



# Maintaining High Achievement in Baltimore: An Overview of the Elementary Grade Trajectories of Four Recent City Schools First Grade Cohorts<sup>1</sup>

A Research Report by the Baltimore Education Research Consortium

By Rachel E. Durham and Stephen B. Plank

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Over the past several years, Baltimore City Public Schools (City Schools) first grade students have increasingly demonstrated high levels of proficiency on foundational reading and mathematics skills. Large proportions of first-graders are performing above the national median on standardized assessments, and a current priority among City Schools leaders is ensuring that high achievement in first grade is sustained through the elementary grades and beyond. The focus of this study was to trace the achievement of four recent cohorts of City Schools first graders as they progress to third, fourth, and fifth grades. The main questions driving this study are:

- 1) How does first grade achievement relate to later elementary school achievement, and how have patterns changed across four successive cohorts of students? Specifically, how are previously high-performing students<sup>2</sup> scoring in third, fourth, and fifth grade? Further, are students who were previously low-performing students reaching “proficiency” on the Maryland School Assessment (MSA) by third, fourth, or fifth grade?
- 2) How have patterns in attendance, grade promotion, and out-migration from City Schools changed as cohorts progressed through the elementary grades?

## Introduction

In recent years, the gap between Baltimore schools’ performance and the rest of the state of Maryland has begun to shrink. Median test scores on both criterion and norm-referenced tests have been rising, especially among students in the elementary grades. Test performance in Baltimore has continually improved over the past decade, on average, so that finally in the summer of 2009, City Schools was removed from ‘corrective action’ status for the first time in over a decade (*Baltimore Sun*, July 22, 2009). Under No Child Left Behind (NCLB) and its accountability framework, more schools are making Adequate Yearly Progress (AYP) each year.

In addition to the achievement measures presented in this document, other measures of student engagement show promise as well. In particular, by four years after first grade, more students are in their on-time grade as we move from earlier to more recent cohorts. Attendance rates have been increasing so that fewer students are chronically absent in the elementary grades.

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<sup>1</sup> The full technical report underlying this overview is available and can be downloaded at: <http://www.baltimore-berc.org> . Data analyses were prepared specifically for this report and may not match other published statistics.

<sup>2</sup> For this report, we define previously high-performing as at or above the 70<sup>th</sup> national percentile in first grade, and low performing as below the 30<sup>th</sup> national percentile in first grade)

In this study, we explored longitudinally the achievement trajectories of four first grade cohorts moving through four subsequent elementary school years, to what would be students’ on-time fifth grade year. Our cohorts include students beginning first grade in 1999-00, 2001-02, 2003-04, and 2004-05. Hereafter these cohorts will be referred to as Cohort 1, Cohort 2, Cohort 3, and Cohort 4, respectively.

The academic years traversed by Cohorts 1, 2, 3 and 4 are shown in Table 1.

Table 1. School Years Covered by Cohorts 1, 2, 3, and 4.

1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
<b>Cohort 1 (1999-00)</b> Year 1	====>	====>	====>	====					
		<b>Cohort 2 (2001-02)</b> Year 1	====>	====>	====>	====			
				<b>Cohort 3 (2003-04)</b> Year 1	====>	====>	====>	====	
					<b>Cohort 4 (2004-05)</b> Year 1	====>	====>	====>	====
						Year 2	Year 3	Year 4	Year 5
						Year 2	Year 3	Year 4	Year 5
						Year 2	Year 3	Year 4	Year 5

## Achievement

To answer Central Question (1) and to gain a clearer, longitudinal understanding of *how* City Schools has achieved these improvements, it is useful to compare fifth year scores to first grade performance. In this way, we can determine whether the trends shown above were caused primarily by rising achievement among initially low achievers, maintaining high achievement among the previously high scorers, or some combination of both. Further, by examining these relationships over four successive first grade cohorts, we can gauge whether trends across the elementary grades have changed over time.

For these first grade cohorts, we conducted statistical analyses to determine the predicted probability of students at various initial first grade achievement levels scoring Basic, Proficient, or Advanced in the third, fourth, and fifth years of the elementary grades.<sup>3,4</sup> For the purposes of these analyses we have grouped students who became behind grade for age by the outcome year with the Basic category, so that possible outcomes are: Basic or behind grade for age, Proficient, or Advanced.

