



Performance patterns for students with disabilities in grade 4 mathematics education in Massachusetts



Institute of Education Sciences

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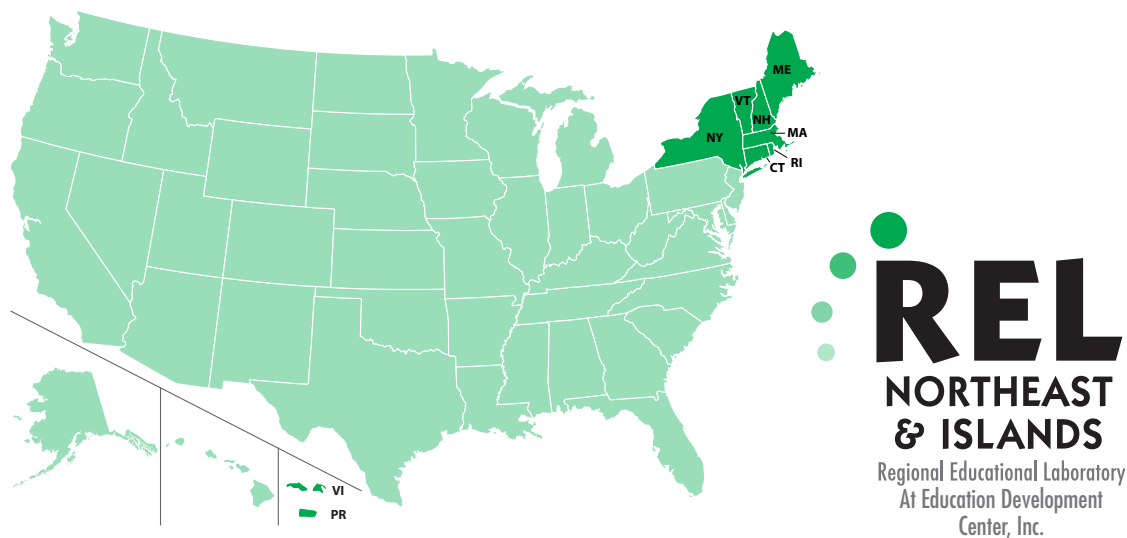
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August 2008

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Performance patterns for students with disabilities in grade 4 mathematics education in Massachusetts

This report—analyzing the mathematics performance of grade 4 students with disabilities in Massachusetts across several metrics (by locale-need combination categories, in top-performing schools, and relative to general education students)—finds that the proportion of students with disabilities scoring proficient fell by less than 1 percentage point between 2004 and 2006. The proficiency gap between general education students and students with disabilities was 30 percentage points in 2006 and decreased by almost 2 percentage points over the period.

Across the country states and school districts need to improve the mathematics performance of students with disabilities. Not only has this population of students increased since the 1970s, but there have also been changes in education expectations and accountability under the requirements of the Individuals with Disabilities Education Acts of 1997 and 2004 and the No Child Left Behind (NCLB) Act of 2001. NCLB, in particular, has cast light on the generally low mathematics performance of many students with disabilities and on the achievement gaps between this subgroup and general education students. Performance trends in the

Northeast and Islands Region mirror those of the country.

To clarify this complex issue, this report presents descriptive and inferential analyses of mathematics achievement patterns for grade 4 students with disabilities and general education students in Massachusetts. Three research questions are examined:

1. What is the mathematics performance of public school grade 4 students with disabilities in Massachusetts?
2. How has the performance of grade 4 students with disabilities and grade 4 general education students changed over time?
3. What is the gap in proficiency percentages between grade 4 general education students and grade 4 students with disabilities?

The report finds that in 2006, 15.3 percent of grade 4 students with disabilities reached proficiency on the Massachusetts Comprehensive Assessment System exam. The performance of students with disabilities differed across the locale-need combination categories. The highest percentage of students scoring proficient attended rural low-need schools. In schools

where the percentage of students with disabilities scoring proficient was in the top 10 percent of all schools, 47 percent of students with disabilities reached proficiency, compared with only 12.7 percent in other schools. The schools at the top of the distribution included schools from each locale and from each need level.

From 2004 to 2006 the proportion of students with disabilities scoring proficient decreased from 15.7 percent to 15.3 percent. The proportion of proficient general education students fell from 48.6 percent to 46.4 percent. Within locale-need combination categories, the proficiency improvement was highest for students in rural low-need schools (a 1 percentage point gain). Across the state 43.7 percent of schools exhibited improved proficiency from 2004 to 2006.

The proficiency gap between general education students and students with disabilities was 30 percentage points in 2006, a 2 percentage point decrease from 2004. That change reflected decreases in proficiency among both groups, with general education students falling more.

The gap shrank in suburban low- and medium-need schools and in rural low- and medium-need schools. But the gap widened in high-need schools across all locales and in urban schools across all need categories. At the school level, the proficiency gap narrowed from 2004 to 2006 (without a decrease in performance among general education students) in 12.7 percent of schools with appropriate data.

In addressing the research questions, this report illustrates the analyses that state and district leaders can conduct with publicly reported data, along with the ways the findings can be interpreted. The limitations of the analyses come from examining cross-sectional data on the proportion of students scoring proficient rather than longitudinal data on actual student scores, and from lacking information on the types and severity of disabilities. The findings and limitations are important as states move forward in analyzing subgroup performance and proficiency gap data and in making data-driven decisions.

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This report—analyzing the mathematics performance of grade 4 students with disabilities in Massachusetts across several metrics (by locale-need combination categories, in top-performing schools, and relative to general education students)—finds that the proportion of students with disabilities scoring proficient fell by less than 1 percentage point between 2004 and 2006. The proficiency gap between general education students and students with disabilities was 30 percentage points in 2006 and decreased by almost 2 percentage points over the period.

WHY THIS STUDY?

Across the country states and school districts seek to improve the mathematics performance of students with disabilities. This subgroup grew from 3.7 million students in 1976 to 6.7 million in 2006 (U.S. Department of Education, National Center for Education Statistics 2007). Along with this increase, there have been sweeping changes in education expectations and accountability for students with disabilities. The Individuals with Disabilities Education Acts of 1997 and 2004 mandate that students with disabilities be included in the general education curriculum “to the maximum extent possible” and receive the support necessary to meet the same high standards as other students. The No Child Left Behind (NCLB) Act of 2001 holds school systems accountable for including students with disabilities in standardized assessments and for reporting the results. Moreover, schools must show improved performance of each subgroup over time, known as adequate yearly progress, in order to meet NCLB’s ultimate goal of proficiency for each student by 2014.

Because the NCLB Act imposes sanctions on schools that do not achieve adequate progress for each subgroup, there has been national concern that the performance of the students with disabilities subgroup will have a negative impact on adequate yearly progress determinations for districts and schools (Johnson, Peck, and Wise 2007; also see Koretz 2006; Rothstein, Jacobsen, and Wilder 2006). In a comprehensive summary of state assessment data, the National Center for Educational Outcomes (NCEO) found that only 39 percent of students with disabilities scored proficient on standardized assessments in elementary mathematics in 2003/04 (Thurlow, Moen, and Altman 2006). Moreover, all grade levels showed large achievement gaps in mathematics between students with disabilities and general education students (VanGetson and Thurlow 2007; see box 1 for definitions of key terms). Despite these gaps, research has found increasing rates of proficiency in successive cohorts of the students with disabilities subgroup (Thurlow, Moen, and Alterman 2006; VanGetson and Thurlow 2007).

