

## Research Note: School Reopenings During the COVID-19 Pandemic and Implications for Gender and Racial Equity

Liana Christin Landivar, Leah Ruppanner, Lloyd Rouse,  
William J. Scarborough, and Caitlyn Collins

**ABSTRACT** In the fall of 2020, school districts across the country reopened under a variety of instructional modes. Some districts returned to in-person instruction and some operated remotely. Others reopened under hybrid models, wherein students alternated times, days, or weeks of in-person instruction. To capture this variation, we developed the Elementary School Operating Status (ESOS) database. ESOS provides data on elementary school districts' primary operating status in the first grading period of the 2020–2021 school year, covering 24 million students in more than 9,000 school districts in all states. In this research note, we introduce these data and offer two analytical examples. We show that school districts with greater representation of Black and Hispanic students were less likely to offer in-person instruction than were districts with greater representation of White students. These racial disparities remained after accounting for geographic locale and COVID-19 prevalence. We also show that the number of in-person elementary school instruction days was associated with mothers' labor force participation relative to fathers and to women without children—that is, the fewer days of instruction, the less likely that mothers were employed. ESOS is a critical data source for evaluating the mid- and long-term implications for students who experienced reduced in-person learning and for mothers who exited employment in the absence of in-person instruction and care.

**KEYWORDS** Education • Employment • COVID-19 • Race and ethnicity • Gender

### Background

During the COVID-19 pandemic, schools have experienced unprecedented closures across all states. Many moved their operations online for extended periods (McElrath 2020), and some school districts did not reopen for in-person instruction for more than a year (Thompson 2021). Most states required school districts to develop continuity of learning plans in the summer of 2020. Yet school districts across the United States developed very different operating plans, resulting in a patchwork of kindergarten to 12th grade programming at the start of the 2020–2021 school year. Many school districts reopened in remote status, while others reopened

in person. Another group of school districts reopened in hybrid status, offering limited attendance to cohorts that alternated times, days, or weeks of in-person instruction. These approaches were a response to a rapidly changing landscape of infection, federal guidance, state and local mandates, teacher union negotiations, and parental surveys (Centers for Disease Control and Prevention 2021). To understand the resulting variation in school reopening, we collected comprehensive data on school districts' reopening status, focusing on elementary school students because, in many districts, these plans differed from options offered to older students. Elementary students are of key concern because young students are the most likely to require close supervision and assistance to complete remote education (Dorn et al. 2020).

We developed the Elementary School Operating Status (ESOS) database, which provides data on school districts' primary operating status in the first grading period of the 2020–2021 school year. These data are publicly available for 9,195 elementary school districts, representing all 50 states, the District of Columbia, and Puerto Rico (download available here: <https://osf.io/zeqrj/>). We introduce this data source, show the extensive variation in school operating status at the state and school district levels, and illustrate some of the analytical capabilities of these data. We provide evidence that school districts with greater representation of Black and Hispanic students were less likely to offer in-person instruction compared with districts with a greater representation of White students. We also show that having fewer in-person elementary school instruction days was negatively associated with mothers' employment relative to fathers and women without children.

## Education: Federal, State, and Local Oversight

U.S. public schools operate within a complex governmental legislative structure that leads to heterogeneity across states and local school districts. To access funding, the federal government mandates minimum school day lengths and benchmarks school performance (Lynch 2016). However, federal funding accounts for only 8 cents of each dollar spent on education, with states and local communities providing 83 cents for every dollar spent and 9 cents coming from private sources (U.S. Department of Education 2005). These stakeholders create a complex public school system that yields disparate funding and educational outcomes across districts (Morgan and Amerikaner 2018).

Because decision-making largely resides at the state or local level, school reopening was determined by state and local governments as one component of broader COVID-19 response plans. At the start of the 2020–2021 school year, California's state government mandated remote learning in counties where cases of COVID-19 remained elevated, and the Oregon governor's directives on school operations were so strict that most schools could not reopen (Cowan 2020; Oregon Health Authority 2020). Many states, such as Illinois and Pennsylvania, allowed for more local discretion in schools' reopening plans, resulting in greater intrastate variation in school operations (Goldstein 2020). On the other hand, the governors of Arkansas and Florida mandated school reopening, resulting in mostly in-person operations at the start of the school year (Demillo 2020; Fraser et al. 2020).