While our statistical models generate predicted outcomes for students at every level of the first grade achievement distribution (from 1<sup>st</sup> to the 99<sup>th</sup> national percentile on a standardized assessment), in this document we select three substantively interesting levels— those at the 15<sup>th</sup>, 50<sup>th</sup>, and 85<sup>th</sup> national percentiles in reading or mathematics as first graders. These three levels conceptually correspond to below, at, or above appropriate grade-level performance, respectively.

<sup>3</sup> In this “Overview of Findings,” we only present results for Year 5 (which was fifth grade for most students). The full technical report also presents results for Years 3 and 4.

<sup>4</sup> Hierarchical multinomial logit models were estimated to account for the nested structure of the data, i.e., students nested within schools. Further, in all multivariate models and for each cohort, in addition to first grade achievement, we controlled for gender, minority status, free/reduced-price lunch status, special education status, prior retentions in grade, attendance rate for the outcome year, and number of school changes as of the outcome year. Thus, these *predicted* probability estimates differ significantly from the cross-sectional, unadjusted percentage counts of MSA performance presented by City Schools and the Maryland State Department of Education each spring.

**Figure 1. Year 5 MSA Reading Performance  
Among Students at the 15th NP in First Grade**

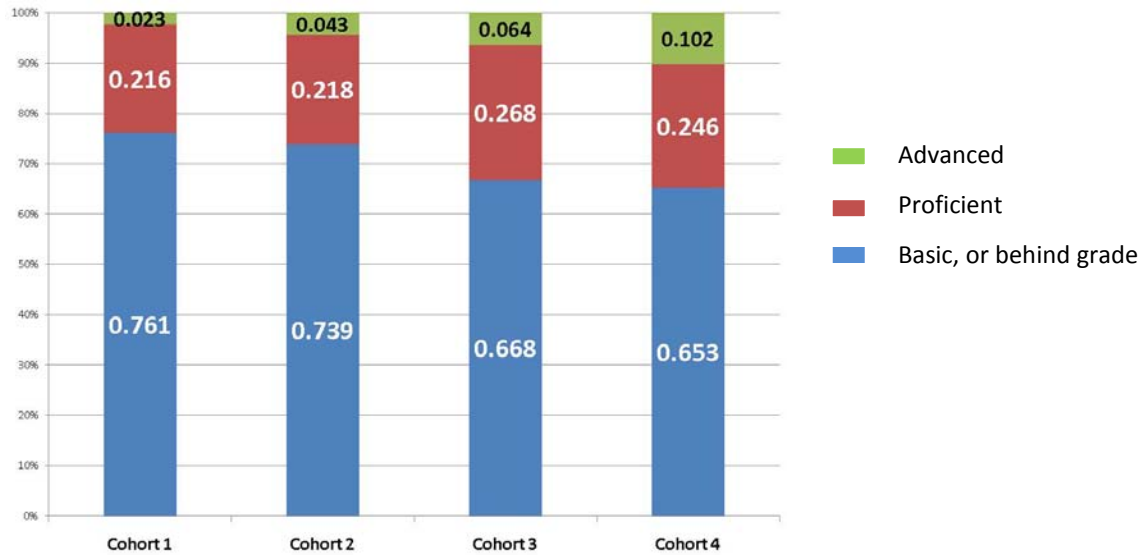


Figure 1 shows how students previously scoring at the 15<sup>th</sup> national percentile in first grade were performing in reading on the MSA in Year 5, or what was fifth grade for most students.<sup>5</sup> While most students scoring at the 15<sup>th</sup> national percentile in first grade in any of the cohorts scored Basic on the reading MSA or had fallen behind their on-time grade, the overall trend is that of an increasing probabilities of students scoring Advanced or Proficient as we move from the earlier to more recent cohorts.

Next, we examine the Year 5 reading performance of students who had scored at the 50<sup>th</sup> national percentile in reading in first grade.

