## STRATEGIC DATA PROJECT

## SDP COLLEGE-GOING DIAGNOSTIC

Boston Public Schools

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## THE STRATEGIC DATA PROJECT (SDP)

Since 2008, SDP has partnered with 56 school districts, charter school networks, state agencies, and nonprofit organizations to bring high-quality research methods and data analysis to bear on strategic management and policy decisions. Our mission is to transform the use of data in education to improve student achivement.

Part of the Center for Education Policy Research at Harvard University, SDP was formed on two fundamental premises:

1. Policy and management decisions can directly influence schools' and teachers' ability to improve student achievement.
2. Valid and reliable data analysis significantly improves the quality of decision making.

SDP's theory of action is that if we are able to bring together the right people, assemble the right data, and perform the right analysis, we can help leaders make better decisions-ultimately improving student achievement significantly.

## To make this happen, SDP pursues three strategies:

1. Building a network of top-notch data strategists who serve as fellows for two years with our partners (e.g., school district, charter management organization, nonprofit, or state education agency).
2. Conducting rigorous diagnostic analyses of teacher effectiveness and college-going success using agency data.
3. Disseminating our tools, methods, and lessons learned to the education sector broadly.

The project is supported by the Bill \& Melinda Gates Foundation.

## SDP COLLEGE-GOING DIAGNOSTIC

INTRODUCTION AND BACKGROUND

The Strategic Data Project's College-Going Pipeline is a framework used to examine the secondary to postsecondary pathway of Boston Public School (BPS) students.

The first two stages of the pipeline examine students' pathways through high school in the Boston Public Schools (MA)-focusing particularly on whether students transition successfully from ninth to 10th grade, and whether they stay on track for graduation throughout high school. As students progress towards graduation, we pay particular attention to specific characteristics of BPS students, such as achievement prior to high school, credits attained each year, and the high school attended, in order to provide district and school leaders with information about who graduates and who drops out. The second half of the pipeline examines college enrollment patterns for BPS graduates, including students' postsecondary enrollment and their persistence to the second year of college.

Examining both halves of this pipeline provides BPS with new information about their students' postsecondary attainment. While graduation rates are, of course, publicly known, these analyses provide a deeper understanding of graduation patterns by exploring how student achievement prior to high school and course-taking patterns in high school relate to whether a student graduates. In addition, by linking BPS students to college enrollment data, we are able to highlight student attainment results that have been historically difficult for BPS to access.

## How does the Strategic Data Project (SDP) know about the college enrollment of BPS graduates?

In partnership with BPS, we obtain college enrollment data by linking BPS administrative student records to postsecondary enrollment data from the National Student Clearinghouse (NSC).

NSC is a national nonprofit organization that provides postsecondary enrollment verification for colleges and universities. The clearinghouse maintains student enrollment records at over 3,300 institutions of higher education throughout the United States, including career and technical training institutes, as well as two- and fouryear colleges and universities. When this research was conducted, NSC covered institutions serving $93 \%$ of all postsecondary students nationwide. ${ }^{1}$ However, given that not all institutions are covered and there are a number of instances in which students change names or high schools, some students who attend college may not be matched with NSC records. Thus, actual enrollment rates are likely to be slightly higher than those shown in this report.

## Which students were included in these analyses?

To ensure that we have sufficient numbers within each school and to reduce short-term random variation in outcomes, we combine student-level data from three recent cohorts of first-time ninth graders and graduates from traditional high schools to describe the trends in student achievement and attainment.

We used ninth-grade cohorts from 2003-04 through 200506 to analyze variation in high school graduation outcomes. Our postsecondary analysis uses three cohorts of high school graduates from 2006-07 through 2008-09 to analyze students' college-going patterns. We track the college enrollment outcomes of these BPS graduates through fall 2010, the start of at least the second school year after high school graduation for each of these three cohorts of BPS graduates.

## SDP College-Going Definitions

We calculate on track for high school graduation, high school completion, college enrollment, and college persistence rates in the following ways:

## On Track to Graduation Status Groups

We determine whether students are on or off track for graduation in four years in each of the years of students' high school careers. Since the specific graduation requirements vary to some degree across BPS high schools, we decided, in consultation with the BPS Office of Research and Assessment, to use a minimal standard for graduation of passing, on average, one math course and one English and language arts (ELA) course per year since starting high school. That is, a student who has passed at least three math and three ELA courses in high school would be classified as on track for graduation after three years in high school, regardless of when the student passed those courses or whether that student passed all courses in other subjects. ${ }^{2}$

We further divide students who are on track for graduation into two groups based on cumulative GPA: those with less than a 3.0 cumulative GPA, and those with a 3.0 cumulative GPA or higher. We use all available grades from a student's courses in determining the cumulative GPA.