## The Elementary School Operating Status Database

In the absence of federal government plans to collect detailed data on school reopening at the school district level, we created the ESOS database. ESOS is the most comprehensive database on school district operating status for elementary-age students. While existing databases on school reopening in fall 2020 provided data for a limited set or the largest school districts,<sup>1</sup> we cover the majority of school districts: 9,195 of the approximately 13,000 school districts serving all age-groups and population sizes. We collect data for districts that serve elementary schools with a minimum of 500 students, which yields coverage for 72% of all public school districts offering elementary instruction and 98% of all elementary school students across all 50 states, the District of Columbia, and Puerto Rico. Although 28% of districts are not in the ESOS sample, this constitutes only 2% of elementary school students because districts omitted from ESOS are overwhelmingly rural and with small populations. However, ESOS yields robust coverage of rural areas. The majority of ESOS districts are rural, as there are many more rural districts serving smaller populations of students than urban districts serving large populations. We report differences between districts included in ESOS and those excluded from the sample in Table A1 of the online appendix.

ESOS data are collected from elementary and unified school districts, focusing on plans for students in kindergarten to grade 6 and covering approximately 24 million students. ESOS provides a variety of information: (1) operating status (in person, hybrid, remote); (2) type of hybrid program (part-day, part-week, alternating weeks); (3) school district population size; (4) estimated number and share of children living in poverty in the school district; (5) number of students by grade; (6) racial and ethnic composition of the school district; and (7) urban-centric locale information.<sup>2</sup> Additional data sets may be linked to ESOS at the state level using state names or codes (e.g., FIPS codes) or National Center for Education Statistics district identifiers at the school district level.

To collect data on the 9,195 districts included in ESOS, we conducted an intensive data collection of materials available in the public domain. School districts must make school reopening plans broadly available to the public so parents and local communities can adjust their plans to schools' operating status. We located the requisite information primarily on school district websites. Many schools also maintain active social media accounts, through which they provide operational status updates. We also used supplemental sources of information (e.g., local newspapers) when the reopening plan was ambiguous or when state governments or education boards provided the information.

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<sup>1</sup> For example, Education Week tracked 900 out of approximately 13,000 public school districts, Burbio actively monitored 1,200 districts (including the largest 200), and MCH Strategic Data had an 18% response rate to its school operating survey. More recent expansive and laudable efforts used cell phone data to infer school operating status (e.g., U.S. School Closure & Distance Learning Database), but these collections do not offer the granularity needed to determine which hybrid plans have been implemented and lack precision in determining the share of students allowed to attend under various learning plans.

<sup>2</sup> School district geographic locale information was obtained from the National Center for Education Statistics, Elementary/Secondary Information System. In the analyses presented here, urban districts included city large, city midsize, and city small; suburban districts included suburban large, suburban midsize, and suburban small; and rural districts included town fringe, town distant, town remote, rural fringe, rural distant, and rural remote.

All sources have an associated date, which is critical to capture the same period across school districts: operating status as of September 20–30, 2020. We selected this date range because it is the point in the term that covers the majority of the first grading period across most school districts nationwide. If school districts changed status during this period, districts that began the school year in August were evaluated as of September 20, whereas districts that began in September were evaluated as of September 30. We developed sampling, data collection, and quality assurance protocols, including (1) all large school districts were verified by at least two team members, including a lead researcher; and (2) an additional 10% of the school districts were selected for reverification by a lead researcher to ensure consistent coding (for more details, see ESOS technical documentation at <https://osf.io/zeqzj/files/>).

