

**Population Association of America 2019 – Extended Abstract**  
**School Disengagement Patterns Before Conception Among New York City Teen Mothers: Informing the Timing of School-Based Pregnancy Prevention Programs**  
**Cristina Yunzal-Butler, Judith Sackoff, Sanders Korenman**

Although the teen birth rate has declined by over 50% in the past 20 years, rates are still significantly higher in the United States than in other developed countries and substantial racial, ethnic and socioeconomic disparities remain.<sup>1-3</sup> Schools are a dominant institution in the lives of young adolescents, and a promising locus for unintended pregnancy prevention activities either through the provision of reproductive health services or programs that focus more broadly on positive youth development.<sup>4,5</sup>

The consensus on when to initiate school-based pregnancy prevention efforts is to begin as early as middle school since a teen pregnancy represents the culmination of events and choices related to sexual activity (age of initiation, number of partners) and contraception (decision to use or not use contraception, consistency of contraceptive use, efficacy of methods) that may have been made years before the pregnancy.<sup>6,7</sup>

A further perspective on the optimum timing of prevention services is to offer them while students are still engaged in school. Early disengagement from school is strongly associated with an increased risk of a teen birth.<sup>8,9</sup> By age 12 a significant proportion of urban minority youth are disengaged from school, and in a population of New York City (NYC) students who subsequently had a teen birth, 21% were chronically absent (20-39 absences/year) or severely chronically absent (>40 absences) at age 13.<sup>8,9</sup> At a minimum, girls who are disengaged may not be well-served by school-based interventions because they miss significant amounts of school. More fundamentally, they may not be receptive to pregnancy prevention messages if they do not believe they are capable of meeting academic norms or hold high expectations of educational success. By contrast, teens who are engaged in school and believe they have something to lose by having a pregnancy will likely make different choices regarding sex and contraception.<sup>10</sup>

In this research we describe patterns of school disengagement among students who had a teen birth to inform the optimum timing of school-based pregnancy prevention interventions. As a measure of disengagement, we use attendance data from middle school until before conception. Although disengagement is a multifactorial concept with both emotional and behavioral components, behavioral measures such as attendance are particularly useful because they are readily available and comparable over time and place. We build on our earlier work, which focused on attendance at a single point in time, and possibly missed heterogeneity in the onset and severity of attendance problems from middle school until conception.<sup>9</sup> To capture this heterogeneity, we used monthly attendance data from middle school through conception, and group-based trajectory modeling (GBTM) to identify clusters of teen mothers with similar long-term preconception attendance patterns.

We hypothesize that:

1. Most teen mothers will have substantial absences in middle school, years before conception.
2. Preconception patterns of attendance among teen mothers will vary in the timing of onset of chronic absenteeism and the rate at which it worsens.

## **Data and Methods**

We used a unique and rich longitudinal dataset created by linking NYC Department of Education (DOE) enrollment records for female students ages 12-22 with NYC Department of Health (DOH) birth certificates for school years 2004-2005 through 2012-2013. The full dataset had records for 643,677 female students, 30,244 (4.7%) of whom had a teen birth, defined as a conception at ages 14-18, leading to a first birth by age 18. Each record included student demographics, monthly attendance, standardized test scores, enrollment, and gestational ages and dates of birth. Our analysis cohort included 6,809 teen mothers who turned 12 in school years 2004-2005 to 2006-2007, whose attendance we could follow over ages 12 to 18.

Our measure of disengagement was school absenteeism from age 12 up to the month before conception. For purposes of classification, we drew on generally accepted definitions of absenteeism, where chronic absenteeism (CA) is defined as missing 10% or more of school ( $\geq 2$  absences/month) and severe chronic absenteeism (SCA) as missing 20% or more ( $\geq 4$  absences/month).

We estimated trajectories using group-based trajectory modeling (GBTM), a method used in social science research to identify individuals with similar developmental patterns. GBTM estimates the shape of each group's trajectory using maximum likelihood estimation.<sup>11</sup> Our trajectory estimates were based on up to 70 months (10 months per school year) of absenteeism data from ages 12-18. We chose a five-group specification with quartic functions for all trajectories. Within each trajectory group, we also calculated mean monthly absences and determined the prevalence of chronic and severely chronic absenteeism by age.

