

Relationship between State Annual School Monitoring Indicators and Outcomes in Massachusetts Low-Performing Schools

Appendix A. Timeline of low-performing school identification, monitoring, and exit decisions by the Massachusetts Department of Elementary and Secondary Education

Appendix B. Indicators and ratings continuum for turnaround practice area implementation

Appendix C. The hierarchical linear models and detailed regression results

Appendix D. Sensitivity analyses

See <https://go.usa.gov/xHEJ8> for the full report.

Appendix A. Timeline of low-performing school identification, monitoring, and exit decisions by the Massachusetts Department of Elementary and Secondary Education

The Massachusetts Department of Elementary and Secondary Education timeline for low-performing school identification, monitoring, and exit decisions is presented in table A1.

Table A1. Turnaround practice timelines

Year 1—Identification and baseline of low-performing school	
Fall	<p>Low-performing school is identified by the Massachusetts Department of Elementary and Secondary Education (DESE) based on the school’s prior-year performance data. (For example, schools identified in 2015/16 as low performing are identified based on student assessment results from the 2014/15 school year.)</p> <p>Low-performing school receives an annual monitoring visit.</p> <p>Low-performing school receives a report with Turnaround Practices and Indicators (TP&I) ratings.</p> <p>The district and the DESE support provider meet with the school leader to discuss the report findings and strategies for continuous improvement.</p>
Winter and spring	<p>Low-performing school submits a turnaround plan based on a needs assessment (including data from the monitoring visit).</p>
Spring	<p>DESE reviews and approves turnaround plan.</p>
Year 2—Implementation of turnaround plan and continuous improvement	
Fall	<p>Low-performing school implements turnaround plan.</p>
Fall and winter	<p>Low-performing school receives a monitoring visit.</p> <p>Low-performing school receives a report on the TP&I ratings.</p> <p>The district and the DESE support provider meet with the school leader to discuss the report findings and strategies for continuous improvement.</p>
Spring	<p>Low-performing school revises turnaround plan based on needs identified in monitoring visit reports.</p>

Year 3—Eligibility for exit decision or continuation in accountability status

Fall	Low-performing school implements turnaround plan.
Fall and winter	Low-performing school receives a report on the TP&I ratings. The district and the DESE support provider meet with the school leader to discuss the report findings and strategies for continuous improvement.

Year 4+—Exit, continuation, or receivership decision

Exit, continuation, or receivership decision for low-performing school is based on schoolwide student outcomes and growth based on student assessment results:

- Low-performing school is eligible to exit underperforming status if they are on track to meet stated three-year goals in school performance.
- Low-performing school that has made progress but has not met all benchmarks may be kept in turnaround status for another school year.
- Low-performing school that continues to decline in performance during the first three years in turnaround status can be placed under control of an external receiver.

Source: Massachusetts Department of Elementary and Secondary Education.

Appendix B. Indicators and ratings continuum for turnaround practice area implementation

The Massachusetts Department of Elementary and Secondary Education (DESE) developed criteria for rating levels for each indicator in the Turnaround Practices and Indicators (TP&I) rubric. As part of the monitoring process for low-performing schools, each school receives a TP&I rating based on an analysis of quantitative and qualitative data collected annually from low-performing schools. These data are derived from observations of classroom instructional practices during monitoring visits; staff survey responses; and interviews and focus groups with school leaders, teachers, students, and other key stakeholders. The TP&I ratings are based on a four-point scale for each indicator: limited evidence (the lowest rating, 0), developing (second lowest, 1), providing (second highest, 2), and sustaining (highest, 3).

Turnaround Practice Area 1. Leadership, Shared Responsibility, and Professional Collaboration

The school has established a community of practice through leadership, shared responsibility for all students, and professional collaboration (table B1).

Table B1. Turnaround Practice Area 1. Leadership, Shared Responsibility, and Professional Collaboration

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Providing	Sustaining
1.1 Use of Autonomy	School leaders have little to no autonomy to make decisions about key elements of the school, such as staffing or length of the school day.	School leaders have some autonomy to make decisions about key elements of the school (such as staffing or school schedule) but have not yet used this autonomy or are uncertain about how best to use it.	School leaders have the autonomy to make decisions about key elements of the school day (such as staffing or school schedule) and have begun to use this autonomy to make changes in the school.	School leaders use their autonomy and authority (regarding, for example, staffing or school schedule) to focus on implementing their turnaround plan or other efforts to improve the quality of teaching and learning at the school.
1.2 High Expectations and Positive Regard	There is little to no evidence that the school prioritizes high expectations and positive regard among leadership, staff, and students.	School leaders understand the importance of high expectations and positive regard among leadership, staff, and students but do not implement strategies or activities to ensure that these elements are in place.	School leaders understand the importance of high expectations and positive regard among leadership, staff, and students and implement strategies or activities to ensure that these elements are in place.	School leaders understand the importance of high expectations and positive regard among leadership, staff, and students and implement strategies or activities to ensure that these elements are in place. A majority of staff believe leadership, staff, and students have high expectations and demonstrate positive regard.

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Providing	Sustaining
1.3 Vision/Theory of Action and Buy-In	School leaders have a loosely defined theory of action or vision along with established goals and interim benchmarks to guide dramatic school improvement, but the goals and benchmarks are not used to inform the school's work. There is little to no sense of urgency or collective responsibility for realizing school improvement.	School leaders have a defined theory of action or vision along with established goals, and interim benchmarks have been communicated to some staff. A common sense of urgency and shared ownership for the success of all students exists among some staff and leaders, but not all staff members share this responsibility.	School leaders have a defined and communicated theory of action or vision along with established goals and interim benchmarks to drive priorities related to turnaround efforts, and these goals and benchmarks are understood and implemented consistently by most staff. A common sense of urgency and purpose for improvement is evident among a majority of staff, but ownership and responsibility for success of all students may still be centralized at the principal or leadership team level.	School leaders and most staff members understand the theory of action or vision driving the priorities related to turnaround efforts, are familiar with the goals and interim benchmarks used to consistently monitor progress (for example, at least once a month), and identify and prioritize the next level of work. A common sense of urgency and ownership for the success of all students is shared among most staff, as demonstrated through staff discourse and actions.
1.4 Monitoring Implementation and School Progress	School leaders rarely prioritize improvement initiatives for implementation; processes or protocols are not in place for systemic implementation.	School leaders prioritize improvement initiatives for implementation; however, processes and protocols for systemic implementation are emerging or not well defined.	School leaders prioritize improvement initiatives; processes and protocols for systemic implementation are well defined. A majority of staff members are aware of the priorities, and some monitoring of these initiatives takes place.	School leaders are actively engaged in monitoring implementation of turnaround efforts, use this information to prioritize initiatives and strategies, communicate progress and challenges and seek input from staff, and continuously and systematically monitor progress.

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Providing	Sustaining
1.5 ^a Trusting Relationships	Relationships between teachers and instructional supports (such as coaches) are not guided by trust; teachers feel coaching and instructional support is judgmental, and evidence of collaboration among staff is limited.	Some relationships between teachers and instructional supports (such as coaches) are guided by trust, and some teachers feel instructional support is nonjudgmental, but this is inconsistent throughout the school. Some groups of teachers may collaborate with colleagues to share strategies, such as developing standards-based units, examining student work, analyzing student performance, and planning appropriate interventions. However, this is not consistent among all staff.	Most relationships between teachers and instructional supports (such as coaches) are guided by trust, and most teachers feel that instructional support is nonjudgmental. There is evidence that most staff at least occasionally use collegial relationships to share strategies in such work as developing standards-based units, examining student work, analyzing student performance, and planning appropriate interventions.	Most staff members share a relational, trust-focused culture with each other and their instructional supports (such as coaches) that is solution oriented and focused on improvement, as exemplified by frequent collaboration in developing standards-based units, examining student work, analyzing student performance, and planning appropriate interventions. Educators regularly share their strengths and struggles, in the spirit of helping each other continually improve their practice.
1.6 Time Use for Professional Development and Collaboration	The schedule includes little or no time for professional development or collaboration between teachers.	The schedule does not include adequate time for professional development opportunities, collaboration time for teachers is limited, or the available time is not used effectively to improve teaching and learning.	The schedule includes adequate time for professional development opportunities and collaboration for most teachers. Time is generally used well to improve teaching and learning.	The schedule includes adequate time for professional development opportunities and collaboration for most teachers. There is a process in place for evaluating the schedule using collected data to maximize opportunities for teacher professional development and ensure that it helps all educators continually improve their practice (for example, through targeted coaching and peer observations) and collaboration time.