**Figure 2. Year 5 MSA Reading Performance  
Among Students at the 50th NP in First Grade**

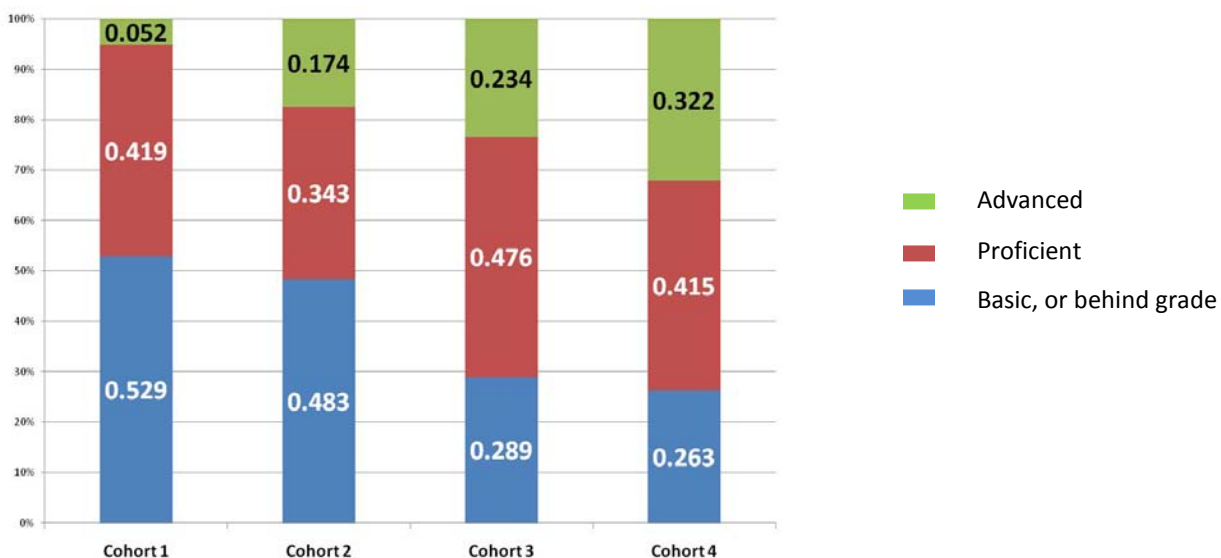
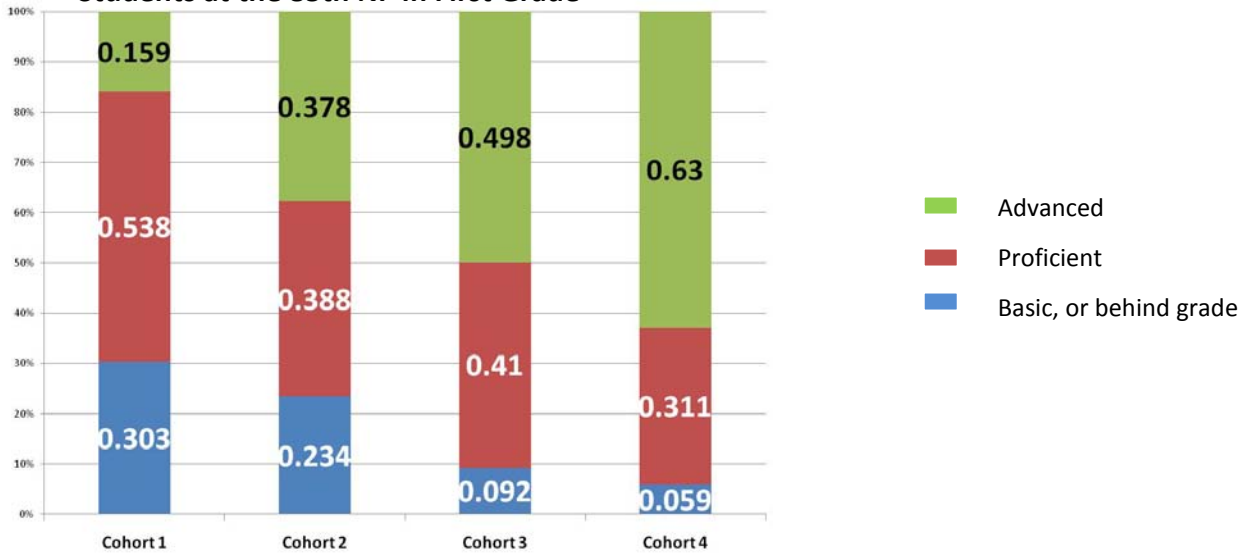


Figure 2 shows a similar trend where, across cohorts and over time, more students were scoring Advanced and Proficient while fewer students were scoring Basic or falling behind in grade.