## Results

Of the 6,824 teen mothers in our sample, 35.8% were Black, 59% were Latina, 79.6% were eligible for free or reduced-price lunch, 6.8% were over-age for grade at age 12, and the median age of conception was 16 (not shown). Figure 1 shows the five attendance trajectories before conception for girls who became teen mothers (depicted by solid lines) estimated by GBTM plotted with observed mean monthly absences (dashed lines). The vertical axis includes reference lines for 2 and 4 absences, the thresholds for CA and SCA respectively. Preconception absences for all teen mothers rose over time, but there is heterogeneity in trajectory shapes based on the age of onset of chronic absenteeism and the rate at which disengagement worsened.

We labelled the five trajectories as follows: Early Disengagement/Rapid Worsening (14.5% of sample), Early Disengagement/Gradual Worsening (17.7%), Later Disengagement/Rapid Worsening (20.9%), Later Disengagement/Gradual Worsening (26.5%), and Typically Good Attendance (20.3%) [Figure 1]. The Typically Good Attendance group mostly stayed below 2 absences per month, only crossing the CA threshold between ages 17 and 18. The two Early Disengagement groups had similar attendance at age 12; from there, their slopes quickly diverged and were clearly differentiated by age 13. While both groups were at or above the SCA threshold at this age, the Early Disengagement/Gradual Worsening group had relatively little change in absenteeism through early high school (age 15) and the Early Disengagement/Rapid Worsening group was typically above 6 absences per month by the end of middle school (age 14). The two Later Disengagement groups had similar, mostly good attendance at ages 12 and 13; trajectories began to diverge by age 14. By the end of that school year, the Later Disengagement/Rapid Worsening group was at or near the SCA threshold whereas the Later Disengagement/Gradual Worsening group did not cross the threshold until age 16. While we use the terms Early and Later to describe the average onset of disengagement in these four groups, chronic or severe chronic absenteeism was evident in all by the end of middle school.

Table 1 summarizes monthly mean absences at each age. At age 12 -- at least two years before conception -- overall mean absences were 1.9 per month, increasing to 2.9 by age 14. However, girls in the Early Disengagement/Rapid Worsening group averaged 3.6 monthly absences at age 12; by age 14, they were missing 7.5 days, about the equivalent of 1.5 weeks of school, per month, on average. Over this period, mean absences for the Early Disengagement/Gradual Worsening group increased more slowly, from 3.2 at age 12 to 4.0 at age 14. Both Early Disengagement groups were at or above the SCA threshold before entering high school; the two Later Disengagement groups exceeded this threshold at ages 15 and 18, respectively.

Figure 2 provides a different perspective on absenteeism, showing the prevalence of CA and SCA over time within each trajectory group and overall. In the two Early Disengagement groups, approximately 80% were CA or SCA at age 12, worsening to over 90% in by age 13. In the Later Disengagement groups, the majority (>50%) of students were CA or SCA by ages 14 (Rapid Worsening) or 15 (Gradual Worsening). Overall, 37% of girls were already CA or SCA at age 12, years before conception, increasing to 56% by age 14, the end of middle school. After age 14, the majority of students with attendance problems were SCA.

## Discussion

Early disengagement from school has been identified as a serious problem in many poor urban areas of the United States, and our research extends this inquiry specifically to students with a teen birth.<sup>12,13</sup> We used attendance as a measure of engagement and identified five attendance trajectories that were heterogeneous with respect to age of onset and rate of increase of chronic absenteeism. Thirty-seven percent of teen mothers were disengaged by age 12, rising to 56% by age 14. Only 20% were in the group with mostly good attendance throughout. Teen mothers also differed in the rate at which their attendance worsened: the 36% with rapidly worsening attendance missed an average of 12-14 days of school per month by age 18. Despite this

heterogeneity, school disengagement, as measured by chronic absence, precedes conception by many years for the majority of teen mothers.

Rather than succumbing to a pregnancy “shock” that derails their school attendance, as some have suggested, most teen mothers were already on poor attendance trajectories years before conception.<sup>14</sup> In our sample, the mean age of a first conception leading to a birth is 16, but by age 14, the majority of students who became teen mothers were CA or SCA; by age 15, they were missing an average of almost 4 days of school per month. Without strong educational goals, at-risk teens may believe they do not have much to lose by becoming teen mothers and may be more likely to engage in behaviors that increase the risk of pregnancy, such as initiating sex early and not using any contraception or using it inconsistently.<sup>10</sup> A fundamental principle of effective intervention strategies for youth problems, such as teen pregnancy, is that interventions should be timed so that they focus on changeable precursor behaviors and not the unwanted target behavior.<sup>15</sup>