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Providing	Sustaining
1.7 Communication with Staff	Structures and opportunities for fostering staff input into school decisions and initiatives are informal, are not well defined, or do not exist.	Formal structures and opportunities for fostering staff input into school decisions and initiatives are defined but may not be used to effectively build relationships and two-way communication across staff and school teams.	Formal structures and opportunities for fostering staff input into school decisions and initiatives are in place and are used effectively to build relationships and two-way communication across staff and school teams. However, there are some barriers to communication between administrators and staff.	Formal structures are in place to build effective staff relationships balanced with transparency and open, two-way communication across staff and school teams and between administrators and staff.
1.8 ^b Sustainability	There is little to no evidence that school leadership prioritizes building staff capacity to sustain improvement efforts.	School leadership is aware of the importance of planning for sustainability. However, there is little to no evidence that improvement efforts will be sustained over time or under new leadership.	School leadership implements specific strategies (such as succession plan, distributed leadership, and new funding streams) to ensure that improvement efforts will be sustained over time or under new leadership.	School leadership implements strategies (such as succession plan, distributed leadership, and new funding streams) to ensure that improvement efforts will be sustained over time or under new leadership. Majority of staff believe and can describe specific strategies that will enable the school to continue to improve, even with changes in staff or school leadership.

a. Instructional Leadership and Improvement (formerly indicator 1.5 in the 2014/15 monitoring site visit report) was removed, and its content was incorporated into indicator 2.4 in the 2015/16 monitoring site visit report. Trusting Relationships (formerly Indicator 4.5 in the 2014/15 monitoring site visit report) is now reflected in indicator 1.5.

b. Sustainability (indicator 1.8) was a new indicator in the 2015/16 monitoring site visit report.

Source: Massachusetts Department of Elementary and Secondary Education.

Turnaround Practice Area 2. Intentional Practices for Improving Instruction

The school employs intentional practices for improving teacher-specific and student-responsive instruction (table B2).

Table B2. Turnaround Practice Area 2. Intentional Practices for Improving Instruction

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Providing	Sustaining
2.1 Instructional Expectations	Expectations for teachers’ classroom practices are not articulated by school leaders.	Expectations for teachers’ classroom practices are communicated, but the expectations may not be specific, are not understood by most staff, and might not be actively monitored by school leaders.	Specific or precise expectations for teachers’ classroom practices are consistently communicated, understood by most staff and faculty, and monitored throughout the school year.	Specific or precise expectations for high-quality instruction are communicated and understood by most staff, monitored by school leaders, and consistently implemented by most teachers.
2.2 Instructional Schedule	Existing instructional schedules lack consistency or do not include uninterrupted blocks of schoolwide learning time for students.	Existing instructional schedules include uninterrupted blocks of schoolwide learning time. However, instructional support staff are not coordinated and aligned across grade levels and content areas to provide students with differentiated access to high-quality core instruction.	Existing instructional schedules include uninterrupted blocks of schoolwide learning time. Content instruction and instructional support staff are coordinated or systematically organized and aligned across grade levels and content areas.	Instructional schedules are developed in collaboration with teachers and ensure that instructional support staff are coordinated and aligned across grade levels and content areas to provide students with differentiated access to high-quality core instruction. An effective process is in place for evaluating the schedule based on collected data related to the quality of instruction and student needs across grade levels and content areas.

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Providing	Sustaining
2.3 Identifying and Addressing Student Academic Needs	No formal data collection process is in place for identifying individual students' academic needs. Specific protocols for using data and identifying actions to address student academic needs are not in place.	Formal strategies and processes (such as instructional leadership team, collaborative planning, and professional learning communities) are in place, with protocols for using data and identifying actions to address individual students' academic needs. However, the protocols may not be consistently used or followed.	Formal strategies and processes (such as instructional leadership team, collaborative planning, and professional learning communities) and protocols for using data and identifying actions to address individual students' academic needs are in place and used consistently, but communication among all staff about action steps is limited.	Formal teaming and collaboration strategies, processes (such as instructional leadership team, collaborative planning, and professional learning communities), and protocols are consistently employed to address individual students' academic needs by using data, identifying actions to address student learning needs, and regularly communicating action steps among all staff and teams to build and sustain a professional culture of learning.
2.4 Classroom Observation Data Use	Instructional leaders rarely or never conduct class observations (such as learning walkthroughs). Evidence that specific and actionable feedback on the quality and effectiveness of instruction is being provided to individual teachers is limited or nonexistent.	Instructional leaders conduct occasional or routine classroom observations (such as learning walkthroughs), primarily as a function of the principal's role and with little to no timely feedback, focused on strengthening teachers' instructional practices. Observation and feedback may be focused on only a few grades or subject areas.	Instructional leaders conduct regular classroom observations (such as learning walkthroughs) to gauge the quality of instructional practices and provide specific and actionable feedback on the quality and effectiveness of instruction. However, this information or these data do not inform instructional conversations or the provision of targeted and individualized supports (such as coaching) for teachers, as needed.	Instructional leaders conduct weekly or daily classroom observations (such as learning walkthroughs) focused on strengthening teachers' instructional practices and provide specific and actionable feedback on the quality and effectiveness of instruction to individual teachers and teacher teams. These data inform instructional conversations and the provision of targeted and individualized supports (such as coaching) for teachers, as needed.
2.5 Student Assessment Data Use (for schoolwide decision-making)	Building and teacher leaders use little or no student assessment data to make decisions related to schoolwide practices.	Building and teacher leaders consider only student results on state assessments when making decisions related to schoolwide practices.	Building and teacher leaders occasionally consider student results on benchmark and common assessments in addition to state assessments when making decisions related to schoolwide practices.	Building and teacher leaders consistently use student results on benchmark and common assessments and state assessments to make decisions related to schoolwide practices.

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Providing	Sustaining
2.6 Student Assessment Data Use (for classroom instruction)	There is little or no emerging awareness of best practices for analyzing student performance data to inform instruction and assess progress toward intended student outcomes, or the effect of these practices is negligible.	Some teachers are aware of the importance of using a variety of assessment data to inform instruction and of employing research-based instructional strategies to discern progress toward intended student outcomes. However, not all staff consistently use these practices.	Most teachers are aware of their roles and responsibilities for using a variety of assessment data to inform instruction and for employing research-based instructional strategies to discern progress toward intended student outcomes. However, there are some barriers to using data effectively to improve instruction.	Most teachers work individually and collaboratively to use a variety of assessment data (such as common assessment data and student work) to discern progress toward intended student and school outcomes, determine appropriate action steps, and monitor the results of those actions.
2.7 Structures for Instructional Improvement	Structures, practices, and use of resources (such as collaborative meeting time, coaching, supports for implementing the Massachusetts Curriculum Frameworks) to support the use of assessment data and research-based instructional strategies and differentiation and to ensure rigor and relevance are limited, do not exist, or have negligible impact.	Structures, practices, and use of resources (such as collaborative meeting time, coaching, supports for implementing the Massachusetts Curriculum Frameworks) to support the use of assessment data and research-based instructional strategies and differentiation to ensure rigor and relevance are in place but may be poorly defined, inefficient, or ineffective.	Structures, practices, and use of resources (such as collaborative meeting time, coaching, supports for implementing the Massachusetts Curriculum Frameworks) to support the use of assessment data and to guide and select research-based instructional strategies and differentiation are clearly defined but are not always used consistently throughout the school.	Structures, practices, and use of resources (such as collaborative meeting time, coaching, supports for implementing the Massachusetts Curriculum Frameworks) to support data-driven instruction and the use of research-based instructional strategies and differentiation are in place and consistently implemented, resulting in rigorous instruction—reflective of the shifts in cognitive demand for the Massachusetts Curriculum Frameworks—that meets the needs of each student.

Source: Massachusetts Department of Elementary and Secondary Education.

