

Advanced Placement Opportunities and Success in Boston Charter and District Schools: A Demographic Report

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Executive Summary

Massachusetts' students receive accolades for strong performance on international tests, one indicator that many of the Commonwealth's schools do an excellent job of helping students achieve. Massachusetts' charter public schools, particularly in Boston, also receive attention for the strong results that their students, a majority of whom are low-income and minority, achieve on standardized examinations.

But one area of academic achievement that receives less attention is the rate at which students in different high schools take and pass Advanced Placement examinations and courses. Likewise, in the debate about whether to lift the cap on charter public schools in Massachusetts, rates of college readiness and college-going among charter and district school graduates have received ample attention, but AP course taking and passing rates are rarely discussed.

Whether students take and succeed in AP courses and on AP examinations can be one important indicator of the rigor of a school's offerings (at least for some students). It can also be an indicator of the extent to which schools are truly helping students prepare for and persist in college. Furthermore, when schools serve large populations of disadvantaged students, exposure to AP courses and AP course and exam passing rates can be indicators of whether students have equitable access to material that will prepare them for and even allow them to get ahead in college.

This paper gives a brief description of the AP program. It compares AP course taking and AP course and exam passing rates in Boston Public Schools and Boston's charter schools. Where relevant, BPS data are disaggregated to show results for Boston Public Schools' traditional and exam schools. Students "test in" to Boston's prestigious exam schools; as a result, these schools serve a select population of very high-achieving students. Moreover, Boston's exam schools are not reflective of the student population that BPS or Boston's charter schools serve.

We find that students in Boston's exam schools take and pass AP courses and examinations at higher rates than their counterparts at BPS and Boston's charter schools. In fact, Boston's exam schools account for a comparatively high percentage of the AP courses and exams taken and passed by BPS students: When data on Boston's exam schools are disaggregated from overall data for Boston Public Schools, it becomes clear that the rates at which BPS students take AP courses, and how many take and pass AP tests are comparatively low. Students

in Boston's charter schools, which are demographically more similar to their peers in BPS non-exam schools, take and pass AP courses and exams at higher rates than their district school peers.

Introduction

Massachusetts is known for having high educational standards, a strong accountability system, and effective public schools. In recent years, the Commonwealth has garnered attention for strong student performance on many different standardized tests, including the National Assessment of Educational Progress (NAEP), the Program for International Student Assessment (PISA), and the Trends in International Math and Science Survey (TIMSS).

Although U.S. students, on average, achieve mediocre results on international examinations such as the PISA and TIMSS, when test reports separate out Massachusetts students, they score on par with the top countries in the world. On the 2012 PISA, for example, Massachusetts's students ranked ninth

in the world in math and fifth in the world in reading. On the 2011 TIMSS, they scored second only to students from Singapore on global measures of science competency.¹

Some attribute these achievements to the "high expectations" that the Commonwealth has set for students, beginning with the landmark Massachusetts Education Reform Act (MERA) of 1993.² The MERA requires that all teachers teach to a set of minimum competencies on which students are tested (previously known as the Massachusetts Curriculum Frameworks). It also requires that students sit for standardized examinations that test their knowledge of those frameworks various times throughout elementary and middle school and at least once (in the 10th grade) to graduate from high school.

But even with high standards and the success that some have derived from them, the Commonwealth acknowledges that it has a long way to go in closing persistent achievement gaps between low-income and black and Latino youth and their wealthier, white counterparts. Those gaps have narrowed in the past decade, but they still exist.³ Moreover, the Commonwealth recognizes that these gaps in achievement too often stem from gaps in opportunity: low-income black and Hispanic students are over-represented in some of Massachusetts' poorest performing school districts, where schools struggle to

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attract and retain the most talented teachers and where funding for additional programming that may help close opportunity gaps can be scarce.⁴

Not surprisingly, it is in the largest of these struggling districts, those with the greatest concentrations of black and Hispanic students such as Boston and Springfield, where demand for charter public schools is also comparatively high. In Boston, for example, the state lists 10,308 unique students on charter school waitlists in 2016.⁵ This demand speaks not only to dissatisfaction with some struggling district schools but also to the perception (and reality) that some charter public schools in these cities provide students with different and sometimes better opportunities.

