

# Virginia School Division Operations During SY 2020-21: In-Person Learning

Erica N. Sachs, Luke C. Miller, & Beth E. Schueler  
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## Summary

During the 2020-21 school year, COVID-19 forced Virginia's school divisions to adapt to unprecedented circumstances, which led many divisions to deviate from the typical five-day-a-week pre-pandemic school schedule with all students attending school in person each day. In-person learning is superior to remote learning in promoting student achievement for the average student, according to the most rigorous research. [1] It is, therefore, vital to quantify how much in-person learning occurred if we are to understand COVID's educational impact. A full understanding of these impacts requires that we document how in-person learning varied across grade levels, student demographics, and division characteristics. Together this information is key to taking an essential step toward helping divisions recover from this extended period of educational disruption.

To that end, we compiled and analyzed day-by-day data on the in-person learning of each grade level in Virginia's 132 public school divisions for the entire 2020-21 school year. We use these data to describe learning and teaching in Virginia along four dimensions: (1) learning modality (fully remote, hybrid, or fully in person), (2) attendance rotation patterns, (3) days students learned in person, and (4) days teachers taught in person.

We find the following:

- **Learning Modality:** The average student spent almost half the year in the hybrid modality, less than half the year in the fully remote modality, and only a small portion of the year in the fully in-person modality. Over the year, despite some fluctuations, the share of students in the fully remote modality decreased, while the share in both the hybrid and fully in-person modalities increased.
- **Attendance Rotation Patterns:** Throughout the year, divisions' changes to students' attendance rotation patterns altered the number and order of days in a week that students could learn in person. The average student experienced two changes to their attendance rotation pattern, though earlier grades experienced more disruptions than later grades.
- **In-Person Learning:** The average student spent a third of the school year learning in person in either the hybrid or fully in-person modality. Earlier grades spent more time in person than later grades.
- **In-Person Learning:** Asian students attended schools in divisions that offered the least in-person learning, while White students attended schools in divisions that offered the most. English Learner (EL) students learned in person

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for a smaller share of the year than non-ELs.

- **In-Person Learning:** There were no differences in learning in person across students' disability (SWD) or economic disadvantage (ED) statuses.
- **In-Person Learning:** Divisions in communities with greater broadband access tended to offer their students more in-person learning. Rural divisions provided more in-person learning than divisions in towns, suburbs, or cities. There was no consistent relationship between a division's COVID-19 death rate and the amount of in-person learning.
- **In-Person Teaching:** The average teacher spent just under half of the school year teaching in person. Overall, as with student learning, the percentage of teachers teaching in person grew as the school year progressed.

The amount of in-person learning provided to students and in-person teaching required of teachers could have impacted students' enrollment decisions, students' academic performance, teacher retention, and teacher job satisfaction. In this brief, we describe divisions' decisions regarding in-person learning, but we will examine how these decisions relate to student and teacher outcomes in future analyses.

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## Why Track Learning During the Pandemic?

In the wake of COVID-19's spread during the spring and summer of 2020, it became clear that for 2020-21 divisions would not likely follow a traditional school attendance model with five days per week of in-person learning all year. Instead, divisions, throughout the year, had to decide when and how many students to have in school buildings. Division decisions can be viewed as a two-step process. First, divisions selected the learning modality by deciding whether no (fully remote), some (hybrid), or all (fully in person) students could attend in person. Second, if the division chose the hybrid modality, the division decided which days and how many students could

attend in person each day. Regardless of the potential public health benefits of the shifts away from the traditional school attendance model, it likely had implications for student learning. Further, the changes may have differentially affected groups of students in ways that could increase or reduce differences in their educational outcomes. The most rigorous research currently available suggests that in-person learning is superior to remote schooling in promoting student achievement for the average student. [1] It is crucial, therefore, to document in-person learning and how it varied by grade level, student demographics, and division characteristics. Our collection and analysis of this information are necessary steps toward helping divisions recover from this extended period of educational disruption.