BOX 1

Key terms used in the report

- *General education students* are all students who are not students with disabilities. The sum of general education students and students with disabilities equals the total number of students in a school.
- *Percentage point differences*, rather than percentage differences, are used to report differences in percentages of students reaching proficiency. For example, if the percentage of students reaching proficiency changes from 70 percent in 2004 to 85 percent in 2006, this is reported as a change of 15 percentage points, not 21.4 percent.
- *Proficiency gap* refers to the difference in the percentage of general education students reaching proficiency and the percentage of students with disabilities reaching proficiency.
- *Schools* refer to all public schools in the Massachusetts publicly available dataset for which there are grade 4 data. While most are elementary schools, some schools may contain different combinations of grades (for example, K–8).
- *Scoring proficient or reaching proficiency* indicates the percentage of students who score in the top two levels (“proficient” and “advanced”) on the Massachusetts Comprehensive Assessment System. Note that the report primarily reports on this group, rather than students who fall in the “proficient” category only. The bottom two levels, “needs improvement” and “failing,” are considered below proficiency.
- *Similar school categories* were created out of the combination of locale and need, also referred to as locale-need combination categories (see box 2). This resulted in nine categories of schools: urban low need, urban medium need, urban high need, suburban low need, suburban medium need, suburban high need, rural low need, rural medium need, and rural high need.
- *Student performance* is the percentage of students who score within a particular proficiency level or multiple proficiency levels (generally proficient and advanced combined), rather than actual scores or the percentage of correct answers on a test (see appendix A for details).
- *Students with disabilities* are students with an Individualized Education Program, as set out under the Individuals with Disabilities Education Acts of 1997 and 2004.

States need to increase proficiency rates among their students with disabilities subgroup and decrease the number of schools that fail to make adequate yearly progress because of this subgroup. To do this, states and districts must understand the performance trends of this subgroup, particularly the variation in performance across similar groups of schools (for example, similar levels of need) and student performance in schools at the top of the school-level distribution. It is also important to gain a clearer picture of how students with disabilities have performed over time relative to general education students, in order to understand the potential for students with disabilities to achieve similar rates of proficiency as general education students in the coming years and to close the proficiency gap between them (Blackorby et al. 2007).

To add to the emerging research base on the performance trends of students with disabilities, this report examines mathematics performance patterns for grade 4 students with disabilities in the Commonwealth of Massachusetts for school years 2003/04 to 2005/06 (referred to in the report by the second semester dates, 2004, 2005, and 2006), as well as the proficiency gap between them and general education students over the same period. Although the mathematics achievement of students with disabilities is an issue across all schools, this report focuses on elementary schools because those years are critical to building foundations in mathematics. The analyses center on grade 4 because it was the only elementary grade tested in mathematics in Massachusetts before 2006.

This report seeks to provide a more nuanced examination of performance patterns among students with disabilities by examining performance within similar schools, using schools' locale-need combination categories (see box 2). These categorizations are important in analyzing a state as large and diverse as Massachusetts. Examining

student performance across schools with similar characteristics can enhance states' understanding of their student data, particularly by allowing states to understand what schools with certain constraints (such as high-need student populations) are capable of (Johnson, Peck, and Wise 2007).

BOX 2

The school locale-need combination categories

School locale-need combination. This index uses school locale and school student-population need level to create combination categories.

- *School locale* was determined using the 2005/06 school locale codes from the U.S. Department of Education, National Center for Education Statistics (2006): large city, mid-size city, urban fringe of a large city, urban fringe of a mid-size city, rural inside core based statistical areas (CBSA), rural outside CBSA, small town, and large town. These eight categories are then grouped into three: urban (large or mid-size city), suburban (urban fringe of a large or mid-size city), and rural (rural inside or outside CBSA or small or large town).¹ In a very small percentage of cases (less than 1 percent), the National Center for Education Statistics does not provide a locale for a school. In these cases knowledge of the school's location, the locale data of other schools in the same district, and information on a school's web site were used to determine a locale code.

- *School need* was determined by using a calculation employed by the New York City Department of Education (2007) to categorize a school's need based on disadvantaged subgroups.² This measure assigns a weighted average to the percentages of students with disabilities, students eligible for free or reduced-price lunch, and limited English proficiency students. The formula is:

*(0.45 * the percentage of students with disabilities) + (0.45 * the percentage of students eligible for free or reduced-price lunch) + (0.10 * the percentage of limited English proficiency students)*

This formula is used to calculate a weighted need average for each school in the dataset and, after sorting the schools by their weighted average, to divide the schools into thirds and assign a category of need—low, medium, or high—to each school.³ For each year the third of schools with the lowest weighted average is categorized as low need, the third with the highest weighted average as high need, and the middle third as medium need (see table A5 in appendix A for breakdown of subgroup population by low-, medium-, and high-need categories in 2006). A school could have the same weighted average for all three years but fall

into different need levels each year because of a change in the overall distribution from year to year.

The school locale-need index combines locale and need into nine categories: urban low need,⁴ urban medium need, urban high need, suburban low need, suburban medium need, suburban high need, rural low need, rural medium need, and rural high need. Table A4 in appendix A shows the number of schools by locale-need category. Within categories schools are similarly situated. The analysis presents tabulations of the performance data of these similarly situated schools and allows comparisons of schools facing different conditions across locale-need categories

Notes

1. This grouping was based on the recommendation of National Center for Education Statistics staff (personal communication, June 14, 2006).
2. New York City's formula was used because Massachusetts does not have a formula in its publicly available data that measures school need.
3. Because there was no obvious point of division in the distribution of weighted need averages, need was divided into three groups to match the division of locales.
4. There were no urban low need schools with data on students with disabilities for 2006.

Research questions

This report examines three research questions:

1. What is the mathematics performance of public school grade 4 students with disabilities in Massachusetts? To explore the nuances in the performance of students with disabilities, this question is addressed by describing their 2006 performance across locale-need categories (see box 2) and by examining the top 10 percent of the 2006 distribution of school-level performance among students with disabilities.
2. How has the performance of grade 4 students with disabilities and grade 4 general education students changed over time? This question is answered by looking at student performance from 2004 to 2006 and by determining the number of schools that exhibited improved performance of students with disabilities over the period.
3. What is the gap in proficiency between grade 4 general education students and grade 4 students with disabilities? This question is addressed by examining whether the gap in proficiency rates between the two subgroups from 2004 to 2006 diminished over time.

Results are also presented by the number of schools that reduced the size of their gap as a result of improvement in proficiency rates among students with disabilities.

Answers to these questions will help policymakers and educators understand the current and changing status of the mathematics performance of students with disabilities in Massachusetts, both independently and against the performance of general education students. By using only publicly available data, the report illustrates the kinds of analyses that

can be performed with these datasets to explore the performance of the students with disabilities subgroup, as well as the limitations of using these datasets. The results have particular implications in light of the demands of the NCLB Act and adequate yearly progress requirements.

An overview of the findings

In 2006, 15.3 percent of grade 4 students with disabilities reached proficiency on the Massachusetts Comprehensive Assessment System (MCAS) mathematics exam. The performance of students with disabilities differed across the locale-need combination categories. The highest percentage of students scoring proficient appeared in rural low-need schools. In schools where the percentage of students with disabilities scoring proficient fell into the top 10 percent, 47 percent of students with disabilities scored proficient, compared with only 12.7 percent in other schools. Schools from each locale and from each need level were included in this group.

From 2004 to 2006 the proportion of students with disabilities scoring proficient fell from 15.7 percent to 15.3 percent, or 0.4 percentage point. The proportion of general education students scoring proficient fell from 48.6 percent to 46.4 percent, or 2.2 percentage points. Within similar school categories the improvement in proficiency was highest for students in rural low-need schools (an increase of 1 percentage point). Across the state 43.7 percent of schools improved their performance from 2004 to 2006.

The proficiency gap between general education students and students with disabilities was 30 percentage points in 2006, a 2 percentage point decrease from 2004. The change was due to a smaller share of students scoring proficient among both groups, with general education students declining more. The gap between students with disabilities and general education students narrowed in suburban low- and medium-need schools and rural low- and medium-need schools. But it widened in high-need schools across all locales and in urban schools across all need categories. At the school

Answers to the three research questions addressed in this report will help policymakers and educators understand the current and changing status of the mathematics performance of students with disabilities in Massachusetts, both independently and against the performance of general education students

level 12.7 percent of schools with appropriate data lowered their proficiency gap from 2004 to 2006 without a decrease in performance among general education students.

In interpreting these findings, readers should note the limitations of the data (see box 3 and appendix A).