School districts were assigned a primary operating status on the basis of the implemented plan for a majority of elementary school grades within the district. We coded schools as operating in person if they offered at least four days of in-person instruction per week. Schools were classified as remote if no days of in-person instruction were offered for a majority of the student population. Schools operating hybrid plans offered part-day (fewer than four hours per day), part-week (1–3 days a week), or rotating-week schedules (in which cohorts attend different weeks). Although schools may operate multiple programs, we classified the district by the most generous in-person option offered to a majority of students. Among schools not already operating primarily in remote status, all school districts offered a remote option, either broadly available to all who requested it or by medical waiver. However, these school districts were classified as remote only if the majority of the grades operated exclusively through remote learning. Data were collected at the school district level. For analytical purposes, we also created a weighted aggregation (by student population size) of school district operating status at the state level (e.g., percentage of districts in a state operating in in-person, remote, or hybrid status). The weights ensure that school districts have representation proportional to their student population (see ESOS technical documentation). In addition, we included a categorical classification of states as primarily remote, primarily hybrid, or primarily in person based on the most common operating status for students in the state.

The aim of this collection is to capture the learning options offered to parents by each school district. This does not capture the extent to which parents opted out of in-person or hybrid options. Learning options offered by school districts are in the public domain and available for all states, whereas parents' choices are not consistently available for most school districts. To capture changes in learning options offered by the school districts during the 2020–2021 school year, ESOS will offer a second wave of data with a reference period of April 2021, and future analyses will examine how school districts changed operating plans by the end of the school year.

## September 2020: School Operating Status

Figure 1 presents an overview of primary operating status across states. Our data reveal that elementary schools in the West (e.g., California and New Mexico) and along the central eastern seaboard (e.g., Maryland and New Jersey) were predominantly remote. By contrast, six eastern seaboard states operated hybrid models (e.g., New York and Connecticut). Primarily in-person instruction took place in 27 states concentrated

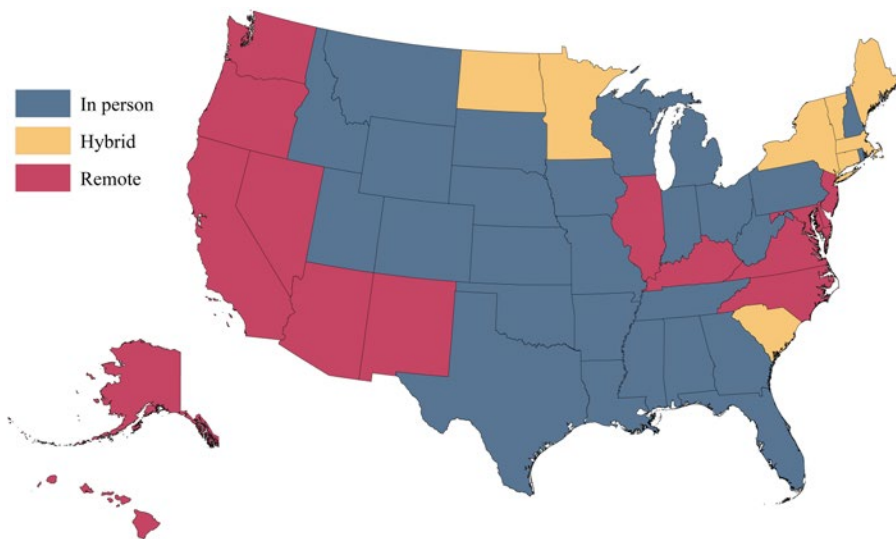


Fig. 1 Elementary school operating status in September 2020, by state. *Source:* Elementary School Operating Status database, Wave 1.