## How We Tracked Learning

As part of a research project in partnership with the Virginia Department of Education (VDOE), we collected data on the operations of Virginia's 132 school divisions during the 2020-21 school year. We gathered these data from each division's website (including archived sites), Twitter feed, Facebook page, and local news sources. The resulting compiled data include detailed day-by-day information on school calendars, learning modality, scheduled attendance rotation patterns, and disruptions experienced by every grade level (pre-kindergarten through 12th) in all divisions. In addition to information on students' experiences, the data enable us to determine how much of the school year divisions may have expected teachers to teach in person, which is also important for assessing COVID's impact and aiding divisions' recovery efforts. We used these data to address the following research questions related to four key dimensions of learning during the 2020-21 school year:

1) *How much time did the average student in Virginia spend in each of the three learning modalities (fully remote, hybrid, fully in person)?*

2) *How did the attendance rotation patterns (the number and order of days in a week when student groups were learning in person) vary across divisions, and how often did these patterns change?*

3) *Regardless of learning modality, what percent of the school year did the average student spend learning in person, and how did that vary by student grade level, student demographics, and division characteristics?*

4) *What percent of the school year was the average educator expected to teach in person?*

Though the data we compiled are quite detailed, it is important to note that these data only reflect what divisions publicly said they would do or were doing when they released an update or a change. [2] There are several reasons why this may not perfectly capture the lived experiences of students and teachers.

First, it is possible that divisions may have changed their approach to in-person learning but conveyed the changes to the community only via emails, texts, or phones without posting an announcement online. While we cannot rule this out, we believe it is rather unlikely as these are decisions all families needed to know. Second, following VDOE guidance, divisions may have offered additional in-person learning to certain student groups, such as English Learners or students with disabilities. Unfortunately, there were insufficient data to develop an accurate picture of these decisions. Our data for these student groups, therefore, likely underrepresent the amount of in-person learning provided to these students. Third, our estimates do not apply to students who chose a full-time virtual program or another form of specialized schooling. Fourth, since students were not evenly distributed across grades within divisions or across divisions within the state, we used VDOE division enrollment data to create a series of weights that allow us to calculate the amount of in-person learning for the average student rather than the average division. These weights are based on each division's total enrollment (or enrollment of a grade

or a student group) which does not exclude the students who chose a full-time virtual program or another form of specialized schooling.

### **Dimension #1: Learning Modality**

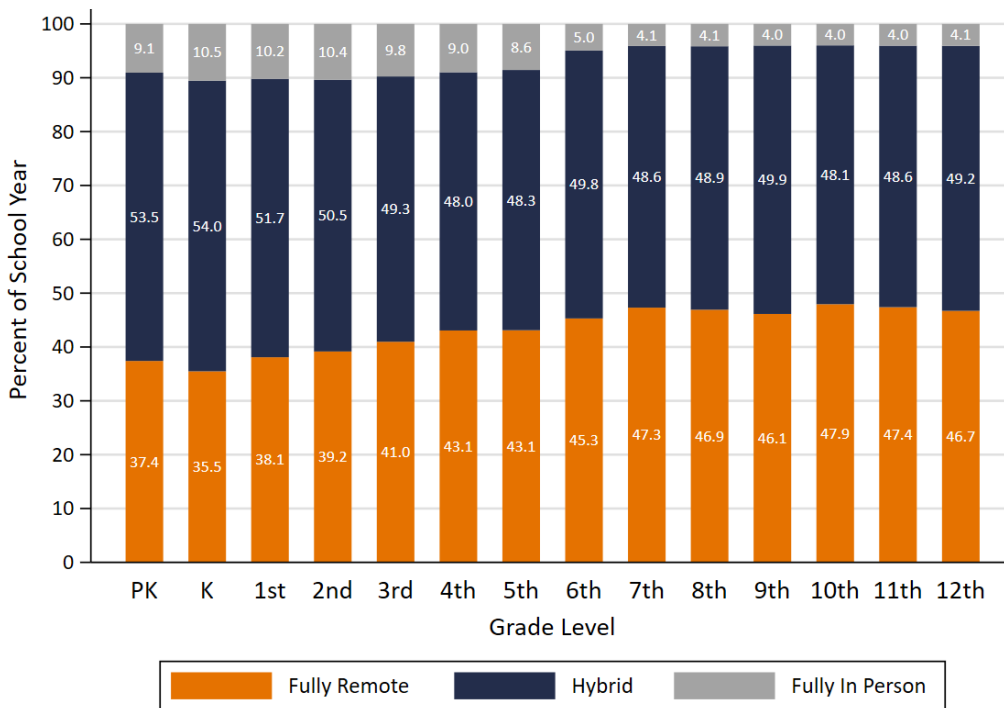
We began by examining the learning modality a division selected when they decided whether no (fully remote), some (hybrid), or all (fully in person) students would attend in person. Our team developed the following definitions for the three modalities:

- Fully remote: All students learn remotely five days a week.
- Hybrid: All students learn in person on some days and remotely on others.
- Fully in person: All students learn in person five days a week, as was the default pre-pandemic modality.

We find a stark departure in the 2020-21 learning modalities from pre-pandemic times. For instance, not a single division across the state had all grades in the fully in-person modality all year long. For the average student, almost half the year was spent in the hybrid modality (49.6%), less than half of the year was fully remote (43.7%), and only a small percentage of the year was fully in person (6.7%). Students in earlier grades spent more of the year in the hybrid and fully in-person modalities and less of the year fully remote than students in later grades, as shown in **Figure 1** on the next page.

For instance, the average 2nd grader spent 39.2% of the year fully remote, half of the year hybrid (50.5%), and 10.4% fully in person; in contrast, the average 10th grader spent under half the year fully remote (47.9%) and hybrid (48.1%) with only 4.0% of the year fully in person (shown in **Figure 1**).

As the school year progressed, divisions tended to shift from fully remote to hybrid and/or in-person modalities. We illustrate these patterns in **Figure 2** on the next page, which displays the percentage of students in each modality by month across the



hybrid, and 11.6% were fully in person. This pattern held across all grade levels.

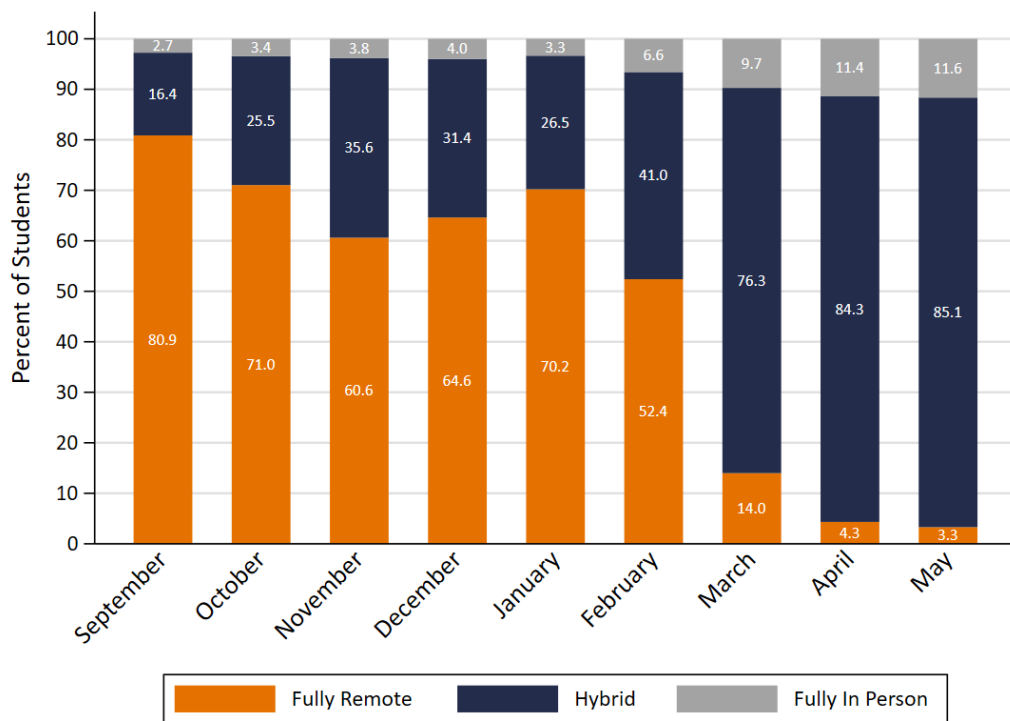
### Dimension #2: Attendance Rotation Patterns

Data on the three learning modalities hint at how much in-person learning divisions offered. To calculate the percent of the year students learned in person, however, we must document how divisions implemented the hybrid modality. To do so, we tracked “attendance rotation” patterns. An attendance rotation (or rotation) is a series of letters representing whether and which students

**Figure 1.** Percent of the Year Students Spent in Each Learning Modality by Grade Level

2020-21 school year. Throughout September 2020, 80.9% were in the fully remote modality, 16.4% in hybrid, and only 2.7% in fully in person. Between September and November, the percentage of fully remote students fell by 20 percentage points. Nearly all those students shifted into the hybrid modality. Some students shifted to the fully remote modality through January. The largest shifts in learning modality occurred after January 2021. Divisions’ decisions to offer more in-person learning to more students accelerated as divisions moved to comply with Governor Northam’s order to make in-person learning available to all students by March 15th. By May, only 3.3% of students were in the fully remote modality, 85.1% were in

could attend school in person on each day of the week. Attendance rotations could, and often did, vary across grade levels within a division. Divisions operating in the hybrid modality tended to divide



**Figure 2.** Percent of Students in Each Learning Modality by Month

their students into groups, within grade levels, to limit the number of students in the schools on any given day. The letters of an attendance rotation reveal the number of student groups and which group could attend in person each day. For example, the ABABR hybrid rotation represents a division that divided a grade level into two groups (A and B). Group A attended school in person on Monday and Wednesday, and Group B attended school in person on Tuesday and Thursday. Each student group learned remotely on the days their group did not attend school in person. The “R” on Friday in this example rotation indicates that all students learned remotely on that day. Most rotations detailed a single week; however, a small number of rotations spanned two or three weeks.

Whereas there was only one rotation for both the fully in-person modality (AAAAA) and the fully remote modality (RRRRR), we identified 27 unique rotations for the hybrid modality. As evidenced by the examples in Table 1, hybrid rotations varied on several key dimensions, including the number of student groups and the number of days each group could attend in person. It is important to note that all rotations provide the same number of in-person days to every student group. We can, therefore, use these features to calculate the percent of students learning in person each day and for the rotation. For example, continuing with the ABABR rotation, 50% of students attended in person Monday through Thursday, and no students attended in person on Friday. Under this rotation, each student attended school in person for 40% of the days covered by the

rotation. The amount of in-person learning varied between 20 and 80% across the hybrid rotations we show in **Table 1**.

Most divisions made changes to these rotations at some point during the year. While many factors influenced these decisions, all changes likely represent some degree of disruption to students. Students, on average, experienced two rotation changes during the year. Most rotation changes involved learning modality changes (e.g., RRRRR to ABABR). The average student experienced 1.7 changes to their learning modality. The remaining changes involved movement among hybrid rotations which primarily increased or decreased the number of days each student group could attend in person. The maximum number of attendance rotation changes experienced by a grade within a division was 12.

