Opportunity Gaps: Findings From Initial Analysis of Student Performance in Early Literacy in Massachusetts

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Background

Like many states, Massachusetts has intensified efforts in recent years to improve literacy outcomes, particularly in the early grades. Initiatives have focused on providing guidance and resources for implementing changes in curriculum, instruction, and additional screening and support for struggling students. In September 2022, the Board of Elementary and Secondary Education in Massachusetts amended state law to require that all elementary schools assess each student's reading abilities and early literacy skills a minimum of twice per year from kindergarten through at least grade 3. The goal of such screening is to identify students who may be at risk of reading difficulty and proactively intervene to ensure that all students have the foundational skills needed to be successful readers. Beginning with the 2020/21 school year, the Massachusetts Department of Elementary and Secondary Education (DESE) began collecting literacy screening assessment data from schools and districts participating in certain state grants. The goal of collecting the data is to analyze patterns of performance to inform improvement efforts—for example, knowing when students struggle or how they progress over time may help schools, districts, and the state target resources and supports.

Grantee schools and districts that provided literacy screener data to DESE selected their screening assessments from a list of state-approved commercially available literacy screener products. Each assessment is typically administered to students at least three times per year (most commonly in the fall/beginning of year [BOY], winter/middle of year [MOY], and spring/end of year [EOY]). Using the benchmarks provided within each assessment to identify students at risk of reading difficulty, this issue brief

Available Data

- *More than 35,000 students across 2020/21 and 2021/22 school years*

- *About 10 percent of state's K–3 student population*

- *43 districts and 159 schools*

- *Scores from multiple literacy screening assessments: Acadience Reading, DIBELS 8th Edition, mClass, FastBridge aReading, FastBridge CBMreading, FastBridge earlyReading, i-Ready Diagnostic, ISIP ER, Lexia Rapid, MAP Growth, MAP Reading Fluency, Star Early Literacy, Star Early Literacy Spanish, Star Reading*

provides a first look at how students with different learning environments and background characteristics perform and progress based on available data.[1]

Findings

Students enrolled in schools with the highest mobility rates, lowest attendance rates, highest discipline rates, fewest experienced teachers, lowest teacher retention rates, and highest percentages of historically marginalized student groups among grantees were more likely to be below benchmark and to stay there from the beginning to the end of the school year than were their peers in schools without those characteristics.

Student-level performance is often a reflection of the opportunities and circumstances in which students from different backgrounds grow up. For example, economically disadvantaged students may live in communities where poverty rates are high and attend schools that must meet the needs of many economically disadvantaged students. Compared to the state as a whole, the screening assessment data sample includes more English learner, Hispanic, and economically disadvantaged students given the criteria used to select schools and districts to receive grants. Within the screening assessment data sample, however, there is variation among schools in the resources and supports available to students (e.g., class size and teacher experience) and in the characteristics of students attending. Dividing grantee schools into four groups (quartiles) shows that variation (see Table 1). For example, the top quartile of schools in terms of high-need students has at least 84 percent high-need students, while the bottom-quartile schools have at most 41 percent (see Table 1). Class sizes can vary from a maximum of 16 for bottom-quartile schools to 24 for top-quartile schools, and the percentage of experienced teachers varies from a maximum of 77 to 100 percent.

Table 1. Values of School-Level Characteristics for Top- and Bottom-Quartile Schools in Screening Assessment Data Sample

School-level characteristics	Percentage range in bottom quartile (least)	Percentage range in top quartile (most)
Percentage of high-need students	20–41%	84–99%
Percentage of English learner students	0–4%	33–67%
Percentage of students receiving special education services	7–14%	20–39%
Percentage of kindergarten students who attended an early childhood program	0–52%	87–100%
Percentage of Asian students	0–2%	9–67%

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1   Most of the approved screening assessments provide several performance benchmarks or risk levels (e.g., "some risk" and "high risk" or "well below benchmark" and "below benchmark"). For the analyses in this brief, we use the generic terms "at risk" or "did not meet benchmark" to differentiate students with any level of risk of reading difficulty from those classified as having little or no risk. See *A First Look at Early Literacy Performance in Massachusetts: Results of Initial Analysis Based on State Grantee Literacy Screening Assessments* for details.

School-level characteristics	Percentage range in bottom quartile (least)	Percentage range in top quartile (most)
Percentage of Black students	0–2%	11–54%
Percentage of Hispanic students	0.6–8%	49–98%
Percentage of White students	0.8–25%	78–94%
Attendance rate	87–92%	94–97%
Mobility rate	2–8%	19–35%
Discipline rate	0–0%	2–15%
Class size	8–16	20–24
Student–teacher ratio	8–11	14–19
Percentage of experienced teachers	39–77%	91–100%
Teacher retention rate	35–74%	88–100%

Source: Massachusetts Department of Elementary and Secondary Education's publicly available school and district profiles website: https://profiles.doe.mass.edu/

Note. "Bottom Quartile" means schools in the bottom 25 percent among grantees, and "Top Quartile" means schools in the top 25 percent among grantees. Quartiles were determined using the 2022 publicly available school-level data. Quartile data are not shown for two racial/ethnic groups (American Indian/Alaska Native students and Native Hawaiian/Pacific Islander students) because of insufficient variation due to small overall numbers of students. "High-need" students means students who are low income/economically disadvantaged, English learner students or former English learner students, or students with a recorded disability (i.e., students with an individualized education program or IEP). "Students receiving special education services" refers to students who have an IEP, "Attendance rate" refers to the average percentage of days in attendance, "Mobility rate" refers to the rate of students transferring into or out of a public school/district throughout the school year ("churn"), and "Discipline rate" refers to the percentage of students who were disciplined (i.e., suspended, expelled, removed, referred to law enforcement, arrested). A teacher is considered "experienced" if they have been teaching in a Massachusetts public school for at least 3 years. "Kindergarten students who attended an early childhood program" are students who attended any type of early childhood program (formal or informal) based on the state's early childhood experience survey of families with incoming kindergartners. Note that 14 schools had no data for kindergarten students and were therefore excluded from the quartile analysis. "Teacher retention rate" is the percentage of teachers who remain working in the same position from one year to the next. One school had no data on teacher retention and was therefore excluded from the quartile analysis.

Given that students generally take early literacy screening assessments several times in a year, there are multiple approaches to considering whether students are performing at benchmark, such as whether a student was never below benchmark, ever below benchmark, below benchmark more than once, or below benchmark at the end of the year. Each of these approaches can provide somewhat different information about risk levels. For example, an end-of-year measure provides an indication of student performance after an academic year of instruction and support; a measure of whether students were ever below benchmark distinguishes between students who are solidly on track and those who may at least sometimes need extra support. We focus in this section on students who were ever below benchmark and those who remained at benchmark from the beginning to the end of the year.

More students in schools with the highest percentages of high-need students, English learner students, Black students, Hispanic students, and students receiving special education services were classified as

ever below benchmark and as staying below benchmark over time than were students in schools with fewer of these student groups (see the bulleted lists in the text box below and in the appendix). In other words, students enrolled in schools with the highest percentages of historically marginalized student groups were more likely to be below benchmark at least once and to stay there from the beginning of the year to the end of the year than were their peers in schools with the lowest percentages of historically marginalized students. Additionally, more students in schools with the lowest percentages of kindergarten students attending preschool were classified as ever below benchmark and as staying below benchmark than were students in schools with the highest percentages of students who attended preschool.

This list shows the percentages of students ever below benchmark (see appendix for the percentages of students staying below benchmarks) in grantee schools with the following:[2]

- most high-need students: 82 percent; least high-need students: 50 percent

- most Hispanic students: 81 percent; least Hispanic students: 55 percent

- least kindergarten students who attended an early childhood program: 81 percent; most kindergarten students who attended an early childhood program: 53 percent

- highest discipline rates: 79 percent; lowest discipline rates: 53 percent

- most English learner students: 77 percent; least English learner students: 58 percent

- least White students: 77 percent; most White students: 56 percent

- most Black students: 76 percent; least Black students: 54 percent

- lowest attendance rates: 76 percent; highest attendance rates: 49 percent

- highest mobility rates: 74 percent; lowest mobility rates: 49 percent

- smallest number of experienced teachers: 72 percent; largest number of experienced teachers: 52 percent

- most students receiving special education services: 67 percent; least students receiving special education services: 64 percent

- largest student–teacher ratios: 66 percent; smallest student–teacher ratios: 63 percent

- smallest class sizes: 65 percent; largest class sizes: 61 percent

- lowest teacher retention rates: 64 percent; highest teacher retention rates: 55 percent

- least Asian students: 60 percent; most Asian students: 50 percent

Additionally, more students in schools with the highest student mobility rates, lowest attendance rates, highest discipline rates, fewest experienced teachers, and lowest teacher retention rates were classified as below benchmark and as staying below benchmark from the beginning to the end of the year than were their peers in schools with different levels of these characteristics. For example, 72 percent of students from schools with

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2 The source of the data in this list are 2020/21 and 2021/22 district-provided screening assessment data. Analysis includes all students in schools with each school-level characteristic. For example, 82 percent of all students in schools with the most high-need students were ever below benchmark, whether they were individually classified as high-need or not. Some students may appear multiple times per time period if they were administered multiple screening assessments. Refer to the note for Table 1 for additional information about the school-level characteristics included. "Most" means highest percentage of a student group and "Least" means lowest percentage of a student group among schools in the screening assessment data sample (e.g., "Most high-need students" means schools with 84–99 perecent high-need students, and "Least high-need students" means schools with 20–41 percent high-need students—these are the top and bottom quartiles within schools in the screening assessment data sample).

the lowest percentages of experienced teachers (those with 39 to 77 percent of experienced teachers) were classified as ever below benchmark compared to 52 percent of students from schools with 91 to 100 percent experienced teachers. Similarly, more students in schools with smaller overall class sizes were classified as ever below benchmark and as staying below benchmark than were their peers in schools with larger class sizes. This result may be partly explained by the fact that schools with larger class sizes had lower percentages of English learner students, students receiving special education services, and high-need students.

Further, more students in schools with larger student-teacher ratios were classified as ever below benchmark than were students in schools with smaller student-teacher ratios. However, schools with smaller student-teacher ratios had more students stay below benchmark than schools with larger student-teacher ratios. In schools with more students receiving special education services, 16 percent more students stayed below benchmark from the beginning of the year to the end of the year than in schools with fewer students receiving special education services (67 percent compared to 51 percent), though similar percentages of students were classified as ever below benchmark across top- and bottom-quartile schools for students receiving special education services (67 percent compared to 64 percent).

> **Economically disadvantaged students, English learner students, students receiving special education services, Black students, and Hispanic students were more likely than their peers not in those groups to score below benchmark at least once during the school year and to stay below benchmark over the course of the school year.**

Research going back decades shows that children from families with low income—who are more often Black and Hispanic—enter school less prepared for success because of "limited access to high-quality child care, preschool, and health care; greater demands on parental attention, and more stressful family and neighborhood circumstances."[3] These disparities may then be exacerbated by differences in resources at the schools that students attend. In the previous section, we examined disparities in early literacy performance by available school-level characteristics. In this section, we review performance by student groups across all schools in the screening assessment data sample.

Across all schools, data from 2020/21 and 2021/22 show that 64 percent of all students were ever below benchmark (see Table 2). Analysis by student group shows that 76 percent of economically disadvantaged students were ever below benchmark compared to 53 percent of non–economically disadvantaged students. The relative risk of economically disadvantaged students ever being classified as below benchmark was 1.4 times that of non–economically disadvantaged students. Asian students were less likely to ever be below benchmark compared to other students, while Hispanic students were 1.4 times more likely than non-Hispanic students to ever be classified as below benchmark, and Black students were 1.2 times more likely than other students to ever be classified as below benchmark. About the same proportions of female and male students were classified as ever at risk. Finally, students receiving special education services were 1.3 times more likely to ever be classified as at risk than were other students, and English learner students were 1.4 times more likely to ever be classified as at risk compared to non–English learner students.

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3   The Annie E. Casey Foundation. (2006). Race matters: Unequal opportunities for school readiness. https://www.aecf.org/resources/race-matters-unequal-opportunities-for-school-readiness-1

Table 2. Percentage of Students Never Below Benchmark, Below Benchmark Three Times, Ever Below Benchmark, and Below Benchmark at the End of the Year, by Student Group

Demographic	Never Below Benchmark	Below Benchmark Three Times	Ever Below Benchmark	Below Benchmark at EOY	Relative Risk of Ever Being Below Benchmark	Stayed Below Benchmark (Below Benchmark at EOY if Below Benchmark at BOY)
Economically disadvantaged	24%	23%	76%	60%	1.4	71%
Non–economically disadvantaged	47%	14%	53%	30%		49%
Female	37%	18%	63%	43%	1.0	58%
Male	35%	19%	65%	46%		61%
Nonbinary	--	--	--	--		
English learner students	16%	21%	84%	69%	1.4	74%
Non–English learner students	42%	17%	58%	36%		56%
Students receiving special education services	18%	33%	82%	67%	1.3	80%
Students not receiving special education services	39%	15%	61%	40%		54%
American Indian/ Alaska Native	18%	5%	82%	71%	†	†
Asian	57%	11%	43%	26%	0.6	49%

Demographic	Never Below Benchmark	Below Benchmark Three Times	Ever Below Benchmark	Below Benchmark at EOY	Relative Risk of Ever Being Below Benchmark	Stayed Below Benchmark (Below Benchmark at EOY if Below Benchmark at BOY)
Black	27%	21%	73%	54%	1.2	67%
Native Hawaiian/ Pacific Islander	36%	18%	64%	46%	†	†
Hispanic	19%	22%	81%	65%	1.4	71%
White	36%	20%	64%	42%	1.0	59%
All students	**36%**	**18%**	**64%**	**45%**		**60%**

Source: 2020/21 and 2021/22 district-provided screening assessment data

Note. Students may be included in more than one racial/ethnic category (Hispanic/not Hispanic and multiple race categories). Risk ratio indicates the likelihood of a student group ever being classified as at risk compared to students not in that group (e.g., economically disadvantaged students were 1.4 times more likely to be classified as ever at risk compared to non–economically disadvantaged students). Students in the "Never Below Benchmark," "Ever Below Benchmark," and "Below Benchmark at EOY" categories can have different numbers of scores. Student groups with fewer than 10 students are not shown to protect student privacy.