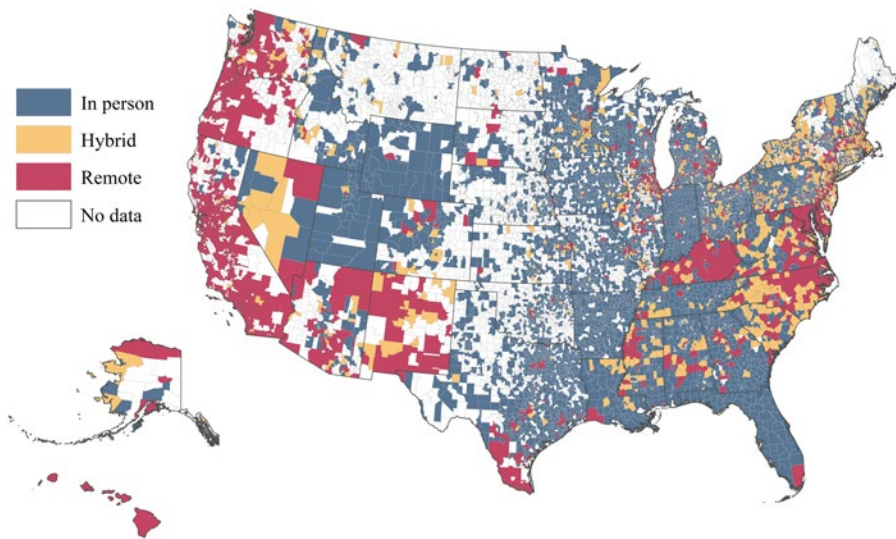


Fig. 2 Elementary school operating status in September 2020, by school district. Data were unavailable for districts with student populations of less than 500. *Source:* Elementary School Operating Status database, Wave 1.

in the South and middle of the country. Figure 2 presents operating status at the school district level. Many states were homogeneous in operations (e.g., California, Maryland, and Oregon), whereas other states had significant variation at the school district level (e.g., New York, Pennsylvania, and Virginia).

Table 1 provides select district characteristics by reopening status. A majority of all districts operated in person (56%), a quarter operated remotely, and a fifth were

**Table 1** School district characteristics by reopening status

Characteristic	In Person	Hybrid	Remote
Share of all Districts (%)	55.7	19.7	24.6
Share of all Students (%)	38.2	17.1	44.8
Average Elementary Student Population	1,818	2,310	4,849
Setting (%)			
Urban	30.9	15.1	54.2
Suburban	32.9	31.0	36.2
Rural	69.6	14.9	15.5
Share of Children Living in Poverty (%)	16.1	13.3	18.2
Average Cumulative COVID-19 Cases per 100,000 Residents as of September 30, 2020	1,869	1,747	2,022
District Racial Composition (%)			
≥25% Black students	41.5	20.2	38.4
≥25% Hispanic students	37.5	12.4	50.1
≥75% White students	68.2	21.1	10.7

*Notes:* Rates of COVID-19 were derived from the Johns Hopkins University Novel Coronavirus Visual Dashboard (Dong et al. 2020) county-level reports. All counties overlapping district boundaries were included in district-level rates of COVID-19. District locale was defined according to National Center for Education Statistics classifications. Percentages may not sum to 100.0 because of rounding.

hybrid. Rural districts were more than twice as likely as urban and suburban districts to have in-person instruction, and were the least likely to offer remote instruction. The elementary student population in in-person districts was, on average, about one third the size of that in remote districts. Therefore, despite the fact that the majority of districts adopted in-person instruction, these schools served only 38% of elementary school students, while 45% of elementary students attended schools that operated remotely and 17% attended schools with hybrid schedules. Upon examination of differences in the extent of COVID-19 transmission, we found that the prevalence of cases was about 15% higher in remote districts than in hybrid districts, and 8% higher than in in-person ones. Remote or hybrid schooling policies may have been implemented in response to high local rates of COVID-19 in some districts.

### School Operating Status and Racial Disparities

Table 1 also presents schools’ racial and ethnic composition by operating status; these data are visualized in Figure 3. Following the definition of “Hispanic-serving institution” by the U.S. Department of Education, we classified school districts as having a large Hispanic student population if at least 25% of students were Hispanic. We classified districts as having a large Black student population if at least 25% of students were Black, and as having an overrepresentation of White students if at least 75% of students were White.

