

Highlights From Early Literacy Performance in Massachusetts

Results of Ongoing Analysis of Early Literacy Screening Assessments

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Background

In the 2020/21 school year, the Massachusetts Department of Elementary and Secondary Education (DESE) began an ongoing effort to collect and analyze literacy screening assessment data from schools and districts participating in certain state grants to inform improvement efforts. Grantee schools and districts that provide literacy screening assessment data to DESE select their screening assessments from [a list of state-approved, commercially available literacy screener products](#). Each assessment is typically administered to students three times per year (most commonly in the fall/beginning of year [BOY], winter/middle of year [MOY], and spring/end of year [EOY]).

Analysis of 2021/22 and earlier data provided a first look at early literacy performance and progress of students in Massachusetts,¹ offering a number of key insights. This issue brief provides highlights from follow-up analysis using data from the 2022/23 school year. Though direct comparisons of results across years cannot be made due to changes in methods (see box at right), patterns of student performance and progress in 2022/23 are consistent with earlier analysis. The 2022/23 reporting also offers new information related to performance of students with different background characteristics, performance of students in Massachusetts relative to the nation, and comparisons of screening assessment benchmarks.

Data and Methods in 2022/23 Analysis

- *Available data in 2022/23 doubled from 2021/22, including nearly 200,000 scores and 67,000 students, or about 26 percent of the state's K-3 student population, with scores from 308 schools, 88 districts, and 12 literacy screening assessments*
- *More students in 2022/23 with scores from all three time periods, improving the ability to analyze student progress*
- *Focus of 2022/23 reporting on students "significantly below benchmark" instead of "below benchmark" to align with new state guidance*

¹ Initial reports with 2020/21 and 2021/22 data are available at <https://www.doe.mass.edu/instruction/ela/research/>.

Findings From 2022/23

- **As in prior reporting, more students were identified as at risk (in this case, significantly below benchmark) at BOY than at MOY or EOY.** The percentage of students significantly below benchmark decreased from 36 percent at BOY to 29 percent by EOY. Across all grades and time periods combined (BOY, MOY, and EOY), 45 percent of students were ever classified as significantly below benchmark. Additionally, 31 percent were identified as significantly below benchmark multiple times in the school year.²
- **Kindergarten students again showed the greatest change from BOY to EOY, compared to students in grades 1 to 3.** The percentage of kindergarten students identified as significantly below benchmark decreased by 21 percentage points between BOY and EOY, compared to 3 percentage points for grades 1 and 2 students and no change for grade 3 students. By EOY, a smaller percentage of students in kindergarten were significantly below benchmark than students in all other grade levels. Kindergarten students were also least often significantly below benchmark more than once during the year.
- **As in prior reporting, most students who were below benchmark or significantly below benchmark at BOY still performed at those levels at EOY, though there were differences by grade.** Overall, 60 percent of students who were below benchmark at BOY were still below benchmark at EOY. However, about 30 percent of students who were significantly below benchmark at BOY met benchmark by EOY, and another 16 percent improved to the next performance level although they did not meet benchmark. Students who improved to the point of meeting benchmark level by MOY were significantly more likely to meet benchmark at EOY than those who were still classified as at risk at MOY. Grade 3 students were more than twice as likely as kindergarten students to be identified as significantly below benchmark at EOY if identified as such at BOY, grade 2 students were 1.9 times as likely, and grade 1 students were 1.5 times as likely.
- **As in prior reporting, most students who were at risk in one grade level were still at risk in the next grade level, but students at earlier grade levels were more likely to get on track.** More students in later grades remained below benchmark or significantly below benchmark across years than did students in earlier grades. For example, 77 percent of grade 2 students who were significantly below benchmark were still significantly below benchmark in grade 3, compared to 64 percent of kindergarten students who moved to grade 1.
- **Differences in performance and progress between student groups were again evident.** Outcome data suggest that the current educational system often does not provide adequate support for students from historically marginalized groups, such as students learning English or students with disabilities. Low income students, English learner students, students receiving special education services, Black students, and Hispanic students were more likely than their peers who were not in those groups to be classified as significantly below benchmark at each time period and more than once during the school year. Asian and White students were less likely than their peers to be classified as such. Additionally, as shown in prior analyses of 2020/21 and 2021/22 data, more English learner students, low income students, students receiving special education services, and Black and Hispanic students were significantly below benchmark at EOY after being identified as such at BOY or MOY than their peers who were not in those student groups.

