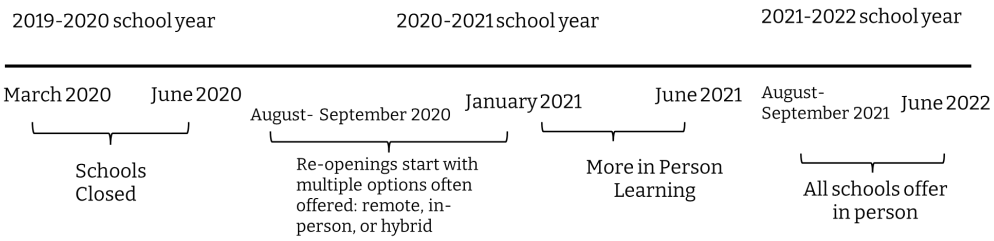
The COVID-19 Pandemic and Schools

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Introduction

The coronavirus disease 2019 (COVID-19) pandemic had an unprecedented impact on students, families, and educators. All public schools across the United States closed for in-person learning in the spring of 2020, and many shifted to remote learning modes, significantly impacting teachers, students, and families. Despite the efforts of school districts to provide and manage the technology needed for remote learning, school learning experiences differed widely across students from different socioeconomic backgrounds during the spring of 2020.

In the fall of 2020, schools began to reopen using in-person, hybrid, and remote learning models. However, the availability of in-person learning options varied widely across the country. The lack of centralized decision-making left reopening decisions to individual school districts, and states differed in their approaches to mitigate the spread of COVID-19. Only in the fall of 2021 did nearly all schools in the country open for in-person learning, with the prevalence of remote instruction waning.



This chapter provides an overview of the research findings on the effects of the pandemic on students and educators and the recovery thus far.

Key findings

Key finding #1: *Not all children had the same learning experiences during the pandemic.*

The digital divide was an important barrier to learning as schools closed in the spring of 2020. Black students, Hispanic students, and students living in rural areas or from low-income backgrounds were more likely to lack the necessary internet access. Unequal access to learning opportunities continued as schools reopened in the fall of 2020, which resulted in significant racial and ethnic gaps in in-person learning this first pandemic school year. A combination of factors explains this pattern, including the offerings of school districts, political leanings, the perceived risk from the pandemic, and local levels of COVID-19 outbreaks. Although smaller, the Black-white gap in in-person learning persisted through the 2021–22 school year.

Key finding #2: *The pandemic resulted in a national decline in enrollment in the public-school sector and increases in homeschooling and private school enrollments.*

An estimated 3% of students in the country (1.5 million students out of 49.4 million enrolled in public schools in 2020), especially in kindergarten, left the public school system for homeschooling and private schooling during the first pandemic year. In 2022, public-school student enrollment levels remained below prepandemic levels in most states in the U.S.

Key finding #3: *The pandemic greatly impacted student academic achievement, and there is still a need for recovery.*

Multiple measures of student achievement showed significant declines in student achievement growth during the pandemic, resulting in widening achievement gaps by race, level of prior achievement, and school poverty. Prolonged school closures and remote and hybrid learning appear to be a primary driver of the observed achievement declines. At the same time, academic achievement recovery has still been insufficient to compensate for the impacts of the pandemic and reduce growing educational inequalities, especially in higher grades. Failing to properly address the academic achievement declines caused by the pandemic could lead to significant economic consequences in the future for the generations of students affected.

Key finding #4: *The pandemic also affected other nontested student academic outcomes.*

Researchers have observed increases in chronic absenteeism and impacts on students' mental health since the pandemic started. The increases in chronic absenteeism seem larger among districts and groups of students with traditionally higher absenteeism levels. Additionally, high levels of absenteeism might have limited the academic recovery of students. In contrast, high school graduation rates were not much affected by the pandemic. Most likely, the relaxation of graduation standards mitigated a negative effect on high school graduation rates. Similarly, researchers have documented lasting changes in grading standards during the pandemic that might have contributed to a disconnect between grades and more objective measures of student learning and a subsequent lack of concern by parents for their students' need for academic recovery.

Key finding #5: *The pandemic was hard for teachers, but it had a limited impact on teacher turnover.*

Teachers' levels of stress and burnout were high throughout the pandemic, raising concerns about a potential increase in turnover and future teacher shortages. However, administrative data from states across the country showed stable trends in teacher turnover during the first two pandemic school years, followed by an increase in turnover in the 2022–23 school year. The early results for 2023–24 show signs of a potential recovery in teacher turnover.