Districts that had a greater representation of Hispanic and Black students were more likely to be operating remotely. Half of the school districts with a large share of Hispanic students were remote, as were 38% of school districts with a large share of Black students, compared with only 11% of districts in which White students were

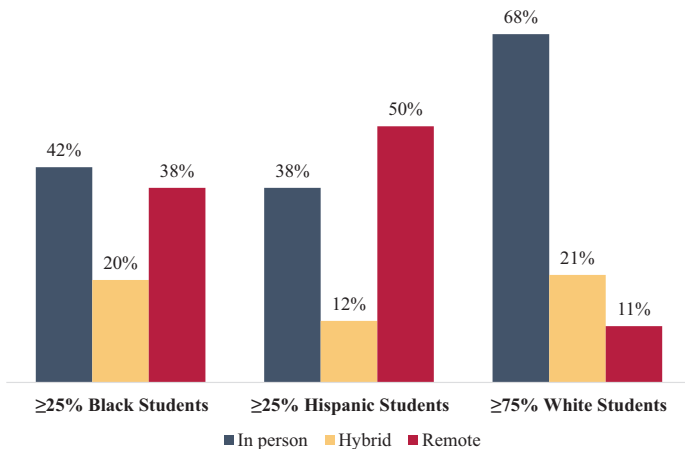


Fig. 3 Share of school districts operating in in-person, hybrid, or remote status in September 2020, by race and ethnicity of student population. *Source:* Elementary School Operating Status database, Wave 1.

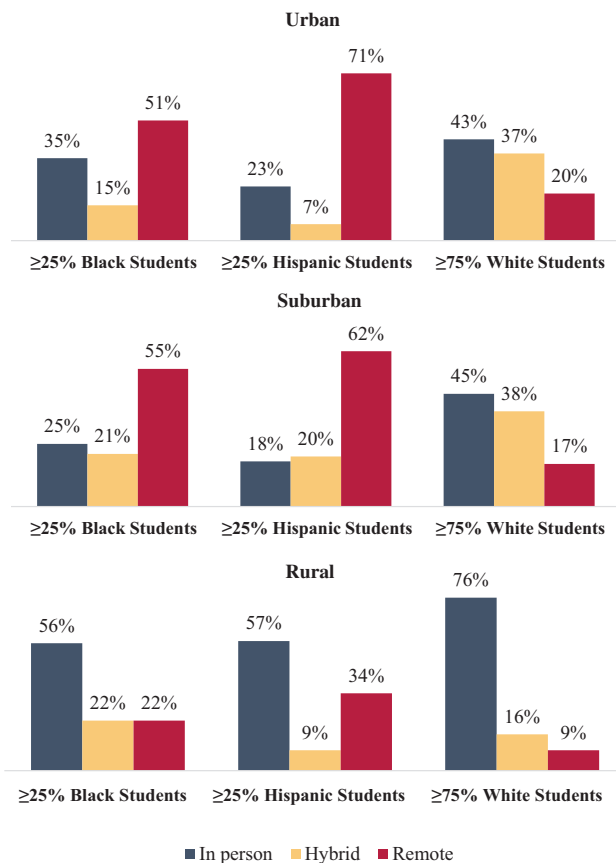


Fig. 4 Share of school districts operating in in-person, hybrid, or remote status in September 2020, by race and ethnicity of student population, across urban, suburban, and rural locales. *Source:* Elementary School Operating Status database, Wave 1.

overrepresented. Only 38% and 42% of school districts serving larger percentages of Hispanic and Black students, respectively, were operating in person, compared with 68% of districts with predominantly White student populations. Figure 4 illustrates that these differences remain across urban, suburban, and rural areas. Figure A1 in the online appendix shows consistency in these patterns by local COVID-19 rates. Across locale and COVID-19 conditions, Black- and Hispanic-serving districts were more than twice as likely as predominantly White school districts to be remote.

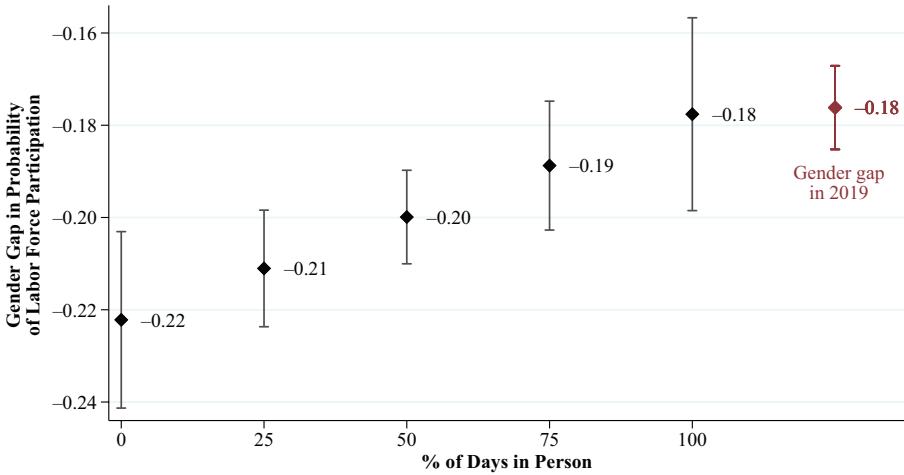
## School Operating Status and Mothers' Employment