BOX 3

Data sources, limitations, and analysis

Data sources

This study uses cross-sectional state report card data publicly available on the Massachusetts Department of Elementary and Secondary Education web site. The performance data come from the grade 4 mathematics assessment of the Massachusetts Comprehensive Assessment System (MCAS). The dataset contains performance data for all schools that administered the MCAS, but certain data are excluded (see appendix A for details).

Data limitations

The largest exclusion occurred because the state did not report data for schools where the students with disabilities subgroup included fewer than 10 students. This reduced the sample size by roughly half the schools in the database. Also removed from the analysis were schools with missing data and schools that were considered outliers (very high or very low percentages of students with disabilities; see appendix A for details).

Besides the data exclusions, the analyses were limited by the nature of the data available in the datasets, with implications for the study findings. Three key limitations relate to having only cross-sectional data, examining the proportion of students scoring proficient rather than actual

scores, and lacking information on types of disabilities (for discussion of other limitations, see appendix A):

Having access only to cross-sectional data limited the analyses to examining different cohorts of students rather than exploring how individual students perform over time. Performance could be evaluated only by the change in the proportion of students who scored proficient from one year to the next. Such changes may reflect differences in the characteristics of students from year to year rather than differences in the performance of the same students over time.

Performance was operationalized as the percentage of students scoring proficient—a limited view of student performance. On the one hand, its results can be too sensitive to the performance of students just above and just below the proficiency threshold. So, a small change in scores could move several students into the proficient category, with minimal effects on the overall average score across all students. On the other hand, students may improve without moving to the next proficiency level, a change masked by these analyses.

The data do not provide information on types or severity of disabilities, so annual differences in proficiency rates may be due to unknown variations in disability types for each cohort.

Data analysis

Each research question is addressed in the following two ways:¹

Student-level. The overall performance of students with disabilities and general education students throughout Massachusetts and within each locale-need category (see box 2) is examined by giving equal weight to each student rather than to each school. This formula permits the calculation of the percentage of students reaching proficiency across all schools within a given school index (such as all rural schools):

$$\left(\frac{\text{The sum of all students with disabilities scoring proficient or above}}{\text{The sum of all students with disabilities in all schools}} \right) \times 100$$

School-level. The performance of schools, based on the percentage of students with disabilities scoring proficient within each school, is examined by giving each school, rather than each student, equal weight. Thus, the average rate of proficiency at the school level is simply the average of the proficiency rates across all schools in a group.

Note

1. The data in this report represent the grade 4 population of Massachusetts elementary schools rather than a random sample from which population inferences can be made. So, inferential testing was not employed.

WHAT IS THE MATHEMATICS PERFORMANCE OF GRADE 4 STUDENTS WITH DISABILITIES?

Addressing the first research question, this section describes the percentage of grade 4 students with disabilities meeting proficiency overall and within each similar school category in 2006 in Massachusetts. It then describes the performance of the schools in which students with disabilities performed in the top 10 percent of the distribution across all Massachusetts schools.

Performance of students with disabilities

In 2006, 15.3 percent of grade 4 students with disabilities reached proficiency on the MCAS exam (figure 1). This included 11.6 percent of students with disabilities scoring at the proficient level and 3.7 percent scoring at the advanced level. The remaining 84.7 percent scored below proficiency (warning and needs improvement).

There were differences in the performance of students with disabilities across locale-need combination categories. As need decreases within each

locale, the performance of students with disabilities increases (figure 2). Also evident is that in the medium- and high-need levels, proficiency rates were lower for students with disabilities in urban schools (11.5 percent and 6.4 percent, respectively) than in suburban schools (17.1 percent and 11.8 percent) and rural schools (15.7 percent and 10.6 percent).

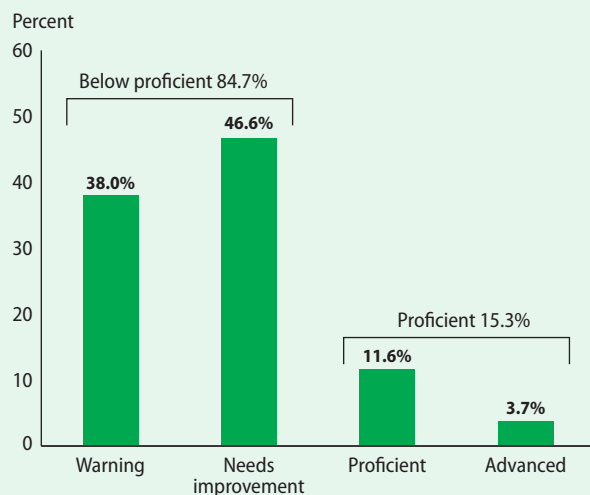
Schools in the top 10 percent of the distribution of school-level performance for students with disabilities

In schools where the percentage of students with disabilities scoring proficient fell into the top 10 percent of the school-level distribution, 47 percent of students with disabilities reached proficiency, compared with only 12.7 percent in other schools (figure 3).

Of the schools at the top of the distribution, 75.0 percent were suburban, 19.2 percent were rural, and only 5.8 percent were urban (table 1). More than half the schools (51.9 percent) were low need. All three locale categories and all three need categories were represented in the

FIGURE 1

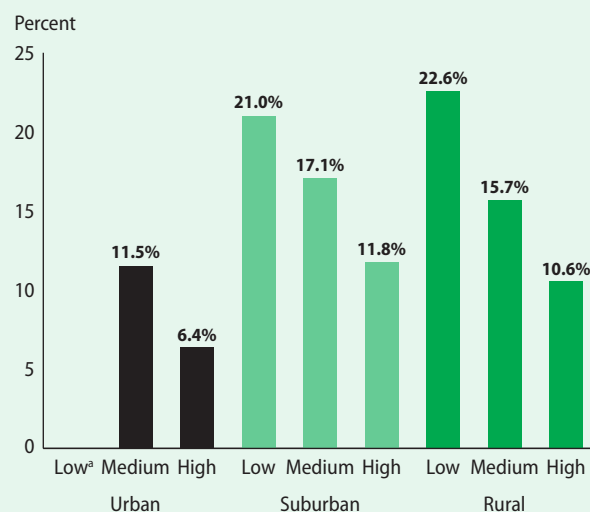
Percentage of grade 4 students with disabilities performing at each proficiency level in Massachusetts, 2006



Source: Authors' analysis based on data from Massachusetts Department of Elementary and Secondary Education (2006b).

FIGURE 2

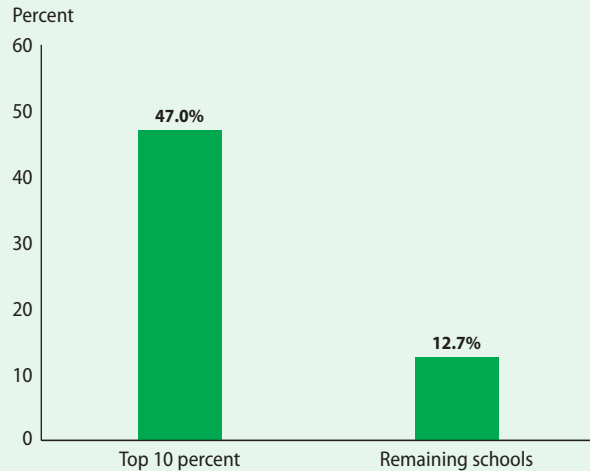
Percentage of grade 4 students with disabilities scoring proficient, by locale-need category, 2006



a. No performance data reported because all schools in the category contained fewer than 10 students with disabilities (see appendix A).

Source: Authors' analysis based on data from Massachusetts Department of Elementary and Secondary Education (2006b).

FIGURE 3

Percentage of students with disabilities scoring proficient in schools in the top 10 percent of the distribution and in remaining schools, 2006

Source: Authors' analysis based on data from Massachusetts Department of Elementary and Secondary Education (2006b).

top 10 percent of the school-level performance distribution in 2006, but none was both rural and high need.

Although on average urban schools performed worse than any other locale, a few schools performed in the top 10 percent of the distribution, with 51.3 percent of their students with disabilities scoring proficient (see table 1). This rate was higher than the average in suburban schools at the top of the distribution (47.3 percent) and in rural schools (44.7 percent). Similarly, high-need schools at the top of the distribution (with only four schools represented) had an average proficiency rate of 50.8 percent, slightly higher than the 48.2 percent proficiency in low-need schools and the 44.8 percent proficiency in medium-need schools. These relatively high proficiency rates across all locale and need categories show the potential of all schools.

TABLE 1

Number, percentage, and average proficiency for students with disabilities in schools in the top 10 percent of the school-level performance distribution among students with disabilities, 2006

Category	Low need	Medium need	High need	Total
Urban				
Number	—	1	2	3
Percent	—	1.9	3.9	5.8
Percent proficient	—	37.0	58.5	51.3
Suburban				
Number	19	18	2	39
Percent	36.5	34.6	3.9	75.0
Percent proficient	50.3	44.7	43.0	47.3
Rural				
Number	8	2	0	10
Percent	15.4	3.9	0.0	19.2
Percent proficient	43.4	50.0	0.0	44.7
Total, by need				
Number	27	21	4	52
Percent	51.9	40.4	7.7	100.0
Percent proficient	48.2	44.8	50.8	47.0

— is no performance data reported because all schools in the category contained fewer than 10 students with disabilities (see appendix A).

Note: Percent is calculated as a share of the total number of schools in the top 10 percent of the distribution (52 schools).

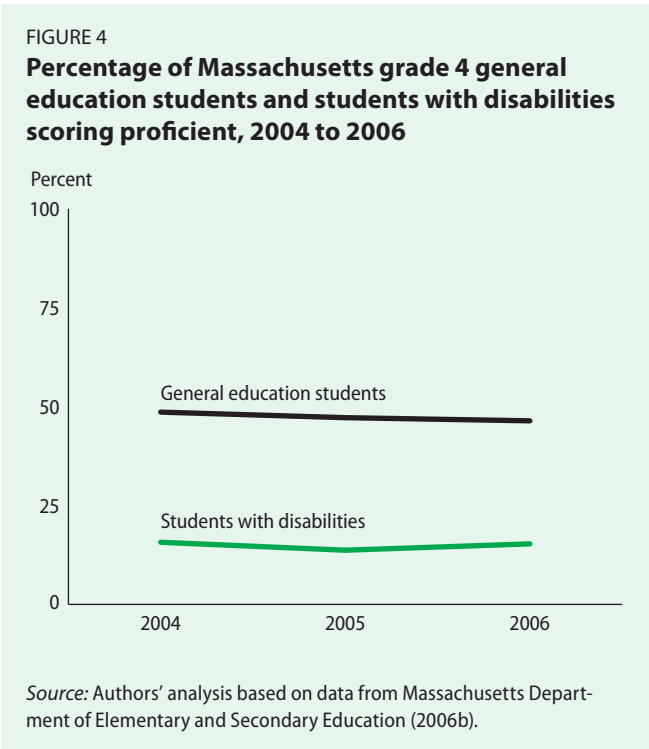
Source: Authors' analysis based on data from Massachusetts Department of Elementary and Secondary Education (2006b).

HOW HAS THE PERFORMANCE OF GRADE 4 STUDENTS WITH DISABILITIES AND GRADE 4 GENERAL EDUCATION STUDENTS CHANGED OVER TIME?

This section describes the change in the performance of students with disabilities and that of general education students from 2004 to 2006. It also describes the number of schools that improved performance among their students with disabilities from 2004 to 2006 and their average proficiency increase.

Student performance over time

While the proportion of general education students scoring proficient was much higher than that of students with disabilities, the subgroups had similar rates of change across the state. From 2004 to 2006 the percentage of students with disabilities scoring proficient fell from 15.7 percent to 15.3 percent, or 0.4 percentage points. The percentage of general education students scoring proficient fell from 48.6 percent to 46.4 percent, or 2.2 percentage points (figure 4).



In rural areas students with disabilities improved their proficiency rates from 2004 to 2006 across need levels, ranging from 0.2 percentage points in high-need schools to 1.0 percentage points in low-need schools (table 2). Students with disabilities in urban medium-need schools also improved by 0.7 percentage points. General education students improved in urban medium-need schools (1.5 percentage points), suburban high-need schools (2.2 percentage points), and rural high-need schools (5.7 percentage points).

Performance of schools over time

Despite the declining state performance from 2004 to 2006, individual schools increased proficiency among their students with disabilities. Of the 387 schools with data for students with disabilities for 2004 and 2006, 169 (43.7 percent) improved over the period. The gain in the proportion of students scoring proficient within schools ranged from 1 percentage point to 50 percentage points, with an average of 11.8 percentage points. A smaller proportion of schools (39.9 percent) made gains in the percentage of general education students

TABLE 2
Percentage point change in students with disabilities and general education students scoring proficient between 2004 and 2006, by locale-need category

Locale-need category		Students with disabilities	General education students
Urban	Low need	—	–6.3
	Medium need	0.7	1.5
	High need	–0.2	–0.1
Suburban	Low need	–1.0	–8.9
	Medium need	–0.1	–3.5
	High need	–3.0	2.2
Rural	Low need	1.0	–8.8
	Medium need	0.7	–0.2
	High need	0.2	5.7

— is no performance data reported because all schools in the category contained fewer than 10 students with disabilities (see appendix A).
Source: Authors' analysis based on data from Massachusetts Department of Elementary and Secondary Education (2006b).

scoring proficient, and the average improvement was slightly smaller as well (11.4 percentage points). Within similar school categories for students with disabilities, urban high-need schools had the smallest percentage of schools improving (32.9 percent), and rural high-need schools had the highest percentage (66.7 percent; table 3).

WHAT IS THE GAP IN PROFICIENCY PERCENTAGES BETWEEN GRADE 4 GENERAL EDUCATION STUDENTS AND GRADE 4 STUDENTS WITH DISABILITIES?

The proficiency gap is important because the NCLB Act's requirement that all students reach proficiency by 2014 means that students with disabilities must improve faster than general education students.

The proficiency gap between students with disabilities and general education students

In 2006 Massachusetts's proficiency gap between grade 4 general education students and students with disabilities was about 30 percentage points—15.3 percent of students with disabilities and 46.5 percent of general education students were proficient.

In urban and suburban schools the gap was smallest among students in higher need schools—19.8 percentage points in urban high-need schools and 23.6 percentage points in suburban high-need schools (figure 5). But in rural areas the gap was smallest in low-need schools (24.2 percentage points). Across all locale-need combination categories the smallest gap was in urban high-need schools (19.8 percentage points), and the largest was in suburban low-need schools (37.8 percentage points).

There was a slight narrowing in the state-level proficiency gap between 2004 and 2006—from a 33.0 percentage point difference in 2004 to a 31.1 percentage point difference in 2006. The gap shrank in suburban low- and medium-need schools (by 2.9 percentage points and 3.5 percentage points, respectively) and in rural low- and medium-need schools (by 9.8 percentage points and 0.9 percentage points, respectively; figure 6). But the gap increased for all high-need schools and all urban schools.

Several factors could account for the narrowing proficiency gap:

- Performance improved in both subgroups but improved more for students with disabilities.

TABLE 3

Schools with improving performance for students with disabilities, by locale-need category

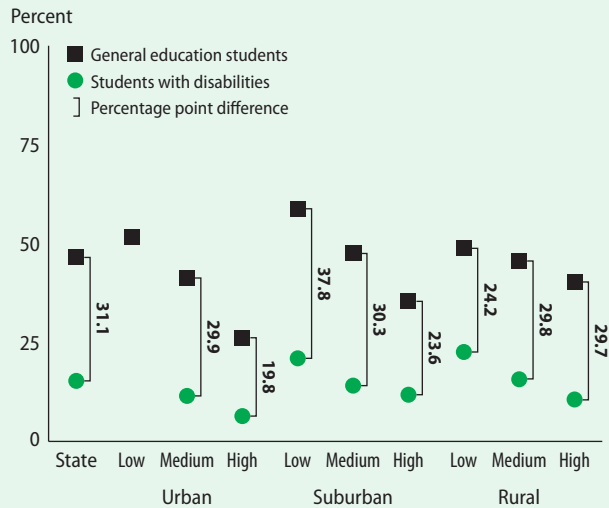
Locale-need category		Number	Percent	Percentage point increase		
				Mean	Minimum	Maximum
Urban	Medium need	9	45.0	8.9	2.0	17.0
	High need	28	32.9	11.7	1.0	50.0
Suburban	Low need	47	46.1	10.9	1.0	34.0
	Medium need	50	45.1	12.9	1.0	50.0
	High need	12	41.4	10.8	2.0	28.0
Rural	Low need	16	61.5	13.4	1.0	38.0
	Medium need	5	45.5	14.6	1.0	26.0
	High need	2	66.7	6.5	2.0	11.0

Note: No performance data are reported for urban low-need schools because all schools in the category contained fewer than 10 students with disabilities (see appendix A).