There is ample evidence to support the claim that charter schools in Boston are particularly good at closing opportunity and achievement gaps. A 2013 Center for Research on Educational Outcomes (CREDO) study found that Boston charter school students outperform their district peers by more than .34 standard deviations in reading and .36 standard deviations in math. This translates into an additional 12 months of learning in reading and 13 months in math each school year, as compared to charter students' "virtual twins" in the sending district's schools (Boston).⁶

Another study from The Massachusetts Institute of Technology (MIT) finds that growing numbers of students with special needs in charter schools, including English language learners, have a test score advantage over their peers in the sending district. The results of this study are of particular note, because the study avoids selection bias by comparing charter students to those who applied to charter school lotteries but did not win.⁷

The Department of Elementary and Secondary Education (DESE) also publishes data on college acceptance and college-going rates for charter school and district students. Using these publicly available data, a 2013 study used the lottery approach described above to ascertain whether Boston charter school attendance affects the likelihood of college attendance. While the results of the study are not conclusive due to the small sample of charter students who had reached college-going age at the time it was performed, they suggest that attending a Boston charter school "increases the likelihood of college attendance" and "shifts" students to four-year public universities, as opposed to two-year college programs.⁸

These data are all very impressive for charter schools. But one area of charter school performance that has been less

frequently explored is Advanced Placement. In the past decade, an increasing number of public schools in Massachusetts, including charter public schools, have begun to offer and in some cases require that students enroll in AP courses. Consequently, more students across the Commonwealth have been sitting for AP examinations.

Conceived by the College Board in the 1950s, the AP program is one of only a handful of options for exposing students to college content while they're still in high school.⁹ Students who take and pass AP courses and tests may have an advantage in college admissions, be able to skip basic college courses, or earn college credit early. While research on the effects of AP course- and test-taking on college admission and graduation is mixed, a growing number of recent studies suggest positive impacts for many students.¹⁰

Given that charter schools in Massachusetts and in Boston in particular have received so much attention for strong academic results, it is compelling to consider whether the achievement of these students on state examinations and international examinations translates positively in other contexts, such as AP.

The following paper provides general information on the Advanced Placement program in the United States and in Massachusetts and discusses some of the research literature on the impacts of participating in Advanced Placement. It goes on to provide basic data on AP course taking, test taking, and passing rates for charter school students and their peers in sending

districts in two of the communities with the highest charter school enrollment in the Commonwealth. Unless otherwise indicated, all data presented below are based on the authors' calculations of data publicly available from the Department of Elementary and Secondary Education (DESE).

In our examination of AP course taking, test taking and passing rates, we find that charter schools do a better job than their non-exam Boston Public School counterparts at providing traditionally underserved students with access to AP. We also find that charters do a better job than their non-exam BPS counterparts of helping traditionally underserved students pass AP tests.

The paper concludes with some reflections on AP access and equity in Massachusetts and the relationship between charter public school opportunities and AP. It also includes recommendations for how all schools, public and charter alike, can think about and take advantage of AP opportunities.

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Advanced Placement in Context

The Advanced Placement (AP) program dates to the 1950s, though at the time it was not widely available to high school students but “concentrated in well-to-do high schools.”¹¹ In recent decades, the program has gained in popularity and expanded throughout the U.S: “by 2009-2010,” 71 percent of all U.S. public high schools had students participating in the AP program, and these schools enrolled 91 percent of public high school students.”¹²

AP courses and examinations are overseen by the College Board and are available in 30 subjects, comprised of English, science, and math subject matter as well as history, art, and world culture. Course materials and examinations are designed with college faculty advisors in each subject area. The goal of AP is to expose advanced high school students to college-level content and give them the opportunity to show mastery of that content on a standardized examination. At some colleges and universities, high scores on AP examinations enable students to “place out” of introductory courses or to earn college credit from their AP courses.¹³

The availability of AP programs in high schools does not mean that all students take advantage of the offering, however. Furthermore, students who take AP courses may choose not to sit for AP exams, and not all students who take AP exams will score high enough to place out of college-level content. Thus, not only the availability of AP courses but also the way in which the courses are used and their impact on college attendance has been the subject of a fair amount of research.

