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Cumulative Violence Exposure and Self-Rated Health: Longitudinal Study of Adolescents in the United States

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Abstract

OBJECTIVE—The goal was to determine whether cumulative exposure to violence in childhood and adolescence contributes to disparities in self-rated health among a nationally representative sample of US adolescents.

METHODS—The National Longitudinal Survey of Youth 1997 is an ongoing, 8-year (1997–2004), longitudinal, cohort study of youths who were 12 to 18 years of age at baseline (N = 8224). Generalized estimating equations were constructed to investigate the relationship between cumulative exposure to violence and risk for poor health.

RESULTS—At baseline, 75% of subjects reported excellent or very good health, 21.5% reported good health, and 4.5% reported fair or poor health. Cumulative violence exposures (witnessed gun violence, threat of violence, repeated bullying, perceived safety, and criminal victimization) were associated with a graded increase in risk for poor health and reduced the strength of the relationship between household income and poor health. In comparison with subjects with no violence exposure, risk for poor self-rated health was 4.6 times greater among subjects who reported ≥5 forms of cumulative exposure to violence, controlling for demographic features and household income. Trend analysis revealed that, for each additional violence exposure, the risk of poor health increased by 38%. Adjustment for alcohol use, drug use, smoking, depressive symptoms, and family and neighborhood environment reduced the strength of the relationships between household income and cumulative exposure to violence scores and poor self-rated health, which suggests partial mediation of the effects of socioeconomic status and cumulative exposure to violence by these factors.

CONCLUSIONS—In this nationally representative sample, social inequality in risk for poor self-rated health during the transition from adolescence to adulthood was partially attributable to disparities in cumulative exposure to violence. A strong graded association was noted between cumulative exposure to violence and poor self-rated health in adolescence and young adulthood.

Keywords

longitudinal study; socioeconomic status; self rated health; adolescents; exposure to violence

Introduction

Exposure to violence in childhood and adolescence constitutes a pervasive national public health problem,1,2 affecting an estimated 70% to 97% of US school-aged children and teens. Community violence disproportionately affects minority youths and youths living in urban environments.1 Youths living in poorer neighborhoods have increased exposure to violence in both their homes and their communities.3–14 Moreover, youths with lower socioeconomic status (SES) experience more-frequent social stressors.3,5,9,15 Disparate exposure to social adversities, such as violence, may contribute to social inequalities in health.

Research evidence has emerged that highlights the long-term effects of violence exposure in early life on morbidity and mortality rates in adulthood,16 as well as on physical and mental health and risk profiles.13,16–19 Reducing adverse health outcomes related to violence exposure has been identified as one of the health promotion priorities for Healthy People 2010,20 but there is limited understanding of the mechanisms through which violence exposure leads to poor health outcomes. Life course epidemiology conceptualizes determinants of disease occurrence in terms of biological and social exposures experienced during different stages of life.17 Adverse childhood exposures during critical periods may have both latent effects21,22 and cumulative effects that negatively affect health outcomes and trajectory.23–,25

In this study, we evaluated the association between cumulative exposure to violence (CEV) and self-rated health (SRH) for adolescents transitioning into young adulthood. Our preliminary hypothesis was that, as individuals were exposed to increasing amounts of community violence, their SRH would decline. This study is unique in that we prospectively evaluated youth reports of SRH in a socioeconomically and racially/ethnically diverse national sample of youths and used a statistical method that accounts for correlations between repeated measures over time.

Methods

Survey Design

The National Longitudinal Survey of Youth 1997 is an ongoing prospective cohort study initiated in 1997 to examine the transition from school to the workforce among US adolescents. A nationally representative sample of 8984 youths, 12 to 18 years of ages, was enrolled, after screening of 75 291 households in 147 nonoverlapping primary sampling units. A supplemental sample of black and Hispanic youths in that age range was also recruited. Computer-assisted personal interviews are conducted annually to collect information on labor market participation, training, income, family formation and background, behaviors, and health. Both youths and parents/guardians are surveyed.

Retention rates between 1998 and 2004 were 93% to 86% and 94% to 88% for the cross-sectional and supplemental samples, respectively.26

Sample

We restricted our analyses to the first 8 waves of data (1997–2004) available at the time of analysis and youths who did not have a chronic condition at baseline (n = 570), because having a "physical, emotional, or mental condition that limited schoolwork" was highly correlated with SRH in our bivariate analyses (χ^2 test, $P < .001$). We also excluded youths with incomplete baseline information on violence exposure, health behaviors, or demographic characteristics (n = 190). After exclusions, the final sample size was 8224 youths.