Source: Authors' analysis based on data from Massachusetts Department of Elementary and Secondary Education, (2006b).

FIGURE 5

Comparison of the percentage of grade 4 general education students and students with disabilities scoring proficient, across Massachusetts and by locale-need categories, 2006



a. No performance data reported because all schools in the category contained fewer than 10 students with disabilities (see appendix A), so percentage point difference cannot be calculated.

Source: Authors' analysis based on data from Massachusetts Department of Elementary and Secondary Education (2006b).

- Performance improved for students with disabilities and declined or remained unchanged for general education students.
- Performance declined for both subgroups but declined more for general education students.

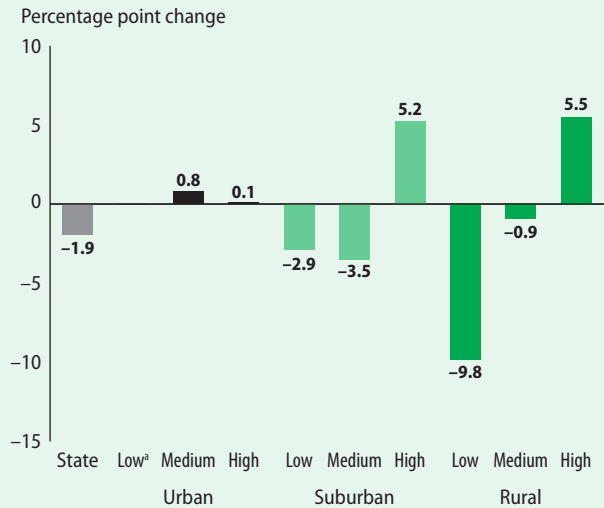
The decrease was not due to the first reason (both subgroups increasing with students with disabilities increasing by more; see table 2). So, only the last two reasons apply across Massachusetts.

Across the state from 2004 to 2006 the proficiency gap decreased by 1.9 percentage points, as general education students' proficiency rates decreased more than those of students with disabilities.

- In four of the eight similar school categories that could be examined (suburban low and medium need, and rural low and medium

FIGURE 6

Change in the percentage point difference of grade 4 general education students and students with disabilities scoring proficient, across the state and by locale-need category, 2004–06



a. No performance data reported because all schools in the category contained fewer than 10 students with disabilities (see appendix A), so percentage point difference cannot be calculated.

Source: Authors' analysis based on data from Massachusetts Department of Elementary and Secondary Education (2006b).

need), the gap decreased from 2004 to 2006. In suburban low- and medium-need schools general education students declined in proficiency more than students with disabilities did. In rural low- and medium-need schools proficiency rates increased for students with disabilities but declined for general education students.

- In urban medium- and high-need schools, suburban high-need schools, and rural high-need schools the proficiency gap increased from 2004 to 2006. In urban medium-need and rural high-need schools proficiency rates for students with disabilities increased, but those for general education students increased more.

Schools in which the proficiency gap narrowed

The NCLB Act holds each school accountable for ensuring that every subgroup makes adequate

yearly progress. This section examines data on a school-by-school basis from 2004 to 2006. In the previous analysis, which examined the proficiency gaps within similar categories of schools—combining proficient students from all schools within a need level, locale, or both—data were pooled from schools that increased their proficiency gap and schools that decreased it. By contrast, the analysis in this section looks only at schools in which the proficiency gap decreased and excludes all schools with declining performance by general education students.

Of the 1,021 schools in the original dataset, 387 had the data to examine whether the gap narrowed.¹ Of these 387 schools (the same number of schools examined in the previous section), 49 schools (12.7 percent) reduced their proficiency gap from 2004 to 2006 with no decrease in the performance of general education students. These are the gap-reducing schools that are examined.

The remaining schools were not considered gap-closing for the following reasons:

- 163 schools (42.1 percent) had reductions in their proficiency gap from 2004 to 2006, but with a decline in the performance of their general education students.
- 15 schools (3.9 percent) had no changes in their proficiency gap from 2004 to 2006.
- 160 schools (41.3 percent) had increases in their proficiency gap from 2004 to 2006.

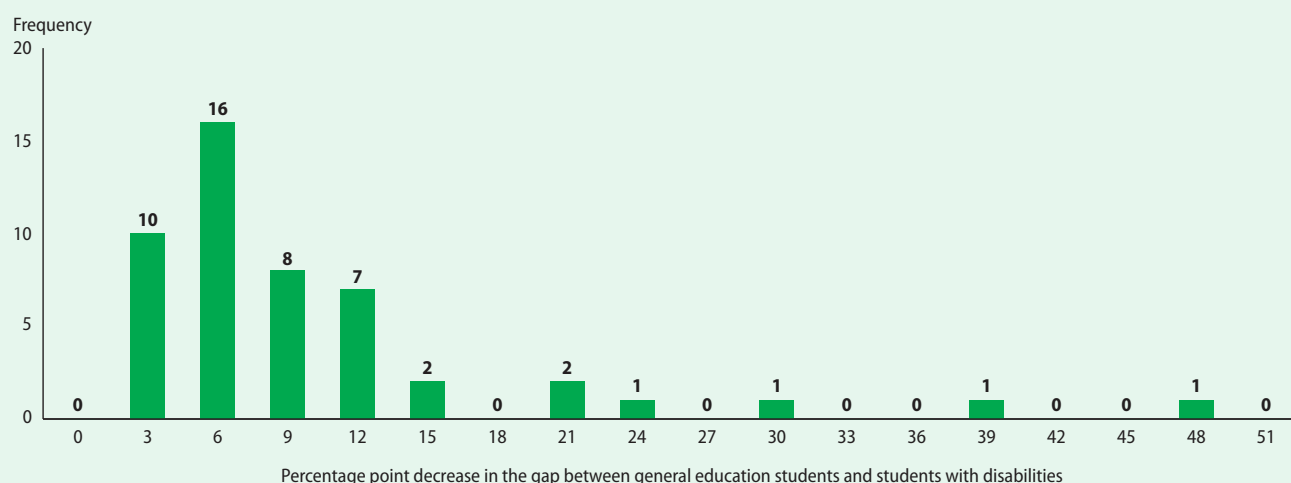
In the 49 gap-reducing schools the gap from 2004 to 2006 decreased an average of 9.0 percentage points. The reduction in the proficiency gap from 2004 to 2006 varied across schools (figure 7). In 10 schools the gap fell by 0–3 percentage points and in 16 schools the gap fell by 3–6 percentage points.

CONCLUSION

This section offers considerations for interpreting the findings of the study, suggestions for future inquiry, and potential policy implications of the findings.

FIGURE 7

Number of schools that narrowed the proficiency gap between the percentage of grade 4 general education students scoring proficient and the percentage of students with disabilities scoring proficient, 2004–06



Note: Data include schools where performance improved for students with disabilities and general education students, with students with disabilities improving more.

Source: Authors' analysis based on data from Massachusetts Department of Elementary and Secondary Education (2006b).

Considerations in interpreting results

Although this report adds to the growing literature on the performance of students with disabilities (see, for instance, Thurlow, Moen, and Altman 2006; VanGetson and Thurlow 2007), data limitations affect the interpretation of the findings (for more details, see appendix A).