Skeptics suggest that AP courses and examinations do not represent the rigorous material students encounter at elite universities. Some studies find that the skeptics are correct. A 2004¹⁴ study found that “the number of AP courses taken by a student” is unrelated to freshman college GPA, after controlling for socioeconomic status. A 2010¹⁵ study found that time in AP courses did not reduce the time it took for students to graduate from college. Reacting to these studies and others (and, some suggest, an effort to avoid revenue lost when students “pass out” of courses), some very selective universities have stopped granting credit for AP exams.¹⁶

A slightly larger body of research on AP courses and examinations has found positive impacts. According to Warne et. al in their 2015 review of the AP literature¹⁷:

Students who take AP exams are more likely to enroll in a four-year college, earn higher grade point averages, and earn a bachelor’s degree and subsequent higher income than non-AP students. There is also an increased likelihood of obtaining an advanced degree for students who have successfully completed AP courses.

It is important to note that many studies do not only evaluate AP participation. They evaluate *course participation and success* on AP exams. To pass a test corresponding to an AP course, students must receive a score of 3,4, or 5. In a 2010 study Sadler, Sonnert, Tai, and Klopfenstein found that students who passed AP science tests earned higher grades in introductory level college science courses than their peers who took the AP course but did not take or did not pass the AP test.¹⁸ These findings did not hold true in all science courses, however. Again in 2010, Sadler and Sonnert found that some non-AP students obtained the same grades in chemistry and physics as their peers who had passed the AP examination.¹⁹

Emphasizing these positive findings about AP, the College Board has made a concerted effort to make AP courses available in more schools, to enroll higher numbers of students in AP courses, and to increase the number of students taking AP exams connected to each course. By some measures, it has been successful. In its “2014 AP Report to the Nation” The College Board states that between 2003 and 2013 the “number of students who have been given access to the opportunity of AP” has doubled.²⁰ And as it has tried to increase access for all U.S. students, the College Board has also paid particular attention to the number of poor and minority students who have access to and take AP exams and courses.

The opportunity gap in AP access has long mirrored the opportunity gap that poor and minority students experience more generally: as recently as 2003, only 11 percent of AP test takers were low-income and even fewer were minorities. Although the “number of low-income graduates” with access

TABLE 1: AP Participation and Results for Black and Hispanic Students, US and Massachusetts, 2013

	Black			Hispanic		
	% of graduating class	% of test takers	% of tests passed	% of graduating class	% of test takers	% of tests passed
US	14.5%	9.2%	4.6%	18.8%	18.8%	16.9%
MASS	8.3%	5.7%	3.2%	11.7%	7.9%	6.0%

to AP quadrupled between 2003 and 2013, access to AP for black students in particular remains low. In 2013, though black students comprised 14.5 percent of the overall graduating class, they comprised only 9.2 percent of the AP exam taker population and 4.6 percent of the exam takers scoring 3 or higher (a passing grade) on AP exams.²¹ The national news is only slightly better for Hispanic students.

These national data about AP and minority students are sobering and beg important questions for Massachusetts. First, what does AP access and participation look like in the Commonwealth? Second, if opportunity and achievement gaps for low-income and minority students are closing based on MCAS results, is the same narrowing of these gaps reflected in access to and success in AP courses?

