



# The On-Track Indicator as a Predictor of High School Graduation

June 2005

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*with commentary by Duncan Chaplin*



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## Acknowledgments

The on-track indicator that we describe in this paper developed gradually through the work of many researchers at the Consortium. We would like to acknowledge our colleagues at the Consortium who actually created it. This work originated in the mid-1990s when Melissa Roderick and Eric Camburn began studying the transition from elementary to high school. During the course of this work, Roderick began thinking about how to describe students' academic performance in their first year in high school. In 1999 Shazia Miller further developed these ideas and actually "invented" the on-track indicator we use today. Miller was assisted by her colleagues, including Stuart Luppescu, Matt Gladden, and John Easton in adjusting the measure and developing a series of reports for individual schools that showed how their students performed in high school. Like all work at the Consortium, the on-track indicator was carefully reviewed by our statistical analysts as well as our former Senior Director, Anthony Bryk. Since then, many other Consortium analysts, particularly Consortium Archivist Todd Rosenkranz, have worked with the on-track indicator and have fine-tuned it using complex data on student grades and course-taking. All these people deserve credit for their parts in creating the on-track indicator.

The authors would like to thank Consortium Directors Penny Sebring and Melissa Roderick for carefully reviewing the first draft of this report and providing numerous helpful suggestions. We also received excellent feedback and suggestions from several of our Steering Committee Members, including Donald Fraynd, Arie van der Ploeg, and Martha Zurita. Chicago Public Schools (CPS) High School Officer Donald Pittman and Area Instructional Officers Cynthia Barron and Johnetta James joined in a lively Steering Committee discussion and shared their thoughts and CPS perspectives on this study. We want to thank Duncan Chaplin, Senior Research Methodologist at the Urban Institute, for reviewing the final version of this paper and providing a commentary on it. Thanks also to Stuart Luppescu for conducting our final technical read.

This research was supported by the Joyce, MacArthur, and Spencer Foundations.

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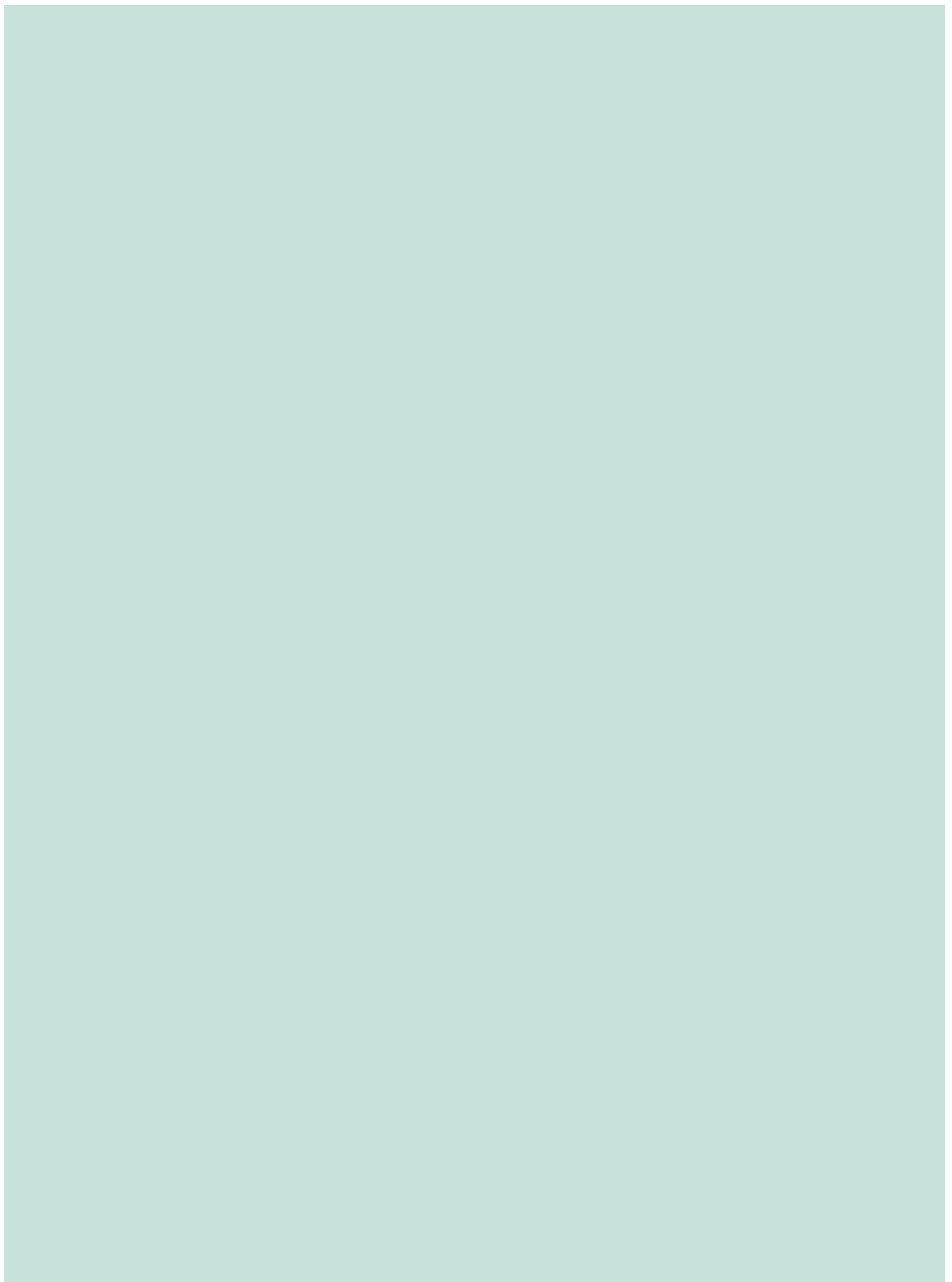
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## INTRODUCTION

The first year of high school is a critical transition period for students. Those who succeed in their first year are more likely to continue to do well in the following years and eventually graduate. Because a successful transition into high school is so important, in 1999 the Consortium developed an indicator to gauge whether students make sufficient progress in their first year of high school to be on-track to graduate within four years. On-track students have completed enough credits by the end of the school year to be promoted to tenth grade, and have failed no more than one semester of a core subject area. The on-track indicator has since become part of the accountability system for Chicago public high schools. Unlike the other indicators of high school performance—dropout rates and Prairie State Achievement Exam scores—the on-track indicator provides information about performance within students’ first year of school, making it a timely indicator of student progress. This report defines the on-track indicator in detail and shows that it is a better predictor of high school graduation than eighth-grade test scores or students’ background characteristics. We also compare on-track rates across schools and show systemwide trends over time. The evidence presented here suggests that the on-track indicator can be a valuable tool for parents, schools, and the school system as they work to improve students’ likelihood of graduating.

The on-track indicator has had a long history of development at the Consortium. In the mid 1990s we showed that course failures (one component of the on-track measure) are common in Chicago’s high schools, with half of ninth graders failing at least one course in their first semester of high school.<sup>1</sup> More importantly, that study also showed that failure rates are not strictly determined by students’ entering achievement test scores, and that some high schools do a much better job than others with low-performing and average students. Schools that look similar in terms of their students’ elementary school test scores sometimes look very different in terms of their freshman failure rates. Some seem to offer stronger programs and better supports to help students succeed in the first year of high school.

In the late 1990s, the Consortium began to work to develop a statistical indicator of students’ progress toward high school graduation. In particular, we wanted to show the progress of a group of students as they move from elementary school to their first year of high school, and then each year thereafter through high school graduation. We knew that the majority of students completed their freshman year, even though many failed to eventually graduate. Of those who stayed in the system, we knew which ones were making progress toward graduation and which ones were having trouble based on indicators such as attendance rates, grade point averages, total

number of credits earned, and the number of F's received. Each one of these indicators, measured either at the end of the first semester or at the end of the freshman year, is significantly correlated with graduation.<sup>2</sup> We created the on-track indicator from two of them, credits earned and number of F's in core courses, in such a way that each student could be characterized as on or off track. Even though any one of the variables above would have worked relatively well individually as an indicator of freshman performance that would predict graduation, we combined these two variables because we believed that each contained important information relevant to Chicago Public Schools (CPS) policy about grade promotion. The indicator is described more fully on the next pages.

Following development of the on-track indicator, the Consortium created school-by-school reports, with support from the Education Alli-

ance at Roosevelt University, to provide elementary schools with timely data about how their graduates were doing in high school.<sup>3</sup> In 2002, we released a series of reports on high schools that also used the on-track indicator to gauge high school student performance. One of these reports showed improving trends in freshman on-track rates in CPS between the 1993–94 and 1999–00 school years, along with improvements in test scores and other outcome measures.<sup>4</sup> More recently, the Consortium presented evidence that improvements in credit accumulation, one component of the on-track indicator, have contributed to improvements in high school graduation rates across CPS.<sup>5</sup> While each of these reports touched on the relationship between being on-track in the freshman year and the likelihood of graduating, none has given substantial evidence regarding this relationship. This report examines the relationship in more detail.