² Note that this brief uses “significantly below benchmark” and “at significant risk” interchangeably.

Although key patterns of student performance did not change, 2022/23 reporting offers new information in several areas.

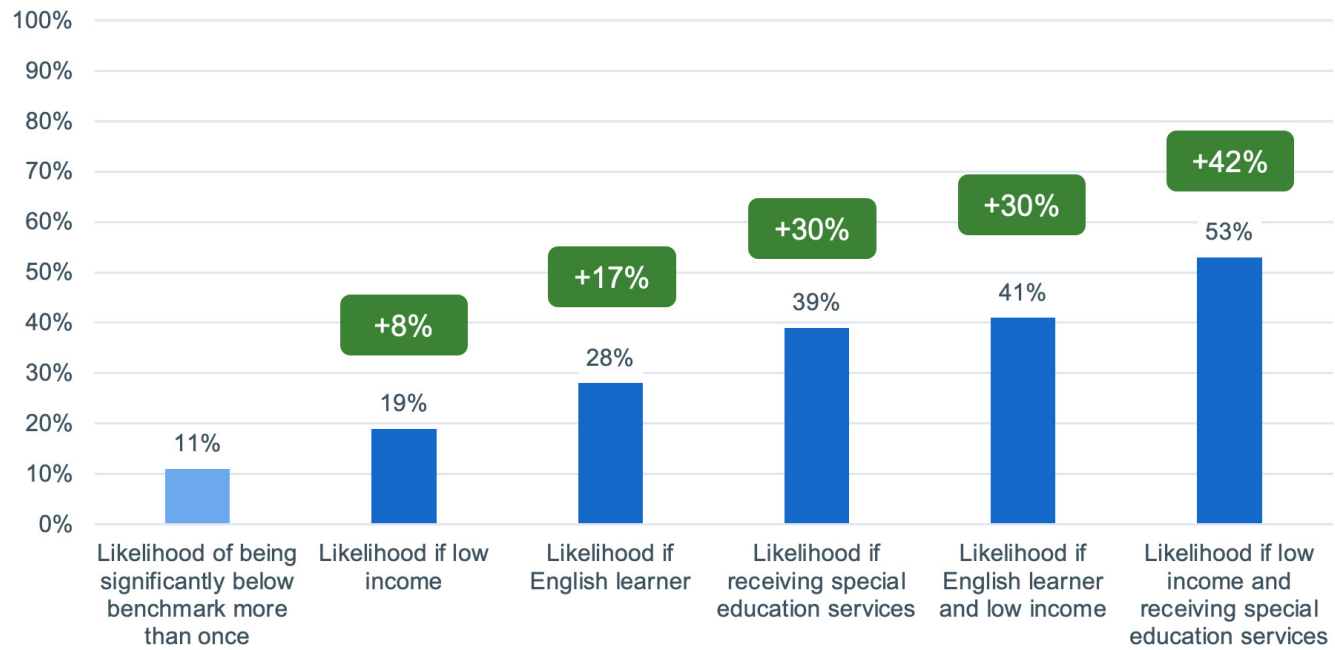
Analyzing student background characteristics in combination shows that the likelihood of being identified as significantly below benchmark varies as social and economic categories interact and overlap.