Key finding #6: *Tutoring and other efforts to address the academic impacts of the pandemic faced challenges that limited success.*

Public school districts across the country used resources injected by the federal government to support students' academic growth through programs such as tutoring and extended learning time. Evaluations of these efforts have found that they struggled to make meaningful progress in boosting students' academic recovery, with districts often citing staffing challenges as a major barrier to implementation. In addition, initiatives that often relied upon student opt-in suffered from low levels of parental buy-in. In this respect, offering tutoring during school time, as opposed to after school hours, appears to be key to achieving positive effects.

Understudied topics

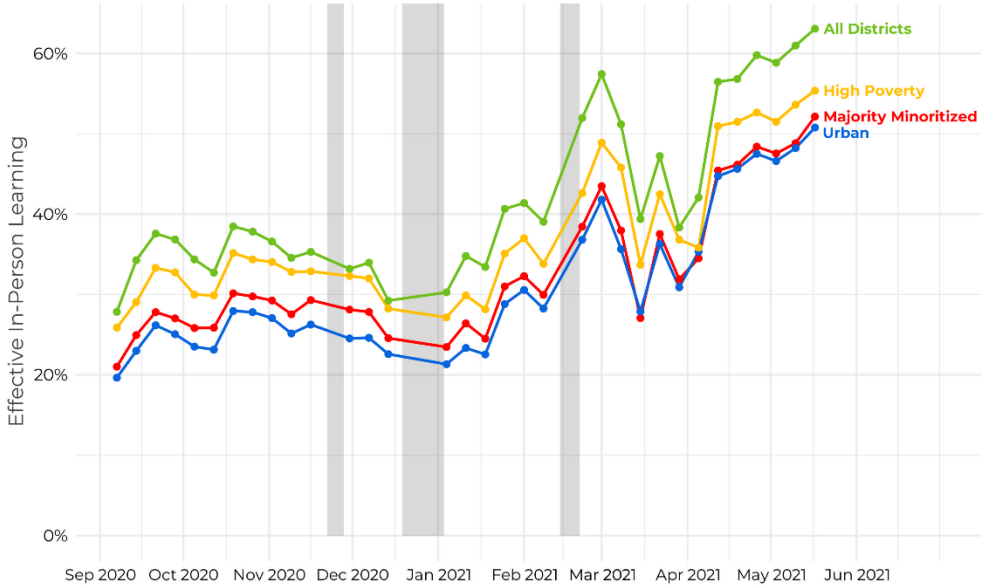
Although significant literature has emerged documenting the effects of the pandemic on students, families, and teachers, these effects are still an ongoing field of research. More research is needed to understand the sources and patterns of chronic absenteeism across the country, the changes in grading standards because of the pandemic and their potential implications, the pandemic effects on nontested outcomes such as student well-being and mental health, the sources of lower levels of parental buy-in for academic interventions, the potential of virtual tutoring, and the longer-term effects.

Evidence

Key finding #1: *Not all children had the same learning experiences during the pandemic.*

Following nationwide school closures in the spring of 2020, schools began to open in the fall of 2020 using combinations of in-person, hybrid, and remote learning. In most states, individual districts were left to decide which modality or modalities to offer. Both districts' decisions about how to reopen and differences in families' preferences for in-person learning led to significant differences in students' and educators' educational experiences during the 2020–21 school year. This variation is shown in the figure below, which charts the proportion of each school week that students spent learning in person over the 2020–21 school year.[1] This in-person learning rate is shown for all districts for which data are available, for districts serving communities with high rates of childhood poverty (i.e., greater than 25%), for districts with a majority of minoritized students, and districts located in urban areas.

Figure 1: Rate of In-Person Learning during the Pandemic Relative to the Prepandemic Level



Note: Data corresponding to Thanksgiving, Christmas, and President's Day not shown. In-person learning is a measure that captures the proportion of time that students effectively spent learning in person during the 2020–21 school year. Developed by Lalé and Kurmann (2022), this measure uses anonymized cell phone geodata and reports of school modality from several trackers (e.g. the Return to Learn Tracker of the American Enterprise Institute (AEI) and MCH Strategic Data, among other sources). This measure compares the time students spent learning in person per week during the 2020–21 school year, with a base period extending from November 2019 through February 2020 (excluding holidays). For example, a value of 50% indicates that students spent 50% of a period of a prepandemic 5-day school week learning in person during a given month of the 2020–2021 school year.

As shown in the figure above, research has found that at the beginning of the 2020–21 school year, districts serving higher proportions of minoritized students or economically disadvantaged students tended to offer more remote learning,[2] while districts in more conservative-leaning areas were more likely to reopen using in-person learning modalities.[3] Given that early pandemic research found that households in higher-income areas and areas with more prevalent access to high-speed internet were more likely to access online educational resources,[4] this gap in in-person learning justified significant concerns about equitable access and potential differential impacts on vulnerable students.