Mothers' labor force participation in the United States declined significantly during the pandemic and has recovered more slowly than fathers' employment (Bauer 2021; Landivar et al. 2020). Using the Current Population Survey (CPS) (Flood et al. 2020), we assessed how school operating status was associated with mothers' labor force participation across all U.S. states. Because the CPS lacks adequate sample size to analyze data at the school district level, we applied state-level aggregates. We measured school operating status as the weighted average number of days school districts offer in-person learning. We used CPS data for September–November (for 2019 and 2020) to create an adequate sample for state-to-state comparisons. We compared prepandemic employment levels in 2019 to employment during the first grading period of the 2020–2021 school year, corresponding to the time frame in ESOS.

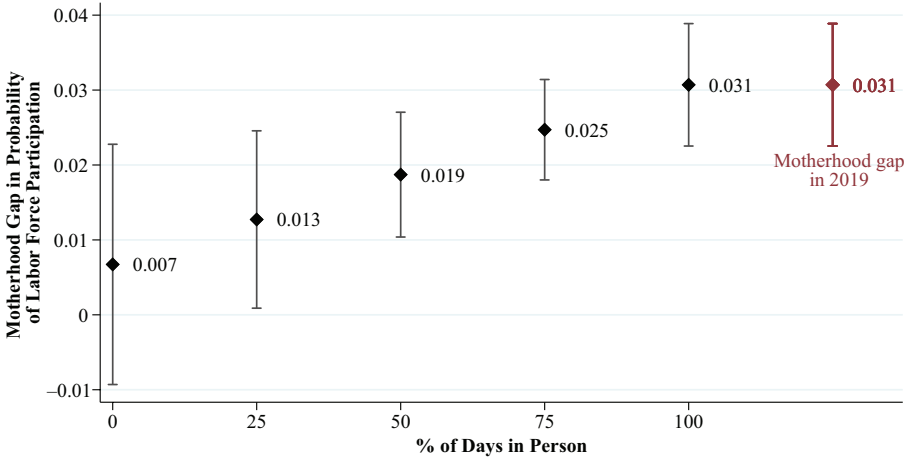
We employed two counterfactual comparison groups to isolate, as much as possible, the association of school operating status with mothers' labor force participation. First, we compared mothers and fathers aged 18–55 with a youngest child aged 5–12. Labor force attachment for fathers and mothers may be similarly affected by several unobserved state-level characteristics, but because mothers perform the majority of caregiving (Petts et al. 2020), the impact of a reduction of in-person schooling should be greater for mothers. Whereas the comparison of fathers and mothers is designed to isolate gendered caregiving allocations, we focused on the association with motherhood by using an additional counterfactual group to compare mothers aged 18–55 with a youngest child aged 5–12 with women aged 18–55 without children. By examining whether in-person schooling has a stronger association with mothers' labor force attachment than with that of women without children, we accounted for unobserved factors related to women's employment more generally. We used two independent linear probability models. Each model includes state-level fixed effects, individual-level controls, and the average daily rate of COVID-19 infections at the state level for each month of the analytic sample. We derived differences in labor force attachment between mothers and fathers and between mothers and women without children by employing interaction terms between motherhood status and the weighted percentage of in-person school days offered by a state.

