

FULL HOSPITALS, EMPTY CLASSROOMS: THE IMPACT OF THE COVID-19
PANDEMIC ON CHRONIC ABSENTEEISM IN SCHOOLS

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Abstract

Educators across the United States are holding their breath to see if their empty classrooms during the height of the COVID-19 pandemic remain so even after an end to widespread school closures. Existing research on chronic absenteeism has yielded insight into which students are particularly vulnerable to missing school and the debilitating long-term impacts for chronically absent students. This paper employs panel methods to analyze to explore how the pandemic impacted the rates and realities of chronic absenteeism in New York City public schools, relying on cross-sectional and panel observation data across several years from publicly available chronic absenteeism and demographic data of over 1,800 Department of Education schools, COVID-19 death and case rates from the NYC Department of Health and Mental Hygiene, and economic indicators from the US Census. This paper finds that the COVID-19 death rate of a community was associated with increased rates of chronic absenteeism within its schools, as were a range of economic and demographic characteristics that point to a sustained and amplified absenteeism crisis without targeted, immediate action from policymakers.

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1. Introduction

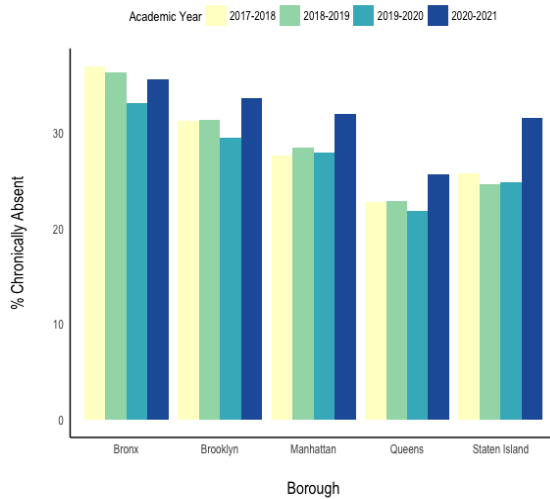
The COVID-19 pandemic has super-charged one of the United States public school system's most intractable problems - chronic absenteeism. For years, education officials and policymakers have sounded alarm bells about the significant number of students enrolled in public schools that are chronically absent, defined as missing 10% or more of school days within a year. These students have consistently been shown to have a higher likelihood of dropping out, performing poorly academically, and experiencing interactions with the criminal justice system than their present peers. Then, in March 2020, school doors closed and in-person learning shifted to remote instruction, which would remain the status quo for most schools across the United States for the following year. This drastic shift in how students interacted with schools and communities was accompanied by widespread economic fallout, social isolation, and the seismic health impact of the COVID-19 disease. What this means for schools across the country and the nation's young people has yet to be fully grappled with.

This paper uses data from the New York City Department of Education, the NYC Department of Health and Mental Hygiene, and the US Census Bureau to understand how the COVID-19 pandemic impacted the landscape of chronic absenteeism in New York City. New York City was an ideal starting point for this analysis due to its robust reporting requirements of public schools, the wide range of economic and cultural lived experiences of its residents and its status as the largest public school system in the United States. New York City was also among the places most impacted by the spread of COVID-19, an early epicenter in the United States with extensive rates of infection across the population.¹ As can be seen in **Figure 1** and **Figure 2**,

¹ Jose Olmo and Marcos Sanso-Navarro, "Modeling the Spread of Covid-19 in New York City," *Papers in Regional Science* 100, no. 5 (2021): 1209-1229, <https://doi.org/10.1111/pirs.12615>.

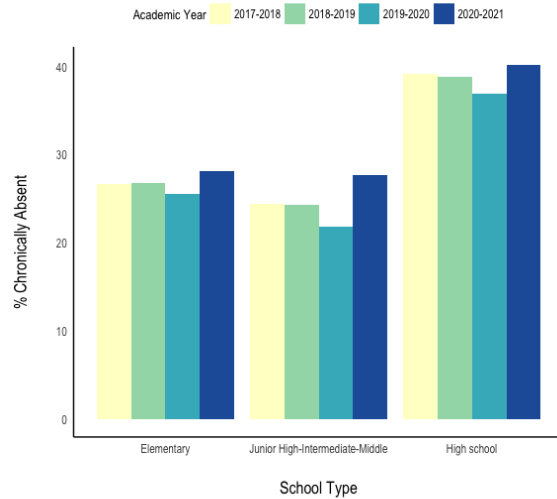
chronic absenteeism increased in all five boroughs across New York and all levels of schooling on average even after years of improvement.

Figure 1 | Chronic Absenteeism in NYC Department of Education Schools
Based on reporting for 1510 schools



** Only includes schools with data for all years reported. Schools by borough: Bronx (352), Brooklyn (456), Manhattan (280), Queens (347), Staten Island (75).
Source: (1) New York City Department of Education, School End-of-Year Attendance and Chronic Absenteeism Data, (2) New York City Department of Education, School Locations Report

Figure 2 | Chronic Absenteeism in NYC DOE Schools by School Level
Based on reporting for 1230 schools in New York City



** Only includes schools with data for all years reported. Schools by level: Elementary (636), Junior High-Intermediate-Middle (253), High School (341).
Source: (1) New York City Department of Education, School End-of-Year Attendance and Chronic Absenteeism Data, (2) New York City Department of Education, School Locations Report

This paper uses panel methods and fixed effects regression to determine what factors may be most inextricably linked with the increased rates of chronic absenteeism, finding that while a higher death rate from COVID-19 in the community of a school was associated with increased rates of sustained absenteeism, other economic and demographic factors proved more consequential such as the percentage of Black and Hispanic students in a school, the percentage of students with disabilities, the percentage of students eligible to receive HRA benefits, the unemployment rate of the community and the poverty level of a community. This confirms pre-existing research showing that low-income students, students of color, and students with disabilities are all at a higher risk of chronic absenteeism and that this risk may have been amplified by the unequal, disproportionate impact of the pandemic from an economic and health perspective.

By all indications, the pandemic has heightened the pre-existing structural inequities that have impacted low-income students and students of color in unexpected and profound ways. There is no reason chronic absenteeism is immune from this nor are the complex relationships between students, their families, and their environments. In order to effectively respond to the pandemic and its impact on chronic absenteeism, it is imperative to first understand the factors most relevant to specific communities and schools. This paper finds that while there are some similarities in risk factors for chronic absenteeism shared across schools, specific boroughs and types of schools have unique dynamics that could serve as targeted points of intervention for policymakers and future areas of study.

2. Literature Review

2.1 The Promise of Attendance and the Perils of Chronic Absenteeism

Across the United States, attendance is among the most critical indicators of the health of a school; a signal of engagement and a measure of its capacity to provide consistent instruction to students during their formative years. For many school districts, attendance metrics are directly linked to performance evaluations and funding, largely based on the fundamental belief in the link between attendance and educational outcomes.² Research has shown that schools with higher rates of attendance have improved standardized test scores, narrowed achievement gaps, and increased rates of graduation.³ As such, education practitioners and policymakers have attempted a wide array of interventions from leveraging parent relationships to incentivizing timeliness to communication campaigns in order to increase attendance in schools.⁴

² Todd L. Ely, and Mark L. Fermanich. "Learning to Count: School Finance Formula Count Methods and Attendance-Related Student Outcomes." *Journal of Education Finance* 38, no. 4 (2013): 343-369. muse.jhu.edu/article/539775.

³ Steven B. Sheldon and Joyce L. Epstein. "Getting Students to School: Using Family and Community Involvement to Reduce Chronic Absenteeism," *School Community Journal* 14, no. 2 (2004): 39-56. <https://www.adi.org/journal/fw04/>.

⁴ Todd Rogers and Avi Feller, "Reducing Student Absences at Scale by Targeting Parents' Misbeliefs," *Nature Human Behaviour* 2, no. 5 (2018): 335-342, <https://doi.org/10.1038/s41562-018-0328-1>.