Several factors that can provide greater insight into the patterns of student performance, such as student characteristics and accommodation policies (as noted by McLaughlin 2006), were unaccounted for. Some of these factors can be assessed only through student-level data, which are not typically available publicly. For instance, performance may be affected by multiple subgroup status (for example, a student with a disability who is also eligible for free or reduced-price lunch), which may have a higher occurrence in certain locales and need levels, but is not indicated in the

dataset. Additionally, publicly available datasets typically contain cross-sectional data, so each year's data come from a new cohort of students. Thus, a change in performance from one year to the next does not mean that a group of students improved or worsened over that period. It could simply reflect changes in the composition of students.

A school's performance for the students with disabilities subgroup may also vary dramatically from year to year because of differ-

ences in the types and severities of the disabilities among cohorts of students, an effect that can be magnified by the small size of this subgroup. Districts may also vary in how they classify students with disabilities. For example, an urban district may give the classification of "specific learning disability" to students with more severe disabilities than does a suburban district. The available dataset does not permit comparing the composition of the students with disabilities subgroup

across locale and need categories—another limitation on interpreting the findings.

An added consideration is the way performance was measured. Performance was presented in the publicly available dataset as the percentage of students scoring proficient or above in each school, rather than as an average test score. So, in this report signs of improvement over time were limited to increases in the percentage of students reaching proficiency. But students often improve their scores without moving to the next proficiency level, particularly in the students with disabilities subgroup, where many students are in the needs improvement category. Such improvements are masked in the available data. So, lack of improvement in the percentage of students with disabilities reaching proficiency does not mean that student scores did not improve. The average score of all students in the needs improvement category could have increased but not enough to reach the proficient category.

Nearly half the schools in Massachusetts were not included in the analyses because of missing, removed, or excluded data—particularly because Massachusetts does not allow schools to report data for subgroups with fewer than 10 students. Students in excluded schools may not have performed the same as their counterparts included in the analyses. This limitation is particularly relevant for rural schools, where the highest proportion of schools had data excluded because of small subgroups. An even larger proportion of schools was omitted from the analyses of trends over time because of the requirement that a school have data for general education students and students with disabilities in both 2004 and 2006.

Last, the performance of students with disabilities in Massachusetts may partly reflect the high standards and difficulty of the MCAS (Cronin et al. 2007; U.S. Department of Education 2007b). Massachusetts is one of only two states (of 33) whose proficiency cutoff point is higher than that of the National Assessment of Educational Progress (NAEP) for grade 4 math. So, students

Lack of improvement in the percentage of students with disabilities reaching proficiency does not mean that student scores did not improve. The average score of all students in the needs improvement category could have increased but not enough to reach the proficient category

must perform better on the MCAS than on the NAEP to reach proficiency. These high standards and difficulty of the MCAS are important in interpreting the report's findings, both for performance at a single point in time and for the improvement rates of the students with disabilities subgroup.

Areas for further inquiry

The findings and the limitations of the analyses suggest several areas for future research. One concern is whether the same students with disabilities improved from year to year and how individual performance may vary over time by disability type and severity. While school-level performance data cannot be used to examine these trends, student-level performance data could be collected on the same cohort of students with disabilities across several years. By using student-level data, future research might also examine whether students in multiple subgroups are less likely to make adequate yearly progress.

To address how to help students with disabilities improve their education attainment, research could examine the practices and policies of schools and districts where students with disabilities display high achievement—especially in schools with high-need student populations. To help explain how proficiency rates change from year to year, a closer look may also be warranted for the policies and practices that Massachusetts applies to all its students. In 2006, for example, Massachusetts began implementing the Expanded Learning Time initiative, a pilot program that “enables schools to significantly expand the hours and days in their school schedules to create integrated learning experiences for all students that are responsive to students’ needs and the higher expectations set by state and federal laws” (Massachusetts Department of Elementary and Secondary Education 2006a). It seems plausible that such programs could improve mathematics performance for both students with disabilities and general education students—useful knowledge for other states.

Massachusetts standards are difficult compared with those of other states and the NAEP (Cronin et al. 2007; U.S. Department of Education 2007b). This raises a question for future research. Do states with more stringent standards than the NAEP differ from states with less stringent standards in the performance and improvement of students with disabilities? This research could provide context for interpreting performance patterns in Massachusetts and other states with high standards, highlighting for federal policymakers the implications of having similar expectations across states with varying proficiency cutoffs on state tests.

Potential policy implications of the findings

The report can help policymakers and education leaders understand the performance of students with disabilities—and make informed, data-driven decisions about policy and practice.

First, the report's finding of large variations across different locale and need categories underpins the value of comparing schools with others in the same category, rather than with the state average. Examining the performance of students in schools that are similar to one another—as done here using locale and need categories and by looking at schools with high performance in these categories—realizes the suggestion made in a previous report regarding the examination of performance among similar school groupings (Johnson, Peck, and Wise 2007).

Second, the findings raise questions about the long-term chances of states reaching adequate yearly progress targets and about the adequacy of today's assessments. Although nearly half of Massachusetts schools improved their proportion of students with disabilities scoring proficient or above, far fewer reduced their proficiency gap without performance

The report's finding of large variations across different locale and need categories underpins the value of comparing schools with others in the same category, rather than with the state average

faltering among general education students. Reaching the goal of complete proficiency by 2014 can occur only if both subgroups improve and the proficiency gap closes.

Third, Massachusetts's "world class" expectations for student learning, evident in the difficulty of the MCAS, may help explain the state's strong performance on the NAEP. On the 2007 NAEP grade 4 mathematics test Massachusetts students with disabilities had the highest average scaled score (238) and proficiency rates (33 percent) across all states (Lee, Grigg, and Dixon 2007). But these high expectations may also help explain the low proficiency rates of students with disabilities. Massachusetts is commended for its high standards and NAEP performance, but these standards penalize the state for adequate yearly progress determinations—its schools face the same sanctions as schools in states with lower proficiency standards.

Most important, this report may be useful to education leaders and policymakers in other states

and nationally. The questions asked and the results obtained were confined by the cross-sectional nature of the data—the same type of data states must use for calculating adequate yearly progress under the NCLB Act. Education leaders need to know how to explore and analyze cross-sectional data to understand the types of questions that such data can reliably answer. And they need to understand the limitations of results that can be derived with such data.

Education leaders and policymakers should consider ways to better illuminate the performance of students with disabilities. Growth models, for instance, which evaluate school effectiveness by measuring individual student learning over time, require longitudinal performance and background data on each student. A benefit of such models is their avoidance of variations due to changes in the composition of the students being studied—a chief limitation of current analyses (Gong, Perie, and Dunn 2006; Goldschmidt et al. 2005).

APPENDIX A

DATA SOURCES AND METHODS

This appendix discusses Massachusetts publicly available datasets and the limitations of the dataset.

Massachusetts' publicly available datasets

The No Child Left Behind (NCLB) Act requires each state to make disaggregated student performance data publicly available. These data are cross-sectional, consisting of information on different cohorts of students over time in a given grade. Cross-sectional data are often employed by states and districts to analyze student performance over time, and federal, state, and district decisions are made based on analyses of publicly available datasets. Thus, it is important to know what types of questions can be answered using cross-sectional data, as well as the limitations on interpreting results and analyzing such data.

This study describes the performance of students with disabilities and general education students on the Massachusetts Comprehensive Assessment System (MCAS) mathematics test, using cross-sectional data made publicly available by the Massachusetts Department of Elementary and Secondary Education. The dataset used to analyze the mathematics performance of students with disabilities was created from the publicly available data on the Massachusetts Department of Elementary and Secondary Education web site (<http://profiles.doe.mass.edu>). The web site contains population and performance data for all schools that administered the MCAS, as well as additional school indicators. The following variables were used in the analyses:

- School name.
- Number of students participating in the MCAS (overall and by subgroup).
- Percentage of students participating in the MCAS (overall and by subgroup).

- Percentage of students that performed at each level of proficiency (overall and by subgroup):
 - Warning.
 - Needs improvement.
 - Proficient.
 - Advanced.