Measures

Definition of SRH—The outcome of interest, participants' SRH, was assessed annually by using a single question, that is, "How would you rate your health?," on a Likert-type scale with 5 possible responses (excellent, very good, good, fair, or poor). SRH is commonly used to assess global health status and has been recommended by the World Health Organization and the European Union Commission for monitoring. Validation research has established SRH as a reliable valid predictor of health care utilization and physical health problems.27,28 SRH has several advantages, including the strength and consistency of its predictive power for morbidity and death and the potential to reflect human judgments, behaviors, and resources.28 It reliably predicts death independent of other medical, behavioral, and psychosocial risk factors among adults,28 and it has been associated with other health measures.29 In the Medical Expenditure Panel Survey, youths ≤17 years of age in fair or poor health had significantly higher average total expenditures ($2688 vs $805 per child) and were more likely to have office visits, inpatient hospitalizations, and prescription medications than were youths in good to excellent health.30 Responses were analyzed by using SRH as a dichotomous outcome. The variable was dichotomized into good (good, very good, or excellent) versus poor (fair or poor), comparable to previous studies.31–34

Definition of Exposure to Violence—Exposure to violence was measured with 4 baseline questions (in 1997) and 3 follow-up questions, queried during the first survey after each participant's 18th birthday. These questions assessed 4 domains of violence exposure, that is, direct victimization, perceived safety, threat of violence, and witnessing violence. Perceived school safety was assessed with a single question in 1997, "Do you feel safe at school?," rated on a 4-point Likert-type scale from strongly agree to strongly disagree. We dichotomized this variable as unsafe (disagree or strongly disagree) versus safe (agree or strongly agree). Threat of violence was assessed in 1997 as the number of times someone had "threatened to hurt" the respondent at school, on a scale of 0 to 50. Youths were asked about repeated bullying and witnessing gun violence before the age of 12 with 2 yes/no questions, as follows. (1) "Before you turned age 12, were you ever the victim of repeated bullying?" (2) "Before you turned age 12, did you ever see someone get shot or shot at with a gun?" Threat of violence, bullying, and witnessing gun violence were all dichotomized as ever/never variables. During follow-up interviews, participants were queried about gun violence and bullying at ages 12 to 18 with the following questions. (1) "Between the ages

of 12 and 18, have you ever been shot at, or seen someone get shot or shot at, with a gun?" (2) "Between the ages of 12 and 18, were you ever the victim of repeated bullying?" In 2002, all youths were asked about criminal victimization between 1997 and 2002, as follows: "In the last 5 years, have you been the victim of a violent crime, for example, physical or sexual assault, robbery, or arson?"

The CEV score was created by summing the number of self-reported violence exposures, including school safety in 1997, threatened in 1997, witnessed shooting at <12 years of age, witnessed shooting at 12 to 18 years of age, repeated bullying at <12 years of age, repeated bullying at 12 to 18 years of age, and criminal victimization. Because of small sample sizes in the highest categories, we combined those with ≥5 exposures into a single group. We created the CEV score because we did not have access to a formal measure that assesses multiple sources of exposure to violence in this data set. There was a statistically significant correlation among all individual types of violence included in the CEV score (data not shown). For subanalyses, we also created separate CEV scores for violence exposures before 12 years of age and exposures between 12 and 18 years of age.

Demographic, Behavioral, Familial, and Neighborhood Characteristics—

Potential confounding variables were identified on the basis of theoretical relevance, literature suggestions, or empirical evidence. Definitions of these variables are presented in Table 1. Gross household income was modeled as a categorical variable (less than $20 000, $20 000 to $50 000, or more than $50 000). Youths with incomplete or missing information were categorized as having missing data (~26% of the original sample; n = 2252). Youths with missing income data were more likely to be black (30% vs 24%) or Hispanic (26% vs 20%) and were less likely to smoke (37% vs 40%) than were those who reported income; however, they did not differ appreciably with respect to any other baseline characteristics. Parent SRH in 1997 was dichotomized as excellent, very good, or good versus fair or poor. Youths with missing values for parent SRH (n = 1022) accounted for 12% of the original sample. Parent SRH was positively correlated with youth SRH (r = 0.18; P = .001).

Statistical Analyses

All statistical analyses were performed by using SAS (SAS Institute, Cary, NC). Participants with incomplete baseline information on violence exposure were excluded from the analysis. Those with missing information on violence exposure in the later survey years (1998–2004) were assumed not to have been exposed. Because inclusion of those with missing information who might have had exposure would result in misclassification and might bias results toward the null, we also performed analyses excluding those with missing information, to evaluate the potential impact, and we found no substantial difference in the results.