At the individual student level, the relationship between attendance and future outcomes is well-documented. Students with higher rates of attendance are more likely than their absent peers to graduate on time and perform well academically.⁵ Researchers have found positive correlations between attendance and GPAs and standardized test results, even when controlling for an array of demographic and family indicators.⁶ There have also been consistently proven links between early grade attendance and ELA and Math proficiency in later years with many scholars also stressing the particular importance of building healthy attendance habits at an early age.⁷ The inverse is true for those students who are not present, especially for those whose absences pass a threshold into the domain of chronic absenteeism. Students who are chronically absent, defined as missing 10% or more of the school year, are susceptible to a wide range of adverse outcomes.⁸ Chronic absenteeism has been linked to an increased likelihood of dropping out of school with some studies finding as many as 65% of high school dropouts exhibiting a pattern of absenteeism before their secondary schooling ended.⁹ Additionally, research has shown there is a higher likelihood of anxiety, depression, and substance abuse for students who are absent at higher rates than their peers.¹⁰ Chronically absent students are also more likely to have interactions with the criminal justice system and disciplinary systems that can create cyclical, enduring negative ramifications for their future academic careers, employment, lifetime earning potential, relationships, and a range of other outcomes.¹¹

⁵ Elaine Marie Allensworth and John Q. Easton, *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, IL: Consortium on Chicago School Research at the University of Chicago, 2007).

⁶ Michael A. Gottfried, "Evaluating the Relationship between Student Attendance and Achievement in Urban Elementary and Middle Schools," *American Educational Research Journal* 47, no. 2 (2010): 434-465, <https://doi.org/10.3102/0002831209350494>.

⁷ *Attendance in Early Elementary Grades: Association with Student Characteristics, School Readiness and Third Grade Outcomes*, Applied Survey Research, May 2011.

⁸ Hedy N. Chang and Mariajose Romero, *Present, Engaged and Accounted For: The Critical Importance of Addressing Chronic Absence in the Early Grades*, National Center for Children in Poverty, (New York: NY, 2008), <https://doi.org/10.7916/D84B392G>.

⁹ John M. Bridgeland, John, J. Dilulio, and Karen B. Morison, *The silent epidemic: Perspectives of high school dropouts*. Civic Enterprises, (Washington, DC: 2006).

¹⁰ Sachine Shinde et al., "Factors Associated with School Absenteeism and Grade Retention among Young Adolescents in Addis Ababa, Ethiopia," *Health Behavior and Policy Review* 9, no. 2 (January 2022), <https://doi.org/10.14485/hbpr.9.2.7>.

¹¹ Todd Rogers and Avi Feller, "Reducing Student Absences at Scale by Targeting Parents' Misbeliefs," 335.

The scale of chronic absenteeism in the United States is staggering and has been for a while. In 1998, the Department of Education found that 15% of teachers at public schools reported absenteeism as a “serious problem” for their school.¹² As of 2017, one in ten schools in the United States was reporting “extreme absenteeism”, a case in which at least 30% of their student body was chronically absent.¹³ However, even given the anecdotal scale of the problem, there is a lack of transparency in how chronic absenteeism has changed over time due to misalignment in how schools report attendance information, if at all. There are differing definitions of chronic absenteeism at the federal level, making it difficult to have comprehensive analyses across states, and often chronic absenteeism will be left out of the attendance calculations altogether. The most common form of reporting for attendance is average daily attendance, which can give a misleading sense of whether the attendance is comprised of several chronically absent students or many students absent for a day or two at a time.¹⁴ Chang and Romero (2008) have also noted that school districts serving low-income, majority students of color also tend to have more missing data, which is especially problematic given that this is where chronic absenteeism tends to be most pronounced.¹⁵ Taken together, researchers have struggled to rely on publicly available data for analysis, especially data at the student level that could provide a more comprehensive sense of what factors may be associated with a student’s pattern of absences.¹⁶

2.2 The Causes of Chronic Absenteeism

There has been substantial research into the potential causes of chronic absenteeism, albeit little to no research about how these dynamics may have shifted during the COVID-19

¹² U.S. Department of Education, *Digest of education statistics*. National Center for Education Statistics (NCES). (Washington, DC: 1998)

¹³ Attendance Works, *Portraits of change: Aligning school and community resources to reduce chronic absence*, Everyone Graduates Center, (September 2017).

¹⁴ Ibid.

¹⁵ Chang and Romero, *Present, Engaged and Accounted For: The Critical Importance of Addressing Chronic Absence in the Early Grades*, 7.

¹⁶ Gottfried, “Evaluating the Relationship between Student Attendance and Achievement in Urban Elementary and Middle Schools,” 434.

pandemic. It is imperative to note when considering the case of a chronically absent student that there is no distinction made for whether the absences are excused or unexcused. Balfanz and Byrnes (2012) have defined three categories of chronic absenteeism: (i) students who *cannot attend* school due to “illness, family responsibilities, housing instability, the need to work or involvement with the juvenile justice system”, (ii) students who *will not attend* in order to “avoid bullying, unsafe conditions harassment and embarrassment”, and (iii) students who *do not attend* because they “they, or their parents, do not see the value in being there, they have something else they would rather do, or nothing stops them from skipping school.”¹⁷ While this is a helpful taxonomy for categorizing some reasons for absenteeism, it runs the risk of oversimplification and does not make explicit the reality that any given student may have more than one factor influencing their attendance. In fact, researchers have shown that students who have “cumulative exposure to risk” - experiencing more than three or more indicators of risk at a time - are likely to have higher rates of absenteeism than their peers without any single category of risk.¹⁸ Among the categories of risk that were associated with absenteeism are poverty, a teenage mother, a single mother, low maternal education, welfare recipient status, unemployment, a mother with poor health, food insecurity, and four or more children at home.¹⁹

Unsurprisingly, a large body of work related to the association between absenteeism and attendance has focused on their family’s socioeconomic status. Research has shown that students experiencing homelessness are more likely to be absent than their peers, as are students whose families are highly mobile, which often leads to transferring schools and significant life changes like shifts in their parents’ employment status, housing, and social networks of support.²⁰

¹⁷ Robert Balfanz and Vaughn Byrnes, *Chronic Absenteeism: Summarizing What We Know From Nationally Available Data*, Johns Hopkins University Center for Social Organization of Schools, (Baltimore, MD: 2012).

¹⁸ National Center for Children in Poverty, *How Maternal, Family and Cumulative Risk Affect Absenteeism in Early Schooling: Facts for Policymakers*, Columbia University, (New York, NY: 2008).

¹⁹ Ibid.

²⁰ Chang and Romero, *Present, Engaged and Accounted For: The Critical Importance of Addressing Chronic Absence in the Early Grades*, 13.

Low-income students, generally, are more likely to experience higher rates of chronic absenteeism. According to a National Center for Education Statistics survey sample of 4th and 8th graders in 2005, students experiencing conditions of poverty are 25 percent more likely to miss three or more days of school in a month.²¹ Using a nationally representative sample of children entering kindergarten through The Early Childhood Longitudinal Study of 1998, Romero and Lee (2007) found that children with families below the federal poverty level were four times more likely to be chronically absent than their peers in kindergarten.²² As such, higher rates of absenteeism have been observed in schools where more students meet the qualifications for free or reduced-price lunches as well as school districts in which a larger share of families are at or below the federal poverty level. Race is also frequently used as a predictor of absenteeism. In the United States, according to the Department of Education, high school students of color have the highest observed rates of absenteeism with Latino and Black students particularly affected by chronic absenteeism.²³ Crucially, not only are low-income students and students of color more likely to be chronically absent, but research has shown that these students are more likely to experience negative consequences of absenteeism than their wealthier, whiter peers.²⁴

It is imperative to view factors relating to attendance through an intersectional lens. Race, socioeconomic status, and economic development are all inextricably tied in the United States, and these linkages produce downstream effects that impact attendance for students. For example, research has shown that chronic illness - either of the student or a parent - is among one of the highest predictors of absenteeism.²⁵ However, research has also found that students who are

²¹ U.S. Department of Education, *The Condition of Education*. National Center for Education Statistics (NCES). (Washington, DC: 2006)

²² Mariajose Romero and Young-Sun Lee, *A National Portrait of Chronic Absenteeism in the Early Grades*, National Center for Children in Poverty, (New York: NY, 2007), <https://doi.org/10.7916/D89C7650>.

²³ Ain A. Grooms and Diana Galvez Bohorquez, "What's Your Excuse? Sensemaking about Chronic Absenteeism in a Rural, Latinx High School," *Journal of School Leadership* 32, no. 4 (2021): 384-405, <https://doi.org/10.1177/10526846211026260>.