Thus, to have maximal impact, school-based interventions are needed before students are disengaged, and before they make critical choices about their sexual and contraceptive behavior. Our data suggest that the transition from elementary to middle school may be an important window for intervention. Programs limited to the high school setting will be too late to reach most young women at risk, 37% of whom are severely chronically absent at the start of high school. Despite the support of the CDC and middle school parents for early intervention policies, only a minority of middle schools require instruction on pregnancy prevention (38%) or contraceptive efficacy (26%); moreover, condoms or other contraceptives are provided in just 2-4% of middle schools and 7-11% of high schools.<sup>16-19</sup>

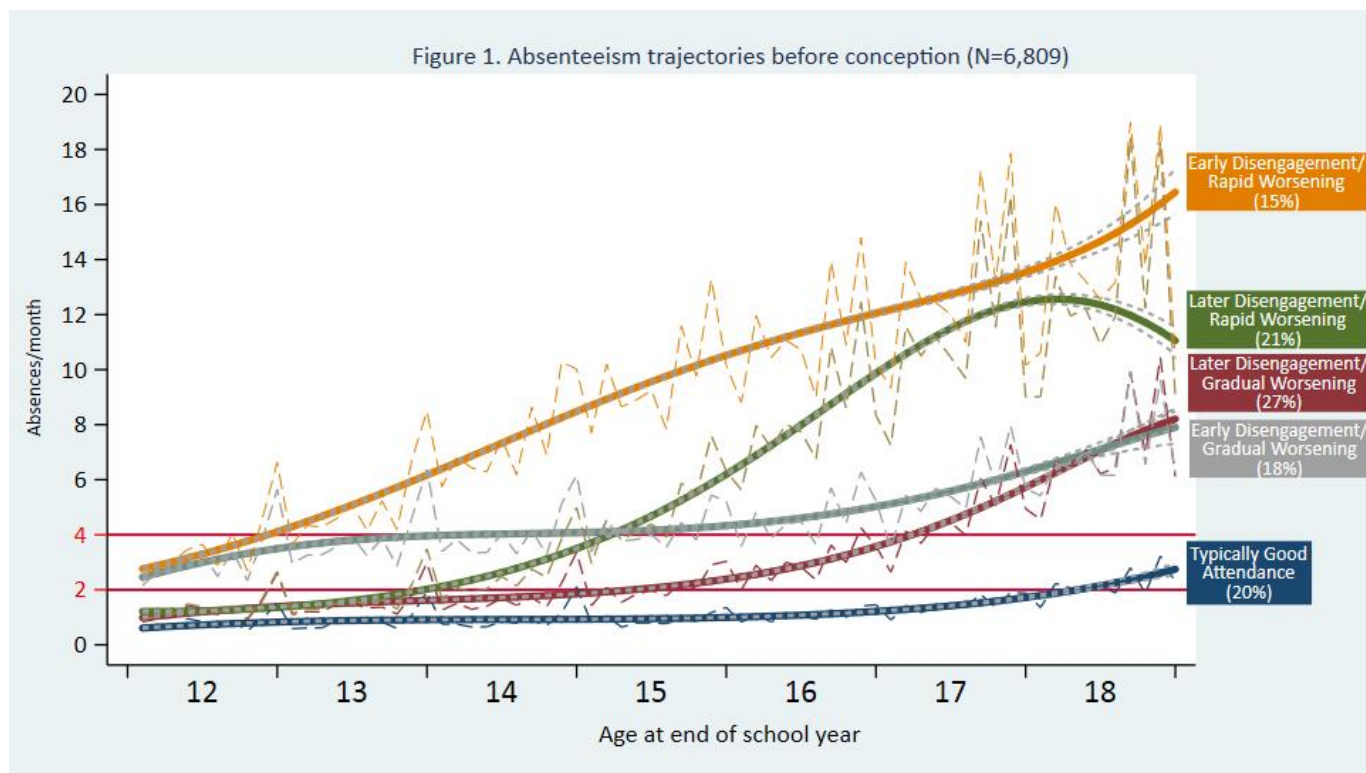


Figure 2. Chronic and severe chronic absenteeism among teen mothers before conception, by age and trajectory group