Overall, Massachusetts has seen great gains in recent years both in the “percentage of graduating seniors who took at least one AP exam and in the percentage who scored at least a 3 on the exam’s 5-point scale.” In 2015, roughly 45 percent of the state’s graduating seniors had taken at least one AP exam and 31.5 percent of the “class of 2015 scored 3 or higher.” The scores of the 2015 graduating class helped Massachusetts “place second in the nation behind Maryland in terms of the percentage of the class of 2015 who scored a 3 or higher...”²²

Data also reveal that the Commonwealth has made some progress in helping low-income and minority students to access AP courses and exams. According to a DESE²³ press release on College Board Data:

In 2005, 9.5 percent of Massachusetts’ black high school graduates took at least one AP exam; in 2015, 35.2 percent did. In 2005, 3.4 percent of black high school graduates scored at least 3 on one or more AP exams; in 2015, 13.5 percent did.

DESE notes that in 2015 Hispanic and Latino students saw similar gains, both in terms of the number of students taking AP exams and the number of students who passed. Low-income students, in general, did not see remarkable gains, but take and pass the AP exams at “almost the same rate (22 percent) of all students nationally (22.4 percent).”²⁴

As positive as these results are for Massachusetts, they still show a gap in AP participation, test taking, and passing rates based on race and socioeconomic status. The narrowing of the gap since 2005 is encouraging, but there is still work to be done to ensure AP equity for all students.

Some states that receive high “equity” marks from the College Board require that all high schools offer at least one AP

course—West Virginia requires all schools to offer at least four AP courses or the International Baccalaureate (an advanced program alternative to AP).²⁵ Moreover, whether a state provides financial support and incentives to students, or includes AP availability and participation as part of its accountability system, can make a great deal of difference in AP participation rates.

Massachusetts does not mandate AP offerings or hold schools accountable for them. But the Commonwealth does collect and publicize school-level AP data, provide scholarship incentives for AP test takers, and subsidize low-income students who wish to take AP examinations, which can be expensive for many families. These are important steps toward closing the AP opportunity gap.

Interestingly, although the state does not mandate that students participate in AP, individual schools may. Some charter schools that serve disproportionate numbers of low-income and minority students, are implementing “AP for All” policies and/or requiring that students take at least one AP course before graduation.²⁶

Given the impacts (cited above) that charter public schools in Massachusetts, and particularly in Boston, have on student outcomes and college attendance rates, it is interesting to compare AP access and

passing rates in charter and district schools. If charters are providing access to AP and helping students pass AP tests at comparatively high rates, than they could be a key part of the effort to close the AP equity gap in Massachusetts.

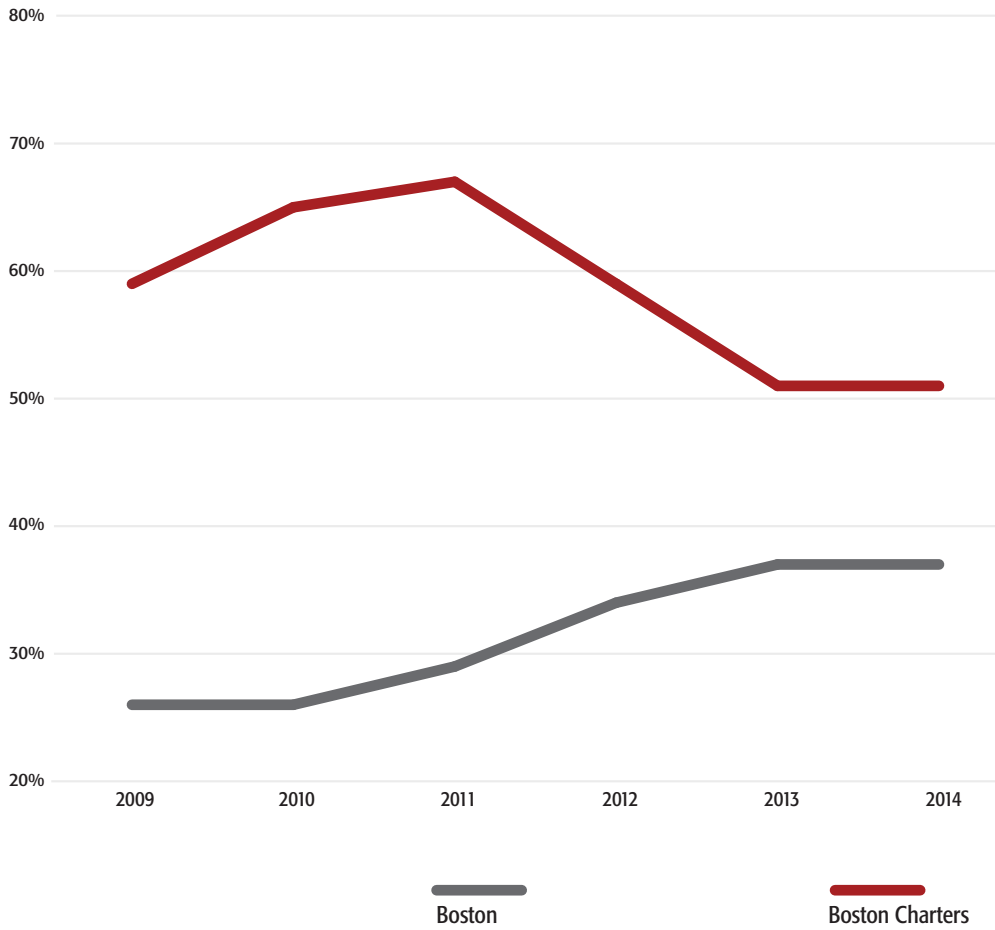
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Advanced Placement in Boston Charters and Boston Public Schools