²⁴ Douglas D. Ready, "Socioeconomic Disadvantage, School Attendance, and Early Cognitive Development," *Sociology of Education* 83, no. 4 (2010): 271-286, <https://doi.org/10.1177/0038040710383520>.

²⁵ Ibid.

chronically sick and from low-income families have an even more pronounced likelihood of chronic absenteeism.²⁶ Low-income families are more likely to live in neighborhoods with air or water pollution, which increases the likelihood of contracting chronic illnesses like asthma, while also being more likely to lack access to health insurance or health care that could mitigate the effects of the chronic illness.²⁷ There is a compounding, cyclical effect in many of these indicators that leave students in a particularly volatile position as it relates to attending school. This is true of other indicators linked to socioeconomic realities such as geographic distance from school and access to transportation for which researchers have shown that students who live further away from their schools are more likely to be absent than their peers who live closer, as are students without access to reliable transportation to and from school.²⁸ Schools that are larger, in urban settings, and with students that have negative perceptions of their teachers are also likely to have lower rates of attendance and are difficult to disentangle from a broader intersectional, socioeconomic, and racial nexus.²⁹

2.3 The COVID-19 Pandemic and Chronic Absenteeism

In March 2020, the COVID-19 pandemic led to the large-scale closures of schools across the United States with remote learning being the reality for upwards of 50% of students still in December 2020.³⁰ On the global scale, the United Nations estimates that the closures of schools and other places of learning impacted 94% of the world's students.³¹ There has been much debate about the effectiveness of these closures and the projected long-term effects. Researchers have sounded alarms about a learning loss crisis, a protracted and more profound reduction in literacy

²⁶ Chang and Romero, *Present, Engaged and Accounted For: The Critical Importance of Addressing Chronic Absence in the Early Grades*, 13.

²⁷ Ibid.

²⁸ Marc Schlossberg et al., "School Trips: Effects of Urban Form and Distance on Travel Mode," *Journal of the American Planning Association* 72, no. 3 (2006): 337-346, <https://doi.org/10.1080/01944360608976755>.

²⁹ Sheldon and Epstein, "Getting Students to School: Using Family and Community Involvement to Reduce Chronic Absenteeism," 45.

³⁰ Matt Hawrilenko et al., "The Association between School Closures and Child Mental Health during COVID-19," *JAMA Network Open* 4, no. 9 (March 2021), <https://doi.org/10.1001/jamanetworkopen.2021.24092>.

³¹ United Nations, *Policy brief: Education during COVID-19 and beyond*, United Nations, (2020)

and numeracy levels than the regular summer break losses, which is likely to widen the gap between low-income and high-income students even further.³² According to extensive case studies, school closures have led to changes in teaching methods, decreased access for students without the space, time, or infrastructure to learn remotely, reduced feedback from teachers, and a wide array of emotional stressors; all of which have drastically impacted their ability to learn throughout the course of the pandemic.³³

However, the pandemic's effect on chronic absenteeism is not yet understood. The exacerbation of economic stress due to widescale disruption and unemployment may be responsible for the instigation of a wide array of predictors of chronic absenteeism in the long term. For example, for many families who lost work during the pandemic, students began working, which was facilitated, in part, by the fact that they could check into their classes online or were not receiving any instruction to begin with. Given the protracted economic downturn in many communities in the United States, students have continued working even as schools returned to in-person instruction. Uneven access to federal funding to support remote learning or a return to in-person schooling may also contribute to sustained absenteeism. Many students experienced the tragic loss of one or more caretakers, especially in communities where death rates from COVID-19 were high. Beyond the severe emotional trauma of this, the loss of a caretaker is likely to increase the odds of financial difficulties, food insecurity, and instability in their housing, all of which are individually highly predictive of chronic absenteeism, let alone acting together.³⁴ Food insecurity is of particular importance given the disruption to free and reduced-price lunch programs and the economic recession.

³² Wim Van Lancker and Zachary Parolin, "Covid-19, School Closures, and Child Poverty: A Social Crisis in the Making," *The Lancet Public Health* 5, no. 5 (2020): 243-244, [https://doi.org/10.1016/s2468-2667\(20\)30084-0](https://doi.org/10.1016/s2468-2667(20)30084-0).

³³ Sergei Zhdanov et al., "Analysis of Learning Losses of Students during the COVID-19 Pandemic," *Contemporary Educational Technology* 14, no. 3 (2022), <https://doi.org/10.30935/cedtech/11812>.

³⁴ Van Lancker and Parolin, "Covid-19, School Closures, and Child Poverty: A Social Crisis in the Making," 243.

Chronic illness and socioemotional disturbance have been repeatedly shown to have a profound impact on attendance. It is hard to understate the impact of the pandemic on the prevalence of both. Communities experiencing chronic illness prior to the pandemic, disproportionality low-income and majority persons of color, were devastated by the pandemic due to the susceptibility to the most severe effects of the pandemic and the inadequate health infrastructure to respond.³⁵ In fact, preliminary research found that communities with at least 60% of the population identifying as people of color had death rates from COVID-19 that was six times higher than communities with fewer than 20% people of color.³⁶ The mental health impacts on young people are unprecedented with researchers highlighting how social disconnection, abuse at home, lack of access to mental health services, instability of routines, and elevated levels of stress have had profound impacts on the prevalence of anxiety and depression, especially for those students who were already vulnerable before the pandemic.³⁷

It is essential that there be a concerted effort to evaluate the new landscape of chronic absenteeism after the pandemic to inform how schools and school districts support students. Previous interventions to increase attendance have highlighted the critical role of partnership between schools, parents, and communities.³⁸ Practitioners have also shown the need to differentiate interventions with students based on their specific needs, both from one school to another and one student to another.³⁹ In the worst-case scenarios, attendance interventions that fail to grapple with the full context of a student or group of students' reasons for absenteeism can create “biased exclusionary discipline and discriminatory absenteeism-related policies and

³⁵ Ibid.

³⁶ Jarvis T. Chen and Nancy Krieger, “Revealing the Unequal Burden of Covid-19 by Income, Race/Ethnicity, and Household Crowding: US County versus ZIP Code Analyses,” *Journal of Public Health Management and Practice* 27, no. Supplement 1 (September 2020), <https://doi.org/10.1097/phh.0000000000001263>.

³⁷ Matt Hawrilenko et al., “The Association between School Closures and Child Mental Health during COVID-19,” 2.

³⁸ Sheldon and Epstein. “Getting Students to School: Using Family and Community Involvement to Reduce Chronic Absenteeism,” 39.

³⁹ Christopher A. Kearney, “Functional Impairment Guidelines for School Attendance Problems in Youth: Recommendations for Caseness in the Modern Era,” *Professional Psychology: Research and Practice* 53, no. 3 (2022): 295-303, <https://doi.org/10.1037/pro0000453>.

practices” or fail to engage the proper domain of support from the appropriate actors, whether that be care from health care, school-based or outside professionals.⁴⁰ Given the drastic changes and amplification of disparity wrought by COVID-19, education professionals and policymakers must navigate a new, complex web of relationships between students, families, and schools to improve attendance.

3. Data and Methods

3.1 Methods

This paper will use a series of regression models to explore the relationship between the COVID-19 pandemic and chronic absenteeism in schools, testing the hypothesis that the more profound the health impact in a community, the higher the rates of chronic absenteeism in that community’s schools. The analysis will start with bivariate models regressing the COVID-19 death rate and case rate on chronic absenteeism in the 2020-2021 school year, before including additional economic and demographic control variables in a series of multivariate regression models. These additional variables will include a robust set of metrics historically proven to be associated with chronic absenteeism in order to better target the specific impact of death and case rates. Additionally, these multivariate models will be run at various levels of disaggregation, including by borough and school levels, to determine whether the interplay of variables is consistent across contexts. Lastly, fixed-effects will be used with panel data to explore how chronic absenteeism and its associated factors have shifted over the past several years to contextualize the specific impact of the COVID-19 pandemic.

⁴⁰ Ibid.

3.2 Data

This paper will focus on public schools in New York City, relying on cross-sectional and panel data from the NYC Department of Education, the NYC Department of Health and Mental Hygiene, and the US Census Bureau to create a detailed snapshot of the individual school level for approximately 1,500 public schools from the 2017-2018 school year through the 2020-2021 school year. **Table 1** in *Appendix A* provides a full breakdown of the specific metrics used in this research, the years for which that metric is available, the technical description of that metric, and the source of that data point.