### **BEING ON-TRACK AND GRADUATING ARE INDICATORS OF BASIC SUCCESS IN HIGH SCHOOL**

The benefits of high school graduation have been thoroughly documented. For example, on average, high school graduates will earn more money than dropouts over their lifetimes and avoid incarceration at higher rates.<sup>1</sup> It does not follow, however, that all high school graduates are well prepared to pursue their postsecondary goals, whether college, a job, or military service. In fact, recently a spate of studies have suggested that high school graduates in the United States are not well prepared academically.<sup>2</sup>

In Chicago, high school graduates are well ahead of dropouts in terms of the likelihood of future success, but their diploma is by no means a guarantee that they are prepared for the future. About 15,700 students graduated from CPS high schools in 2004, but a look back at their PSAT scores from the previous year reveals very troubling information. The average ACT composite score for the group of high school graduates for whom PSAT scores are available was 16.9 on a scale ranging from 0 to 36. This is well below the statewide average for the ACT composite (20.3), and the national average (20.9),<sup>3</sup> putting the average CPS graduate below the 25<sup>th</sup> percentile nationally.<sup>4</sup>

These low test scores have broad implications for college admissions and college course placement. ACT has created benchmark scores that indicate readiness for college classes.<sup>5</sup> For college algebra, the ACT benchmark score is 22. Approximately 13 percent of CPS graduates scored 22 or higher on the math portion of the ACT. The ACT benchmark for college biology is 24 on the science section of the ACT. Only 7 percent of CPS graduates achieved a score greater than or equal to this. Clearly the average CPS graduate looks very weak on these important measures of achievement.

Throughout this report we suggest that students who graduate from high school have “succeeded.” We are using this term relatively. Compared to students who drop out, graduates are indeed more successful. In terms of strong preparation for college or the job market, graduation is a necessary but far from sufficient indicator of future success.

<sup>1</sup> Coley (1995).

<sup>2</sup> See for example, American Diploma Project (2004).

<sup>3</sup> See ACT, Inc. (2004b).

<sup>4</sup> See ACT, Inc. (2004a).

<sup>5</sup> ACT, Inc. (2004c). These are the minimum score required on a subject area test for a student to have a 50 percent chance of receiving a grade of B or higher or a 75 percent chance of getting a C or higher in a credit-bearing college course.

## WHAT DOES IT MEAN FOR A STUDENT TO BE ON-TRACK?

Being on-track is a baseline indicator of acceptable, though not necessarily strong, school performance. A student is counted as on-track at the end of freshman year if both of the following criteria are met:

- The student has accumulated five full course credits, the number needed to be promoted to tenth grade according to CPS policy.<sup>6</sup>
- The student has no more than one semester F (that is, one-half of a full credit) in a core subject (English, math, science, or social studies).

In terms of measurement, the criteria differ in two key ways: 1) course failures are counted only for core courses, while credit accumulation includes all credit-bearing classes; and 2) failures are counted by semester, while credit accumulation is measured in terms of full-year credits, with half credits given for each semester course (see Table 1).

Thus, the on-track indicator combines two separate but related factors: number of credits earned and number of F's in core subjects. These are the

### HOW WE HANDLE FIRST-YEAR DROPOUTS, TRANSFER STUDENTS, AND SECOND-YEAR FRESHMEN

There is one difference between the numbers presented in this report and the on-track rates used by CPS for accountability purposes. We have removed students who dropped out of school during their freshman year from most of our calculations, except where noted, while the school board counts these students as off-track. For purposes of accountability, it makes sense to count students who drop out as off-track: certainly dropouts are not on-track for graduation. However, when evaluating the on-track indicator as a predictor of graduation, it makes little sense to include students who have already left school. A student who is off-track because of dropping out cannot be expected to graduate. For readers who are interested, we provide statistics calculated both ways in Figures 2 and 6. We also include dropouts when showing on-track rates by student characteristics (see *On-Track Rates by Students' Background Characteristics*, page 5) so as not to miss any group differences in on-track rates that exist because of group differences in dropout rates.

Students who transfer out of CPS during their freshman year are not included in any of the statistics. Those who transfer after their freshman year are included in statistics of freshman year performance (e.g., on-track rates), but not in statistics related to graduation rates.

This report is based on analysis of first-time high school freshmen. Students who are repeating ninth grade are not counted as first-year students in any of our calculations.

two components of the academic requirements for graduation—students need to accumulate enough course credits (24 credits), and they need to pass specific courses in core subjects (English, math, science, and social science). Both are crucial for success. If a student does not earn sufficient credits in the first year, she will need to earn extra credits in subsequent years in order to graduate in four years. If a student fails a core course, he will need to make up this credit and he will not have taken the expected sequence of courses in that subject. This could be problematic in two ways: 1) course scheduling at the school may make it difficult to repeat the failed course while not getting further behind in more advanced courses; and 2) it may be difficult to pass more advanced courses if the student has not learned the material covered in the prerequisite class. The two components of being on-track are strongly related because course failures result in fewer credits being earned. Table A in the Appendix demonstrates how these components are interrelated for the 2003–04 freshman class.

### Why Are Students Off-Track?

Table 1 shows the on-track rates for students in the 2003–04 freshman cohort, broken down by whether they were off-track because of credits or number of F’s. Most students (60 percent) are on-track their freshman year, but 40 percent do not meet minimum standards of acceptable performance. Most students who are off-track

*. . . of the students who entered with very high eighth-grade test scores, almost one-quarter were off-track by the end of their freshman year. On the other hand, of the students who entered high school in 2003–04 with very low eighth-grade test scores, more than 40 percent were on-track by the end of freshman year.*

have simultaneously failed at least two semesters of a core course and have earned fewer than five credits. Almost one-quarter of the 2003 incoming freshman class was in this position by the end of freshman year. Another sizeable group earned enough credits to move on to tenth grade, but was behind in at least one core subject area. A very small group was off-track because of attempting too few credits. In the 2003–04 CPS freshman class, most of the students in this last group were enrolled at achievement academies (schools for students who failed to meet the eighth-grade promotion standards). The number of students counted as off-track because of failure to accumulate credits has declined over the last decade as students have been attempting a larger number of credits. In the 1994–95 freshman class, for example, 47 percent of students failed to earn at least

**Table 1: Percentage of First-Time Freshmen in 2003–04 On- and Off-Track by Credits Earned and Number of F’s**

Number of semester F’s in core courses (1 semester course = 0.5 credit)	Number of credits accumulated freshman year (1 full year course = 1 credit)	
	Less than 5.0	5.0 or more
<b>2 or more*</b>	<b>Off-track (23%)</b>	<b>Off-track (14%)</b>
<b>0 to 1</b>	<b>Off-track (4%)</b>	<b>On-track (60%)</b>

\* Students who fail one full year of a course (i.e., two semesters) are considered off-track. Percentages represent students in the 2003-04 freshman cohort who remained in school through the spring semester. Students who dropped out before the end of spring semester (3 percent of the cohort) are not included in this table. If they were included, the on-track rate would be 58 percent, as shown on pages 5 and 12.



five credits in their freshman year, and 9 percent of the class failed to earn five credits despite failing no more than one semester class.<sup>7</sup>

One might expect that students who leave elementary school with high test scores are more likely to be on-track in their first year of high school. This is true. Yet many students with low and average test scores can and do succeed in high school. Likewise, students with strong elementary test scores do not universally perform well in their high school courses. In the 2003–04 freshman class, for example, of the students who entered with very high eighth-grade test scores (those in the top quarter of their class), almost one-quarter were off-track by the end of their freshman year. On the other hand, of the students who entered high school in 2003–04 with very low eighth-grade test scores (those in the bottom quarter of their class), more than 40 percent were on-track by the end of freshman year.

This suggests that students need additional skills besides those measured by achievement tests in order to succeed in high school. The transition to high school places significant demands on students—academically, socially, and behaviorally. Schools can ease these demands by providing a safe, supportive environment and by working with students to help them develop appropriate skills, behaviors, and strategies to deal with obstacles that develop.

There are large differences across schools in on-track rates, suggesting that school climate and structure make a difference in helping students succeed during their freshman year. A student’s likelihood of being on-track differs markedly from school to school. Schools’ freshman on-track rates vary from just over 30 percent to just over 90 percent, with three-fourths of schools having between 47 and 77 percent of their students on-track at the end of their freshman year

## ON-TRACK RATES BY STUDENTS’ BACKGROUND CHARACTERISTICS

### On-Track Rates by Students’ Race and Gender

*Students in the 2003–04 Freshman Cohort*

Race/Ethnicity	Female	Male	Total
African-American	59.8%	44.2%	<b>52.3%</b>
Asian	87.0%	79.0%	<b>83.0%</b>
Latino	66.8%	52.0%	<b>59.4%</b>
White	80.3%	67.3%	<b>73.5%</b>
<b>Total</b>	<b>65.0%</b>	<b>50.5%</b>	<b>57.9%</b>

### On-Track Rates by Students’ Economic Background and Eighth-Grade Test Scores

*Students in the 2003–04 Freshman Cohort*

Economic Status	Eighth-Grade Iowa Tests of Basic Skills (ITBS) <i>(reading and mathematics combined)</i>				Total
	Lowest Quartile	Second Quartile	Third Quartile	Highest Quartile	
Lowest quartile	41.9%	50.1%	60.6%	74.5%	<b>52.4%</b>
Second quartile	40.2%	48.9%	62.2%	76.1%	<b>54.1%</b>
Third quartile	43.2%	50.6%	61.9%	78.4%	<b>58.5%</b>
Highest quartile	49.4%	51.2%	63.2%	82.5%	<b>66.3%</b>
<b>Total</b>	<b>42.9%</b>	<b>50.1%</b>	<b>62.0%</b>	<b>78.7%</b>	<b>57.9%</b>

Note: Freshman-year dropouts are counted as off-track.

