Comparing 2020-2021 Absences to Longitudinal Averages

Technical Report

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Overview

Chronic absenteeism became a part of the state accountability structure after the 2016-2017 school year (SY1617). The introduction of the chronically out-of-school indicator increased district-level attention on student absence trends. The office of Research, Evaluation, and Assessment (REA) developed a methodology to study student absences to provide better context for drivers of the chronic absenteeism indicator. The model developed in this study may be used to monitor trends in student absences in SY2021 and subsequent years.

The findings of this study highlight several patterns related to student absences. Student absences tend to follow regular patterns year-over-year, with increased absences on Fridays, days preceding student holidays, and generally increases as the year progresses. Analysis of the shortened 2020-2021 school year suggests that unpredictable events (especially inclement weather days) may lead to daily spikes in absences that could have consequences on the district-level chronically absent rate.

Methodology

Absence data from SY1415 through SY1819 was extracted from EMIS, the Knox County Schools' (KCS) data warehouse. SY1920 absence data was extracted from the ASPEN database after the EMIS platform was sunset in the spring of 2020. SY1920 absence data was extracted from ASPEN using Microsoft SQL Server Management Studio version 18.6. The data for all years include both excused and unexcused absences.

Results

The initial exploration of the data involved plotting the raw number of absences versus the days elapsed since the start of the school year. Figure 1 displays the results of this analysis.

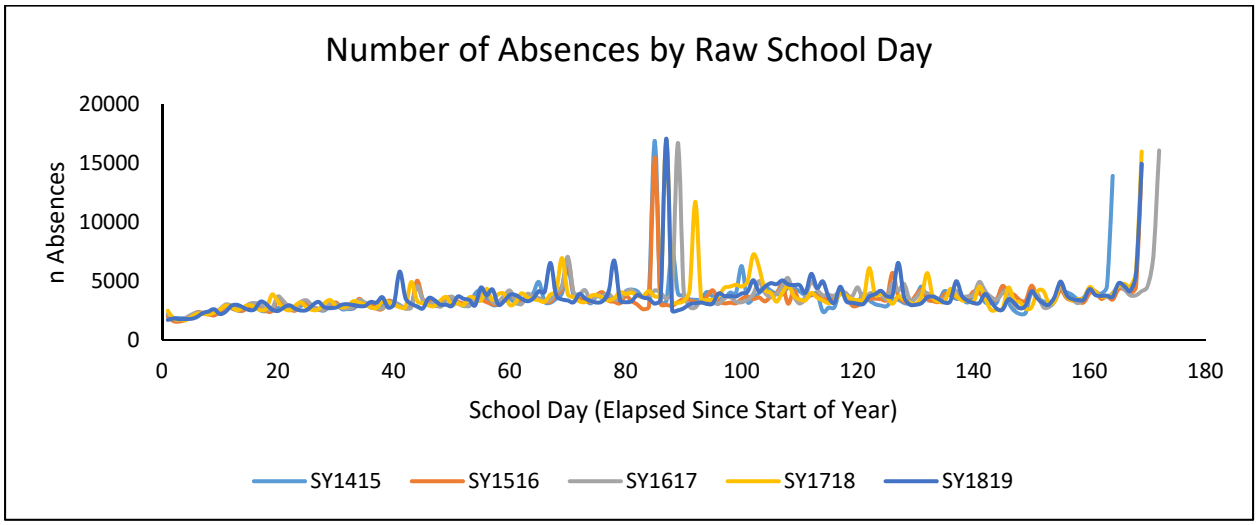


Figure 1: Number of Absences by School Day; Raw Data

Consider the following highlights from Figure 1:

- The data needs to be time-shifted to clarify year-over-year comparisons of absence data.
    - There are weekly cycles of absences, with the greatest number of absences tending to occur on Fridays. The lowest number of absences tend to occur on Tuesdays and Thursdays. Data needs to be aligned by day of the week for comparison purposes.
    - There are large spikes in absences leading into student holidays. Data needs to be time-shifted to align attendance data near student holiday windows.
- The number of absences in the district remains relatively constant despite slight fluctuations in student enrollment between SY1415 to SY1819. Comparing the raw number of absences year-over-year at the district level should be sufficient for drawing conclusions from the data. There appears to be little need to complicate the analyses using an absence rate (the percent of daily enrollment that is absent) because of the consistency in the raw number of absences.