Turnaround Practice Area 3. Student-Specific Supports and Instruction to All Students

The school is able to provide student-specific supports and interventions informed by data and by the identification of student-specific needs (table B3).

Table B3. Turnaround Practice Area 3. Student-Specific Supports and Instruction to All Students

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Limited evidence	Sustaining
3.1 General Academic Interventions and Enrichment	Structured academic interventions and enrichment experiences (such as tiered system of support) are not in place or, if provided, are not based on research or promising practices.	Specific, research-based interventions and enrichment experiences (such as tiered system of support) are defined and planned but might not be consistently or systematically implemented or available to all students.	Specific, research-based interventions and enrichment experiences (such as tiered system of support) are defined and planned and regularly provided, although student participation is not systematic, or interventions are not comprehensive (for example, available for both English language arts and math). Barriers might include scheduling conflicts or other structural challenges.	All students experience research-based academic interventions appropriate for their specific needs. These best practices and enrichment experiences are implemented systematically during regularly scheduled school time and for all core content areas through a robust tiered system of support.
3.2 Teacher Training to Identify Student Needs (academic and nonacademic)	Staff members are provided with little or no training or support on how to identify and address student needs.	Some staff members are provided with training and support on how to identify and address at least one area of student need. However, training is not provided to all appropriate staff members or is not provided for all areas of student need (both academic and nonacademic).	Most staff members are provided with training and support to ensure that they can identify both academic and nonacademic student needs. However, staff do not receive training or support on how to respond appropriately to those cues, or staff fail to consistently respond to those cues despite training.	Most staff members are provided with training and support to ensure that they can identify cues when students need additional assistance (both academic and nonacademic) and can respond appropriately to those cues.
3.3 Determining Schoolwide Student Supports (academic interventions and enrichment)	Specific student academic intervention and enrichment needs are neither identified nor diagnosed.	Specific student academic intervention and enrichment needs are diagnosed and identified annually or once a semester.	Student academic performance is reviewed regularly throughout the school year to monitor progress and to identify emerging needs; however, students are not reassigned to interventions as needed throughout the school year.	Student learning and academic performance are regularly reviewed (at least once a month) throughout the school year, using a wide array of ongoing assessments to identify student-specific and schoolwide emerging needs. Students are reassigned to interventions, enrichment, and supports, as needed, throughout the school year.

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Limited evidence	Sustaining
3.4 Multitiered System of Support (academic and nonacademic)	No system is in place to guide how to identify students in need of support or the necessary interventions and supports for those students. Leaders have not defined intervention entry and exit criteria for struggling students. Students are assigned to interventions using a wide range of information and processes that are not consistent across the school.	Leaders have defined but not clearly communicated intervention entry and exit criteria for identified struggling students. Students are assigned to interventions with a limited application of the entry criteria, and student progress is not consistently or systemically monitored during the school year. The system meets one of the following three conditions: staff members follow consistent rules and procedures to identify students in need of additional assistance; a team of appropriate staff and stakeholders makes decisions about needed interventions and supports; or staff members follow consistent rules and procedures when monitoring the delivery and effectiveness of interventions and supports.	Leaders and teachers understand and use systems with criteria and protocols for identifying students for interventions and enrichment. Students are assigned to interventions, but this system meets only two of the following three conditions: staff members follow consistent rules and procedures to identify students in need of additional assistance; a team of appropriate staff and stakeholders makes decisions about needed interventions and supports; or staff members follow consistent rules and procedures when monitoring the delivery and effectiveness of interventions and supports.	Leaders and teachers actively use established systems with criteria and protocols for identifying students for interventions and enrichment. This system meets all of the following conditions: staff members follow consistent rules and procedures to identify students in need of additional assistance; a team of appropriate staff and stakeholders makes decisions about needed interventions and supports; and staff members follow consistent rules and procedures when monitoring the delivery and effectiveness of interventions and supports.
3.5 ^a Academic Interventions for English Language Learners	Specific, research-based interventions for English learner students are not in place or, if provided, are not based on research or promising practices.	Specific, research-based interventions for English learner students are defined and planned but might not be consistently or systematically implemented (due to staffing, scheduling, or other barriers) or designed to meet students' specific needs.	Specific, research-based interventions for English learner students are defined and planned and regularly provided. However, student participation is not always systematic, and supports are not always aligned to students' specific needs.	All English learner students experience research-based academic interventions that are appropriate for their specific needs and that are implemented systematically in the school.

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Limited evidence	Sustaining
3.6 ^b Academic Interventions for Students with Disabilities	Specific, research-based interventions for students with disabilities are not in place or, if provided, are not based on research or promising practices.	Specific, research-based interventions for students with disabilities are defined and planned but might not be consistently or systematically implemented (because of staffing, scheduling, or other barriers) or designed to meet students' specific needs.	Specific, research-based interventions for students with disabilities are defined and planned and regularly provided. However, student participation is not always systematic, and supports are not always aligned to students' specific needs.	All students with disabilities receive research-based academic interventions appropriate for their specific needs. These supports are implemented systematically in the school.

a. High Standards (formerly indicator 3.5 in the 2014/15 monitoring site visit report) was removed and content was incorporated into indicator 2.7 for the 2015/16 monitoring site visit report. Academic Interventions for English Language Learners is now reflected in indicator 3.5.

b. Academic Interventions for Students with Disabilities (indicator 3.6) was a new indicator for the 2015/16 monitoring site visit report.

Source: Massachusetts Department of Elementary and Secondary Education.

Turnaround Practice Area 4. School Climate and Culture

The school provides a safe, orderly, and respectful environment for students and a collegial, collaborative, and professional culture among teachers (table B4).

Table B4. Turnaround Practice Area 4. School Climate and Culture

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Limited evidence	Sustaining
4.1 Schoolwide Behavior Plan	No schoolwide behavior plan guides the consistent implementation of behavior management procedures, or if there is a behavior plan, it is not implemented consistently.	The schoolwide behavior plan includes a defined set of behavioral expectations, but there is not a clear system or set of structures for positive behavioral supports that is aligned with those expectations. In addition, there is limited evidence that any staff implement the procedures outlined in the schoolwide behavior plan.	The schoolwide behavior plan includes a defined set of behavioral expectations, and a system and set of structures for positive behavioral supports are aligned with those expectations. However, there is either no evidence that any staff implement the procedures outlined in the schoolwide behavior plan or evidence that only some staff implement the procedures.	The schoolwide behavior plan includes a defined set of behavioral expectations, and the system and set of structures for positive behavioral supports are aligned with those expectations. In addition, most staff implement the procedures outlined in the schoolwide behavior plan. Leaders monitor implementation using data.

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Limited evidence	Sustaining
4.2 Adult–Student Relationships	Structures (such as structured advisories and mentor programs) to support the development of strong, supportive relationships between adults and students are not in place or are inadequate.	Structures (such as structured advisories and mentor programs) to support the development of strong relationships are defined but might not be used consistently or might not be available to all students.	Structures (such as structured advisories and mentor programs) are in place to support relationships among students and adults and to deliver social-emotional supports.	Structures (such as structured advisories and mentor programs) are in place to support relationships among students and adults and to deliver social-emotional supports. These supports are monitored actively to discern whether they are meeting the needs of the school.
4.3 Expanded Learning	Students have limited to no opportunities to participate in expanded learning programs.	Opportunities for students to participate in expanded learning programs exist but might not be well defined, or awareness of and participation in the programs might be limited.	Structured opportunities for students to participate in expanded learning programs are in place and are well defined.	All students have access to expanded learning opportunities that are well defined and well supported. High-need students are targeted for participation in these programs.
4.4 Wraparound Services and External Partners	There is little or no emerging leadership and no staff awareness of strategies to increase the capacity of families to support education in the home through wraparound services (such as health care and housing referrals).	Leaders and staff are aware of the needs of families to support education through wraparound services (such as health care and housing referrals). However, there is no system to provide these services consistently.	Leaders and staff are aware of the needs of families to support education through wraparound services (such as health care and housing referrals) and to provide these resources to families, as needed.	Leaders and staff share individual and mutual responsibility for building the capacity of families to support education through a systemic system of wraparound services (such as health care and housing referrals). Leaders and staff assess the needs of students and families throughout the school year.

