Meeting the Challenge of Combating Chronic Absenteeism

Technical Appendix

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This technical appendix details the research methodology and statistical analyses behind the Everyone Graduates Center, Johns Hopkins University School of Education's evaluation report on the efforts and impacts of the NYC Mayor's Interagency Task Force on Truancy, Chronic Absenteeism & School Engagement.

Methods

This report uses mixed methods methodology. First, descriptive methods of analysis are used to outline the dimensions of chronic absenteeism and its relationships to other student and academic factors. A cross-sectional analysis of students from the most recent 2012-13 school year examines chronic absence rates in the 146 Task Force & Comparison schools, as well as chronic absence rates by various demographic background and academic subgroups (grade level, ethnicity, administrative status, disciplinary characteristics, and achievement levels). We then use two sets of longitudinal cohort analyses to examine the relationships between chronic absence and other academic factors. A backwards looking analysis takes a cohort of students from 2012-13 and examines chronic absence patterns and trends in prior years for those students. A forward looking analysis takes a cohort of students from 2009-10, and examines their academic patterns in later years, as compared to their earlier chronic absence statuses.

The report then evaluates the impact of the task force's chronic absenteeism prevention and intervention programs on reducing chronic absenteeism and increasing school attendance, using a quasi-experimental design 'interrupted time-series' design. We show changes in schools' trend lines from before implementation to after, while also including the matched control group of non-pilot schools as an added point of comparison. The design thus offers two counterfactuals of what chronic absence levels would have looked like at the pilot schools had they not participated in the new programs and thereby allows us to estimate the programs' impacts. First, we are able to compare the pilot schools' post-implementation chronic absence levels to their levels before they started the programs. Second, we are able to compare their levels, as well as any changes over time, to the trends at the control schools, which assures us that any changes seen in the pilot schools' chronic absence levels that aren't also seen in the control schools are in fact due to the program impact and not to historical events in a given year, or to improvements that were being made districtwide through other efforts or programs.

We use multi-level (hierarchical linear) regression models as a method of statistical analysis. Three sets of models are analyzed. The first are two level models, with chronic absence rates modeled over time, within schools. These models estimate the impact of the intervention programs on school level chronic absence rates and control for school characteristics such as school size and percentage of minority students. The second set of model are three-level models, including student level data and outcomes, with students nested within years/cohorts, nested within schools. These models control for school characteristics as well as individual students' characteristics, such as gender, race, grade level, special education and ELL statuses,

free/reduced lunch eligibility, temporary shelter status, and overage-for-grade status. The specific outcome modeled was whether an individual student would be chronically absent or not, with the results expressed in terms of a student's probability of being chronically absent. Interactions between treatment effect and all student and school characteristics were also tested.

The third and final set of models are similar to the second but focus specifically on evaluating the NYC Success Mentor Corps Program, a key component of the Task Force's intervention programs. Specifically, we reran the same multi-level models based upon student level data, but with impact measured through an indicator of which individual students received personal mentoring as part of the NYC Success Mentor Corps Program. These analyses were also conducted with a reduced sample to include only those students who had been chronically absent in the prior year, as this was the primary criterion for determining which students would receive mentoring. Thus, only students who were chronically absent the prior year (but did not receive mentoring) from both the task force and comparison schools are included as a counterfactual to estimate the impact of mentoring on student outcomes. Similarly, some students who were mentored are not included in the analyses—those who were *not* chronically absent in the year prior to mentoring, but were selected for mentoring either because they were chronically absent in the early part of the year in which they were mentored, or because they exhibited other distress or disengagement signals early in the year.

Data

The analyses presented in the main report rely entirely on administrative data sets obtained from the New York City Department of Education. These data sets provide individual-level information about students: their demographic backgrounds (gender, ethnicity, age), their administrative statuses (special education, English Language Learner, economically disadvantaged, homeless), course data (gpa and credit accumulation), attendance data, disciplinary incidents and suspensions, test scores, and whether a students received mentorship as part of the NYC Success Mentor Corps program. Additional school level data includes schools' progress report marks, and background information pulled from the Common Core of Data (school enrolment size, percent of students eligible for the federal Free/Reduced Lunch program, the percent of minority students, and the student-teacher ratio).

Sample

These data sets cover 146 Task Force & Comparison schools and any student who ever attended one of these schools between the 2009-10 and 2012-13 school years. This four year time period covers the three years of program implementation as well as one year prior as a baseline. The task force concentrated its efforts on schools with above-average rates of chronic absenteeism in New York City within which were a mix of high, middle, elementary and alternative transfer schools, all of which served high-poverty and high-minority student populations. For all students who attended one of these schools at any time during the four year span, data is included for all four years, even if during one or more of those years they were attending another NYC school outside of the 146 Task Force & Comparison schools.

Specific sample sizes per analysis are as follows:

- Cross-sectional analyses from the 2012-13 school year include the 87,685 students who attended the 146 Task Force & Comparison schools during that year.
- Retrospective cohort analyses examining the prior histories of chronically absent students begin with those same 87,685 students.
- Longitudinal cohort analyses that examine students' later academic measures based on prior chronic absence histories include 86,397 students who attended one of the 146 Task Force & Comparison schools during the 2010-11 school year, and had attendance data for both the 2009-10 and 2010-11 school years.

- Multi-level models evaluating the impact of the intervention programs on school level chronic absence rates include 5,206 observations over time for the 146 schools.
- Multi-level models evaluating the impact of the intervention programs on the student level outcome of becoming chronically absent include 370,863 students from 579 cohorts observed at the 146 schools over the course of four years.
- Multi-level models evaluating the impact of the Success Mentor program on the student level outcome of becoming chronically absent include 74,635 students from 438 cohorts observed at the 146 schools over the course of the three implementation years.