The raw attendance data was manipulated to align student holidays and days of the week. This time-shifted data is plotted in Figure 2. The annual trends are stacked in Figure 3 to better illustrate the level of alignment in year-over-year data. Gaps in the intra-year plots represent student holidays or school cancellation days (weather and/or illness cancellations).

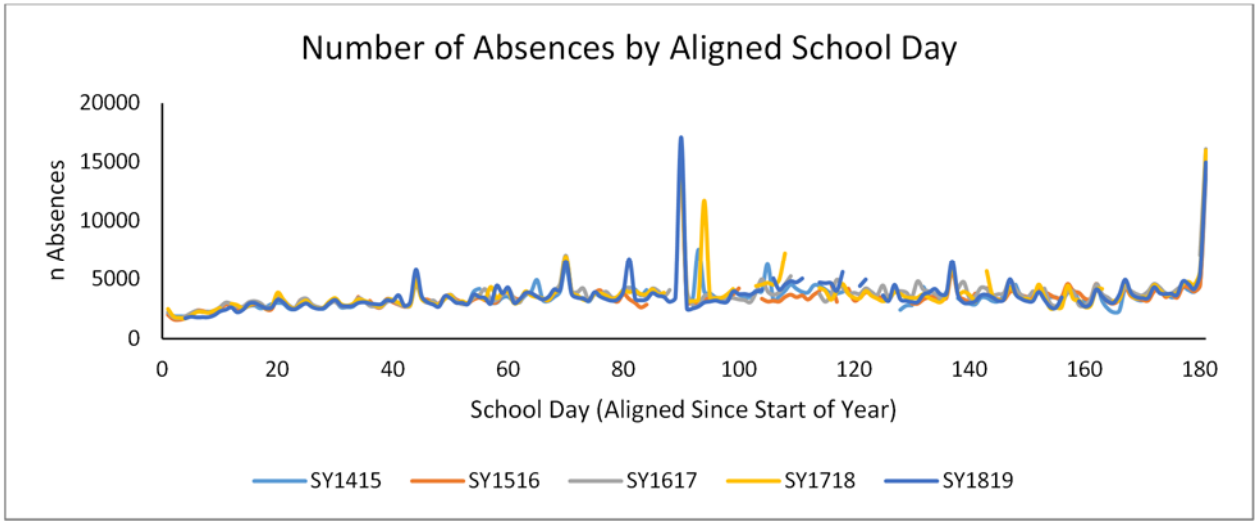


Figure 2: Number of Absences by School Day; Aligned Data

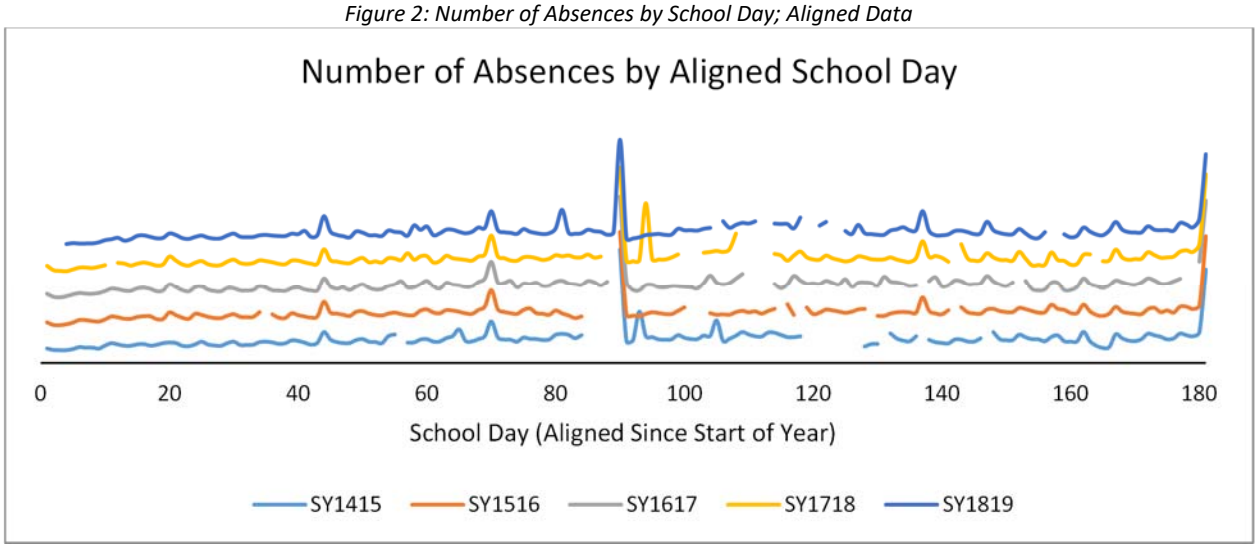


Figure 3: Stacked plot of Absences by School Day; Aligned Data

Consider the following highlights from Figures 2 and 3:

- The days before the start of the winter holiday and the last day of school are the instructional days with the largest number of absences. More than a quarter of KCS students were absent on these days in each of the five years investigated in this study.

