Chronic Absenteeism in Arizona:

A Description of K–8 Trends 2017–2021

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Key Findings

This statewide study of Arizona schools, co-developed by WestEd and the Helios Education Foundation, documents K–8 trends in student absences, which student groups and grade levels have the highest rates of chronic absence, and how rates compare across districts before the COVID-19 pandemic and during the pandemic.

In Arizona, chronic absence is a school accountability measure that is defined as a student being absent from a given school for any reason (excused and unexcused) more than 10 percent of a school's calendar year (e.g., 18 days for a typical 180-day school year that meets 5 days per week).

Pre-pandemic, the rates of chronic absence were stable in Arizona at about 14 percent. During the pandemic, with the physical closure of school buildings in spring 2020, the chronic absence rates declined to 9 percent as schools stopped reporting attendance. This may or may not represent improved attendance for any individual student. In 2021, the state's chronic absence rate exceeded pre-pandemic levels and was up to 22 percent. Compared to previous years, the average number of days absent in a given month increased after the outbreak of the pandemic and a higher percentage of students reached the cut-off for being identified as chronically absent earlier in the school year.

An alternative definition of chronic absence that took into account the total days of absence across the different schools of attendance within a school year resulted in a modest 1 percentage point increase in the overall state's chronic absence rate, but a much larger increase among students who experienced school mobility (about a 5-percentage point increase).

Overall, as often documented in the literature, the percentage of chronically absent students was higher in the early elementary grades than the upper elementary grades but increased again across the middle school grades.

An examination of the geography of chronic absence by district in Arizona showed that the chronic absence rates were high in rural districts in the northeast and northwest corners of Arizona and on the Navajo Nation or Hopi land. Some of these districts reported over 30 percent chronic absenteeism. In contrast, school districts in the center of the state generally reported lower percentages of chronically absent students. As a geographic region, the districts in the Phoenix metroplex generally had lower rates of chronic absence than the districts in the Tucson and Flagstaff areas.

An examination of the variability in chronic absence rates at the student, school, and district levels showed that a larger part of the variation (about 80 percent) in chronic absence was

among students in the same schools, highlighting large gaps in attendance between students in the same schools.

In 2019, American Indian or Alaska Native students, economically disadvantaged students, and special education students had the highest rates of chronic absence. While differences in chronic absence rates were smaller across school characteristics than student characteristics, students enrolled in rural schools and schools with high concentrations of poverty were more likely to be chronically absent than their peers.

Finally, following two comparable cohorts of students, the cohort of students progressing from grade 5 in 2017 to grade 7 in 2019 and the cohort of students progressing from grade 5 in 2019 to grade 7 in 2021 allowed to contrast the chronic absence outcomes of two comparable cohorts to provide a first description of the changes in chronic absence rates over the pandemic. While chronic absence rates increased by 5 percentage points from grade 5 to grade 7 for students in the 2017 cohort, they doubled for the 2019 cohort who experienced the pandemic in the same grades. In both cohorts, chronic absence in grade 5 was highly predictive of chronic absence in grade 7. While the rates of chronic absence increased for all student groups, students classified as economically disadvantaged, English language learner students, American Indian or Alaska Native students, Black/African American students, and Hispanic students were more strongly impacted than their peers.

As elsewhere in the nation, Arizona schools face a challenge with too many students missing too much school and rates of chronic absence disproportionately high for some vulnerable student groups. The pandemic seems to have widened some of the existing gaps in chronic absence. The data included in this report are critically important for planning to improve attendance moving forward. They provide a baseline and a benchmark for state leaders to make well-informed decisions, to both plan for practical and effective attendance interventions and monitor progress once interventions are implemented.

Background and Methods

The COVID-19 pandemic has disrupted K–12 public education in unprecedented ways. A particularly concerning challenge was the spike in the number of students across the country who were regularly absent from school or who disengaged from school completely.

In Arizona, educators and policymakers are committed to ensuring that gaps in learning due to students missing school during the pandemic are minimized. As a critical step to supporting student learning, they are focused on making sure that students attend school daily. State leaders are currently interested in better understanding trends in chronic absence across the state and how rates changed throughout the pandemic, especially when schools unexpectedly transitioned from traditional in-person learning to distance learning from home and have now reopened.

Chronic absence, defined in Arizona as missing at least 10 percent of the school calendar in a year, is an especially important indicator to track since the outcomes of missing too much school have negative and long-term consequences. For example, chronically absent students in kindergarten are behind in math and reading skills and by grade 3 are less likely to read at grade level.[1] By grade 6 chronically absent students are more likely to fail courses and by grade 9 they are more likely to drop out.[2] Some student groups such as economically disadvantaged students, racial/ethnic minority students, and special education students are disproportionately affected by chronic absence,[3] and missed instruction furthers disparities in academic achievement.

This statewide study of Arizona schools documents K–8 trends in absenteeism, which student groups and grade levels have the highest rates of chronic absence, and how rates compare across districts. It was co-developed by WestEd and the Helios Education Foundation to specifically examine chronic absence in the three years leading up to the pandemic to establish a baseline to better understand the effects of the pandemic on attendance during the 2020 and

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[1] Applied Survey Research. (2011). *Attendance in the early elementary grades: Association with student characteristics, school readiness and third grade outcomes.* Retrieved from http://www.attendanceworks.org/wp-content/uploads/2017/06/ASR-Mini-Report-Attendance-Readiness-and-Third-Grade-Outcomes-7-8-11.pdf

[2] Allensworth, E., & Easton, J. (2007). *What matters for staying on-track and graduating in Chicago public high schools: A close look at course grades, failures, and attendance in the freshman year.* Chicago: University of Chicago, Consortium of Chicago School Research. Ginsburg, A., Jordan, P., & Chang, H. (2014*). Absences add up: How school attendance influences student success.* Retrieved from http://www.attendanceworks.org/wordpress/wp-content/uploads/2014/09/Absenses-Add-Up_090114-1-1.pdf

[3] Balfanz, R., & Byrnes, V. (2012). *The importance of being in school: A report on absenteeism in the nation's public schools.* Baltimore, MD: Johns Hopkins University, Center for Social Organization of Schools.

2021 school years and to help state leaders benchmark progress as they plan for student attendance interventions and learning recovery efforts during the current school year.

This study examined chronic absence in Arizona from 2017 to 2021. It describes the main trends in chronic absence, reports on rates of chronic absence key student and school characteristics, examines the variation in those rates at the school and district levels, and reports which student and school characteristics are most related to chronic absence in the last pre-COVID-19 year, 2019. Specifically, the study addressed six research questions:

(1) What are statewide trends in chronic absence 2017–2021?
(2) What are the pre-COVID-19 rates of chronic absence for key student characteristics?
(3) What are the pre-COVID-19 rates of chronic absence for key school characteristics?
(4) How do chronic absence rates vary at the school and district levels?
(5) Which student and school characteristics are most related to chronic absence?
(6) What are the preliminary 2021 trends in chronic absence for vulnerable student populations?

Key terms related to chronic absence are explained in box 1.

Box 1. Key terms

Chronic Absence – In Arizona, chronic absence is when a student is absent from a given school for any reason (excused and unexcused) more than 10 percent of a school's calendar year (e.g., 18 days for a typical 180-day school year that meets 5 days per week).

Alternative Definition of Chronic Absence – For the purpose of this study, absences (excused and unexcused) were added across all schools attended by a student in a given school year. A student with absences more than 18 days in a school year was classified as chronically absent.

The study also examined student and school characteristics that have been identified in the literature as being associated with chronic absence. Data on student characteristics available from the Arizona Department of Education (ADE) included gender, economic disadvantage status (as indicated by eligibility for the federal school lunch program), eligibility for special education services (special education status), English learner language status, mobility, and race/ethnicity. Data on school characteristics included the concentration of students with an economic disadvantage, school size, school type (alternative or special education school versus other schools), and school urbanicity. In addition, because Arizona has a high percentage of students enrolled in charter schools (18 percent in 2013–14, according to U.S. Department of Education, 2015), the analysis includes charter school status.

The data sources, sample, and methods used in the analysis are in box 2.

Box 2. Data sources, samples, and methods

Data sources. The data for this study came from ADE sources. Student demographic characteristics, school enrollment records, and the annual list of students identified as chronically absent were extracted from the ADE longitudinal data system. Monthly absences data were obtained from ADE's School Finance data system. School characteristics, such as school charter status, were obtained from ADE school and districts lists; school type and school urbanicity were collected from the National Center for Education Statistics (NCES) Common Core of Data. All records were linked using unique student identification numbers and school identification numbers provided by ADE. School district boundaries for the 2018–2019 school year were obtained from the NCES Education Demographic and Geographic Estimate program.[4]

Population of analysis. The study population consisted, for each year, of all students enrolled in an Arizona public school in grades K to 8 who were included in the October school census. This totaled 773,653 students in 2017, 762,243 students in 2018, 772,573 students in 2019, 775,311 students in 2020, and 741,733 students in 2021.

Methodology. Descriptive statistics were calculated to report on the trends in chronic absence from 2017 to 2021, as well as the pre-COVID-19 pandemic rates (2019) of chronic absence for key student and school characteristics. For the last pre-pandemic year, multilevel modeling was used to examine the variation in chronic absence rates at the school and district levels. Two models were examined to estimate the variance composition by levels: a two-level random intercept model for all students enrolled in an Arizona public school in grades K to 8 in 2019 where students were nested within schools. A three-level model random intercept was estimated for all students enrolled in a multi-site Arizona school district (a district with multiple schools) in grades K to 8 in 2019 where students were nested within schools, which were, in turn, nested within districts. The inclusion of random effects at the student, school, or district levels allows the estimation of 1) the variance component between districts, 2) the variance between schools nested in districts, and 3) the random individual differences within schools nested in districts. A significant district random effect indicates non-negligible differences between districts after the school and student variances have been accounted for, and a significant school random effect indicates non-negligible differences between schools after the student variance has been accounted for. Next, a two-level model including a random school effect as well as student and school characteristics was used to report on the student and school characteristics most related to chronic absence. The two-level model was used to account for the fact that students are nested within schools. The model calculated the probability of being chronically absent controlling for student and school characteristics. A more detailed description of the study methods is in the appendix.

Findings

Statewide Trends in Chronic Absence

While the percentage of chronically absent students declined in 2020, in 2021 the state's chronic absence rate exceeded pre-pandemic levels.

Figure 1 shows that during the three pre-pandemic school years (2017, 2018, 2019), 12 percent to 14 percent of K–8 students were identified as chronically absent, representing about 100,000 students across the state. The rates were lower in 2017 (12 percent) and stabilized at 14 percent in 2018 and 2019.

In 2020, due to the midyear outbreak of COVID-19, many school districts stopped the conventional reporting of daily attendance (See Box 3 for further details).

## Box 3. COVID-19 and Attendance Tracking for years 2020 and 2021

Starting on March 15, 2020, with the physical closure of school buildings due to the COVID-19 pandemic, Arizona Department of Education School Finance instructed schools not to report attendance (See https://www.azed.gov/finance/school-finance-guidance-for-covid-19/ "Brick & Mortar (B&M) General Information and Attendance".) This directive caused the chronic absenteeism rates to seem to improve when in reality they may or may not have improved for any individual student.

On June 24, 2020, Governor Doug Ducey's Executive Order 2020-41 required Local Educational Agencies (LEAs) to submit distance learning plans at the beginning of the 2020–2021 school year reflecting the ongoing challenges of the pandemic. As part of that executive order schools and LEAs were required to describe how they would track attendance for students who were in school remotely either full time or intermittently. The LEAs were given the freedom to determine what best fit their program(s) and instruction as they put these plans in place. Variance among the LEAs resulted in variance in attendance tracking. An increase in absentee rates across the state, throughout the year was noted.

On March 3, 2021, Governor Ducey issued another Executive Order requiring schools to offer in-person learning beginning March 15th or following the 2021 spring break. Despite many schools returning to in-person learning, absenteeism remained higher than in previous years due to quarantining, illness, or exposure. Over the last 18 months, the only constant is how chronic absenteeism is calculated for ADE Accountability purposes.

A shift was required in attendance tracking as schools closed and pivoted to distance learning. As a result, the estimated number of students with chronic absence during this period dropped to 8 percent. However, by 2021, when daily attendance reporting resumed with new policies and processes, the estimated number of students with chronic absence sharply increased, surpassing pre-pandemic levels and reaching 22 percent.

Figure 1. Statewide Annual Rates of Chronic Absence, 2017–2021
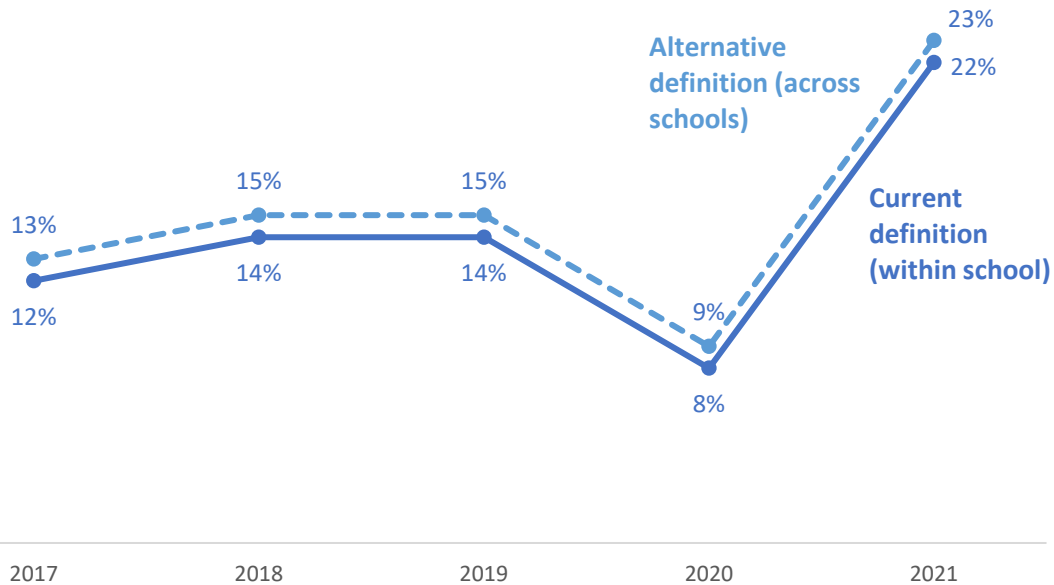
Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: The analysis population included 773,653 students in 2017, 762,243 in 2018, 772,573 in 2019, 775,311 in 2020, and 741,733 in 2021.

While chronic absence is defined in Arizona as missing at least 10 percent of the school calendar in a year within any school of enrollment and is related to school accountability measures, an alternative definition was developed for this analysis to identify students with more than 18 days of absence across any school of enrollment in a year as chronically absent.[5] Using this definition, an additional 10,000 students were identified as chronically absent. This resulted in a 1-percentage point increase in the state's chronic absence rate across each year, reaching 23 percent during 2021.

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[5] The 18 days of absence cut-off corresponds to 10 percent of a typical 180 school calendar in Arizona.

Fewer students were absent at least one day in a given month in 2021 than for previous years.

As shown in figure 2, before the pandemic, in a given month, about half of the students were absent at least one day and a quarter were absent at least two days, with monthly rates slightly rising during the school year. Starting in March 2020, when daily attendance was no longer reported for the remainder of the school year, the percentage of students with an absence decreased to 0 percent. In the school year 2020–21, when new attendance reporting policies were implemented, the percentage of students with at least one absence in a given month decreased by about 10 percentage points compared to pre-pandemic years (about 40 percent compared to 50 percent) while the percentage of students absent at least two days in a given month stayed at about 20 percent, with monthly rates of absence rising during the school year.

