CONNECTICUT VOICES FOR CHILDREN

Youth Risk Behavior by School Income Level

An Analysis of the Connecticut School Health Survey

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KEY FINDINGS

Connecticut Voices for Children's analysis of data from the 2007 Connecticut School Health Survey shows that youth who attend schools with high concentrations of students from low income families are more likely to behave in ways that jeopardize their health and safety. The survey, conducted statewide by the Connecticut Department of Public Health, measures a wide range of behaviors and risk factors, including substance abuse, sexual activity, violence, dietary habits, physical activity, academic achievement, and mental health among Connecticut's high school students. The results of this analysis show that income is strongly correlated with risk behaviors. Key findings:

- Students who attend schools with high proportions of students from low-income families were more likely than students in higher income districts to report poor diet, physical inactivity, depression, exposure to violence, poor school performance, and risky sexual behavior.
- Students who attend schools with high proportions of students from low-income families were less likely than students in higher income districts to report cigarette and alcohol use.

Based on these findings, we recommend that policy makers take into account these differences in risk behaviors when designing and targeting interventions aimed at improving health in adolescence.

Introduction

Many of the most prevalent causes of mortality and morbidity are directly related to health-risk behaviors that develop in adolescence, continue into adulthood, and are preventable.[2] These behaviors fall into six principle categories:[3] those that lead to unintentional injuries and violence, tobacco use, drug and alcohol use, risky sexual behavior, unhealthy diet, and physical inactivity. Today, the most common causes of death among teenagers in Connecticut are motor vehicle accidents, suicide, and homicide.[4] Heart disease and cancer, the two most prevalent causes of mortality in the United States, are highly linked to preventable behavior that begins in youth. The more that can be learned about the prevalence and distribution of risky behaviors among youth, the better equipped administrators and policymakers will be to pursue the programs and policies best suited to curb those behaviors and improve health.

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[1] This research was conducted by Joachim Hero, who was a Senior Policy Fellow with CT Voices and is now a doctoral candidate at Harvard University. For further information, please contact Mary Alice Lee, Senior Policy Fellow at CT Voices. Funding for this work was provided by the Connecticut Health Foundation and Melville Charitable Trust.

[2] Eaton D.K., et al., "Youth Risk Behavior Surveillance – United States, 2007" MMWR 57(SS04), June 6, 2008.

[3] While the categories are distinct, the behaviors within them are often linked.

[4] National Center for Health Statistics (NCHS), National Vital Statistics System.

In 2006, Connecticut Voices for Children examined youth risk behavior by race and ethnicity using data from the 2005 Connecticut School Health Survey (CSHS).[5] The key finding was that risk behaviors often correlated, sometimes strongly, with race/ethnicity. White students, for example, more commonly reported cigarette and alcohol use and abuse, while black and Hispanic students reported higher frequencies of risky sexual behavior, violence, poor nutritional habits, and physical inactivity.

Since race and ethnicity in Connecticut are highly correlated with socio-economic status, Connecticut Voices recommended that the CSHS include information on the family incomes of respondents. Based on this recommendation, the Connecticut Department of Public Health agreed to provide income data with the 2007 CSHS that were obtained from the school profile. The addition of information on socio-economic status allows for an examination of youth risk behavior by income.

Using the new income data, we found that income from school profiles is strongly correlated with several types of risk behavior and risk factors. Students who attend schools with high proportions of students from low-income families were more likely to report poor diet, physical inactivity, depression, exposure to violence, poor school performance, and risky sexual behavior. These same students, on the other hand, reported lower cigarette and alcohol use.

Methods

Survey Data

All data on youth risk behaviors were obtained from the Connecticut School Health Survey (CSHS). The CSHS was administered by the Connecticut Department of Public Health in 2005 and again in 2007 as part of the state component to the U.S. Center for Disease Control's Youth Risk Behavior Surveillance System (YRBSS). The YRBSS was developed to measure priority health-risk behaviors and the prevalence of obesity and asthma among the country's high school students. The survey covers a wide range of behaviors and risk factors including, but not limited to, substance abuse, sexual activity, violence, dietary habits, physical activity, academic achievement, and mental health. States and the federal government use the results of the YRBSS to monitor progress toward the achievement of Healthy People 2010 goals, to assess behavioral trends in high-school students, and to assess the effectiveness of state and federal interventions designed to encourage healthy behavior and minimize risk factors.