- Year-over-year absence trends become less regular in the second semester during January and February when school cancellations (due to illness and weather) generally become more frequent.

A composite attendance profile was constructed from the aligned student absence data from SY1415 to SY1819. The composite profile was constructed from five-year mean absences as a function of the (aligned) school day, along with the 95% confidence interval for the mean. The mean number of absences is represented by the black line in Figure 4. The 95% confidence interval is presented as the gray shaded area in Figure 4.

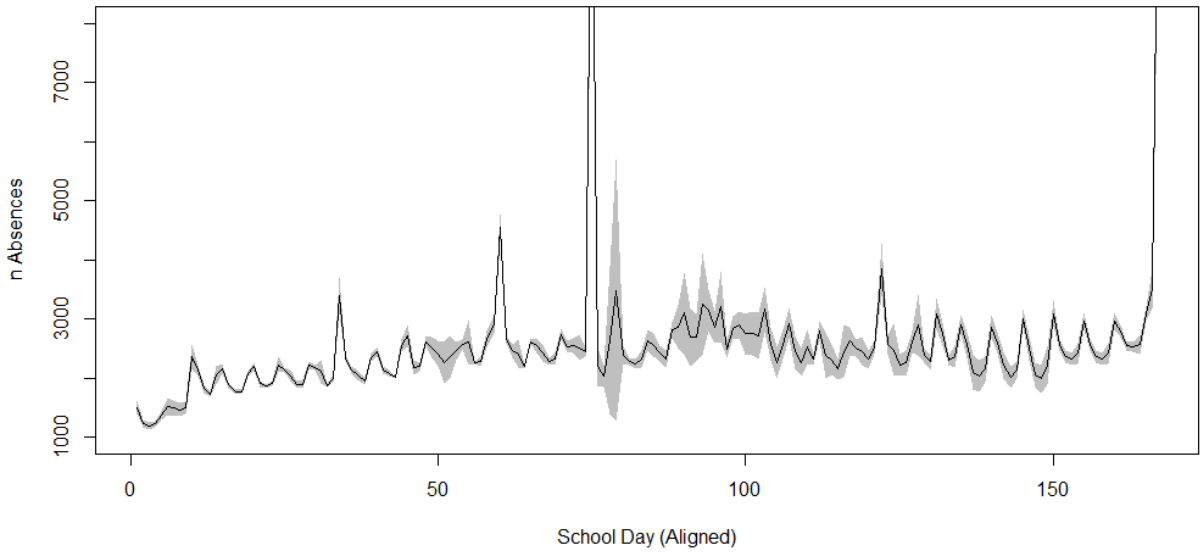
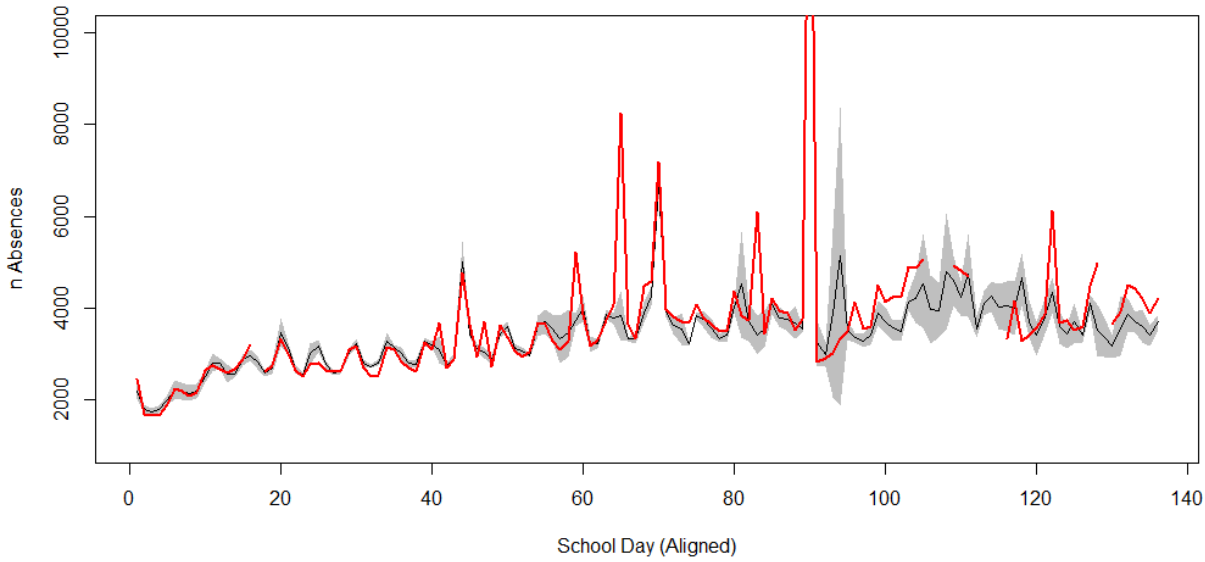