Indicator	Turnaround Practices and Indicators (TP&I) rating			
	Limited evidence	Developing	Limited evidence	Sustaining
4.5 ^a Family and Community Engagement	There is little or no evidence that the school makes family and community engagement a priority.	The school makes family and community engagement a priority, but only one or two of five conditions are met: one or more staff members coordinate family and community engagement activities; regular social events are planned throughout the year to engage families and community members; regular activities are planned throughout the year to engage families and community members in planning for and collaborating in the implementation of academic and nonacademic supports; staff members routinely reach out to families to communicate information about their children’s progress and needs; and communications with families are made available in multiple languages, as needed.	The school makes family engagement a priority, but only three or four of five conditions are met: one or more staff members coordinate family and community engagement activities; regular social events are planned throughout the year to engage families and community members; regular activities are planned throughout the year to engage families and community members in planning for and collaborating in the implementation of academic and nonacademic supports; staff members routinely reach out to families to communicate information about their children’s progress and needs; and communications with families are made available in multiple languages, as needed.	The school makes family and community engagement a priority and all of the following five conditions are met: one or more staff members coordinate family and community engagement activities; regular social events are planned throughout the year to engage families and community members; regular activities are planned throughout the year to engage families and community members in planning for and collaborating in the implementation of academic and nonacademic supports; staff members routinely reach out to families to communicate information about their children’s progress and needs; and communications with families are made available in multiple languages, as needed.

a. Formerly indicator 4.6 in the 2014/15 monitoring site visit report.
Source: Massachusetts Department of Elementary and Secondary Education.

Table B5 summarizes average ratings and standard deviations by practice area for the first three years among 43 schools with three or more years of data.

Table B5. Average Turnaround Practice and Indicators ratings and standard deviations by practice area for the first three years among 43 schools with three or more years of data, 2014/15–2018/19

Turnaround practice area and indicator	Mean rating (standard deviation) at time of monitoring		
	First year	Second year	Third year
1. Leadership, Shared Responsibility, and Professional Collaboration			
1.1 Use of Autonomy	1.95 (0.79)	2.49 (0.59)	2.72 (0.45)
1.2 High Expectations and Positive Regard	1.98 (0.86)	2.26 (0.76)	2.47 (0.67)
1.3 Vision/Theory of Action and Buy-In	1.65 (0.90)	2.14 (0.80)	2.44 (0.70)
1.4 Monitoring of Implementation and School Progress	1.64 (0.79)	2.12 (0.79)	2.58 (0.66)
1.5 Trusting Relationships	1.98 (0.94)	2.30 (0.77)	2.44 (0.73)
1.6 Time Use for Professional Development and Collaboration	1.74 (0.69)	2.00 (0.62)	2.23 (0.65)
1.7 Communication with Staff	1.79 (0.83)	2.14 (0.80)	2.35 (0.69)
1.8 Sustainability	0.95 (0.51)	1.70 (0.74)	2.02 (0.83)
2. Intentional Practices for Improving Instruction			
2.1 Instructional Expectations	1.77 (0.68)	1.81 (0.50)	1.98 (0.15)
2.2 Instructional Schedule	1.58 (0.79)	1.84 (0.69)	2.28 (0.67)
2.3 Identifying and Addressing Student Academic Needs	1.79 (0.86)	2.05 (0.72)	2.42 (0.70)
2.4 Classroom Observation Data Use	1.95 (0.92)	2.30 (0.80)	2.70 (0.60)
2.5 Student Assessment Data Use (for schoolwide decision-making)	1.98 (0.74)	2.51 (0.70)	2.60 (0.58)
2.6 Student Assessment Data Use (for classroom instruction)	2.00 (0.79)	2.28 (0.80)	2.58 (0.54)
2.7 Structures for Instructional Improvement	1.77 (0.68)	1.93 (0.51)	2.02 (0.15)
3. Student-Specific Supports and Instruction to All Students			
3.1 General Academic Interventions and Enrichment	1.49 (0.63)	1.67 (0.61)	2.00 (0.76)
3.2 Teacher Training to Identify Student Needs (academic and nonacademic)	1.07 (0.67)	1.63 (0.72)	1.91 (0.84)
3.3 Determining Schoolwide Student Supports (academic interventions and enrichment)	1.81 (0.85)	2.26 (0.82)	2.19 (0.85)
3.4 Multi-tiered System of Support (academic and nonacademic)	1.26 (0.79)	1.74 (0.85)	1.81 (0.85)
3.5 Academic Interventions for English Language Learners	1.55 (0.76)	1.81 (0.66)	2.07 (0.74)
3.6 Academic Interventions for Students with Disabilities	1.45 (0.60)	1.67 (0.64)	1.98 (0.64)
4. School Climate and Culture			
4.1 Schoolwide Behavior Plan	1.60 (0.93)	2.02 (0.67)	2.21 (0.64)
4.2 Adult–Student Relationships	1.33 (0.71)	1.74 (0.49)	1.98 (0.51)
4.3 Expanded Learning	1.67 (0.81)	1.93 (0.88)	2.19 (0.96)
4.4 Wraparound Services and External Partners	1.49 (0.70)	1.93 (0.59)	1.98 (0.71)
4.5 Family and Community Engagement	1.95 (0.72)	2.28 (0.59)	2.37 (0.54)

Note. Analysis is based on observation data from 43 schools with three or more years of data. The average Turnaround Practices and Indicators ratings are calculated on a four-point scale ranging from 0 (limited evidence) to 3 (sustaining).

Source: Authors' analysis of data for 2014/15–2018/19 from the Massachusetts Department of Elementary and Secondary Education.

Appendix C. The hierarchical linear models and detailed regression results

The study team used hierarchical linear models (HLM) to investigate the relationships between Turnaround Practices and Indicators (TP&I) ratings and school mean student growth percentiles (SGP) in English language arts and math and chronic absenteeism rate.¹ The analyses included all low-performing schools with at least one year of indicator data. In estimating the relationship between each indicator and outcome, the HLM analyses controlled for school-level covariates, including grade span (elementary or middle/high), percentages of male and female students, percentage of racial/ethnic minority students, percentage of English learner students, percentage of students with a disability, and percentage of economically disadvantaged students (as defined by the Massachusetts Department of Elementary and Secondary Education).²

For each turnaround practice indicator the study team used the following two-level HLM model to estimate the relationships between an indicator rating and a given outcome after controlling for school covariates. As specified in the model, each school had one to five observations at level 1 (L1, the year level), depending on how many years of indicator data were available for the school. The L1 outcome was the outcome in year i for school j , and the L1 equation included four year dummy variables in addition to the year-specific measures of school characteristics and ratings for each turnaround indicator. At level 2 (L2, school level) the intercept was modeled as a school-level grand mean at year 1 plus a random error, and all the L1 slopes were fixed to their grand means with no error terms at L2. The general equation for the full regression model is as follows:

Level 1 (year level):

$$Y_{ij} = \beta_{0j} + \beta_{1j} \text{Indicator}_{ij} + \sum \beta_{2j} \text{School}_{ij} + \sum \beta_{3j} \text{Year}_{ij} + \varepsilon_{ij}$$

where Y_{ij} is the outcome (school mean SGP in English language arts, school mean SGP in math, or chronic absenteeism rate) in year i for school j ; β_{0j} is the intercept in school j , which can be interpreted as the first-year outcome for school j , adjusted for the TP&I rating and school characteristics; β_{1j} is the relationship between the indicator rating and the outcome for school j ; β_{2j} is a vector of the relationships between the school characteristics and the school outcome in year i for school j ; β_{3j} is a vector of the relationship between year dummy variables and the outcome for school j ; Indicator_{ij} is the indicator rating in year i for school j ; School_{ij} is a vector of grand-mean centered, school-level covariates in year i for school j ; Year_{ij} is a vector of dummy variables indicating the n th year for which the school had observation data in year i for school j ; and ε_{ij} is the year-level residuals.

¹ The study team considered conducting a factor analysis to determine whether the indicators held together in each practice area, but the Massachusetts Department of Elementary and Secondary Education staff indicated that the results would be difficult to interpret and that indicator-level findings were preferred to aggregate-level findings in each practice area. Another reason for not creating higher-level constructs based on individual indicators is that the TP&I ratings were not designed to reflect higher-level constructs.