States have the option of working with the CDC to administer a state-specific component of the YRBSS. Connecticut's CSHS is one of 44 such state components. The state component may include additional questions that address particular state health and behavior interests so long the survey remains under 100 questions. The CSHS is composed of 99 questions, is voluntary, self-administered, and follows local parental permission procedures before the administration of each survey.

To protect the identities of respondents and to encourage truthfulness in questionnaire responses, all questionnaires are anonymous. Questions on the students' gender, age, race, weight, and height are

[5] Gabrielle Grode, Priscilla Canny, and Elizabeth Clark. "Do Health Behaviors of Connecticut Youth Differ by Their Race and Ethnicity? The Connecticut School Health Survey 2005." Connecticut Voices for Children, March 2007.

included in order to allow for stratified analysis along different demographic and health categories, but answers are impossible to trace to any particular student.

In 2007 the state of Connecticut collected survey responses from about two thousand students in grades 9 through 12 in order to estimate self-reported student behaviors in the general Connecticut high school population.[6] Survey responses were weighted by the CDC to account for non-responses and for differences between the survey sample and the general population in terms of demographic characteristics that are known to be associated with student response rates (e.g. race and age).

For more detailed information on the CSHS sample, including sample demographic proportions and methods for creating demographic categories, see Appendix A at the end of this report.

Interpreting CSHS Results

The CSHS uses responses from 2,074 students in Connecticut public high schools in order to estimate health risk factors for the entire public high school population (177,000 students in 2007).[7] Therefore, student responses from the CSHS may not exactly match the responses from the full population. To deal with this issue, this report presents each of its results with a range (called a confidence interval) within which results from the total population would likely be, given the result found using a sample.[8] In addition to confidence intervals, most of the results have been tested statistically to determine whether it is likely that students' responses between demographic categories (race, income, etc.) would be different from one another had the survey been administered to the entire public high school population.[9] In other words, the statistical tests are done to determine whether the differences in student responses observed in the CSHS sample likely reflect an actual difference between groups had the survey included the entire high school student population.

Income Measure

For the purposes of this study, each response was assigned an income category, determined by attaching school profile data to each individual record. The income measure was the percentage of students eligible for Free or Reduced Price Meals (FRPM) in the source school.[10] Generally, a student is eligible to receive FRPMs at school if their family's yearly income is less than 185 percent of the federal poverty guidelines. Therefore, school rates of FRPM eligibility can be used to identify schools with higher proportions of students that come from low-income families. To analyze the potential effect of income on risky student behavior we defined three separate income categories:

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[6] The CSHS uses a two-stage sampling design in order to gather respondents. The first stage is conducted at the school level, meaning a sample of schools is randomly selected from the total pool of eligible public schools in the state (46 schools were selected in 2007). Following the selection of schools, a randomly selected sample of classrooms is chosen from each school. All students in each classroom are asked to complete the CSHS. For an even more detailed description of sampling design, see Appendix A.

[7] 2007 Enrollment numbers from State Department of Education

[8] All confidence intervals displayed in this report represent 95 percent confidence around the survey frequency. This means that for each estimate, the population frequency would lie within the confidence interval in 95 out of 100 samples of the same size.

[9] The tests in this report consider a difference to be statistically significant when the probability that the students' responses between demographic categories is the same is less than 5 percent.

[10] Available from the Connecticut Department of Education

- Low-income, if school FRPM eligibility was greater than or equal to 20 percent of the school population.
- Middle-income, if school FRPM eligibility was less than 20 percent but greater than or equal to 10 percent of the school population.
- High-income, if school FRPM eligibility was less than 10 percent of the school population.

For the purposes of this study, these categories were defined according to "natural breaks" in the distribution of FRPM eligibility rates and to provide adequate sample size across categories. Of 2,074 respondents, 864 were categorized as low-income, 543 were categorized as middle-income, and 667 were categorized as high-income. For more details on the income categories, see appendix B.