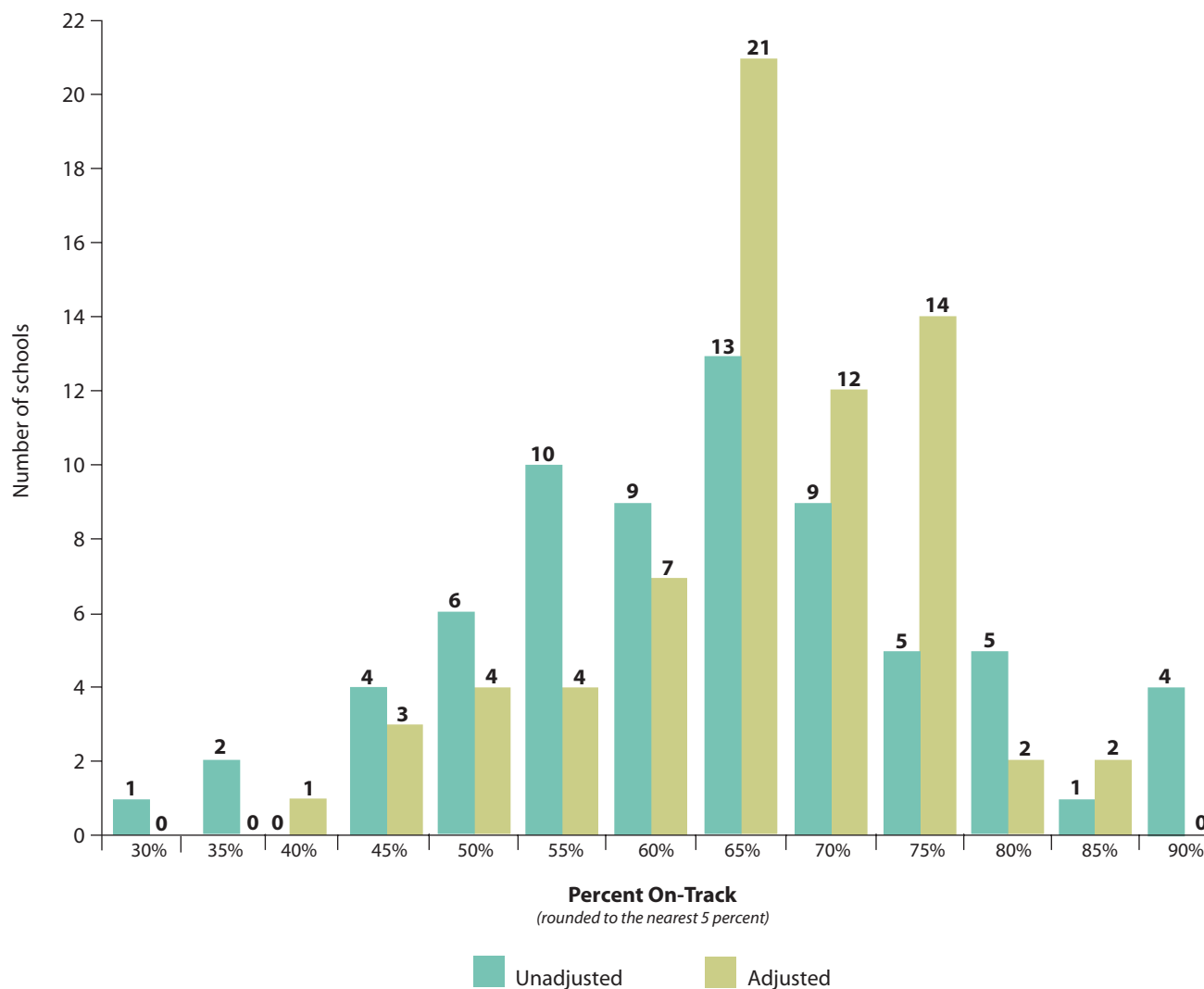
backgrounds who fail. While students with similar backgrounds may share some common experiences, students have their own individual strengths and weaknesses that will contribute to their ability to make a successful transition to high school. The on-track indicator is a better predictor of high school graduation than a student’s race/ethnicity, elementary achievement, or economic background. It is highly predictive of graduation among all types of students. By using the on-track indicator, schools can focus their resources on individual students who are at highest risk for failure, rather than simply focusing on their backgrounds.

Our previous report, *Graduation and Dropout Trends in Chicago*, showed large differences in graduation and dropout rates based on students’ gender and race/ethnicity. Therefore, it is not surprising that similar differences exist in on-track rates. Likewise, there are substantial differences in on-track rates based on students’ economic status and their achievement levels upon leaving elementary school. Disparities by race/ethnicity, gender, and economic status are troubling and highlight the fact that substantial work remains to be done to provide equal educational experiences for all students.

At the same time we must be cautious not to stereotype students based on their background characteristics. There are many students who succeed in their first year of high school even when their background characteristics suggest they might not, and others with advantaged

Figure 1

### On-Track Rates of CPS Schools



**Note:** On-track rates have been rounded to the closest 5 percent. Adjusted rates take out differences that can be explained by the characteristics of students entering each school’s freshman class, including differences in race/ethnicity, gender, elementary achievement test scores, economic status, and age at entry into high school.

(see Figure 1). Some of these across-school differences result because schools enroll students with very different levels of preparation for high school. But even when we compare only those students with similar background characteristics (i.e. the same elementary test scores, gender, race/ethnicity, economic background, and age at entering high school) we still see large differences in on-track rates based on the school they attend. The on-track rate for students with background characteristics that are typical for CPS (e. g. aver-

age achievement and average economic status) differs by almost 20 percentage points (from 56 to 75 percent) among the middle three-fourths of schools, and by 40 percentage points if all schools are compared.<sup>8</sup> This suggests that students’ likelihood of being on-track at the end of freshman year depends quite a bit on which school they attend. In this study we have not investigated which factors are responsible for these differences, but work is continuing in this area.

## HOW IS ON-TRACK STATUS RELATED TO HIGH SCHOOL GRADUATION?

The on-track indicator is highly predictive of whether students eventually graduate. Among students entering a CPS high school in 1999, those who were on-track by the end of their freshman year were more than three and one-half times more likely to graduate in four years than off-track students (see Figure 2). A full 81 percent of the students on-track at the end of freshman year graduated from high school in 2003, four years after beginning high school; however, only 22 percent of the off-track students graduated in four years. After a fifth year of high school, some additional students from both the on- and off-track groups graduated. Among students who began high school in 1999, on-track students were three times as likely to graduate within five years as off-track students (85 percent compared to 28 percent).

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*Many students enter high school with relatively weak test scores, yet are on-track in their freshman year and graduate in four years.*

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It might seem obvious that students who do well in school their freshman year continue to do well throughout high school up to graduation. But the importance of course performance in high schools is often overlooked, especially in the current era of accountability, when test results often take predominance over students' actual classroom experiences. Test scores are important measures of student success, but they are only part of the picture. We know that students who enter high school with stronger elementary school test scores are more likely to succeed in high school than low-scoring students. But the relationship between being on-track and graduating from high school holds even when we factor in students' preparation for high school as measured by eighth-grade achievement tests.

Many students enter high school with relatively weak test scores, yet are on-track in their freshman year and graduate in four years. More than 40 percent of the freshmen entering ninth grade in fall 2000 with low eighth-grade test scores (those in the bottom quarter of their class) were on-track at the end of their freshman year and 68 percent of these on-track students graduated four years later (see Figure 3). Even though these students began high school with eighth-grade achievement that was well below the system average, their graduation rates were much higher than typical in CPS because they were successful in their first

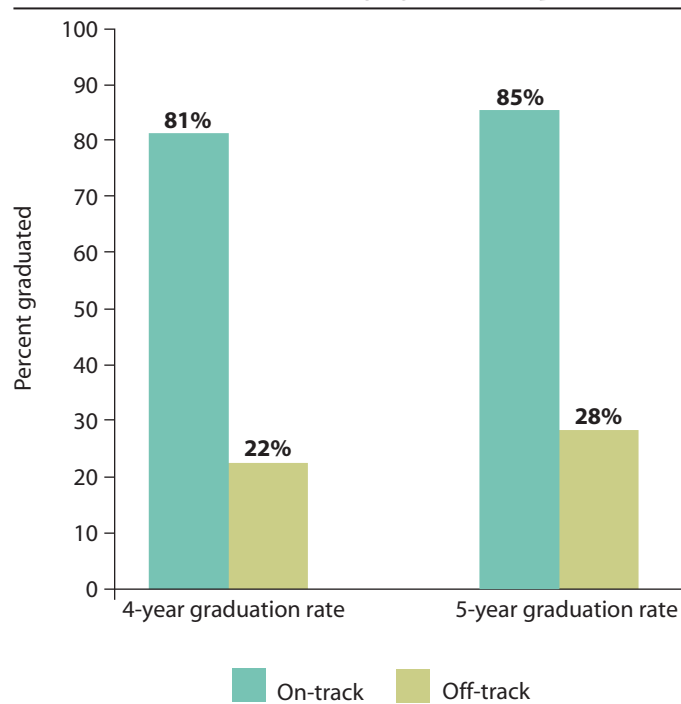
year of high school.<sup>9</sup> Likewise, having high achievement in eighth grade does not guarantee that a student will succeed in high school. Almost one-quarter of students who began high school with high eighth-grade achievement (those in the top quarter of their class) were not on-track at the end of their freshman year. Although these students graduated from elementary school with strong test scores, only 37 percent of these off-track students graduated from high school within four years.

Students who enter high school with strong achievement test scores are more likely to be on-track than lower-scoring students, but the important message to take from these data is that low-scoring students can and do perform well in their course work, and this performance is likely to lead to high school graduation. At the same time, students who have shown success in elementary school (as

measured by test scores) do not necessarily succeed in their first year of high school. Even though they come into high school with high test scores, students are unlikely to graduate if they do not make a suc-

Figure 2

**Four- and Five-Year Graduation Rates by Whether On-Track at the End of the Freshman Year**  
*Students entering high school in September 1999*



**Note:** Students who dropped or transferred out of CPS before the end of the school year are not included in these calculations. If students who dropped out during their first year were included, the off-track graduation rates would be 20 percent (4-year) and 25 percent (5-year). The on-track rates would remain the same.

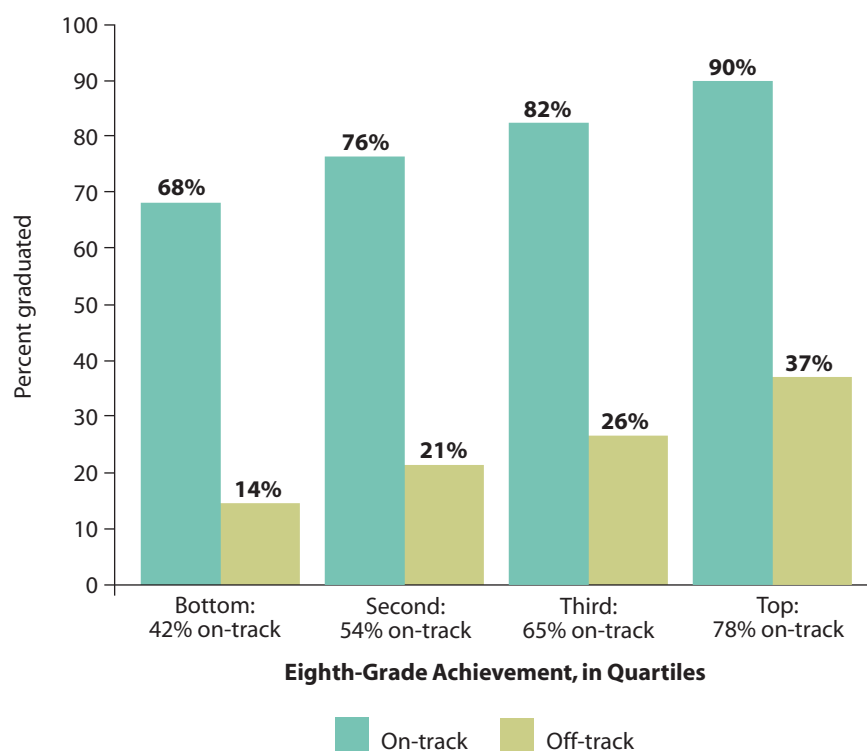
**WE ARE NOT SUGGESTING THAT STUDENTS BE GIVEN PASSING GRADES IF THEY HAVE NOT SHOWN ADEQUATE MASTERY OF COURSE MATERIAL**

The relationship between course F's and graduation is strong, and knowledge of this relationship may tempt a sympathetic teacher to give a student credit despite failing to meet standards for the class. We are not advocating this. To the contrary, such an action may demonstrate to the student that little effort is necessary for passing, thus making the student more likely to fail subsequent courses. We are also not suggesting that course requirements be “dumbed down” to make it easier for students to pass. If a class is too easy, students may lose motivation to attend, and may be more likely to fail that class and subsequent classes that require the knowledge and skills they should have learned. They may also be unprepared for subsequent demands in college or the labor market. Instead, we are advocating that teachers and schools identify students who are failing, find out why they are failing, and then try to give them the support they need to recover from this failure and avoid future failures.

Figure 3

### Four-Year Graduation Rates by On-Track Status after Freshman Year and Incoming Reading and Mathematics Achievement

*Students entering high school in September 2000*



**Note:** Students who dropped or transferred out of CPS before the end of the school year are not included in these calculations.

successful transition into high school. The on-track indicator is a much better predictor of graduation than eighth-grade test scores.<sup>10</sup>

One may wonder whether both being on-track and graduating mostly reflect students' background characteristics, including their elementary school achievement as measured by standardized tests. Often one hears reports that students fail their courses because of background factors such as poverty, low levels of parental education, and poor preparation in elementary school. If these are the main reasons for course failure, we may see a strong association between the freshman and senior outcomes simply because the same types of students—those with disadvantaged backgrounds—are both off-track freshman year and dropouts by what should be their senior year. To

see if this was true, we conducted statistical analyses to determine the extent to which being on-track is important in and of itself for graduation, and not merely reflective of students' background characteristics.<sup>11</sup> Our analyses showed that the on-track indicator is not merely a reflection of students' background characteristics, including prior achievement. The relationship between being on-track and graduating remained very strong after accounting for differences between students such as elementary achievement, race/ethnicity, gender, economic status, and age at entering high school. For example, if we only look at students with background characteristics typical for CPS students (i.e., average CPS students), we see that the students on-track at the end of freshman year were 55 percentage points more likely to graduate in four years than similar off-track stu-

dents in the same school (81 percent compared to 26 percent).<sup>12</sup> As shown in the sidebar on page 5, on-track rates are related to students' background characteristics—their elementary achievement levels, gender, race/ethnicity, and economic status. However, these background characteristics do not predetermine who will be off-track, nor who will graduate. Furthermore, the on-track indicator is an equally good predictor of graduation for all students, regardless of their background.<sup>13</sup>

The statistical analyses also allowed us to determine whether the strength of the relationship between being on-track and graduating was the same in all schools, even selective enrollment schools. We found that it was. Only one school showed a slightly weaker relationship, with a 49-percentage-point difference in graduation rates

between students on- and off-track at the end of freshman year, compared to a 55-percentage-point difference in the other schools. While schools differ markedly in the percentage of students on-track at the end of the freshman year, the on-track indicator is an equally good predictor of graduation in all schools.

## A Closer Look at the Two Components of the Indicator

On-track combines two indicators—the number of credits earned and the number of semester F’s in core subjects. Each of these on its own is highly predictive of graduation.

Figure 4 shows the relationship between number of credits earned freshman year and graduation rates. Clearly, the more credits students earn freshman year, the more likely they are to graduate in four years. There is a particularly large gap in graduation rates between students who earn six or more credits and those who earn fewer, and a somewhat smaller gap between those who earn five or more credits and those who earn fewer.

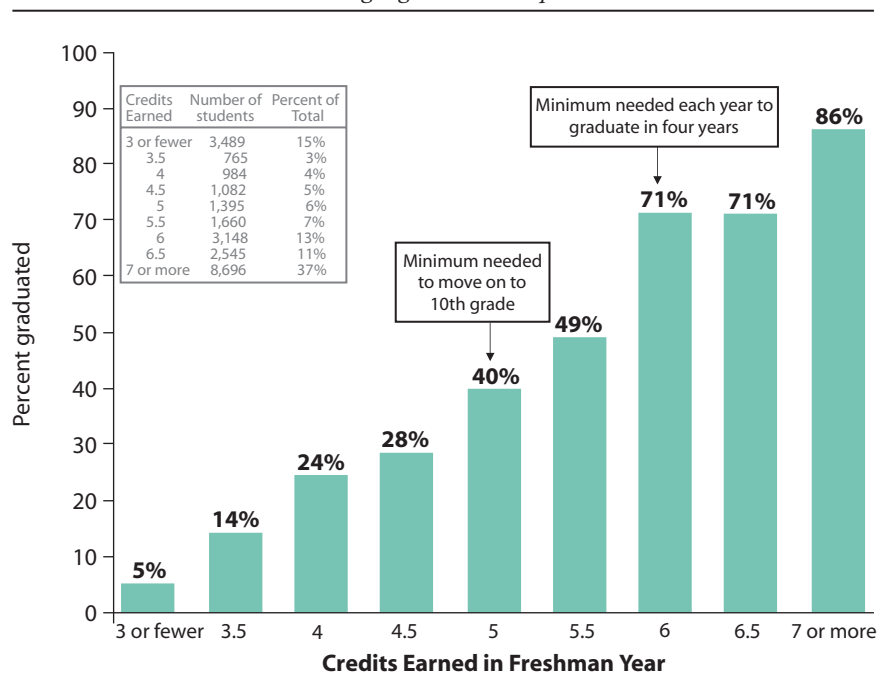
Five credits is the minimum number required for a student to be considered on-track because this is the number CPS mandates in order for students to be promoted to tenth grade. Yet this is obviously a minimum standard; only 40 percent of students with exactly five credits graduate in four years. CPS requires 24 credits in order to graduate, or an average of six per year. Therefore, students actually need to earn more than five credits in their first year; otherwise they will need to pass a heavier course load in a later year or go to summer school in order to catch up. Figure 4 shows the much higher graduation rate of students with six or more credits at the end of freshman year. More than 70 percent of students who earned six credits in their freshman year graduated, and fully 85 percent of freshmen who earned seven or more credits graduated in four years.

The second component of the on-track indicator is failure in the core courses required for graduation. The number of core course failures, like the number of full credits earned, is highly predictive of who will eventually graduate (see Figure 5). The vast majority of students (83 percent) who received no semester F’s in core courses during the freshman year graduated within four years. Students who received just one semester F had a graduation rate more than 20 percentage points lower than students who passed all their courses. A second semester F meant a graduation rate 16 percentage points lower. Fewer than one-third of freshmen with three or more semester F’s, or 1.5 full-course F’s, graduated in four years.