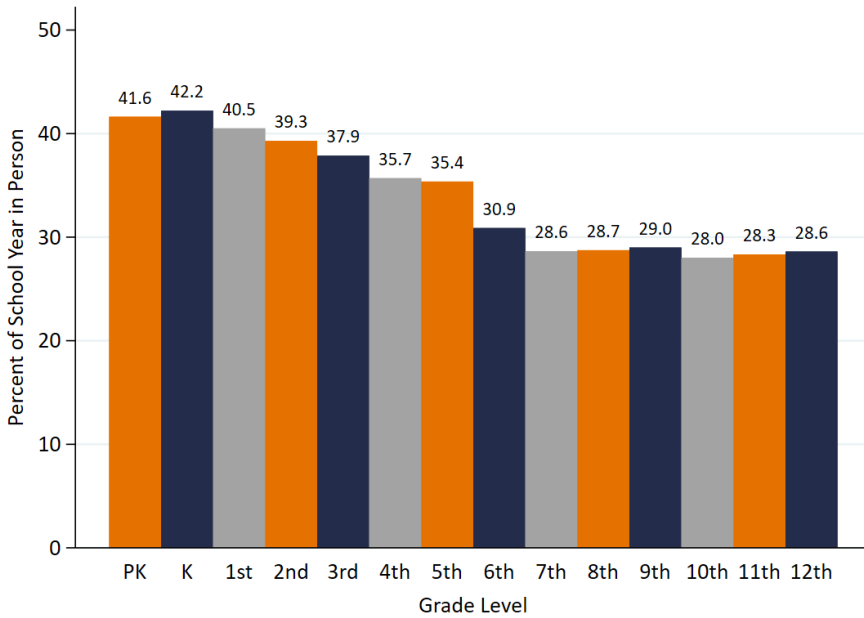
### Dimension #3: In-Person Learning

With the features of all attendance rotations detailed, we were able to explore the percent of the school year that divisions provided in-person learning to students in the hybrid and fully in-person modalities. The average student was permitted to learn in person for a third of the school year (33.2%) or roughly two and a half to three months. [3] Earlier grades spent a larger portion of their school year learning in person, as shown in **Figure 3** on the next page. For example, the average kindergarten student spent 42.2% of the year (around three and a half months) learning

**Table 1.** Examples of Hybrid Rotations for a Specific Grade in a Division

Attendance Rotation	# Student Groups	# Days In Person per Group	% In-Person Learning per Student per Rotation	Days All Students Learned Remotely	Consecutive In-Person Days Within Group
AARAA	1	4	80%	Wednesday	Yes
ARBRR	2	1	20%	Tues., Thurs., Fri.	No
RABCD	4	1	20%	Monday	No
AAAAR-BBBBB	2	4	40%	Friday	Yes
AAAAA-BBBBB	2	5	50%	None	Yes





**Figure 3.** Percent of the Year Students Could Learn in Person by Grade Level

in person.

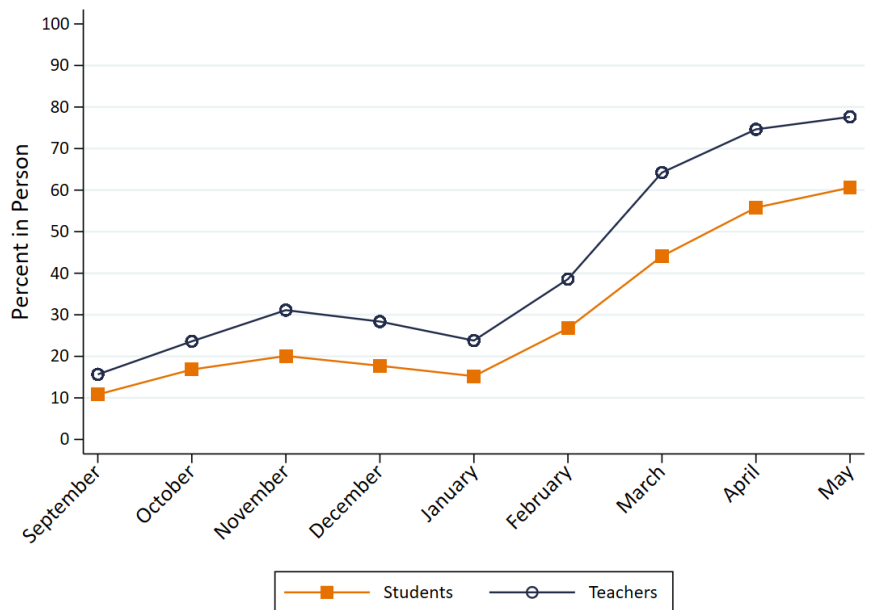
In **Figure 4**, we show the percent of students learning in person by month over the 2020-21 school year. For all grades, the share of students learning in person rose steadily from September (10.8%) to November (20.1%) of 2020, then dropped slightly around the winter holidays to 15.2% in January. After January, the percent of students with access to in-person learning increased for the remainder of the year. This was likely partly due to the Governor’s executive order but also may have reflected declining COVID cases and increasing numbers of educators becoming vaccinated against the disease. By May 2021, nearly two-thirds (60.6%) of Virginia students could attend school in person.