Analytic Methods

Statistical analyses were conducted on weighted data using SAS® software to account for YRBSS sampling design.[11] The SURVEYFREQ process was used to calculate frequencies and 95 percent confidence intervals of responses by income, both of which were represented graphically using Microsoft Excel.[12] Rao-Scott Chi-Square, a survey-design-adjusted Pearson Chi-Square, tests were used to determine statistically significant differences between income categories. Statistical significance was defined as $p < .05$. In tabular displays of results, a star (*) is included at the end of the question heading if any two of the three income categories exhibited a statistically significant difference. Pair-wise tests were not performed.

Findings

Findings for this report are divided into six risk-factor categories:

I. *Tobacco, Alcohol, and Marijuana Use*
II. *Violence*
III. *Mental Health*
IV. *Sexual Behavior*
V. *Diet and Physical Activity*
VI. *School Performance and Aspirations*

Each risk-factor category examines a set of between three and five questions by income. Questions that measured high-prevalence behaviors were favored for selection because of their large public health impact. For details on demographic definitions, see appendix A

I. *Tobacco, Alcohol, and Marijuana Use*

Teen substance abuse can harm school performance, can lead to unhealthy habits and addiction later in life, and can ultimately lead to injury or death. Smoking habits usually begin during teenage years

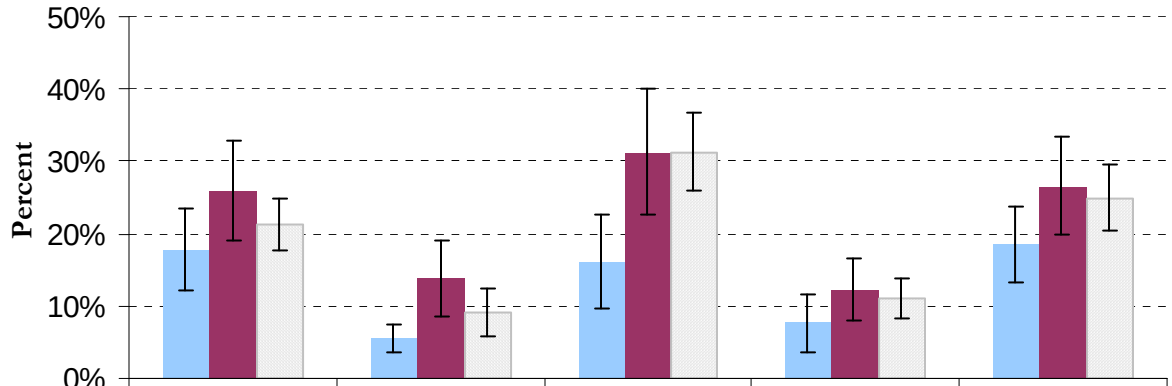
[11] SAS Institute, Inc. SAS, version 9.1 [software and documentation]. Cary, NC: SAS Institute; 2003.
[12] Microsoft Corporation. Microsoft. Excel 2000 [software and documentation]. Redmond, WA: Microsoft Corporation, 2000.

and teenagers who do not smoke will rarely start smoking later in life.[13] Driving while under the influence of alcohol or drugs is the most common cause of fatal accidents in Connecticut, and the risk of getting into an accident is four times higher among teenagers than among any other age group.[14]

For this report, five questions were chosen to examine substance use and abuse among Connecticut youth. Two questions asked about smoking habits, two asked about drinking habits, and one asked about marijuana use. Current cigarette use is defined as having smoked a cigarette in the last thirty days, while frequent smoking refers to having smoked cigarettes on 20 or more of the last 30 days. Binge drinking behavior is defined as drinking five or more drinks in a row within a couple hours. The questions on binge drinking, drunk driving, and current marijuana use all refer to behavior that has occurred in the past 30 days.

Harmful tobacco-, and alcohol-related behaviors were reported at a higher frequency among students in schools that draw from middle- and high-income areas, but statistically significant differences were detected in only two of five studied questions (Table 1). In particular, students in middle and high-income schools are two times more likely than students in lower-income school to report binge-drinking behavior. