



# Performance patterns for students with disabilities in grade 4 mathematics education in New York State



Institute of Education Sciences  
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**August 2008**

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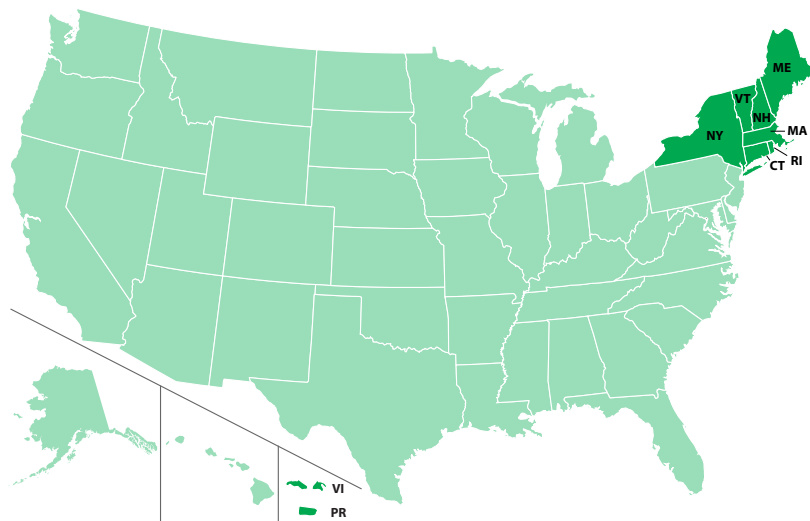
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# Performance patterns for students with disabilities in grade 4 mathematics education in New York State

**This report describes the mathematics performance of grade 4 students with disabilities across schools categorized by need-to-resource capacity and compares their performance by school with that of general education students across New York State from 2003 to 2005. It finds that the percentage of students with disabilities scoring proficient increased over time and that the proficiency gap between this subgroup and general education students narrowed by 1 percentage point.**

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 considerably since the 1970s, but education expectations and accountability for this subgroup of students have changed under the mandates of the Individuals with Disabilities Education Acts of 1997 and 2004 and the No Child Left Behind (NCLB) Act of 2001. NCLB requirements, in particular, have cast light on the generally low mathematics performance of many students with disabilities and on the large proficiency 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 analyses of mathematics performance patterns for grade 4 students with disabilities and general education students in New York State. It examines performance overall and using the state's categorization of need-to-resource capacity, a measure of school district need and resources. Three research questions are examined:

1. What is the mathematics performance of public school grade 4 students with disabilities in New York State?
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?

Findings indicate that 57 percent of grade 4 students with disabilities scored proficient on the state test in 2005. There was variation across need-to-resource-capacity index categories, with a 30 percentage point difference between the highest scoring need-to-resource-capacity category and lowest scoring category. Across all schools those whose performance

was above the 90th percentile of the distribution of school-level performance of students with disabilities had 100 percent proficiency rates for their students with disabilities. Included in this group were 45 high need-to-resource-capacity schools, 66 average need-to-resource-capacity schools, and 70 low need-to-resource-capacity schools.

From 2003 to 2005 the percentage of students with disabilities scoring proficient rose by 7.8 percentage points and that of general education students rose by 6.8 percentage points. Within similar school categories the improvement in proficiency was greatest in need-to-resource-capacity category 1 (New York City schools) and lowest in need-to-resource-capacity category 6 (low need schools). Across the state more than half (59 percent) of schools exhibited improved performance from 2003 to 2005, with an average gain of 23.2 percentage points.

From 2003 to 2005 there was a slight narrowing (about 1 percentage point) of the gap in proficiency between students with disabilities and general education students for the state

overall. Nearly 45 percent of the schools in the dataset had reductions in the proficiency gap from 2003 to 2005 without any decline in the performance of general education students. Of these schools more than a quarter had reductions in the gap of at least 30 percentage points.

In addressing the research questions, this report illustrates the types of analyses that state and district leaders can conduct with publicly reported data, along with the ways the findings can be interpreted. Limitations of the analyses include examining cross-sectional data on the percentage of proficient students rather than examining longitudinal data on actual student scores, lacking information on types and severity of disabilities, and applying the district-level need-to-resource-capacity categorization at the school level. This report's findings and limitations are important as states move forward in analyzing subgroup performance and proficiency gap data and in making data-driven decisions.

**August 2008**

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**This report describes the mathematics performance of grade 4 students with disabilities across schools categorized by need-to-resource capacity and compares their performance by school with that of general education students across New York State from 2003 to 2005. It finds that the percentage of students with disabilities scoring proficient increased over time and that the proficiency gap between this subgroup and general education students narrowed by 1 percentage point.**

## WHY THIS STUDY?

Across the country states and school districts seek to improve the mathematics performance of students with disabilities. This subgroup of students increased from 3.7 million in 1976 to 6.7 million in 2006 (U.S. Department of Education, National Center for Education Statistics 2007). Along with this population increase, there have been increases 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 assessment 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.

Since the NCLB Act imposes sanctions on schools that do not achieve adequate yearly 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). In a comprehensive summary of state assessment data the National Center for Educational Outcomes found that, on average, 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 proficiency gaps in mathematics between students with disabilities and general education students, with an average difference of 29 percentage points in elementary mathematics for 2004/05 (VanGetson and Thurlow 2007; see box 1 for definitions of key terms). Despite these gaps research has found increasing rates of proficiency in successive



## BOX 1

**Key terms used in the report**

- *Being or scoring proficient or reaching proficiency* indicates the percentage of students that score within the top two levels (levels 3 and 4) of the New York State standards. Level 1 is below basic, level 2 is basic, level 3 is proficient, and level 4 is above proficient. This terminology accords with the language of the NCLB regulations (see, for example, No Child Left Behind Act of 2001) and is used in this report to describe student performance and improvement trends.
- *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 2003 to 85 percent in 2005, this is reported as a difference of 15 percentage points rather than a change of 21.4 percent.
- *Proficiency gap* refers to the difference between the percentage of general education students reaching proficiency and the percentage of students with disabilities reaching proficiency.
- *Schools* refers to all public schools in the New York State 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).
- *Student performance* is the percentage of students who score within a particular proficiency level or multiple proficiency levels (generally levels 3 and 4, or proficient and above combined), rather than actual scores or the percentage of correct answers on a test (see appendix A for details).
- *Students with disabilities* are students who have an Individualized Education Program, as set out under the Individuals with Disabilities Education Acts of 1997 and 2004.

cohorts of the students with disabilities subgroup (Thurlow, Moen, and Altman 2006; VanGetson and Thurlow 2007).

States need to increase proficiency rates among students with disabilities 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 (schools with similar levels of need) and the distribution of performance across all schools. 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 describes the mathematics performance patterns of grade 4 students with disabilities in New York State for school years 2002/03–2004/05 (referred to in the report by the second semester dates, 2003–05), 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 school levels, this report focuses on the elementary level because these early years are critical for building students' foundations in mathematics. This report analyzes grade 4 data because this was the only elementary grade tested in mathematics in New York State before 2006.<sup>1</sup>

This report seeks to provide a more nuanced examination of performance patterns of students with disabilities by examining the performance

of this subgroup in similar schools, using the New York State Education Department's need-to-resource-capacity (N/RC) index to group schools based on a district's level of need (defined by the percentage of students eligible for free or reduced-price lunch), resources (defined by the combined wealth ratio), and locale (see box 2 for definition of the need-to-resource-capacity index). This categorization is important in analyzing a state as large and diverse as New York, with more than 700 school districts representing a wide range of need and resource levels. 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 are capable of (Johnson, Peck, and Wise 2007).

### Research questions

This report examines three research questions:

1. What is the mathematics performance of public school grade 4 students with disabilities in New York State? To explore the nuances in the

#### BOX 2

#### The need-to-resource-capacity index categories (N/RC)

This report analyzes the performance of grade 4 students with disabilities within need-to-resource-capacity (N/RC) index categories (see appendix B for more details). The New York State Education Department developed the index to categorize school districts for policy development. The index emerged from statistical research showing that student performance is negatively related to a district's level of need and positively related to its level of resources (New York State Education Department 2005b). The index has two components: a district's level of need, defined by the percentage of students eligible for free or reduced-price lunch, and its level of resources, defined by the combined wealth ratio. The combined wealth ratio "is computed for school districts that employ more than eight certified teachers. It combines assessed property value and personal incomes as reported for the district region. The number is then divided by a count of pupils and compared to a statewide average. Districts with the

same value as the state average have a value of 1; districts with low wealth have a value less than one" (New York State Education Department 2005b). The need-to-resource-capacity index also takes locale into account—defined by the number of students per square mile and the student enrollment of the district (see table below).

Throughout this report the need-to-resource-capacity categories are often

referred to by their number only (N/RC 4), rather than by their number and level of need and geographic locale (N/RC 4, high need, rural). In general, the lower the need-to-resource-capacity index number, the higher the need-to-resource-capacity ratio of the school. For example, schools in the N/RC 1 category have a higher need-to-resource-capacity ratio than schools in the N/RC 6 category.

#### Need-to-resource-capacity index categories for schools and school districts in New York State

Need-to-resource-capacity (N/RC) index category	Index value	Locale
N/RC 1	High	New York City
N/RC 2	High	Four large city districts <sup>a</sup>
N/RC 3	High	Urban and suburban districts
N/RC 4	High	Rural districts
N/RC 5	Average <sup>b</sup>	na
N/RC 6	Low <sup>c</sup>	na
N/RC 7	Charter schools <sup>d</sup>	na

na is not applicable.

a. Buffalo, Rochester, Syracuse, and Yonkers.

b. Districts with a need-to-resource-capacity index between the 20th and 70th percentiles.

c. Districts with a need-to-resource-capacity index below the 20th percentile.

d. Schools were not coded as N/RC 7, charter schools, until 2005, so the 36 schools in this category were removed from the analyses of 2005 data.

Source: New York State Education Department (2005b).

achievement of students with disabilities, this question is addressed by describing their 2005 performance across need-to-resource-capacity categories (see box 2) and by examining the distribution of 2005 school-level performance of 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 2003 to 2005 and by determining the number of schools that exhibited improved performance of students with disabilities over this period.
3. What is the gap in proficiency rates 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 of students from 2003 to 2005 diminished over time. Results are also presented by the number of schools that reduced the size of their gap as a result of improvements in proficiency rates among students with disabilities.

**From 2003 to 2005 the percentage of students with disabilities scoring proficient increased by 7.8 percentage points and that of general education students rose by 6.8 percentage points**

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. Results of these research questions have particular implications in light of the demands of the NCLB Act and adequate yearly progress requirements.

Answers to these research questions will help policymakers and educators understand the current and changing status of the mathematics performance of students with disabilities in New York State, both independently and in relation to the performance of general education students. By using only publicly available data,

### An overview of the findings

This report found that 57 percent of grade 4 students with disabilities scored proficient on the state test in 2005. There was variation across need-to-resource-capacity categories, with a 30 percentage point difference between the highest scoring need-to-resource-capacity category and the lowest scoring category. Across all schools those whose performance was above the 90th percentile of the distribution of school-level performance of students with disabilities had 100 percent proficiency rates for their students with disabilities. Included in this group were 45 high need-to-resource-capacity schools, 66 average need-to-resource-capacity schools, and 70 low need-to-resource-capacity schools.

From 2003 to 2005 the percentage of students with disabilities scoring proficient increased by 7.8 percentage points and that of general education students rose by 6.8 percentage points. Within similar school categories the improvement in proficiency was greatest in N/RC 1 (New York City schools) and lowest in N/RC 6 (low-need schools). Across the state more than half (59 percent) of schools exhibited improved performance from 2003 to 2005, with an average gain of 23.2 percentage points.

From 2003 to 2005 the slightly larger gains in performance for students with disabilities compared with general education students contributed to a slight narrowing of the proficiency gap for the state overall (approximately 1 percentage point). The gap between students with disabilities and general education students also decreased in four of the six categories (N/RC 1 and N/RC 3–5). During the period the gap narrowed for 44 percent of schools in the dataset without any decline in the performance of general education students. Of these schools more than a quarter had reductions in the gap of at least 30 percentage points.

In interpreting these findings, readers should be aware of limitations of the data, especially data that could not be accounted for in the analyses (see box 3 and appendix A).

## BOX 3

**Data sources and analysis****Data sources**

This study uses cross-sectional state report card data publicly available on the New York State Education Department web site. The report shows how cross-sectional data impede certain types of analyses, such as growth in student learning over time, but can illuminate other performance patterns.

The participation and performance data come from the grade 4 mathematics assessment of the New York State Testing Program administered in 2003, 2004, and 2005. Data for 2006 were not publicly available in time for this report.

The dataset contains population and performance data for all students who took the state assessment, but certain data are excluded (see appendix A for details). The largest exclusion occurred because the state did not report data for schools whose students with disabilities subgroup included fewer than five students. This reduced the sample size by roughly a quarter of the schools in the database. Also removed from the analysis were schools with missing data and schools considered outliers (very high or very low percentages of students with disabilities; see appendix A for details).

**Data limitations**

Besides the data exclusions, the analyses were limited by the nature of the data available in the datasets, with implications for the study findings. Four key limitations are mentioned here; 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 is evaluated by the increase in the percentage of students who score proficient from one year to the next. Such differences may reflect differences in the characteristics of students from year to year rather than differences in performance.
- Performance was operationalized as the percentage of students scoring proficient, a limited view that can yield results that are overly sensitive to the performance of students just above and just below the proficiency threshold. A small change in scores could place several students into the proficiency category (increasing the percentage proficient), with minimal effects on the average score across all students. Conversely, students can improve without moving to the next proficiency level, which is masked by the current analyses.
- The data do not provide information on the types or severity of disabilities, so annual differences in proficiency rates may be due to unknown variations in disability types for each cohort.
- Although the New York State Education Department defines need-to-resource-capacity index categories at the district level, this study applies these categories to each school within a district and refers to them as a school's

need-to-resource-capacity category. This is a potential limitation since individual schools within each district may vary considerably in need and resources.

**Data analysis**

Each research question is addressed on two levels:<sup>1</sup>

- *Student-level.* The overall performance of students with disabilities and general education students in New York State and within each need-to-resource-capacity index category (see box 2) is examined by giving equal weight to each student rather than to each school. This formula permits calculation of the percentage of students reaching proficiency across all schools within a given domain (such as all of N/RC 1):

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

- *School-level.* The performance of schools, based on the percentage of students with disabilities scoring proficient within each school, is examined by giving equal weight to each school rather than to each student. 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 analyzed in this report represent the grade 4 population of New York State elementary schools rather than a random sample from which population inferences can be made. Therefore, 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 by need-to-resource-capacity category in 2005. It also describes the distribution of 2005 school-level performance of students with disabilities.

On the New York State Testing Program (NYSTP), 57.3 percent of grade 4 students with disabilities scored proficient on the state test. There was variation across need-to-resource-capacity categories, with a 30 percentage point difference between the highest scoring and lowest scoring categories. All schools above the 90th percentile of the distribution of school-level performance of students with disabilities had 100 percent proficiency rates for their students with disabilities. Included in this group were 45 high need-to-resource-capacity schools, 66 average need-to-resource-capacity schools, and 70 low need-to-resource-capacity schools.

### Performance of students with disabilities

In 2005, 57.3 percent of grade 4 students with disabilities tested proficient or above proficient on the NYSTP mathematics exam (figure 1). This included 45.5 percent of students with disabilities who scored at the proficient level (level 3) and 11.8 percent who scored at the above proficient level (level 4). Nearly 43 percent of students scored below proficiency (either level 1, below basic, or level 2, basic).

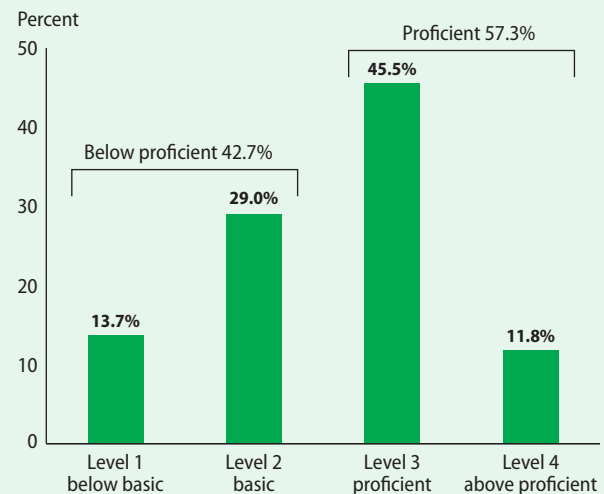
There were differences in the performance of students with disabilities across the six need-to-resource-capacity categories (figure 2). In moving from N/RC 1 to N/RC 6 (from highest to lowest need), the percentage of students with disabilities reaching proficiency increased by more than 30 percentage points (see figure C1 in appendix C for more detail). Proficiency rates for students with disabilities in N/RC 1–N/RC 4 (high need) ranged from 46 percent to 53 percent

in 2005, while rates in N/RC 5 and N/RC 6 (average and low need) ranged from 65 percent to 79 percent.

### Distribution of the school-level performance of students with disabilities

All schools were ranked according to the performance of their students with disabilities subgroup across the entire distribution of school-level performance of students with disabilities. A greater proportion of high need-to-resource-capacity schools fell in lower percentile rankings, while a greater proportion of average and low need-to-resource-capacity schools fell into higher percentile rankings. For example, 39.6 percent of all schools in N/RC 1 fell in the 25th percentile of the distribution or below, while 54.7 percent of schools in N/RC 6 fell above the 75th percentile (table 1). Notably, all of the schools above the 90th percentile had 100 percent proficiency rates for their students with disabilities. Included in this group were 45 high need-to-resource-capacity schools, 66 average need-to-resource-capacity schools, and 70 low need-to-resource-capacity schools.

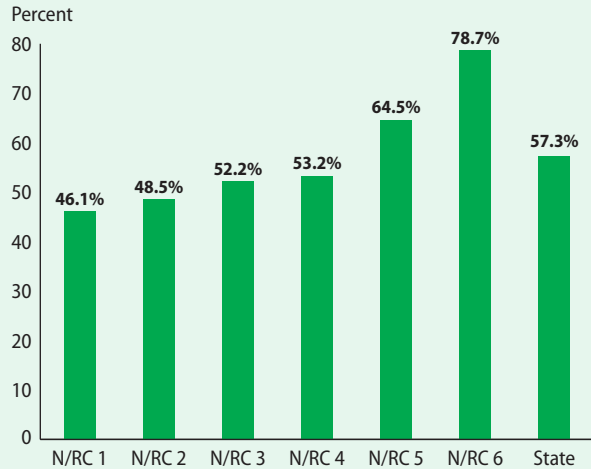
FIGURE 1  
**Percentage of grade 4 students with disabilities performing at each proficiency level in New York State, 2005**



Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).



**FIGURE 2**  
**Percentage of grade 4 students with disabilities reaching proficiency, by need-to-resource-capacity (N/RC) index category and across the state, 2005**



Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

**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 2003 to 2005. It also describes the number of schools that exhibited improved performance among their students with disabilities subgroup from 2003 to 2005 and the average percentage increase in proficiency in those schools.

From 2003 to 2005 the percentage of students with disabilities scoring proficient rose by 7.7 percentage points, and the percentage of general education students scoring proficient rose by 6.8 percentage points. Of the schools that had proficiency information on students with disabilities for both years, 58.7 percent (925) had a higher percentage

**TABLE 1**  
**Distribution of school-level percentages of proficient students with disabilities, by N/RC, 2005**

Need-to-resource-capacity (N/RC) index category	Index value	Locale	10th percentile and below		11th–25th percentile		26th–50th percentile		51st–75th percentile		76th–90th percentile		Above 90th percentile	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
N/RC 1	High	New York City	104	17.9	126	21.7	179	30.8	111	19.1	36	6.2	25	4.3
N/RC 2	High	Four large city districts <sup>a</sup>	16	16.0	20	20.0	31	31.0	20	20.0	8	8.0	5	5.0
N/RC 3	High	Urban and suburban districts	19	11.9	35	21.9	50	31.3	30	18.8	16	10.0	10	6.3
N/RC 4	High	Rural districts	12	9.7	28	22.6	41	33.1	28	22.6	10	8.1	5	4.0
N/RC 5	Average <sup>b</sup>	na	30	5.2	62	10.8	163	28.3	162	28.1	93	16.1	66	11.5
N/RC 6	Low <sup>c</sup>	na	3	1.1	6	2.2	30	10.9	86	31.2	81	29.3	70	25.4
Average rate of proficiency (percent)			15.1		34.3		51.6		70.9		87.6		100.0	

a. Buffalo, Rochester, Syracuse, and Yonkers.  
 b. Districts with a need-to-resource-capacity index between the 20th and 70th percentile.  
 c. Districts with a need-to-resource-capacity index below the 20th percentile.

Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

of students with disabilities scoring proficient in 2005 than in 2003, with an average gain of 23.2 percentage points.

### Student performance over time

From 2003 to 2005 the overall share of students with disabilities reaching proficiency increased from 49.6 percent to 57.3 percent (figure 3), an improvement of 7.7 percentage points. The proficiency rate of general education students rose by 6.8 percentage points.

The percentage of students with disabilities scoring proficient rose in all need-to-resource-capacity categories (table 2). By need-to-resource-capacity category the range of improvement for special education students was 0.6 to 12.8 percentage points, while that of general education students was 0.2

to 12.8 percentage points. The highest increase occurred in high need-to-resource-capacity category schools.

**From 2003 to 2005 the overall share of students with disabilities reaching proficiency increased from 49.6 percent to 57.3 percent, an improvement of 7.7 percentage points**

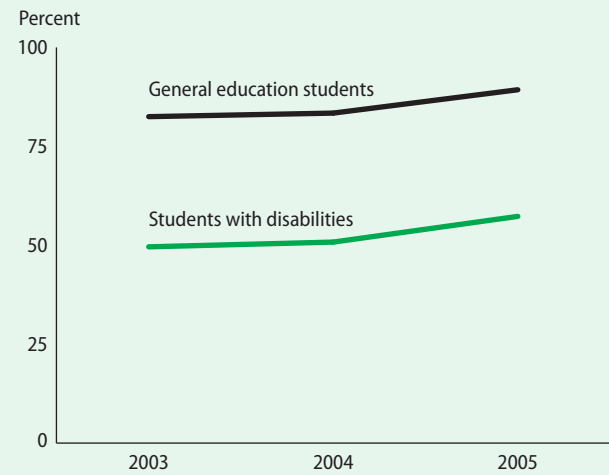
### Performance of schools over time

This section looks at schools that had increases in the percentage of students with disabilities scoring proficient from 2003 to 2005. Of 1,577 schools that had proficiency information on students with disabilities for both years, 925 (58.7 percent) had a higher percentage of students with disabilities scoring proficient in 2005 than in 2003. The improvement ranged from 1 percentage point to 87 percentage points, with an average gain of 23.2 percentage points (table 3). As a point of comparison, although the percentage of general education students scoring proficient increased for a larger percentage of schools (71.7), the increase averaged only 9.7 percentage points.

The N/RC 1 category had the highest percentage of schools with improved performance for students with disabilities from 2003 to 2005 (68.9 percent); the N/RC 6 category had the lowest percentage

FIGURE 3

### Percentage of New York State grade 4 general education students and students with disabilities scoring proficient, 2003–05



Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

(47.7 percent; see table 3). Although N/RC 2 had the lowest number of schools with improved performance for students with disabilities, it had the highest mean percentage point increase (25.5) for schools that did improve.

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

Building on the findings that many schools had increases in the percentage of grade 4 students with disabilities scoring proficient and that in several need-to-resource-capacity categories students with disabilities showed greater gains than their general education counterparts, this section investigates the proficiency gap in mathematics between the two subgroups. It also identifies the number of schools with reductions in their proficiency gaps.

In 2005 the proficiency gap was approximately 32.0 percentage points for the state overall and ranged from a low of 19.5 percentage points in N/RC 6 to a high of 37.3 percentage points in N/RC 4. From



TABLE 2

**Percentage point change in students scoring proficient between 2003 and 2005 for students with disabilities and general education students, by need-to-resource-capacity index category**

Need-to-resource-capacity(N/RC) index category	Index value	Locale	Students with disabilities	General education students
N/RC 1	High	New York City	12.8	10.1
N/RC 2	High	Four large city districts <sup>a</sup>	6.6	12.8
N/RC 3	High	Urban and suburban districts	4.5	-0.2
N/RC 4	High	Rural districts	5.6	5.0
N/RC 5	Average <sup>b</sup>	na	5.2	3.6
N/RC 6	Low <sup>c</sup>	na	0.6	1.5

na is not applicable.

a. Buffalo, Rochester, Syracuse, and Yonkers.

b. Districts with a need-to-resource-capacity index between the 20th and 70th percentile.

c. Districts with a need-to-resource-capacity index below the 20th percentile.

Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

TABLE 3

**Schools showing improved performance for students with disabilities from 2003 to 2005, by need-to-resource-capacity index category**

Need-to-resource-capacity (N/RC) index category	Index value	Locale	Number	Percent <sup>a</sup>	Percentage point increase		
					Mean	Minimum	Maximum
N/RC 1	High	New York City	354	68.9	24.5	1	86
N/RC 2	High	Four large city districts <sup>b</sup>	49	56.3	25.5	1	67
N/RC 3	High	Urban and suburban districts	73	53.7	24.5	1	87
N/RC 4	High	Rural districts	60	57.7	22.6	1	50
N/RC 5	Average <sup>c</sup>	na	276	55.3	23.1	1	79
N/RC 6	Low <sup>d</sup>	na	113	47.7	17.8	1	74
Total/average	na	na	925 <sup>e</sup>	58.7	23.2	1	74

na is not applicable.

a. Percentage of total number of schools in each need-to-resource-capacity index category for students with disabilities performance data for both 2003 and 2005.

b. Buffalo, Rochester, Syracuse, and Yonkers.

c. Districts with a need-to-resource-capacity index between the 20th and 70th percentile.

d. Districts with a need-to-resource-capacity index below the 20th percentile.

e. Of the 2,350 schools in the dataset for 2003, 767 schools were removed from these analyses because of missing data for at least one year, and an additional 6 were removed because they were in the N/RC 7 (charter schools) category.

Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

**From 2003 to 2005 the proficiency gap across the state narrowed by 1 percentage point as the percentage of students with disabilities scoring proficient rose more than that of general education students**

2003 to 2005 the slightly larger gains in performance for students with disabilities than for general education students contributed to a slight narrowing (approximately 1 percentage point) of the proficiency gap for the state overall. The gap between students with disabilities and general education students was reduced in N/RC 1 and N/RC 3–N/RC 5. N/RC 1 had

both the largest proficiency gap and the greatest reductions in the gap over time. At the school level 44 percent of schools with appropriate data had reductions in the proficiency gap from 2003 to 2005, without any decline in the performance of general education students.

#### The proficiency gap between students with disabilities and general education students

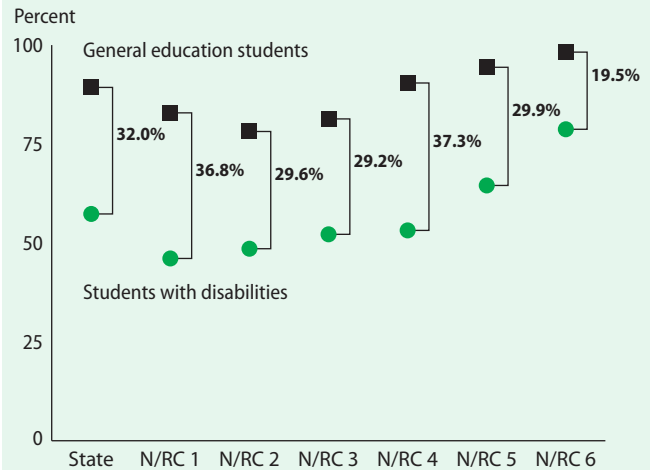
In 2005 the proficiency gap between the state's grade 4 general education students and students with disabilities was 32.0 percentage points (figure 4). The smallest proficiency gap was in N/RC 6 (19.5 percentage points), and the largest gaps were in N/RC 4 (37.3 percentage points) and N/RC 1 (36.8 percentage points).

The performance gap declined across the state and for most N/RC categories from 2003 to 2005 (figure 5). Several factors could account for a decrease in the proficiency gap:

- Percentage of students scoring proficient rose for both the students with disability and general education student subgroups but improved more for students with disabilities.
- Percentage of students scoring proficient rose for the students with disabilities subgroup and fell or remained unchanged for the general education student subgroup.
- Percentage of students scoring proficient fell for both groups but declined more for general education students.

FIGURE 4

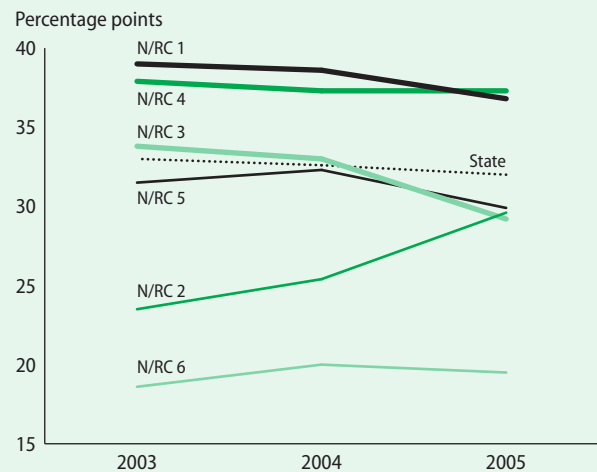
**Comparison of percentage of grade 4 students with disabilities and general education students scoring proficient, across the New York State and by need-to-resource-capacity (N/RC) index category, 2005**



Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

FIGURE 5

**Percentage point difference between percentage of grade 4 general education students and students with disabilities scoring proficient, across the state and by need-to-resource-capacity (N/RC) index category, 2003–05**



Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

Since the performance of students with disabilities improved across the state and in each need-to-resource-capacity category, only the first two reasons for a reduction in the proficiency gap apply.

From 2003 to 2005 the proficiency gap across the state narrowed by 1 percentage point as the percentage of students with disabilities scoring proficient rose more than that of general education students. There were larger changes in some need-to-resource-capacity categories:

- In four of the six categories (N/RC 1 and N/RC 3–N/RC 5) performance improved more from 2003 to 2005 for students with disabilities than for general education students, leading to a narrowing in the proficiency gap. The gap narrowed most for N/RC 3 schools (4.6 percentage points), as the performance of general education students declined while that of students with disabilities improved.
- In N/RC 2 and N/RC 6 schools the proficiency gap widened, as performance improved more for general education students than for students with disabilities. N/RC 2 had the largest increase (6.6 percentage points) in the proficiency gap over time.

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#### 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 2003 to 2005, looking only at schools in which the proficiency gap narrowed and excluding all schools in which the gap narrowed because of declining performance by general education students. In the previous analysis, which examined the proficiency gaps within similar categories of schools—combining students from all schools within a need-to-resource-capacity category who scored proficient—data were pooled from schools that increased their proficiency gap and schools that decreased it.

Of the 2,350 schools included in the dataset for 2005, 1,422 had the data required to examine whether there was any narrowing in the proficiency gap.<sup>2</sup> Of these 1,422 schools 626 schools (44 percent) narrowed their proficiency gap from 2003 to 2005, with no decline in the performance of general education students. These are the gap-reducing schools that are examined.

The remaining schools were removed from the analyses for the following reasons:

- 159 schools (11.2 percent) had reductions in their proficiency gap from 2003 to 2005, but with a decline in the performance of general education students.
- 23 schools (1.6 percent) had no change in their proficiency gap from 2003 to 2005.
- 614 schools (43.2 percent) had increases in their proficiency gap from 2003 to 2005.

For the 626 gap-reducing schools the average narrowing in the proficiency gap was 19.7 percentage points. The narrowing in the proficiency gap from 2003 to 2005 varied across schools

(figure 6). For example, 97 schools narrowed the proficiency gap by 0–5 percentage points, and another 111 schools narrowed the gap by 5–10 percentage points. More than a quarter (28.6 percent) narrowed the gap by more than 30 percentage points.

**For the 626 gap-reducing schools the average narrowing in the proficiency gap from 2003 to 2005 was 19.7 percentage points**

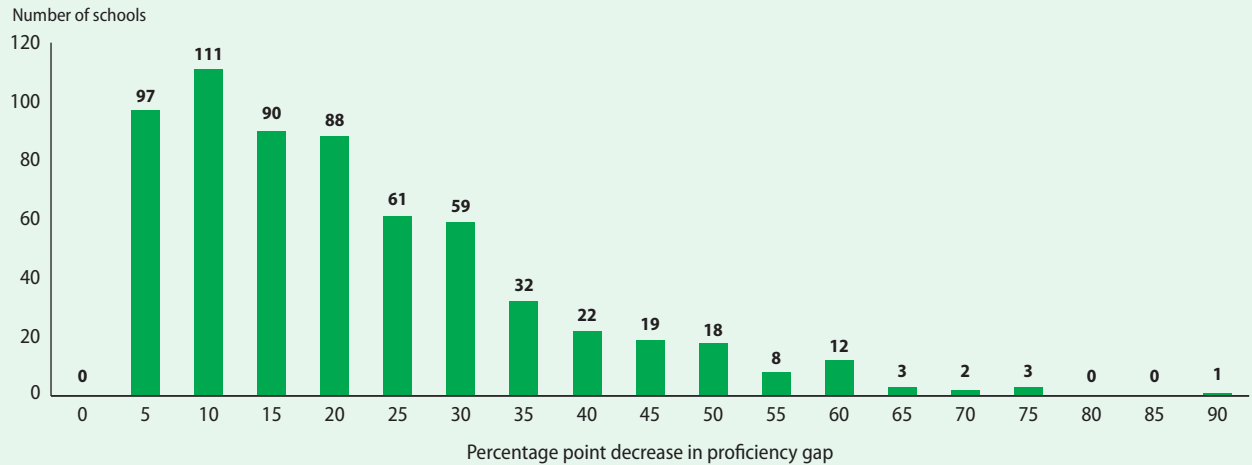
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## CONCLUSION

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

FIGURE 6

**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, by percentage point decrease in the gap, 2003–05**



Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

### 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), there were several limitations of the data that 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 in the current report. Some of these factors can be assessed only through student-level data, which are not typically available publicly. 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 need not mean that a group of students improved or worsened over that time period. Rather, any variation from one year to the next could reflect changes in the composition of students. Also important to note is that for the students with disabilities subgroup, a school's

performance may vary dramatically from year to year because of differences in the types and severities of disabilities among cohorts of students, an effect that can be magnified by the small size of this subgroup.

Another consideration in interpreting the findings is the way performance was measured. Performance was presented in the publicly available dataset as the percentage of students scoring proficient in each school, rather than as an average test score. Therefore, 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 below proficiency category. Such improvements are masked by the available data. Therefore, a lack of improvement in the percentage of students with disabilities reaching proficiency does not necessarily mean that student scores did not improve. For instance, the average score of all students in level 2 (basic) could increase, but not enough for those students' scores to reach level 3 (proficient).

Another limitation is the application of the district-level need-to-resource-capacity categories to each school within a district. Since individual schools within a district can vary considerably in need and resources, the higher performance of some high-performing schools may be due to lower levels of need or higher levels of resources.

Finally, nearly a quarter of the schools in New York State were not included in the analyses because of unreported, missing, or removed data (see appendix A). The exclusion of data for subgroups with fewer than five students particularly affects the results for rural schools, which typically have smaller enrollments. Students in excluded schools may have performed differently from the students included in these analyses, creating a bias in the findings.

#### Areas for further inquiry

Both the findings and the limitations of the analyses suggest several areas for future research. For example, did the same students with disabilities improve from year to year, and how does individual performance 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. Also, by using student-level data, future research could examine whether students in multiple subgroups are less likely to meet adequate yearly progress, and whether different subgroup configurations affect student performance.

To specifically address how to help students with disabilities improve their educational attainment, research could examine which practices and policies are in place in schools or districts where students with disabilities display high achievement patterns. In addition, a closer look may be warranted at the policies and practices that New York State applies to all its students, to help explain how proficiency rates appear to increase from year to year. For example, Academic Intervention Services have been mandated in New York State since 2000.

These services must be provided to each student scoring below proficient on the state assessments. It seems plausible that the widespread implementation of this type of policy may be associated with improved mathematics performance for both students with disabilities and general education students—useful knowledge for other states across the country.

**Nearly a quarter of the schools in New York State were not included in the analyses because of unreported, missing, or removed data**

#### Potential policy implications of the findings

The report's findings may help education leaders and policymakers better understand the performance of students with disabilities and make more informed, data-driven decisions. In particular, the descriptions of performance may reveal how school-level data can be examined to clarify important questions that drive policy decisions.

The current report's finding of large variations across different need-to-resource-capacity categories underpins the value of comparing schools with others in the same category, rather than with the state average. Specifically, examining the performance of students in schools that are similar to one another—as was done here using New York State's need-to-resource-capacity categories—realizes the suggestion made in a previous report on the examination of performance among similar school groupings (Johnson, Peck, and Wise 2007, p. 13). The differences in performance of students with disabilities in different need-to-resource-capacity categories suggest that attention be paid to variations in performance at schools with different levels of needs and resources and to what some schools are doing to overcome need and improve performance.

While many schools displayed improvement in the proficiency rate for students with disabilities, it is important that education leaders recognize that many schools in New York State did not improve from 2003 to 2005 and that students with

disabilities performed differently across need-to-resource-capacity categories. High need-to-resource-capacity schools, which had lower rates of proficiency, typically have large numbers of disadvantaged students requiring education services and thus may face challenges in serving them. The patterns revealed in this report may help state education leaders decide where to focus resources and assistance to improve mathematics education for students with disabilities.

Most important, this report may be useful to education leaders and policymakers in other states and at the national level. The questions asked and the results discussed 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. In addition to better understanding the problems inherent in using cross-sectional 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, EXCLUSIONS, AND LIMITATIONS

This appendix discusses New York State's publicly available datasets, data excluded from the project's analyses, and limitations due to the datasets employed.

### New York State's 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. Because cross-sectional data are often employed by states and districts to analyze student performance, and federal, state, and district decisions are based on analyses of publicly available datasets, it is important to know what types of questions can be answered using cross-sectional data as well as the limitations on interpreting and analyzing such data.

This study of the performance of grade 4 students with disabilities used cross-sectional data made publicly available by the New York State Education Department on its web site (<http://www.emsc.nysed.gov/irts/reportcard>). The research questions took the limitations of the data into account while permitting new ways of examining the performance of students with disabilities.

The following variables were available in the datasets:

- School name.
- Number of students participating in the state test (overall and in each subgroup).
- Percentage of students participating in the state test (in each subgroup).
- Percentage of students that performed at each level of proficiency (overall and by subgroup):

- Level 1: Not meeting learning standards.
- Level 2: Partially meeting learning standards.
- Level 3: Meeting learning standards.
- Level 4: Meeting learning standards with distinction.

- Need-to-resource-capacity (N/RC) category for each school.

The participation and performance data come from the grade 4 mathematics assessment of the New York State Testing Program (NYSTP), administered since 1997.<sup>3</sup> The grade 4 mathematics test consists of multiple choice, short response, and extended response questions.

This report focuses on grade 4 data for three school years: 2002/03, 2003/04, and 2004/05, which are referred to by their second semester years (2003, 2004, and 2005). Data are analyzed only through 2005 because the 2006 subgroup data cannot be accurately compared with data for prior years because of changes in the 2006 test. (The new test reflects a revision of the New York State Learning Standards for Mathematics and a change in the testing period from May to March.) Data for 2005 are examined for snapshots of the performance of students with disabilities or of students at top-performing schools. Data from 2003 to 2005 are examined for describing changes over time.

### Excluded data

Unreported, missing, or removed data are described below.

*Unreported data.* To protect the privacy of individual students, New York State does not publicly report performance data for students in subgroups that contain fewer than five students in a given school and grade. In addition, if a school reports fewer than five students for one subgroup, the



data for the next largest subgroup in the same category were also removed. Since general education students and students with disabilities are the only two subgroups in their categories, whenever data for students with disabilities were removed, general education data were also removed. As a result, approximately 22 percent of the schools did not have reported data for the students with disabilities subgroup or the general education students subgroup.

In several cases a school had five or more students in one year but fewer than five students in another year. In these cases a school's performance data were included for the former year, but excluded for the latter year.

*Missing data.* Data appeared to be missing from the publicly available datasets when the New York State Education Department reported neither the number of students in a subgroup at a school nor the performance data for the school. Since it was not known whether these data were not reported or whether the schools did not exist in previous years, all such cases were considered as missing data. In addition, there were 2,693 elementary schools in the state in 2005 but only 2,350 schools with grade 4 data reported in the publicly available dataset for 2005. 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 New York State elementary schools, outlier schools were dropped from the analyses. Outliers were defined as schools with students with disabilities populations that were more than two standard deviations higher or lower than the mean number of students with disabilities in each school. The following calculation was used to determine which schools would be labeled as outliers and therefore removed from the analyses:

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

Because two standard deviations below the mean yielded negative numbers, outliers included only schools with very high percentages of students with disabilities. Outliers accounted for just 1.6 percent of the dataset (38 schools) in 2005, 1.7 percent of the dataset (38 schools) in 2004, and 1.1 percent of the dataset (26 schools) in 2003.

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 dataset for the entire population. Table A1 shows the number of schools in the complete dataset and the number of schools with excluded data on students with disabilities or general education

TABLE A1

**Number of schools included and excluded in dataset**

Number of schools reported in New York State	Students with disabilities performance data			General education students performance data		
	2003	2004	2005	2003	2004	2005
Department of Education dataset	2,355	2,301	2,348	2,355	2,301	2,348
Number of schools in the performance analysis dataset	1,812	1,792	1,818	1,876	1,901	1,898
Number of schools removed as outliers	26	38	38	nc	nc	nc
Criterion for being an outlier school (percentage of students with disabilities)	≥ 32	≥ 31	≥ 31	na	na	na

nc is not calculated.

na is not applicable.

Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

students. The number of schools with missing data in 2003 and 2004 is represented by the difference between the numbers of reported schools in those years and the number reported in 2005.

### Data limitations

The kinds of information provided in the New York State Education Department'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 limited the analyses to examining different cohorts of students for each year for which 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 percentage of students scoring 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, differences in proficiency rates from one year to the next (or from one need-to-resource-capacity category to another) may reflect unknown variations in disability types for each cohort.

*Alternate assessments.* The dataset does not provide information on the number of grade 4 students with disabilities in each school who took the New York State Alternate Assessment (NYSAA), so it is not possible to study the impact of schools' participation rates in the NYSA on the performance of their students with disabilities.<sup>4</sup> That

impact is likely to be small, however, because the NCLB regulation limits 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. For New York State overall only 6 percent of grade 4 students with disabilities (1,753) took the NYSA in 2005.

*Overlap of student subgroups.* Although the categories of general education students and students with disabilities are mutually exclusive (and together account for 100 percent of the grade 4 population in each reported school), either category could overlap with limited English proficiency or eligibility for free or reduced-price lunch. Since the school-level dataset does not provide information on whether students fall into one subgroup or multiple subgroups (overlaps are more likely in higher need schools), it does not indicate whether students with disabilities who also 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 need-to-resource-capacity categories.

*Exclusion of scaled scores.* Data were the percentage of students scoring at each level of proficiency—not scaled scores. Identifications of progress were thus limited to movement between proficiency levels and could not register smaller movements within proficiency levels.

*Unreported or missing data.* For reasons already explained (see above, "Excluded data"), data from about a quarter of New York State grade 4 students were not available. This report does not provide information about how grade 4 students with disabilities are performing in schools that were excluded from the dataset.

## APPENDIX B

### STUDENT AND SCHOOL COMPOSITION OF NEED-TO-RESOURCE-CAPACITY CATEGORIES

The need-to-resource-capacity (N/RCs) categories vary greatly in the numbers of schools and students they include. Tables B1–B3 display the number of schools with grade 4 data in each need-to-resource-capacity category for each year of data. This analysis focuses on table B1, with the most recent year of data, 2005. N/RC 5 (all schools within districts with a need-to-resource-capacity index between the 20th and 70th percentiles) includes the largest percentage of schools, at 31 percent. N/RC 1 schools (New York City) make up another 30 percent of schools. N/RC 2 schools (those located in the large city districts of Buffalo, Rochester, Syracuse, and Yonkers) had the smallest proportion of schools, at 6 percent. Thus, the need-to-resource-capacity categories represent different proportions of the state’s student population. For example, 50 percent of the student population in N/RC 5 corresponds to 15.9 percent of the state’s population, while 50 percent of the population in N/RC 4 corresponds to 4.4 percent of the state’s population.

