percent in 2000-01 to 36 percent in 2014-15 (Figure 1).

The AP participation gap between rural students and their urban and suburban peers narrows once access to coursework is considered. To create a fair comparison of AP exam-taking rates across urbanities, this report

includes adjusted numbers to limit the analysis to only high schools offering AP. Although data do not indicate which students enrolled in AP, prior College Board research indicates that approximately 70-80 percent of students taking AP ultimately will take the exam.

After making this correction, the analysis showed near parity in exam-taking rates for urban and suburban students, but lower exam-taking rates overall for rural students. For example, in 2015, only 31 percent of rural high school seniors attending a high school offering at least one AP ended up taking at least one AP exam, compared to 40 percent and 39 percent of urban and suburban students respectively (Table 1). Rates for STEM AP exam-taking trended in the same direction, although the differences between urbanities were less striking there (Table 2).

Table 1: AP Exam-Taking Among Students with Access to AP, 2015 Cohort

Urbanicity	Percent of <u>all seniors</u> who had <u>access to at least 1 AP</u> in 2014-15	Percent of <u>all seniors</u> who <u>took at least 1 AP exam</u> in 2014-15	Percent of <u>seniors with access to at least 1 AP</u> in 2014-15 who <u>took at least 1 AP exam</u> in 2014-15
Rural	73%	23%	31%
Urban	92%	36%	40%
Suburban	95%	37%	39%

Table 2: STEM AP Exam-Taking Among Students with Access to STEM AP, 2015 Cohort

Urbanicity	Percent of <u>all seniors</u> who had <u>access to at least 1 STEM AP</u> in 2014-15	Percent of <u>all seniors</u> who <u>took at least 1 AP STEM exam</u> in 2014-15	Percent of <u>seniors with access to at least 1 STEM AP</u> in 2014-15 who <u>took at least 1 STEM AP exam</u> in 2014-15
Rural	62%	11%	18%
Urban	88%	19%	22%
Suburban	93%	21%	22%

Performance on AP Exams

Although rural AP exam-takers continue to lag their urban and suburban peers in terms of exam volume and performance, more than half (53 percent) of seniors in the 2015 cohort received a passing AP score in 2014-15. This percentage has remained about the same since 2001 (54 percent), even as participation has expanded.

Students who take an AP exam receive a standardized score of 1, 2, 3, 4 or 5, with 5 indicating the highest level of performance. A score of 3 indicates a student demonstrated subject proficiency worthy of credit or placement into a higher-level college course, while a score of 5 signifies a student is extremely well qualified for such credit or placement. Scores of 3 or higher are often accepted by postsecondary institutions for college credit, and are thus considered a college-credit-level score.

The data show that across urbanities, more than half of the students who take an AP exam receive a college-credit-level score on at least one exam. However, this analysis also shows some variations by urbanicity; specifically, rural AP exam-taking students appear less likely to meet this benchmark than their urban and suburban peers. The data in this report demonstrate that, on average, while two-thirds of suburban AP examinees from the 2015 cohort earned at least one college-credit-level score, slightly more than half of rural and urban AP examinees achieved this metric (Figure 3).

AP examinees in rural areas take fewer AP exams, providing them fewer opportunities to earn at least one college-credit-level score.

Yet this data point – earning a college-credit-level score on at least one exam among AP exam-takers – actually reflects two trends: the average AP exam scores for students and the average number of AP exams per student. Students who take more AP exams would increase their opportunities to earn a college-credit-level score on at least one of those exams. Therefore, this report disaggregates these two factors to examine their separate effects.

The data show that, on average, rural students score lower on AP exams overall than their urban and suburban counterparts, although these differences are less dramatic than differences in the average number of exams students take. In both urban and suburban schools, AP examinees took an average of 3.4 exams by high school graduation. In rural schools, this number stood at 2.6 (Figure 3). Similar patterns exist for AP STEM exams (Figure 4). The fact that AP examinees in rural areas take fewer AP exams means that fewer opportunities exist for them to earn at least one credit-granting score. Increasing AP access and participation for academically prepared rural students could help level the playing field on this comparison.

