

Supplementary Material for “Revisiting Pediatric Covid-19 cases in
Counties With and Without School Mask Requirements—United
States, July 1—October 20 2021”

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1 Notes on Sample Construction and Replication

Two factors make it impossible to exactly replicate the CDC study by Budzyn et al. First, it is unclear how that study treated school districts that cross county lines, as well as those counties which contain multiple school districts. This is important because mask policies are set at the district level while case data are only available at the county level, and the two levels of geography do not map clearly to one another. This paper assigns each such district to each county of which it is a part, thereby duplicating some school districts.

Second, Budzyn et al obtain school masking rules, and other school district variables, from MCH, which in turn obtains these from phone surveys of school districts. MCH updates school district information frequently. This study uses MCH data that were current as of October 15, 2021. The CDC study used information from much earlier, which was likely to have been different as school district information changes regularly and the MCH information also sometimes conflicts with other sources.

Our study finds 565 counties that satisfy the selection criteria used by Budzyn et al, in contrast to the 520 counties used in that study. The difference is likely due to the reasons provided above.¹ This is why the results of our replication cannot line up exactly with those in Budzyn et al although, as we show below, the results are very similar.

Note that, of the 565 counties that fit the criteria in Budzyn et al, 270 imposed mask requirements in schools and 295 did not. In comparison, in our full sample of 1832 counties, 776 had school mask requirements and 1056 did not.

2 Inclusion of the CCVI variable

Budzyn et al control for a number of covariates in their analysis, including the Social Vulnerability Index (SVI) and the Community Covid-19 Vulnerability Index (CCVI). The CCVI was developed by a private company, Surgo Ventures, who state that it is based on the SVI.² These variables are indeed very similar with a correlation between them of 0.85. It is unclear why both were included as covariates, in addition to multiple other variables associated with social vulnerability including poverty, population density and percent uninsured.

Including all these variables as regression controls is an unusual choice, because it increases the standard error of the estimated coefficients. In the case of the Budzyn et al study, it turns out that the resulting estimates are highly sensitive to the choice of controls. As we show in the next section, it appears likely that the main regression coefficient in the Budzyn et al regression is only statistically significant when all these variables are included, and not if the CCVI variable is dropped. Upon dropping the largely redundant CCVI covariate, the significant result in the

¹When contacted, the corresponding author of the CDC study did not clarify this issue and declined to share the code used to construct the sample.

²See <https://precisionforcovid.org/ccvi> and <https://www.atsdr.cdc.gov/placeandhealth/svi/index.html>

specification that attempts to replicate the Budzyn et al analysis ($p = 0.019$) is no longer significant ($p = 0.076$). In terms of our analysis, dropping the CCVI resulted in significantly higher case numbers in the masked counties, as described in the main manuscript text.

3 Additional Figures and Regression Specifications

Figure 1 reproduces the main Figure in the CDC study and is very similar. It suggests a negative correlation between school mask mandates and pediatric Covid-19 case rate changes, as counties with school mask mandates appear to exhibit smaller spikes in cases following school reopening than those without such mandates.

Figure 2 extends the sample to use 1832 counties, and up to 6 weeks after the opening of school. We measure the change in case rates from three weeks prior to the start of school.³ In all cases, schools without mask requirements did not see a rises in cases, relative to schools with mask requirements, that was statistically significant. Specifically, we tested the null hypothesis that the difference in means was zero against a one-sided alternative that schools without mask requirements had a larger increase in cases. We failed to reject the null in all cases; in other words, we identified no significant correlation. P-values ranged from 0.99 for week -3 to week 1, to 0.11 from week -3 to week 6.

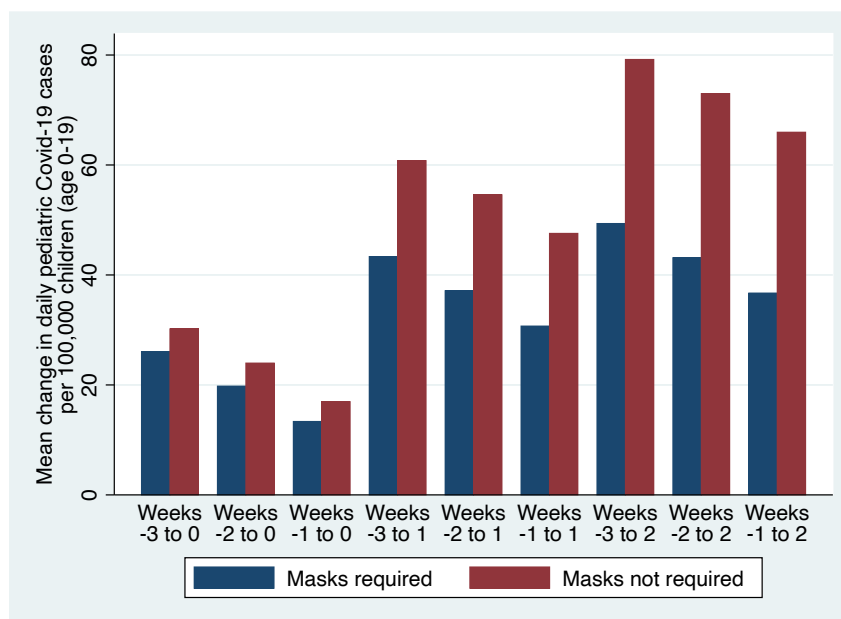
Table 1 presents six regression specifications. The specifications in Column 1 regresses pediatric cases per capita on the control variables used by Budzyn et al, but using the sample of 1832 counties for the first 7 weeks that schools were open. Column 2 adds week fixed-effects to the specification of Column 1.⁴

Columns 3 and 4 omit the CCVI variable that was employed by Budzyn et al, with Column 4 adding week fixed-effects again. Finally, Columns 5 and 6 estimate the regression for the 565 counties that fit the Budzyn et al specification. The result of Column 5 shows the only case where there is a statistically significant association between school mask requirements and pediatric cases, though this is no longer the case when the CCVI variable is dropped in the specification of Column 6.