Beyond the choice of instructional modality, the quality of remote and hybrid learning experiences during the pandemic was also likely mediated by access to technology and instructional characteristics such as synchronous vs. asynchronous instruction. Hence, unequal access to high-speed internet or devices such as laptops or tablets could negatively affect the learning experiences of vulnerable students. Some districts serving these students used pandemic-related federal aid (e.g., Elementary and Secondary School Emergency Relief (ESSER) funds) to address some of these challenges. Although evidence on the effectiveness of these expenditures is limited, a

mixed-methods study examining online learning in the Detroit Public Schools Community District found that 70% of students were absent online for more than 10% of instructional days (i.e., were chronically absent); additionally, 40% of surveyed parents indicated that access to the internet or computers contributed to this chronic absenteeism.[5] Future research is needed to understand the extent to which differential access to the internet and technology or differential participation in synchronous/asynchronous remote learning occurred during this early stage of the COVID-19 pandemic.

Importantly, during the pandemic, many districts offered multiple learning modalities. Families' decisions about which learning modality to use appeared to be predicted by both the offering of in-person learning and nonschool factors such as perceptions of COVID-19 risk and institutional trust.[6] Taken together, these findings indicate that many families—particularly those in minoritized communities that experienced higher COVID-19 mortality rates[7]—likely made difficult decisions on instructional modality based on not only academic achievement but also physical and emotional health. These decisions resulted in significant racial and ethnic gaps in in-person learning in the first pandemic school years.[8]

Key finding #2: *The pandemic resulted in a national decline in enrollment in the public-school sector and increases in homeschooling and private school enrollments.*

While many districts offered several learning modality options for students by the end of the 2020–21 school year, most larger districts or districts in urban areas offered only remote learning in the fall of 2020. This lack of in-person learning has been associated with decreased student enrollment,[9] with 3% fewer students attending public schools during the 2021–22 school year than before the COVID-19 pandemic. Simultaneously, enrollment in private schools and homeschooling has increased. While comprehensive data on student enrollment in these sectors are not available nationwide, estimates indicate that during the pandemic, enrollment in private schools and homeschooling increased by 4% and 30%, respectively.[10] Alongside the decrease in the number of school-aged children in the United States, these trends explain roughly two-thirds of the decrease in public-school enrollment in recent years and may have significant implications for school systems that are often funded on a per-pupil basis. Importantly, nearly one-third of the decrease in national public-school enrollment is not explained by these factors, indicating that further research is needed to understand the shifts in enrollment since the start of the COVID-19 pandemic. Data from both Massachusetts and the nation since the onset of the pandemic to 2024 show that declines in enrollment in public schools have persisted. This data also shows that declines appear more concentrated in middle grades (5-8) and among White and Asian students.[11]

Key finding #3: *The pandemic greatly impacted student academic achievement, and there is still a need for recovery.*

The impacts of the pandemic, pandemic-related schooling disruptions, and different school modalities on students' academic achievement have been profound and persistent.[12] Researchers have documented large and persistent rates of learning loss using multiple national student achievement test sources, with larger declines in student growth observed in math than in reading. Here, learning loss is defined as

lower rates of students' achievement growth compared with average prepandemic student growth levels.

Using data from the Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP) test, which is administered to over 4.9 million students in grades 3 through 8 across the country, researchers showed initial harmful effects of the pandemic on student achievement that accumulated over the first pandemic school year (2020–21). As a result, students' achievement levels lagged typical prepandemic levels by between 0.16 to 0.26 standard deviations (s.d.) in math and between 0.06 and 0.11 s.d. in reading.[13] The results from the second pandemic school year (2021–22) showed that despite achievement growth returning to or slightly exceeding prepandemic levels, on average, students were unable to recover the losses in achievement from the prior years and average student achievement remained lower than that in a typical prepandemic year.[14] By the third pandemic school year (2022–23), researchers documented stalled progress in achievement growth gains and estimated a long path for full recovery. By the spring of 2023, the average student would still require approximately 4.1 additional months of schooling in reading and 4.5 months in math to catch up to typical prepandemic achievement levels. The most recent reports from the spring of 2024 and 2025 still showed limited progress toward recovery, especially among those in higher elementary- and middle-school grade levels, and more so in reading than in math.[15]