Univariate analyses were performed to evaluate the distributions of both SRH and CEV scores and all theoretically relevant independent variables, including measures of SES, sociodemographic characteristics, health behaviors, and individual violence exposures. Frequency distributions were performed to determine the correlation between dichotomized SRH in 1997 and potential categorical predictors (including, age, gender, parent SRH, and categorical household income). A covariate was included in the multivariate analyses if

theoretical or empirical evidence supported its role as a risk factor for poor SRH, if it was a significant predictor of SRH in univariate regression models, or if including it in the full multivariate model led to a change in the odds ratio of ≥5%.35 Finally, we evaluated the correlations between different types of violence exposure by using χ^2 tests.

Generalized estimating equation analyses, performed by using the SAS PROC GENMOD procedure, were used to estimate a logistic model for predictors of poor SRH while allowing for dependence between repeated measurements for the same subject.36,37 We used an exchangeable correlation structure and logistic link function. The estimated exchangeable correlation was fairly low, at 0.18. To prevent an imbalance attributable to missing data, we included a within-subject effect that specified the order of measurements for individuals. Analyses used all 8 waves of data to create a general linear model to predict poor SRH. The model estimates are population averaged.

Initially, we performed a series of multiple-predictor models estimating the impact of each early life adversity on SRH separately. Model 1 included the following variables: age, gender, race/ethnicity, household income, family structure, baseline BMI, and time-varying residence in an urban area. Model 2 included all variables in model 1 plus the CEV score. Model 3 included all variables in model 2 plus parent SRH, homelessness, incarcerated household member, depressive symptoms between 2000 and 2004, neighborhood gangs, family risk environment scale, and time-varying risky health behaviors (smoking, alcohol consumption, and marijuana use).

Mediation of the impact of household income on SRH by CEV was tested as outlined by Baron and Kenny,38 to ensure that the mediating variable was correlated with the outcome, the outcome was correlated with the antecedent, and the relationship between antecedent and outcome changed when the mediator was included. First, we evaluated the relationship between household income and CEV. Next, generalized estimating equation models with and without CEV assessed whether CEV mediated the relationship between SES and SRH. In addition, we tested whether there were significant interactions between CEV and time and between CEV and income.

In subanalyses, we evaluated the relative contributions of cumulative measures of violence in early life (<12 years of age) and adolescence (12–18 years of age) independently and within the same models. All analyses were repeated by excluding those with missing household income data, to assess differences between those with missing income data and the rest of the sample. Supplementary analyses were performed with the subset of the cohort screened for depressive symptoms at baseline in 1997 (N = 4988), to test whether baseline depressive symptoms confounded observed associations.

RESULTS

Study Group and Baseline Findings

The final sample used in analyses consisted of 8224 youths (49% female), with a mean age of 14 years (range: 12–18 years) in 1997 (Table 2). At baseline, the majority (75%) of the youths reported excellent or very good SRH, 21.5% reported good SRH, and ~

4.5% reported fair (4.3%; n = 348) or poor (0.2%; n = 19) SRH. Whereas 14% of youths reported not feeling safe at school, 20% had been threatened, and 19% had been bullied repeatedly before age 12. The prevalence of youths reporting fair or poor SRH differed according to gender, race/ethnicity, household income, and parental health. Compared with those reporting good SRH, the prevalence of fair/poor SRH was higher among female (56%), low-income (32%), and black youths (39%).

The prevalence of each type of violence exposure and the CEV scores according to SRH at baseline are presented in Table 3. Compared with youths who reported good SRH, those with fair/poor SRH had higher prevalence rates of not feeling safe at school (29% vs 13%), being threatened at school (31 vs 19%), being bullied repeatedly (31 vs 18%), and having witnessed shooting (23 vs 10%). Table 4 presents the distribution of SRH findings according to CEV scores. Of youths with CEV scores of ≥5, 18% reported fair/poor SRH, compared with only 3% of those with CEV scores of 0. Table 5 demonstrates the distribution of demographic characteristics and known risk factors for poor SRH according to CEV scores. Most variables varied significantly according to CEV scores.

Multivariate Analyses

To model the population-averaged effects of several social, demographic, and behavioral factors on SRH over time, we used the PROC GENMOD procedure. First, separate models were used to assess the relationships between each type of violence exposure, household adversity, and health risk behavior and SRH individually, controlling for baseline demographic features. When modeled individually, the odds of poor SRH increased by ~60% to 80% for each type of violence exposure (results not shown). Estimates of the odds ratio (OR) for each violence category were statistically significant ($P < .01$).