² The indicator ratings might be related to these school demographic characteristics because of differences in how schools prioritize and implement various turnaround practices. For example, a school with a very high percentage of economically disadvantaged students might need to implement turnaround practices differently from a school with a lower percentage of such students. Without controlling for these factors, a model would allow their influence on the outcome to be implicitly reflected in the estimated relationships between the TP&I ratings and the outcome. Comparing findings from models with and without these covariates would facilitate understanding of these relationships.

Level 2 (school level):

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

$$\beta_{2j} = \gamma_{20}$$

$$\beta_{3j} = \gamma_{30}$$

where γ_{00} is the intercept, interpreted as the overall average across schools in their first year with available data, γ_{10} is the average relationship between the indicator rating and the given outcome, γ_{20} is a vector of average relationships between the school-level covariates and the given outcome, γ_{30} is the average relationship between year dummy variables and the given outcome, and u_{0j} is the school-level residual.

The study team estimated the model with one turnaround indicator included in the model at a time and compiled a list of coefficients related to the turnaround indicators within each turnaround practice area. (See select HLM estimates in tables C1–C3; indicators with significant estimates are shown in bold.) A potential limitation of estimating a single indicator per model is the increased risk for Type 1 errors resulting from multiple comparisons. Therefore, the study team applied the Benjamini–Hochberg correction for multiple comparisons to obtain an unbiased statistical significance for each indicator within a practice area, as recommended by the What Works Clearinghouse (What Works Clearinghouse, 2020). Because the Massachusetts Department of Elementary and Secondary Education wanted to identify which indicators were related to the outcomes, the study team flagged the indicators that have a statistically significant coefficient γ_{10} . Indicators with an estimated regression coefficient that was larger than .25 of a standard deviation but that was not statistically significant were not highlighted because the result was likely due to chance. Taken together, the flagged indicators can help the state understand the extent to which the turnaround indicators are related to improving the outcome.

Table C1. Regression results for the relationship between each schoolwide turnaround indicator on the Turnaround Practices and Indicators (TP&I) rubric and selected school demographic characteristics and school mean student growth percentile in English language arts, 2014/15–2018/19

Indicator	Turnaround indicator			Grade span ^a			Percentage of economically disadvantaged students		
	Estimate	Standard error	p-value	Estimate	Standard error	p-value	Estimate	Standard error	p-value
Covariates only	ni	ni	ni	2.65	1.38	0.05	-0.15	0.06	0.02
1.1	1.51	0.79	0.06	2.55	1.37	0.06	-0.16	0.06	0.01
1.2	1.03	0.74	0.16	2.41	1.38	0.08	-0.15	0.06	0.02
1.3	1.51	0.68	0.03	2.08	1.39	0.13	-0.16	0.06	0.01
1.4	1.65	0.71	0.02	2.50	1.36	0.07	-0.17	0.06	0.01
1.5	1.53	0.69	0.03	2.01	1.39	0.15	-0.15	0.06	0.01
1.6	1.93	0.79	0.01	2.03	1.38	0.14	-0.15	0.06	0.01
1.7	1.48	0.69	0.03	2.42	1.37	0.08	-0.17	0.06	0.01
1.8	1.41	0.70	0.04	0.81	1.36	0.55	-0.15	0.06	0.02
2.1	1.27	1.14	0.27	2.60	1.37	0.06	-0.15	0.06	0.02
2.2	2.12	0.74	<0.01*	2.16	1.36	0.11	-0.15	0.06	0.02
2.3	1.43	0.70	0.04*	2.07	1.39	0.14	-0.16	0.06	0.01
2.4	2.03	0.68	<0.01*	2.47	1.35	0.07	-0.17	0.06	0.01
2.5	2.04	0.77	0.01*	2.12	1.37	0.12	-0.15	0.06	0.01
2.6	2.07	0.76	0.01*	2.09	1.37	0.13	-0.16	0.06	0.01
2.7	2.62	1.07	0.01*	2.52	1.36	0.06	-0.15	0.06	0.02
3.1	2.40	0.80	<0.01*	2.05	1.36	0.13	-0.15	0.06	0.02
3.2	2.64	0.69	<0.01*	2.02	1.34	0.13	-0.17	0.06	0.01
3.3	1.64	0.68	0.02*	1.64	1.42	0.25	-0.16	0.06	0.01
3.4	1.75	0.66	0.01*	2.20	1.37	0.11	-0.17	0.06	0.01
3.5	2.47	0.75	<0.01*	0.87	1.32	0.51	-0.15	0.06	0.02
3.6	2.29	0.82	0.01*	0.73	1.34	0.59	-0.16	0.06	0.01
4.1	2.34	0.74	<0.01*	1.84	1.37	0.18	-0.17	0.06	0.01
4.2	1.99	0.92	0.03	2.51	1.36	0.07	-0.14	0.06	0.02
4.3	1.20	0.65	0.06	2.69	1.37	0.05	-0.14	0.06	0.03
4.4	1.28	0.79	0.11	2.36	1.38	0.09	-0.16	0.06	0.01
4.5	1.18	0.94	0.21	2.18	1.42	0.13	-0.15	0.06	0.02

* Statistically significant at the $p < .05$ level after multiple comparison adjustment; p -values are unadjusted.

ni is not included in the model.

Note: Bold type identifies TP&I indicators with statistically significant estimates. Each row presents hierarchical linear model estimates for one turnaround practice indicator. Each two-level hierarchical linear model that has observations grouped within schools controlled for school demographic characteristics. For the multiple comparisons method the Benjamini–Hochberg correction was used to adjust statistically significant thresholds (p -values) within each domain. Analysis was based on 229 year-specific observations from 91 schools from 2014/15 through 2018/19. Average school mean student growth percentile in English language arts was 45.03, with a standard deviation of 8.29.

a. Elementary grades versus middle or high school grades.

Source: Authors' analysis of data for 2014/15–2018/19 from the Massachusetts Department of Elementary and Secondary Education.

Table C2. Regression results for the relationship between each schoolwide turnaround indicator on the Turnaround Practices and Indicators (TP&I) rubric and selected school demographic characteristics and school mean student growth percentile in math, 2014/15–2018/19

Indicator	Turnaround indicator			Grade span ^a			Percentage disadvantage		
	Estimate	Standard error	p-value	Estimate	Standard error	p-value	Estimate	Standard error	p-value
Covariates only	ni	ni	ni	3.97	1.66	0.02	-0.12	0.08	0.11
1.1	1.98	0.97	0.04	3.84	1.65	0.02	-0.14	0.08	0.08
1.2	1.01	0.90	0.26	3.74	1.67	0.03	-0.13	0.08	0.09
1.3	1.64	0.83	0.05	3.35	1.68	0.05	-0.14	0.08	0.08
1.4	1.90	0.86	0.03	3.84	1.65	0.02	-0.14	0.08	0.06
1.5	2.22	0.83	0.01	3.05	1.67	0.07	-0.13	0.08	0.08
1.6	2.30	0.96	0.02	3.22	1.67	0.05	-0.13	0.08	0.10
1.7	1.68	0.83	0.04	3.70	1.65	0.03	-0.15	0.08	0.06
1.8	0.55	0.85	0.52	3.16	1.66	0.06	-0.07	0.08	0.34
2.1	3.45	1.37	0.01*	3.83	1.64	0.02	-0.13	0.08	0.10
2.2	1.30	0.92	0.15	3.66	1.67	0.03	-0.12	0.08	0.11
2.3	1.42	0.85	0.09	3.39	1.69	0.04	-0.13	0.08	0.09
2.4	1.65	0.83	0.05	3.80	1.65	0.02	-0.14	0.08	0.07
2.5	1.90	0.94	0.04	3.48	1.67	0.04	-0.13	0.08	0.09
2.6	3.42	0.91	<0.01*	3.06	1.63	0.06	-0.14	0.08	0.06
2.7	3.84	1.29	<0.01*	3.77	1.63	0.02	-0.12	0.08	0.10
3.1	2.34	0.98	0.02*	3.38	1.66	0.04	-0.12	0.08	0.12
3.2	2.19	0.86	0.01*	3.45	1.65	0.04	-0.14	0.08	0.06
3.3	1.73	0.83	0.04*	2.91	1.72	0.09	-0.13	0.08	0.08
3.4	1.95	0.81	0.02*	3.50	1.65	0.03	-0.15	0.08	0.06
3.5	2.06	0.93	0.03*	3.05	1.63	0.06	-0.07	0.08	0.37
3.6	1.46	1.01	0.15	3.02	1.65	0.07	-0.08	0.08	0.31
4.1	1.46	0.92	0.11	3.47	1.69	0.04	-0.14	0.08	0.08
4.2	2.94	1.10	0.01*	3.76	1.64	0.02	-0.12	0.08	0.13
4.3	1.06	0.78	0.18	4.01	1.66	0.02	-0.12	0.08	0.13
4.4	1.41	0.95	0.14	3.65	1.67	0.03	-0.14	0.08	0.07
4.5	1.88	1.13	0.10	3.22	1.71	0.06	-0.13	0.08	0.10

* Statistically significant at the $p < .05$ level after multiple comparison adjustment. p -values are the unadjusted values.

ni is not included in the model.