Research from state assessments has documented similar delays in learning during the pandemic. Using data from public-school districts from over 29 states in the country, researchers documented that by the spring of 2022, the median school district reported a loss in learning of approximately 0.52 grades in math and 0.23 grades in reading compared to the amount of learning that would have been observed in a typical prepandemic year.[16] However, one group of researchers[17] reported a significant recovery in state test scores during the 2022–23 school year, with students making historically large gains in achievement. The authors calculated that, on average, students recovered one-third of the original loss in math and one-fourth of the loss in reading. Nonetheless, most states experienced increased achievement gaps between their high- and low-poverty districts during the pandemic, and, as achievement gains appeared concentrated in wealthier districts, the observed gains in 2022-23 were not sufficient to close these gaps. In addition, the most recent state-level data available shows that as of 2024, while there has been more recovery in math across states, English Language test scores still struggle to recover in many states.[18]

Other national data sources, such as the federal National Assessment of Educational Progress (NAEP), have shown similar large losses. Data from 2022 for 9-year-old students showed declines in scores by an average of 5 points in reading and 7 points in math, erasing all the progress made in the past two decades.[19] Similarly, 13-year-old students showed average declines in performance of 4 points in reading and 9 points in math.[20] The latest NAEP data available from 2024 showed few signs of full recovery in most states and school districts across the country.[21]

Researchers have also documented how the patterns of learning loss described above were uneven across different student groups. Overall, multiple data sources have described how learning losses were more pronounced among Hispanic, Black, and American Indian or Alaska Native students compared with white or Asian students,

especially in upper elementary- and middle-school grades.[22] For instance, while average reading achievement declines in the spring of 2022 were approximately one point of the median percentage rank for Asian students and 3 points for white students, these declines were approximately 5 points for Hispanic and Black students. For Asian students, the decline in math ranged from 3 to 12 points in median percentile rank. Similarly, white students experienced a math decline of between 5 and 10 points. In contrast, Hispanic and Black students saw math declines ranging from 8 to 11 points, while American Indian and Alaskan Native students had declines of between 7 and 12 points. In terms of recovery, subsequent growth, especially in math, was also more variable than in prior years, with lower growth gains occurring among minoritized students and those who were initially lower performing.[23] In addition, girls appear to be more impacted during the pandemic, and boys appear to have regained more ground in math and science tests compared with girls, resulting in increased observed gender gaps in favor of boys in these subjects.[24]

Overall, these varying patterns of student growth during the pandemic contributed to the worsening of existing educational inequalities. Finally, research has also shown that an important contributor to the observed widening achievement gaps during the pandemic was the higher rates and longer offering of remote and hybrid instruction options during the pandemic. For instance, the achievement gaps in math did not appear to widen in areas that continued to offer in-person learning.[25]

Failing to adequately remediate pandemic-induced learning losses could have large economic impacts in the future for the generations of students affected.[26] For instance, researchers estimate that if the experienced losses in NAEP scores described above are not remediated, they could represent a 1.6% decline in the present value of lifetime earnings for the average K-12 student, which could total $900 billion in future losses for all children enrolled in public schools during the 2020–21 school year.[27]

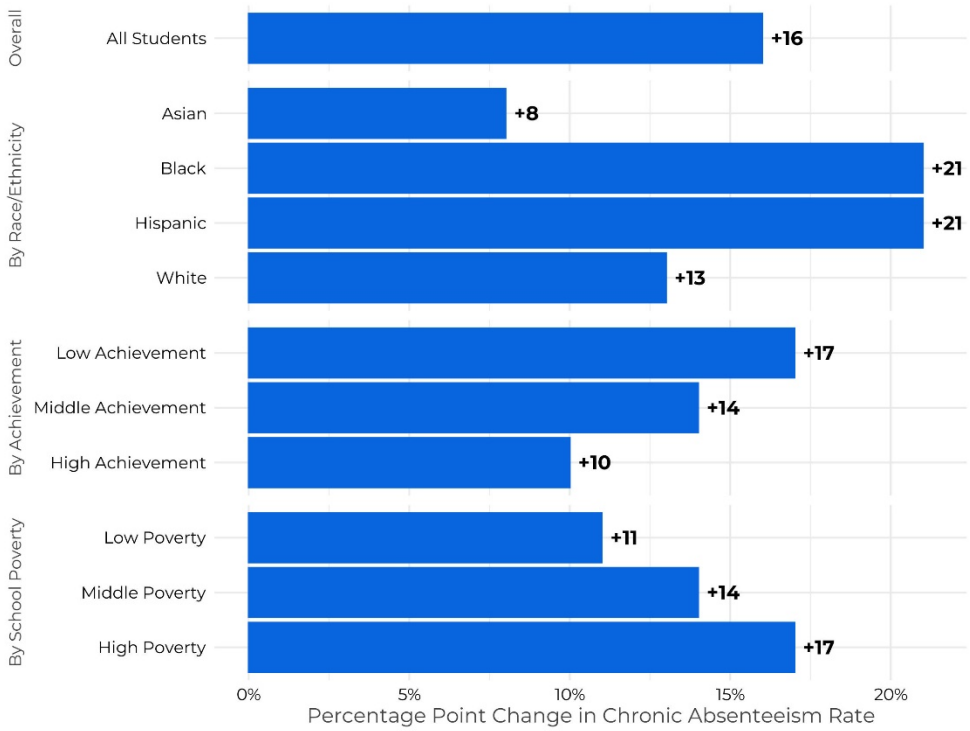
Key finding #4: The *pandemic also affected other nontested student academic outcomes.*