The New York City Department of Education (DOE) has comprehensive reporting requirements for its schools that benefit the data availability of this study. The full list of schools was provided from the DOE's School Locations report, which includes the name of every school with its management type, grade levels taught, and address information. The DOE also mandates annual reporting of demographic data from schools collated in a report known as the Demographic Snapshot. This data provides a number of critical data points for all schools each year from 2017-2018 to 2020-2021 including the total enrollment count, the percentage of students by race, and the percentage of students with disabilities, among a wide range of other metrics. Lastly, a wealth of data was provided through School Quality Reports from the NYC Department of Education in which evaluators visit schools and assess DOE schools on "how well schools are organized to support student learning and teacher practice".⁴¹ In these evaluations, evaluators collect the percentage of students in temporary housing, the percentage of students eligible for HRA benefits, the median distance of students from the school, and a range of additional detailed measures. Given the extensive nature of these audits, this data is not available

⁴¹"2020-2021 School Quality Reports - High School," NYC Open Data (NYC Department of Education, February 4, 2022), <https://data.cityofnewyork.us/Education/2020-2021-School-Quality-Reports-High-School/26je-vkp6>.

by year and only provides the most recent date (between 2014 and 2020) and data from that evaluation. Therefore, this data can not be used in panel analysis but provides insight and context to multivariate models.

Chronic absenteeism rates were also provided by the New York City DOE from the 2016-2017 school year through the 2020-2021 school year, although 2016-2017 will be excluded for panel method alignment. This metric is defined as the percentage of the school's total enrollment that is absent for 10 percent or more of the total days in the school year. According to the DOE, a student must have been enrolled for at least 10 days and present for at least 1 in order to be included.⁴² In the 2019-2020 school year, as a result of the COVID-19 pandemic's shift away from in-person instruction, from April 6 to June 26, 2020 schools were asked to report attendance as whether a student interacted on a given day or not. What this interaction looked like for each school could differ, but common examples included a student submitting an assignment, logging onto a telecommunication platform, and/or a student phone call. This type of reporting continued partly into the 2020-2021 school year, which included both in-person and remote learning but was largely remote until the beginning of the 2021-2022 school year. This paper includes only schools for which there is chronic absenteeism data for 2017-2018 through 2020-2021 and that are managed by the Department of Education in order to enable a more equivalent comparison of schools that were managed by the same policies for the duration of the pandemic and followed consistent reporting protocols. A breakdown of the schools by type and level can be found in **Table 2** of *Appendix A*.

The independent variable in this paper is the rate of COVID-19 within a school's community as measured by the death rate and case rate. This data was collected from a Github

⁴² "2016-17 - 2020-21 School End-of-Year Attendance and Chronic Absenteeism Data," NYC Open Data (NYC Department of Education, May 10, 2022), <https://data.cityofnewyork.us/Education/2016-17-2020-21-School-End-of-Year-Attendance-and-/gqq2-hgxd>.

Repository centralizing information from the NYC Department of Health and Mental Hygiene, which aggregates this data based on positive COVID-19 tests from laboratories and confirmation from the Chief Medical Examiner and the Health Department's Bureau of Vital Statistics.⁴³ In order to integrate this data with the school dataset, reports that aggregated death and case rates at the level of the zip code tabulation area (ZTCA) were used, meaning death rate and case rate variables within the dataset are the rates within the zip code of the school. The death rate and case rate in the month of January 2021 were selected for each of the respective variables because the highest proportion of DOE schools had ZTCAs reporting during this month and because it took place in the middle of the 2020-2021 school year. For panel data purposes, when comparing data across years for various metrics, the death and case rates are 0 for all years but 2020-2021, where a value based on the respective rates in the month of January 2021 will be included.

Economic indicators from the US Census Bureau's Annual Social and Economic Supplements were used to provide a snapshot of the economic health of a school's community in a given year. This paper used American Community Survey (ACS) estimates for 2017, 2018, 2019, 2020, and 2021 to create a year-by-year breakdown of the Unemployment Rate, Median Income, and Poverty Level. These variables are provided by year within the ACS and not across years like the academic calendar for the NYC DOE, so this paper took the average of these variables for the two years each academic year is couched in. For example, the Unemployment Rate in the 2018-2019 school year was the average of the unemployment rate in 2018 and the one in 2019. These rates were tabulated at the level of the Community District of which there are 59 in New York City. This is a slightly higher level of aggregation than that of the ZTCA

⁴³ "Nychhealth/Coronavirus-Data," GitHub, March 22, 2020, <https://github.com/nychealth/coronavirus-data>.

tabulation for COVID-19 death and case rates, but, nonetheless, provides a fairly detailed picture year-by-year of the economic health of a community.

4. Results

4.1 Bivariate Regression - COVID-19 and Chronic Absenteeism in 2020-2021

Bivariate regression models were developed in the first stage of analysis to explore the explanatory power of COVID-19 death rates and case rates alone on chronic absenteeism in 2020-2021. As can be seen in **Analysis 1**, each of the models using ordinary least squares (OLS) regression finds that an increase in COVID-19 death rates or case rates is associated with a decrease in the rates of chronic absenteeism. According to these models, every 1% increase in the overall death rate within a community from COVID-19 in January 2021 is associated with an 81.8% decrease in that 2020-2021 chronic absenteeism rate for that community's schools, while a 1% increase in case rate is associated with a 7.56% decrease. However, because death and case rates are expressed as a percentage of the population, the impact might appear more drastic than is realistic to assume. For example, the highest death rate in the dataset observed is approaching 0.01% in Brooklyn 11224 ZTCA. To witness a death rate increase of 1% would mean communities experiencing approximately 100 times the amount of deaths than this maximum January 2021 death rate, an unfathomable number approaching nearly 26,000 deaths in Brooklyn by 2020 Census population estimates, instead of the actual approximately 2,394 deaths from COVID-19 in that month. In reality, the maximum death rate of 0.01% would be associated with a 0.8% decrease in chronic absenteeism for that ZTCA's schools in 2020-2021; an extremely small range of impact.

Analysis 1: Bivariate Models of Chronic Absenteeism and COVID-19		
	<i>Dependent variable:</i>	
	Chronic Absenteeism (2020-2021)	
	OLS	OLS
Death Rate	-81.80** (37.59)	
Case Rate		-7.56* (4.52)
Constant	34.26*** (1.13)	35.59*** (2.23)
Observations	1,332	1,332
R ²	0.004	0.002
Adjusted R ²	0.003	0.002
Residual Std. Error (df = 1330)	17.44	17.45
F Statistic (df = 1; 1330)	5.33**	3.19*
<i>Note:</i>	Model uses robust standard errors. *p<0.1; **p<0.05; ***p<0.01	
	Source: (1) New York City Department of Education, School End-of-Year Attendance and Chronic Absenteeism Data, (2) NYC Department of Health and Mental Hygiene, Github Repository	

Nonetheless, this runs counter to the expected hypothesis that increased death rates and case rates contribute to increased chronic absenteeism. However, even while the death rate variable is significant at the 95% confidence level and the case rate variable at the 90% level, extremely low adjusted R-squared values for each model point to omitted variable bias, which can be especially important when considering the impact of the COVID-19 pandemic on many of the variables that could have a larger, more direct impact on chronic absenteeism, according to previous research. These models suggest the bivariate analysis provides an incomplete, potentially misleading picture of the dynamics at play with chronic absenteeism in NYC DOE schools for 2020-2021 and warrants a more comprehensive analysis.

4.2 Multivariate Regression - COVID-19, School Characteristics, and Chronic Absenteeism in 2020-2021

Multivariate regression models were developed to control for characteristics and trends within schools that have historically been associated with chronic absenteeism to better contextualize the specific impact of death rates and case rates on chronic absenteeism in 2020-2021. For these regression models, both death and case rates were included together for although there is some correlation between the two, each rate separately could be associated with a range of different responses and the nature of their relationship does not appear consistent, as can be seen in **Figure 3** (see *Appendix B*) showing case rates and death rates by community district across boroughs. **Analysis 2** shows the output of a multivariate model with robust standard errors for 1,267 schools across NYC as well as separate models for each of the five boroughs.