<sup>5</sup> Numbers presented within the bar charts are the statistically adjusted probabilities of scoring at each level of the MSA in Year 5.

**Figure 3. Year 5 MSA Reading Performance Among Students at the 85th NP in First Grade**



Similarly, Figure 3 shows that by Year 5 the majority of students who had, in first grade, scored at the 85<sup>th</sup> national percentile were Advanced and Proficient in reading, with very few scoring Basic or falling behind grade. In fact, among Cohort 4 for whom Year 5 was 2008-09, scoring Advanced had become twice as likely than scoring Proficient, a pattern not evident among the earlier Cohort 1, where the majority of very high achieving first graders were scoring Proficient and notably fewer were scoring Advanced. These results show that for reading, City Schools has been increasingly able to keep very high performing students on track to maintain advanced performance throughout the elementary years.

Next, we examine math performance for these same cohorts.

**Figure 4. Year 5 MSA Mathematics Performance Among Students at the 15th NP in first grade**

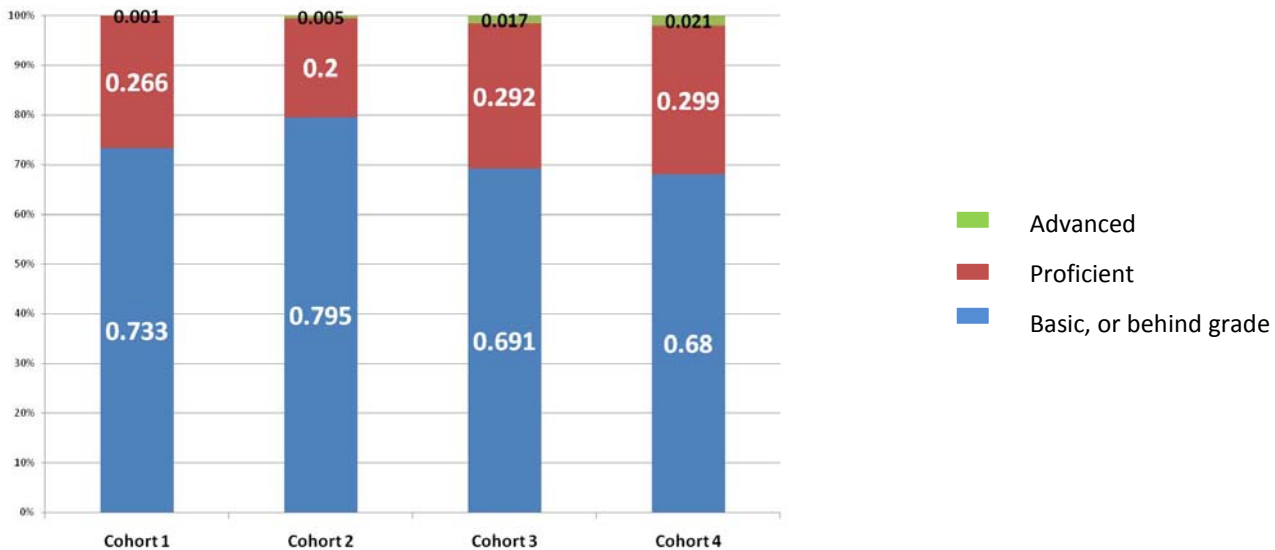


Figure 4 shows Year 5 Math MSA performance among City School students who had scored at the 15<sup>th</sup> national percentile on their math standardized assessment in first grade. The trend is somewhat more irregular, but comparing Cohort 3 to Cohort 1, we find that more students were scoring Proficient and Advanced than previously.