The impact of CEV was even more pronounced. We developed 3 predictive models, as shown in Table 6, controlling for potential confounders in the most parsimonious analysis. The analysis that included CEV scores demonstrated a graded association between the odds of poor SRH and CEV scores (model 2). Compared with youths with no CEV, youths with exposure to ≥5 types of violence had 4.63 times (95% confidence interval [CI]: 3.06–6.99 times) the odds of poor health. CEV was associated with a graded increase in risk for poor health and reduced the strength of the relationship between the lowest- and middle-income groups and poor health (ORs changed from 1.69 to 1.41 and from 1.43 to 1.28, respectively). Inclusion of potential mediators of the relationship between CEV and SRH in model 3 significantly reduced the impact of violence exposure on poor health by nearly twofold among those with ≥5 exposures. This suggests partial mediation of the impact of violence exposures on health through health risk behaviors, depression, and household dysfunction. In summary, adjustment for social stressors, CEV, and health behaviors did not fully account for the impact of household income on health. The deviance was also lower in model 3, in comparison with models 2 and 1 (18 212.7, 24 841.5, and 25 366.4, respectively), which suggests a better model fit with inclusion of CEV, health risk behaviors, family environment, and parental health. Finally, when the CEV score was modeled as a categorical variable, a strong dose-response relationship between CEV scores and poor SRH was observed (test for

trend, P < .001). For each 1-unit increase in the CEV score, the risk for poor health increased by 38%.

The interaction between time and CEV suggested a diminishing impact of CEV on the odds for fair/poor SRH over time (OR: 0.98; 95% CI: 0.97–0.99). Next, we tested the interaction between continuous income and CEV in both the odds for fair/poor health and the risk for declining SRH by using the continuous scale. The 2 approaches gave qualitatively similar results, which suggests a protective effect of increasing income on the risk for fair/poor health among those exposed to CEV; however, the significance level was only marginal in the dichotomous model (OR: 0.99; 95% CI: 0.97–1.00).

Cumulative measures of violence in early life (<12 years of age) and adolescence (12–18 years of age) were evaluated in separate and the same generalized estimating equation models; graded relationships were found for both periods of exposure, but with a slightly greater propensity toward poor SRH with early-life CEV. Each 1-unit increase in early-life CEV and adolescent CEV was associated with 40% (P < .0001) and 30% (P < .0001) increases in odds for poor health, respectively (data not shown).

Additional Analyses

Although results are not presented in the text, all of the analyses described above were repeated by using SRH dichotomized as poor, fair, or good (n = 2154; 26%) versus very good or excellent (n = 6070; 74%). Similar graded relationships were found for CEV scores, household income, and risk for poor/fair/good SRH. In the fully adjusted model, trend analyses revealed that risk for poor/fair/good SRH increased 21% for each 1-unit increase in the CEV score.

Restriction of the analytic sample to youths who did not have missing data for household income yielded results analogous to those for the original sample (data available on request). Restriction of the sample to those with baseline data on depressive symptoms (n = 4988) revealed that, although depressive symptoms at baseline were a significant predictor of SRH in the fully adjusted model (OR: 1.29; 95% CI: 1.11–1.50), inclusion did not alter the estimates for income and only slightly attenuated the effects of CEV; moreover, depressive symptoms between 2000 and 2004 remained statistically significant (OR: 1.56; 95% CI: 1.39–1.76).

DISCUSSION

Our findings demonstrated a strong graded relationship between CEV scores and risk for poor SRH in a nationally representative sample of adolescents. In this study, witnessing gun violence, threat of violence, feeling unsafe, repeated bullying, and criminal victimization each independently and significantly increased risk for poor SRH. A dose-response relationship between CEV and poor SRH was established and is consistent with research that demonstrates the cumulative effect of multiple stressors on health risk.16,19,39

Previous research documented an association between child poverty and the incidence of violence exposure.8,10,40,41 In our study, witnessing gun violence and feeling

unsafe significantly differed according to household income and partially mediated the relationship between household income and health. This confirms the findings of earlier prospective studies, wherein familial income has been consistently linked to childhood health conditions.42