†Not computed because groups are 5 percent or less of the sample.

Most students who score below benchmark at the beginning of the year are still below benchmark at the end of the year. Across grade levels and years, 60 percent of students below benchmark at the beginning of the year also did not meet the benchmark at the end of the year. Data disaggregated by student groups shows similar patterns of students staying below benchmark across the year, but the percentages of students staying below benchmark are higher for economically disadvantaged students, English learner students, students receiving special education services, Black students, and Hispanic students than for students overall and for students not in those groups (see Table 2). While 60 percent of students overall are below benchmark at the end of the year if they were below benchmark at the beginning of the year, the percentages for economically disadvantaged students, English learner students, students receiving special education services, Black students, and Hispanic students range from 67 percent to 80 percent. Asian students were less likely to stay below benchmark compared to other students.

Implications for Policy and Practice

Data from the first analysis of state grantee literacy screening assessment data show that many students are not meeting literacy benchmarks in grades K–3, and if they start the school year off track, most stay that way. However, more historically marginalized students are below benchmark than other students, and they more often stay below benchmark across the school year. These patterns of individual student performance parallel school-level characteristics. These findings suggest some potential implications for policy and practice, as follows:

- **Special attention to schools with many traditionally underserved students and other challenges to learning opportunities for students may be needed.** Given that individual student performance mirrors school-level characteristics, school-level supports and resources may be needed to address broader challenges, such as low attendance or lack of experienced teaching staff. Without tackling opportunity gaps that affect some students (e.g., students of color and English learner students), it will be difficult to reduce disparities in performance.

- **Knowing more about the actions schools are taking to support students and what types of strategies may be particularly effective will be important for making sure that all students can become successful readers.** We have long seen disparities in student outcomes; identifying root causes for them as well as policies and practices to address them in structural and instructional terms is a critical next step.

Additional analysis of school resources — as well as more information about strategies that different schools may be utilizing to help students gain the reading skills they need — may help inform future improvement efforts.

Appendix. Percentage of Students Below Benchmark at End of Year if Below Benchmark in Earlier Time Period, by School-Level Characteristics

This list shows the percentages of students below benchmark at EOY if below benchmark at BOY in grantee schools with the following:[4]

- most high-need students: 74 percent; least high-need students: 38 percent

- most Hispanic students: 70 percent; least Hispanic students: 49 percent

- least kindergarten students who attended an early childhood program: 75 percent; most kindergarten students who attended an early childhood program: 42 percent

- highest discipline rates: 73 percent; lowest discipline rates: 49 percent

- most English learner students: 72 percent; least English learner students: 51 percent

- least White students: 71 percent; most White students: 52 percent

- most Black students: 76 percent; least Black students: 54 percent

- lowest attendance rates: 73 percent; highest attendance rates: 40 percent

- highest mobility rates: 71 percent; lowest mobility rates: 44 percent

- smallest number of experienced teachers: 69 percent; largest number of experienced teachers: 52 percent

- most students receiving special education services: 67 percent; least students receiving special education services: 51 percent

- largest student–teacher ratios: 54 percent; smallest student–teacher ratios: 61 percent

- smallest class sizes: 64 percent; largest class sizes: 56 percent

- lowest teacher retention rates: 64 percent; highest teacher retention rates: 55 percent

- least Asian students: 59 percent; most Asian students: 49 percent

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4   The source of the data in this list are 2020/21 and 2021/22 district-provided screening assessment data. Analysis includes all students in schools with each school-level characteristic. For example, 82 percent of all students in schools with the most high-need students were ever below benchmark, whether they were individually classified as high-need or not. Some students may appear multiple times per time period if they were administered multiple screening assessments. Refer to the note for Table 1 for additional information about the school-level characteristics included. "Most" means highest percentage of a student group and "Least" means lowest percentage of a student group among schools in the screening assessment data sample (e.g., "Most high-need students" means schools with 84–99 percent high-need students, and "Least high-need students" means schools with 20–41 percent high-need students—these are the top and bottom quartiles within schools in the screening assessment data sample).

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