## High School Completion Rate

To calculate high school completion rates, we compute a straightforward ratio across the three cohorts of students that are included in the analysis. The SDP completion formula divides the number of students who graduated in their fourth year after enrolling in ninth grade by the number of first-time ninth graders in their original cohort. We exclude from the calculation all students who transferred out of the district between ninth and 12th grade. We also exclude students who transferred into BPS schools after the ninth grade.

## College Enrollment Rates

We report on two college enrollment outcomes for BPS graduates: (1) enrollment in college the fall following high school graduation (seamless enrollers); and (2) enrollment at any point within two years of graduating high school (delayed enrollers). To calculate seamless enrollment, we use a cut-off date of October 1 in a student's graduation year to determine college enrollment status. To calculate enrollment within two years, we use a cut-off date two calendar years from the date of graduation.

## College Persistence Rates

We calculate persistence rates in college for BPS graduates who seamlessly enrolled in college. To calculate these rates we determine whether a student remained enrolled in any college through October 1 one year following their initial enrollment date. ${ }^{3}$ Research suggests that students who seamlessly transition from high school to college are more likely to complete a degree than delayed college-goers. Thus, in some analyses we calculate rates separately for seamless enrollers and delayed enrollers (Adelman, 2006; Bozick \& DeLuca, 2005; Horn, Cataldi, \& Sikora, 2005).

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## KEY FINDINGS

1. Students' on-track status at the end of ninth grade is a strong predictor of whether they graduate from high school.

Although it is not a perfect predictor of end-of-highschool outcomes, students' on-track status has a strong relationship with the probability of graduating. On-track indicators could be used to target interventions by illustrating, for example, when students fall off track, when they recover on-track status, and how much schools vary in off-track recovery rates.
2. High school graduation and college enrollment rates vary considerably across BPS high schools, even after accounting for students' prior achievement.

Unsurprisingly, schools whose incoming students have higher eighth-grade test scores generally have higher graduation and college enrollment rates than schools with lower average achievement scores. However, some schools have higher graduation and college enrollment rates than their students' prior achievement would suggest. Further, students with below-average prior achievement scores graduate and enroll in college at widely different rates across schools. This suggests that schools factor greatly in on-time graduation and college enrollment, especially for academically struggling students.
3. The percentage of BPS graduates who enroll in college in the fall after high school graduation is substantially lower than the rate suggested by exit surveys completed.

In their exit survey responses at the time of high school graduation, $78 \%$ of BPS graduates report plans to enroll in college the next fall, with $59 \%$ indicating plans to enroll in a four-year college and $19 \%$ indicating plans to enroll in a two-year college. Yet enrollment data compiled by the National Student Clearinghouse indicates that only $56 \%$ of BPS graduates enroll in some college in the fall after high school graduation. This discrepancy stems partly from a non-response bias (those graduates who do not complete the exit survey are disproportionately unlikely to enroll in college ${ }^{4}$ ] and also from the phenomenon of "summer melt" (for every 100 BPS students who report on their exit surveys that they intend to enroll in college after graduation, 18 do not actually do so).
4. Not all high-achieving students enroll in college seamlessly.

Despite potential benefits of seamless four-year college enrollment, $14 \%$ of BPS graduates with high academic qualifications do not matriculate into fouryear colleges. Although some of these students attend two-year colleges, four-year college enrollees persist at substantially higher rates. Importantly, those who do not persist or never enroll in college are likely to earn much lower wages throughout life than peers who seamlessly enroll in college and persist to graduation (U.S. Dept. of Commerce, Bureau of the Census, 2005).
5. Lower-achieving students from all racial and ethnic backgrounds face barriers to high school graduation and college enrollment.

Racial and ethnic gaps in both high school graduation rates and college-going rates nearly disappear when students are compared to peers with similar prior achievement, suggesting that education prior to high school is critical for later success.

## SDP COLLEGE-GOING DIAGNOSTIC

## ANALYSES: Section I

## Section I. What is the overall secondary and postsecondary educational attainment of students in the Boston Public Schools?

This section provides an overview of student outcomes in the Boston Public Schools (BPS) across the entire student college-going pathway-from entering ninth grade through the second year of college. The analysis tracks the percentage of ninth graders who complete high school on time, seamlessly enroll in college, and persist to the second year of college.

As shown in Figure 1, for every 100 ninth graders who enrolled in high school in the Boston Public Schools from 2003-2004 to 2005-2006, 61 completed high school within four years, 39 seamlessly transitioned to college, and 33 persisted to the second year of their postsecondary studies. In comparison, for every 100 ninth graders nationwide, roughly 75 graduate high school within four years, 53 seamlessly enroll in college, and 35 persist to their second year. Across other school districts for which SDP has conducted such analyses, the percentages of students attaining each of these outcomes vary widely. In Fulton County, GA, 80\% of ninth graders graduated from high school, 58\% enrolled in college seamlessly, and $53 \%$ persisted to their second year. In contrast, while 77\% of ninth graders in Fort Worth, TX, graduated from high school, only $32 \%$ enrolled in college
seamlessly, and $24 \%$ persisted to the second year.
We find that BPS's overall postsecondary attainment rates are close to the national average; however, BPS students at individual high schools progress along the education pipeline at vastly different rates.