Family social environment has also been linked to both SES and violence exposure. Impoverished children are at higher risk for neglect and abuse, exposure to familial violence, and inadequate nurturing.13 Elevated familial risk is associated with greater emotional reactivity, poorer coping responses, and low levels of parental support among youths.13 Our study demonstrated partial mediation of the impact of CEV on SRH by familial risk index, which may reflect an impaired ability to buffer stress in the presence of adversities. We also found that health risk behaviors and depressive symptoms partially mediated the relationship between CEV and SRH. These findings support previous research that established the enduring impact of early-life exposure to social stress and violence on health.17–19 Being bullied43,44 and fear of crime have been linked to poor mental and physical health.45,46 Childhood adversities have been linked to smoking initiation and behavior,47–49 as well as alcohol abuse, illegal substance use,50–54 and depression.55–60 Lo and Cheng found that depression mediated the relationship between physical abuse and alcohol and drug abuse.53 Nicotine and illicit substances may have beneficial psychoactive properties for mood regulation, affect, and coping.48,61 Chronic social stress has been linked to neuroendocrine system dysregulation18; moreover, primate62,63 and human64 studies have linked environmental risk to serotonergic dysfunction. Because smoking, alcohol use, and drug abuse are associated with enhanced serotonergic activity,65–67 it is possible that health risk behaviors represent a form of self-medication in the wake of adverse exposures.13,55

School safety may indicate the role of age-specific aspects of the social environment that influence health. Vulnerability within the school environment may contribute directly to inequalities in health through injury, anxiety, and depression. Perceived safety may influence physical activity and indirectly affect health. School safety also may be a proxy for toxic environmental exposures, neighborhood deprivation, food insecurity, access to resources, and other factors that influence health.68,69 The “differential opportunity hypothesis” posits that access to illegitimate and legitimate opportunity structures depends on the social location.70,71 If school environments vary according to SES, then in relatively poorer schools with fewer resources, youths may resort to illegitimate means (such as gangs and drug trade) to obtain social status, which threatens safety, increases violence, and ultimately undermines health.

This study finds empirical evidence in support of the accumulation-of-risk model. This form of the life course model posits that insults, whether correlated or uncorrelated, have a cumulative impact on health outcomes and trajectory.17 Our findings reveal that violence exposure in childhood and adolescence has both strong independent associations and an additive impact on SRH over time. We also found a strong correlation between various forms of violence exposure over time. When testing the critical-period model by comparing exposures in early life (<12 years of age) and later life (12–18 years), we found that, although exposures during both periods had strong graded effects on risk for poor health,

early life exposures seemed to have a slightly greater predictive value for poor health. Therefore, it is possible that exposures at critical periods may have differential effects on health risk, as well as cumulative effects over time.

This study has limitations. First, we cannot rule out the possibility of reverse causality, with poor health preceding CEV. Youths who have identifiable handicaps or poorer fitness because of an illness may be more likely to be the targets of violence in school. However, our analyses excluded children with chronic health conditions at baseline. Fear of violence may be associated with social isolation. Social networks were not assessed in this study; therefore, we cannot rule out the possibility that the relationship between CEV and poor SRH is confounded by impaired social networks. Notably, previous research documented independent effects of repeated bullying and low levels of social support on the mental health of school-aged children.43 Second, we might have failed to capture residual confounding of CEV by SES. Third, to our knowledge, the measures of violence exposure used in this study are not validated.

Although SRH has been used extensively in the health inequality literature, its appropriateness as a metric for adolescent health and the dimensions of health it captures continue to be debated.27 SRH is a subjective measure, therefore individuals with objectively poor health may perceive and therefore rate their health differently. If individuals conceptualize and report health differently across social classes, then SRH may not estimate reliably the degree of inequality.72 Moreover, if health assessment varies between early and late adolescence or with growing awareness of social status, then the income gradient in SRH may be an artifact of this process. Future investigations should use more-objective measures of adolescent health (eg, medical visits, hospitalizations, or physiologic correlates of disease activity).

CONCLUSIONS

CEV had graded robust effects on SRH in this sample of adolescents. Income-related inequalities in health persisted as youths transitioned into adulthood, and they were partially accounted for by CEV, health risk behaviors, family environment, and parental health. These findings suggest that interventions aimed at promoting adolescent health and well-being cannot focus on behavior modification alone. Broader social policy changes aimed at reducing violence exposure in childhood and adolescence, including promoting safer schools and communities, may have greater effects on health trajectories during adolescence and young adulthood.

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ABBREVIATIONS

AAP	American Academy of Pediatrics
BMI	body mass index
CAPI	computer-assisted personal interviews
CI	confidence interval
ETV	exposure to violence
FPL	Federal Poverty Line
NLSY ’97	National Longitudinal Survey of Youth 1997 cohort
SES	socioeconomic status
SRH	self rated health