The relationship between number of F’s and graduation is equally strong among students who enter high school with strong elementary achievement as among students with weak elementary achievement. In fact, students who were high achieving in elementary school (in the top quartile

Figure 4

**Four-Year Graduation Rate by Credits Earned in Freshman Year**  
*Students entering high school in September 2000*



**Note:** Students who dropped or transferred out of CPS before the end of the school year are not included in these calculations. These figures are based on students who were actively enrolled and received course grades in both the fall and spring.

*The vast majority of students (83 percent) who received no semester F's in core courses during the freshman year graduated within four years.*

of their class) but failed just two semester courses their freshman year were much less likely to graduate than students who were low achieving in elementary school (those in the bottom quartile) and passed all their freshman-year courses. Seven percent of students with high elementary achievement (in the top quartile) failed two semesters their freshman year and only 54 percent of those students graduated.

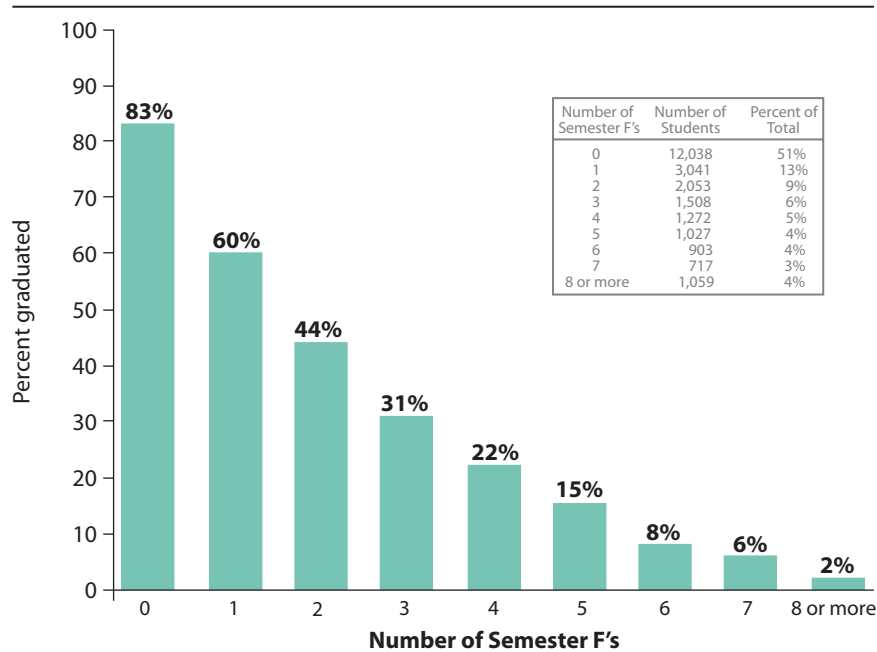
Seventeen percent of high-achieving students failed more than two semesters, and these students had even lower graduation rates than those who failed just two semesters. In contrast, 39 percent of students with low elementary achievement (in the bottom quartile) failed no courses their freshman year and 70 percent of these students graduated.

We also looked into whether the type of course failed affected the likelihood of graduation. For example, does failing a math class make a student less likely to graduate than failing a science class? We found that the relationship between course failure and graduation was similar across all subjects. For example, among CPS students who were freshmen in 1999, graduation was correlated with English failure, math failure, and science failure at -0.49, and with social science failure at -0.48.

Figure 5

**Graduation Rates by Number of Semester F's in Core Courses in Freshman Year**

*Students entering high school in September 2000*



**Note:** Students who dropped or transferred out of CPS before the end of the school year are not included in these calculations. These figures are based on students who were actively enrolled and received course grades in both the fall and spring semesters.

# 3

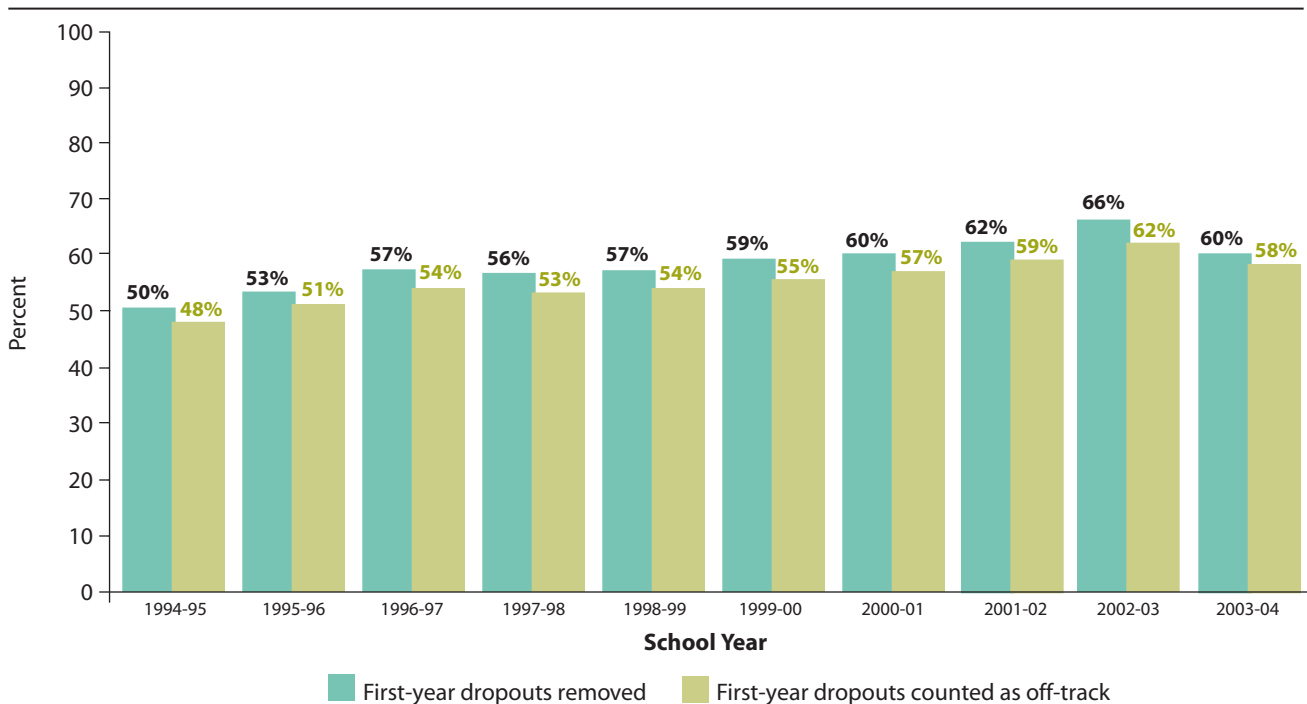
## WHAT ARE THE CITYWIDE TRENDS IN THE ON-TRACK RATE AND ITS COMPONENTS?

Freshman on-track rates in CPS improved from 1994–95 to 2003–04, from 48 percent to 58 percent, counting freshman-year dropouts as off-track as CPS does (see Figure 6). For the most part, increases occurred each year, with one minor exception and a second larger exception. The minor exception occurred in 1997–98 when the on-track rate dipped slightly from 54 percent to 53 percent. The larger exception occurred in the 2003–04 school year, when

the on-track rate of 58 percent represented a significant decrease from the previous year's rate of 62 percent. Improvements have been occurring because students are attempting more credits in the freshman year and passing them at higher rates. The declines occurred because of specific changes in CPS course-taking requirements that made students more likely to fail at least two semesters of a core course.

Figure 6

Percentage of Students On-Track by the End of Freshman Year





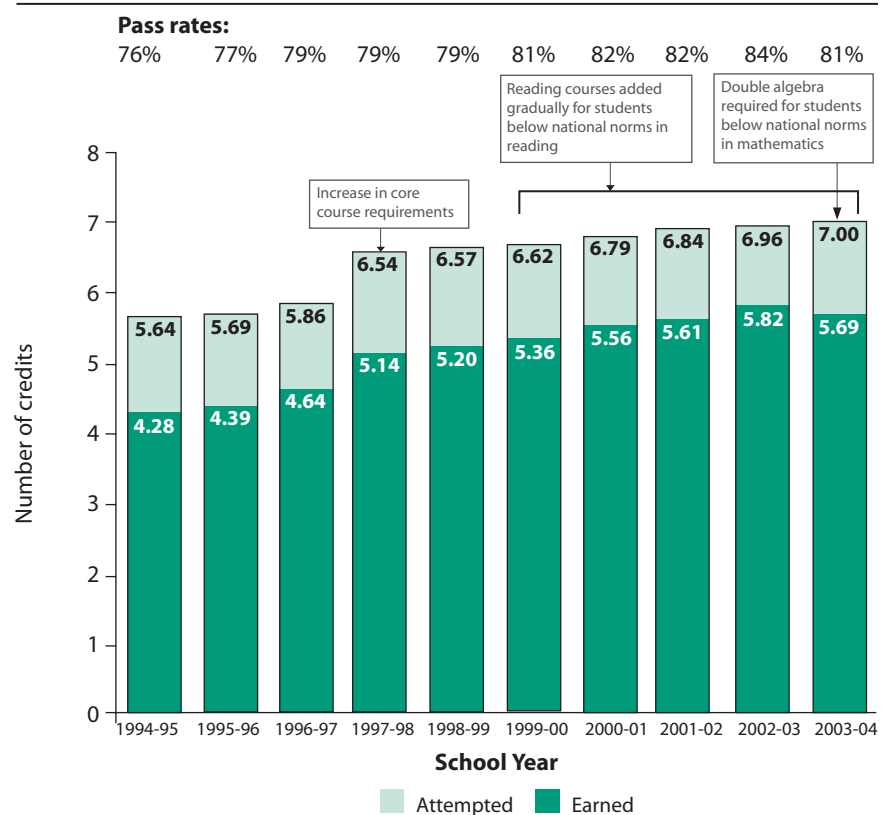
Over the past 10 years, there has been a substantial increase in the average number of courses taken by freshman students. As Figure 7 shows, in 1994–95 the average freshman enrolled in fewer than six full-year courses per year (5.64 courses, on average). The biggest jump in course-taking occurred in the 1997–98 school year, when new, more demanding graduation standards went into effect for freshmen. With the new standards, many students attempted more than six credits in their freshman year—6.54 full-year credits, on average, or almost one full-year course more than in previous years. The average number of courses taken continued to increase each year thereafter, although more slowly. In 2003–04, the average freshman enrolled in 7.0

courses, more than one-quarter of the 24 needed to graduate. Going from an average of 5.64 classes in 1993–94 to 7.00 in 2003–04 is a major increase—the average freshman takes 24 percent more coursework now than previously.

Enrolling in courses, while important, is no guarantee of success. Students must pass their courses in order to graduate. Like courses attempted, credits earned have also increased steadily from 1994–95 to the present, with the exception of this past school year—the first in a decade to show a decline in credits earned. In 1994–95 the average freshman earned 4.28 credits out of the 5.64, for a pass rate of 76 percent. In 2003–04 the average freshman earned 5.69 credits out of 7.00 enrolled, for a pass rate of 81 percent. Over the past decade, students have been attempting more courses and passing them at somewhat higher rates. This has resulted in students earning more credits for graduation. As a result, more students are on-track to graduate in four years. Despite the slight decrease in credits earned this year, students in the 2003–04 freshman class

Figure 7

### High School Credits Attempted and Earned by First-Time Freshmen



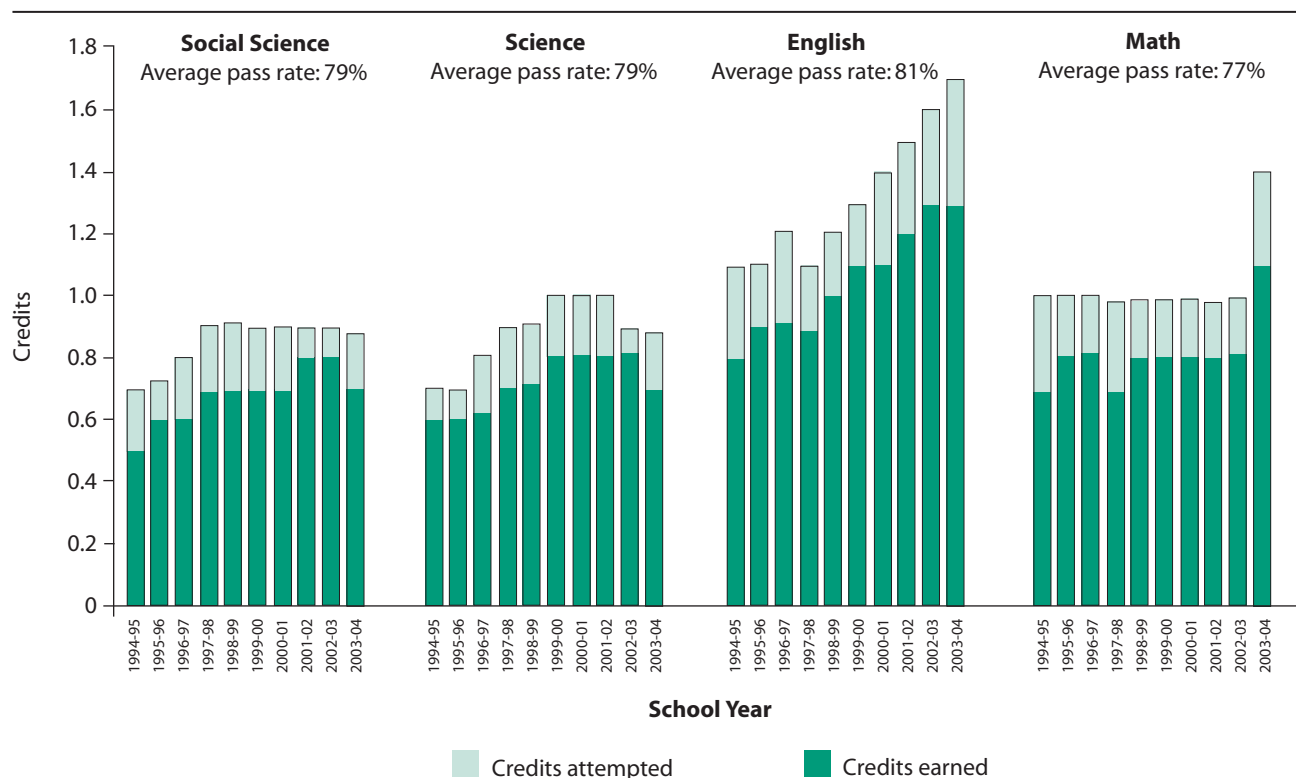
earned one-third more credits than did the freshman class of 1994–95.

The increases in course-taking that we have seen over the past 10 years can be directly linked to various changes in CPS policy and practices. Figure 8 shows that enrollment in science and social studies increased in 1997 with the institution of additional graduation requirements in these subjects. Enrollment in English classes began to increase substantially with the 1999–00 school year, when CPS started to require double-period classes for students with poor reading skills. In 2003–04, math course-taking spiked when CPS required students scoring below national norms in mathematics to enroll in a second math course (Algebra Problem Solving).

The largest increase in on-track rates came in the 2002–03 school year, which was also the first year on-track rates were used for accountability purposes. It is possible that the improvements seen in this school year resulted because of greater pressure on schools to improve their freshman on-track rates. However, improvements

Figure 8

Credits Attempted and Earned by Subject, 1994–95 through 2003–04



Note: See Table B in the Appendix for yearly pass rates by subject.

did not continue with the subsequent classes of freshmen, although the accountability standards remained the same. On-track rates may have been exceptionally strong for the 2002–03 freshman class because these were the first students to pass through the third-grade promotion standard in 1997. Only those students who passed the third-grade promotion standards entered high school in 2002.<sup>14</sup> The low-scoring third-grade peers of the freshman class of 2002–03 were held back by the promotion standard and became part of the freshman class of 2003–04. Figure 9 shows that each class that was the first to pass through a promotion gate showed particularly high course pass rates compared to the previous year’s class, perhaps because the weakest students were moved into the following year’s class.

Because the CPS promotion policy had the effect of shuffling the lowest-achieving students among freshman classes, it is difficult to determine the extent to which improvements in course pass rates have resulted simply from changes in

who is entering high school in each year versus changes in student preparation or changes in the high schools themselves. However, even without the exceptional classes—those first to experience the promotion standard—course pass rates seem to be improving.

### Why Did the On-Track Rate Decline in 1997–98 and 2003–04?

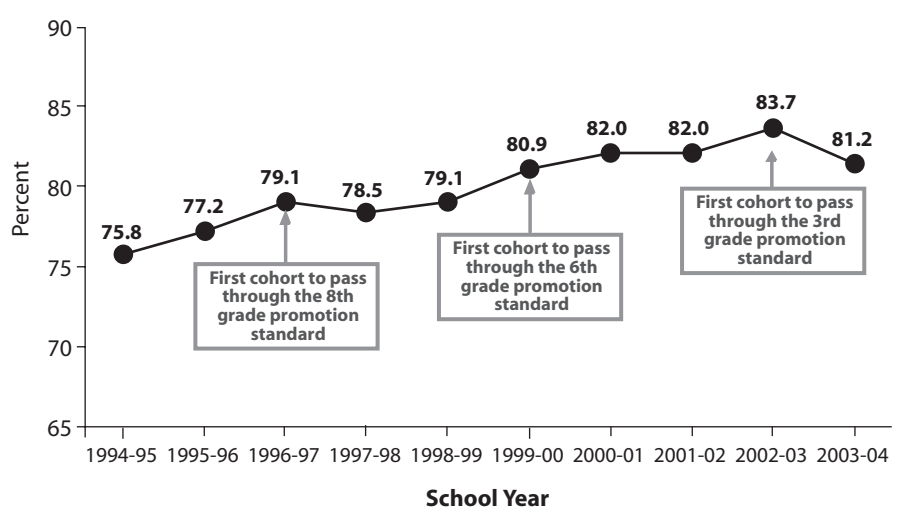
In general, on-track rates have been improving over the last 10 years because students have been attempting more courses and passing them at slightly higher rates. This has resulted in more students accumulating the credits needed to move on to tenth grade. However, higher rates of course-taking can have contradictory effects on on-track rates. The more courses that students take, the more credits they can accumulate; but at the same time, the more likely they are to receive more than one semester F. The declines in on-track rates in 1997–98 and 2003–04 are largely a

result of students receiving more F's in core courses because they attempted more credits. For the 2003–04 school year, most of the decrease in on-track rates can be attributed to a surge in course-taking in mathematics, due to a required double-period math class for students scoring below national norms in eighth grade on the Iowa Tests of Basic Skills. Because students were attempting more credits in a core course, they were more likely to receive more than one semester F in a core course during the school year. See Table B in the Appendix for details.