**Figure 5. Year 5 MSA Mathematics Performance Among Students at the 50th NP in First Grade**

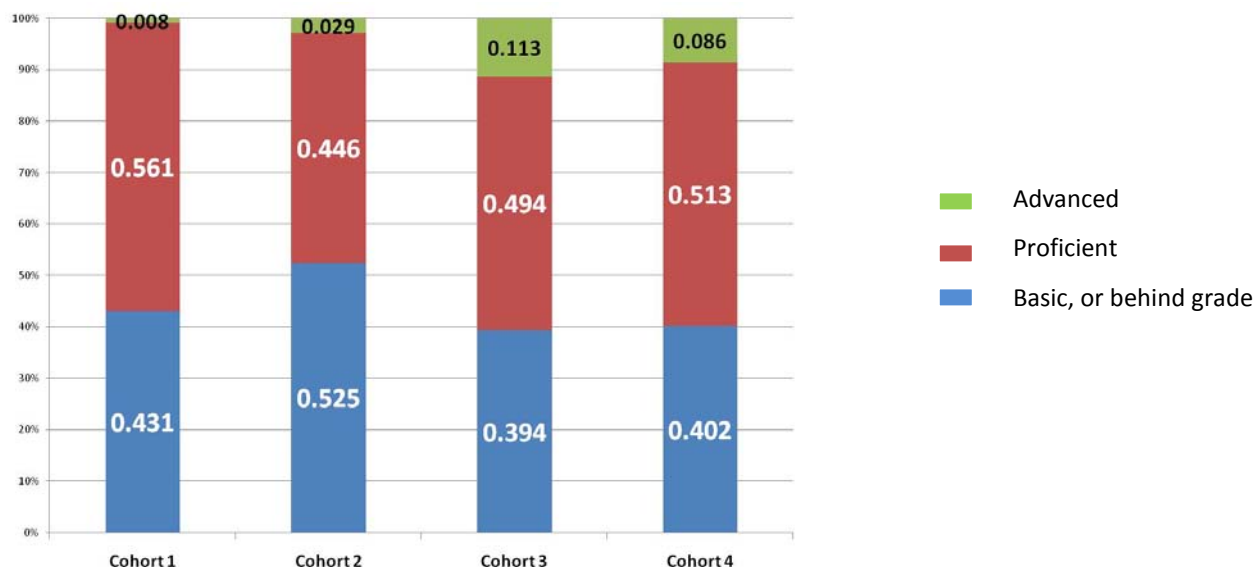
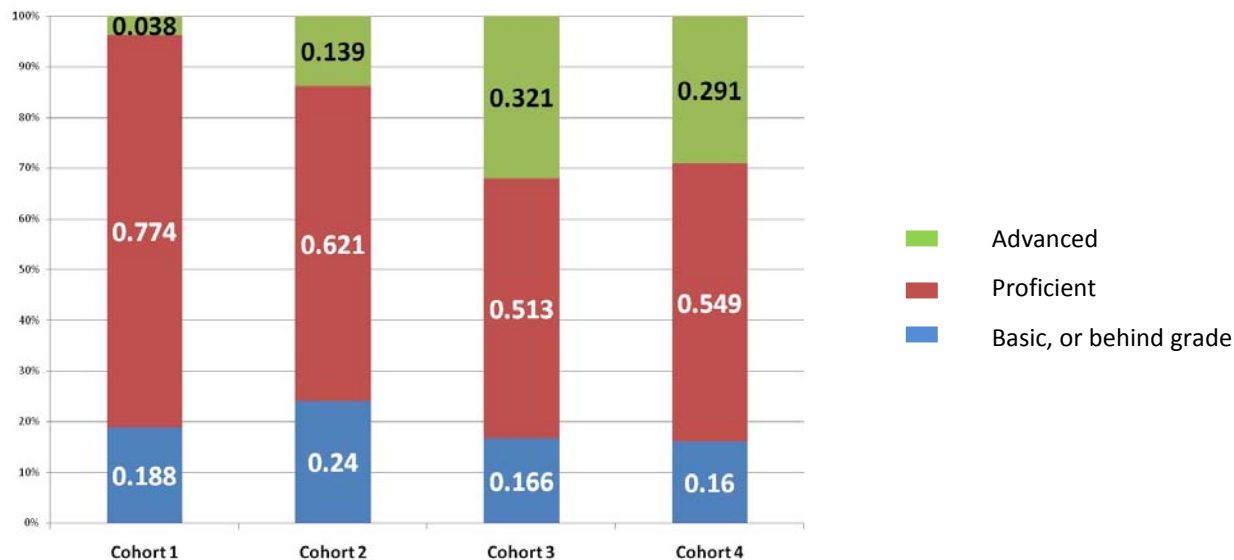