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TABLE 1

Demographic, Behavioral, Familial, and Neighborhood Characteristics

Variable	Definition
Gross household income (1997)[a]	Created by combining wages of respondent, wages of spouse/partner, child support, interest and dividends from stocks or mutual funds, rental income, retirement pension, alimony, Social Security income, public support, monetary gifts, and other income; based on parental report unless respondent was living independently; categorical variable (less than $20 000, $20 000 to $50 000, or more than $50 000).
Place of residence[a]	Respondents' zip codes were linked to Federal Information Processing standard geographic information codes for state and county (with Maptitude V4.7 software, Caliper Corporation, Newton, MA) in order to identify whether place of residence was urban or rural. Urbanized areas are based on the Census Bureau definition and include those with population >2,500. Urban residence was dichotomized and updated with each annual survey. Those whose zip code could not be precisely defined as urban or rural were listed as unknown.
Family structure	Dichotomized as 2-parent household versus all other household types (including single parent).
Race/ethnicity	Recoded as non-Hispanic white, non-Hispanic black, Hispanic, Asian, or other (because of sample sizes, Asian and other combined as 1 category); categorical variable.
Parent SRH (1997)	Dichotomized as excellent, very good, or good versus fair or poor.
Depressive symptoms (2000, 2002, and 2004)	Participants reported frequency of depressive symptoms over past month, "How much of the time during the last month have you felt down in the dumps?"; dichotomized none vs some/most/all of the time.
Baseline depressive symptoms (1997)	Subsample (n = 4988) of cohort was asked, "Are you unhappy, sad, or depressed?"; responses dichotomized as not true vs somewhat/often true.
BMI	Self-reported weight and height at baseline rounded to the nearest centimeter and kilogram, respectively. BMI is calculated as weight (kg) divided by height squared (m^2). A categorical variable was created for BMI-for-age percentile rankings: underweight <5th percentile, healthy weight 5th-85th percentile, overweight 85th-95th percentile, and obese >95th percentile, and missing as recommended by the Centers for Disease Control using age- and sex-standardized measures.
Smoking status	Lifetime use (ever/never) in 1997 and updated annually; dichotomized
Alcohol use	Lifetime use (ever/never) in 1997 and updated annually; dichotomized
Marijuana use	Lifetime use (ever/never) in 1997 and updated annually; dichotomized
Neighborhood gangs	All youths questioned about whether there were "gangs in their neighborhood"; yes/no response, updated annually; dichotomized
Homeless between 1997 and 2002 (2002)	Participants asked whether they had been homeless or lived in homeless shelter for ≥2 nights in past 5 years; yes/no response; dichotomized
Household member incarcerated in 1997–2002 (2002)	Subjects asked whether household member had been incarcerated in past 5 years; yes/no response; dichotomized
Family/Home Risk Index (1997)[b]	Combines youth and parent interview questions and interviewer observations at baseline to provide overall assessment of youth's environment, ie, quality of physical home environment, neighborhood risk factors, availability of enriching educational activities in home and environment, religious behavior of family, parental involvement in schooling and family routines, television viewing, parental physical and mental health/disability, parental monitoring, and youth-parent relationship; higher scores indicate more-risky environment; dichotomized as >75th percentile versus all others.

TABLE 2

Prevalence of Baseline Demographic Characteristics According to Baseline Fair/Poor SRH (N = 8224)

Characteristic	Total	Fair/Poor SRH
Gender, *n* (%)		
Male	4178 (51)	163 (44)
Female	4046 (49)	210 (56)
Age, mean ± SD, y	14 ± 1.5	
Race/ethnicity, *n* (%)		
Asian and other	75 (1)	1 (0.3)
Hispanic	1781 (22)	89 (24)
Non-Hispanic black	2139 (26)	146 (39)
Non-Hispanic white	4229 (51)	137 (36.7)
Two-parent household, *n* (%)		
No	3008 (37)	189 (51)
Yes	5216 (63)	184 (49)
SRH, *n* (%)		
Poor	19 (0.2)	19 (5)
Fair	354 (4.3)	354 (95)
Good	1781 (21.5)	
Very good	2803 (31)	
Excellent	3267 (44)	
Household income, *n* (%)		
Low (less than $20 000)	1622 (20)	120 (32)
Medium ($20 000 to $50 000)	2190 (26)	90 (24)
High (more than $50 000)	2160 (26)	59 (16)
Missing data	2252 (27)	104 (28)
Smoking ever, *n* (%)		
Yes	3162 (39)	188 (50)
No	5062 (62)	185 (50)
Alcohol ever, *n* (%)		
Yes	3488 (42)	191 (51)
No	4736 (58)	182 (49)
Marijuana ever, *n* (%)		
Yes	1602 (19)	114 (31)
No	6622 (81)	259 (69)
Parent SRH, *n* (%)		
Poor/fair	1024 (13)	102 (27)
Good	6179 (75)	218 (59)
Missing data	1021 (12)	53 (14)
BMI, *n* (%)		