A straightforward way to ascertain differences in AP opportunities for charter and district students in Massachusetts is to look at the cities with the greatest concentrations of charters. Among those cities, Boston offers a compelling point of comparison because, as discussed above, its charters have been lauded for helping students achieve excellent MCAS results and college acceptance rates.

The graph on the next page shows the total number of AP test takers in BPS and Boston charters divided by 11th and 12th grade enrollment in BPS and Boston charters. We use only the 11th and 12th grades to provide a general picture of AP test taking in BPS and Boston charters. Students can take AP tests in 10th grade, but comparatively few students do.

GRAPH 1: AP Test Takers / Grades 11 & 12 Enrollment



The graph above shows that Boston charters have a higher percentage of test takers but that test taking in BPS has risen since 2009, narrowing the gap. What this graph does not take into account, however, is the disproportionate number of AP test takers in the district who attend one of Boston’s selective exam schools. Students are admitted to Boston’s charter schools via a lottery. This makes the charter enrollment process similar to traditional Boston public high schools, where high school students can choose among any city-wide high school option and are admitted via lottery if the school(s) they choose are over-subscribed.²⁷ The city’s three exam schools, however, admit students based on test scores: only students with top grades and top scores on the Independent School Entrance Exam are admitted.²⁸ To compare all public schools (charters included) to schools where only advanced students are admitted is inherently biased.

A better comparison, therefore, considers the total number of AP test takers divided by grades 11 and 12 enrollment in Boston charter schools and BPS non-exam schools. While it

is important to point out that this method does not control for potential selection bias (more “capable” students applying to charter school lotteries), other studies, cited above, that do control for selection bias in charter school achievement show that it is not a factor.²⁹

When the exam schools are removed from our calculations, the charter advantage in AP test taking is even clearer. In 2015-16, in Boston’s charter schools roughly 51 percent of eligible³⁰ students took one or more AP exam. In Boston’s non-exam district high schools, 18 percent of students took one or more AP exam. When one considers that 91 percent of eligible students took at least one AP exam in Boston’s three exam schools, it becomes clear that a disproportionate number of AP test takers come from these schools. As these schools are also disproportionately white and higher income compared to traditional BPS schools and Boston charters, there are also implications for equity—the population of AP test takers in BPS is disproportionately white and not low-income.