Figure 5 shows that by the fifth year, first graders at the 50<sup>th</sup> national percentile in math from Cohort 4, who began first grade in 2004-05, were primarily scoring Proficient and Advanced by 2008-09, and were doing so at a higher rate than Cohorts 1 and 2 had in Year 5.

**Figure 6. Year 5 MSA Math Performance Among Students at the 85th NP in first grade**



Finally, Figure 6 shows that there was an increasing trend for the highest-achieving first graders to be scoring Proficient and Advanced in Year 5. The probability for a student who had scored at the 85<sup>th</sup> national percentile in math in first grade to score Advanced on the MSA four years later increased from .038 to .321 from Cohort 1 to Cohort 3, an eight-fold increase in likelihood of remaining Advanced through the elementary years. Among Cohort 4, the probability of scoring Advanced of .291 along with the .549 probability of reaching Proficient is a continuation of this trend.

➡ These findings suggest that one key to getting all students to Proficient or Advanced status in later grades is increasing the proportion of students in first grade who are performing on grade level.

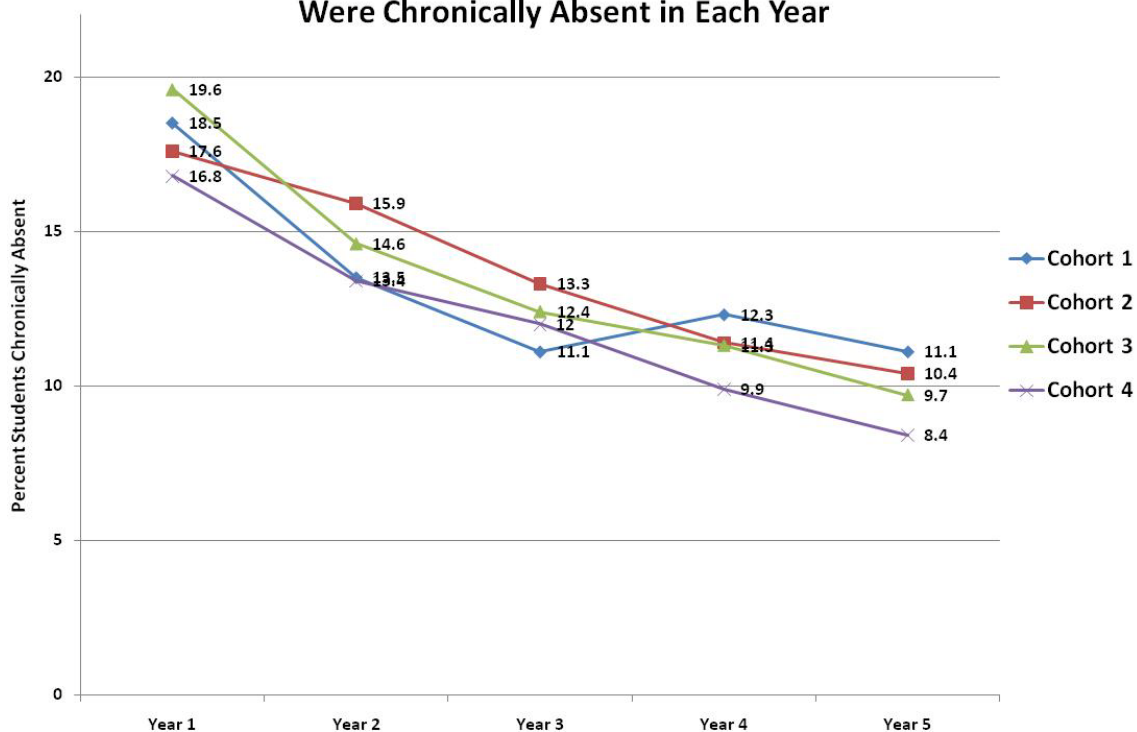
## Attendance

Baltimore's steady progress in improving the academic outcomes of its elementary-aged students has been accompanied by a trend of improved attendance. We examined the rate of chronic absence in each year, defined as missing more than 1/9 of days in the