Figure 4: Final Absence Model

The model in Figure 4 illustrates the increased variability in the number of absences early in the spring semester, increases in Friday absences in the second semester, and a slight increase in general absences as the school year progresses.

The absence data from SY1920 was compared to the SY1516-SY1819 model. Figure 5 contains the five-year mean number of absences (black solid line), the 95% confidence interval on the five-year mean (grey area), and the SY1920 number of absences (red line).



The absence data in SY1920 largely follows the five-year absence model. There were ten dates in which the number of district-level excess absences (the difference between SY1920 absences and the upper 95% confidence interval on the five-year mean) was at least 500 students. These dates are shown in Table 1.

Table 1: SY1920 Excess Absences

Day	Date	Upper 95% CI	SY1920 Absences	Excess Absences
65	11/12/2019	4381	8238	3857
83	12/11/2019	3831	6102	2271
122	2/21/2020	4673	6116	1443
59	11/1/2019	3895	5206	1311
128	3/2/2020	4090	4975	885
96	1/14/2020	3459	4126	667
47	10/16/2019	3157	3703	546
103	1/24/2020	4355	4898	543
133	3/9/2020	3915	4430	515
101	1/22/2020	3729	4238	509

The two days with the largest excess absences were November 12, 2019 and December 11, 2019. Per district website archives, both of these days were affected by weather delays. Excess absences were greater than 1,000 for November 1, 2019 with no readily apparent underlying reason. Other than October 16, 2019, all other dates with high excess absences occurred leading into extended school closures for illnesses during the second semester.

Conclusions & Considerations

Analysis of the trends in absence data collected between SY1415 and SY1920 allows for a better understanding of student attendance patterns within the district. The data confirms that the number of absences is higher on Fridays and on days preceding student holidays. The data suggests that absences are less predictable during January and February (likely due to winter illness impacting regular attendance trends) and that student attendance is significantly impacted by inclement weather delays. The data provides some evidence that fluctuations in the district-level chronically absent rate are largely due to unpredictable events (weather delays, onset of winter illness, single-day spikes in the number of absent students) rather than global increases in absence rates.

The results of this study illustrate the importance of analyzing attendance data while respecting relevant time-series trends. Comparison of annual absence data is likely best accomplished by comparing attendance on aligned school days, rather than aggregated by semester or month. The findings of this study may help inform how the district approaches policy adjustments, procedural changes, and intervention practices designed to impact student attendance.