New analysis of the intersections between student and school background characteristics and performance demonstrates the complex and varying ways in which gender, race, ethnicity, and other factors contribute to risk of reading difficulty. It also highlights student groups that are particularly likely to be identified as at risk. Prior analysis considered student background characteristics separately, but students often belong to multiple overlapping groups. For example, in Massachusetts, common intersections of student background characteristics include low income status and Black or Hispanic race/ethnicity, or English learner status and Hispanic, Black, or Asian race/ethnicity. Key findings from the analysis include the following:³

- Students who belong to historically underserved student groups, such as low income students, were more likely to be identified as at risk of reading difficulty, and the more of these groups that students belong to, the greater the likelihood was (Figure 1). On average, students had about an 11 percent chance of being identified as significantly below benchmark more than once. That likelihood increased by about 8 percentage points if students came from a low income background, about 17 percentage points if students were English learners, and about 28 percentage points if students received special education services. Students receiving special education or English learner services *and* coming from a low income background had an even greater likelihood of being identified as at risk than students with any one of these characteristics. Students belonging to all three groups had even higher likelihoods of being at risk of reading difficulty.
- Although the pattern of increasing likelihood of being identified as at risk as background characteristics intersect was the same for all students, the increases varied by gender and by other background factors. Across ethnoracial groups, female students who were English learners or who received special education services were more likely to be identified as at risk than males. Asian students showed the smallest probability of being identified as at significant risk across intersecting characteristics among ethnoracial groups included in the analysis.
- School characteristics affect students' chances of being identified as at risk. Students in schools with above-average percentages of low income students, below-average teacher retention rates, and below-average student attendance rates had a higher likelihood of being identified as at significant risk. In Massachusetts, more Black and Hispanic students attended schools with these characteristics.

³ Results are based on a multilevel statistical model that includes student- and school-level characteristics. Because the model includes school effects, it is also important to note that the probabilities described in this brief represent students attending average schools in terms of the school-level variables included (percent of low income students, teacher retention rates, and student attendance rates, which were variables found to be relevant during exploratory analysis). Students in schools with above-average percentages of low income students and below-average teacher retention and student attendance rates would be more likely to be identified as significantly below benchmark than students in average schools. A detailed description of the model can be found in the full report from WestEd, *Early Literacy Performance in Massachusetts: Results of Ongoing Analysis of Literacy Screening Assessments*, by Mariann Lemke, Dan Murphy, Aaron Soo Ping Chow, and Angela Acuña.

Figure 1. The likelihood of being identified as in need of additional support increases as student background characteristics intersect



Sources: District-provided screening assessment data and October and June Student Information Management System (SIMS) collection data.

Notes: In this analysis, racial/ethnic groups are mutually exclusive; that is, students can only be identified as belonging to a single group. The likelihood of being significantly below benchmark more than once (11%) is defined by the multiple student and school-level characteristics included in the statistical model.

Despite differences between student groups, students in Massachusetts overall performed above the national average.

Using national norms for two of the most commonly used assessments (DIBELS 8th Edition and mCLASS, which together account for about 42 percent of scores and which use the same assessment tasks and norms) shows that Massachusetts students performed above the national average (Table 1). At EOY, the median national percentile for Massachusetts students was 58, compared to a median national percentile of 50. Students across grades K–3 performed above the national average.

Black students in Massachusetts performed about the same as all other students around the country, White students performed slightly better, Asian students performed significantly better, and Hispanic students performed less well than the national sample.⁴

⁴ Although the national sample includes students from all racial/ethnic groups, specific norms for different student groups were not available.

Table 1. Median national percentiles at BOY, MOY, and EOY, by grade and race/ethnicity

Grade or race/ethnicity	Median national percentile		
	BOY	MOY	EOY
K	53	54	57
1	52	55	56
2	57	58	59
3	60	59	59
White	54	55	56
Hispanic/Latino	34	38	40
Black	49	50	49
Asian	75	73	74
American Indian/Alaska Native	40	45	47
Native Hawaiian/Pacific Islander	54	52	55
Total	55	56	58

Sources: District-provided screening assessment data and October and June SIMS collection data.

Note: The table includes students with one score, students with two scores, and students with three scores.