***In-Person Learning by Student Demographic Characteristics***

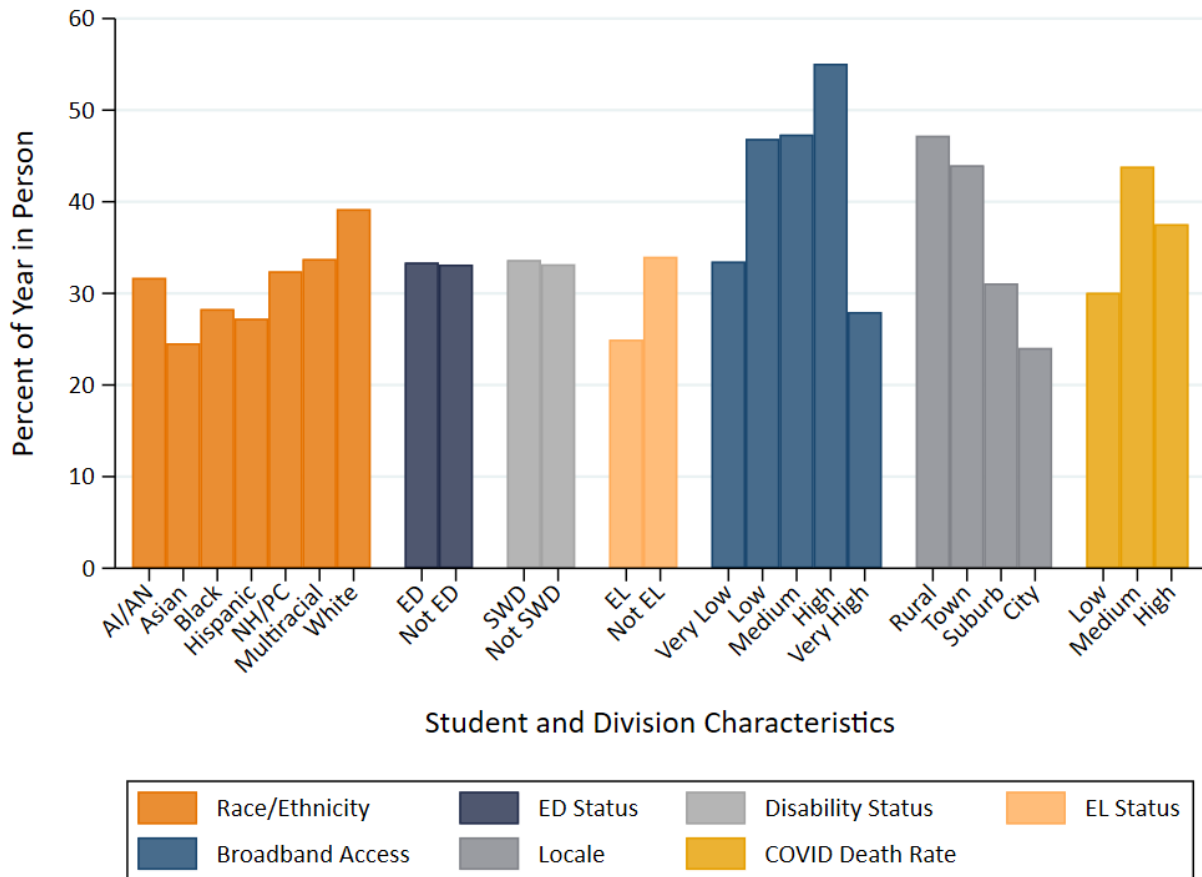
Divisions made different decisions about when and how much in-person learning to provide their students.