Figure 5 shows that greater availability of in-person schooling was associated with a reduction in the gender gap in parents' labor force participation. This was driven via the association of in-person schooling and mothers', but not fathers', employment. An increase of one day of in-person schooling per week was associated with nearly a one-percentage-point increase in mothers' labor force participation relative to fathers ( $p < .05$ ). Figure 6, which compares mothers and women without children,





**Fig. 5** Gender gap in parents' probability of labor force participation by average share of time in in-person schooling. Linear probability models used fixed effects for state and year to account for unobserved state characteristics and overall labor force shifts between 2019 and 2020. Results were derived from an interaction between state-level percentage of in-person school days and gender. Controls include race, ethnicity, age, marital status, education, and state-level average daily cases of COVID-19 per 100,000 residents. Sample was restricted to parents with a youngest child aged 5–12 surveyed during fall 2019 and 2020.  $n=50,864$ . Coefficients are given with 95% confidence intervals.



**Fig. 6** Motherhood gap in women's probability of labor force participation by average share of time in in-person schooling. Linear probability models used fixed effects for state and year to account for unobserved state characteristics and overall labor force shifts between 2019 and 2020. Results were derived from an interaction between state-level percentage of in-person school days and motherhood status. Controls include race, ethnicity, age, marital status, education, and state-level average daily cases of COVID-19 per 100,000 residents. Sample was restricted to mothers with at least one child aged 5–12 and women without children surveyed during fall 2019 and 2020.  $n=108,540$ . Coefficients are given with 95% confidence intervals.

demonstrates a similar relationship: in-person schooling had a stronger relationship to mothers' labor force attachment. The effect size is about half of what was observed in comparing mothers and fathers, but remains significant ( $p < .05$ ). Our results indicate that mothers' labor force attachment was stronger where in-person schooling was more prevalent.

## Conclusion

Elementary school operating status varied across states and districts in the fall of 2020. Fifty-six percent of school districts operated in person, 25% operated remotely, and 20% were hybrid. Even though most districts adopted in-person instruction, these schools served only 38% of elementary school students, while remote schools served 45%. Remote learning was the modal instructional form for schools with a larger share of Hispanic students, whereas in-person learning was most common for school districts where White students were overrepresented. School districts with a larger share of Black students were more evenly split between in-person and remote learning. These racial disparities persisted across geographic location (urban, suburban, rural) and COVID-19 prevalence. Importantly, these disparities represent inequities in the options offered by school districts, rather than differences in parental uptake.

We show that reduced in-person learning was negatively associated with mothers' employment during the pandemic, while in-person education was positively associated with such employment. For each additional day of in-person schooling, we calculated between a half- and a one-percentage-point narrowing of the gap in mothers' labor force participation relative to women without children and to fathers, respectively. These associations remained significant when controlling for state-level COVID-19 infection rates. ESOS data provide state and federal governments, policy-makers, and advocacy groups with robust evidence to aid decision-making on school operations going forward. These data are also critical to support plans to address long-term implications for students who have experienced less in-person learning, as well as reentry support for mothers who have scaled back on employment in the absence of in-person instruction and care. ■

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## References

- Bauer, L. (2021, May 6). *Mothers are being left behind in the economic recovery from COVID-19*. Brookings. Retrieved from <https://www.brookings.edu/blog/up-front/2021/05/06/mothers-are-being-left-behind-in-the-economic-recovery-from-covid-19/>
- Centers for Disease Control and Prevention. (2021). *Operational strategy for K-12 schools through phased prevention* (CDC COVID-19 update). Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/operation-strategy.html>