Based on publisher-provided growth norms, 66 percent of Massachusetts students grew at average or above average rates, compared to about 60 percent nationally.

Early childhood (EC) experience, and, more specifically, formal EC experience, is associated with reduced likelihood of being identified as significantly below benchmark for students in kindergarten and beyond, particularly for English learner students.

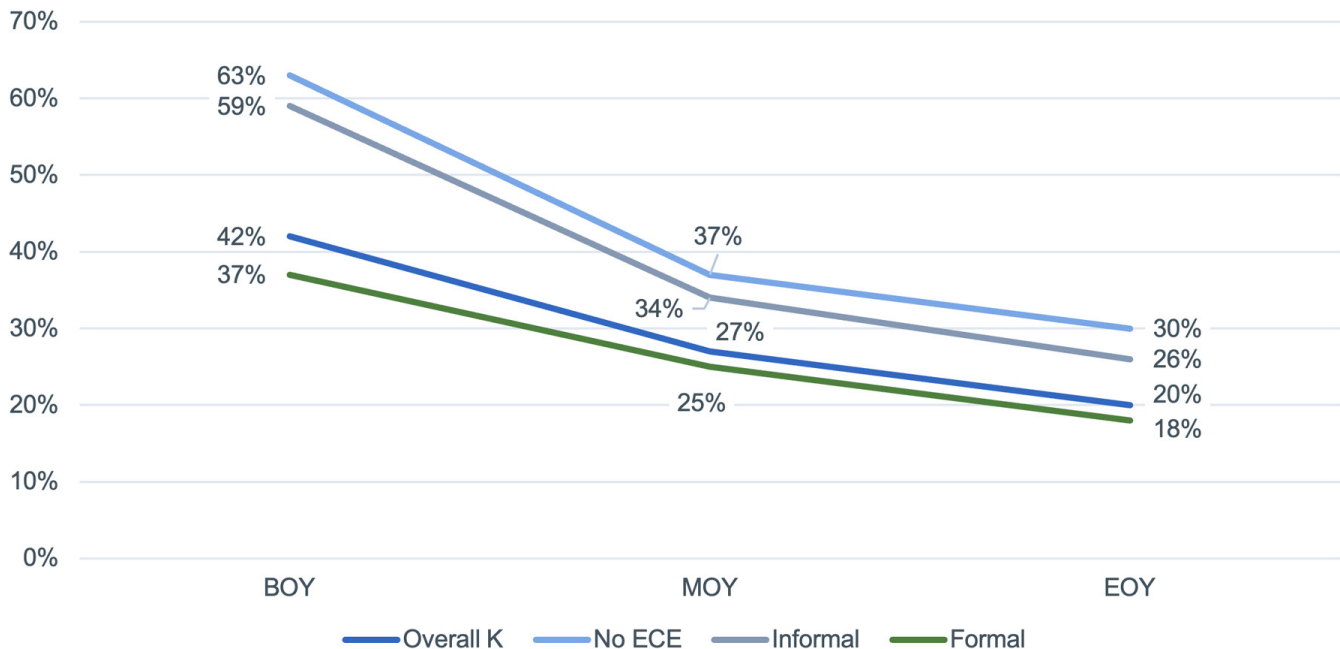
Early childhood (EC) experience has long been shown to have positive effects on later outcomes for students. More than three quarters of kindergarten students with data on EC experience participated in either formal or informal EC programs, with the vast majority participating in formal EC programs.⁵ Low income and English learner students participated less often in EC programs, compared to students who were not in those groups. Students receiving special education services were more likely to participate in EC programs than students who were not receiving services, perhaps due to early intervention programs.