Massachusetts has been administering the MCAS mathematics test to students in grade 4 since 1997. The test for grades 3 and 5 were introduced in 2006 to meet NCLB requirements. The grade 4 mathematics test is administered each year in May and consists of two sessions, each designed to take 60 minutes (though all MCAS tests are untimed). The mathematics tests consist of three types of questions: open response, short answer, and multiple choice. These tests measure student progress against the academic standards of the Massachusetts Curriculum Frameworks. The MCAS reports students' results by using four performance levels: advanced, proficient, needs improvement, and warning.

While the Massachusetts Department of Elementary and Secondary Education web site provides extensive MCAS performance data on students with disabilities starting with the 2000/01 school year, recent changes in reporting make it inaccurate to compare data on students with disabilities across all six years (2000/01–2005/06). In 2006 the MCAS students with disabilities category was redefined according to the federal definition used for adequate yearly progress. Prior to 2006 the MCAS students with disabilities category included students with both Individualized Education Programs and 504s, whereas the adequate yearly progress definition does not include students with 504s.² In addition, in 2006 the Department of Elementary and Secondary Education made changes in 2006 to the way data were reported for absent students and for students who had not attended school since October. The 2004 and 2005 datasets were revised to follow the 2006 rules and policies. Datasets for earlier years (1998–2003), however, were not revised at the time of this analysis and thus are not included in this report.

This report focuses on performance data for three school years: 2003/04, 2004/05, and 2005/06, which are referred to by their second semester years (2004, 2005, and 2006). Data for 2006 are examined for snapshots of the performance of students with disabilities or of students at schools where students with disabilities performed in the top 10 percent of the performance distribution. Data from 2004 to 2006 are examined for describing changes over time. And data from 2004 and 2006 are examined for categorizing schools as improving or reducing proficiency gaps.

Excluded data

Unreported, missing, or removed data are described below.

Unreported data. To protect the privacy of individual students, Massachusetts State does not publicly report the performance data for students in subgroups that contain fewer than 10 students (in a given school in grade 4). Thus, those schools were excluded from the analyses of MCAS performance for that subgroup. About half the schools did not have reported data for the students with disabilities subgroup, and a very small number of schools (about 20) did not have reported data for the general education subgroup.

Missing data. Data appeared to be missing from the publicly available datasets when the Department of Elementary and Secondary Education reported neither the number of students in a subgroup at a school nor the performance data. Since it was not known whether these data failed to be reported or whether these schools did not exist in previous years, all such cases were considered as missing data. In addition, there were 1,189 elementary schools in Massachusetts in 2006, but only 1,021 schools with grade 4 data reported in the publicly available dataset for 2006. Again, it was not known whether data for these schools were not reported or whether these schools did not have a grade 4.

Removed data. To accurately represent the performance of most students with disabilities in Massachusetts elementary schools, outlier schools were dropped from the analyses. Outliers were defined as schools with student populations in this subgroup that were more than two standard deviations higher or lower than the mean of the data:

$$> (\mu + 2*SD) \text{ or } < (\mu - 2*SD).$$

Because schools with very low percentages of students with disabilities (with N-sizes less than 10) were already removed from the dataset, outlier data were removed for schools whose students with disabilities subgroup constituted high proportions of the student population (table A1). It was assumed that these very high percentages characterized schools that teach primarily students with disabilities and that it would be misleading to compare their population and performance data with most of the state's elementary schools. Outliers accounted for just 1–2 percent of the dataset (10–14 schools).

Summary. Because of missing and unreported data and removal of outlier data, the performance dataset used to calculate all proficiency information includes a smaller number of schools with students with disabilities data than the number of schools in the population dataset. Table A1 shows the number of schools in the complete dataset and the number of schools with excluded data on students with disabilities of general education students. The number of schools with missing data in 2004 and 2005 is represented by the difference between the number of reported schools in those years and the number reported in 2006.

Table A2 shows the percentage of schools that removed data on students with disabilities (either because of unreported or removed outlier data) within each locale. For example, in all rural schools reported in 2006, 62.3 percent (the highest percentage out of all the locales) were not included in the dataset.

TABLE A1

Number of schools included and excluded in dataset

Number of schools reported in Massachusetts State	Students with disabilities performance data			General education students performance data		
	2004	2005	2006	2004	2005	2006
Schools reported in Massachusetts Department of Elementary and Secondary Education dataset	997	1,008	1,021	997	1,008	1,021
Schools in the performance analysis dataset	485	507	517	975	987	998
Schools with missing data on students with disabilities or general education students because the n-size was less than 10	498	487	494	22	21	23
Schools removed as outliers	14	14	10	nc	nc	nc
Criterion for being an outlier school (percentage of students with disabilities)	≥ 38 or ≤ 4	≥ 40 or ≤ 1	≥ 39 or ≤ 1	na	na	na

nc is not calculated.

na is not applicable.

Source: Authors' analysis based on data from the Massachusetts Department of Elementary and Secondary Education (2006b).

TABLE A2

Schools with excluded proficiency data on students with disabilities (percent)

Year	Overall	Urban	Suburban	Rural
2004	50.1	59.9	47.1	66.7
2005	49.7	57.7	43.6	65.6
2006	49.4	57.3	41.5	62.3

Source: Authors' analysis based on data from the Massachusetts Department of Elementary and Secondary Education (2006b).

Approximately half the performance data on students with disabilities were excluded from the dataset. Most excluded data resulted from the state reporting fewer than 10 students in that subgroup. And the largest percentage of schools with removed or missing data were rural schools, as they had small numbers (fewer than 10) of students with disabilities.

The final dataset consisted of the students and schools in tables A3 and A4.

TABLE A3

Number of grade 4 students in sample, by locale and need level, 2006

	Low need	Medium need	High need
Urban			
General education students	426	3,466	10,474
Students with disabilities	0	497	1,887
Suburban			
General education students	19,816	13,124	3,231
Students with disabilities	2,328	2,632	694
Rural			
General education students	3,879	1,815	387
Students with disabilities	487	268	47

Source: Authors' analysis based on data from Massachusetts Department of Elementary and Secondary Education (2006b).

TABLE A4

Schools in each locale-need category, 2006

Locale-need category		Number	Percent
Urban	Low need	0	0.0
	Medium need	29	5.6
	High need	115	22.2
Suburban	Low need	136	26.3
	Medium need	146	28.2
	High need	42	8.1
Rural	Low need	30	5.8
	Medium need	15	2.9
	High need	4	0.8
Total		517	100

Source: Authors' analysis based on data from the Massachusetts Department of Elementary and Secondary Education (2006b).

Data limitations

Table A5 provides the average percentages of students with disabilities, students eligible for free or reduced-price lunch, and limited English proficiency students in low-, medium-, and high-need schools, to reflect how many students from each disadvantaged subgroup contributed to schools’ need levels. The average percentage of students eligible for free or reduced-price lunch was greater than the average percentage of the other two subgroups in high- and medium-need schools, though the discrepancy was much smaller in medium-need schools. Thus, the correlation between schools’ high-need status and the number of students eligible for free or reduced-price lunch appeared high, while for the other two subgroups, the correlation appeared only moderate. In low-need schools average percentages were low across all three subgroups, although the average percentage of students with disabilities was greater than the average percentage of students eligible for free or reduced-price lunch. Although the percentage of students eligible for free or reduced-price lunch was the main contributor to need levels, this was mainly because of the higher overall percentage of such students in the state compared with the other two subgroups.

The kinds of information provided in Department of Elementary and Secondary Education’s publicly available datasets place several limitations on the

analyses in this report. The limitations should be considered when interpreting the findings.

Cross-sectional data. Having access only to cross-sectional data for 2004 to 2006 limited the analyses to examining different cohorts of students for each year that there were data. The analyses say nothing about how individual students perform over time. Rather, one year’s grade 4 students were compared with another year’s grade 4 students. Such an analysis evaluates performance by the increase in the proportion of students who scored proficient from one year to the next. The problem with this improvement measure is that it can wrongly be interpreted to suggest differences in performance, whereas only the characteristics of students from year to year may differ.

Disability types. Because the dataset does not indicate the types or severity of disabilities affecting students with disabilities, differences in proficiency rates for these students from one year to the next (or from one locale or need level to the next) may reflect unknown variations in disability types for each cohort.