The dotted lines in Figure 1 below indicate that there is a 55 percentage point range in high school graduation rates, a 66 percentage point range in college enrollment, and a 66 percentage point range in college persistence across high schools in BPS. ${ }^{5}$ These findings reveal that BPS students who attend different high schools experience substantially different pathways as they progress through high school and beyond. Subsequent analyses investigate whether these patterns vary after accounting for the fact that the composition of students who attend BPS high schools differs dramatically from one school to the next.

This analysis raises two critical questions for BPS to understand its students' current college and career readiness: (1) What are the critical junctures that affect student success and progress through high school? (2) What factors are associated with student success in enrollment and persistence in postsecondary education? The remainder of the brief highlights several findings that begin to unpack these questions.

Figure 1. Student Progression from Ninth Grade into College by District Average, District Minimum, and District Maximum Performance


Sample: 2003-04 through 2005-06 BPS ninth graders.
Postsecondary enrollment outcomes from NSC-matched records. All other data from BPS administrative records.

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## ANALYSES: Section II

Section II. What are the critical junctures that affect student success?

Students do not fail to graduate from high school suddenly or for no apparent reason. The majority of students who drop out send clear signals years earlier. Ninth grade, in particular, appears to be a crucial, make-it-or-break-it year for high school success and prepares students to pass the 10th-grade Massachusetts Comprehensive Assessment System (MCAS) test. Focusing on student performance in ninth grade and on the 10th-grade MCAS is important because it enables the identification of most potential dropouts while leaving sufficient time to plan and implement supports that increase students' likelihood of graduation

## Ninth-Grade Status

Figure 2 divides students into four broad categories based on their ninth-grade performance. Students who have passed both an English class and a math class are deemed on track for graduation at the end of ninth grade. Approximately two-thirds of new BPS ninth graders were on track for graduation after one year, but only $18 \%$ of new ninth graders complete the academic year on track for graduation and with a grade-point-average of at least 3.0.

Ninth-grade academic performance proves to be a strong predictor of eventual high school graduation. As shown in Figure 3, almost all students who are on track for graduation and have a ninth-grade GPA of 3.0 or better eventually graduate, and $96 \%$ complete high school in four years. Further, $81 \%$ of students who are on track for graduation at the end of ninth grade, but with GPAs less than 3.0 eventually complete high school. However, the chart also indicates that it is possible to recover from a subpar ninth-grade year. Nearly half of the students who fall off track in one subject in ninth grade graduate in four years. Of students who are off track in both English and math at the end of ninth grade (some of whom drop out and do not even attend school throughout all of ninth grade), 11\% graduate on time.

These results may suggest that while ninth grade is a very important academic year, existing BPS programs and policies are providing important support that enables a substantial number of students to graduate from high school even though they are off track for graduation at the end of ninth grade. Alternatively, these findings could mean that requirements for BPS high school graduation are not sufficiently robust and enable many students who are not adequately prepared in ninth grade to graduate within

Figure 2. On-Track Status at the End of Ninth Grade by High School


Figure 3. Enrollment Status After Four Years in High School by Status After First High School Year


Sample: 2003-04 through 2005-06 BPS first time ninth graders. All data from BPS administrative records.
four years of high school. Practitioners and researchers could examine this question by extending these analyses to include postsecondary outcomes related to students' success in college or career.

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## ANALYSES: Section II

## MCAS Math Test

Performance on the 10th-grade MCAS math test is an important barometer of students' subsequent success in high school for two reasons. First, passing the MCAS test with a score in the range of "Needs Improvement" or better is a requirement for high school graduation. While students who either do not take the test or do not achieve a result of "Needs Improvement" or better during their second year of high school may still be able to pass the test in a subsequent year, it is clearly disadvantageous to have to fulfill this requirement in later years of high school. Second, student performance on the 10th-grade MCAS math test reflects mastery of mathematical concepts that are foundational for advanced math classes. Thus, students with higher 10th-grade math MCAS scores will, on average, be better prepared to succeed in their 11th- and 12th-grade math and science classes.

Figure 4 shows the wide range of MCAS outcomes across BPS high schools. Overall, one quarter of first-time ninth graders attain math scores at the "Advanced" level, but 14\% attain math scores in the "Failing" level, and one quarter of first-time ninth graders do not take the MCAS in the second year after high school entry, presumably because they were not on track for graduation at that time.