³Note that the results are sensitive to the choice of starting week: if we instead use two or one week prior to the start of school as the baseline, we observe greater case growth rates in counties without mask mandates in the first few weeks of school. However, in all scenarios, by week 6 of school opening, there is no statistically significant difference in case rates between counties with and without mask requirements.

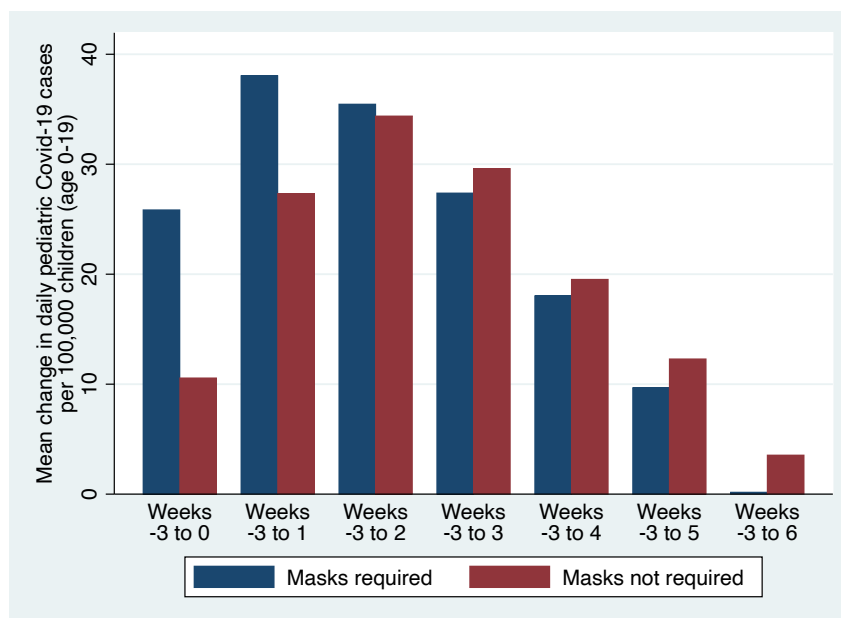
⁴Budzyn et al do not state that they use week fixed-effects, but these seem natural to control for, as we see a regular pattern, across the entire country, of high case rates around the time of school opening that then subsided as the term continued.

Figure 1: Recreation of Figure in Budzyn et al (2021)



Notes: This figure attempts to recreate the main Figure in Budzyn et al (2021). The sample consists of 565 counties that met the criteria used in the CDC study. This figure is larger than the 520 counties used in that study, likely due to updated information from MCH.

Figure 2: Change in Pediatric Cases, 1832 Counties



Notes: This figure plots the change in pediatric case rates per 100,000 from three weeks prior to the start of school until up to 6 weeks after school opening, separately for counties with and without school mask requirements.

Table 1: Regression of Pediatric Cases per 100,000

Regression Number:	1832 counties				565 Counties	
	(1)	(2)	(3)	(4)	(5)	(6)
School Mask Requirement	1.339 (0.051)	1.279 (0.058)	3.564 (0.000)	3.507 (0.000)	-4.892 (0.019)	-3.692 (0.076)
Adult Cases per 100K	1.213 (0.000)	1.194 (0.000)	1.215 (0.000)	1.196 (0.000)	1.492 (0.000)	1.501 (0.000)
Percent Uninsured	-0.538 (0.000)	-0.558 (0.000)	-0.334 (0.000)	-0.353 (0.000)	-0.338 (0.173)	-0.094 (0.702)
Percent in Poverty	0.536 (0.000)	0.531 (0.000)	0.317 (0.000)	0.312 (0.000)	0.859 (0.000)	0.702 (0.001)
Population Density	-0.001 (0.191)	-0.001 (0.162)	0.001 (0.310)	0.001 (0.329)	0.003 (0.709)	0.015 (0.025)
Social Vulnerability Index	-14.062 (0.000)	-13.558 (0.000)	8.371 (0.000)	8.911 (0.000)	-26.470 (0.000)	-2.338 (0.648)
Community Vulnerability Index	27.109 (0.000)	27.154 (0.000)			30.886 (0.000)	
Percent Non-Hispanic White	-1.508 (0.476)	-0.892 (0.667)	-2.449 (0.251)	-1.836 (0.380)	0.703 (0.906)	3.262 (0.584)
Median Age	0.772 (0.000)	0.768 (0.000)	0.742 (0.000)	0.738 (0.000)	1.240 (0.000)	1.186 (0.000)
Pediatric Vaccination Rate	1.411 (0.528)	1.320 (0.546)	-1.256 (0.576)	-1.352 (0.540)	-2.128 (0.755)	-7.528 (0.268)
Intercept	-37.165 (0.000)	-40.113 (0.000)	-33.032 (0.000)	-35.973 (0.000)	-61.641 (0.000)	-57.191 (0.000)
Week Fixed-Effects	No	Yes	No	Yes	No	No
R ²	0.659	0.673	0.652	0.666	0.709	0.705
Obs	12824	12824	12824	12824	2260	2260

Note: p -values in parentheses.