Analysis 2: Multivariate Models of Chronic Absenteeism, COVID-19, and School Characteristics By Borough						
	Dependent variable:					
	Overall	Brooklyn	Chronic Absenteeism (2020-2021)		Queens	Staten Island
			Bronx	Manhattan		
Death Rate	72.04** (33.16)	175.41** (68.57)	109.52 (92.86)	-163.15 (107.52)	13.71 (67.79)	-58.46 (75.06)
Case Rate	-4.02 (4.03)	-16.57 (10.46)	-11.41 (13.31)	7.77 (18.30)	3.01 (6.26)	-13.96 (8.61)
% Hispanic	0.12*** (0.03)	0.19*** (0.05)	0.27*** (0.09)	0.13** (0.05)	0.04 (0.04)	0.20 (0.16)
% Black	0.23*** (0.02)	0.22*** (0.04)	0.33*** (0.09)	0.46*** (0.09)	0.25*** (0.04)	0.25 (0.17)
% Students w/ Disabilities	0.21*** (0.07)	-0.04 (0.12)	-0.17 (0.16)	0.22 (0.14)	0.24 (0.16)	0.39 (0.29)
Enrollment	0.002** (0.001)	0.001 (0.001)	0.003 (0.003)	0.002 (0.003)	0.002* (0.001)	0.002 (0.003)
% Temp Housing	0.09 (0.07)	0.02 (0.12)	0.11 (0.13)	0.25* (0.14)	0.36** (0.16)	0.12 (0.42)
% HRA Eligible	0.30*** (0.03)	0.32*** (0.05)	0.40*** (0.09)	0.19** (0.08)	0.36*** (0.05)	0.46*** (0.13)
Median Distance	1.96*** (0.35)	3.20*** (0.87)	4.15*** (1.46)	1.31*** (0.48)	1.28 (0.79)	2.93 (3.44)
Constant	-8.95*** (2.12)	-3.53 (4.31)	-21.65*** (8.35)	-7.23 (5.99)	-14.38*** (4.92)	-5.93 (7.84)
Observations	1,267	401	329	202	271	64
R ²	0.43	0.35	0.22	0.61	0.56	0.80
Adjusted R ²	0.42	0.34	0.20	0.59	0.54	0.77
Residual Std. Error	12.90 (df = 1257)	13.80 (df = 391)	12.60 (df = 319)	12.68 (df = 192)	10.24 (df = 261)	9.85 (df = 54)
F Statistic	104.77*** (df = 9; 1257)	23.54*** (df = 9; 391)	9.92*** (df = 9; 319)	32.90*** (df = 9; 192)	36.89*** (df = 9; 261)	23.91*** (df = 9; 54)

Note:

Model uses robust standard errors. *p<0.1; **p<0.05; ***p<0.01

Source: (1) New York City Department of Education, School End-of-Year Attendance and Chronic Absenteeism Data, (2) NYC Department of Health and Mental Hygiene, Github Repository, (3) New York City Department of Education, School Demographic Snapshot, (4) New York City Department of Education, School Quality Reports

In the overall model, the COVID-19 death rate has a statistical significance at the 95% level and shows a 1% increase in the death rate is associated with a 72% increase in the chronic absenteeism rate. A 1% increase in the COVID-19 case rate is associated with a -4% decrease in

the chronic absenteeism rate, although this does not meet the threshold for significance. Instead, the overall model shows a strong statistical significance and positive association for variables historically associated with increased chronic absenteeism rates including the percentage of Hispanic and Black students, the percentage of students with disabilities, the percentage of HRA-eligible students, and the median distance of students from the school. Out of all these variables, the percentage of students eligible to receive public assistance from the NYC Human Resources Administration (HRA) has the highest magnitude of impact on chronic absenteeism rates with a 1% increase in HRA-eligible students associated with 0.30% more chronic absenteeism. This means that a school that has approximately 80% of its students as HRA-eligible (the average for DOE schools in the Bronx) is expected to have a 9% higher chronic absenteeism rate than a school with 50% HRA-eligible students (the average for DOE schools in Staten Island). This appears to confirm the association between more economically vulnerable communities and chronic absenteeism established in previous literature.⁴⁴

Analysis 2 also shows the outcomes of the multivariate models across NYC boroughs, which is a crucial stage of analysis given the wide disparities in socioeconomic and demographic factors across these populations. Consistently, the percentage of students that are Black, Hispanic, HRA-eligible, and receiving some sort of IEP (students with disabilities) are the most statistically significant and positively associated with chronic absenteeism. However, in each borough there are different degrees of predictive power for the variables, alluding to different lived experiences for students and their families. For example, in Brooklyn, a 1% increase in the percentage of Black students is associated with a 0.22% increase in chronic absenteeism, while in Manhattan that increase in Black students is associated with over twice the impact on chronic absenteeism (a 0.46% increase). Also in Manhattan, a 1% increase in the percentage of students

⁴⁴ Douglas D. Ready, "Socioeconomic Disadvantage, School Attendance, and Early Cognitive Development," 271-286.

eligible for HRA benefits is associated with a 0.19% increase in chronic absenteeism, while in Staten Island that increase in chronic absenteeism jumps up to 0.46% and this variable is the most statistically significant in that model. These different outcomes demonstrate that the landscape of chronic absenteeism in New York City is not a monolith and that the make-up of schools and communities has varying impacts based on the larger neighborhood in which one resides. This can also be seen in the differing levels of model fit for each borough with the adjusted R-squared of the Manhattan multivariate model at 0.2 and for Staten Island at 0.77, providing further evidence that the mechanisms at play for one borough may differ for another.

When considering the most statistically significant and high magnitude variables on the aggregate, it begins to highlight how larger demographic realities differ for boroughs before even considering recent trends and may have been impacting chronic absenteeism for years. Brooklyn has a percentage of Black students roughly 20% higher than all other boroughs on average, while the Bronx has nearly double the percentage of Hispanic students of most other boroughs. Given the significance of the percentage of Black and Hispanic students as it relates to chronic absenteeism, these disproportionately large rates could be key factors in explaining elevated rates of absenteeism in those boroughs.

Surprisingly, the percentage of students in temporary housing is neither statistically significant in the overall model nor has a large impact on chronic absenteeism relative to other variables. Given the existing literature on housing insecurity and chronic absenteeism, it was expected that the more students in temporary housing the higher the rate of chronic absenteeism.⁴⁵ While this is true for the coefficient in these models, it does not have the predicted explanatory power in terms of significance. However, in Queens and Manhattan, the percentage of students in temporary housing is among the more statistically significant and positively

⁴⁵ Chang and Romero, *Present, Engaged and Accounted For: The Critical Importance of Addressing Chronic Absence in the Early Grades*, 13.

associated with chronic absenteeism, which could be a compelling area for future study. **Figure 4** (see *Appendix B*) shows an overall view of the relationship between these two variables across boroughs, demonstrating a consistently positive overall association with slightly different linear trend lines. The size of the school, as captured in enrollment, also did not appear to have a significant relationship with chronic absenteeism, which runs counter to previous studies finding that larger schools tend to have more absent students on average.⁴⁶

These multivariate models demonstrate that when controlling for a number of various socioeconomic and demographic factors, the death and case rate of COVID-19 appears to have less explanatory power. The Brooklyn model in **Analysis 2** is the only one in which the death rate is statistically significant and shows the largest impact on chronic absenteeism with a 1% increase in the death rate associated with a 175% increase in chronic absenteeism. However, in Manhattan and Staten Island, an increase in the death rate was associated with a decrease in chronic absenteeism. **Analysis 3** (see *Appendix C*) contains additional multivariate models by each school level - elementary, middle, or high school - and shows that the predicted association of the death rate on chronic absenteeism for high schools is nearly 7.5 times higher than that of the relationship for middle schools with a 1% increase in the death associated with a 226% increase in chronic absenteeism. This may be due to the increased care-taking responsibilities for older students, enlisted to step into work when a previously working family member is no longer able to earn money. Other variables that gain more statistical significance and association with increased chronic absenteeism for high schools as compared to middle and elementary schools are the percentage of students in temporary housing, students with disabilities, and Black students.

⁴⁶ Sheldon and Epstein, "Getting Students to School: Using Family and Community Involvement to Reduce Chronic Absenteeism," 45.