Figure 5 shows a strong relationship between students' performance on the 10th-grade MCAS math test and their high school graduation and subsequent college enrollment. Among students who receive a "Needs Improvement" score on this assessment, $83 \%$ complete a high school diploma and $36 \%$ enroll in college. Students who score in the "Proficient" or "Advanced" levels are considerably more likely to enroll in college ( $55 \%$ and $77 \%$, respectively). Among students who take and do not pass the 10th-grade MCAS math test in their second year of high school, more than half graduate from high school, but only $16 \%$ make a seamless transition to college.

These findings suggest that passing the 10th-grade MCAS math test is an important predictor of both students' eventual high school graduation and their enrollment in college. While it appears that many students who either fail the 10 th-grade MCAS math test or score in the "Needs Improvement" range are able to go on to graduate from high school, the percentage of these students who transition to college seamlessly is quite low. This evidence underscores the importance that high schools in BPS and elsewhere include data about students' postsecondary success in their assessment of the adequacy of the education they are providing students.

Figure 4. 10th-Grade MCAS Math Performance by High School


Sample: 2003-04 through 2005-06 BPS first time ninth graders. All data from BPS administrative records.

Figure 5. High School Graduation and College-Enrollment Outcomes by 10th-Grade MCAS Math Proficiency Level


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Figure 6. 10th-Grade MCAS Math Outcomes by High School Among Students who Received a Failing Grade on the Eighth-Grade MCAS Math Exam


Sample: 2003-04 through 2005-06 BPS first time ninth graders who have taken the 8th-grade MCAS math exam. Restricting to 8th grade math MCAS scores between 212-218, to create relatively unbiased comparison. All data from BPS administrative records.

Nearly half of BPS students enter ninth grade with a score in the "Failing" range on their eighth-grade MCAS math test. This suggests that, to adequately prepare students to succeed on the 10th-grade math MCAS test, BPS high schools must reteach foundational middle school math skills in addition to teaching ninth- and 10th-grade math material. To what degree are BPS schools successful in helping students overcome a "Failing" score on the eighth-grade MCAS math test to achieve a result of "Needs Improvement" or better on the 10th-grade MCAS test?

Figure 6 focuses on students with scaled scores of 212 to 218 on the eighth-grade MCAS math test, as these students have eighth-grade scores in the failing range but are not dramatically far away from the cutoff for the next higher range of outcomes. ${ }^{6}$ Across the district, nearly half of the students with eighth-grade scores in this range achieve a scaled score of at least 220 (i.e., a passing result of "Needs Improvement" or better) on the 10th-grade math MCAS test. At the same time, nearly $30 \%$ of students with eighthgrade scaled scores between 212 and 218 do not take the tenth-grade MCAS test in their second year of high school, suggesting that these students are either not in school or are formally classified as behind grade level in math by their second year in high school.

There is also considerable variation in results across high schools. For example, nearly $80 \%$ of students who enter Fenway or TechBoston Academy with eighth-grade MCAS math scores in the 212-218 range increase their performance to "Needs Improvement" or better in 10th grade, though these strong results may be reflective of the admission practices of these high schools, as well as the strength of their math classes. We observe substantial variation in the results even among nonselective district schools. For instance, students at Brighton High School are about twice as likely to move from a "Failing" score on their eighth-grade MCAS math test to a passing score on their 10th-grade MCAS math test, as are students at the Academy of Public Service, Monument High School, or Burke High School.

As we noted before, these findings suggests that while students' prior achievement is important, schools matter as well in the academic attainment of their students. Subsequent analyses should explore some of the root causes for the observed differences in students' performance across BPS high schools. With more evidence, BPS practitioners and administrators may be able to identify and disseminate examples of best practices for helping historically lowachieving students reach their academic potential.

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## ANALYSES: Section II

## High School Graduation Rates

We would expect that some of the differences in graduation and college attendance highlighted in Figure 1 are simply the result of different high schools receiving students with different academic backgrounds. We might expect that the high schools whose students enter with high levels of prior achievement will graduate students at a higher rate than schools whose students are academically behind upon entry. But how strong is this relationship? Do high schools matter relative to the incoming achievement levels of their students?

Figure 7 shows that BPS high schools with higher average incoming prior achievement as measured by eighth-grade MCAS math test scores do indeed have, on average, higher graduation rates. However, we can also see that high schools whose students come in with similar achievement levels can vary dramatically in the percentage of students graduating on time. Many of the larger gaps may be the result of Boston's unique collection of exam and pilot schools. ${ }^{7}$ For instance, New Mission High School graduates students at a far higher rate than East Boston High School, even though its students come in with slightly lower achievement scores. But New Mission High School also has an application that involves an essay, teacher references, and other requirements. As a result, it may be that students attending New Mission were more likely to graduate anyway, given they are a self-selected group.