school year, which – for students who are enrolled for the full year – amounts to missing a month or more of schooling. Figure 7 below shows that while Cohort 3 displayed the highest initial rate of chronic absence in Year 1 (first grade), in the final year Cohort 4's rate of chronic absence was significantly lower than what was observed for Cohort 1. The overall trend has primarily been of improving attendance.

Although these results indicate promising trends, the high rates of chronic absenteeism in first grade are troubling. First grade is the year in which fundamental literacy and number skills are taught most explicitly; these, of course, are the building blocks for future years of learning. Reducing the percentage of students chronically absent in first grade would probably help to improve the first grade academic outcomes that are such important predictors of later academic success.

➔ These results suggest the need for a district-wide emphasis on the importance of being present in school, particularly during first grade.<sup>6</sup>

**Figure 7. Percentage of Students in Each Study Cohort Who Were Chronically Absent in Each Year**

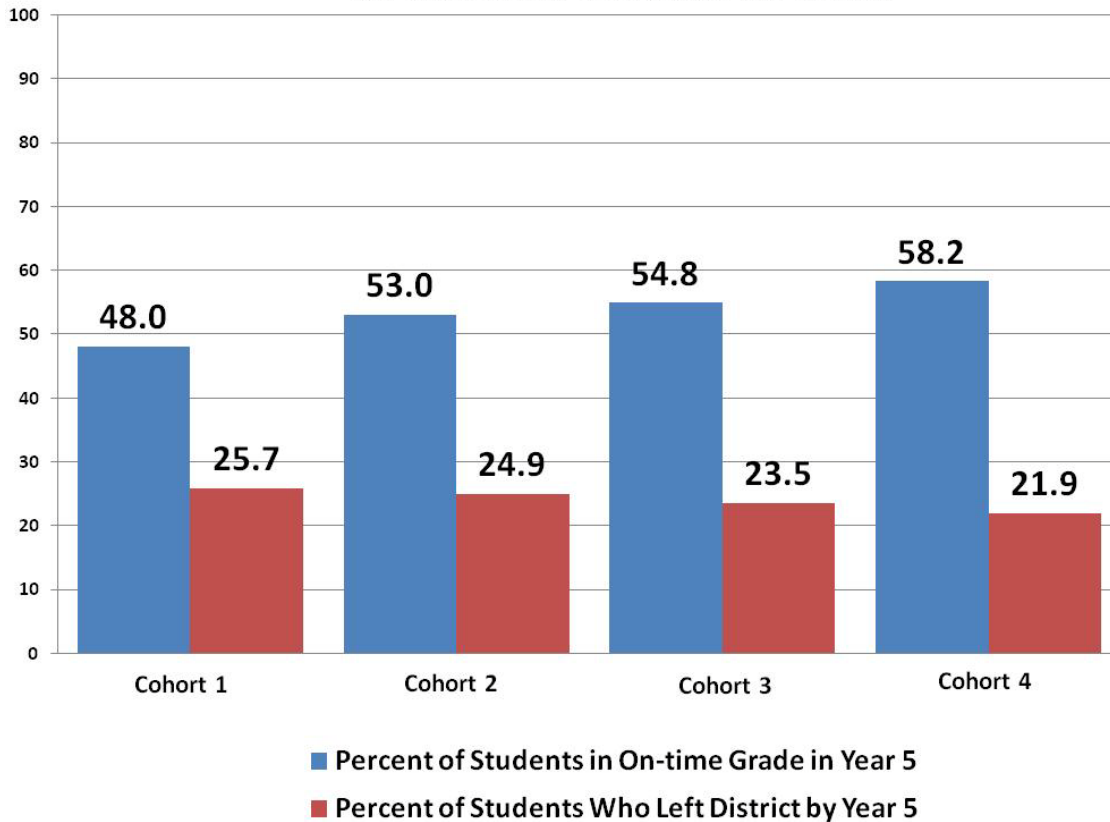


<sup>6</sup> Other research (see <http://baltimore-berc.org>) suggests that chronic absenteeism increases significantly from fifth to sixth grade, and rises dramatically through ninth grade in particular, suggesting the need for similar district initiatives targeted on this age group.