Exclusion of data on students from collaboratives. Some students with disabilities attend special programs at educational collaboratives instead of at their local schools. Performance data on students with disabilities attending collaboratives are reported in district-level publicly available datasets but not in school-level datasets. Because the dataset used employs school-level data, it excludes all students with disabilities attending collaboratives. This may cause a discrepancy between state-reported information on students with disabilities and information reported from this report’s dataset. In 2006 more than 5,700 students with disabilities (across grade levels) received direct services through collaboratives. These students composed around 4 percent of the 160,752 students with Individualized Education Programs that were enrolled in Massachusetts schools.

Alternate assessments. The dataset does not provide information on the number of grade 4

TABLE A5
Average percentages of students with disabilities, students eligible for free or reduced-price lunch, and limited English proficiency students, by school need level, 2006

Student subgroup	Low need	Medium need	High need
Students with disabilities	13.7	18.3	20.6
Students eligible for free or reduced-price lunch	6.3	24.5	74.7
Limited English proficiency students	0.8	3.1	15.0

Source: Authors’ analysis based on data from the Massachusetts Department of Elementary and Secondary Education (2006b).

students with disabilities in each school who took the MCAS-Alternate Assessment. So, it is not possible to determine the impact of schools' participation rates for the MCAS-Alternate Assessment on the performance of their students with disabilities. The impact is likely to be small, however, because NCLB regulations limit the number of students in each local education agency that can be counted as proficient using alternate achievement standards to 1 percent of the local education agency's enrollment in each testing grade. In Massachusetts overall only 8.7 percent of grade 4 students with disabilities (1,753) took the MCAS-Alternative Assessment in 2006.

Overlap of student subgroups. Although the students with disabilities and general education students categories are mutually exclusive (and together account for 100 percent of the grade 4 student population in each reported school), either category could overlap with students eligible for free or reduced-price lunch or limited English proficiency students. The school-level dataset does not provide information on whether students fall into more than one subgroup (overlaps are more likely

in higher need schools and urban schools). So, it is not possible to determine whether students with disabilities who belong to other disadvantaged subgroups have different performance patterns from students with disabilities who do not. Such differences may have implications for interpreting student proficiency results and for making comparisons across locale and need levels.

Exclusion of scaled scores. Data were the percentage of students scoring at the warning, needs improvement, proficient, and advanced level, rather than scaled scores. This limits the identification of progress to movement between proficiency levels, rather than within proficiency levels.

Unreported or missing data. For reasons already explained (see above "Excluded data"), data from about half of elementary schools (containing grade 4) were not included in the analyses of this report. This report does not provide information about how grade 4 students with disabilities are performing in schools that have very small numbers for this subgroup or for other schools that were excluded for unknown reasons.

NOTES

1. Schools were removed if they had unreported, missing, or removed data for 2004 or 2006, or if students with disabilities did not improve over this time period.
2. A 504 plan is a legal document that outlines a plan for instructional services, such as accommodations for students in the general education setting. It differs from an Individualized Education Program. For more information, please see <http://www.ed.gov/about/offices/list/ocr/504faq.html>.

REFERENCES

- Blackorby, J., Knokey, A. M., Wagner, M., Levine, P., Schiller, E., & Sumi, C. (2007). *What makes a difference? Influences on outcomes for students with disabilities* (Special Education Elementary Longitudinal Study SRI Project P10656). Washington, DC: U.S. Department of Education, Office of Special Education Programs. Retrieved June 20, 2007, from http://www.seels.net/designdocs/SEELS_W1W3_FINAL.pdf.
- Cronin, J., Dahlin, M., Adkins, D., & Kingsbury, G. (2007). *The proficiency illusion*. Washington, DC: Thomas B. Fordham Institute. Retrieved July 22, 2008, from http://www.edexcellence.net/doc/The_Proficiency_Illusion.pdf.
- Goldschmidt, P., Roschewski, P., Choi, K., Auty, W., Hebler, W., & Blank, R. (2005). *Policymakers' guide to growth models for school accountability: how do accountability models differ?* Washington, DC: The Council of Chief State School Officers. Retrieved August 1, 2007, from <http://www.ccsso.org/publications/details.cfm?PublicationID=287>.
- Gong, B., Perie, M., & Dunn, J. (2006). *Using student longitudinal growth measures for school accountability under No Child Left Behind: an update to inform design decisions*. Dover, NH: Center for Assessment. Retrieved July 19, 2007, from http://www.nciea.org/publications/GrowthModelUpdate_BGMAPJD07.pdf.
- Individuals with Disabilities Act, Pub. L. No. 108-446, 108 (2004). Retrieved June 20, 2007, from <http://idea.ed.gov/>.
- Johnson, K. E., Peck, K., & Wise, J. (2007). *The students with disabilities subgroup and adequate yearly progress in Mid-Atlantic Region schools*. (Issues & Answers Report, REL 2007–No. 018). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Mid-Atlantic. Retrieved August 1, 2007, from <http://ies.ed.gov/ncee/edlabs/projects/project.asp?id=22>.
- Koretz, D. (2006). *The pending reauthorization of NCLB: an opportunity to rethink the basic strategy*. Paper for Civil Rights Project/Earl Warren Institute Roundtable Discussion on the Reauthorization of NCLB, Washington, DC, November 16, 2006.
- Lee, J., Grigg, W., & Dion, G. (2007). *The nation's report card mathematics 2007* (NCES 2007-495). Washington, DC: U.S. Department of Education, National Center for Education Statistics. Retrieved October 10, 2007, from <http://nces.ed.gov/nationsreportcard/pdf/main2007/2007494.pdf>.
- Massachusetts Department of Elementary and Secondary Education. (2006a). *State 2006 adequate yearly progress report*. Retrieved March 20, 2007, from <http://profiles.doe.mass.edu/ayp2006/school.aspx?orgcode=00000000>.
- Massachusetts Department of Elementary and Secondary Education. (2006b). Profiles. Retrieved March 8, 2007, from <http://profiles.doe.mass.edu/>.
- McLaughlin, M. J. (2006). *Closing the achievement gap and students with disabilities: the new meaning of a "free and appropriate public education."* Paper presented at the Symposium Examining America's Commitment to Closing Achievement Gaps: NCLB and Its Alternatives, sponsored by the Campaign for Educational Equity, Teachers College, Columbia University, November 13–14, 2006.
- New York City Department of Education. (2007). *Similar school achievement comparison reports*. Retrieved October 1, 2006, from http://schools.nyc.gov/daa/ARCHV_reports/default.asp#RR.
- No Child Left Behind Act of 2001, Pub. L. No. 107–110. Retrieved April 2008 from <http://www.ed.gov/nclb/landing.jhtml>
- Rothstein, R., Jacobsen, R., & Wilder, T. (2006). "Proficiency for all"—an oxymoron. Paper presented at the Symposium Examining America's Commitment to Closing Achievement Gaps: NCLB and Its Alternatives, sponsored by the Campaign for Educational Equity, Teachers College, Columbia University, November 13–14, 2006.

- Thurlow, M. L., Moen, R., & Altman, J. (2006). *Annual performance reports (2003–2004): state assessment data* (Technical Report 46). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes. Retrieved April 2007, from <http://www.education.umn.edu/NCEO/OnlinePubs/APR203-04.pdf>.
- U.S. Department of Education, National Center for Education Statistics. (2006). Common Core of Data, Public School Search. Retrieved June 15, 2007, from <http://nces.ed.gov/ccd/schoolsearch/>.
- U.S. Department of Education, National Center for Education Statistics. (2007a). *The condition of education 2007* (NCES 2007-064). Washington, DC: U.S. Government Printing Office.
- U.S. Department of Education, National Center for Education Statistics. (2007b). *Mapping 2005 state proficiency standards onto the NAEP scales* (NCES 2007-482). Washington, DC: U.S. Government Printing Office.
- VanGetson, G. R., & Thurlow, M. L. (2007). *Nearing the target in disaggregated subgroup reporting to the public on 2004–2005 assessment results* (Technical Report No. 46). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes. Retrieved April 2007, from <http://education.umn.edu/NCEO/OnlinePubs/Tech46/>.