Models

Below are sample models from the three sets of multi-level regression analyses whose results are discussed in the main impact report.

1) Summary of the models evaluating the impact of the intervention programs on school level chronic absence rates specified (in equation format)

Level-1 Model

Y = P0 + P1*(OCT) + P2*(NOV) + P3*(DEC) + P4*(JAN) + P5*(FEB) + P6*(MAR) + P7*(APR) + P8*(MAY) + P9*(JUN) + P10*(Year 2010-11) + P11*(Year 2011-12) + P12*(Year 2012-13)
+ P13*(Treatment) + E

Level-2 Model

P0 = B00 + B01*(Elementary School) + B02*(Middle School) + B03*(Transfer School) + B04*(Enrollment Size) = B05*(% Minority) + R0
P1 = B10 + R1
P2 = B20 + R2
P3 = B30 + R3
P4 = B40 + R4
P5 = B50 + R5
P6 = B60 + R6
P7 = B70 + R7
P8 = B80 + R8
P9 = B90 + R9
P10 = B100 + R10
P11 = B110 + R11
P12 = B120 + R12
P13 = B130

2) Summary of the models evaluating the impact of the intervention programs on the student level outcome of becoming chronically absent specified (in equation format)

Level-1 Model

Prob(Y=1|B) = P

log[P/(1-P)] = P0 + P1*(Homeless) + P2*(LEP) + P3*(Spec. Ed.) + P4*(FRL Eligible)
+ P5*(Overage for grade) + P6*(Female) + P7*(White)
+ P8*(Black) + P9*(Asian) + P10*(Other) + P11*(Pre-School)
+ P12*(Kindergarten) + P13*(GRADE1) + P14*(GRADE2) + P15*(GRADE3) +
P16*(GRADE4) + P17*(GRADE5) + P18*(GRADE6) + P19*(GRADE7) +
P20*(GRADE8) + P21*(GRADE10) + P22*(GRADE11) + P23*(GRADE12)

Level-2 Model

P0 = B00 + B01*(Treatment) + B02*(Year 2010-11) + B03*(Year 2011-12) + B04*(Year 2012-13) + R0
P1 = B10
P2 = B20
P3 = B30
P4 = B40
P5 = B50
P6 = B60
P7 = B70
P8 = B80
P9 = B90
P10 = B100
P11 = B110
P12 = B120
P13 = B130
P14 = B140
P15 = B150
P16 = B160
P17 = B170
P18 = B180
P19 = B190
P20 = B200
P21 = B210
P22 = B220
P23 = B230

Level-3 Model

B00 = G000 + G001(Elementary School) + G002(Middle School) + G003(Transfer School) +
G004(Enrollment Size) + G005(% Minority) + U00
B01 = G010
B02 = G020 + U02
B03 = G030 + U03
B04 = G040 + U04
B10 = G100
B20 = G200
B30 = G300
B40 = G400
B50 = G500
B60 = G600
B70 = G700
B80 = G800
B90 = G900
B100 = G1000
B110 = G1100
B120 = G1200
B130 = G1300
B140 = G1400
B150 = G1500
B160 = G1600
B170 = G1700
B180 = G1800
B190 = G1900
B200 = G2000
B210 = G2100
B220 = G2200
B230 = G2300

3) Summary of the models evaluating the impact of the Success Mentor program on the student level outcome of becoming chronically absent specified (in equation format)

Level-1 Model

Prob(Y=1|B) = P

log[P/(1-P)] = P0 + P1*(Homeless) + P2*(LEP) + P3*(Spec. Ed.) + P4*(FRL Eligible)
+ P5*(Mentored) + P6*(Overage for grade) + P7*(Female) + P8*(White)
+ P9*(Black) + P10*(Asian) + P11*(Other) + P12*(Pre-School)
+ P13*(Kindergarten) + P14*(GRADE1) + P15*(GRADE2) + P16*(GRADE3) +
P17*(GRADE4) + P18*(GRADE5) + P19*(GRADE6) + P20*(GRADE7) +
P21*(GRADE8) + P22*(GRADE10) + P23*(GRADE11) + P24*(GRADE12)

Level-2 Model

P0 = B00 + B01*(Year 2011-12) + B02*(Year 2012-13) + R0
P1 = B10
P2 = B20
P3 = B30
P4 = B40
P5 = B50
P6 = B60
P7 = B70
P8 = B80
P9 = B90
P10 = B100
P11 = B110
P12 = B120
P13 = B130
P14 = B140
P15 = B150
P16 = B160
P17 = B170
P18 = B180
P19 = B190
P20 = B200
P21 = B210
P22 = B220
P23 = B230
P24 = B240

Level-3 Model

B00 = G000 + G001(Elementary School) + G002(Middle School) + G003(Transfer School) +
G004(Enrollment Size) + G005(% Minority) + U00
B01 = G010 + U01
B02 = G020 + U02
B10 = G100
B20 = G200
B30 = G300
B40 = G400
B50 = G500 + U50
B51 = G510
B52 = G520
B53 = G530
B54 = G540
B55 = G550
B60 = G600
B70 = G700
B80 = G800
B90 = G900
B100 = G1000
B110 = G1100
B120 = G1200
B130 = G1300
B140 = G1400
B150 = G1500
B160 = G1600
B170 = G1700
B180 = G1800
B190 = G1900
B200 = G2000
B210 = G2100
B220 = G2200
B230 = G2300
B240 = G2400

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