Characteristic	Total	Fair/Poor SRH
<5th percentile	185 (2)	12 (3)
5th to 85th percentile	5642 (69)	187 (50)
85th to 95th percentile	1151 (14)	62 (17)
>95th percentile	863 (10)	83 (22)
Missing data	383 (5)	29 (8)
Household member incarcerated, *n* (%)		
Yes	445 (5)	34 (9)
No	7779 (95)	339 (91)
Homeless ever, *n* (%)		
Yes	96 (1)	14 (4)
No	8128 (99)	359 (96)
Urban environment, *n* (%)		
Yes	6005 (73)	289 (77)
No	2219 (27)	84 (23)
Neighborhood gangs, *n* (%)		
Yes	4852 (59)	251 (67)
No	3372 (41)	122 (33)
Family/Home Risk Index, *n* (%)		
High risk	1025 (12)	96 (26)
Low risk	7199 (88)	277 (74)

TABLE 3

Prevalence of Violence Exposures According to SRH at Baseline

Violence Exposure	*n* (%)		
	Total (*N* = 8224)	**Good SRH (*N* = 7851)**	**Poor SRH (*N* = 373)**
Not safe at school	1146 (14)	1037 (13)	108 (29)[a]
Threatened at school	1636 (20)	1521 (19)	115 (31)[a]
Bullied repeatedly at <12 y	1554 (19)	1440 (18)	114 (31)[a]
Bullied at 12–18 y	784 (10)	729 (9)	55 (15)[b]
Witnessed shooting at <12 y	887 (11)	804 (10)	84 (23)[a]
Witnessed shooting at 12–18 y	966 (12)	890 (11)	76 (20)[a]
Victim of crime, attack, or assault	473 (6)	453 (6)	20 (6)

[a] X^2 test, P < .0001.

[b] X^2 test, P < .005.

TABLE 4

CEV Scores and SRH at Baseline

CEV Score	*n* (%)		
	Total (*N* = 8224)	**Good SRH (*N* = 7851)**	**Fair/Poor SRH (*N* = 373)**
0	4020 (49)	3917 (97)	103 (3)
1	2206 (27)	2092 (95)	114 (5)
2	1159 (14)	1091 (94)	67 (6)
3	542 (6.5)	492 (91)	50 (9)
4	221 (2.5)	196 (89)	25 (11)
5	77 (1)	63 (81)	14 (18)

CEV scores were created by summing the number of self-reported violence exposures, including school safety in 1997, threatened in 1997, witnessed shooting at <12 years, witnessed shooting at 12 to 18 years, repeated bullying at <12 years, repeated bullying at 12 to 18 years, and criminal victimization.

TABLE 5

Prevalence of Violence Exposure Categories According to Demographic Characteristics (N = 8224)

Characteristic	No. With Indicated Violence Categories (%)						
	Total	**0**	**1**	**2**	**3**	**4**	**≥5**
Gender[a]							
Male	4178 (51)	1858 (44)	1163 (28)	659 (16)	320 (8)	128 (3)	50 (1)
Female	4046 (49)	2162 (53.5)	1043 (26)	499 (12)	222 (5.5)	93 (2.3)	27 (0.7)
Age							
12 y	1080 (13)	547 (51)	262 (24)	174 (16)	63 (6)	24 (2)	10 (1)
13 y	1585 (19.2)	783 (49)	434 (27)	208 (13)	111 (7)	36 (2)	13 (1)
14 y	1733 (21)	846 (49)	474 (27)	255 (15)	96 (5.5)	46 (2.5)	16 (1)
15 y	1714 (21)	823 (48)	476 (28)	223 (13)	121 (7)	54 (3)	17 (1)
16 y	1552 (19)	736 (47)	423 (27)	215 (14)	117 (7.5)	46 (3)	15 (1)
17 y	541 (6.6)	277 (51)	130 (24)	81 (15)	32 (6)	15 (3)	6 (1)
18 y	19 (0.2)	8 (42)	7 (37)	2 (11)	2 (11)	0	0
Race/ethnicity							
Asian and other	75 (1)	37 (49)	17 (23)	8 (11)	7 (9)	3 (4)	3 (4)
Hispanic[b]	1781 (22)	877 (49)	510 (29)	235 (13)	112 (6)	29 (2)	18 (1)
Non-Hispanic black[a]	2139 (26)	793 (37)	641 (30)	395 (18.5)	195 (9)	82 (4)	33 (1.5)
Non-Hispanic white	4229 (51)	2313 (55)	1038 (25)	520 (12)	228 (5)	107 (2.5)	23 (0.5)
Two-parent household[a]							
No	3008 (37)	1203 (40)	859 (28.6)	513 (17)	269 (9)	123 (4)	41 (1.4)
Yes	5216 (63)	2817 (54)	1347 (26)	645 (12)	273 (5.3)	98 (2)	36 (0.7)
SRH[a]							
Fair/poor	373 (4.5)	103 (28)	114 (30)	67 (18)	50 (13)	25 (7)	14 (4)
Good/excellent	7851 (95.5)	3917 (50)	2092 (27)	1091 (14)	492 (6)	196 (2)	63 (1)
Household income[a]							
Low	1622 (20)	634 (39)	472 (29)	279 (17)	147 (9)	60 (4)	30 (2)
Medium	2190 (27)	1074 (49)	574 (26)	301 (14)	150 (7)	65 (3)	26 (1)
High	2160 (26)	1220 (56)	532 (24)	263 (12)	96 (4.5)	40 (2)	9 (0.5)
Missing data	2252 (27)	1092 (48)	628 (28)	315 (14)	149 (7)	56 (2.5)	12 (0.5)
Parent SRH[a]							
Poor/fair	1024 (12.5)	396 (39)	291 (28)	176 (17)	379 (6)	44 (4)	20 (2)
Good	6179 (75)	3144 (51)	1609 (26)	841 (14)	97 (9.5)	152 (2.5)	54 (1)
Missing data	1021 (12.5)	480 (47)	306 (30)	141 (14)	66 (6.5)	25 (2.5)	3 (0.3)
BMI[a]							
<5th percentile	185 (2)	90 (49)	44 (24)	28 (15)	17 (9)	4 (2)	2 (1)

Characteristic	No. With Indicated Violence Categories (%)						
	Total	**0**	**1**	**2**	**3**	**4**	**≥5**
5th to 85th percentile	5642 (69)	2859 (51)	1486 (26)	770 (14)	339 (6)	143 (3)	45 (1)
85th to 95th percentile	1151 (14)	516 (45)	333 (29)	170 (15)	85 (7)	37 (3)	10 (1)
>95th percentile	863 (10)	363 (42)	244 (28)	144 (17)	72 (8)	23 (2)	17 (2)
Missing data	383 (5)	192 (50)	99 (26)	46 (12)	29 (8)	14 (4)	3 (1)
Household member incarcerated[a]							
Yes	445 (5.4)	156 (35)	102 (23)	79 (18)	62 (14)	30 (7)	16 (4)
No	7779 (94.6)	3864 (49.5)	2104 (27)	1079 (14)	480 (6)	191 (.5)	61 (1)
Homeless[a]							
Yes	96 (1.2)	15 (16)	17 (18)	23 (24)	25 (26)	6 (6)	10 (10)
No	8128 (98.8)	4005 (49)	2189 (27)	1135 (14)	517 (6.3)	215 (2.7)	67 (1)
Family/Home Risk Index[a]							
Low risk	7199 (87.5)	3679 (51)	1920 (26)	952 (13)	430 (6)	164 (2)	54 (1)
High risk	1025 (12.5)	341 (33)	286 (28)	206 (20)	112 (11)	57 (6)	23 (2)
Smoking ever[a]							
Yes	3162 (38)	1296 (41)	847 (27)	546 (17)	302 (10)	126 (4)	45 (1.4)
No	5062 (62)	2724 (54)	1359 (27)	612 (12)	240 (5)	95 (2)	32 (0.6)
Alcohol ever[a]							
Yes	3488 (42)	1509 (43)	912 (26)	583 (17)	307 (9)	140 (4)	37 (1)
No	4736 (58)	2511 (53)	1294 (27)	575 (12)	235 (5)	81 (2)	40 (1)
Marijuana ever[a]							
Yes	1602 (20)	563 (35)	440 (27)	288 (27)	188 (12)	92 (6)	31 (2)
No	6622 (80)	3457 (52)	1766 (27)	870 (13)	354 (5)	129 (2)	46 (0.7)
Neighborhood gangs[a]							
Yes	4852 (59)	1943 (40)	1369 (28)	847 (17)	437 (9)	188 (4)	68 (1.4)
No	3372 (41)	2077 (61.6)	837 (25)	311 (9)	105 (3.1)	33 (1)	9 (0.3)
Urban environment[a]							
Yes	6005 (73)	2837 (47)	1644 (27)	892 (15)	409 (7)	166 (3)	57 (1)
No	2219 (27)	1183 (53)	562 (25)	266 (12)	133 (6)	55 (2.5)	20 (1)

[a] $P < .0001$.

[b] $P < .01$.