⁵ A *formal EC program* is a public school preschool, licensed community-based preschool/child care, Head Start program, and/or licensed family child care provider. *Licensed family child care* refers to state-licensed child care in a group setting in a home. It may include care in the home of a family member, if the provider is both a relative and a licensed child care provider providing care to children from multiple families. *Center-based care* refers to care for children in a group setting, including public and private preschools, Head Start, early education and care centers, and inclusive/integrated public preschools. *Informal EC* experiences include Coordinated Family and Community Engagement (CFCE) services and Parent Child Home Program (PCHP) participation. CFCE services are locally based programs serving families with children from birth through school age (e.g., parent-child playgroups, parent-child activities). PCHP is funded through the Massachusetts Department of Early Education and Care. Not every community has a program. PCHP is a home-visit model providing low income families with the knowledge, skills, and tools to build school readiness in their homes before their children enter school.

Hispanic, American Indian/Alaska Native, and Native Hawaiian/Pacific Islander students were less likely to participate in any EC program than were White, Black, or Asian students.

New analysis shows that more kindergarten students without EC experience were identified as significantly below benchmark within any time period and more than once during the school year than students with any EC experience (Figure 2). Kindergarten students with formal EC experience were less often at risk than students with informal EC experience for all students in grades K–3.

Figure 2. More kindergarten students without early childhood experience were classified as significantly below benchmark at each time period than students with early childhood experience



Sources: District-provided screening assessment data and October and June SIMS collection data.
Notes: The figure includes students with three scores only. ECE = early childhood experience.

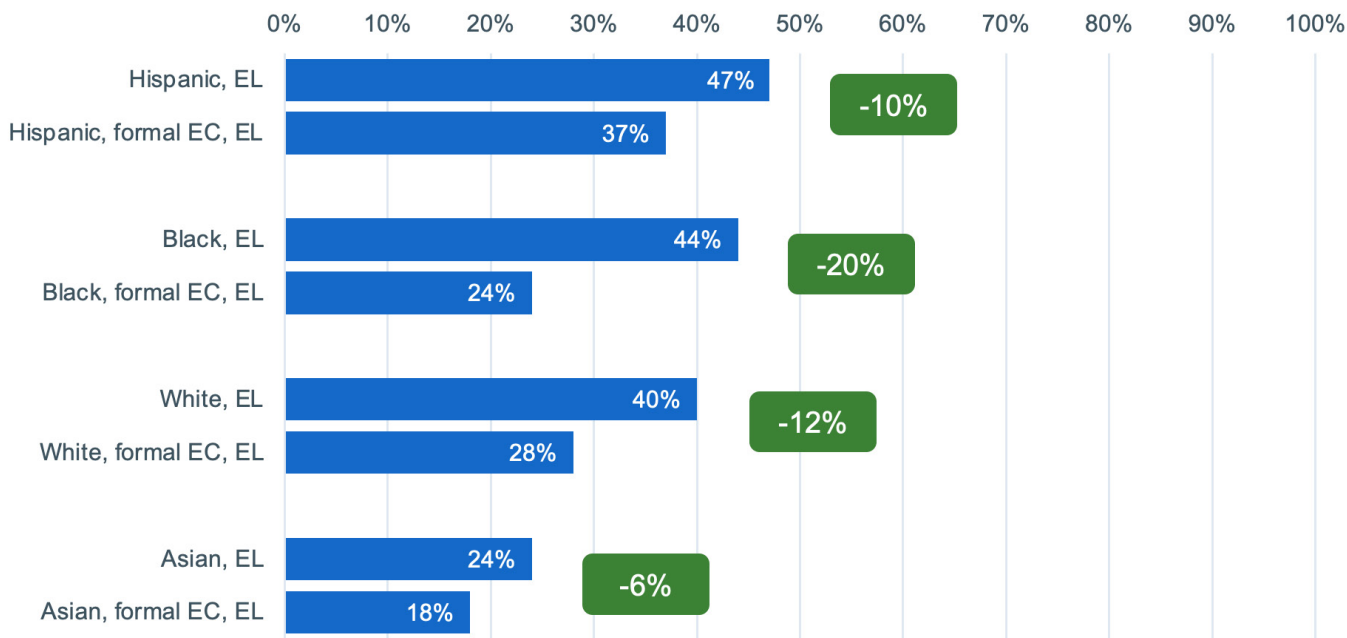
Figure 2 focuses on kindergarten students. Results of a statistical model that takes into account the effects of student- and school-level factors on the likelihood of students being identified as significantly below benchmark found formal EC experience to be a statistically significant predictor, not only for kindergarten students but for all students in grades K–3. This finding suggests that the relationship between formal EC experience and student literacy performance may persist over time.