Note: Bold type identifies TP&I indicators with statistically significant estimates. Each row presents hierarchical linear model estimates for one turnaround practice indicator. Each two-level hierarchical linear model that has observations grouped within schools controlled for school demographic characteristics. For the multiple comparisons method the Benjamini–Hochberg correction was used to adjust statistically significant thresholds (p -values) within each domain. Analysis was based on 229 year-specific observations from 91 schools from 2014/15 through 2018/19. Average school mean student growth percentile in math was 43.62, with a standard deviation of 9.78.

a. Elementary grades versus middle or high school grades.

Source: Authors' analysis of data for 2014/15–2018/19 from the Massachusetts Department of Elementary and Secondary Education.

Table C3. Regression results for the relationship between each schoolwide turnaround indicator on the Turnaround Practices and Indicators (TP&I) rubric and selected school demographic characteristics and school-level chronic absenteeism rates, 2014/15–2018/19

Indicator	Turnaround indicator			Grade span ^a			Percentage disadvantage		
	Estimate	Standard error	p-value	Estimate	Standard error	p-value	Estimate	Standard error	p-value
Covariates only	ni	ni	ni	-6.43	1.19	<0.01	0.16	0.05	<.01
1.1	-1.91	1.00	0.06	-7.51	1.78	<0.01	0.13	0.08	0.11
1.2	-3.29	0.93	<0.01*	-6.81	1.75	<0.01	0.14	0.08	0.10
1.3	-1.24	0.90	0.17	-7.04	1.82	<0.01	0.13	0.08	0.12
1.4	-1.69	0.94	0.07	-7.31	1.78	<0.01	0.14	0.08	0.10
1.5	-3.00	0.87	<0.01*	-6.27	1.78	<0.01	0.13	0.08	0.12
1.6	-1.91	1.03	0.07	-6.83	1.82	<0.01	0.12	0.08	0.15
1.7	-2.29	0.91	<0.01*	-7.17	1.77	<0.01	0.15	0.08	0.07
1.8	-0.70	1.00	0.49	-8.67	1.97	<0.01	0.12	0.09	0.18
2.1	-1.16	1.46	0.43	-7.47	1.79	<0.01	0.12	0.09	0.15
2.2	-1.54	0.99	0.12	-7.13	1.80	<0.01	0.12	0.08	0.15
2.3	-2.08	0.90	0.02	-6.74	1.80	<0.01	0.13	0.08	0.13
2.4	-0.29	0.91	0.75	-7.52	1.79	<0.01	0.13	0.09	0.14
2.5	-1.75	1.02	0.09	-7.04	1.80	<0.01	0.12	0.08	0.14
2.6	-1.76	1.01	0.08	-7.07	1.80	<0.01	0.13	0.08	0.13
2.7	-1.89	1.40	0.18	-7.43	1.78	<0.01	0.12	0.08	0.15
3.1	-3.34	1.04	<0.01*	-6.59	1.77	<0.01	0.11	0.08	0.19
3.2	0.58	0.95	0.54	-7.70	1.80	<0.01	0.12	0.09	0.16
3.3	-2.98	0.85	<0.01*	-5.69	1.82	<0.01	0.14	0.08	0.08
3.4	-1.63	0.88	0.06	-7.19	1.79	<0.01	0.15	0.09	0.09
3.5	0.28	1.12	0.80	-8.88	1.96	<0.01	0.13	0.09	0.17
3.6	-2.49	1.16	0.03	-8.31	1.95	<0.01	0.13	0.09	0.15
4.1	-3.20	0.94	<0.01*	-6.53	1.77	<0.01	0.15	0.08	0.08
4.2	-3.36	1.15	<0.01*	-7.27	1.76	<0.01	0.11	0.08	0.17
4.3	0.45	0.86	0.60	-7.55	1.79	<0.01	0.13	0.09	0.13
4.4	-1.13	1.01	0.27	-7.35	1.79	<0.01	0.14	0.09	0.11
4.5	-1.36	1.20	0.26	-6.97	1.86	<0.01	0.13	0.08	0.13

* Statistically significant at the $p < .05$ level after multiple comparison adjustment. p -values are the unadjusted values.

ni is not included in the model.

Note: Bold type identifies TP&I indicators with statistically significant estimates. Each row presents hierarchical linear model estimates for one turnaround practice indicator. Each two-level hierarchical linear model that has observations grouped within schools controlled for school demographic characteristics. For the multiple comparisons method the Benjamini–Hochberg correction was used to adjust statistically significant thresholds (p -values) within each domain. Analysis was based on 229 year-specific observations from 91 schools from 2014/15 through 2018/19. Average school chronic absenteeism rate was 27.46, with a standard deviation of 12.22.

a. Elementary grades versus middle or high school grades.

Source: Authors' analysis of data for 2014/15–2018/19 from the Massachusetts Department of Elementary and Secondary Education.

Reference

What Works Clearinghouse. (2020). *What Works Clearinghouse standards handbook, version 4.1*. U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance. Retrieved July 1, 2020, from <https://ies.ed.gov/ncee/wwc/handbooks>.

Appendix D. Sensitivity analyses

The study team chose to run a series of single-indicator models controlling for school-level covariates because the results would be easier to interpret for action by the Massachusetts Department of Elementary and Secondary Education and by low-performing schools (see tables 4–7 in the main report). To provide a more robust set of analyses that take into account multiple indicators, with and without school-level covariates, the study team conducted sensitivity analyses with models accounting for covariances among Turnaround Practices and Indicators (TP&I) ratings in the same practice area in the rubric and examined the relationships between TP&I ratings and school outcomes unconditioned on school-level covariates.

To investigate how all the indicators in a practice area together related to each outcome, all indicators in the same practice area were included in a linear regression model with school-level covariates controlled for (model I in tables D1–D3). Then the study team removed school-level covariates and re-ran the model, which yielded unconditional relationships between the TP&I ratings and the outcomes (model II in tables D1–D3). Finally, to select a subset of indicators that are strongly related to school outcomes from model II, the study team implemented a stepwise selection strategy to identify the subset of indicators that shared the most variance with the outcomes. Specifically, to enhance the accuracy of indicator selection, the least absolute shrinkage and selection operator (LASSO; Tibshirani, 1996) method was applied to cross-validate indicator selection (model III in tables D1–D3 presents selected indicators and the estimated regression coefficients). Findings from the sensitivity analyses serve as a robustness check of the main findings, and both sets of findings should be considered together.

Compared with the single-indicator models reported in the main report, model I and model II yielded fewer statistically significant relationships for TP&I ratings and school mean student growth percentile (SGP) in English language arts and math and in some cases for chronic absenteeism rate (see tables D1–D3). Indicators in each practice area were expected to be related to each other because they measured related practices. However, because indicators in the same practice area were related to each other (see tables D4–D7), the shared variance among the indicators in a practice area reduced the unique explanatory power of any one indicator to the outcomes, which could result in a more conservative finding of a nonsignificant coefficient for that indicator.