While the losses in student achievement growth are well documented, there is less research available on how the pandemic affected other nontested measures of student academic outcomes and socio-emotional well-being. Although more research is needed in this area, there exists some research documenting the impact of the pandemic on student attendance, mental health, socio-emotional development, high school graduation, college readiness, and college enrollment.[28]

Administrative data across states have documented higher rates of school absenteeism after the pandemic. Using all available district-level data from each state for the school years from 2016–17 through 2022–23, one study documented an increase in chronic absenteeism (defined as the percentage of students who miss 10% of a school year or more) during the pandemic.[29] Overall, average chronic absenteeism rates in K-12 schools rose from 15% in 2018–2019 to 28% in 2021–22, an increase of approximately 89% over prepandemic rates. Although the available data showed some recovery in the 2022–23 school year, improvement appears to be slow and not enough to easily catch up with prepandemic levels. As of 2024, data show that chronic absenteeism remains substantially elevated compared with prepandemic numbers.[30] The rates of chronic absenteeism and increases during the pandemic varied considerably across states, school districts, and students. As illustrated by the figure below, Black and Hispanic students and students in low-achieving or high-poverty school districts, who already

had higher levels of chronic absenteeism rates before the pandemic, were the most affected by the increases in absenteeism. Notably, these are also the groups of students who, as discussed above, were most affected in terms of academic learning losses and need more academic recovery.

Figure 2: Chronic Absenteeism during the Pandemic



Note: Estimates by Malkus (2024).

Students' mental and socio-emotional health was also impacted during the pandemic. Although the availability of data to make pre- and post-pandemic comparisons of these outcomes is more limited, available research shows potential negative impacts on students' mental and socio-emotional health during the pandemic, especially for those from minoritized backgrounds or who learned remotely for longer periods. In this respect, researchers stress the effect of COVID-19 policy-related family financial disruptions, more than school interruptions, on children's mental health outcomes.[31] Anxiety and attempted suicide trends that were already on the rise prepandemic also appear to have worsened because of the pandemic, especially for girls.[32] However, others document a potential benefit of remote learning early in the pandemic, as it could have reduced the incidence of bullying behavior, hence potentially having a positive effect on students' mental health. [33] This positive effect, however, appeared temporary, as it diminished as students returned to in-person learning environments. Overall, more research is needed to understand the influence of the pandemic on these trends in mental health. Similarly, more research is needed to understand the effects on students with disabilities whose treatment plans were interrupted by the pandemic and who appear to be particularly negatively impacted not only in terms of their

academic outcomes but also in terms of their mental health and well-being during these challenging times.[34]

While the effects of the COVID-19 pandemic on academic achievement are well documented, its effects on educational attainment have received less attention in the literature. Recent data from the National Student Clearinghouse[35] show how, compared with 2019, college enrollment in 2-year public institutions decreased in 2020. Even larger declines in enrollment in 2-year public institutions, which serve high percentages of Black and Hispanic students, were observed in 2021 and 2022 before enrollment started to recover and increased in 2023 and 2024. On the other hand, college enrollment in 4-year institutions was less affected by the pandemic. However, these aggregated enrollment statistics potentially mask differences in trends in access and persistence in college. Focusing on transitions from high school to college, researchers have provided the most extensive evidence in terms of high school graduation and college access.[36] Using available national data during the pandemic, they document similar patterns in college entrance. The authors conclude that, compared with prepandemic levels, transitions from high school to college dropped significantly for two-year higher education institutions by 16% and by only 6% for 4-year institutions during 2021. For 2022, the authors document an even larger drop (21%) in enrollment in 2-year institutions. Interestingly, the authors do not find negative effects of the pandemic on high school graduation. High school graduation rates seem to be the only educational outcome that improved during the pandemic, and this was the case for students of different racial backgrounds. The authors find that the relaxation of graduation standards contributed to this increase in high school graduation rates.

Similarly to the relaxation of graduation standards described above, researchers[37] find evidence that grading standards have also changed during the pandemic, leading to potential grade inflation and a disconnect between grades and other more objective measures of student learning. Using data from middle- and high-school grades in Washington State before and after the pandemic, the authors show how easing grading standards during the pandemic led to large increases in grades in math, English, and science courses. Importantly, however, although grades returned to prepandemic levels after the pandemic, test achievement remained far below prepandemic levels, especially in math, which resulted in a divergence between grades and standardized tests that persisted after the pandemic.