Given that student characteristics vary across divisions, it is important to understand how divisions’ decisions created differential access to in-person learning across student groups defined by their demographic characteristics. It must be noted that variability in the access our analyses identify are due to students’ unequal distribution across divisions. No division offered more in-person learning to one racial or ethnic group and less to another, for example. Within-district variability in access to in-person learning only exists across grades (which we have previously documented), disability status, and English Learner status. While VDOE’s guidance encouraged divisions to

provide more in-person learning to SWDs and ELs, we were unable to reflect this in our data. Access to in-person learning varied across student characteristics, as shown in **Figure 5**, shown on the next page. [4] With respect to students’ racial and ethnic backgrounds, White students, on average could attend school in person for 39.2% of the year



**Figure 4.** Percent of Teachers and Students in Person by Month



**Figure 5.** Percent of the Year Students Could Learn in Person by Student and Division Characteristics

Note: AI/AN= American Indian or Alaskan Native, NH/PI=Native Hawaiian or Pacific Islander, ED= Economically Disadvantaged, SWD= Student with Disability, and EL= English Learner

(around three months) compared to 28.3% of the year for Black students, 27.2% for Hispanic students, and 24.6% for Asian students. Additionally, EL students were enrolled in divisions that offered around a month less in-person learning to all students than the divisions in which non-EL students were enrolled (25.0 versus 34.0%). Our data revealed no meaningful variation in the amount of in-person learning by economically disadvantaged or disability status.

### ***In-Person by Division Characteristics***

When choosing a balance between in-person and remote learning, divisions likely considered many factors beyond the few we examine here (locale, access to broadband internet with speeds of at least 100 mbps, and COVID death rates). Furthermore, factors often co-exist with other factors (e.g., cities

have more access to broadband internet than rural communities). Despite the richness of our data, we cannot speak to how a division incorporated its local context into its decision-making process. Therefore, the statistics we present in this section and display in **Figure 5** should be strictly interpreted as how division decisions about in-person learning varied across different types of divisions.

We find that urban divisions provided their students with less in-person learning than rural divisions. [5] Students in divisions in rural areas had access to in-person learning for 47.2% of the year compared to 24.0% for students in city divisions. Divisions in towns made decisions more similar to rural divisions (in-person for 44.0% of the year), while the decisions of divisions in the

suburbs were more like city divisions (31.1%).

Divisions with greater broadband internet access tended to provide more in-person learning than divisions with less access. [6] The percent of the school year students could attend school in person increased from 33.5% in divisions with very low access to 55.1% in divisions with high access. However, the percent declined to 28.0% in divisions with very high broadband access divisions. This decline may be because these divisions being among Virginia's more urban communities which offered the least in-person learning.

There was no consistent relationship between a division's COVID-19 cumulative death rate as of the last day of the 2020-21 school year and the amount of in-person learning divisions provided. [7] In fact, we found inconsistent relationships between in-person learning and other COVID metrics. While the pattern of results for the COVID case rate is similar to that for the death rate, we found the opposite pattern for the hospitalization rate. This likely reflects how the presence of COVID in a division was just one of many factors that influenced decisions regarding in-person learning.

#### **Dimension #4: In-Person Teaching**

Our data can also be used to understand what divisions' decisions about student learning in person implied for teachers teaching in person. In-person teaching was required whenever in-person student learning occurred. Returning to the example hybrid rotation ABABR, students could only attend in person two days a week, but teachers had to provide in-person instruction four days a week. To calculate the percent of the year the average teacher taught in person, we assumed teachers were distributed across divisions and grades the same way students were, given data limitations. Our calculations are likely an overestimate as some divisions hired proctors to sit in the classroom with students while the teacher taught from a remote location.

We estimate that the average teacher taught in person for just under half of the school year (46.6%), or roughly three and three-quarter months. This percentage varied across grades, student demographics, and division characteristics in the same manner as did in-person learning for students, which was expected given the direct relationship between the two constructs. For example, kindergarten teachers taught in person for 54.1% of the year, while 10th-grade teachers taught in person for 42.8% of the year. Across the school year, the percent of teachers teaching in-person increased from 15.7% in September to 77.6% in May (see **Figure 4** on page 6).