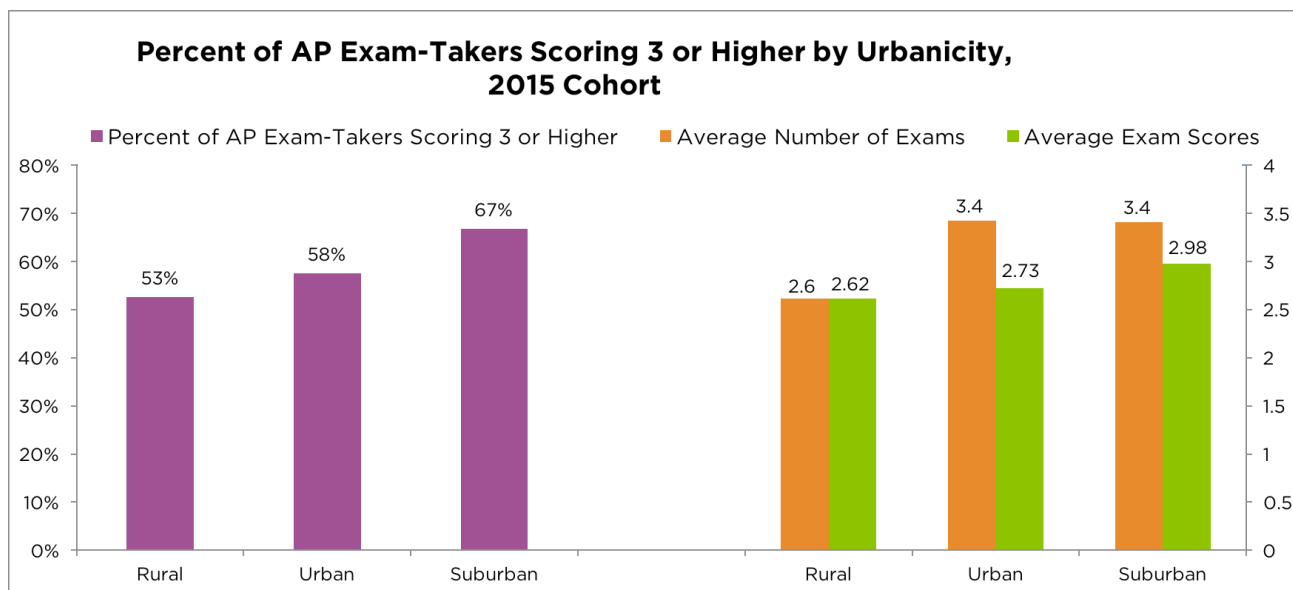


Figure 3. Percent of AP Exam-Takers Scoring 3 or Higher by Urbanicity, 2015 Cohort. Purple bars show, of all AP exam-taking students who were high school seniors during the 2014-15 school year, the total percentage who earned a 3 or higher on at least one AP exam, broken out by urbanicity (rural, urban and suburban). Orange bars show the average number of AP exams taken per AP exam-taking student; green bars show the average exam score across all AP exams taken.