We therefore also suggest examining how "regular" district schools compare with one another. For instance, Madison Park High School and Burke High School enroll incoming classes of ninth graders with approximately the same average eighth-grade math scores. Yet four years later, students at Madison Park High School are 11 percentage points more likely to graduate than students at Burke High School. This suggests that while prior achievement is important, schools also matter in their ability to influence students' academic attainment.

Student success through high school graduation and beyond is influenced by a multitude of factors. Students' preparation in earlier grades is a powerful predictor of their performance in high school, yet most high schools enroll students with both higher and lower levels of prior achievement.

Figure 7. High School Graduation Rates by Student Achievement Profile Upon High School Entry


Sample: 2003-04 through 2005-06 BPS first-time ninth graders with eighth-grade MCAS math scores.

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Figure 8. On-Time High School Graduation Rates by Eighth-Grade MCAS Math Test Score Quartile


Sample: 2003-04 through 2005-06 BPS Ninth Graders with 8th grade math MCAS scores.
*Missing

Figure 8 shows that students who begin high school in the top quartile of math scores graduate from high school at more than twice the rate ( $88 \%$ ) of students who began high school in the bottom quartile of math scores (40\%). The graph also highlights the degree to which enrollment in high schools is segmented by prior test score performance. Of the four schools with graduation rates above the district average for students scoring in the top quartile on the eighth-grade MCAS math test, three are exam schools. These schools, by design, enroll very few students in the bottom quartile of eighth-grade math scores and as a result are excluded from the left panel of the graph. By nature of the entrance requirements for the exam schools, it is likely that the students enrolling in those schools were also stronger than average in incoming achievement in subjects other than math ${ }^{8}$, which may help to explain why these schools have the highest graduation rates for students in the top quartile of the eighth-grade MCAS math test.

However, we can see that there is also substantial variation in graduation rates across regular high schools that enroll students from all academic backgrounds. Among these district schools, Brighton High School has the highest graduation rates for students in each of the top and bottom quartiles of eighth-grade math scores while Burke High School has the lowest graduation rate for students in the top quartile and the second-lowest graduation rate for students in the bottom quartile of eighth-grade MCAS math scores. In fact, students in the bottom quartile of math scores at the start of high school who enroll at Brighton High School are only slightly less likely to graduate from high school than students in the top quartile of math scores who enroll at Burke High School.

These findings suggest that BPS high schools vary in their ability to help students with similar levels of prior achievement progress towards high school graduation. It is important to note that students' performance within a quartile can differ, so some of the variation in graduation rates across BPS high schools among even the lowestperforming students may be partially due to differences in students' average performance within this bottom quartile. These preliminary findings help set the stage for BPS to conduct more penetrating analyses of this nature.

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## ANALYSES: Section III

## Section III. How do BPS graduates progress into college?

Given the substantial economic and social benefits of a college degree, understanding high schools' role in preparing students to enroll in and persist through college is essential.

On average, a bit more than half (56\%) of high school graduates from the Boston Public Schools enroll in college seamlessly in the fall following high school graduation: 42\% enroll at four-year colleges, and 14\% enroll at two-year colleges (Figure 9). By comparison, roughly 68\% of high school graduates nationwide enroll in college seamlessly: $42 \%$ at four-year colleges and $26 \%$ at two-year colleges (U.S. Department of Education, National Center for Education Statistics, 2012).

As with the results for high school graduation, many of the larger gaps in college enrollment rates for graduates across high schools may be the result of Boston's unique collection of exam and pilot schools. More than $80 \%$ of graduates for each of the three exam schools enroll seamlessly in college after high school, with most graduates from these schools enrolling in four-year colleges. These three exam schools clearly stand out as the ones with the highest rates of college enrollment. Then the schools with the next highest rates of seamless college enrollment for graduates are pilot schools. Almost all of the "regular" district schools have seamless college enrollment rates below the district average.

The college enrollment rates in Figure 9 are substantially lower than the college enrollment rates reported by the Boston Private Industry Council (see Sum et al., 2008, for a summary of several of these reports). Further, the college enrollment rates in Figure 9 are also lower than the college enrollment rates corresponding to plans reported by students in exit surveys at the time of high school graduation. Both the exit survey responses and the Boston Private Industry Council reports tend to find college enrollment rates between 75 and $80 \%$ for BPS graduates.

We believe that the results reported in Figure 9 are more accurate than those from either of those other two sources. Further, we believe that there are two distinct reasons why those other analyses tend to overestimate the college enrollment rates for BPS graduates.