As students and parents rely upon grades for information on the student's academic performance, this disconnect may have contributed to a lack of concern by parents for how their children are doing in school, despite the drop in test performance documented by researchers. This potential disconnect has been referred to as "the urgency gap" or "parent–expert disconnect." Using nationally representative data and qualitative interviews, researchers document a lack of concern by parents for how their children are doing academically post-pandemic.[38] The authors report that, as of the 2022–23 school year, only 12% to 18% of parents reported concern for their students' academic well-being. Although parents perceived that the pandemic affected their children in various ways, they feel that their children have recovered as in-person learning returned. Interestingly, the parents interviewed agreed that, more generally, pandemic-induced learning loss was a serious issue for U.S. children.

In turn, parents' lack of urgency can affect their decision to enroll their children in academic recovery programs, which we describe in a later section. Such leniency can also have disparate longer-term effects. For instance, researchers show how academic leniency could have longer-term effects on students and inequality, as it benefits higher-achieving students while further putting low-ability students at a disadvantage.[39]

Key finding #5: The *pandemic was hard for teachers, but it had a limited impact on teacher turnover.*

The COVID-19 pandemic also placed an undeniable strain on teachers. As discussed above, after nationwide school closures during the spring of 2020, schools reopened in the fall using combinations of in-person, hybrid, and remote learning models. Teachers had to adapt to unexpected conditions and teach in unprecedented ways while also being challenged to establish connections with students, families, and colleagues. Health concerns added to teachers' potential stressors, as many teachers returned to in-person education despite the lack of a vaccine and the uncertainty surrounding COVID-19 transmission in schools.

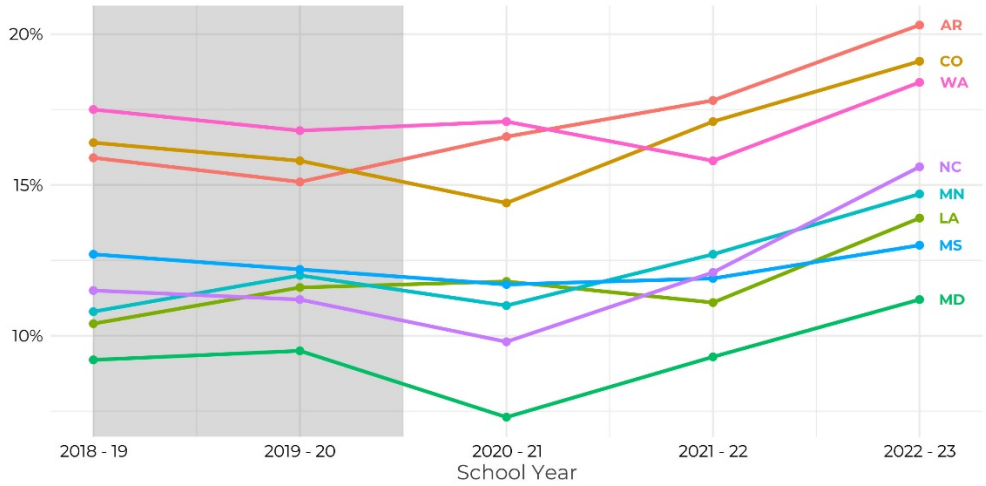
Unsurprisingly, teachers' levels of stress and burnout were high at the beginning of the pandemic, raising concerns about a potential increase in teacher turnover and future teacher shortages. Researchers document how teachers' sense of success dramatically declined in the initial months of the pandemic, especially among teachers in schools with less supportive working environments.[40] Additionally, evidence suggests that teachers' perceptions of their working conditions worsened during the initial shock of the pandemic and have continued to decline through the 2022-23 school year. In particular, teachers report increases in classroom disruptions and decreased levels of student responsibility and safety.[41] Early research during the pandemic sought to examine the extent to which higher levels of stress and burnout combined with worsening working conditions may affect teacher turnover.