Moreover, including all TP&I indicators in a model would suggest that any regression coefficient for an indicator is “conditioned” on the other indicator ratings being held constant, which could decrease the interpretability of the findings. For example, the study team noticed some correlations in an undesired direction between some indicator ratings and chronic absenteeism rate. This could indicate that all schools were practicing on the same level across the indicators. Consider Turnaround Practice Area 2, for which a higher rating of TP&I indicator 2.4 Classroom Observation Data Use was related to higher chronic absenteeism rates. Although all schools are unlikely to have the same practice level across all indicators, the results might also suggest that schools with higher chronic absenteeism rates were more likely to implement 2.4 Classroom Observation Data Use to a greater extent.

Finally, the stepwise regression with a LASSO cross-validation approach (model III) extended model II and distilled a subset of indicators that shared the greatest variance with the outcomes. Those indicators represented a subset of the indicators highlighted in the main report that had similar magnitudes in the regression coefficients for the school mean SGPs in English language arts and math, which offered evidence of the validity of the main findings. For the chronic absenteeism outcomes, however, some findings were inconsistent. In particular, for three indicators, estimated coefficients were related to worse chronic absenteeism rates.

Table D1. Alternative regression coefficients for models of the relationship between turnaround indicators in the Turnaround Practices and Indicators (TP&I) rubric and school mean student growth percentile in English language arts, 2014/15–2018/19

TP&I indicator	Model ^a		
	I. All indicators included with covariates	II. All indicators included without covariates	III. Stepwise deletion with the LASSO method
1. Leadership, Shared Responsibility, and Professional Collaboration			
1.1 Use of Autonomy	-0.66	-0.70	Removed
1.2 High Expectations and Positive Regard	0.53	0.33	Removed
1.3 Vision/Theory of Action and Buy-In	0.96	0.94	Removed
1.4 Monitoring of Implementation and School Progress	0.44	-0.31	Removed
1.5 Trusting Relationships	-0.37	-0.44	Removed
1.6 Time Use for Professional Development and Collaboration	1.69	1.75	Removed
1.7 Communication with Staff	-0.41	-0.26	Removed
1.8 Sustainability	0.28	0.98	Removed
2. Intentional Practices for Improving Instruction			
2.1 Instructional Expectations	-1.55	-1.62	Removed
2.2 Instructional Schedule	1.57	1.79*	Removed
2.3 Identifying and Addressing Student Academic Needs	-1.07	-0.31	Removed
2.4 Classroom Observation Data Use	1.06	0.03	Removed
2.5 Student Assessment Data Use (for schoolwide decision-making)	0.98	1.39	Removed
2.6 Student Assessment Data Use (for classroom instruction)	1.26	1.26	Removed
2.7 Structures for Instructional Improvement	0.92	0.64	Removed
3. Student-Specific Supports and Instruction to All Students			
3.1 General Academic Interventions and Enrichment	0.60	0.97	Removed
3.2 Teacher Training to Identify Student Needs (academic and nonacademic)	1.20	0.88	Removed
3.3 Determining Schoolwide Student Supports (academic interventions and enrichment)	0.68	0.15	Removed
3.4 Multi-tiered System of Support (academic and nonacademic)	0.08	-0.28	Removed
3.5 Academic Interventions for English Language Learners	1.19	2.12*	3.01
3.6 Academic Interventions for Students with Disabilities	0.37	0.10	Removed
4. School Climate and Culture			
4.1 Schoolwide Behavior Plan	1.86*	1.56	Removed
4.2 Adult–Student Relationships	0.76	-0.10	Removed
4.3 Expanded Learning	0.59	1.22	Removed
4.4 Wraparound Services and External Partners	0.17	0.17	Removed
4.5 Family and Community Engagement	-0.08	0.95	Removed

*Statistically significant at the $p < .05$ level.

LASSO is least absolute shrinkage and selection operator.

Note: Each row presents the regression coefficient for one indicator rating. The value of a regression coefficient can be interpreted as the difference in an outcome related to a one unit difference in the rating. Analysis based on 229 year-specific observations from 91 schools.

a. With all indicators within each practice area included in the model, model I controlled for school demographic characteristics (grade span, percentages of male and female students, percentage of racial/ethnic minority students, percentage of English learner students, percentage of students with a disability, and percentage of economically disadvantaged students) and dummy variables for the years in which the schools had observation data. Model II did not account for school demographic characteristics. Model III applied a stepwise deletion method with the LASSO cross-validation approach to select a subset of items from model II. The statistical significance is not tested in model III.

Source: Authors' analysis of data for 2014/15–2018/19 from the Massachusetts Department of Elementary and Secondary Education.

Table D2. Alternative regression coefficients for models of the relationship between turnaround indicators in the Turnaround Practices and Indicators (TP&I) rubric and school mean student growth percentile in math, 2014/15–2018/19

Turnaround practice area and indicator	Model ^a		
	I. All indicators included with covariates	II. All indicators included without covariates	III. Stepwise deletion with the LASSO method
1. Leadership, Shared Responsibility, and Professional Collaboration			
1.1 Use of Autonomy	–0.33	–1.02	Removed
1.2 High Expectations and Positive Regard	–1.11	–0.53	Removed
1.3 Vision/Theory of Action and Buy-In	1.03	1.57	Removed
1.4 Monitoring of Implementation and School Progress	0.64	0.35	Removed
1.5 Trusting Relationships	0.09	–0.43	Removed
1.6 Time Use for Professional Development and Collaboration	2.11	2.71*	Removed
1.7 Communication with Staff	0.16	0.26	Removed
1.8 Sustainability	–0.69	0.12	Removed
2. Intentional Practices for Improving Instruction			
2.1 Instructional Expectations	0.88	0.47	Removed
2.2 Instructional Schedule	0.22	1.13	Removed
2.3 Identifying and Addressing Student Academic Needs	–1.63	–1.07	Removed
2.4 Classroom Observation Data Use	–0.18	–1.32	Removed
2.5 Student Assessment Data Use (for schoolwide decision-making)	0.26	0.91	Removed
2.6 Student Assessment Data Use (for classroom instruction)	3.31*	3.72*	2.75
2.7 Structures for Instructional Improvement	2.14	1.86	Removed
3. Student-Specific Supports and Instruction to All Students			
3.1 General Academic Interventions and Enrichment	0.43	1.01	Removed
3.2 Teacher Training to Identify Student Needs (academic and nonacademic)	0.47	0.84	Removed
3.3 Determining Schoolwide Student Supports (academic interventions and enrichment)	0.31	0.63	Removed
3.4 Multi-tiered System of Support (academic and nonacademic)	0.25	–0.03	Removed
3.5 Academic Interventions for English Language Learners	1.48	2.44*	2.17
3.6 Academic Interventions for Students with Disabilities	–0.16	–0.57	Removed
4. School Climate and Culture			
4.1 Schoolwide Behavior Plan	0.19	–0.09	Removed
4.2 Adult–Student Relationships	2.33	1.52	Removed
4.3 Expanded Learning	0.34	0.74	Removed
4.4 Wraparound Services and External Partners	0.37	0.75	Removed
4.5 Family and Community Engagement	0.85	2.15	Removed

*Statistically significant at the $p < .05$ level.

LASSO is least absolute shrinkage and selection operator.

Note: Each row presents the regression coefficient for one indicator rating. The value of a regression coefficient can be interpreted as the difference in an outcome related to a one unit difference in the rating. Analysis based on 229 year-specific observations from 91 schools.

a. With all indicators within each practice area included in the model, model I controlled for school demographic characteristics (grade span, percentages of male and female students, percentage of racial/ethnic minority students, percentage of English learner students, percentage of students with a disability, and percentage of economically disadvantaged students), and dummy variables for the years in which the schools had observation data. Model II did not account for school demographic characteristics. Model III applied a stepwise deletion method with the LASSO cross-validation approach to select a subset of items from model II. The statistical significance is not tested in model III.

Source: Authors' analysis of data for 2014/15–2018/19 from the Massachusetts Department of Elementary and Secondary Education.

Table D3. Alternative regression coefficients for models of the relationship between turnaround indicators in the Turnaround Practices and Indicators (TP&I) rubric and school chronic absenteeism rate, 2014/15–2018/19

Turnaround practice area and indicator	Model ^a		
	I. All indicators included with covariates	II. All indicators included without covariates	III. Stepwise deletion with the LASSO approach
1. Leadership, Shared Responsibility, and Professional Collaboration			
1.1 Use of Autonomy	–0.29	–0.07	Removed
1.2 High Expectations and Positive Regard	–3.94*	–5.14*	–4.71
1.3 Vision/Theory of Action and Buy-In	1.95	0.84	Removed
1.4 Monitoring of Implementation and School Progress	–0.43	0.05	Removed
1.5 Trusting Relationships	–2.51	–2.12	Removed
1.6 Time Use for Professional Development and Collaboration	–0.02	–0.85	Removed
1.7 Communication with Staff	0.34	–0.38	Removed
1.8 Sustainability	1.64	2.81	Removed
2. Intentional Practices for Improving Instruction			
2.1 Instructional Expectations	0.31	0.27	Removed
2.2 Instructional Schedule	–1.03	–2.47	–2.40
2.3 Identifying and Addressing Student Academic Needs	–1.99	–3.01*	–2.73
2.4 Classroom Observation Data Use	2.04	3.31*	3.51
2.5 Student Assessment Data Use (for schoolwide decision-making)	–0.77	–3.13*	–2.93
2.6 Student Assessment Data Use (for classroom instruction)	–0.75	0.19	Removed
2.7 Structures for Instructional Improvement	–0.32	1.05	Removed
3. Student-Specific Supports and Instruction to All Students			
3.1 General Academic Interventions and Enrichment	–3.05*	–4.93*	–4.97
3.2 Teacher Training to Identify Student Needs (academic and nonacademic)	3.41*	4.47*	4.37
3.3 Determining Schoolwide Student Supports (academic interventions and enrichment)	–3.08*	–4.93*	–5.06
3.4 Multi-tiered System of Support (academic and nonacademic)	–0.35	–0.50	Removed
3.5 Academic Interventions for English Language Learners	3.26*	4.72*	4.59
3.6 Academic Interventions for Students with Disabilities	–2.39	–2.57	–2.61
4. School Climate and Culture			
4.1 Schoolwide Behavior Plan	–2.75*	–4.06*	–3.02
4.2 Adult–Student Relationships	–2.47	–1.64	Removed
4.3 Expanded Learning	1.59	1.74	Removed
4.4 Wraparound Services and External Partners	–0.06	0.15	Removed
4.5 Family and Community Engagement	0.28	–1.48	Removed

^aStatistically significant at the $p < .05$ level.

LASSO is least absolute shrinkage and selection operator.

Note: Each row presents the regression coefficient for one indicator rating. The value of a regression coefficient can be interpreted as the difference in an outcome related to a one unit difference in the rating. Analysis based on 229 year-specific observations from 91 schools.

a. With all indicators within each practice area included in the model, model I controlled for school demographic characteristics (grade span, percentages of male and female students, percentage of racial/ethnic minority students, percentage of English learner students, percentage of students with a disability, and percentage of economically disadvantaged students), and dummy variables for the years in which the schools had observation data. Model II did not account for school demographic characteristics. Model III applied a stepwise deletion method with the LASSO cross-validation approach to select a subset of items from model II. The statistical significance is not tested in model III.

Source: Authors' analysis of data for 2014/15–2018/19 from the Massachusetts Department of Elementary and Secondary Education.

Table D4. Correlations among Turnaround Practices and Indicators (TP&I) indicators in the Leadership, Shared Responsibility, and Professional Collaboration practice area, 2014/15–2018/19

TP&I indicator	TP&I indicator							
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
1.1 Use of Autonomy	1.00							
1.2 High Expectations and Positive Regard	.49	1.00						
1.3 Vision/Theory of Action and Buy-In	.58	.66	1.00					
1.4 Monitoring of Implementation and School Progress	.53	.53	.68	1.00				
1.5 Trusting Relationships	.50	.61	.72	.50	1.00			
1.6 Time Use for Professional Development and Collaboration	.44	.51	.59	.48	.56	1.00		
1.7 Communication with Staff	.42	.61	.62	.48	.63	.52	1.00	
1.8 Sustainability	.50	.56	.59	.53	.55	.57	.48	1.00
Mean	2.33	2.18	2.00	2.12	2.19	1.97	2.09	1.68
Standard deviation	0.75	0.77	0.86	0.83	0.82	0.71	0.82	0.84

Note: The correlations were calculated as Spearman's rank correlation coefficients given the ordinal nature of the indicator ratings. Analysis based on 229 year-specific observations from 91 schools.

Source: Authors' analysis of data for 2014/15–2018/19 from the Massachusetts Department of Elementary and Secondary Education.

Table D5. Correlations among Turnaround Practices and Indicators (TP&I) indicators in the Intentional Practices for Improving Instruction practice area, 2014/15–2018/19

TP&I indicator	Turnaround practice area and indicator						
	2.1	2.2	2.3	2.4	2.5	2.6	2.7
2.1 Instructional Expectations	1.00						
2.2 Instructional Schedule	.45	1.00					
2.3 Identifying and Addressing Student Academic Needs	.45	.57	1.00				
2.4 Classroom Observation Data Use	.50	.51	.63	1.00			
2.5 Student Assessment Data Use (for schoolwide decision-making)	.35	.45	.61	.52	1.00		
2.6 Student Assessment Data Use (for classroom instruction)	.53	.45	.68	.57	.61	1.00	
2.7 Structures for Instructional Improvement	.47	.41	.56	.50	.49	.57	1.00
Mean	1.81	1.83	2.01	2.23	2.31	2.25	1.82
Standard deviation	0.48	0.76	0.84	0.82	0.77	0.74	0.51

Note: The correlations were calculated as Spearman's rank correlation coefficients given the ordinal nature of the indicator ratings. Analysis based on 229 year-specific observations from 91 schools.

Source: Authors' analysis of data for 2014/15–2018/19 from the Massachusetts Department of Elementary and Secondary Education.

Table D6. Correlations among Turnaround Practices and Indicators (TP&I) indicators in the Student-Specific Supports and Instruction to All Students practice area, 2014/15–2018/19

TP&I indicator	Turnaround practice area and indicator					
	3.1	3.2	3.3	3.4	3.5	3.6
3.1 General Academic Interventions and Enrichment	1.00					
3.2 Teacher Training to Identify Student Needs (academic and nonacademic)	.60	1.00				
3.3 Determining Schoolwide Student Supports (academic interventions and enrichment)	.64	.54	1.00			
3.4 Multitiered System of Support (academic and nonacademic)	.53	.51	.57	1.00		
3.5 Academic Interventions for English Language Learners	.50	.43	.44	.51	1.00	
3.6 Academic Interventions for Students with Disabilities	.54	.41	.46	.43	.53	1.00
Mean	1.67	1.52	2.00	1.56	1.81	1.73
Standard deviation	0.73	0.81	0.89	0.82	0.73	0.67

Note: The correlations were calculated as Spearman’s rank correlation coefficients given the ordinal nature of the indicator ratings. Analysis based on 229 year-specific observations from 91 schools.

Source: Authors’ analysis of data for 2014/15–2018/19 from the Massachusetts Department of Elementary and Secondary Education.

Table D7. Correlations among Turnaround Practices and Indicators (TP&I) indicators in the School Climate and Culture practice area, 2014/15–2018/19

TP&I indicator	Turnaround practice area and indicator				
	4.1	4.2	4.3	4.4	4.5
4.1 Schoolwide Behavior Plan	1.00				
4.2 Adult–Student Relationships	.48	1.00			
4.3 Expanded Learning	.25	.33	1.00		
4.4 Wraparound Services and External Partners	.42	.31	.36	1.00	
4.5 Family and Community Engagement	.42	.33	.26	.42	1.00
Mean	1.97	1.72	1.97	1.82	2.25
Standard deviation	0.78	0.63	0.85	0.71	0.64

Note: The correlations were calculated as Spearman’s rank correlation coefficients given the ordinal nature of the indicator ratings. Analysis based on 229 year-specific observations from 91 schools.

Source: Authors’ analysis of data for 2014/15–2018/19 from the Massachusetts Department of Elementary and Secondary Education.

References

Tibshirani, R. (1996). Regression shrinkage and selection via the lasso. *Journal of the Royal Statistical Society: Series B (Methodological)*, 58(1), 267–288.