Nonresponse Bias: First, both the Boston Private Industry Council and exit survey results are subject to non-response bias because not all graduates complete the exit survey or respond to the Boston Private Industry Council phone survey, which is conducted nine months after high school graduation. As we discuss below, Figure 10 documents this nonresponse bias for the exit survey-indicating that students who respond to the exit survey are substantially more likely to enroll in college than those who do not do so. Similarly, the Boston Private Industry Council's analysis of NSC enrollment data for the graduating class of 2000 yields college enrollment rates comparable to those in Figure 9.

Summer Melt: Second, the exit survey results overestimate college enrollment rates because of the phenomenon of summer melt. In independent research SDP Senior Research Manager Lindsay Page and colleague Ben Castleman have documented that a substantial proportion of students who graduate high school with specific college plans do not actually follow through on those plans and enroll in college in the fall semester. This "summer melt" phenomenon suggests that there may be unforeseen barriers to college enrollment for students after graduating from high school. It also raises the question of whether schools and guidance counselors can help students overcome these barriers with additional specialized work during the school year or in the summer after high school graduation.

Figure 9. Seamless College Enrollment by High School


Sample: 2006-07 through 2008-09 BPS high school graduates. Postsecondary enrollment outcomes from NSC matched records.

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Figure 10 compares the post-graduation plans reported by students to the extent to which these plans materialized. Among students who completed the BPS high school graduation exit survey in 2006-07 to 2008-09, 78\% stated that they intended to enroll in college the following fall, including $59 \%$ who planned to attend a four-year college and $19 \%$ who planned to attend a two-year college. ${ }^{9}$ Yet, using postsecondary data from the National Student Clearinghouse, our analyses reveal that $64 \%$ of BPS graduates who completed the exit survey actually enrolled in college the following fall, with $50 \%$ enrolling in a fouryear college and 14\% enrolling in a two-year college.

Figure 10 documents the importance of both (1) nonresponse bias and (2) summer melt in the overestimation using the exit survey of a $78 \%$ enrollment rate for BPS graduates. First, there is evidence of nonresponse bias in the exit surveys because $64 \%$ of students who respond to the exit survey enroll seamlessly in college, but only $56 \%$ of all BPS graduates enroll seamlessly in college. Second, there is evidence of summer melt because $78 \%$ of students who respond to the exit survey say that they intend to enroll in college in the fall semester, but only $64 \%$ actually enroll that fall. Another way of quantifying the summer melt among BPS students is that, for every 100 BPS students who intend to enroll in college after graduation, 18 do not actually do so.

Figure 10. Exit Survey Plans Versus Outcomes


To explore this phenomenon of summer melt further, we conducted a series of additional analyses that restricted our sample to exit survey respondents who planned to attend college full-time. In these analyses, we focused on differences in results for students who intended to enroll in two-year versus four-year colleges. One immediate observation is that summer melt is an important phenomenon for students with plans to enroll full time in college land does not only apply to students planning to enroll part time). Even among students who planned to enroll full time in a four-year college-presumably the set of students with the best developed and most concrete college plans-Figure 11 shows that only $86 \%$ enrolled in college in the fall after high school graduation.

The phenomenon of summer melt is even more pronounced among students who reported plans to enroll full time in a two-year college in their exit survey responses. While a small number ( $4 \%$ ) of these students actually changed plans and enrolled in a four-year college, about 10 times as many did not enroll at all. In all, as also shown in Figure 11, among this set of students who planned to enroll full time at a two-year college, only $57 \%$ enrolled in college the next fall.

Figure 11. Exit Survey Plans Versus Outcomes by Type of College Planned to Attend


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## College Enrollment and Highly Qualified Students

A recent analysis of Chicago students' post-high school educational attainment land a separate study of students in North Carolina and elsewhere) found that a sizeable share of students who are highly qualified to attend a four-year university either do not seamlessly enroll in college or attend two-year colleges instead. ${ }^{10}$ Despite these high-achieving students' hard work to compile impressive credentials (including SAT scores) for college admissions, their decision not to seamlessly enroll in a four-year college makes them statistically unlikely to complete a four-year BA degree. A district with a very high proportion of under-match-highachieving graduates who do not enroll in colleges that match their credentials-might consider providing specialized guidance counseling for these outstanding students. To what degree is under-match prevalent for BPS graduates?

Figure 12 indicates that $11 \%$ of all BPS graduates in the 2006-07 through 2008-09 school years are highly qualified to attend four-year colleges. Not surprisingly, this set of highly qualified graduates is concentrated at exam schools, and minorities are disproportionately underrepresented in this group. (See Section IV for more detailed analysis of the achievement gap between minorities and non-minorities.) Most but not all (86\%) of these highly qualified students enroll seamlessly in a four-year college after high school graduation. This enrollment percent is actually somewhat higher than the comparable percentage for some other districts, yet it is still somewhat surprising that a nontrivial number of students with such outstanding high school records are not going directly on to college.