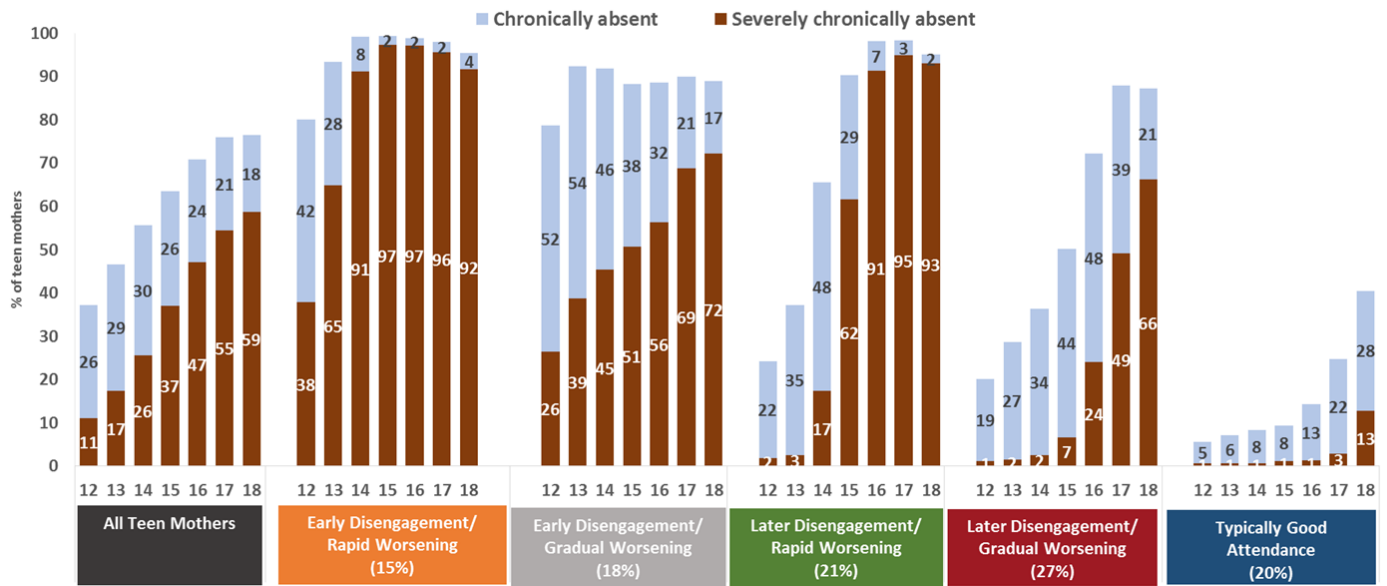


Table 1. Mean monthly preconception absences by age and attendance trajectory

Age	All	Early Disengagement/Rapid Worsening	Early Disengagement/Gradual Worsening	Later Disengagement/Rapid Worsening	Later Disengagement/Gradual Worsening	Typically Good Attendance (Ref)
12	1.9	<b>3.6<sup>abc</sup></b>	<b>3.2<sup>bc</sup></b>	<b>1.4</b>	<b>1.3</b>	0.8
13	2.3	<b>5.1<sup>abc</sup></b>	<b>3.8<sup>bc</sup></b>	<b>1.7<sup>c</sup></b>	<b>1.5</b>	0.9
14	2.9	<b>7.5<sup>abc</sup></b>	<b>4.0<sup>bc</sup></b>	<b>2.6<sup>c</sup></b>	<b>1.7</b>	0.9
15	3.7	<b>9.7<sup>abc</sup></b>	<b>4.2<sup>bc</sup></b>	<b>4.8<sup>c</sup></b>	<b>2.1</b>	0.9
16	4.8	<b>11.1<sup>abc</sup></b>	<b>4.6<sup>bc</sup></b>	<b>8.2<sup>c</sup></b>	<b>2.9</b>	1.1
17	5.8	<b>12.7<sup>abc</sup></b>	<b>5.5<sup>bc</sup></b>	<b>11.0<sup>c</sup></b>	<b>4.5</b>	1.4
18	6.5	<b>13.9<sup>abc</sup></b>	<b>6.6<sup>b</sup></b>	<b>12.1<sup>c</sup></b>	<b>6.5</b>	2.0

Means in **bold** are statistically different from reference group,  $p < .05$ .

Statistically different at  $p < .05$  from: <sup>a</sup> Early Disengagement/Gradual Worsening group <sup>b</sup> Later Disengagement/Rapid Worsening group <sup>c</sup> Later Disengagement/Gradual Worsening group

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