Figure 2. Monthly Rates of Absence for Arizona School Districts, 2017–2021
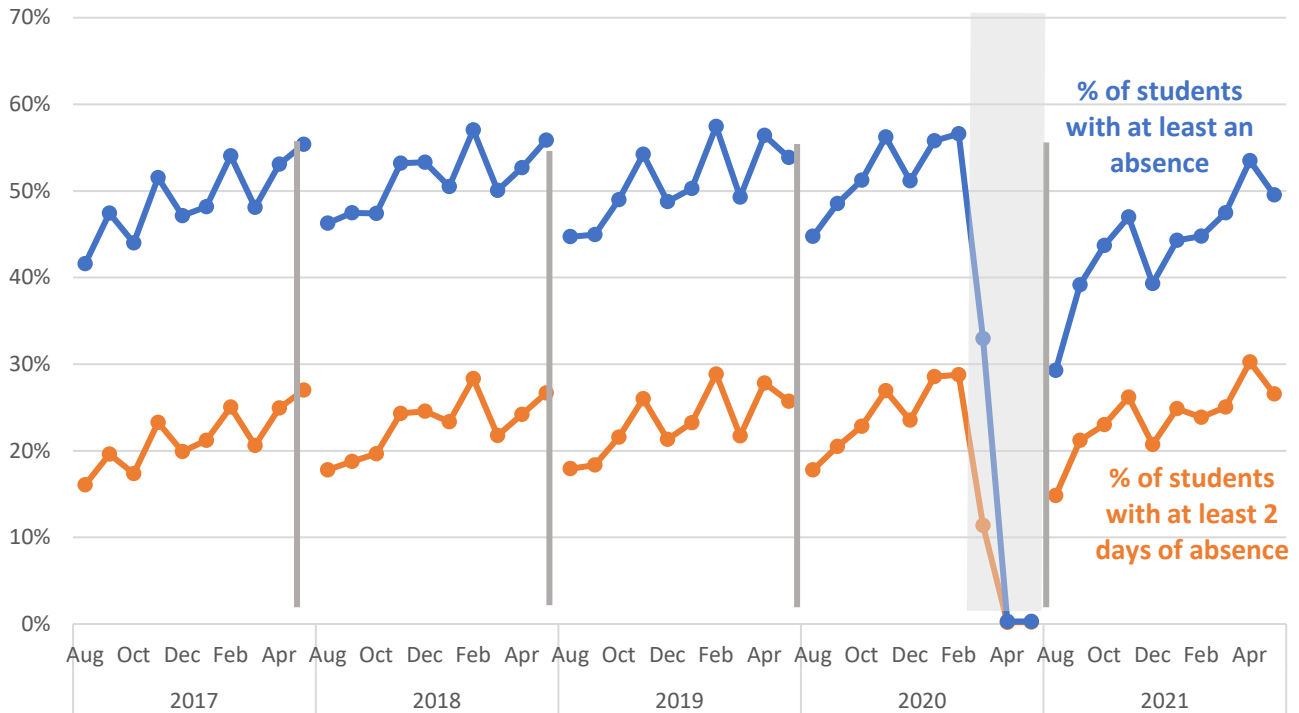
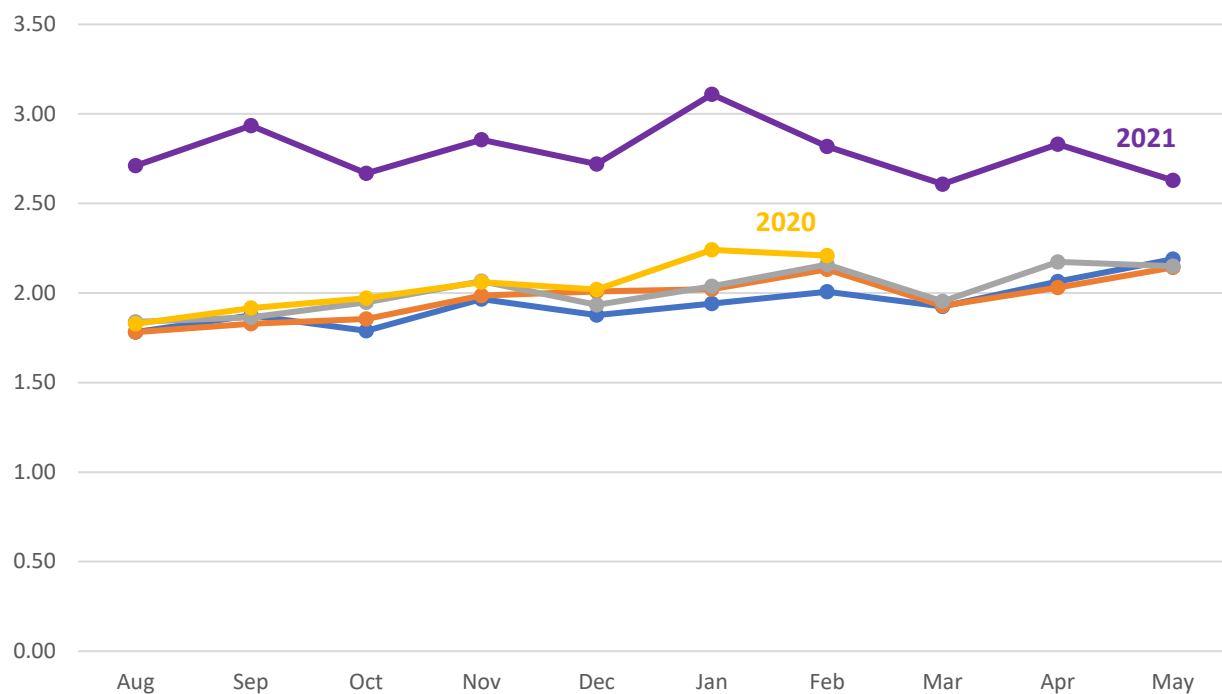**Source**: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: The analysis population included 773,653 students in 2017, 762,243 in 2018, 772,573 in 2019, 775,311 in 2020, and 741,733 in 2021.

The average number of days absent in a given month increased after the outbreak of the pandemic.

During the pre-pandemic years 2017, 2018, 2019, and midyear 2020 when schools closed due to the COVID-19 outbreak, among students absent at least one day in a given month, the average length of absence within that month was about 2 days. Figure 3 shows that this rate was consistent for all years through February 2020 and increased slightly throughout the school year. Starting in March 2020 when schools closed and pivoted to distance learning, the number of days students were absent was not reported for the remainder of the school year since daily attendance was not taken.

In the school year 2021, during the pandemic, the average number of days students were absent in a given month rose to about 2.5–3 days. This is a marked increase from previous years, and the additional day of missed instructional time may place these students at greater risk for falling behind academically.

Figure 3. Average Number of Days Absent in a Given Month, for Students with at Least an Absence

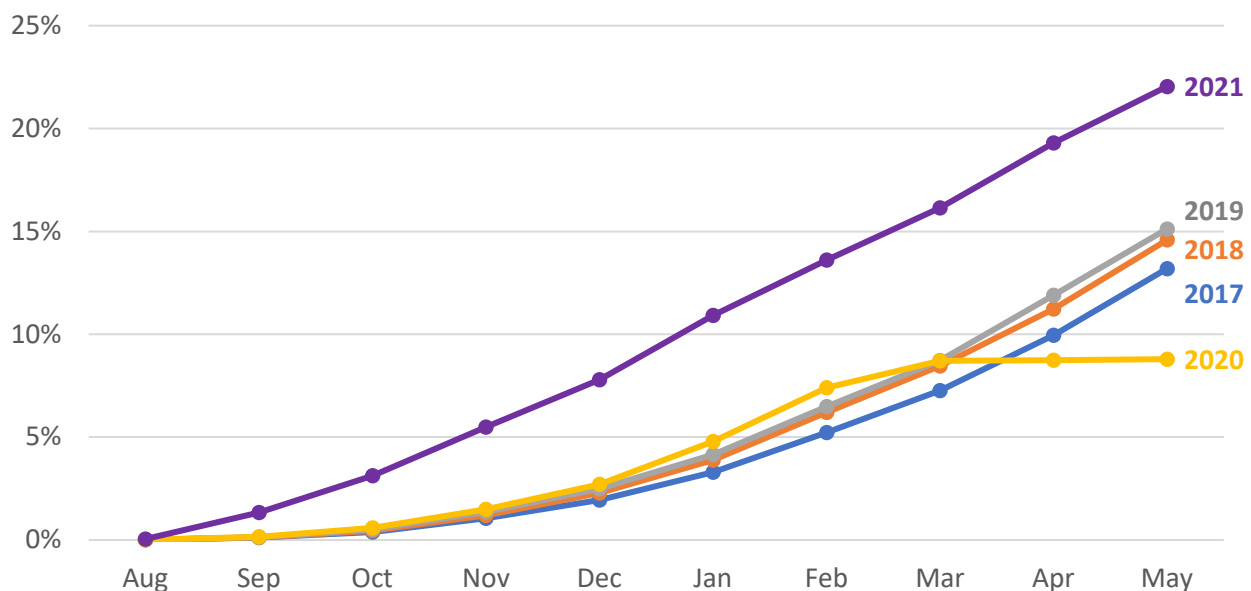**Source**: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: The analysis population included 773,653 students in 2017, 762,243 in 2018, 772,573 in 2019, 775,311 in 2020, and 741,733 in 2021.

In 2021, a higher percentage of students reached the cut-off for being identified as chronically absent earlier in the school year.

Across the pre-pandemic years, the percentage of students reaching the chronic absence cut off in a given month (by adding the days of absence since the beginning of the school year) increased slightly in each successive year. For example, figure 4 shows about 5 percent of students had accumulated at least 18 days of absences in February 2017, compared to 6 percent of students in February 2018 and 2019, and 7 percent of students in February 2020. The pre-pandemic school years closing with 13 percent to 15 percent of students identified as chronically absent.

Starting March 2020, when daily attendance was temporarily halted to accommodate the transition to distance learning due to the pandemic, chronic absenteeism remained at 9 percent until the end of the school year. In 2021, when the new attendance reporting policies were implemented, the percentage of students reaching the chronic absence cut off by a given month increased markedly compared to previous years. For example, during each of the first three months of the school year, the rates were at least double the rates reported in 2020. By February 2021, 14 percent of students had accumulated at least 18 days of absence, compared to 7 percent in February the year before. In March 2021, the percentage of students identified as chronically absent was 16 percent, a rate reached only in May during the pre-pandemic years. By way of comparison, in May 2021 the percentage of students with at least 18 days of absences reached 22 percent, the highest rate during the past five years.

Figure 4. Cumulative Percentage of Students Identified as Chronically Absent, by Month

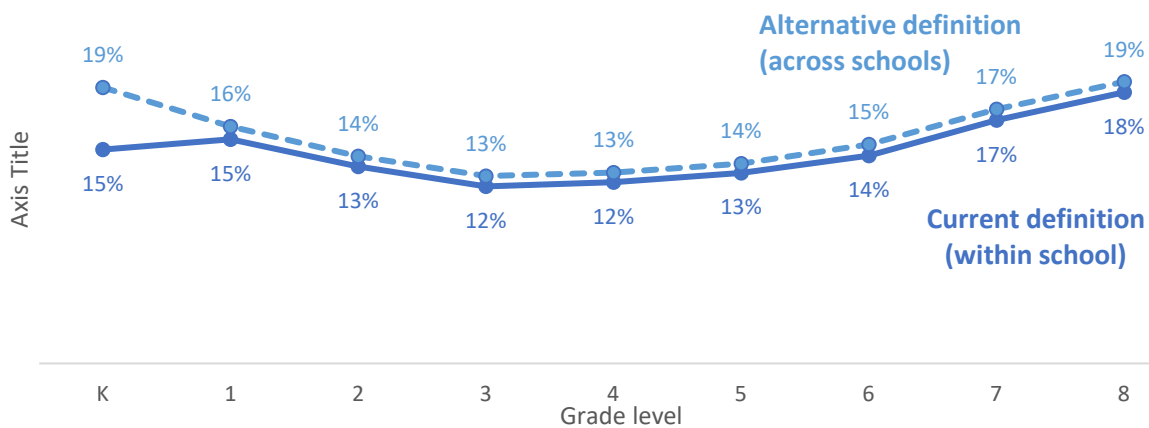**Source**: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: The analysis population included 773,653 students in 2017, 762,243 in 2018, 772,573 in 2019, 775,311 in 2020, and 741,733 in 2021.

Pre-COVID-19 Chronic Absenteeism by Grade Level and Student Characteristics, 2018–19

The percentage of chronically absent students was higher in the early elementary grades than the upper elementary grades but increased across the middle school grades.

Chronic absence rates by K–8 grade levels displayed in figure 5 show a slight "U" shape, which mirrors the shape of national rates by grade levels.[6] Rates using the state's current definition of chronic absence show that 15 percent of kindergarten and grade 1 students were chronically absent during their initial transitional year or years of attending school. These rates slightly decreased to 12 percent and 13 percent in the upper elementary grades but increased starting in grade 6, reaching 18 percent by grade 8. Similarly, the alternative method for defining chronic absence (with an 18-day cut off across all schools of enrollment) produces estimates very close to the current definition, adding only about 1 percent to the rates of chronic absence in all grades except in kindergarten, in which the rate climbed by 4 percentage points. The implications of this are notable. The early grades are where good attendance habits are developed and if about one in six kindergarten and grade 1 students are missing too much school it suggests a concerning trend, and if about one in five grade 8 students are chronically absent, they may be missing instruction needed to help them navigate the critical first year of high school.

Figure 5. Chronic Absence Rates by Grade Level, 2018–19

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: Students with a grade of Ungraded Elementary are not included in the estimates. The analysis population included 772, 014 students in grades K through 8.

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[6] Balfanz, R., & Byrnes, V. (2012). *The importance of being in school: A report on absenteeism in the nation's public schools.* Baltimore, MD: Johns Hopkins University, Center for Social Organization of Schools.

The percentage of students who were chronically absent varied little by gender, but there were large differences by economic status.

There were only small differences in rates of chronic absence by gender across the K–8 grades, which is consistent with national data (data not presented).[7]

In contrast, figure 6 also shows that there were marked differences in rates of chronic absence by economic status. Students classified as economically disadvantaged were much more likely to be identified as chronically absent than students who were not classified as economically disadvantaged, reflecting national data.[8] At each K–8 grade level, economically disadvantaged students had rates between 7 and 11 percentage points higher than students who were not economically disadvantaged. In grade 8, the year before students enter high school, nearly a quarter of students classified as economically disadvantaged (23 percent) were chronically absent compared to 14 percent of their peers who were not classified as economically disadvantaged.

Figure 6. Chronic Absence Rates by Economic Status, 2018–19
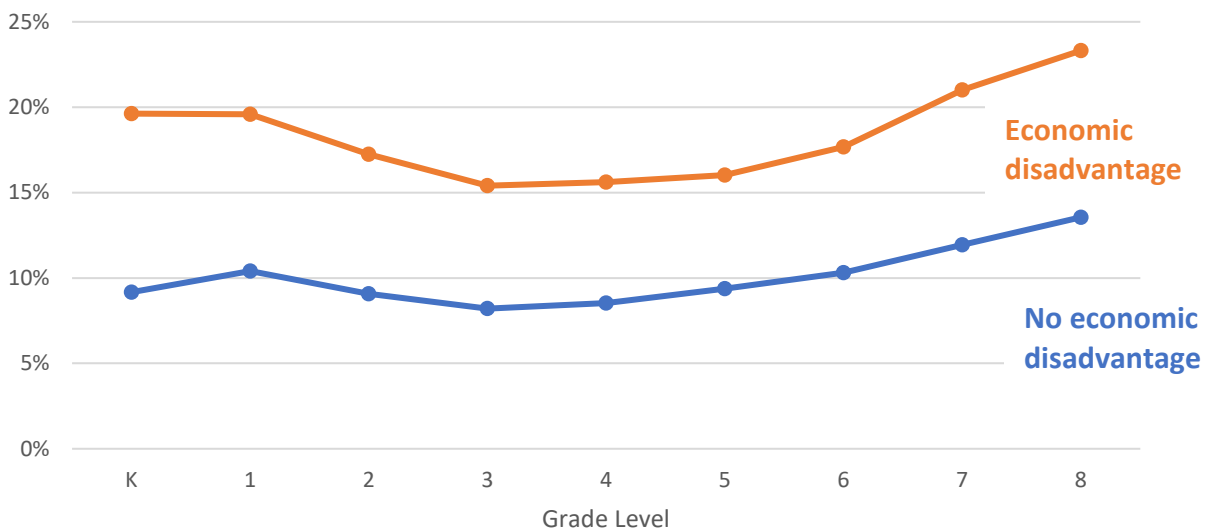
Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: Students with a grade of Ungraded Elementary are not included in the estimates. The analysis population included 772, 014 students in grades K through 8. An additional 84 students did not report a gender of Female or Male and are not included in the chart.