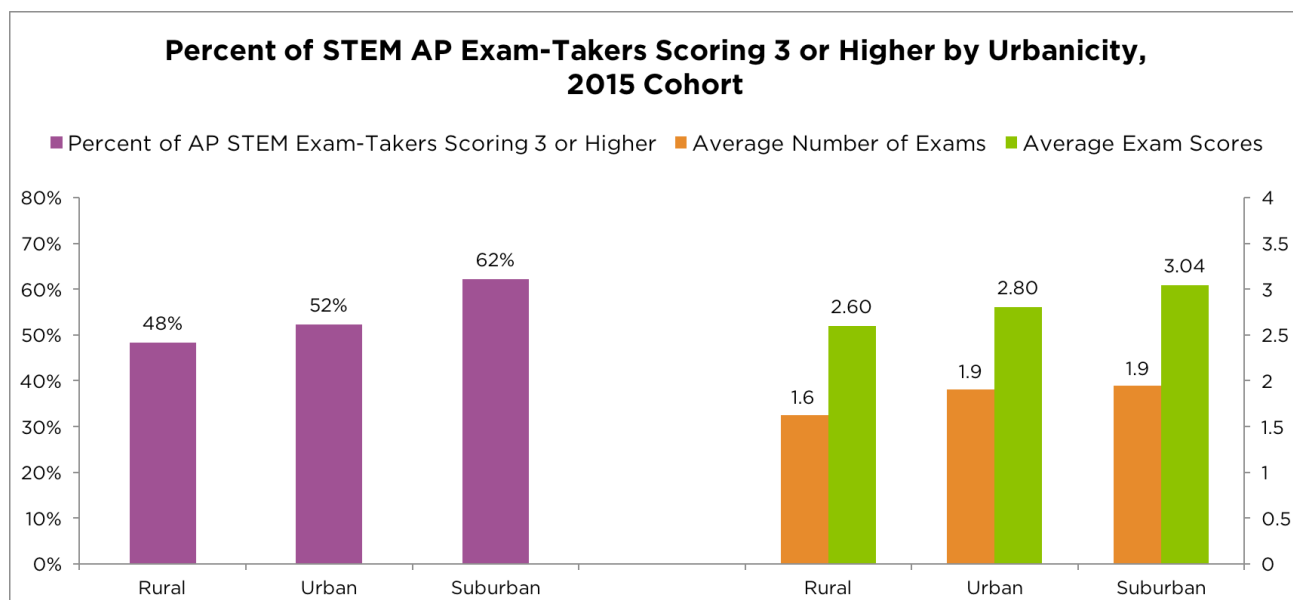


Figure 4. Percent of STEM AP Exam-Takers Scoring 3 or Higher by Urbanicity, 2015 Cohort. Purple bars show, of all STEM AP exam-taking students who were high school seniors during the 2014-15 school year, the total percentage who earned a 3 or higher on at least one STEM AP exam, broken out by urbanicity (rural, urban and suburban). Orange bars show the average number of STEM AP exams taken per STEM AP exam-taking student; green bars show the average exam score across all STEM AP exams taken.

Postsecondary Success of High-Performing AP Students

High-performing rural students equal their peers in postsecondary success. The goal of participating in accelerated learning options such as AP is not merely to achieve a high AP score, but also to translate this success into post-high school endeavors. Therefore, this final analysis examines the trajectories of high-performing students - those who earned a college-credit-level score on at least one AP exam - across urbanicities. Two metrics - enrollment in two-year or four-year postsecondary education following high school graduation, and retention of enrolled students to the second year of postsecondary education - are used to track post-high school success.

Across all three urbanicities, high-performing students demonstrate extremely high postsecondary enrollment rates (90 percent or greater) and retention rates (85

High-performing students across all urbanicities demonstrate extremely high postsecondary enrollment and retention rates.

percent or greater) (Figure 5) compared with national college-going rates (69 percent)¹³ and retention rates (61 percent).¹⁴ In addition, a significant majority of high-achieving AP examinees across all three urbanicities enroll in four-year colleges. These results indicate that earning a college-credit-level score on at least one AP exam is not only a measure of high achievement in high school, but also predictive of enrollment and retention in postsecondary education, regardless of the originating urbanicity of that high-performing student.