## Staying on Grade Level

At the same time that City Schools elementary students' achievement and attendance rates have been improving, the proportion of students in each successive cohort who were progressing through the grades on time has increased as well. Figure 8 demonstrates this trend.

**Figure 8. Percentage of Students in Each Cohort Who in Year 5 Were in On-Time Grade Or Had left the District**



The percentage of students leaving the district between Year 1 and Year 5 (which for most students is Grade 1 through Grade 5) is also shown in Figure 7 so that it can be confirmed that increasing rates of students being their on-time grade was *not* merely the result of more students in Cohort 4 leaving the district. In fact, Cohort 4 demonstrated a lower rate of out-of-district transfer than any of the prior cohorts, which itself is also cause for optimism.

## Who Leaves City Schools?

We conducted analyses to determine which demographic or achievement groups were more likely to depart City Schools between first and fifth grades. A number of demographic characteristics were consistently related to out-migration from the district across all four cohorts. Non-white and FARM-eligible students from all four cohorts were much less likely to leave the district than white or non-FARM eligible students. Further, students with higher rates of absence were more likely to leave the district; special education students and those who frequently made school changes within the district (i.e., more mobile) were less likely to leave the district by fifth grade.

However, while FARM-eligible students appear more likely to stay in the district, this relationship is moderated by first grade achievement. In particular, students in the middle first grade reading quintile (third quintile) who were also non-FARM eligible were more likely to leave City Schools, as compared to non-FARM students from

the highest reading achievement group. Furthermore, non-FARM-eligible students scoring in the middle quintile in first grade were more likely to leave the district than FARM-eligible students from any achievement quintile, including the highest achieving students.

## Conclusions

In the era of high-stakes testing and accountability, there is an intense demand for *all* students to succeed. Any particular accountability paradigm may introduce unintended consequences with incentives to focus on one subset of the student population to the exclusion of others, especially students perceived to be the closest to attaining proficiency who are thus “triaged” to the detriment of the rest. In the case of NCLB and its emphasis on all students achieving “Proficient” status by 2014, there have been worries that the lowest achieving students and the highest achieving students will receive reduced attention, or will encounter curriculum and instruction not optimally suited to their needs and states of readiness.

However, despite these worries about NCLB introducing an undesirable “triage” scenario, the evidence reviewed in this report regarding City Schools students is quite encouraging. As we compare across four cohorts – from those who were first graders in 1999-2000 to those who were first graders in 2004-2005 – students at all points in the baseline achievement distribution have come to have higher probabilities of being Proficient or Advanced by fifth grade – and lower probabilities of scoring Basic – as we move from the earliest cohort to the most recent cohort. In other words, students in the middle-range of Baltimore’s achievement distribution are improving, but it does not seem to be the case that they have been educated at the expense of students beginning in the lowest and highest ranges, and further, students starting in the higher range of achievement are increasingly maintaining that status.

In addition, the percentage of students staying in their on-time grade increased across study cohorts, and the percentage of students who are chronically absent in any year declined across cohorts. Altogether, the results from this study suggest that many recent reform efforts, among them improved developmental conditions from birth to age five, universal prekindergarten, reduced class sizes in the early grades, and standardized curricula are succeeding in keeping Baltimore students on track for success in the middle grades and beyond. Continuing research should attempt to disentangle these various inputs to education, and also investigate the relative returns to investment when resources are directed to the programs and conditions that affect, alternatively, (A) students’ levels of readiness as they enter kindergarten or first grade and (B) the teaching and learning settings and opportunities students experience in first grade and beyond.