- Cowan, J. (2020, July 17). Newsom order would keep most California schools online. *The New York Times*. Retrieved from <https://www.nytimes.com/2020/07/17/us/california-schools-reopening-newsom.html>
- Demillo, A. (2020, August 5). Arkansas: Schools must be open 5 days a week despite virus. *The Associated Press*. Retrieved from <https://apnews.com/article/virus-outbreak-arkansas-fc9d292679c2619ff0c331703b9f76c4>
- Dong, E., Du, H., & Gardner, L. (2020). An interactive web-based dashboard to track COVID-19 in real time. *Lancet*, 20, 533–534.
- Dorn, E., Panier, F., Probst, N., & Sarakatsannis, J. (2020, August 30). *Back to school: A framework for remote and hybrid learning amid COVID-19*. McKinsey & Company. Retrieved from <https://www.mckinsey.com/industries/public-and-social-sector/our-insights/back-to-school-a-framework-for-remote-and-hybrid-learning-amid-covid-19>
- Flood, S., King, M., Rodgers, R., Ruggles, S., & Warren, J. R. (2020). *Integrated public use microdata series, Current Population Survey: Version 8.0* [Data set]. Minneapolis, MN: IPUMS. <https://doi.org/10.18128/D030.V8.0>
- Fraser, J., Stucka, M., Bloch, E., Fradette, R., & Brugal, S. (2020, September 28). Florida schools reopened en masse, but a surge in coronavirus didn't follow, a USA Today analysis finds. *USA Today*. Retrieved from <https://www.usatoday.com/story/news/investigations/2020/09/28/florida-schools-reopened-en-mass-feared-covid-surge-hasn-t-followed/3557417001/>
- Goldstein, A. (2020, August 10). State issues metrics-based guidance schools can consider for reopening. *Pittsburgh Post-Gazette*. Retrieved from <https://www.post-gazette.com/news/education/2020/08/10/pa-reopen-schools-guidelines/stories/202008100089>
- Landivar, L. C., Ruppanner, L., Scarborough, W. J., & Collins, C. (2020). Early signs indicate that COVID-19 is exacerbating gender inequality in the labor force. *Socius*, 6. <https://doi.org/10.1177/2378023120947997>.
- Lynch, M. (2016, September 18). *Understanding federal funding part I: 3 types of school funding*. The Edvocate. Retrieved from <https://www.theedadvocate.org/understanding-federal-funding-part-3-types-school-funding/>
- McElrath, K. (2020, August 26). *Nearly 93% of households with school-age children report some form of distance learning during COVID-19*. United States Census Bureau. Retrieved from <https://www.census.gov/library/stories/2020/08/schooling-during-the-covid-19-pandemic.html>
- Morgan, I., & Amerikaner, A. (2018). *Funding gaps: An analysis of school funding equity across the U.S. and within each state* (Report). Washington, DC: Education Trust. Retrieved from <https://files.eric.ed.gov/fulltext/ED587198.pdf>
- Oregon Health Authority. (2020). *Ready schools, safe learners: Community COVID-19 metrics* (Oregon Department of Education report). Retrieved from <https://www.oregon.gov/oha/ph/diseasesconditions/diseasesaz/emerging%20respiratory%20infections/ready-schools-safe-learners-community-covid-19-metrics.pdf>
- Petts, R., Carlson, D. L., & Pepin, J. (2020). *A gendered pandemic: Childcare, homeschooling, and parents' employment during COVID-19* (SocArXiv Papers). <https://doi.org/10.31235/osf.io/gwkzx>
- Thompson, C. (2021, February 8). *Schools plan for potential of remote learning into the fall*. ABC News. Retrieved from <https://abcnews.go.com/Health/wireStory/schools-plan-potential-remote-learning-fall-75752218>
- U.S. Department of Education. (2005). *10 facts about K-12 education funding* (No Child Left Behind report). Retrieved from <https://www.ed.gov/about/overview/fed/10facts/index.html>

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Liana Christin Landivar (corresponding author)  
[landivar.liana.c@dol.gov](mailto:landivar.liana.c@dol.gov)

*Landivar* • Women's Bureau, U.S. Department of Labor, Washington, DC, USA; Maryland Population Research Center, College Park, MD, USA; <https://orcid.org/0000-0001-5141-9344>

*Ruppanner* • School of Social and Political Sciences, University of Melbourne, Melbourne, Australia; <https://orcid.org/0000-0002-6111-1914>

*Rouse* • School of Social and Political Sciences, University of Melbourne, Melbourne, Australia

*Scarborough* • Department of Sociology, University of North Texas, Denton, TX, USA; <https://orcid.org/0000-0002-1566-4921>

*Collins* • Department of Sociology, Washington University in St. Louis, St. Louis, MO, USA; <https://orcid.org/0000-0002-9358-8151>