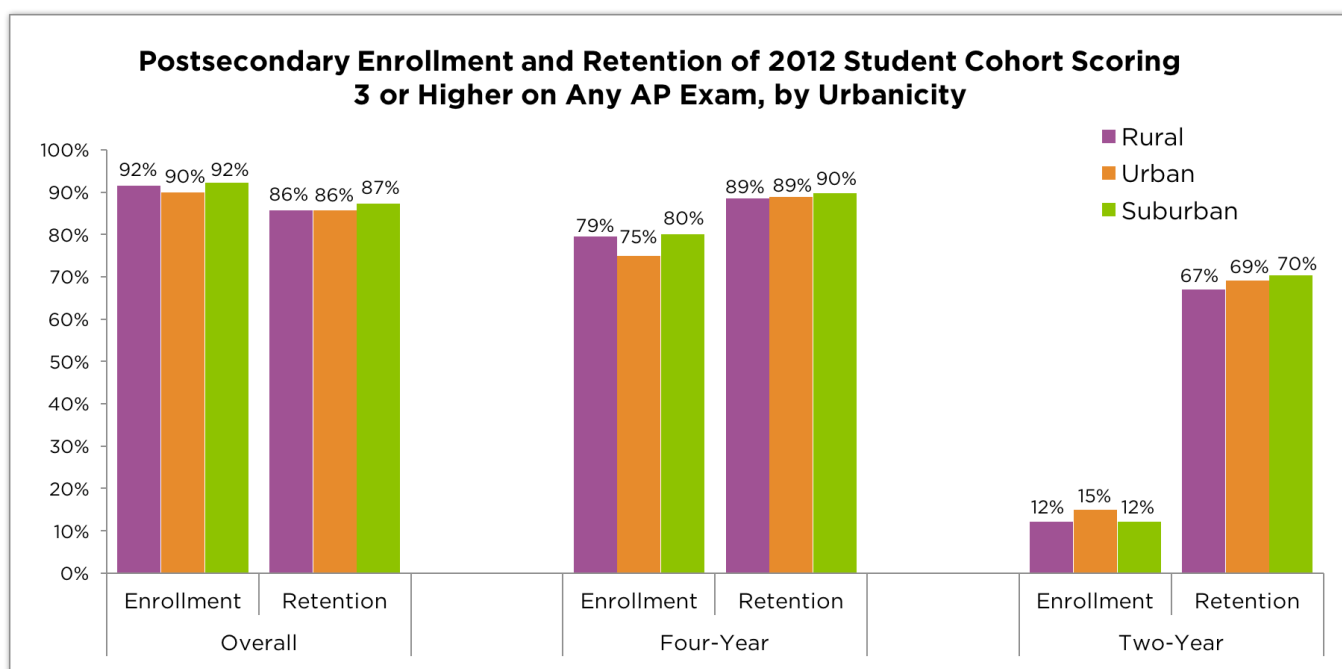


Figure 5. Postsecondary Enrollment and Retention of 2012 Student Cohort Scoring 3 or Higher on Any AP Exam, by Urbanicity. Bars on the left show, of all AP exam-taking students who were high school seniors during the 2011-12 school year and scored 3 or higher on at least one AP exam, the percentage who enrolled in postsecondary education after high school. Bars on the right show, for the same cohort of students, the percentage who remained enrolled in the same postsecondary institution for a second year.

State Policy Implications: Closing the opportunity gap in rural districts

Comparisons of student access, participation, performance, and success in AP programs across urbanities reveal specific challenges for rural schools. Despite the growing rates of AP opportunities in rural high schools, students in rural areas remain less likely to attend a high school offering AP than their urban and suburban counterparts. Unlike rural high schools, urban and suburban high schools have already achieved nearly universal access to AP for their students. Given the lagging college-going rates of rural students, and the potential of AP participation to improve those rates, it is certainly a laudable goal to increase the AP opportunities available to rural students.

State policy considering and prioritizing the specific needs of rural schools can play a clear role in addressing the rural AP opportunity gap.

State policy considering and prioritizing the specific needs of rural schools can play a clear role in addressing the rural AP opportunity gap. The April 2016 Education Commission of the States' report, "[Advanced Placement:](#)

[Model policy components](#)," outlines 11 policy actions states can take to improve AP access and success. Several of these actions would particularly help increase rural student access; for instance, states might follow the lead of **Arkansas, Indiana** and **South Carolina** to mandate that all public high schools offer at least one AP.

States can also use financial support to increase AP access in rural schools. For instance, some states chose to provide support for the development and delivery of virtual AP courses. States offering such courses should ensure that the students they seek to reach will have the required technology access – an infrastructure issue that particularly challenges rural areas. Alternately, states might choose to provide support for teacher training and professional development so that rural schools can support the development of local AP teacher leaders; 25 states currently make funding available for teachers to attend AP training. Finally, states could include accountability incentives to all public schools for AP participation and success.

The AP program provides students with the opportunity to experience rigorous coursework and earn college credit while still in high school. As such, expanding opportunity for students to participate in AP can serve as one option for state policymakers looking to encourage more students to pursue postsecondary credentials.

Technical Appendix: Study Methodology

Data Sources

The analyses in this report draw from three primary data sources:

1. College Board data on AP exam-takers.
2. National Student Clearinghouse (NSC) data on college enrollment and retention.
3. High school level data from the U.S. Department of Education's Common Core of Data (CCD).

Advanced Placement Exams Classified as STEM

Math & Computer Science:

[AP Calculus AB](#)

[AP Calculus BC](#)

[AP Computer Science A](#)

[AP Statistics](#)

AP Computer Science AB (last administered in May 2009)

Sciences:

[AP Biology](#)

[AP Chemistry](#)

[AP Environmental Science](#)

[AP Physics C: Electricity and Magnetism](#)

[AP Physics C: Mechanics](#)

[AP Physics 1: Algebra-Based](#)

[AP Physics 2: Algebra-Based](#)

Physics B (last administered in May 2014; Physics 1 and 2 replaced Physics B in May 2015)

Urbanicity¹⁵

This report uses the determination from CCD 2013-14 to classify high schools as rural, urban, or suburban. The National Center for Education Statistics (NCES) divides locale codes into four main types (city, suburb, town, and rural) and three subtypes within each main type (large, midsize, and small for city and suburb locale types; fringe, distant, and remote for town and rural locale types). This analysis consolidates the subtypes.