Tables B1–B3 also show the number and percentage of schools included in the study dataset in each need-to-resource-capacity category after excluded data were removed. A slightly smaller proportion of N/RC 4 rural schools (61.4 percent) were included in the analyses of students with disabilities than of the remaining need-to-resource-capacity categories, which had roughly similar percentages of schools included in the analyses in 2005 (see table B1).

The average percentages of grade 4 students with disabilities and other subgroups varied across the six need-to-resource-capacity categories (table B4). Schools in N/RC 2 had the highest mean percentage of students with disabilities (19.6 percent); in the remaining need-to-resource-capacity categories the mean percentage ranged from 11.8 percent to 14.3 percent. N/RC 1 and N/RC 2 had much higher percentages of limited English proficiency students and students eligible for free or reduced-price lunch than schools in the other categories. In addition, the student subgroup percentages displayed for each need-to-resource-capacity category in table B4 can refer to widely divergent numbers of students. For example, N/RC 1 and N/RC 4 have

TABLE B1

#### Schools included in the analyses, by need-to-resource-capacity index category, 2005

Need-to-resource-capacity (N/RC) index category	Index value	Locale	Number of schools in dataset	Schools included in students with disabilities analyses		Schools included in general education students analyses	
				Number	Percent	Number	Percent
N/RC 1	High	New York City	696	581	83.5	611	87.8
N/RC 2	High	Four large city districts <sup>a</sup>	129	100	77.5	112	86.8
N/RC 3	High	Urban and suburban districts	207	160	77.3	170	82.1
N/RC 4	High	Rural districts	202	124	61.4	131	64.9
N/RC 5	Average <sup>b</sup>	na	734	576	78.5	591	80.5
N/RC 6	Low <sup>c</sup>	na	343	276	80.5	282	82.2
Total	na	na	2,311	1,817	78.6	1,897	82.1

na is not applicable.

a. Buffalo, Rochester, Syracuse, and Yonkers.

b. Districts with a need-to-resource-capacity index between the 20th and 70th percentile.

c. Districts with a need-to-resource-capacity index below the 20th percentile.

Source: Authors’ analysis based on data from New York State Education Department (2003, 2004, 2005a).

TABLE B2

**Schools included in the analyses, by need-to-resource-capacity index category, 2004**

Need-to-resource-capacity (N/RC) index category	Index value	Locale	Number of schools in dataset	Schools included in students with disabilities analyses		Schools included in general education students analyses	
				Number	Percent	Number	Percent
N/RC 1	High	New York City	712	547	76.8	598	84.0
N/RC 2	High	Four large city districts <sup>a</sup>	144	94	65.3	112	77.8
N/RC 3	High	Urban and suburban districts	203	156	76.9	162	79.8
N/RC 4	High	Rural districts	201	138	68.7	148	73.6
N/RC 5	Average <sup>b</sup>	na	742	586	79.0	604	81.4
N/RC 6	Low <sup>c</sup>	na	348	271	77.9	277	79.6
Total	na	na	2,350	1,792	76.3	1,901	80.9

na is not applicable.

a. Buffalo, Rochester, Syracuse, and Yonkers.

b. Districts with a need-to-resource-capacity index between the 20th and 70th percentile.

c. Districts with a need-to-resource-capacity index below the 20th percentile.

Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

TABLE B3

**Schools included in the analyses by need-to-resource-capacity index category, 2003**

Need-to-resource-capacity (N/RC) index category	Index value	Locale	Number of schools in dataset	Schools included in students with disabilities analyses		Schools included in general education students analyses	
				Number	Percent	Number	Percent
N/RC 1	High	New York City	712	567	79.6	586	82.3
N/RC 2	High	Four large city districts <sup>a</sup>	145	103	71.0	112	77.2
N/RC 3	High	Urban and suburban districts	202	157	77.7	165	81.7
N/RC 4	High	Rural districts	202	134	66.3	139	68.8
N/RC 5	Average <sup>b</sup>	na	740	579	78.2	596	80.5
N/RC 6	Low <sup>c</sup>	na	349	272	77.9	278	79.7
Total	na	na	2,350	1,812	77.1	1,876	79.8

na is not applicable.

a. Buffalo, Rochester, Syracuse, and Yonkers.

b. Districts with a need-to-resource-capacity index between the 20th and 70th percentile.

c. Districts with a need-to-resource-capacity index below the 20th percentile.

Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

the same percentage of students with disabilities (12.8 percent); however, that percentage corresponds to 9,336 students in N/RC 1 and 1,546 students in N/RC 4. Such differences are important to keep in mind when interpreting the findings in the report.

Another factor to consider is that the categories of limited English proficiency students, students

eligible for free or reduced-price lunch, and students with disabilities are not mutually exclusive (nor are limited English proficiency students, students eligible for free or reduced-price lunch, and general education students). Thus, there can be considerable overlap across these groups in each need-to-resource-capacity category, as represented in table B4 by subgroup percentages that do not total 100 percent.

TABLE B4

**Average composition of grade 4 population by need-to-resource-capacity index category and No Child Left Behind student subgroup, 2005**

Need-to-resource-capacity (N/RC) index category	Index value	Locale	Number of students	Mean percentage of total students			
				General education students	Students with disabilities	Limited English proficiency students	Students eligible for free or reduced-price lunch
N/RC 1	High	New York City	72,936	87.2	12.8	12.9	85.5
N/RC 2	High	Four large city districts <sup>a</sup>	8,147	80.4	19.6	11.3	75.2
N/RC 3	High	Urban and suburban districts	16,445	85.7	14.3	8.0	59.3
N/RC 4	High	Rural districts	12,096	87.2	12.8	0.8	45.1
N/RC 5	Average <sup>b</sup>	na	62,448	87.0	13.0	1.7	24.6
N/RC 6	Low <sup>c</sup>	na	31,202	88.2	11.8	2.5	5.8

na is not applicable.

a. Buffalo, Rochester, Syracuse, and Yonkers.

b. Districts with a need-to-resource-capacity index between the 20th and 70th percentile.

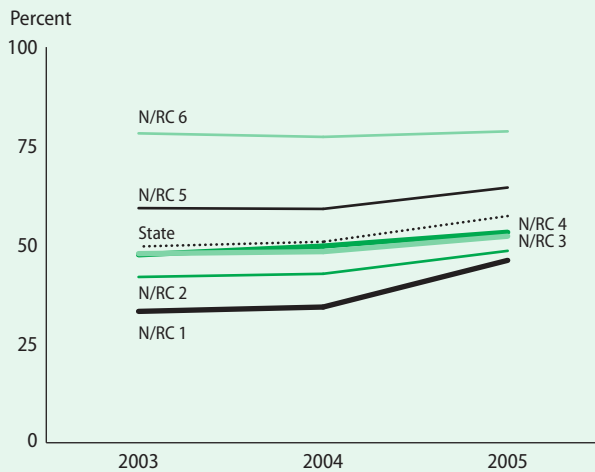
c. Districts with a need-to-resource-capacity index below the 20th percentile.

Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

**APPENDIX C  
SUPPLEMENTAL FIGURES ON  
STUDENT PERFORMANCE**

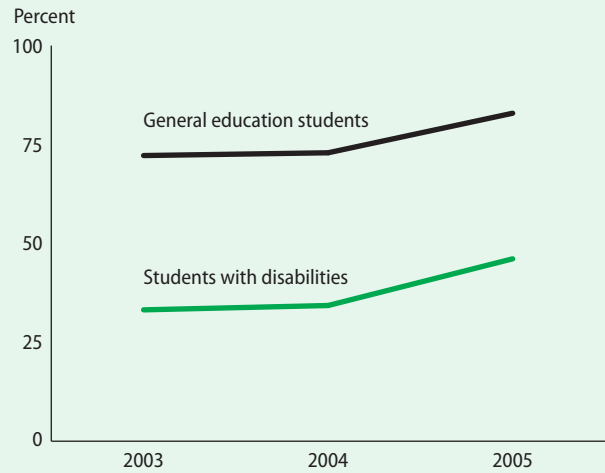
Appendix C provides supplemental figures on the percentage of students with disabilities and general education students scoring proficient in 2003–05 for each need-to-resource-capacity category.

**FIGURE C1  
Percentage of grade 4 students with disabilities scoring proficient, for schools in each need-to-resource-capacity (N/RC) index category and for New York State, 2003–05**



Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

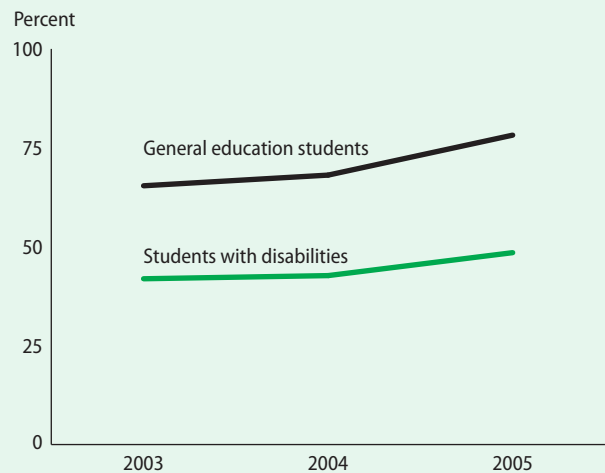
**FIGURE C2  
N/RC 1: Percentage of grade 4 general education students and students with disabilities scoring proficient, 2003–05**



Note: N/RC is need-to-resource-capacity index category.

Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

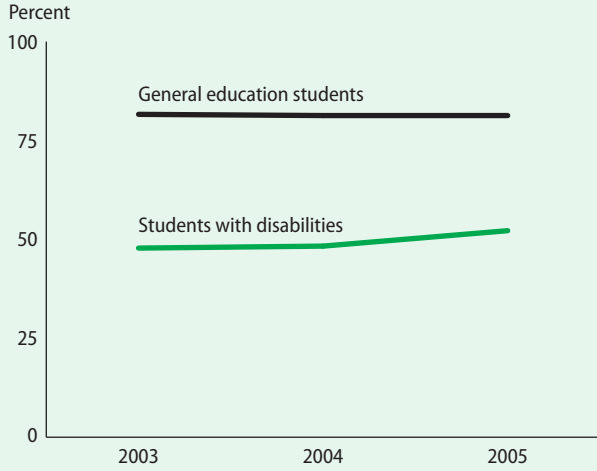
**FIGURE C3  
N/RC 2: Percentage of grade 4 general education students and students with disabilities scoring proficient, 2003–05**



Note: N/RC is need-to-resource-capacity index category.

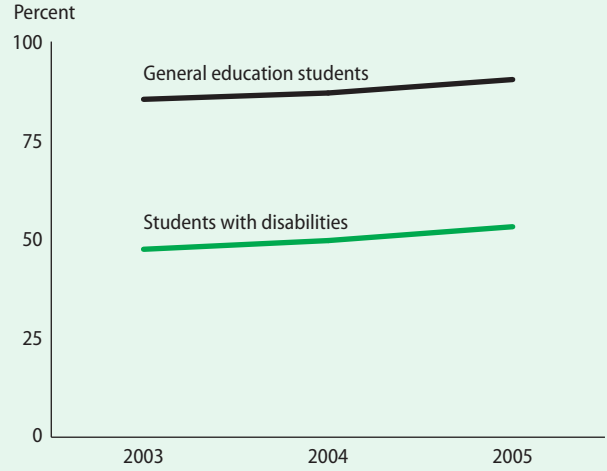
Source: Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

**FIGURE C4**  
**N/RC 3: Percentage of grade 4 general education students and students with disabilities scoring proficient, 2003–05**



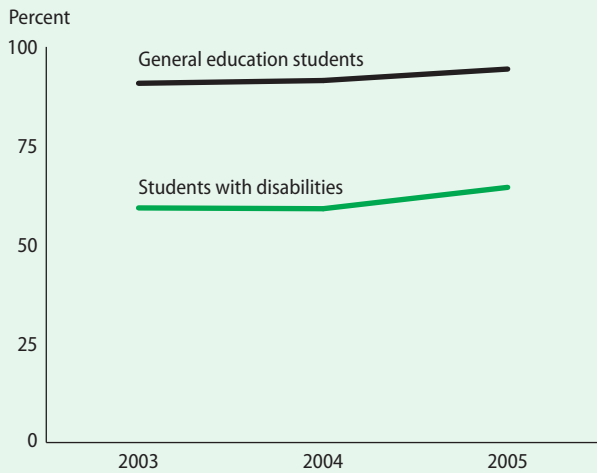
*Note:* N/RC is need-to-resource-capacity index category.  
*Source:* Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

**FIGURE C5**  
**N/RC 4: Percentage of grade 4 general education students and students with disabilities scoring proficient, 2003–05**



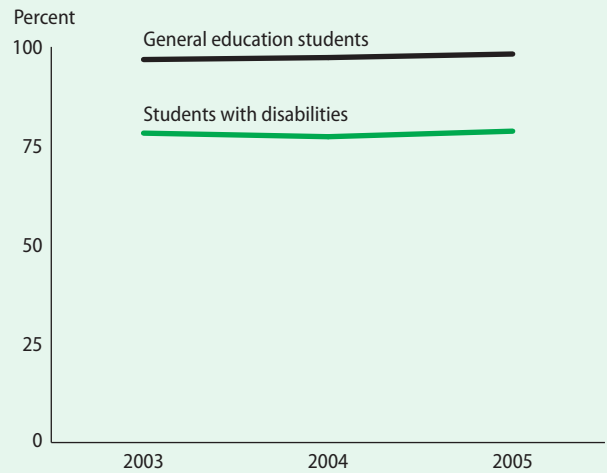
*Note:* N/RC is need-to-resource-capacity index category.  
*Source:* Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

**FIGURE C6**  
**N/RC 5: Percentage of grade 4 general education students and students with disabilities scoring proficient, 2003–05**



*Note:* N/RC is need-to-resource-capacity index category.  
*Source:* Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).

**FIGURE C7**  
**N/RC 6: Percentage of grade 4 general education students and students with disabilities scoring proficient, 2003–05**



*Note:* N/RC is need-to-resource-capacity index category.  
*Source:* Authors' analysis based on data from New York State Education Department (2003, 2004, 2005a).



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**NOTES**

1. The tests for grades 3 and 5 were introduced in 2006 to meet NCLB requirements.
2. Schools were removed from the analysis if there was no gap or a reverse gap in 2003 (students with disabilities were outperforming general education students), if students with disabilities did not improve over this period, or if there were unreported, missing, or removed data for the 2003 or 2005 school year.
3. The tests for grades 3 and 5 were introduced in 2006 to meet NCLB requirements.
4. For details about the development of the alternate assessment and participation requirements, see the New York State Alternate Assessment Administration Manual (<http://www.vesid.nysed.gov/specialed/alterassessment/manual/admin0607.pdf>).

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