4.1 Fixed Effects Regression - COVID-19 and Chronic Absenteeism Over Time

Fixed effects were employed in this paper as an additional layer of analysis to better isolate the specific impact of COVID-19 rates as they relate to chronic absenteeism and not some unobserved change over time or change within some of the keys factors related to chronic absenteeism, for example, the shifting demographics at a school or even the continuation of a pre-existing trajectory. **Analysis 4** compiles the results of these fixed effects regressions using panel data, showing models with time-fixed effects and entity-fixed effects for case rate and death rate on chronic absenteeism between the 2017-2018 and 2020-2021 school year as well as a multivariate model that includes economic data from the same time frame while utilizing entity-fixed effects.

Analysis 4: Fixed-Effects Regression Determinants of Chronic Absenteeism					
	Dependent variable:				
	Death Rate (1)	Case Rate (1)	Chronic Absenteeism Death Rate (2)	Case Rate (2)	Multivariate
Death Rate	-81.56*** (0.31)		73.70*** (10.49)		28.92* (15.68)
Case Rate		-7.55*** (0.0003)		4.83*** (0.67)	
Unemployment Rate					0.77*** (0.14)
Poverty Level					0.68*** (0.15)
Median Income					0.0001* (0.0000)
Entity effects?	No	No	Yes	Yes	Yes
Time effects?	Yes	Yes	No	No	No
Observations	5,853	5,853	5,853	5,853	5,853
R ²	0.001	0.001	0.03	0.03	0.05
Adjusted R ²	0.0005	0.0000	-0.31	-0.31	-0.28
F Statistic	6.80*** (df = 1; 5848)	4.09** (df = 1; 5848)	118.61*** (df = 1; 4344)	129.55*** (df = 1; 4344)	55.96*** (df = 4; 4341)

Note:

Model uses robust standard errors. *p<0.1; **p<0.05; ***p<0.01

Source: (1) New York City Department of Education, School End-of-Year Attendance and Chronic Absenteeism Data, (2) NYC Department of Health and Mental Hygiene, Github Repository, (3) New York City Department of Education, School Demographic Snapshot, (4) New York City Department of Education, School Quality Reports, (4) U.S. Census Bureau, American Community Survey 5-Year Estimates for 2017-2020 and 1-Year Estimates for 2021

In the time-fixed effects models, death rate and case rate are both negatively associated with chronic absenteeism, demonstrating that an increase in either is associated with a decrease in the chronic absenteeism rate. This runs counter to the hypothesis but is in keeping with the insight from the multivariate model that the individual differences amongst schools and

communities are some of the most powerful explanatory variables. Time-fixed effects control for those variables that change across time but are constant across schools, which could include large-scale policy changes, closures due to the pandemic, and even wider economic trends. These sorts of constant variables across schools are to be expected for schools under the same management of the DOE and do little to account for variation over time in chronic absenteeism, as can be seen with the adjusted R-squared values approaching 0 for both models.

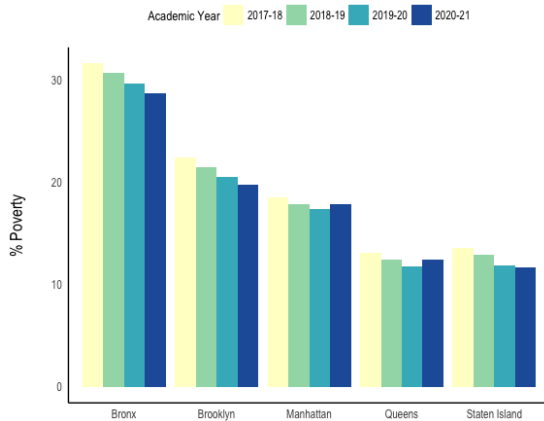
The two entity-fixed effects models for death rate and case rate alone show that the COVID-19 death rate and case are strongly associated with increased chronic absenteeism with a 1% increase in the death rate associated with a 73.7% increase in chronic absenteeism. Of course, there is the same consideration of scale in what a 1% increase in COVID-19 death rate means as previously discussed, but this model appears to provide a more robust argument for the predictive power of death rate and case rate over time, in fact, confirming with the two-tail p-values that the coefficient is different than 0. These models control for all variables that vary across schools but are constant over time, which is likely to include characteristics related to the type of school (elementary, middle, high school), program offerings, and stickier demographic and socioeconomic realities at each school. What this model does not include, however, are those variables that changed over time and could very well have strong explanatory power for changes in chronic absenteeism like wide-scale economic decline from the pandemic, which may push students and their families to more precarious, uncertain conditions.

To explore these changes in economic realities over time, the fifth model in **Analysis 5** uses entity-fixed effects in a death rate model while controlling for several key economic indicators from the communities surrounding each school over the four years of study - the unemployment rate, median income, and poverty level. When adding these variables to the

model, the coefficient from the COVID-19 death rate becomes less significant (down to the 90% level) and smaller, dropping to an associated 28% increase in chronic absenteeism with a 1% increase in the death rate. This, alongside the statistical significance of the unemployment rate and poverty level at the 99% level, suggests that these economic trends in the communities surrounding the schools provide important context for how death rates may have impacted chronic absenteeism.

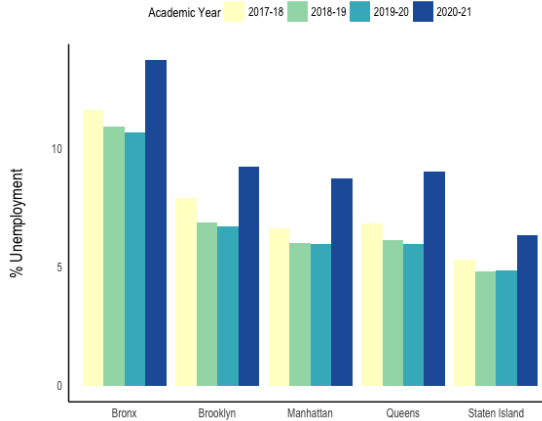
In fact, this model suggests that the unemployment rate and poverty level could be among the strongest predictive variables for chronic absenteeism with a coefficient of 0.77 and 0.68, respectively, especially when comparing the economic realities across boroughs. As can be seen in **Figure 5**, the poverty level for each borough actually decreased in 2020-2021 for every borough except Manhattan and Queens which saw slight upticks. However, the pre-existing differences in poverty levels between boroughs are drastic with the Bronx's 2019-2020 poverty level of 29.7% roughly 18% higher than the 11.8% level of Queens and Staten Island. According to the entity-fixed effects model, this would mean schools in the Bronx are likely to have a chronic absenteeism rate 12.2% higher than schools in Queens and Staten Island, before taking other variables into account. This provides a compelling possible explanation for why the Bronx and Brooklyn boroughs could have higher rates of chronic absenteeism over the years compared to other boroughs.

Figure 5 | Poverty Level by New York City Borough
Based on average rate of community districts within borough



** Poverty level calculated as percentage of families and unrelated individuals whose income in the past 12 months is below the poverty level within a community district.
Source: (1) U.S. Census Bureau, 2017 American Community Survey 5-Year Estimates, (2) U.S. Census Bureau, 2018 American Community Survey 5-Year Estimates, (3) U.S. Census Bureau, 2019 American Community Survey 5-Year Estimates, (4) U.S. Census Bureau, 2020 American Community Survey 5-Year Estimates, (5) U.S. Census Bureau, 2021 American Community Survey 1-Year Estimates.

Figure 6 | Unemployment Rate by New York City Borough
Based on average rate of community districts within borough



** Unemployment rate calculated as number of persons unemployed as a percent of the civilian labor force 16 years old and over within a community district.
Source: (1) U.S. Census Bureau, 2017 American Community Survey 5-Year Estimates, (2) U.S. Census Bureau, 2018 American Community Survey 5-Year Estimates, (3) U.S. Census Bureau, 2019 American Community Survey 5-Year Estimates, (4) U.S. Census Bureau, 2020 American Community Survey 5-Year Estimates, (5) U.S. Census Bureau, 2021 American Community Survey 1-Year Estimates.

Figure 6 provides the unemployment rates for each borough from 2017-2018 to 2020-2021. Here, too, it becomes evident that the Bronx, in particular, has a different economic outlook to start with given its relatively higher unemployment rates. Perhaps more important, however, is the increase in every borough's unemployment rate in 2020-2021 after years of declining rates, which mirrors trends in chronic absenteeism rates. According to the entity-fixed effects model with these variables, this means that the 3.1% increase in the Bronx unemployment rate from 2019-2020 to 2020-2021 could be associated with a 2.39% increase in chronic absenteeism for those schools. The impact of a parent's unemployment and a family's poverty status on an individual student's likelihood to be chronically absent has been well-established in the literature and this trend appears to hold on the aggregate in this specific case.⁴⁷ One can also imagine that the more precarious a family's financial stability to less likely a student is able to have access to a device needed for remote learning, which was the only option for the latter half of the 2019-2020 school year and most of the 2020-2021 school year.