In addition to students taking more courses, the decrease in the 2003–04 on-track rates also occurred because of an increase in course failure rates. Course failure rates increased in 2003–04 across all subjects, and even among academically strong students who were not required to take the double-period math class. Details for course pass rates over the last ten years appear in Table B of the Appendix.

Figure 9

Course Pass Rates of Freshman Cohorts, 1994–95 through 2003–04



# 4

## HOW CAN THE RESULTS OF THIS STUDY HELP SCHOOLS IMPROVE THEIR GRADUATION AND DROPOUT RATES?

**D**ropping out is a complex process, often caused by many cumulative factors.<sup>15</sup> The complex nature of the problem makes it difficult to address. Course performance—credit accumulation and failures—may be a manageable place on which to focus attention. Discussions with the members of the Consortium’s Steering Committee and with CPS officials suggest two potential uses of these data for improving practice in high schools. One set of conversations has focused on what kinds of interventions for individual students would be most fruitful. A second set of discussions has involved the use of on-track data to initiate self-evaluation in schools based on additional in-depth data analysis. Here we discuss each of these in more detail.

The strong relationship between being on-track and graduating suggests a need for interventions for failing students before their second year of high school. Because all of our data are correlational, we cannot say with certainty what would happen to graduation rates if more students were prevented from falling off-track, or if recovery rates were improved among off-track students by the end of their freshman year. However, it seems very likely that graduation rates would improve. Some students fail to graduate because they have been unsuccessful in earning the credits needed to graduate. Working to improve on-track rates could reduce the number of such students. For other students, course failures may simply be a

sign that a student has disengaged from school—as the student stops participating in school and doing work, his grades will fall. For these students, efforts to improve on-track rates may be misdirected if they do not address other underlying problems. At the same time, some efforts to get students back on track might also re-engage such students in school.

How might intervention efforts for individual students work? One suggestion that we have heard is for schools to identify students who are likely to fail before they actually fail. We have been urged to look more closely into the characteristics of off-track students: What race are they? What gender? What family characteristics do they share? However, we are hesitant to recommend this. This study shows that freshman year performance is a much better predictor of graduation than simple categorization of students based on their backgrounds. It seems more productive to think about individual students who are at high risk of failure, rather than assuming that certain types of students will fail in high school.

We have neither the experience nor the expertise to advocate specific interventions. However, they are likely to include improving communications among schools, parents, and students; closer monitoring of student attendance and progress in class work by parents, teachers, and counselors; better course scheduling and incentives so that students quickly make up failed courses; development of strong relationships, including mentor-

### POTENTIAL REFINEMENT OF THE INDICATOR

The on-track indicator is a very good predictor of high school graduation. However, it does have weaknesses. One issue results from the contradictory effects on the indicator that occur as course-taking increases: the likelihood of getting more than one F increases along with the potential for earning more credits. Therefore, students are more likely to be counted as off-track if course-taking increases, even if pass rates improve and students earn more credits toward graduation. The on-track indicator could be refined based on pass rates instead of number of F's. In addition, the indicator currently uses a very low baseline of credit accumulation for defining students as on-track: only the five credits required by CPS for promotion to tenth grade. However, to be more likely to graduate in four years, students should earn six credits in their freshman year. A six-credit minimum may be more appropriate as the criterion for identifying students likely to graduate in four years. Finally, it should be reiterated that this is only an indicator of adequate performance in the freshman year, and provides little information as to whether students are acquiring the skills they will eventually need to do well in advanced classes, or to prepare for college or work. A second indicator of progress at a higher level of performance would be useful for schools to more fully evaluate their success in educating students.

ing, between students and teachers; and greater individualization of strategies and potential remedies. We doubt that there are one-size-fits-all solutions to helping students get on track and stay on track. There are some models for high school reform that seem to show promise in this area.<sup>16</sup>

We do have experience in raising questions about data, and we believe that schools could potentially use data on course failures to critically evaluate mechanisms in the school that tend to lead students to fail. For example school personnel may want to ask:

- Are failure rates higher at specific times of the day? For example, if first-period failure rates are high, are students having difficulty arriving at school on time? If last-period rates are high, are there sufficient monitoring procedures to make sure students are staying for a full day of school?
- Are students who enter high school with strong test scores failing courses at high rates? If so, why are they showing weak performance? Where are they encountering obstacles?

- How many students are off-track from failing just one or two courses? What are these students' options for getting back on track?
- How much do failure rates differ from one subject area to another? Is there a problem within a particular department in the school?
- Are there specific teachers whose failure rates are higher than those of colleagues who teach similar courses? If so, is this because of higher standards in these courses or because of the teaching style?

Looking into these questions can give schools a more exact definition of the nature of the challenges they face and suggest problem-solving approaches that are more precisely tailored. Further insight might be gained from talking to failing students about their experiences, or by looking at students' reports about the school's climate and expectations (e.g., feelings of safety and academic press) as reported in the Consortium's biannual individual school reports for schools that participate in our student survey.

# 5

## SUMMARY

This data brief provides evidence that freshman-year course performance is strongly linked to eventual graduation from high school. Students who are on-track at the end of their freshman year are more than three and one-half times more likely to graduate in four years than off-track students. One implication of this finding is that addressing freshman on-track rates should be a priority for schools working to improve graduation rates. It also suggests that parents, teachers, and counselors need to closely monitor students' course performance early in the first year of high school.

The on-track indicator is a tool that can be used to predict with high levels of accuracy who will graduate from high school. It is equally valid for predicting graduation among students entering high school with low achievement test scores as it is for students with average and high scores,

and among students at all types of high schools. Being on- or off-track at the end of freshman year is a much better predictor of high school graduation than eighth-grade test scores.

This report contains some good news for CPS: on-track rates, course credit accumulation, and course passing rates have been increasing for about 10 years now, despite more rigorous requirements in these areas. Some of these gains are no doubt the result of having stronger students entering high school, but they also are likely the result of improvements in high schools themselves. Students are taking heavier course loads and passing courses at higher rates than at the beginning of the decade. Overall, student performance in high school is improving and this is reflected in improving graduation and dropout rates.<sup>17</sup>

## COMMENTARY

**Duncan Chaplin, Ph.D.**  
The Urban Institute  
Education Policy Center

Once again the Consortium on Chicago School Research has produced a valuable contribution to the literature on high school graduation rates. This time they present an indicator that predicts which students will graduate using data collected early in high school, a task that has long perplexed researchers.<sup>1</sup> Through a series of thoughtful analyses, the report's authors show that a measure of being on-track to graduate at the end of the freshman year (combining information on credits and grades) is a very strong predictor of high school graduation, and a much better predictor than pre-high school test scores.

These findings have a number of important implications for both policy and research. In the policy arena, this work suggests that an on-track indicator might serve as a short-term substitute for graduation rates for the purposes of No Child Left Behind (NCLB) accountability. Currently NCLB holds schools strictly accountable for test scores, but barely accountable for high school graduation rates. This is problematic because it means that a school can game the system by allowing (or even encouraging) lower-scoring students to drop out, thereby increasing the school's test scores. Furthermore it is extremely difficult to obtain valid estimates of graduation rates by school because schools often have little information on where students go when they leave. Even when states have longitudinal data on individual students, they often produce estimates of graduation rates that are implausibly high.<sup>2</sup> Consequently, indicators that do not require information about students after they have left school could be extremely valuable. A variation of the on-track measure analyzed here is one such indicator. More precisely, such an indicator could compare the fraction of students who left the school on-track to graduate out of those who enrolled at the school during a fixed period of time, say four years. This would show the school's success in preparing students to

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<sup>1</sup> Gleason and Dynarski (2002).

<sup>2</sup> Haney (2000); Greene with Winters (2002); and Swanson and Chaplin (2003).

graduate without requiring that schools know the education outcomes of their transfers and drop-outs.

One concern about NCLB indicators in general, and the high school graduation rate measure in particular, is that they do not take into account the wide variation in students' preparation for school. Hence, an unintended negative consequence of NCLB accountability is that it encourages schools to be very selective with regard to which students they let in and which they encourage to stay. A previous Consortium report<sup>3</sup> provides a method of mitigating this problem by calculating graduation rates adjusted for the pre-high school academic success of the students—rates that could be referred to as “value-added” graduation rate measures.<sup>4</sup> Similar methods are used in the current report to adjust the on-track measure (see Figure 1) and could be used to calculate value-added on-track indicators. Interestingly, the results presented suggest that there is somewhat less variation in school performance based on the adjusted indicator than based on the unadjusted performance.

Another important implication is that work like this could be used to develop intervention strategies for students struggling academically. For example, this paper suggests that while additional course-taking is generally helpful for later graduation, it can be harmful to the extent that it increases the likelihood that students fail at least some of their classes, particularly those in the core subject areas. This suggests that the school system should consider estimating the optimal course load for each student so that all students are sufficiently challenged but none are so over-burdened that they burn out and perhaps fail. Additional research, similar to the work presented here, might help to better identify the optimal course load and how it varies depending on prior student performance.