#### **Closing**

Virginia school divisions, as school districts in other states, made substantial departures during the 2020-21 school year from the traditional five-day-per-week in-person learning modality. No division remained in the fully in-person modality for the entire year. Modality patterns reveal that the pandemic caused students to spend less time learning in person; however, these facts do not quantify how much less. In contrast, our data, unlike those used in most studies on COVID-era learning, allow us to quantify in-person learning at a more granular level regardless of modality. While the average Virginia student only experienced 6.7% of the year fully in-person and 43.7% of the year in the hybrid modality, the attendance rotations indicate that the average student spent 33.2% of the school year learning in person. Teachers, who had to be at the school whenever students were in attendance, were expected to teach in person for 46.6% of the year on average.

The unique richness of our data allows us to track in-person learning through the school year and across the grade levels, student demographics, and division characteristics. In-person learning became more common as the year progressed, with a notable dip in the winter months. Younger students had access to more in-person learning than older



students as did White students compared to students of other racial and ethnic backgrounds. Non-EL students could attend school in person more than EL students. Rural divisions provided more in-person learning than more urban divisions, and divisions with greater broadband internet access tended to provide more in person learning than divisions with less broadband access. However, there was no consistent pattern in how in-person learning varied with the divisions' COVID-19 public health metrics.

Divisions' decisions about how much in-person learning to provide could have had substantial impacts on students' school enrollment and academic performance, as well as teacher retention and job satisfaction. Although examining these connections is beyond the scope of this brief, we plan to explore these important issues in future work.

## Acknowledgments

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## Endnotes

[1] See, for example: Darling-Aduana, J., Woodyard, H. T., Sass, T. R., & Barry, S. S. (2022). Learning-mode choice, student engagement, and achievement growth during the COVID-19 pandemic (Working Paper No. 260-0122). National Center for Analysis of Longitudinal Data in Education Research. <https://caldercenter.org/sites/default/files/CALDER%20WP%20260-0122.pdf>; Goldhaber, D., Kane, T. J., McEachin, A., Morton, E., Patterson, T., & Staiger, D. O. (2022). The consequences of remote and hybrid

instruction during the pandemic (Working Paper No. 30010). National Bureau of Economic Research. <http://www.nber.org/papers/w30010>; Halloran, C., Jack, R., Okun, J., & Oster, E. (2021). Pandemic schooling mode and student test scores: Evidence from US states (Working Paper No. 29497). National Bureau of Economic Research. <https://doi.org/10.3386/w29497>

[2] We document announced school closures due to COVID with one exception. We do not document changes that impacted less than half of a grade in a division. For instance, a division closed one of its three elementary schools because of an outbreak. Our data does not reflect this change. These instances of selective within-grade closures and changes were rare.

[3] All conversions of percentages to days, weeks, or months are based on the length of the division's school year which ranged from 161 and 186 days.

[4] Information on each division's enrollment disaggregated by grade, racial/ethnic background, and ED, EL, and SWD status come from VDOE's Fall Membership website.

[5] Information on each division's locale comes from the National Center for Education Statistics' Education Demographic and Geographic Estimates program. Fifteen divisions are classified as in a city, 27 as in a suburb, 25 as in a town, and 65 as in a rural area.

[6] Information on broadband internet access within each division's community as of June 2020 comes from the website Broadbandnow.com. We created five levels of broadband internet access as measured by the percent of residences with access to (but not necessarily connected to) speeds of at least 100 Mbps (very low 0-40%, low 41-60%, medium 61-80%, high 81-90%, or very high 91-100%). Broadband access was very low in 20 divisions, low in 14 divisions, medium in 23 divisions, high in 22 divisions, and very high in 53 divisions.

[7] Information on the division's COVID-19 death rate comes from the Virginia Department of Health and reflects the number of deaths as of the last day of school divided by the division's population from the 2020 Census. The death rate (per 10,000 persons) was low (2.7-14.6) in 67 divisions, medium (14.7-29.3) in 51 divisions, and high (29.8-78.9) in 14 divisions.