Figure 12. Rates of Highly Qualified Students Attending College by Race Among Students Eligible to Attend Four-Year Massachusetts Universities


## College Persistence

For many high school graduates, college enrollment is just the first of many hurdles on the road to postsecondary success. While considerable attention has been paid to challenges related to college preparedness and access, recent conversations have expanded to consider barriers to degree completion, focusing on the rates at which students persist from college enrollment to degree completion.

Across the district, college persistence rates forstudents who seamlessly enrolled at four-year colleges are higher than for their peers who enrolled at two-year colleges (Figure 13). On average, $86 \%$ of students enrolled at four-year colleges persist to their second fall in college, compared with $63 \%$ of those enrolled at two-year colleges-a 23-percentage-point difference in college persistence rates.

Once again, performance of exam school graduates stands out in Figure 13. More than 90\% of graduates from Boston Latin School, O'Bryant School of Math and Science, and Boston Latin Academy who enroll in four-year colleges persist and are still enrolled in college one year later. Yet, in contrast to our analysis of high school graduation rates across high schools, the two schools with the next highest college persistence rates after the exam schools-Brighton High School and Charlestown High School—are both "regular" district schools rather than pilot schools. While there is some variation in college persistence rates across schools, the more pronounced phenomenon is that students enrolling in four-year colleges are more likely to persist in college than are students enrolling in two-year colleges.

Figure 13. College Persistence by High School Among Seamless Enrollers


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## ANALYSES: Section IV

Section IV. How do high school graduation rates and college enrollment rates vary by students' race and prior achievement?

Examining how high school graduation and college enrollmentratesvaryforstudentsfrom differentracial/ethnic backgrounds provides districts with important information about the equity of educational opportunities across their school system. While districts often already know basic descriptive statistics about how important outcomes differ across student subgroups, they oftentimes have not taken the next step to examine the interrelatedness of student characteristics, such as race, poverty, or prior achievement. Here, we describe how high school graduation and college enrollment rates differ across racial/ethnic subgroups for students with similar levels of prior achievement.

Black, Latino, and White students' average on-time high school graduation rates are $61 \%, 58 \%$, and $76 \%$, respectively. However, as Figure 14 shows, the disparities between White and Latino or White and Black students appear to be largely related to differences in students' academic achievement and socioeconomic status upon entering high school. When we examine high school graduation rates among students who qualify for free or reduced-price lunch, disparities in graduation rates decrease significantly. Among Black, Latino, and White students who qualify for free or reducedprice lunch, $60 \%, 58 \%$, and $63 \%$ graduate from high school on time, respectively. Among students who qualify for free or reduced-price lunch and score in the same quartile on their eighth-grade math MCAS test, White students have lower on-time high school graduation rates than Black students.

Average college enrollment rates for Black, Latino, and White graduates are similar to high school graduation rates: $52 \%$ of Black high school graduates, $51 \%$ of Latino graduates, and $73 \%$ of White graduates enroll in college in the fall semester after high school graduation. But once again, these average differences diminish when we control for students' prior academic achievement and socioeconomic status. When we restrict our analysis to include only students who qualified for free or reducedprice lunch during high school, Black high school graduates enroll in college at similar or slightly higher rates than Latino or White students in three of the four quartiles of eighth-grade MCAS math performance (Figure 15)-the top quartile being the notable exception.

Figure 14. On-Time High School Graduation Rates Among Students Qualifying for Free or Reduced-Price Lunch by Eighth-Grade MCAS Math Test Score Quartile and Race


Figure 15. Seamless College Enrollment Rates Among Students Qualifying for Free or Reduced-Price Lunch by Eighth-Grade MCAS Math Test Score Quartile and Race