Finally, this work also points to the importance of considering factors other than just test

scores when evaluating school performance. Even assuming that standardized tests adequately measure the full range of benefits that students derive from education, we are still unable to obtain this information for students who drop out of school. In Illinois, NCLB accountability determinations for high schools are based on test scores taken at the end of the junior year. Any students who drop out before then are not included with the school's test scores. In addition, there is at least some reason to believe that high school graduation has important implications over and above test score measures alone. For example, I have previously presented evidence that years of education (and hence high school graduation) have independent impacts on later labor-market outcomes.<sup>5</sup> Similarly, this report shows that the on-track indicator appears to be a much better predictor of finishing high school than pre-high school test scores. This suggests that it is likely capturing valuable non-academic skills, such as the willingness to complete tasks and work with others.

While this latest work from the Consortium is valuable, some further analyses would serve to enhance its usefulness. For example, it would be helpful to compare alternative variations of their on-track indicator, to look at later outcomes such as college and labor-market performance, and to compare this indicator with additional indicators based, for example, on ninth-grade test scores and grades. Much of the data needed for these additional analyses are not currently available in Chicago but may become available in future years.

NCLB is designed to ensure that schools focus their efforts on a clear and finite set of goals and have strong motivations to reach those goals. While this is potentially very valuable, it will do society little good if the goals are not wisely chosen and schools do not know what they can do to reach those goals. By helping to address both of these issues, the Consortium's latest work represents an important contribution to ongoing discussions about how to improve NCLB.

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<sup>3</sup> Allensworth (2005).

<sup>4</sup> The term “value added” has been used extensively to refer to test-score-based measures of school performance that adjust for previous test scores.

<sup>5</sup> Chaplin (2003).



# APPENDIX—SUPPLEMENTAL TABLES

**Table A: Credits Earned by Number of Semester Course Failures**

*2003–04 Freshman Class*

Number of F's	Number of Credits					Total
	3 or fewer	4	5	6	7 or more	
0	42 0.16%	236 0.89%	221 0.83%	2,053 7.73%	11,109 41.82%	13,661 51.43%
1	19 0.07%	82 0.31%	378 1.42%	2,071 7.80%	431 1.62%	2,981 11.22%
2	63 0.24%	144 0.54%	733 2.76%	1,108 4.17%	128 0.48%	2,176 8.19%
3	92 0.35%	322 1.21%	917 3.45%	139 0.52%	20 0.08%	1,490 5.61%
4	231 0.87%	512 1.93%	523 1.97%	60 0.23%	4 0.02%	1,330 5.01%
5	534 2.01%	542 2.04%	73 0.27%	5 0.02%	1 0.00%	1,155 4.35%
6 or more	3,376 13.09%	267 1.01%	25 0.09%	1 0.00%	0 0.00%	3,769 14.19%
<b>Total</b>	4,457 16.78%	2,105 7.92%	2,870 10.80%	5,437 20.47%	11,693 44.02%	26,562 100.00%

**Table B: Course Pass Rates from 2000–01 through 2003–04**

Freshman Class	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
English pass rate	77%	77%	80%	78%	80%	81%	82%	82%	83%	81%
Science pass rate	75%	76%	77%	76%	77%	79%	81%	80%	82%	80%
Social science pass rate	74%	75%	77%	76%	76%	79%	81%	82%	83%	80%
Mathematics pass rate	71%	73%	75%	73%	74%	76%	77%	79%	81%	79%
Mathematics pass rate <i>Students below national norms on 8th grade Iowa Tests of Basic Skills</i>				65%	67%	68%	70%	72%	73%	72%
Mathematics pass rate <i>Students above national norms on 8th grade Iowa Tests of Basic Skills</i>				84%	85%	85%	83%	86%	87%	84%
Average number of semester F's in mathematics <i>Students below national norms on 8th grade Iowa Tests of Basic Skills</i>				0.35	0.34	0.32	0.31	0.28	0.28	0.47
Average number of semester F's in mathematics <i>Students above national norms on 8th grade Iowa Tests of Basic Skills</i>				0.16	0.16	0.16	0.18	0.14	0.14	0.17

**Note:** The national norms used prior to 1997 are not equivalent to those used after 2000. Therefore, statistics that separate students based on national norms are not presented for students tested before 1997.

## ENDNOTES

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<sup>1</sup> Roderick and Camburn (1996).

<sup>2</sup> The correlations between the following variables at the end of freshman year and graduation are: number of F's, -0.56; credits earned, 0.61; number of absences, -0.51; and grade point average, 0.61. Fall semester indicators are also very predictive of graduation, although slightly less than full-year indicators (number of F's, -0.48; credits earned, 0.51; number of absences, -0.46; and grade point average, 0.57).

<sup>3</sup> Miller et al. (1999).

<sup>4</sup> Miller, Allensworth, and Kochanek (2002).

<sup>5</sup> Allensworth (2005).

<sup>6</sup> Chicago Public Schools (2004). In addition to needing five full credits, a student must also pass three full core courses to be promoted to tenth grade. This promotion standard is somewhat different from the core course component of the on-track indicator used for accountability, which requires no more than one semester failure in a core course. Therefore, some students who are promoted according to CPS criteria are considered off-track by our definition.

<sup>7</sup> Graduation requirements were also less stringent for this class, with 21 credits required instead of 24.

<sup>8</sup> These differences were determined using statistical models that allowed us to compare on-track rates across schools after removing differences that could be explained by the background characteristics of entering students. We ran two-level hierarchical generalized linear models with students nested within schools, predicting whether a student was on-track with the following variables (all at the student level): scores on the Iowa Tests of Basic Skills in third through eighth grade; level of poverty in neighborhood of residence (from 2000 census data on block groups); average social status in neighborhood of residence (from 2000 census data on block groups); age at beginning high school; race/ethnicity; gender; and dummy variables representing whether the student entered high school from a private elementary school, a non-CPS public school, or as a returning CPS student.

<sup>9</sup> The systemwide average graduation rate for the CPS students who were freshmen in 2000 was 54 percent.

<sup>10</sup> Figure 3 actually exaggerates the achievement-graduation relationship in comparison to the on-track-graduation relationship because it contrasts students with extreme differences in achievement—the top quartile compared to the bottom quartile. When we compare graduation rates by whether students are on-track, we are comparing the bottom 40 percent of students, in terms of course performance, to the top 60 percent. A similar comparison by achievement shows that students entering high school with eighth-grade achievement in the top 60 percent had graduation rates about 28 percentage points higher than students with achievement in the bottom 40 percent (71 percent compared to 43 percent). This is much smaller than the almost 60-percentage-point difference in graduation rates between on- and off-track students.

<sup>11</sup> We ran two-level hierarchical generalized linear models with students nested within schools, predicting graduation with the following variables (all at the student level): on-track at the end of freshman year; scores on the Iowa Tests of Basic Skills in third through eighth grade (their latent eighth-grade score); level of poverty in neighborhood of residence (from 2000 census data on block groups, information on the percentage of men unemployed, and percentage of families under the poverty line); average social status in neighborhood of residence (from 2000 census data on block groups, information on average education levels of adults, and percentage of men employed as managers/executives/professionals); age at entering high school; race/ethnicity; gender; and dummy variables representing whether the student entered high school from a private elementary school, a non-CPS public school, or as a returning CPS student. The relationship between being on-track and graduating remained after accounting for these differences between students.

<sup>12</sup> These numbers are not quite identical to those in Figure 1 because of statistical adjustments. They represent the average graduation rate for students with characteristics typical of CPS who are on-track, compared to the average graduation rate for students with the same background characteristics but who are off-track.

<sup>13</sup> Additional statistical models run separately by race/ethnicity and gender, and for students with different economic and achievement backgrounds showed that students on-track at the end of their freshman year graduated at rates that were 50 to 60 percentage points higher than similar students who were off-track.

<sup>14</sup> Promotion standards were put into place for eighth-grade students in the 1995–96 school year, and for third- and sixth-graders in the 1996–97 school year. Students who did not obtain a minimum score on

the Iowa Tests of Basic Skills were required to take summer school; those who still could not achieve the minimum score were retained in grade. For details, see Roderick et al. (1999).

<sup>15</sup> See for example, Rumberger (2004).

<sup>16</sup> See Kemple and Herlihy (2004); and Bottoms, Presson, and Han (2004).

<sup>17</sup> Allensworth (2005).

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This report was designed and produced by the Consortium's Publications and Communications Department:

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*Cover photo by John Booz*

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**John Q. Easton** is Executive Director at the Consortium on Chicago School Research. He is the lead author of the first Consortium research study, *Charting Reform: The Teachers' Turn* (1991), and an ongoing series of annual studies of elementary school test score trends, including *How Do They Compare? ITBS and ISAT Reading and Mathematics in the Chicago Public Schools, 1999 to 2002* (2003). In the 2001 to 2002 school year, Easton served as Director of Research and Evaluation at the Chicago Public Schools, a position that he also held from 1994 to 1997. He is a member of the National Assessment Governing Board (NAGB), the independent, 26-member board that sets policies for the Nation's Report Card, the National Assessment of Educational Progress (NAEP). Easton received his Ph.D. in Measurement, Evaluation, and Statistical Analysis from the Department of Education at the University of Chicago.

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The Consortium on Chicago School Research aims to conduct research of high technical quality that can inform and assess policy and practice in the Chicago Public Schools. By broadly engaging local leadership in our work, and presenting our findings to diverse audiences, we seek to expand communication among researchers, policy makers, and practitioners. The Consortium encourages the use of research in policy action, but does not argue for particular policies or programs. Rather, we believe that good policy is most likely to result from a genuine competition of ideas informed by the best evidence that can be obtained.

Founded in 1990, the Consortium is located at the University of Chicago.

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ISBN 0-9726035-6-5 \$10.00  
5 1 0 0 0 >



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