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[7] Garcia, M. & Weiss, E. (2018). *Student absenteeism: Who misses school and how missing school matters for performance,* Retrieved from https://files.epi.org/pdf/152438.pdf
[8] Garcia, M. & Weiss, E. (2018). *Student absenteeism: Who misses school and how missing school matters for performance,* Retrieved from https://files.epi.org/pdf/152438.pdf

Special education students were also more likely than other students to be classified as chronically absent at every grade level.

Like national chronic absence rates, special education students in Arizona consistently had higher rates of chronic absence than their peers who were not receiving special education services.[9] As shown in figure 7, the gap between chronic absence rates for special education students and their peers not receiving services widened across grade levels. Starting in kindergarten, where nearly one in five (19 percent) special education students were chronically absent, rates held steady until the middle grades but then climbed to about a quarter (26 percent) of special education students identified as chronically absent in grades 7 and 8. This represents a 10-percentage point difference with other students, doubling the gap between chronic absence rates since kindergarten.

Figure 7. Chronic Absence by Grade Level by Special Education Status, 2018–19
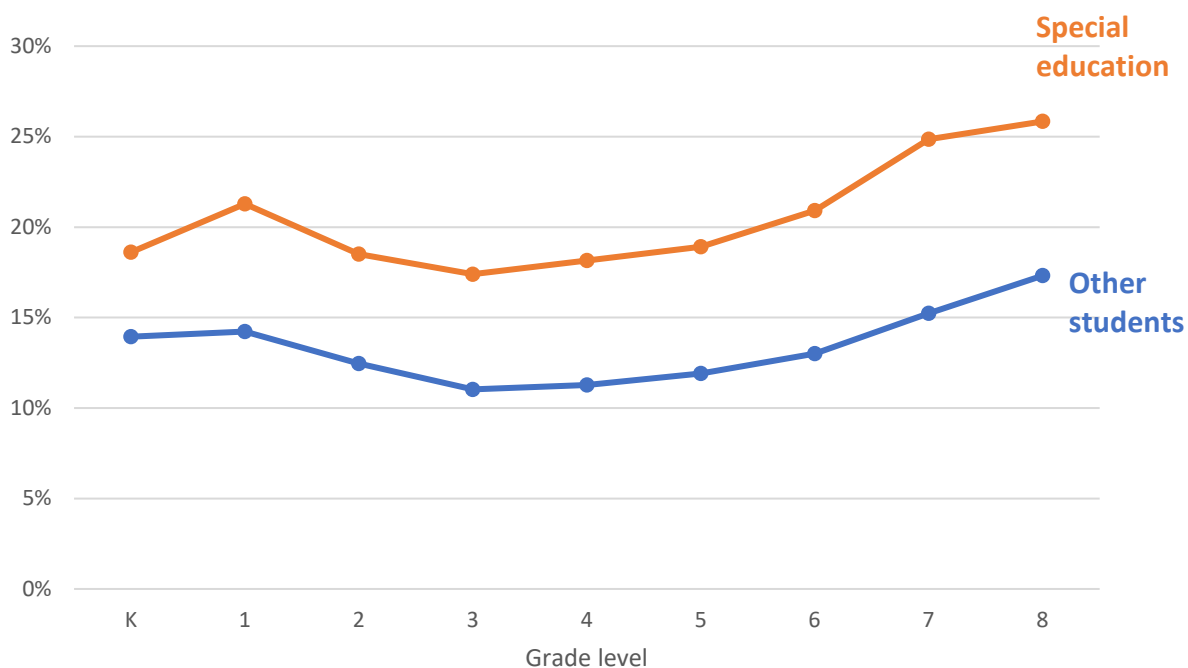
Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: Students with a grade of Ungraded Elementary are not included in the estimates. The analysis population included 772, 014 students in grades K through 8.

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[9] Attendance Works & Everyone Graduates Center.(2021). Chronic Absence to Map Interrupted Schooling, Instructional Loss, and Educational Inequity: Insights from School Year 2017–18 Data. Retrieved from https://www.attendanceworks.org/wp-content/uploads/2019/06/Attendance-Works-Using-Chronic-Absence-to-Map_020221.pdf

While English language learner students had higher rates of chronic absence than their peers not classified as English language learners, the lowest rate of chronic absence was documented for English language learner students who were reclassified as proficient.

Figure 8 shows that English language learner students were more likely to be chronically absent than their peers who were not classified as English language learner students across all grade levels. Beginning in kindergarten, about one in five (21 percent) English language learner students were chronically absent. While rates slightly declined across the elementary grades they increased in the middle grades, with about a quarter (24 percent) of English language learner students identified as chronically absent in grade 8. Students not classified as English language learners had chronic absence rates of about 14 percent during the first years of school and rates increased to 18 percent by grade 8. By way of comparison, students who were English language learners but had been reclassified as English language proficient in the last year had the lowest rates of chronic absence across grades, but these students, like their peers, still showed increased rates in grades 7 and 8, reaching 15 percent. This represents 9 percentage points below their English language learner peers.

Figure 8. Chronic Absence by Grade Level by English Language Learner Status, 2018–19

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: The category ELL stands for English language learner and includes students with an ELL need but not enrolled in services, ELL students enrolled in services, students with an ELL need withdrawn by parents, and special educatio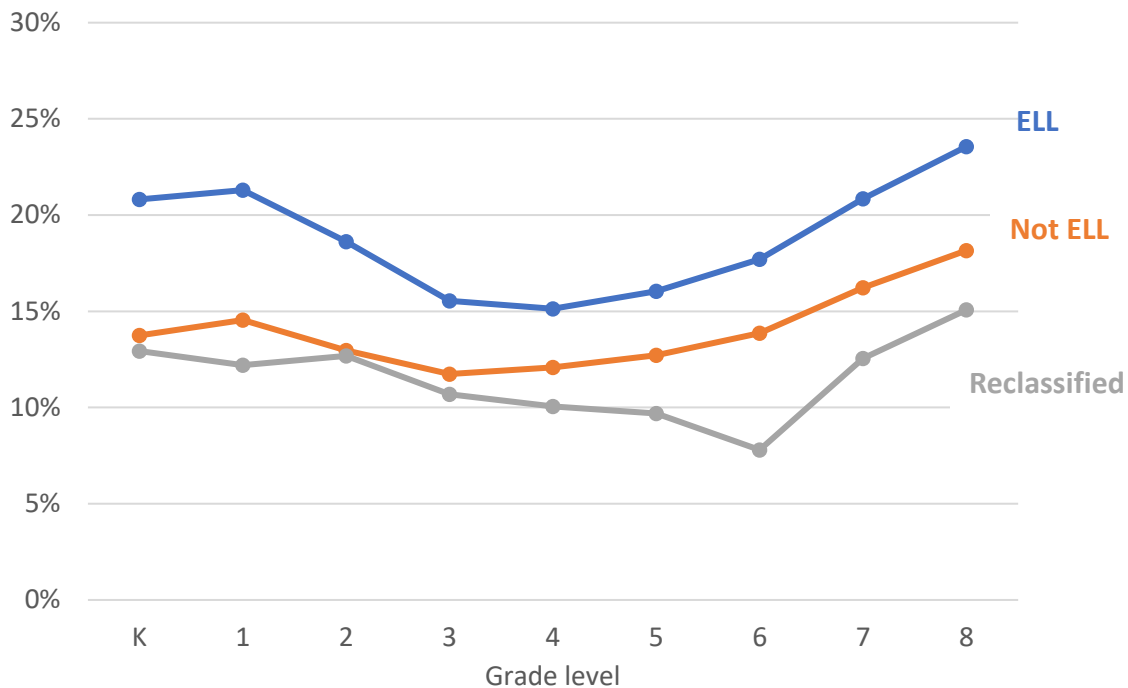n students with an ELL need who have withdrawn from ELL services. Students with a grade of Ungraded Elementary are not included in the estimates. The analysis population included 772, 014 students in grades K through 8.

American Indian or Alaska Native students were far more likely to be chronically absent than their peers.

As shown in figure 9, chronic absenteeism varies by student racial/ethnic groups. American Indian or Alaska Native students had the highest rates of chronic absence across grades K–8,[10] reaching about a quarter in grades 3, 4, and 5 and about a third in grades 7 and 8. Hispanic or Latino students and Black/African American students also showed higher rates of chronic absence than White students and Asian students in the elementary grades. While the rates for Hispanic or Latino students decreased from 18 percent in kindergarten across the elementary grades, they increased in the middle school grades, reaching 21 percent. The rates for Black/African American students stayed stable over the K–8 grades, peaking at 16 percent both at kindergarten and grade 8. In contrast, chronic absence rates for White students were stable at about 9 percent across the elementary grades but ticked up in the middle school grades, narrowing the gap by grade 8 with Hispanic or Latino and Black/African American students and reaching 15 percent. The rates of chronic absence for Asian students were consistently lower than for their peers and, in contrast to other racial/ethnic student groups, they declined in the middle school grades, shifting from 8 percent in kindergarten and grade 1 to 4 percent in grades 7 and 8. By grade 8, the gap between racial/ethnic groups with the highest and lowest rates of chronic absence was 29 percentage points.

Figure 9. Chronic Absence by Grade Level by Race/Ethnicity, 2018–19
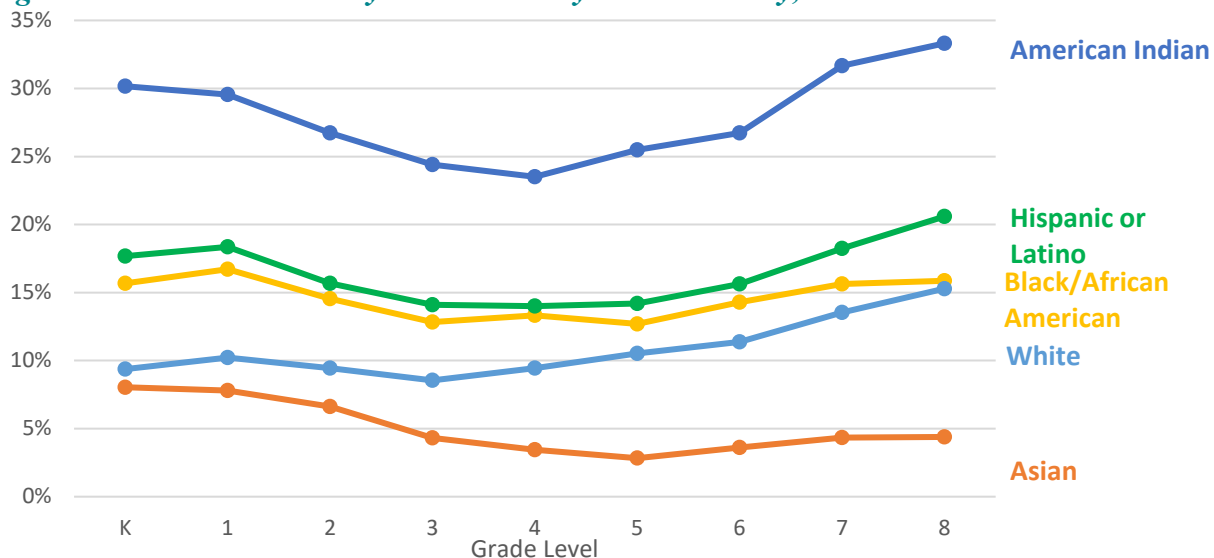
Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: Students with a grade of Ungraded Elementary and students with a race-ethnicity of *Multiple Races*, *Native Hawaiian or Pacific Islander*, and *Unknown* are not presented in the chart. The analysis population included 729, 919 students in grades K through 8.

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[10] U.S. Department of Education. (2017). *Chronic absenteeism in the nation's schools: A hidden educational crisis.* Retrieved from https://www2.ed.gov/datastory/chronicabsenteeism.html

Mobile students, those who changed school at least once during the school year, were more likely to be chronically absent than students who remained in the same schools throughout the year.

Changing schools during a school year is associated with a number of academic and social-emotional disruptions and adverse outcomes, including affecting daily attendance. As figure 10 shows, mobile students had higher rates of chronic absence than students who remained in the same school for the entire school year. During the elementary grades, the gap in chronic absence rates between mobile students and those who did not change schools during the year was only 1 or 2 percentage points, with rates for mobile students consistently at about 16 percent. By the middle grades these rates increased, especially for mobile students, with the gap widening by 6 percentage points in grade 8. In the year before entering high school, about a quarter (24 percent) of mobile students were identified as chronically absent.

The alternative definition for determining chronic absence accounts for days absent across all schools of enrollment, which is particularly relevant for students who changed schools. While the alternative definition only added about 1 percentage point to the statewide annual estimates of chronic absence (see figure 1), figure 10 clearly indicates that for mobile students chronic absenteeism increases by about 5 percentage points, reaching 29 percent for these students in grade 8.