1. The only four-year institutions in Massachusetts with enrollments exceeding 1,000 students that do not participate in National Student Clearinghouse (NSC) are Assumption College and Babson College. Pine Manor College and New England Institute of Technology are listed as participating in the NSC Clearinghouse, but we were unable to match graduates to these colleges in the NSC data for fall 2007, 2008, or 2009. Among the colleges where at least 15 BPS graduates in the classes of 2007, 2008, and 2009 indicated plans to attend, only Pine Manor College, Lincoln Technical Institute, Blaine Beauty School, Bay State School of Technology, Universal Technical Institute, Babson College, Le Cordon Bleu School, McGill University, Boston Architectural College, and ITT Technical Institute do not appear in the NSC data.
2. We do not have data on summer school courses taken by these students, so in some instances, we may classify a student as off track for graduation based on that student's school-year grades even though that student is on track for graduation as the result of passing additional classes in the summer.
3. This persistence outcome is not dependent on maintaining enrollment at the same institution from one year to the next. Therefore, we consider a student to have persisted to the second year of any college if we observe that student enrolled at any college over the course of two subsequent years. Likewise, we consider a student to have persisted to the second year of four-year college if we observe that student enrolled at a four-year college over the course of two subsequent years, irrespective of which four-year college(s) he or she attended.
4. Similarly, the estimates from the Boston Private Industry Council's post-graduate survey nine months after high school graduation appear to suffer from nonresponse bias. These surveys typically indicate that $70+\%$ of BPS graduates are enrolled in college the next year after high school graduation (see for example, Figure 1 of "Getting to the Finish Line", http://www.tbf.org/~/media/TBFOrg/Files/ Reports/PIC\%20Report.pdf), but consistent with the findings of this diagnostic, the National Student Clearinghouse results provided in that same report indicate that only $64 \%$ of BPS graduates from the class of 2000 enrolled in college at any time between 2000 and 2007 (see Table 3 of "Getting to the Finish Line").
5. While this range of outcomes is likely exaggerated by the results for exam schools, there is still quite a large range of outcomes among non-exam district high schools. Many of the analyses in this report examine school-level variation in greater depth and begin to explore possible explanations for differences observed across high schools.
6. More than one-third of ninth-grade entrants to BPS have eighth-grade MCAS math scaled scores between 212 and 218; less than $10 \%$ have scores of 210 or below. This restriction also facilitates comparisons between high schools because some schools enroll few or no students with eighth-grade test scores below 210.
7. Exam schools with controlled admission include Boston Latin Academy, Boston Latin School, and O'Bryant School of Math and Science. Pilot schools include Another Course to College, Boston Arts Academy, Boston Community Leadership Academy, Fenway High School, New Mission High School, and TechBoston Academy.
8. Most of the students included in this analysis did not take the eighth-grade MCAS English test because it was not administered from 2001 to 2004.
9. Most, but not all, graduates complete the exit survey; exit survey response rates varied from a low of $81.9 \%$ to a high of $86.6 \%$ during 2006-07 to 2008-09. Based on NSC records, those students who complete the exit survey are more likely to enroll in college than students who do not complete the exit survey. Therefore, our analysis of exit survey responses may exaggerate the percentage of students who enroll in college after graduation.
10. Our definition of a highly qualified student closely aligns with criteria established by Bowen, Chingos, and McPherson (2009) in their research of college application and enrollment data from twenty-one flagship public universities and four statewide systems of higher education.

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## Figure Notes

## Figure 1

Sample: 2003-04 through 2005-06 BPS first-time ninth graders. Postsecondary enrollment outcomes from NSC matched records. All other data from BPS administrative records.

Figure 2
Sample: 2003-04 through 2005-06 BPS first-time ninth graders. All data from BPS administrative records.

## Figure 3

Sample: 2003-04 through 2005-06 BPS first-time ninth graders. All data from BPS administrative records.

## Figure 4

Sample: 2003-04 through 2005-06 BPS first-time ninth graders. All data from BPS administrative records.

## Figure 5

Sample: 2003-04 through 2005-06 BPS first-time ninth graders. All data from BPS administrative records.

## Figure 6

Sample: 2003-04 through 2005-06 BPS first-time ninth graders who have taken the eighth-grade MCAS math exam. All data from BPS administrative records.

## Figure 7

Sample: 2003-04 through 2005-06 BPS first-time ninth graders who have taken the eighth-grade MCAS math exam. All data from BPS administrative records.

Figure 8
Sample: 2003-04 through 2005-06 BPS first-time ninth graders who have taken the eighth-grade MCAS math exam. All data from BPS administrative records.

## Figure 9

Sample: 2006-2009 BPS graduates. Postsecondary enrollment outcomes from NSC matched records. All other data from BPS administrative records.

## Figure 10

Sample: 2006-2009 BPS graduates. Postsecondary enrollment outcomes from NSC matched records. All other data from BPS administrative records.

Figure 11
Sample: 2006-2009 BPS graduates who have taken the exit survey. Postsecondary enrollment outcomes from NSC matched records. All other data from BPS administrative records.

## Figure 12

Sample: 2006-07 through 2008-09 BPS graduates. Eligibility to attend a four-year college is based on student's cumulative GPA and SAT scores. All data from BPS administrative records.

## Figure 13

Sample: 2006-07 through 2008-09 BPS graduates. Postsecondary enrollment outcomes from NSC matched records. All other data from BPS administrative records. Omitted schools are the result of insignificant (less than 20 students) sample size.

## Figure 14

Sample: 2003-04 through 2005-06 BPS first-time ninth graders who have taken the eighth-grade MCAS math exam. All data from BPS administrative records

Figure 15
Sample: 2006-2009 BPS graduates with eighth-grade math MCAS scores. Postsecondary enrollment outcomes from NSC matched records. All other data from BPS administrative records.

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Notes
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[^0]:    Sample: 2003-04 through 2005-06 BPS first time ninth graders. All data from BPS administrative records.