⁴⁷ National Center for Children in Poverty, *How Maternal, Family and Cumulative Risk Affect Absenteeism in Early Schooling: Facts for Policymakers*, Columbia University, (New York, NY: 2008).

5. Conclusion

Chronic absenteeism increased by 3.6% on average between 2019-2020 and 2020-2021 across all NYC Department of Education schools included in this analysis, equating to approximately 28,000 more students in these schools missing 10% or more school days in a year. This increase comes on the heels of years of steady improvement and concerted efforts to reduce this number. At differing levels of aggregation the trend holds with chronic absenteeism increasing for every borough, every school level (elementary, middle, high school), and every school type (general academic, career technical, special education). This paper finds that while the COVID-19 death rate in a given area is associated with an increase in chronic absenteeism for that area's schools, the demographic and socioeconomic realities of that school and its broader community have a more profound relationship with chronic absenteeism. Schools with a higher percentage of Black and Hispanic students as well as students with disabilities are more likely to have higher rates of chronic absenteeism. Schools with higher shares of students that qualify for benefits from the NYC Human Resources Administration (HRA) are also more likely to have students missing a significant amount of school, as are schools in which students need to travel further on average to get to school. Fixed-effects regressions also find that the unemployment rate and poverty level for the community surrounding a school has a positive relationship with chronic absenteeism, an increase in either associated with an increase in students missing school.

These findings confirm a wide array of literature establishing that low-income students and students of color are more likely than their wealthier, white peers to be chronically absent, while also demonstrating that the COVID-19 pandemic may have amplified these disparities by exacerbating economic difficulties and the precarious situation of many families.⁴⁸ This paper

⁴⁸ Chang and Romero, Present, Engaged and Accounted For: The Critical Importance of Addressing Chronic Absence in the Early Grades, 13.

also establishes that the specific dynamics of chronic absenteeism may differ depending on the community, school type, or school level and that an exploration of these distinct contexts can yield insights into specific areas of intervention. For example, schools that have a larger share of Black students in Manhattan have disproportionately high rates of chronic absenteeism when compared with other boroughs, while the median distance of students from school in the Bronx appears to impact chronic absenteeism more than elsewhere. Higher unemployment rates and poverty level indices are associated with more students missing schools, but those levels were far higher in the Bronx and Brooklyn than in other boroughs before the pandemic. In each of these cases, there is a unique, context-specific interplay of factors leading to students missing school that cannot and should not be conflated.

This paper is limited in exploring the relationship between the COVID-19 pandemic and chronic absenteeism in several ways. For one, as of this writing, the New York City Department of Education has yet to release chronic absenteeism rates for 2021-2022. This data would be critical in determining whether the exacerbated risk factors from the pandemic are sustained and continue to impact chronic absenteeism, especially as COVID-19 proliferates in communities. This will also be crucial in determining how much of the increase in chronic absenteeism is attributable to the shift to remote learning and hybrid learning in the latter half of 2019-2020 and 2020-2021. Additionally, the New York City Department of Education school system is both the largest public school system in the United States and an urban one, meaning these findings may not be generalizable to smaller school districts, private or charter schools, or schools in rural or peri-urban areas. It is also difficult to disentangle how much of the increase in chronic absenteeism is attributable to the shift to remote learning and different methods for calculating attendance at the school level. Lastly, the level of analysis in this paper takes place at the level of

the school instead of the level of the student, which limits the ability of these findings to provide a model to explore how individual student experiences may be leading to chronic absenteeism.

In order to craft specific, well-targeted policy responses that reduce the number of students missing school, policymakers and researchers must take an increasingly disaggregated view of chronic absenteeism to determine what demographic and socioeconomic factors are the particular risk factors of a community. Equally important, policymakers must supplement these analyses with rigorous qualitative studies to establish how risk factors may be contributing to chronic absenteeism. Do schools in communities with high unemployment rates have more students working to supplement their families' income? Do schools with more Black and Hispanic students see specific patterns of absenteeism that are not evident in other schools? Why are students with disabilities more likely than their peers to miss school? This paper establishes that these are risk factors on aggregate for chronic absenteeism and provide a path for better-targeted further research that may highlight the specific barriers to attendance for low-income students, students with disabilities, and students of color.

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APPENDIX

Appendix A: Overview of Datasets

Table 1: Descriptions of All Variables for Regressions

Table 1 contains a breakdown of all variables included in the various regression models, along with a description of the variable and the source for its measurement. In the “Variable Name” column the manner in which the variable is coded is included in parentheses.

Variable Name	Description	Source
Chronic Absenteeism (chron_abs2017_2018, chron_abs2018_2019, chron_abs2019_2020, chron_abs2020_2021)	The percentage of students at each school absent 10 percent or more of total days enrolled. Students must be enrolled for at least 10 days and be present for one of those.	New York City Department of Education, School End-of-Year Attendance and Chronic Absenteeism Data
Death Rate (death_rate)	Deaths from COVID-19 per 100 people in January 2021 within the school’s ZCTA. Death rates were reported monthly and represent individuals who “had a positive molecular test for the virus that causes COVID-19 and did not die of external causes such as gunshot wounds or drug overdoses” and individuals who are “an NYC resident (or residency pending) who had no known positive molecular test for the virus that causes COVID-19 but the death certificate lists “COVID-19” or an equivalent as a cause of death.” ⁴⁹ Originally, reported per 100,000 people according to US Census 2020 estimates, but were divided by 1,000 to make a percentage of the population.	NYC Department of Health and Mental Hygiene, Github Repository
Case Rate (case_rate)	Cases of COVID-19 per 100 people on average for the weeks of January 2, 9, 16, 23, and 30 in 2021 within the school’s ZTCA. Case rates were reported weekly and include individuals who tested positive with a molecular test or meet any of the following criteria “(a) test positive with an antigen test, (b) have symptoms and an exposure to a confirmed COVID-19 case, or (c) died and their cause of death is listed as	NYC Department of Health and Mental Hygiene, Github Repository

⁴⁹ “Nychealth/Coronavirus-Data.” GitHub, March 22, 2020. <https://github.com/nychealth/coronavirus-data>.

	COVID-19 or similar.” ⁵⁰ Originally, reported per 100,000 people according to US Census 2020 estimates, but were divided by 1,000 to make a percentage of the population.	
% Hispanic (perc_hispanic)	The total percentage of Hispanic students in the 2020-2021 school year.	New York City Department of Education, Demographic Snapshot
% Black (perc_black)	The total percentage of Black students in the 2020-2021 school year.	New York City Department of Education, Demographic Snapshot
% Students with Disabilities (perc_swd)	The total percentage of students in the 2020-2021 school year with an IEP at the end of the school year.	New York City Department of Education, Demographic Snapshot
Enrollment (total_enrollment)	The total enrollment count of students in all grades in the 2020-2021 school year.	New York City Department of Education, Demographic Snapshot
% Temp Housing (temp_housing_pct)	The percentage of students in school in temporary housing as of the latest School Quality Report review date.	New York City Department of Education, School Quality Report
% HRA Eligible (hra_elig_pct)	The percentage of students eligible to receive benefits from the NYC Human Resource Administration (HRA) as of the latest School Quality Report review date.	New York City Department of Education, School Quality Report
Median Distance (median_distance)	The average distance of students' housing situation from the school in miles as of the latest School Quality Report review date.	New York City Department of Education, School Quality Report
Unemployment Rate (Unemployment_Rate2017_2018, Unemployment_Rate2018_2019, Unemployment_Rate2019_2020, Unemployment_Rate2020_2021)	Number of persons unemployed as a percent of the civilian labor force 16 years old and over within the school's community district. Unemployment rates are calculated to span an academic year, which includes two years, so each year variable is the average of the two years in which it is couched. For example, Unemployment_Rate2017_2018 is the average of the unemployment rate in 2017 and 2018 in that community district. All years are American Community Survey (ACS) five-year estimates, except for 2021 which is one-year at the time of paper.	US Census Bureau, Annual Social and Economic Supplements
Poverty Level (Poverty_Level2017_2018, Poverty_Level2018_2019, Poverty_Level2019_2020,	Percentage of families and unrelated individuals whose income in the past 12 months is below the poverty level in the school's community district.	US Census Bureau, Annual Social and Economic Supplements

⁵⁰ “Nychealth/Coronavirus-Data.” GitHub, March 22, 2020. <https://github.com/nychealth/coronavirus-data>.