Using nationally representative data from the RAND American Teacher Panel, researchers note that most teachers who left the profession after March 2020 and before their scheduled retirement cited COVID-19 as a major reason.[42] Similarly, other researchers who also used data from the RAND American Teacher Panel document how teachers' considerations of leaving the profession increased during the first year of the pandemic relative to prepandemic levels.[43] The authors find that approaching retirement age (i.e., being 55 years old or older), having to change instructional modes at least once, having COVID-19-related health concerns, and having high levels of job-related burnout were all significantly associated with a higher probability of considering leaving or retiring. Hybrid teaching was also associated with increased consideration of leaving because of COVID-19. While teachers' self-reported intentions to leave may not necessarily match actual teacher turnover,[44] these intentions tend to become increasingly predictive over time.[45]

One of the primary challenges in measuring teacher turnover and educator workforce staffing challenges is the lack of available data, especially at the national level. However, as state-level administrative data became available, researchers began to document actual teacher turnover during the pandemic. The figure below displays the turnover rate entering each school year in several states where data are available. Despite the different contexts, these states' administrative data show remarkably similar turnover

patterns. Both this figure and analyses of statewide data from Arkansas, Massachusetts, North Carolina, South Carolina, and Washington State indicate that teacher turnover was slightly lower entering the 2020–21 school year than in previous years.[46] While at odds with survey research and popular media coverage, this decrease in teacher turnover during the early pandemic period is consistent with the research finding that teacher turnover tends to be lower when unemployment is high.[47] In other words, teachers appear less likely to leave their jobs when there are fewer opportunities outside of the education sector.

Figure 3: Teacher Turnover during the Pandemic



Note: Definitions of teacher turnover vary by state, with some states (e.g., Arkansas) considering within-district movements to be turnover and others (e.g., Mississippi) considering only between-district movements to be turnover. Therefore, we discourage comparisons between turnover levels in the graph above and suggest focusing on similar trends.

As the national economy began to recover, however, teacher turnover began to increase. Entering the 2021–22 school year, overall teacher turnover increased by 2 percentage points (p.p.) (10%) in Arkansas, 2.7 p.p. (18%) in Massachusetts, 2.3 p.p. (23%) in North Carolina, and 2.5 p.p. (16%) in Washington State relative to the previous school year.[48]

Despite the similarities in trends in teacher turnover, there are notable differences across states in terms of who left the teacher workforce. In both Massachusetts and North Carolina, the turnover rate among minoritized teachers decreased entering the 2020–21 school year before increasing to levels greater than the prepandemic level at the start of the 2021–22 school year.[49] In contrast, turnover among Black teachers increased entering both the 2020–21 and 2021–22 school years in Arkansas.[50] These increases, if continued, could lead to a loss of diversity in the teaching workforce. Given the evidence supporting beneficial teacher–student race match effects,[51] the decrease in teacher diversity would disproportionately harm minoritized students. Similarly, in Massachusetts and Washington State, turnover among early-career teachers rebounded to levels higher than the prepandemic level after modest declines entering the 2020–21 school year,[52] raising concerns about the long-term stability of the teacher workforce. Differences are also observed in terms of the levels of experience of those

who exited the profession during the pandemic. While teachers near retirement were 4 p.p. more likely to exit the North Carolina teacher workforce entering 2021–22, there does not seem to be a substantial increase in attrition among these more experienced teachers in Massachusetts.[53]

Across states where administrative data have been reported, we observe even higher rates of turnover entering the 2022–23 school year. In Arkansas and North Carolina, teacher turnover increased by 5.2 and 4.4 p.p., respectively, relative to the 2019–20 school year.[54] Similarly, teacher turnover in Washington State reached its highest level in nearly forty years, with turnover most pronounced in high-poverty schools.[55] However, the extent to which these increases may reflect national trends is largely unknown. Data limitations and a lack of national administrative measures of teacher turnover prevent researchers from providing a timely analysis of teacher turnover during turbulent times such as the COVID-19 pandemic.

Given these data limitations, researchers often rely on national surveys to study the teacher workforce. Using a nationally representative survey of district leaders, researchers[56] corroborate prior results, as teacher turnover reported by principals also increased in the 2022–23 school year by approximately 4 p.p. relative to prepandemic levels. These survey results also show that leaders in high-poverty districts, urban districts, and districts serving a high proportion of minoritized students reported the highest levels of turnover.

While analyses of recent turnover are limited, there are signs that teacher turnover has begun to return to prepandemic levels. In Arkansas and North Carolina, teacher turnover entering the 2023–24 school year decreased by 1.1 and 1.2 p.p., respectively, relative to the previous school year.[57] The extent to which this relative improvement in teacher retention can be attributed to a recovery towards prepandemic levels of turnover (as employers, both within and outside the education sector, returned to regular work environments) or to elevated levels of hiring is unclear. Alternatively, these improvements could be driven by state-specific conditions and policies.