More specifically, results show a decrease of 1 or 2 percentage points in the percentage of students identified as significantly below benchmark multiple times, across gender and racial/ethnic groups, for students who attended formal EC programs. Additionally, results show that, across racial and ethnic groups, formal EC experience decreased the probability of low income students being identified as significantly below benchmark multiple times by about 2 percentage points.

Effects of formal EC experience were most pronounced among English learner students, and among Black English learner students in particular (Figure 3). Note that Figure 3 shows results for females only—male

students show the same patterns of reduced risk with EC experience, but the likelihood of female English learner students being significantly below benchmark more than once was always greater than that of male English learner students. The likelihood of Black English learner students being identified as significantly at risk was reduced by approximately 20 percentage points when they had attended formal EC programs (24 percent, compared to 44 percent, for females; 21 percent, compared to 40 percent, for males). Hispanic, White, and Asian English learner students who attended formal EC programs were also less likely to be identified as significantly below benchmark, but the decrease in likelihood varied by race/ethnicity and gender.

Figure 3. Formal EC experience reduced the probability of risk most for English learner students, and particularly for Black English learner students



Sources: District-provided screening assessment data and October and June SIMS collection data.
Notes: In this figure, racial/ethnic groups are mutually exclusive; that is, students can only be identified as belonging to a single group. This restriction was for the purposes of the statistical model. This figure shows results for females only. EL = English learner.

Additional analysis shows that screening assessment benchmarks indicating significant risk did not always map to the same Massachusetts Comprehensive Assessment System (MCAS) and national percentile scores at each time period or across grade levels, which means that students with the same skills might have been classified differently at different time periods, and changes in the percentages of students identified as significantly below benchmark over time may have been due, in part, to changes in the benchmarks themselves.

Prior analysis of risk-level benchmarks focused on grade 3 EOY only. New analysis of 2022/23 data examines benchmarks at each time period for grades 2 and 3. This analysis shows that risk-level benchmarks can change relative to MCAS and national norms, both within and across years. For example, a BOY benchmark indicating performance significantly below benchmark might have corresponded to the 28th percentile, MOY to the 31st percentile, and EOY to the 34th percentile. This means that different numbers

of students may have been identified in different time periods, and a student with the same screening assessment scores at BOY and EOY might have been identified as significantly below benchmark at one time period and not at the other. These changes also affect interpretation of student growth. For example, students in schools that used an assessment with a benchmark that shifted from lower to higher between BOY and EOY may have improved their reading skills, yet did not appear to show progress relative to that benchmark because it had become more difficult. Conversely, students in schools that used an assessment with a benchmark that shifted from higher to lower between BOY and EOY may have appeared to move out of the category of significantly below benchmark, but may still have had similar skill levels at BOY and at EOY. Across grades, some students may have appeared to have lost ground over the summer if benchmarks shifted upward from the end of one grade to the beginning of another, whereas other students may not if benchmarks shifted downward from the end of one grade to the beginning of another.

Implications for Policy and Practice

As more data are collected over time, the extent to which the screening assessment data can provide useful information will likely continue to improve. Future research will be able to track more students across grades, and new questions can be explored. Ultimately, however, research and data analysis can only inform literacy policy and practice. Knowing that formal EC experience is associated with positive outcomes for students, and for English learners in particular, may offer guidance for targeting resources or outreach. Understanding how the probability of being identified as at significant risk changes based on overlapping social categories may help educators and policymakers understand how differing experiences shape student performance and may help focus attention on how interventions and supports can best aid students. However, it is the design and implementation of policy and practice at the state and local levels that has the potential to truly impact students' learning.

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