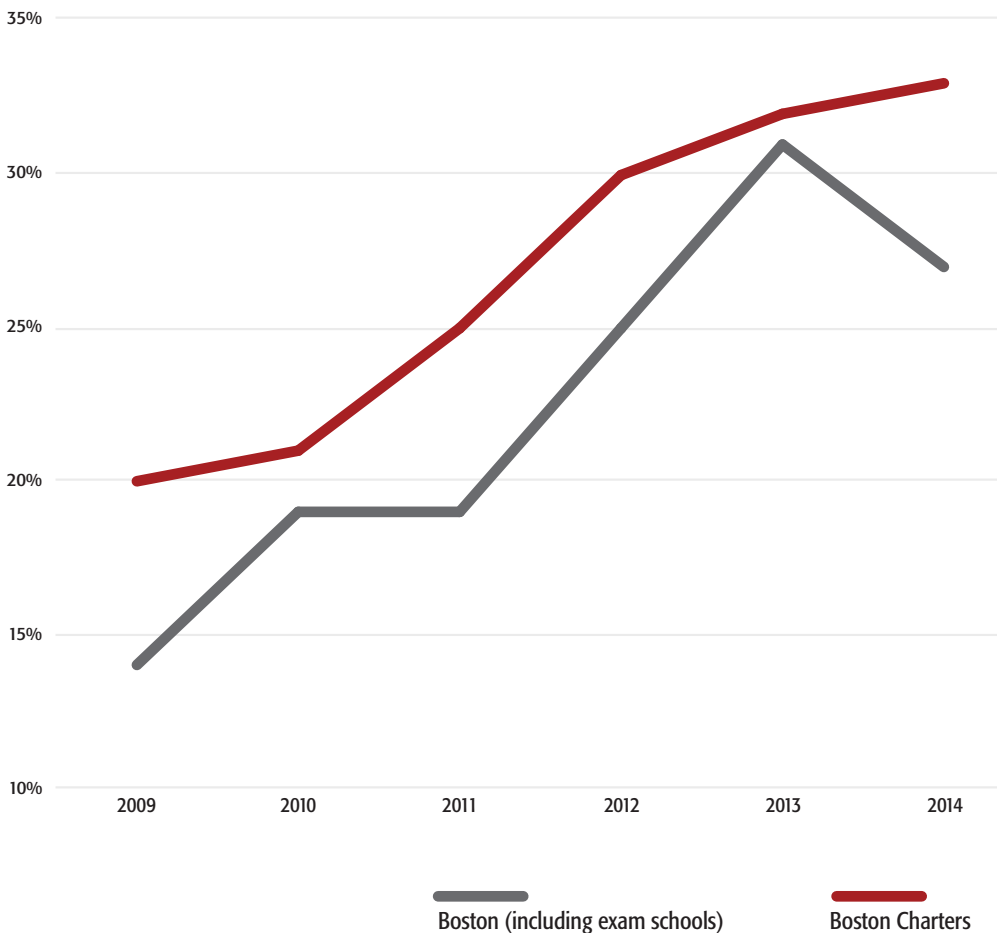
TABLE 2: 2015-16 Demographic Data, Boston Charter, Traditional, and Exam Schools

	Boston Charters	Boston Public Schools (non-exam)	Boston Exam Schools
Black	53%	32%	20%
Hispanic	35%	42%	20%
White	8%	14%	32%
Economically Disadvantaged	43%	49%	27%

Given the type of students they serve, Boston’s charter high schools are giving more minority and low-income students access to AP courses and exams than their district counterparts. Data from the 2012-2013 school year show that in Boston’s charter high schools 48 percent of black upperclassmen and 42 percent of Latino upperclassmen took one or more AP exams. “By contrast, in Boston’s non-exam district high schools 16 percent of black upperclassmen and 22 percent of Latino upperclassmen took one or more AP exams.³¹ (The authors could not calculate more recent figures, as DESE does not publish enrollment data by grade/race).