Figure 10. Chronic Absence by Grade Level by Mobility, 2018–19
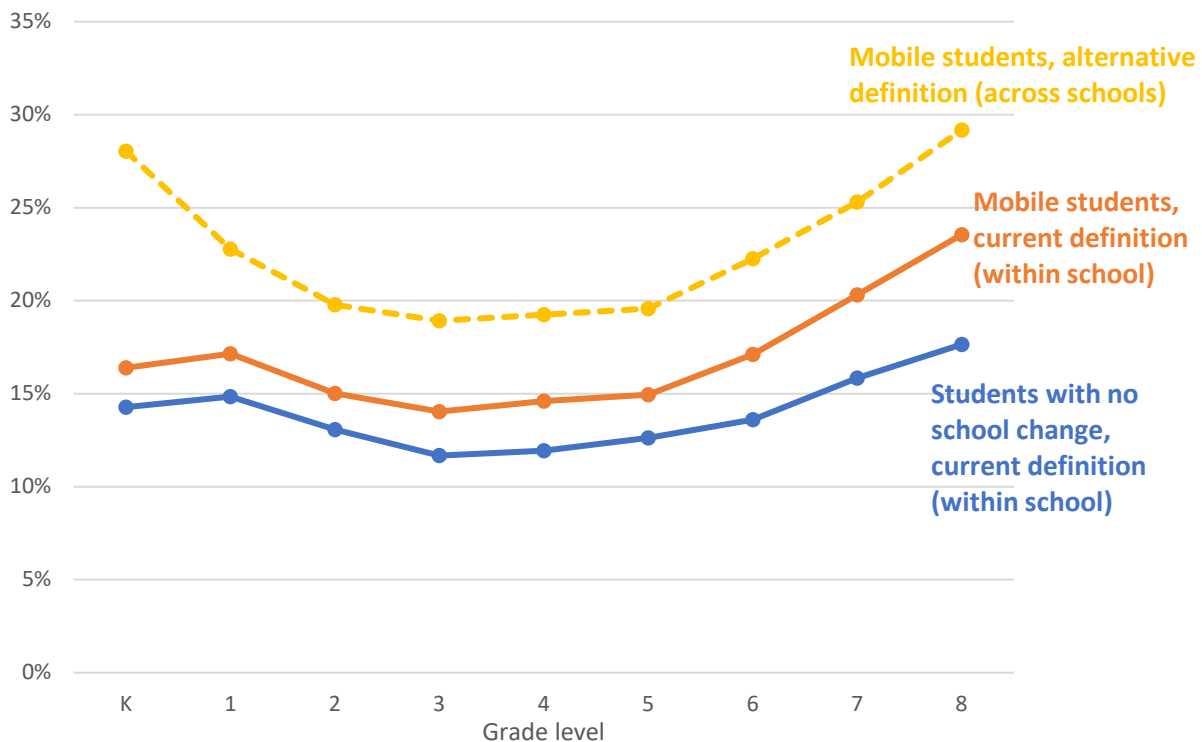
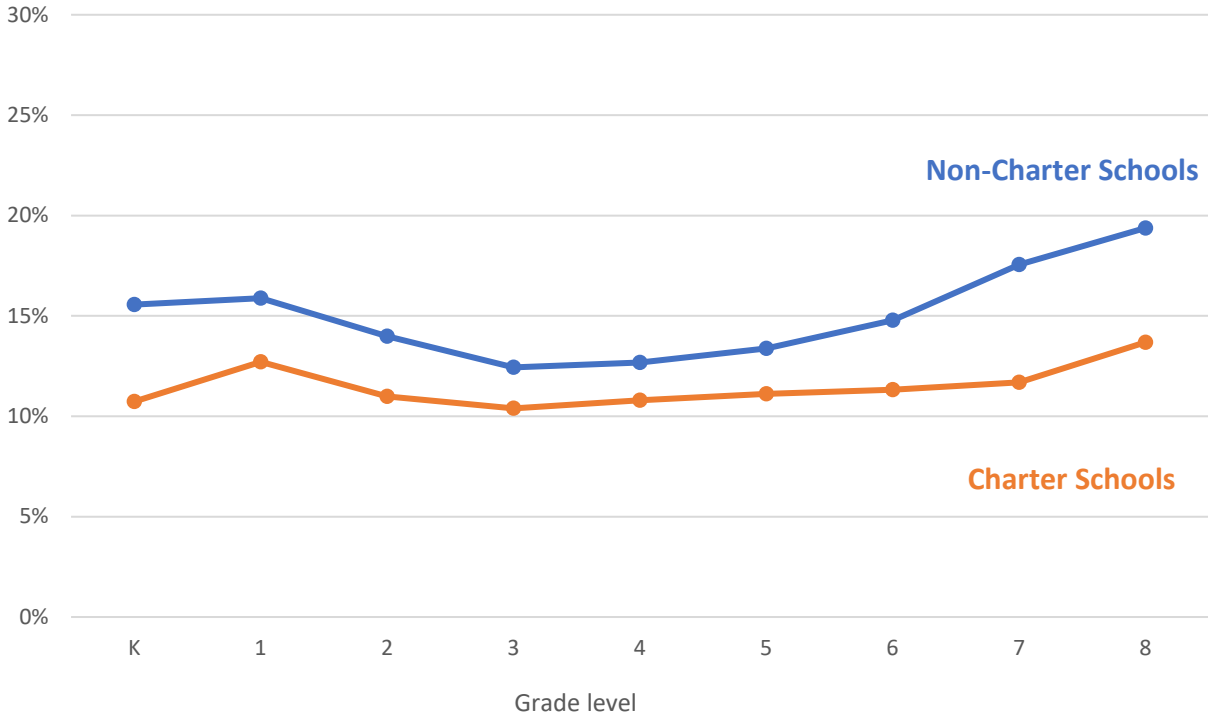**Source**: Authors' analysis based on Arizona Department of Education data described in Box 2.

Note: Students with a grade of Ungraded Elementary are not included in the estimates. The analysis population included 772, 014 students in grades K through 8.

Pre-COVID Chronic Absenteeism by School Characteristics, 2018–19

Students in charter schools had lower rates of chronic absence than students in other public schools.

Figure 11 shows that across K–8 grade levels, students in charter schools had lower rates of chronic absence than students in other schools. Rates for students in charter schools were about 11 percent until peaking in grade 8 at 14 percent. For students in non-charter schools, chronic absenteeism reached 19 percent in grade 8, 5 percentage points above their peers in charter schools. Aside from kindergarten, the difference in chronic absence rates between students in charter schools and students in other schools was greater in grades 7 and 8 (5 to 6 percentage points) than in elementary school (2 to 3 percentage points).

Figure 11. Chronic Absence by School Charter Status, 2018–19

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.

Note: Students with a grade of Ungraded Elementary are not included in the estimates. The analysis population included 771,899 students in grades K through 8 for whom the charter status of the school of enrollment was available.

Students enrolled in schools with a higher concentration of economically disadvantaged students showed higher rates of chronic absence than students in other schools.

The chronic absence rates across all K–8 grades differed with the school level of concentration of economically disadvantaged students. Figure 12 shows that students in schools with higher rates of students living in poverty (more than 52 percent) were chronically absent more frequently than those students in schools with lower rates of economic hardships. Rates of chronic absence were similar for students in schools with concentrations of economically disadvantaged students in the two lowest quartiles (below the median of 52 percent). However, for students enrolled in schools with the highest concentration of students living in poverty (83 percent or more), chronic absence rates were highest and reached nearly a quarter (24 percent) of students in grade 8.

Figure 12. Chronic Absence by School Concentration of Students Classified as Economically Disadvantaged, 2018–19
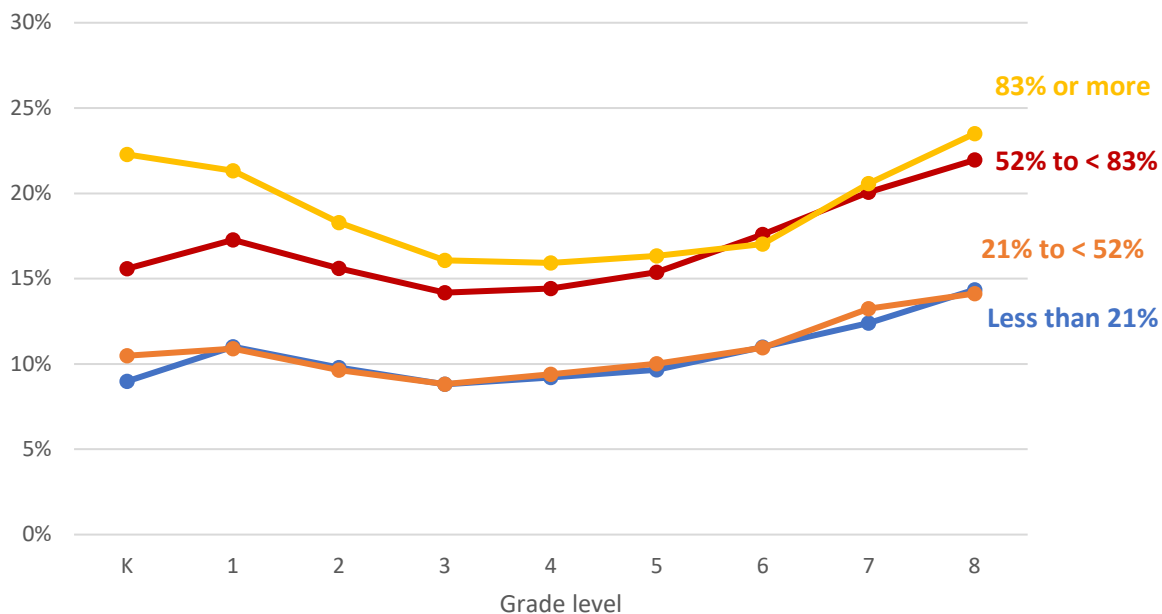

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: Students with a grade of Ungraded Elementary are not included in the estimates. The analysis population included 772, 014 students in grades K through 8.

Students enrolled in alternative or special education schools showed higher rates of chronic absence than students in other schools, especially in the elementary grades.

While enrolling only a very small share of the state's students (less than 1 percent), students enrolled in alternative or special education schools were more likely to be chronically absent than students in other schools, especially throughout the elementary grades (figure 13). In middle school, the difference in chronic absence rates decreased regularly, reducing the gap between alternative or special education schools (21 percent) and other schools (18 percent) to only 3 percentage points.

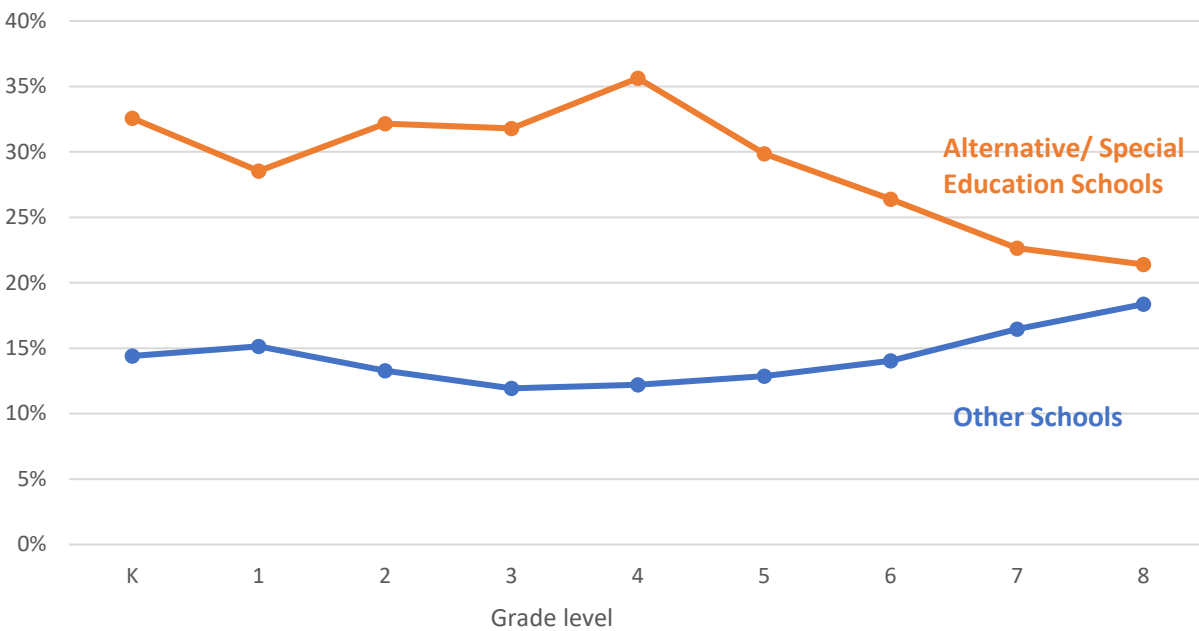### Figure 13. Chronic Absence by School Type, 2018–19

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: Students with a grade of Ungraded Elementary are not included in the estimates. The analysis population included 771,899 students in grades K through 8 for whom school type was available.

Small schools had higher rates of chronic absence in elementary grades but there were little differences in chronic absence by school size in the middle grades.

Students enrolled in small schools had higher chronic absence rates than other students in the elementary grades. The percentage of chronically absent students were higher by about 5 percentage points in small schools (less than 300 students). In middle school, the rates regardless of size reached about 18 percent (figure 14).

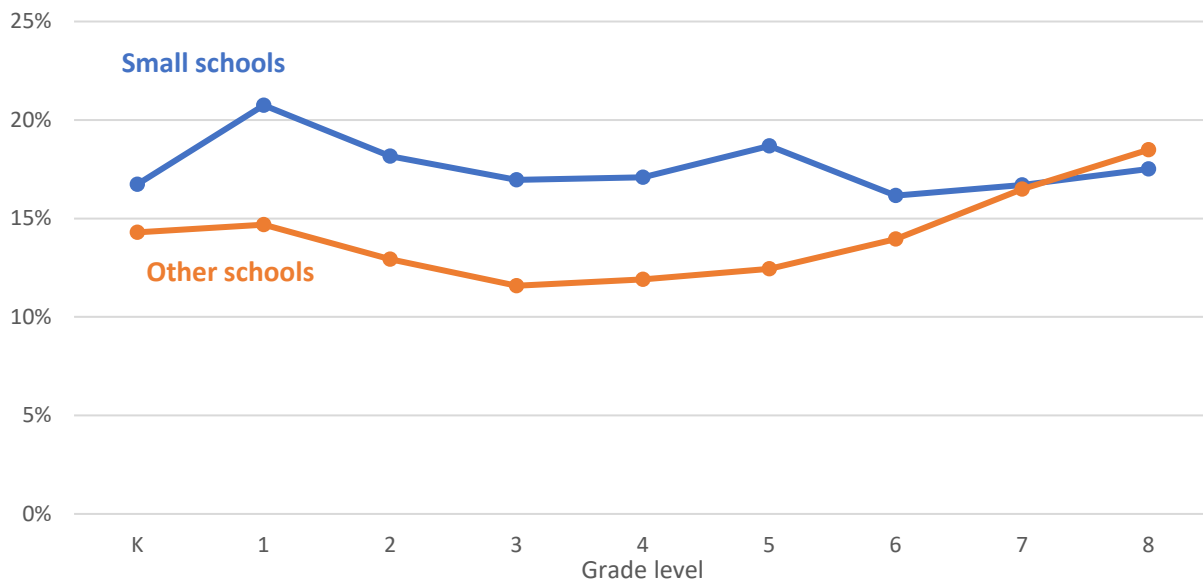### Figure 14. Chronic Absence by School Size, 2018–19

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: Students with a grade of Ungraded Elementary are not included in the estimates. The analysis population included 772, 014 students in grades K through 8.

Students in suburban schools had the lowest rates of chronic absence and students in rural schools had the highest rates.

Figure 15 shows notable differences in chronic absenteeism by geographic location, with the highest rates in rural schools and the lowest rates in suburban schools. Across the K–8 grade levels, the rates trended similarly regardless of location type. Specifically, rates declined from grades 1 to 3 and increased from grades 4 to 8. For each location type, rates peaked in grade 8 at 15 percent for suburban schools, 19 percent for city schools, and 21 percent for rural schools.

Figure 15. Chronic Absence by School Urbanicity, 2018–19
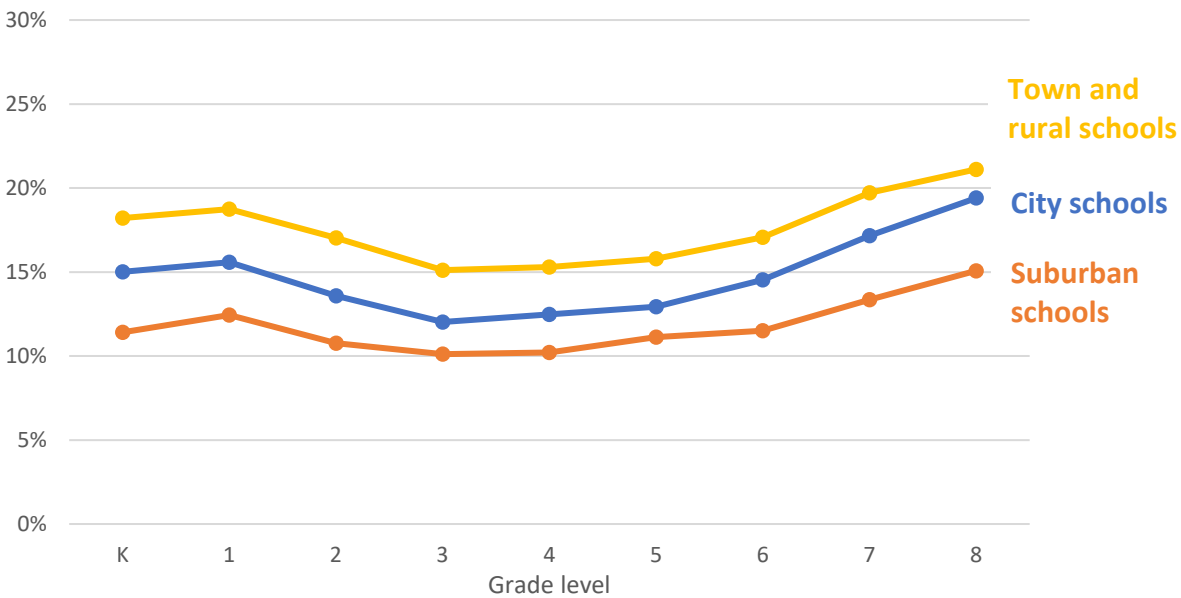

Source: Authors' analysis based on Arizona Department of Education data and NCES data described in Box 2.