Poverty_Level2020_2021)	Poverty level rates are calculated to span an academic year, which includes two years, so each year variable is the average of the two years in which it is couched. For example, Poverty_Level2017_2018 is the average of the poverty level in 2017 and 2018 in that community district. All years are American Community Survey (ACS) five-year estimates, except for 2021 which is one-year at the time of paper.	
Median Income (Median_Income2017_2018, Median_Income2018_2019, Median_Income2019_2020, Median_Income2020_2021)	Median household income in year's inflation-adjusted dollars for families and unrelated individuals in school's community district. Median income rates are calculated to span an academic year, which includes two years, so each year variable is the average of the two years in which it is couched. For example, Median_Income2017_2018 is the average of the median income in 2017 and 2018 in that community district. All years are American Community Survey (ACS) five-year estimates, except for 2021 which is one-year at the time of paper.	US Census Bureau, Annual Social and Economic Supplements

Table 2: Breakdown of Chronic Absenteeism Data Availability by School Type and Level

Visualizations and regression models only include those schools that are managed by the Department of Education and have chronic absenteeism data for every year from the 2017-2018 to the 2020-2021 school year. **Table 2** contains the count and distribution of those schools by school level (the grades taught) and the school type, of which there are three different categories in the Department of Education - career technical, general academic, and special education.

School Level	School Count
Elementary	636 (52%)
Middle School	253 (20%)
High School	341 (28%)

School Type	School Count
Career Technical	47 (3%)
General Academic	1408 (93%)
Special Education	55 (4%)

Appendix B: Visualizations By Borough

Figure 3: Case rates and death rates by community district across boroughs

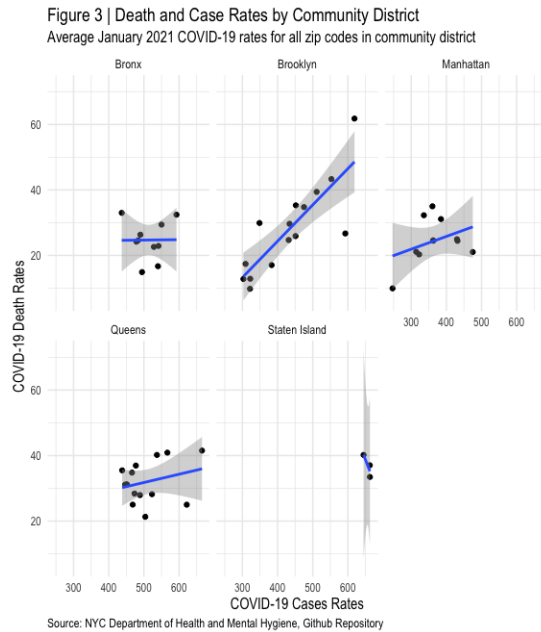
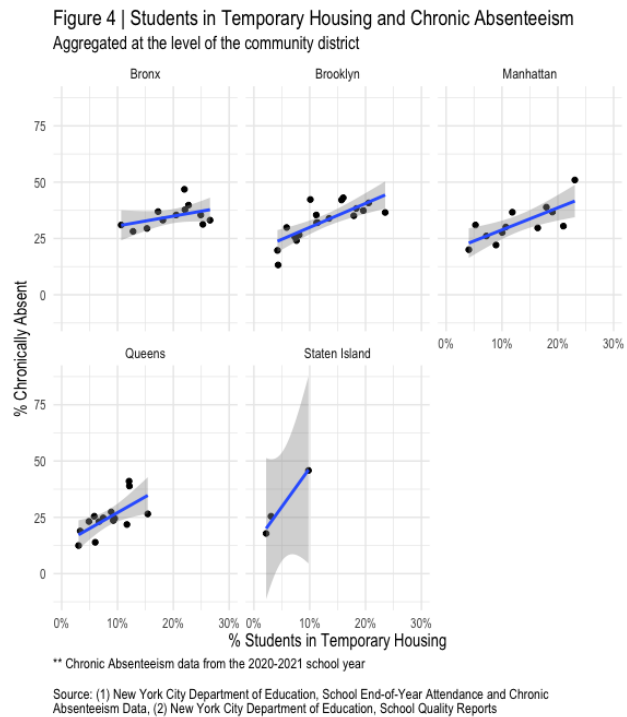


Figure 4: Chronic absenteeism and students in temporary housing by borough



Appendix C: Additional Multivariate Model

Analysis 3: Multivariate Models of Chronic Absenteeism, COVID-19, and School Characteristics By School Level

Analysis 3: Multivariate Models of Chronic Absenteeism, COVID-19, and School Characteristics By School Level				
	<i>Dependent variable:</i>			
	Overall	Chronic Absenteeism (2020-2021)		
		Elementary	Middle	High
Death Rate	72.04** (33.16)	19.71 (30.98)	29.59 (89.43)	226.44*** (83.59)
Case Rate	-4.02 (4.03)	6.52 (4.13)	-17.31 (11.24)	-15.46 (9.81)
% Hispanic	0.12*** (0.03)	0.09*** (0.03)	-0.01 (0.06)	0.20** (0.09)
% Black	0.23*** (0.02)	0.20*** (0.03)	0.16** (0.06)	0.26*** (0.08)
% Students w/ Disabilities	0.21*** (0.07)	0.26*** (0.08)	0.31* (0.17)	0.36** (0.17)
Enrollment	0.002** (0.001)	-0.01*** (0.002)	0.01*** (0.003)	0.001 (0.001)
% Temp Housing	0.09 (0.07)	0.11 (0.09)	0.19 (0.16)	0.32* (0.18)
% HRA Eligible	0.30*** (0.03)	0.28*** (0.03)	0.24*** (0.09)	0.21* (0.12)
Median Distance	1.96*** (0.35)	-1.81 (2.19)	-1.63 (1.71)	0.42 (0.57)
Constant	-8.95*** (2.12)	-5.00* (2.64)	-1.86 (6.92)	-4.73 (7.13)
Observations	1,267	562	232	272
R ²	0.43	0.64	0.25	0.31
Adjusted R ²	0.42	0.63	0.22	0.28
Residual Std. Error	12.90 (df = 1257)	9.39 (df = 552)	13.60 (df = 222)	15.10 (df = 262)
F Statistic	104.77*** (df = 9; 1257)	108.17*** (df = 9; 552)	8.21*** (df = 9; 222)	12.81*** (df = 9; 262)

Note:

Model uses robust standard errors. *p<0.1; **p<0.05; ***p<0.01

Source: (1) New York City Department of Education, School End-of-Year Attendance and Chronic Absenteeism Data, (2) NYC Department of Health and Mental Hygiene, Github Repository, (3) New York City Department of Education, School Demographic Snapshot, (4) New York City Department of Education, School Quality Reports

Curriculum Vita

Evan Young was born in Columbia, Maryland in 1994. In 2015, he completed a Bachelor of Arts in International Affairs with a concentration in International Development at George Washington University in Washington, DC. After his undergraduate program, Evan started a nonprofit called *Asepsis*, which sought to raise global awareness regarding the worldwide sanitation crisis and to provide assistance to impoverished and marginalized communities suffering from the crisis by designing and implementing sustainable, human-centered solutions. In 2017, he began working with *NewGlobe Education*, a multinational social enterprise that helps create and operate low-income private schools and public-partnership schools in Africa and India, where he went on to become a Lead Analyst, designing networks of tools and dashboards used to manage the day-to-day operation of schools across every level of the school management vertical and leading inter-departmental evaluations to understand the effectiveness of various academic, community, and operational programs.

Most recently, Evan works as the Data and Analytics Manager for *MESA Charter High School* in Bushwick, New York, where he leverages data-driven systems and best practices to support the critical operations of the school. In December 2022, Evan will complete his Master of Science in Data Analytics & Policy at Johns Hopkins University, after which point he hopes to continue using data analytics to improve and better understand education outcomes for students.