But access to AP courses and tests does not necessarily mean that students will pass the tests and therefore reap the benefits of “placing out” of introductory college courses or earning college credit. AP for all and/or mandatory AP courses, popular in some charter schools, provide access to AP but mean that less-prepared students are taking AP tests, which could depress passing rates. An initial look at how Boston Public Schools and Boston charters perform in terms of AP passing rates suggests that while Boston charters have more AP test takers, the passing rates at these schools are lower. The data in the chart below are from 2014-15 and include Boston exam schools in the estimates for BPS.

GRAPH 2: AP Exams Passed / Grades 11 & 12 Enrollment



The graph to the right separates the percent of AP tests passed in 2014-15 by Boston’s exam and non-exam schools and Boston charters. Again, this table shows that Boston’s exam school students pass AP tests at a much higher rate than their peers in non-selective BPS schools. While Boston charter school students do not pass AP tests at nearly the same rate as their exam school counterparts, they do pass AP tests at a much higher rate than their peers in BPS. Charter schools have much higher pass rates than the non-exam schools despite greater participation (more equitable access to AP could depress results, but in this case it doesn’t). As discussed previously, roughly three times as many charter school students take AP exams as students in BPS non-exam schools.

Table 3 below shows passing rates for sub-groups that all these schools serve, and shows Boston charters do a significantly better job than their non-selective BPS counterparts of helping traditionally underserved groups (black, Hispanic, and economically disadvantaged students) pass AP exams.

Again, it is important to point out that our estimates do not control for potential selection bias in charters, though studies previously mentioned in this report do control for selection bias when looking at other academic measures. Given this, we have reason to believe that selection bias is not the driving force behind higher AP passing rates in Boston charters.

GRAPH 3: % of AP Pass Rates in Boston Schools, 2014-15

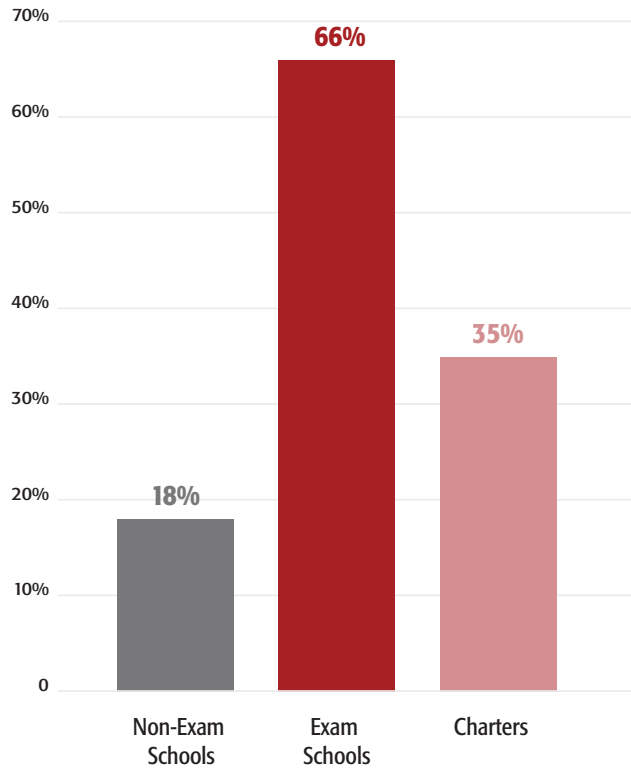


TABLE 3: AP Exam Pass Rate by Demographic Group, 2014 - 2015

	BLACK STUDENTS		HISPANIC STUDENTS		ECONOMICALLY DISADVANTAGED	
	Exams	% Passing	Exams	% Passing	Exams	% Passing
BPS Exam Schools	531	44.8%	470	56.2%	825	56.4%
BPS non-Exam Schools	599	8.3%	598	22.6%	669	15.4%
Boston Charters	216	19.4%	116	41.4%	119	21.8%

Conclusions and Recommendations

Access to Advanced Placement courses and tests is an increasing concern for many families and students. AP courses can provide an edge in college applications and, in some cases, may even help students graduate from college early or on time. Receiving college credit for AP classes taken in high school or placing out of introductory college courses can also save a portion of expensive college tuition.