Paradoxically, however, the future school staffing challenges that some districts will face may stem from employing too many teachers, rather than too few. During the COVID-19 pandemic, school districts received unprecedented levels of federal funds intended to address anticipated state revenue shortfalls, the costs associated with COVID-19 mitigation, and student learning losses. Plausibly causal evidence from Washington State indicates that districts may have used these funds to, among other things, create new positions.[58] Specifically, researchers estimate that approximately 5,100 new teaching positions and 6,900 new nonteaching positions were created as a result of these emergency (ESSER) funds. This trend appears to be true in several states. A relatively large number of new noninstructional positions were also created in Arkansas school districts during the pandemic, and some of these positions may have been funded using ESSER allocations. However, districts had to either spend these funds or allocate them to contract services by September 2024. In combination with the enrollment declines in many public-school systems since the onset of the COVID-19 pandemic described above, this requirement may create a revenue shortfall that forces districts to lay off staff in the coming years.

The uncertainty surrounding the stability of the teacher workforce is concerning, particularly in the context of the previously discussed COVID-19 learning losses. Not only are teachers the greatest school-based factor contributing to students' academic success,[59] but teachers are also often the individuals responsible for implementing the interventions needed to bring students in line with the levels of achievement that we would have expected them to reach absent the pandemic. However, the implementation of these interventions has been marred by significant challenges, including limited staff capacity, as we describe next.

Key finding #6: *Tutoring and other efforts to address the academic impacts of the pandemic faced challenges that limited success.*

Efforts to address the academic impacts of the pandemic were widespread, and the federal government allocated $189.5 billion in emergency relief (i.e., ESSER) funds to support these efforts. Public schools have been using these resources to support students' academic growth. According to data from the Institute of Education Statistics,[60] as of December 2022, 37% of public schools reported providing high-dosage tutoring, i.e., tutoring that takes place for at least 30 minutes per session, that involves one-on-one or small-group instruction, that is offered three times per week or more, that is provided by educators or well-trained tutors, and that aligns with an evidence-based core curriculum or program. In addition, a total of 59% of public schools reported providing a less intensive tutoring program. Similarly, most public schools (78%) reported offering academically focused summer programming during the summer of 2023.

Among these initiatives to promote students' academic growth, tutoring appears to have the most potential for helping students accelerate their learning and overcome learning losses during the pandemic.[61] In a recent meta-analysis of available experimental evaluations of preK-12 tutoring programs, researchers[62] find consistently positive impacts of tutoring programs, with pooled estimated effect sizes in student test scores of 0.3 s.d. In comparison, when focused on math, summer programs, which represent the second most popular intervention that schools have used to promote students' academic recovery, are found to have an average weighted impact of approximately 0.1 s.d.[63] Researchers argue that tutoring programs have the largest impact, on average, among a wide range of education interventions, including class-size reductions, school day/year extensions, vacation academies, and summer school.[64]

Virtual tutoring, as opposed to in-person tutoring, has been proposed as an alternative that can help lessen staffing challenges while having the potential for positive academic effects. Virtual tutoring was mentioned as one possible intervention that could be supported with ESSER funds, making it an attractive option for district leaders and policymakers. Although research evaluating the effectiveness of virtual tutoring in promoting students' academic growth is still limited, the available research shows promising positive effects. Among secondary school students, the available evaluations consistently show positive effects of virtual tutoring programs. Online video tutoring offered to Italian students in grades 6–8 increased test performance in multiple subjects by 0.26 s.d.[65] Similarly, a call-based tutoring program in Spain increased math test performance by a similar amount.[66] In the U.S., an online program with high-school students also showed a 0.23 s.d. increase in math scores.[67] Finally, while an evaluation of online tutoring for middle-school American students showed small, statistically

nonsignificant effects,[68] a virtual tutoring program for young children (from kindergarten to second grade) showed positive effects on early literacy.[69]

However, the implementation of these tutoring programs appears important for their effectiveness. Research shows how the effectiveness of programs is larger when tutoring is delivered by qualified personnel (e.g., paraprofessionals) and to smaller groups (i.e., 1:1 tutoring), is held during school time, and is a higher dose (i.e., at least three days per week).[70]

Evaluations of tutoring and summer program efforts during the pandemic have often found that implementation frequently struggled to make meaningful progress in boosting students' academic recovery,[71] with districts often citing staffing challenges as a major barrier to implementation.[72] Additionally, many initiatives rely upon student opt-in, raising concerns about equity and access.[73] Low parental buy-in for these programs, probably due to the lack of parental concern about students' academic performance during the pandemic described above, appears to have been an important roadblock to successful implementation. Using nationally representative survey data, researchers show low levels of parental interest in tutoring and summer school interventions during the spring of the 2021–22 school year.[74] Only 23% of surveyed parents were interested in summer school, and only 28% declared interest in tutoring programs. Their survey results show not only low levels of parental interest but also low take-up rates, even among students struggling academically. In this respect, offering tutoring during school time, as opposed to after school hours, may be key for delivering the promise of tutoring at scale.[75]

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