Note: Students with a grade of Ungraded Elementary are not included in the estimates. The analysis population included 770,897 students in grades K through 8 for whom school urbanicity was available.

Another way to depict chronic absenteeism in Arizona is to visually map chronic absence rates (from higher to lower) across all of the school districts in the state. There were notable and patterned differences, and map 1 offers both a geo-spatial description of chronic absenteeism during the 2018–19 school year and at-a-glance comparisons of rates across the state.

Large areas of the state show school districts with rates of chronic over 20 percent, the highest-level category statewide. These are primarily rural districts in the northeast and northwest corners of Arizona, and many are located on the Navajo Nation or Hopi land. Some of these districts reported over 30 percent chronic absenteeism. The towns of Nogales and Agua Prieta along the southern border also had similarly high rates of chronic absence.

Rates in the state's main urban centers were more varied, including some areas with relatively lower rates and other areas with relatively higher rates. As a geographic region, the districts in the Phoenix metroplex generally had lower rates of chronic absence than the districts in the Tucson and Flagstaff areas. Several districts around Flagstaff, in particular, reported chronic absence rates above 15 percent, the state average in 2019.

In contrast, school districts in the center of the state generally reported lower percentages of chronically absent students. Most districts in these areas reported rates of chronic absence below 15 percent and many reported rates below 9 percent.

Map 1. Map of District Rates of Chronic Absence, 2018–19

Legend:
- More than 20%
- > 15% – 20%
- > 11% – 15%
- > 9% – 11%
- 9% or less
- No data or masked
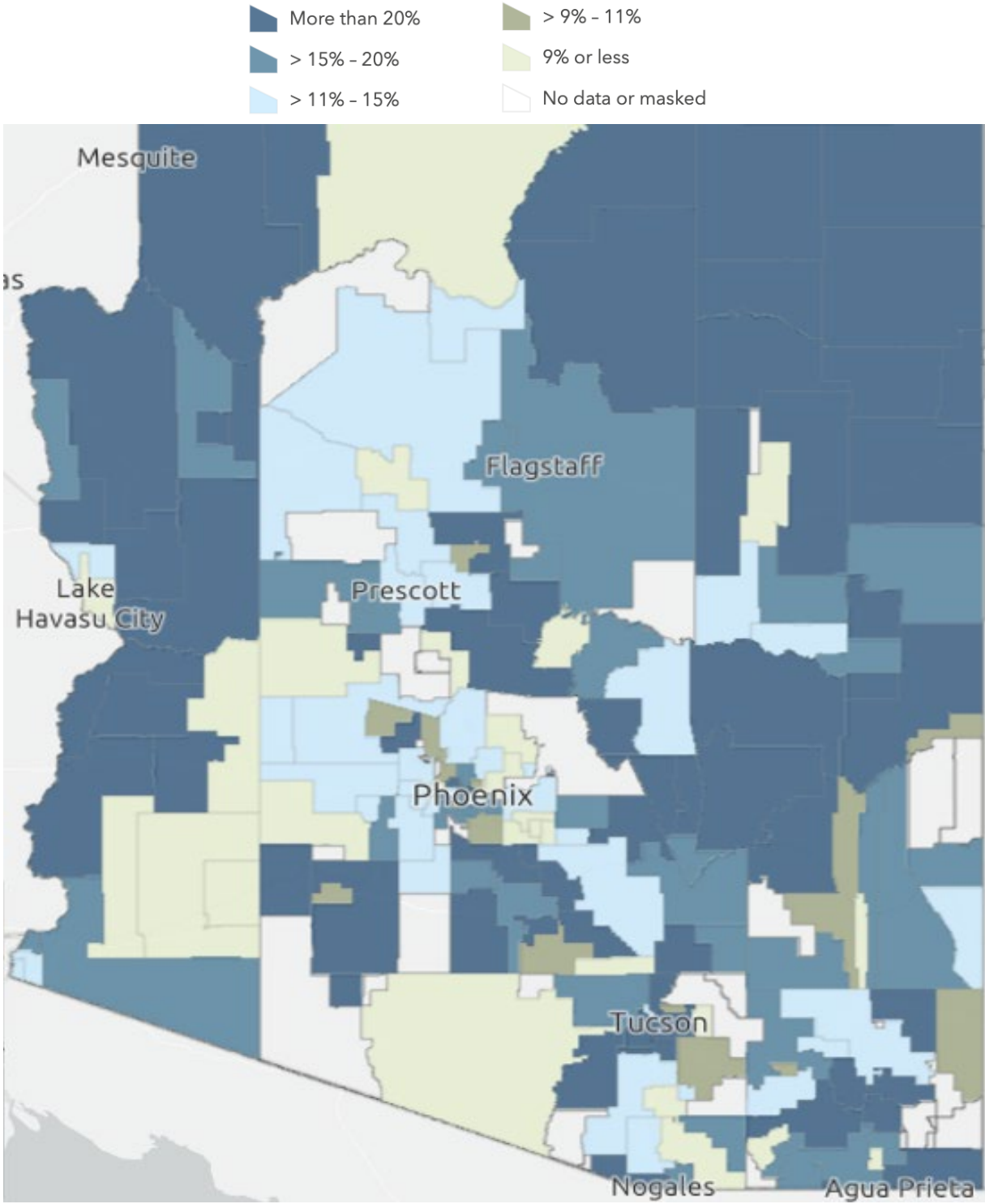
Source: Authors' analysis based on Arizona Department of Education and National Center for Education Statistics data described in Box 2.

Note: Include data for 187 public school districts serving students in grades K through 8. Chronic absence rates are not reported for any district with fewer than 10 enrolled students. Charter districts are not included in the map.

The suburban areas fared the best. Many districts reported chronic absence rates of less than 9 percent. In general, rates of chronic absence tended to decrease moving away from the urban centers, such as Phoenix and Tucson, but to increase moving towards the more rural areas.

These geographical observations both corroborate the findings from the analysis of chronic absence rates by the student and school characteristics above and are supported by trends of chronic absence identified in the existing literature. National data identify Native students (American Indian or Alaska Native and Native Hawaiian or other Pacific Islander) as the racial/ethnic student groups with the highest rates of chronic absence.[11] These students may face distinct challenges in attending school, leading them to miss more school in relation to their peers. Students in rural districts are also reported to be at higher risk of chronic absence than their peers in urban or suburban districts.[12]

Variations in Chronic Absence at the School and District Levels

Beyond focusing on a few school or district characteristics, Arizona leaders are interested in better understanding what proportion of the variation in chronic absence among students might be related to school or district differences. The rationale for distinguishing chronic absence rates based on the school and district of enrollment is that students at the same school might be more similar to each other than they are to students from another school. Similarly, students at different schools but within the same district might be more similar to each other than they are to students from another district. The reasons for within-school or within-district similarities could be that the institutions either enroll demographically similar students or that they share similar policies and practices regarding attendance. This study used a Hierarchical Linear Model framework, with students nested in schools that are in turn nested in districts, to estimate the degree to which variance at the student level depends upon school and district group membership (See additional details in the appendix).

Most of the variation in chronic absence was attributable to student, not school or district, differences.

Because a certain number of districts in Arizona have only one school, we estimated two different models on the last pre-pandemic year (2019) to examine the variability of chronic absence at the institution levels: 1) a two-level model with students nested in schools for all students in the population, and 2) a three-level models with students nested in schools in turn nested in districts for students enrolled in multi-site districts.[13]

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[11] Cortiella, C., & Boundy, K. B. (2018). Students with Disabilities & Chronic Absenteeism. NCEO Brief. Number 15. *National Center on Educational Outcomes*.

[12] Hammond, B. (2014, February 6). Empty desks: Oregon's absenteeism epidemic. The Oregonian. Retrieved from http://www.oregonlive.com/absent/index.html

[13] Among the 772,014 students enrolled in 1,654 schools and 572 districts in Arizona, 653,560 students were enrolled in multi-site district enrolling 10 or more students.

Table 1 reports the intraclass correlation coefficients (ICC) that can be interpreted as the proportion of variance in chronic absence accounted by schools or districts' differences.[14] The ICCs are reported for the two- and three-level models of chronic absence.

Table 1. Intraclass Correlation Coefficients Estimates for Two- and Three-Level Unconditional Models of Chronic Absence

Levels	Sample	Covariance Estimate (district)	Covariance Estimate (school)	ICC, district-level	ICC, School-level
2	All schools (N= 772,014)		0.71**		22%
3	Students enrolled in multi-site districts (N = 653,560)	0.32**	0.31**	10%	9%

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: The dependence at the higher levels can be assessed through the intraclass correlation coefficient (ICC). The ICC ranges from 0 to 1.0 and estimates the proportion of the total variance that depends upon group membership (See appendix for additional details).

Table 1 shows that 22 percent of the variation in chronic absence rates for all students was accounted at the school level, leaving 78 percent to be accounted at the student level. Similarly, for students enrolled in multi-site districts, 10 percent of the variation in chronic absence rates was accounted at the district level. Another 9 percent was accounted at the school level, representing 19 percent at the level of schools nested within districts, which leaves 81 percent to be accounted at the student level.

In both models, the variations in chronic absence were statistically significant at the school and district levels. However, a larger part of the variation (about 78 to 81 percent) in chronic absence was among students in the same schools, highlighting large gaps in attendance between students in the same schools.

[14] Snijders, T. A. B., & Bosker, R. J. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling.* Thousand Oaks: Sage Publishing.

Student and School Characteristics Related to Chronic Absence

Chronic absence is related to many student and school factors. To examine the relationships between chronic absence and student and school characteristics in an overarching way, and to quantify the relationships between those characteristics and chronic absence, the study predicted the probabilities of being identified as chronically absent for each student using simultaneously the student and school characteristics previously examined.[15] These probabilities were estimated at two important transition grades: at the end of elementary school (grade 5, with one of the lowest chronic absence rates) and the end of middle school (grade 8, with one of the highest chronic absence rates).

Predicted probabilities of chronic absence were higher in grade 8 than in grade 5.

Overall, the predicted rate of chronic absence for an average student attending an average school was 12 percent in grade 5 and 16 percent in grade 8 (figure 16). Higher rates of chronic absence in grade 8 were documented for all student groups, although the differences were larger between these groups in grade 5 than in grade 8.

American Indian or Alaska Native students, economically disadvantaged students, and special education students had the highest rates of chronic absence.
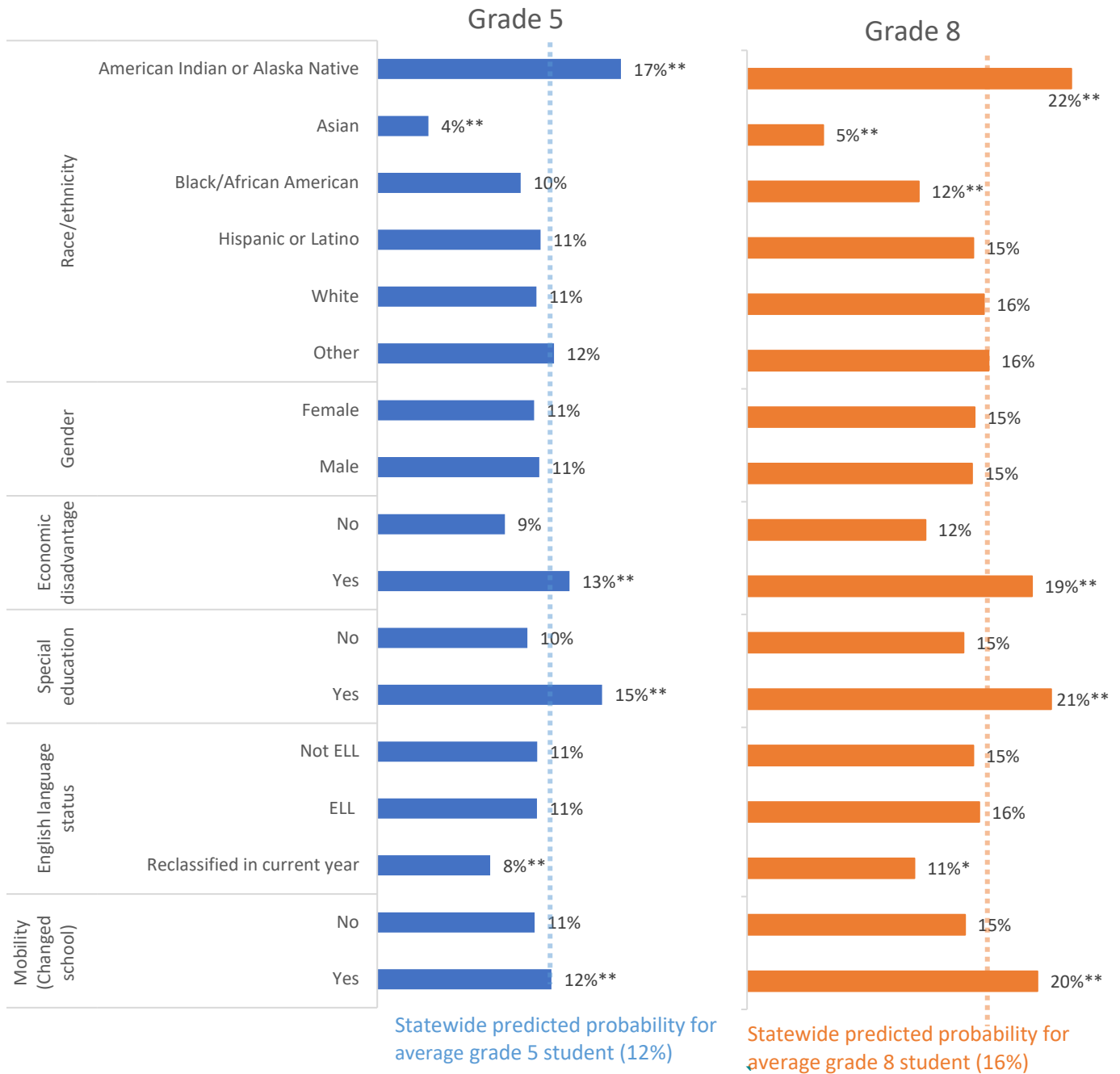
After other differences in student and school characteristics were accounted for, American Indian or Alaska Native students had significantly higher chronic absence rates in grades 5 and 8 (17 percent and 22 percent, respectively) than other student groups and Asian students had significantly lower rates in both grades (4 percent and 5 percent, respectively) than their peers.[16] In grade 5, the chronic absence rates for Black/African American, and White students stayed within a couple of percentage points and were not significantly different from each other. However, in grade 8, chronic absence rates for Black/African American students became significantly lower than their Hispanic or Latino or White peers while they were still much higher than the rates for Asian students.

There was no significant difference by gender, however, significantly higher rates of chronic absence were documented for special education students and economically disadvantaged students in both grades 5 and 8. At 15 percent in grade 5 and 21 percent in grade 8, the rates of chronic absence of special education students were among the highest of any student group.

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[15] We used a two-level hierarchical model that included of a random school effect as well as the student and school characteristics previously examined for all students in an Arizona school in 2019.

[16] Each predictor was centered on its grand mean — the average proportion of each demographic characteristic in the analytic sample. Therefore, the probability reported for a given characteristic corresponds to the probability of an average student — a student with average demographic characteristics at an average school — to be identified as chronic absent.