Understanding the extent to which all schools provide students with AP access, especially those who have been traditionally underserved, helps in understanding how equitable our schools are. In the Massachusetts context, looking at AP test taking and pass rates in Boston, a city with a great concentration of traditionally underserved students, is revealing.

While a surface-level look at Boston's district schools reveals a rather positive

AP picture, especially in comparison to Boston's charter public schools, a deeper look at the data make it clear that students in Boston's selective exam schools have much more access to AP courses and tests and pass these courses and tests at much higher rates than their peers in the district as a whole. Boston charters, on the other hand, which are not selective schools, compare favorably to their non-exam BPS counterparts both in terms of providing AP access and helping students pass AP exams. Boston charter schools serve a greater concentration of traditionally underserved youth, especially when compared to Boston's exam schools, which serve a higher percentage of white, non low-income students. Because of this, we conclude that they are making important strides in providing AP opportunities to the students who will most benefit from them.

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Recommendations

The Commonwealth should make the differences between Boston’s exam and non-exam schools more transparent: The charter/district school debate aside, it is clear that students in Boston's exam schools have a great advantage over their peers in the larger district when it comes to AP access. Outcomes data provided by the state often do not separate the selective exam schools from BPS as a whole, which paints a misleading picture of how students in non-exam schools are faring.

DESE should consider assessing “AP for All” and other school policies that provide greater AP access to underserved students: Boston's charter schools are helping the traditionally underserved populations that they serve access and pass AP courses. While room for improvement remains at these schools and others, it could be helpful to understand the impact of some policies such as “AP for All” on students' sense of efficacy. Both district and charter schools that encourage AP course and test taking at high rates could provide positive models for schools that do not.

The Commonwealth should continue to provide avenues for disadvantaged students to access AP: Currently, the state provides subsidies and scholarship incentives for low-income students to encourage AP course taking. But these mechanisms do not do anything to hold schools directly accountable for offering and encouraging AP course and test taking to a wide range of students. While collecting AP data, as the state currently does, is a step in the right direction, the Commonwealth should consider other mechanisms for holding schools accountable for AP access. This could include making more transparent and better publicizing the percentage of students in each subgroup who take AP courses and exams in a school or district. DESE could also consider including AP access/equity “scores” in a district's annual and publicly available profile.

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- For more information about BPS choice and enrollment: <http://www.bostonpublicschools.org/Page/654>
- The three schools are the Boston Latin School, Boston Latin Academy, and the John D. O'Bryant School of Mathematics and Science. Application and acceptance processes for these schools are explained at "Boston Public Schools," "Exam Schools," "Application Process," <http://www.bostonpublicschools.org/exam>.
- See, for example: Angrist et. al (2013) "Charter schools and the road to college readiness: the effects on college preparation, attendance, and choice," The Boston Foundation and New Schools Venture Fund, http://users.nber.org/~dynarski/Charters_and_College_Readiness.pdf; Setren, Elizabeth (2015) "Special Education and English Language Learner Students in Boston Charter Schools: Impact and Classification," Massachusetts Institute of Technology.
- 10th, 11th, and 12th grade students are eligible to take the exam, but the majority of tests are taken by students in 11th and 12th grades. The figures reported in the text for the share of students taking AP exams divide the total number of test takers in a school or group of schools (charter, exam, non-exam) by enrollment in grades 11 and 12. Because some 10th grade students take exams, these figures

are an estimate of the share of eligible students taking an AP test. This is most apparent at the exam school Boston Latin, where the number of total test takers is greater than total enrollment in 11th and 12th grade, suggesting that many 10th graders at Boston Latin do sit for AP exams.

31. Boston charters outperform comparable Boston district high schools on Advanced Placement exams, Massachusetts Charter Public Schools Association Press Release, July 16, 2014, <http://www.masscharterschools.org/media/press/boston-charters-outperform-comparable-boston-district-high-schools-advanced-placement>.

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