The three relevant categories for this report are defined as:

- Urban: Territory inside a principal city and inside an urbanized area of 50,000 or more people.
- Suburban: Territory outside a principal city and inside an urbanized area of 50,000 or more people.
- Rural: Territory outside an urbanized area of 50,000 or more people and outside a cluster of towns and cities with 2,500 to 50,000 people each.

AP Access

The AP access metric in this brief shows the fraction of seniors who attended a high school where students had the opportunity to take an AP course. The methodology uses an N of five exams in a subject as an indication that the school provides access to AP. In a small number of instances, this may mean that the school offers AP exams to their students but, because of low student numbers or a school's curricular preference, may not offer actual AP courses.

Postsecondary Enrollment and AP Participation

College Board data are merged with NSC data to show postsecondary enrollment and retention of AP exam-takers in the high school graduating cohort of 2012. For the purposes of this analysis, enrollment indicates that the student enrolled in postsecondary education at some point between high school graduation (2012) and fall 2015, and retention indicates continued enrollment at the same postsecondary institution for two consecutive academic years.

Using data on the high schools attended among AP exam-takers, this report calculates the total number of AP exam-takers at each high school for each graduating cohort. These aggregated data are then merged to 12th grade enrollment data in the matched cohort from the

2000-01 through 2013-14 administrations of the CCD to calculate the fraction of seniors at each high school who participated in the AP program.

For example, to calculate the fraction of students at a given high school from the 2009 cohort who participated in AP, the number of AP exam-takers from that high school's 2009 cohort is divided by 12th-grade enrollment data from the 2008-09 CCD. At the time of analysis, the CCD data were not available for academic year 2014-15, so 2013-14 is used as a proxy.

AP Scoring

The College Board database contains students' AP exam scores on the 1-5 integer scale for the 2001-2015 high school graduation cohorts, where a score of 1

indicates that the American Council on Education offers no recommendation for college credit, and a score of 5 indicates that a student is extremely well qualified for college credits in the relevant subject. The student-level AP data also identify the high schools where students are enrolled.

High School Sampling

To ensure that this report tracks trends within high schools, analyses are restricted to public schools enrolling at least one senior in each graduating cohort from 2001-2014. Tables 1 and 2 show the sampling frame of these analyses against the universe of high schools from the CCD. For the 2001 cohort, the sampled rural high schools cover 90 percent of rural seniors; that estimate drops to 82 percent for the 2014 cohort.

Appendix Table: Sampled Schools and CCD Universe, by Urbanicity							
		CCD Universe		Sampled Schools		% of Schools Sampled	% of Seniors Sampled
		Schools	Seniors	Schools	Seniors		
Rural	2001	8,106	572,106	6,453	516,793	80%	90%
	2014	8,289	642,852	6,453	527,850	78%	82%
Urban	2001	4,142	798,917	2,420	662,427	58%	83%
	2014	5,834	1,018,602	2,420	718,700	41%	71%
Suburban	2001	4,925	1,093,872	3,736	1,008,398	76%	92%
	2014	6,161	1,428,374	3,736	1,141,882	61%	80%
Town	2001	3,195	390,886	2,443	360,470	76%	92%
	2014	3,511	398,962	2,443	358,761	70%	90%
Total	2001	20,368	2,855,781	15,052	2,548,088	74%	89%
	2014	23,795	3,488,790	15,052	2,747,193	63%	79%

Notes: Sampled high schools have at least one senior in each year from 2000-01 through 2013-14 and have College Board codes that allow for linkage across organizations. The universe is the total count of schools with at least one senior in the specified CCD year. Urbanicity is taken from the 2013-14 CCD, and if unavailable, comes from the 2000-01 CCD.

ENDNOTES

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2. Jerry M. Lowe, "Rural Education: Attracting and Retaining Teachers in Small Schools," *Rural Educator* vol. 27, no. 2 (2006); Paul T. Hill, "If America Neglects Its Rural Schools, Nobody Wins," *Real Clear Education*, 2016, http://www.realcleareducation.com/articles/2016/02/12/if_america_neglects_its_rural_schools_nobody_wins_1261.html (accessed February 14, 2017).
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