Figure 16. Predicted Probabilities by Student Characteristics

Grade 5

Category		Probability
Race/ethnicity	American Indian or Alaska Native	17%**
	Asian	4%**
	Black/African American	10%
	Hispanic or Latino	11%
	White	11%
	Other	12%
Gender	Female	11%
	Male	11%
Economic disadvantage	No	9%
	Yes	13%**
Special education	No	10%
	Yes	15%**
English language status	Not ELL	11%
	ELL	11%
	Reclassified in current year	8%**
Mobility (Changed school)	No	11%
	Yes	12%**

Statewide predicted probability for average grade 5 student (12%)

Grade 8

Category		Probability
Race/ethnicity	American Indian or Alaska Native	22%**
	Asian	5%**
	Black/African American	12%**
	Hispanic or Latino	15%
	White	16%
	Other	16%
Gender	Female	15%
	Male	15%
Economic disadvantage	No	12%
	Yes	19%**
Special education	No	15%
	Yes	21%**
English language status	Not ELL	15%
	ELL	16%
	Reclassified in current year	11%*
Mobility (Changed school)	No	15%
	Yes	20%**

Statewide predicted probability for average grade 8 student (16%)

** Significant at p = .01. ; * significant at p = .05. Indicates categories significantly different from other categories in the same variable. For variables with multiple categories, pairwise comparisons were calculated with a Tukey-Kramer correction for multiple comparisons. Variables with no categories associated with a starred probability were not significant at p = .05, e.g., gender.

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.

Note: ELL stands for English language learner. The average student probability corresponds to the probability of an average student at an average school being classified as chronically absent. Populations of analysis included were 90,052 students in grade 5 and 88,390 students in grade 8.

In both grades 5 and 8, there was no difference in chronic absence rates between English language learner students and non-English language learner students; however, in both grades students who were reclassified in the current year showed significantly lower rates of chronic absence than their peers.
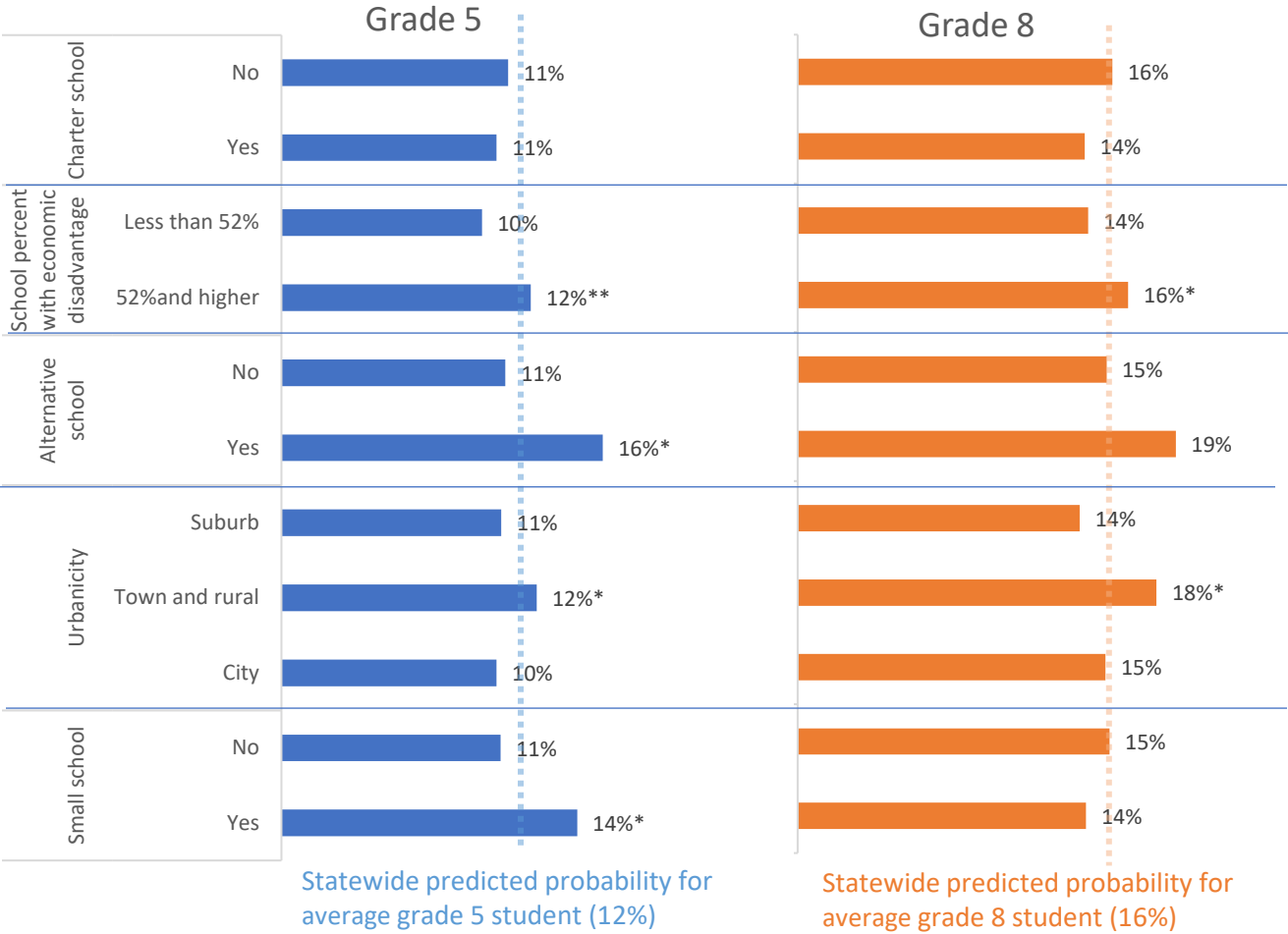
Finally, mobility was significantly related to higher chronic absence rates with a small difference at the end of elementary school increasing to a 5-percentage point difference in grade 8. At the end of middle school, students who changed schools during the school year had a chronic absence rate of 20 percent, one of the highest of any student group.

While differences in chronic absence rates were smaller across school characteristics, students enrolled in rural schools and schools with high concentrations of poverty were more likely to be chronically absent.

Figure 17 shows that in grade 5, an average student enrolled in an alternative school or a small school had significantly higher rates of chronic absence than other students (16 percent and 14 percent, respectively).

The school concentration of students at an economic disadvantage and urbanicity (attending a rural school) were also significantly related to higher chronic absence rates even if the difference in predicted probabilities were small. In grade 8, only a high concentration of students at an economic disadvantage and attending a rural school were significantly related to higher rates of chronic absence and higher differences in the predicted probabilities.

Figure 17. Predicted Probabilities by School Characteristics

Grade 5

Charter school	
No	11%
Yes	11%

School percent with economic disadvantage	
Less than 52%	10%
52% and higher	12%**

Alternative school	
No	11%
Yes	16%*

Urbanicity	
Suburb	11%
Town and rural	12%*
City	10%

Small school	
No	11%
Yes	14%*

Statewide predicted probability for average grade 5 student (12%)

Grade 8

Charter school	
No	16%
Yes	14%

School percent with economic disadvantage	
Less than 52%	14%
52% and higher	16%*

Alternative school	
No	15%
Yes	19%

Urbanicity	
Suburb	14%
Town and rural	18%*
City	15%

Small school	
No	15%
Yes	14%

Statewide predicted probability for average grade 8 student (16%)

** Significant at *p* = .01. ; * significant at p = .05. Indicates categories significantly different from other categories in the same variable. For variables with multiple categories, pairwise comparisons were calculated with a Tukey-Kramer correction for multiple comparisons. Variables with no categories associated with a starred probability were not significant at p = .05 (e.g., charter school).

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.

Note: The average student probability corresponds to the probability of an average student at an average school being classified as chronically absent. Populations of analysis included were 90,052 students in grade 5 and 88,390 students in grade 8.

Preliminary 2021 Chronic Absence Trends for Vulnerable Student Groups

To better understand the preliminary 2021 chronic absence trends, the analysis follows the cohort of students enrolled in grade 5 in 2019 and reports their chronic absence rates in 2021, in grade 7. Numbers for the cohort of students enrolled in grade 5 in 2017 and still enrolled in an Arizona public school in grade 7 in 2019 are provided as a comparison point.[17]

While chronic absence rates increased by 5 percentage points from grade 5 to grade 7 from 2017 to 2019, they doubled for the same grades from 2019 to 2021.

As seen in previous sections of this report, the rates of chronic absence increased from grade 5 to grade 7. Overall, the chronic absence rate for grade 5 students in 2017 was 11 percent and it increased to 16 percent when those students were in grade 7 in 2019. Pre-pandemic, the chronic absence rate for grade 5 students in 2019 was 13 percent and it doubled to 26 percent when those students reached grade 7 post-pandemic in 2021.

Figure 18. Percent of Students Chronically Absent in Grade 5 and Grade 7, from 2017 to 2019 and 2019 to 2021
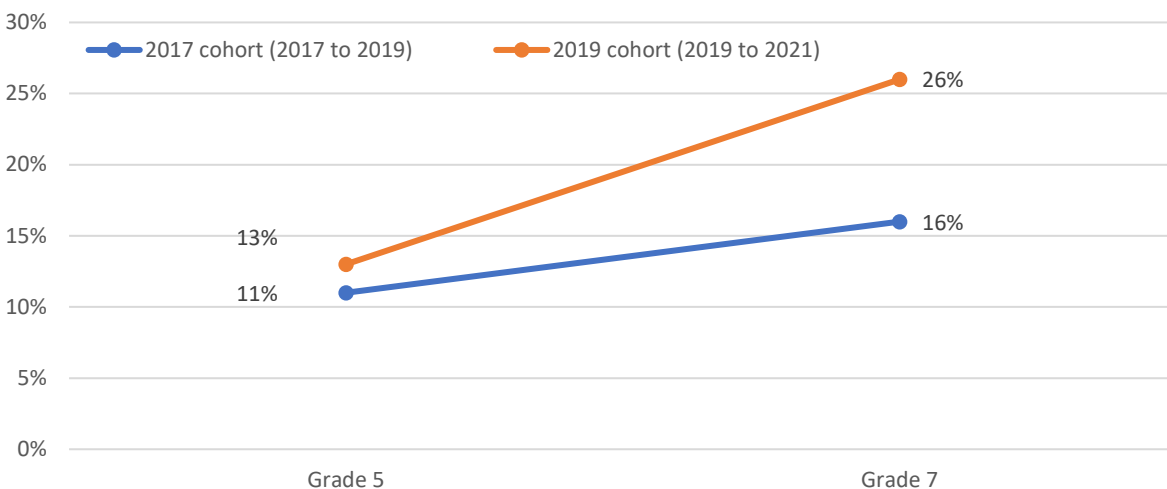
Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: Populations of analysis included 79,832 students in grade 5 in 2017 and grade 7 in 2019 for the 2017 cohort and 81,322 students in grade 5 in 2019 and grade 7 in 2021 for the 2021 cohort.

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[17] Most of the cohort of 2017 grade 5 students and most of the cohort of 2019 grade 5 students (91 percent) were again enrolled in Arizona public schools two years later. This suggests that the pandemic did not significantly impact enrollment and progress for grade 5 students.

Specific student characteristics were examined since these student groups were especially vulnerable to higher rates of chronic absence such as students chronically absent in grade 5, economic disadvantage, special education status, English language learner status, and race/ethnicity.

Chronic absence in grade 5 was highly predictive of chronic absence in grade 7.

Over half of the students in both the 2017 and 2019 cohorts who were chronically absent in grade 5 were also chronically absent in grade 7, and this was consistent before the pandemic and during recovery from the pandemic (figure 18). The chronic absence rate of grade 7 students who were also chronically absent in the 2017 grade 5 cohort is 57 percent, one of the highest rates reported in Arizona but it did not worsen over the pandemic years for the 2019 cohort of grade 5 students (56 percent). In contrast, the grade 7 chronic absence rate for students who were not chronically absent in grade 5 was 12 percent for the 2017 cohort but increased significantly to 22 percent in 2021 for the 2019 cohort, suggesting an increased expansion of chronic absence in grade 7 among students with no previous history of chronic absence in grade 5.

Figure 19. Percent of Students Chronically Absent in Grade 7 by Chronic Absence Status in Grade 5, 2019 and 2021
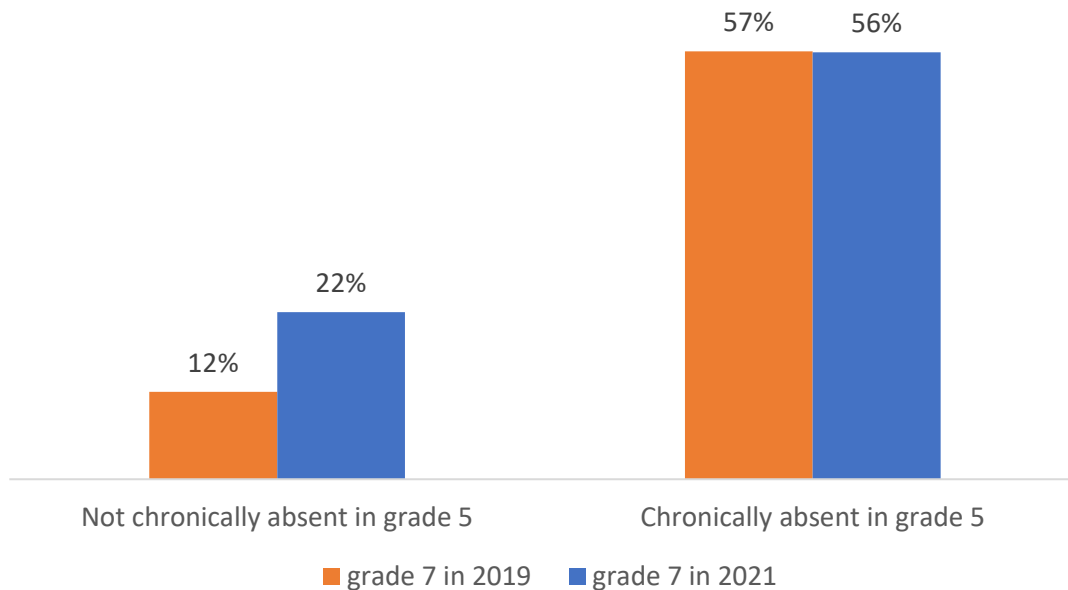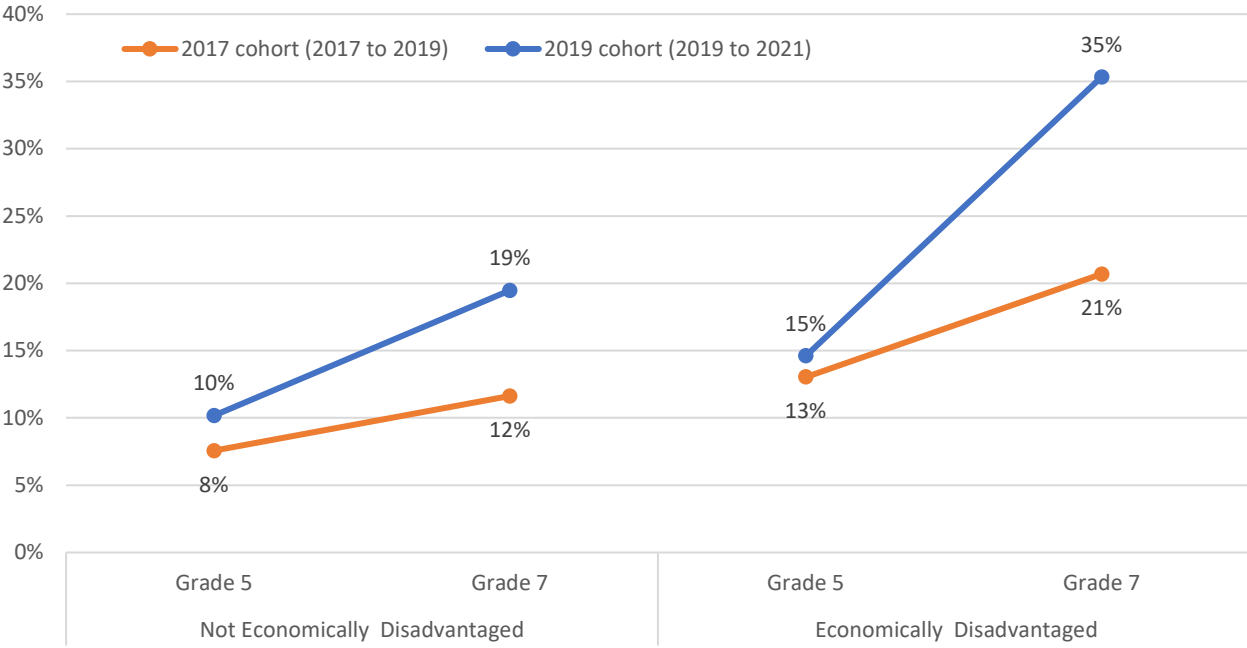

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: Populations of analysis included 79,832 students in grade 5 in 2017 and grade 7 in 2019 for the 2017 cohort and 81,322 students in grade 5 in 2019 and grade 7 in 2021 for the 2021 cohort.

While the rates of chronic absence increased for all student groups, students classified as economically disadvantaged were more strongly impacted.

For the 2017 grade 5 cohort, figure 19 shows chronic absence rates increased from 8 percent in grade 5 to 12 percent in grade 7 for students not classified as economically disadvantaged and from 13 percent to 21 percent for their economically disadvantaged peers. This suggests an aggravation of the gap in chronic absence rates between economically disadvantaged students and their peers in middle school. For the 2019 grade 5 cohort, the increase in chronic absence rates was sharper for both groups during the pandemic than for the 2017 cohort, with a particularly dramatic increase for students classified as economically disadvantaged (from 15 percent to 35 percent).

Figure 20. Percent of Students Chronically Absent in Grade 7 by Economic Disadvantage Status in Grade 5, 2017 and 2019 Grade 5 Cohorts
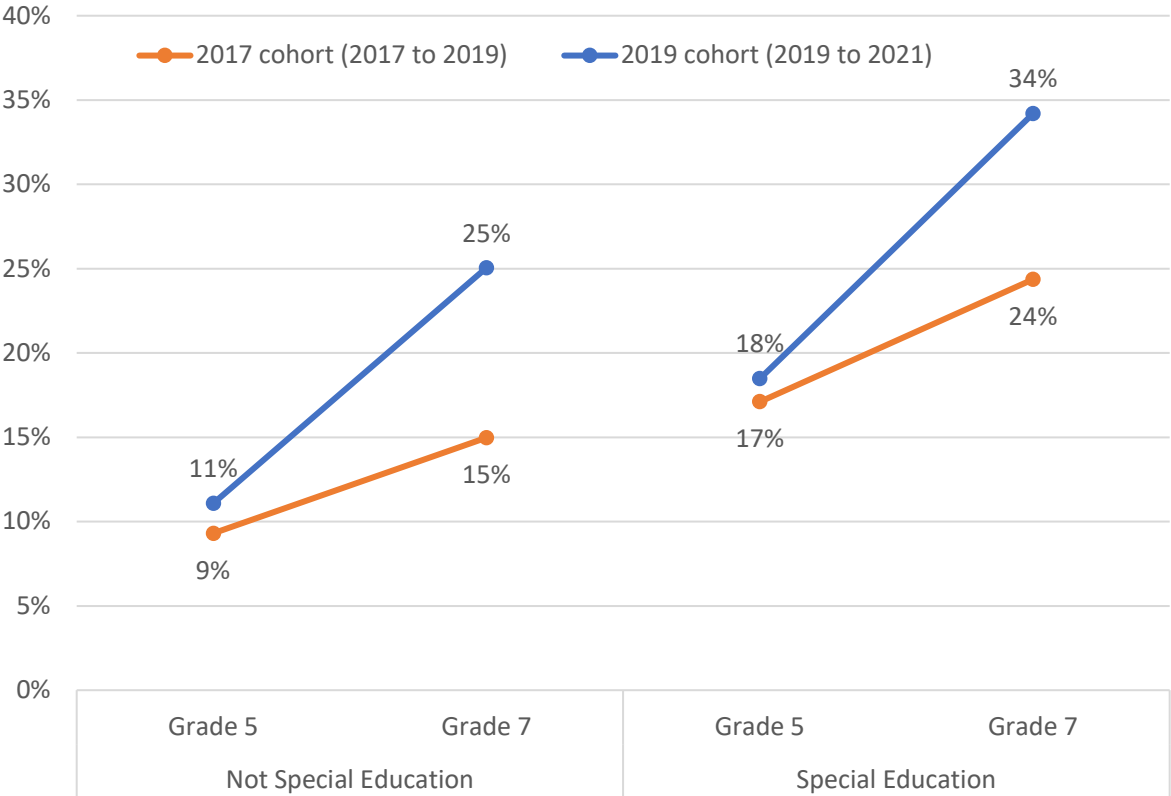

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.

Note: Populations of analysis included 79,832 students in grade 5 in 2017 and grade 7 in 2019 for the 2017 cohort and 81,322 students in grade 5 in 2019 and grade 7 in 2021 for the 2021 cohort.

While the rates of chronic absence for special education students increased sharply during the pandemic, the increase was similar for students not receiving special education services.

Figure 20 show that the rates of chronic absence were higher for special education students than for peers not receiving special education services and increased by about 7 percentage points from grade 5 to grade 7 for the 2017 cohort, from 17 percent to 24 percent. The increase was sharper during the pandemic when rates increased by 16 percentage points for special education students and by 14 percentage points for their grade 7 peers who did not receive special education services. During the pandemic in 2021, chronic absence rates reached 34 percent in grade 7 for special education students compared to 25 percent for grade 7 students not receiving special education services.

Figure 21. Percent of Students Chronically Absent in Grade 7 by Special Education Status in Grade 5, 2017 and 2019 Grade 5 Cohorts
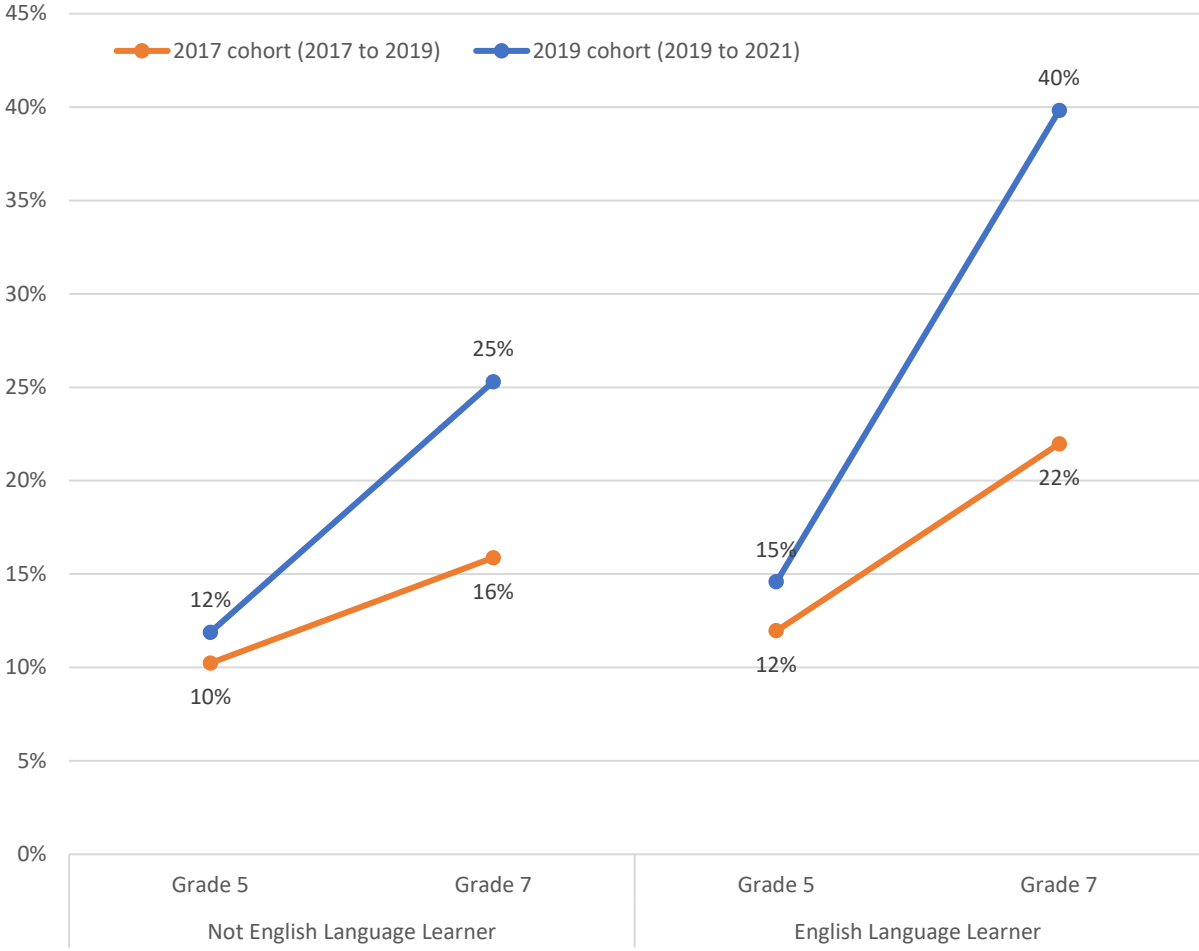

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.

Note: Populations of analysis included 79,832 students in grade 5 in 2017 and grade 7 in 2019 for the 2017 cohort and 81,322 students in grade 5 in 2019 and grade 7 in 2021 for the 2021 cohort.

The rates of chronic absence for English language learner students increased more sharply than for their non-English learner peers during the pandemic.

Chronic absence rates increased more than threefold during the pandemic years for English language learner students, climbing from 15 percent in grade 5 to 40 percent in grade 7 in 2021 (figure 21). In contrast, for English language learner students in the pre-pandemic 2017 grade 5 cohort, rates of chronic absence grew by 10 percentage points from 12 percent to 22 percent in grade 7. Chronic absence rates also increased sharply for the 2019 grade 5 cohort of students not classified as English language learner students, doubling from 12 percent to 25 percent.

Figure 22. Percent of Students Chronically Absent in Grade 7 by English Language Learner Status in Grade 5, 2017 and 2019 Grade 5 Cohorts
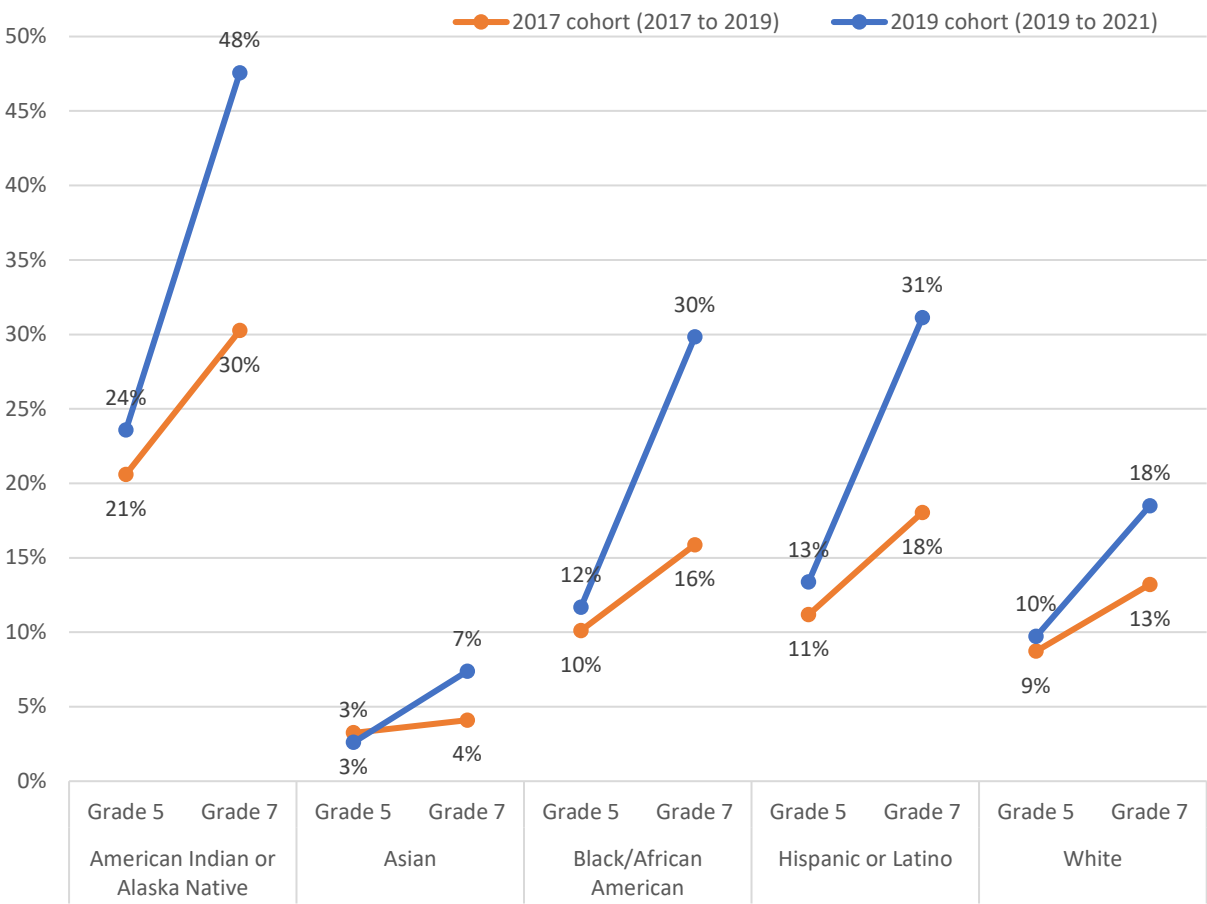

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: Populations of analysis included 79,832 students in grade 5 in 2017 and grade 7 in 2019 for the 2017 cohort and 81,322 students in grade 5 in 2019 and grade 7 in 2021 for the 2021 cohort.

The rates of chronic absence for American Indian or Alaska Native students, already high in 2019, increased and reached nearly 50 percent in grade 7 in 2021.

Figure 22 shows that chronic absence rates increased for all racial/ethnic groups during the pandemic, but that some groups in the 2019 grade 5 cohort experienced particularly sharp spikes by grade 7. Rate increases were sharpest for American Indian or Alaska Native students (24 percent to 48 percent), Black/African American students (12 percent to 30 percent), and Hispanic or Latino students (13 percent to 31 percent) by 2021. For Asian students and White students, the increases were steeper for the 2019 grade 5 cohort than for the pre-pandemic 2017 grade 5 cohort, but they stayed well below the grade 7 chronic absence rates of their American Indian, Alaska Native students, and Black/African American peers.

Figure 23. Percent of Students Chronically Absent in Grade 7 by Race/Ethnicity Status in Grade 5, 2017 and 2019 Grade 5 Cohorts

Source: Authors' analysis based on Arizona Department of Education data described in Box 2.
Note: Populations of analysis included 75,412 students in grade 5 in 2017 and grade 7 in 2019 for the 2017 cohort and 77,258 students in grade 5 in 2019 and grade 7 in 2021 for the 2021 cohort.

Conclusion

As elsewhere in the nation, Arizona schools face a challenge with too many students missing too much school. Even before the outbreak of the COVID-19 pandemic dramatically worsened rates for nearly all students, some student groups had rates of chronic absence that were already unacceptably and disproportionately high, undermining student academic success.

This study produced a clear picture of chronic absence in schools and districts across the state. Trends data show that during the atypical pandemic years, absenteeism spiked to over one in five Arizona students being chronically absent. But the data reveal so much more. They show these rates increased each month and peaked in grade 8, which is especially concerning given how critical it is for students to be well prepared for the academic rigors and social complexities of high school in order to be on track to graduate.

Prior to the pandemic, some student groups were missing too much school at much higher rates than their peers. Among those facing the most attendance barriers were economically disadvantaged students, special education students, English language learner students, and mobile students. Chronic absenteeism also varied widely among racial/ethnic groups, with American Indian or Alaska Native students consistently missing by far the most school across K–8 grades. A third of these students in grade 8 were chronically absent; grade 8 rates for Hispanic or Latino students and Black/African American students were also high, with over one in six students chronically absent.

Rural schools, small schools, schools with high concentrations of students living in poverty, and alternative or special education schools had higher rates of chronic absence than comparison schools. Those findings were corroborated by mapping chronic absence rates by district. Charter schools fared somewhat better than other public schools, especially during the key grade 8 year.

A small amount of the variation in chronic absence rates was attributable to school or district levels, but most of the variation in chronic absence was attributable to the student level. This suggests that practitioners and policymakers might want to investigate how to reduce gaps in chronic absence within schools in addition to increasing students' attendance levels overall.

A deeper statistical dive into absenteeism allowed us to consider all those factors simultaneously and confirmed that for American Indian or Alaska Native students, economically disadvantaged students, special education students, and mobile students in grade 8, rates were particularly high compared to their peers. The multivariate analysis also identified the concentration of

economically disadvantaged students and urbanicity schools (for rural schools) to be important factors to explain variability in chronic absence rates.

Based on these findings, Arizona leaders might choose to prioritize interventions that support student attendance in rural districts or districts with high percentages of Native American students. One strategy could be to learn from comparable districts in terms of student composition that could be faring better compared to their surrounding districts in their chronic absence rates. Further, the current definition for chronic absence in Arizona used for accountability purposes does not accurately reflect chronic absenteeism among students who change schools. With increased student mobility during the pandemic, the definition may need to be revisited to help districts target interventions to mobile students who accumulate absences across multiple schools.

The study also reveals a number of findings based on preliminary 2021 data, while students and schools continue to adapt to the uncertainty of the current pandemic conditions. For example, chronic absence in grade 5 is highly predictive of chronic absence in grade 7, and economically disadvantaged students, special education students, and English language learner students had sharper increases in chronic absence during the pandemic than other students, increasing the disparity between peers. And rates of chronic absence spiked highest during the pandemic for American Indian or Alaska Native students, with nearly half chronically absent in grade 7, followed by nearly a third of Hispanic or Latino students and Black/African American students again illuminating the widening gaps triggered by the pandemic.

These data are critically important for planning to improve attendance. They provide a baseline and a benchmark for state leaders to make well-informed decisions, to both plan for practical and effective attendance interventions and monitor progress once interventions are implemented. They also clarify which student groups have been hurt the most by lost learning opportunities and need the most support to recovery during these unprecedented times.

Appendix

This appendix describes the data sources, populations of analysis, definitions of measures and variables, and analysis methods for the study.

Data sources

The data for this study came from the Arizona Department of Education (ADE) sources. These included an October enrollment file for each year of the study, a fiscal enrollment file that included student demographic characteristics and school enrollment records, and the annual list of students identified as chronically absent. In addition, monthly absences data were obtained from ADE's School Finance data system. School characteristics, such as school charter status, were obtained from ADE school and districts lists; school type and school urbanicity were collected from the National Center for Education Statistics (NCES) Common Core of Data. All records were linked using unique student identification numbers and district and school identification numbers provided by ADE. School district boundaries for the 2018–2019 school year used for the map were obtained from the NCES Education Demographic and Geographic Estimate program.

Populations of analysis

The study population consisted, for each year, of all students enrolled in an Arizona public school in grades K to 8 who were included both in the fiscal enrollment file and in the October school census. This represented 773,653 students in 2017, 762,243 students in 2018, 772,573 students in 2019, 775,311 students in 2020, and 741,733 students in 2021, and was the population of study for the analysis of trends in chronic absence. To examine the pre-COVID-19 chronic absence rates by grade level and student and school characteristics in 2019, students with a grade of Ungraded Elementary were not included in the analysis so the population of analysis included 772, 014 students in grades K through 8. To examine student and school characteristics related to chronic absence, predicted probabilities were computed based on 2019 data for 90,052 students in grade 5 and 88,390 students in grade 8. Finally, to examine preliminary 2021 chronic absence trends, the analysis followed two cohort of students: 1) the cohort of students enrolled in grade 5 in 2019 to 2021, when those students were in grade 7 (79,832 students), and 2) the cohort of students enrolled in grade 5 in 2017 and grade 7 in 2021 (81,322 students).

Definitions of measures and variables

State chronic absence rates. Two alternative measures were defined to compute the statewide rates of chronic absence:

Within school statewide chronic absence rate. The statewide rate of chronic absence, SR, was computed as:

$$SR = \frac{Number\ of\ students\ flagged\ as\ Chronic\ Absent\ by\ ADE\ in\ at\ least\ a\ school}{Number\ of\ unique\ students\ in\ the\ population}$$

Across school statewide chronic absence rate. The alternative rate of chronic absence, SRA, was computed as:

$$SRA = \frac{Number\ of\ students\ flagged\ as\ Chronic\ Absent\ by\ ADE\ in\ at\ least\ a\ school\ \ OR\ missing\ 18\ days\ across\ schools}{Number\ of\ students\ unique\ students\ in\ the\ population}$$

In those two definitions, students were not double-counted if they were identified as chronically absent in two separate schools.

District chronic absence rates. For the research questions that examined chronic absence by school or district characteristics, a main school and district of reference were defined for each student in this study, including for those students who changed school within a school year. The school and district of reference were defined for each student with the following priorities:

1. School where the student is flagged as chronic absent by ADE,
2. If the student was not chronically absent, the school of enrollment as of October (as indicated in the October file). The definition of the school of reference defined the district of reference.

Once the school of reference was identified for each student, two alternative measures were defined for the districtwide rates of chronic absence:

Within school district chronic absence rate. The district rate of chronic absence, DR, was computed as:

$$DR = \frac{Number\ of\ students\ flagged\ as\ Chronic\ Absent\ by\ ADE\ in\ their\ school\ of\ reference}{Unduplicated\ number\ of\ students\ in\ the\ district}$$

Across school district chronic absence rate. The alternative rate of chronic absence, DRA, was computed as:

$$DRA = \frac{Number\ of\ students\ flagged\ as\ Chronic\ Absent\ by\ ADE\ in\ their\ school\ of\ reference\ \ OR\ missing\ 18\ days\ across\ schools}{Number\ of\ students\ enrolled\ in\ the\ district}$$

In those two district definitions, students were not double-counted if they were identified as chronically absent in two separate schools.

Days of absence. ADE's School Finance data included both full- and partial-days absences. Absences were added across schools so that no student could have more than one day of absence for a given calendar day, even in rare cases of dual enrollment where both schools counted the student absent. In addition, because kindergarten is counted as a half-day in most schools, a half-day absence was counted as a full-day absence just for that grade. As a result, kindergarten students did not need to miss 36 half school days to be declared chronic absent but 18 half days. Days of absence were only accrued from August to April of a given school year and as a result, might underestimate the actual days of absence.

Grade Level. In cases when a student had two enrollment records at his school of reference with different grades within a school year, the lower grade was kept for this analysis.

Student characteristics. Based on previous related literature that identified certain student characteristics as potentially associated with chronic absence, the study team included in the analysis the following student characteristics for which data were available in the ADE datasets:

- *Economic Disadvantage*. Indicates a family or individual economic need and includes foster children. Examples include annual income at or below the official poverty line, eligibility for free school lunch, eligibility for Aid to Families with Dependent Children and other public assistance programs, and eligibility for participation in programs assisted under Title I of the WIA. A student was classified as having an economic disadvantage for a school year if he was classified as economically disadvantaged at any point during the school year.
- *Special education (SPED) status*. Indicates that a student has a special education need. A student was classified as SPED for a school year if he was identified as SPED at any point during the school year.
- *English language learner (ELL) status*. ELL need is defined as any student with less than proficient overall proficiency level on the Arizona English Language Learner Assessment (AZELLA) in the current year. Six categories were available in the ADE data and were grouped for this analysis into the following 3 categories: 1) Not ELL, 2) Students reclassified in the current fiscal year, and 3) ELL students regrouping students with an ELL need enrolled or not in ELL services, and well as students withdrawn by parents or due to their SPED status. A student was classified as ELL for a school year if he was identified as ELL at any point during the school year.
- *Race/ethnicity*. Students identified as Native Hawaiian or Pacific Islander and Multiple Races were combined into the category Other because of small cell sizes.
- *Mobile students*. A mobile student is defined as a student who changed school within a school year.

For the cohort analysis, the student demographic characteristics corresponded to grade 5.

School characteristics. Based on previous related literature that identified certain school characteristics as potentially associated with chronic absence, the study team included in the analysis the following school characteristics for which data were available in the data sources:

- *Charter schools*. Based on ADE school charter status.
- *Alternative/Special education schools' status*. Based on ADE school type complemented by NCES Common Core of Data in case of missing information.
- *School percentage of students with Economic Disadvantage*. The school percentage of students with economic disadvantage was classified into quartiles of the school distribution weighted by student enrollment (first quartile = 21%, median = 52%, third quartile = 83%).
- *Small schools*. For this analysis, a small school refers to a school with less than 300 students in grades K–8.
- *School urbanicity*. School urbanicity was defined based on the school Locale variable from the NCES Common Core of Data that is composed of four basic types (City, Suburban, Town, and Rural) that each contains three subtypes. https://nces.ed.gov/programs/edge/docs/locale_classifications.pdf. The classification was grouped into 1) City, 2) Suburban, 3)Town and Rural.

Analysis methods

For most research questions, the study team calculated descriptive statistics on the rates of chronic absence for each group of students of interest using the chronic absence rate definitions described above. To examine the variability of the chronic absence rates at the school- and district-level and to estimate the predicted probabilities of being chronically absent for specific groups of students, the study team conducted a multilevel regression analysis using chronic absence as the dependent variable.

Multilevel regression analyses

Because students are nested within schools, the study team used a random intercept multilevel regression model.[18] The dependent variable, being chronically absent, was dichotomous, so hierarchical generalized linear models allowing for binary non-normally distributed responses were estimated, and the dependent variable was transformed using the logit link function.[19]

Two different models were estimated on the last pre-pandemic year (2019) to examine the variability of chronic absence at the institution levels: 1) a two-level model with students nested in schools for all students in the population, and 2) a three-level model with students nested in schools in turn nested in districts for students enrolled in multi-site districts.[20] The intraclass

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[18] Snijders, T. A. B., & Bosker, R. J. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling.* Thousand Oaks: Sage Publishing.

[19] Luke, D. A. (2004). Multilevel modeling. Sage.

[20] Among the 772,014 students enrolled in 1,654 schools and 572 districts in Arizona, 653,560 students were enrolled in multi-site district enrolling 10 or more students.

correlation coefficients derived from these models were used to examine what proportion of the variation in chronic absence might be related to school or district differences.

Next, to examine the relationships between chronic absence and student and school characteristics, and to quantify the relationships between those characteristics and chronic absence, the study predicted the probabilities of being identified as chronically absent for all students using a two-level model that included student and school characteristics.

Two-Level Hierarchical Design.
The random intercept model accounting for individual students (level 1) nested within schools (level 2) can be represented as:

(Level 1)　　　$Z_{ij} = \log [P_{ij} / (1 - P_{ij})]$
　　　　　　　$Z_{ij} = \beta_{0j} + \beta_1 X_{1ij} + \beta_2 X_{2ij} + ... + \beta_n X_{nij}$

where Z_{ij}, the dependent variable, is the log odds of being chronically absent for student i in school j; P_{ij} is the probability of being chronically absent for student i in school j; X_{nij} is a set of student characteristics; β_{0j} represents a school j constant; and β_n is a regression coefficient indicating the predicted change in Z_{ij} for every one-unit increase in the value of the associated X_n variable, holding constant the other variables in the model.

At the school level the random intercept model can be represented as:

(Level 2)　　　$\beta_{0j} = \gamma_{00} + \gamma_{01} W_{1j} + \gamma_{02} W_{2j} + ... + \gamma_{0n} W_{nj} + u_{0j}$

where $\gamma_{0n} W_{nj}$ represents a set of school characteristics, such as school demographic composition and charter school designation, and u_{0j} is a school error term that is assumed to be normally distributed with a mean of zero and variance τ^2.

The intraclass correlation coefficient (ICC) for a two-level model is calculated as the portion of variance that was due to between-school differences in an empty model (without covariates):[21]

$$ICC = \tau^2 / (\tau^2 + 3.29)$$

If there is no statistical dependency due to the nesting of students within schools, all of the variances would be expected to be among students, and the ICC would be close to zero. In contrast, with highly dependent data the largest proportion of variance would be between schools, and the ICC would be closer to 1. Note that school ICCs can be interpreted in the

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[21] $\pi^2/3 = 3.29$ is the estimated variance of the standard logistic distribution. Snijders, T. A. B., & Bosker, R. J. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling.* Thousand Oaks: Sage Publishing.

context of previous research findings. For example, Hedges and Hedberg report the average ICC for K–12 academic achievement is about 0.22 for students nested within schools.[22]

Three-Level Hierarchical Design.
The random intercept model accounting for individual students (level 1) nested within schools (level 2) in turn nested within district (level 3) can be represented as:

(Level 1)　　　$Z_{ijk} = \log [P_{ijk} / (1 - P_{ijk})]$
　　　　　　　　$Z_{ijk} = \beta_{0jk} + \beta_1 X_{1ijk} + \beta_2 X_{2ijk} + ... + \beta_n X_{nijk}$

where Z_{ijk}, the dependent variable, is the log odds of being chronically absent for student i in school j in district k; P_{ijk} is the probability of being chronically absent for student i in school j in district k; X_{nijk} is a set of student characteristics; β_{0jk} represents a school j constant in district k; and β_n is a regression coefficient indicating the predicted change in Z_{ijk} for every one-unit increase in the value of the associated X_n variable, holding constant the other variables in the model.

At the school level the random intercept model can be represented as:

(Level 2)　　　$\beta_{0jk} = \gamma_{00k} + \gamma_{01} W_{1jk} + \gamma_{02} W_{2jk} + ... + \gamma_{0n} W_{njk} + u_{0jk}$

where $\gamma_{0n} W_{njk}$ represents a set of school characteristics, such as school demographic composition and charter school designation, and u_{0jk} is a school error term that is assumed to be normally distributed with a mean of zero and variance τ^2.

At the district level the random intercept model can be represented as:

(Level 3)　　　$\gamma_{00k} = \pi_0 + v_{00k}$

Where π_0 is the grand mean and v_{00k} is a district error term with mean 0 and variance φ^2.

Dependence at the higher levels in the three-level model can be also represented by the Intraclass Correlation Coefficients (ICC), in an empty model (without covariates). The total variance is now partitioned among three levels:

$ICC_{,\,level3}$　　=　　　$\varphi^2 / \varphi^2 + \tau^2 + 3.29$　　　　　　　　(districts)

$ICC_{,\,Level2.1}$　　=　　　$\tau^2 / \varphi^2 + \tau^2 + 3.29$　　　　　　　　(schools)

$ICC_{,\,Level2.2}$　　=　　$\tau^2 + \varphi^2 / \varphi^2 + \tau^2 + 3.29$　　　　(schools within districts)

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[22] Hedges, L. V., & Hedberg, E. C. (2007). Intraclass Correlation Values for Planning Group-Randomized Trials in Education. Educational Evaluation and Policy Analysis, 29(1), 60–87. https://doi.org/10.3102/0162373707299706

Two-Level Hierarchical Design with covariates.
To examine which student and school characteristics were most closely associated with the likelihood of chronic absence, the study team used the two-level hierarchical design and added student- and school-level fixed effects of interest to compute predicted probabilities of being absent for all students in grade 5 and grade 8 in 2019.

Each predictor was centered to its grand mean (the average proportion of each demographic in the analytic sample). Therefore, the estimated intercept represents the log odds of being chronically absent for a typical student at a typical school in each model. The models were estimated using the SAS GLIMMIX procedure with the Laplace estimation method.

Predicted probabilities.
Predicted probabilities were computed by applying the inverse link function to the least squares means of each group effect on the logit scale, with all other student and school variables at the average value for the population. For example, the predicted probability for Hispanic or Latino students was computed for an average student (other than being Hispanic or Latino) attending an average school. This predicted probability can be compared with the predicted probability for students of other races/ethnicities(e.g., Black or African American), which was also computed for an average student (other than being Black or African American) attending an average school.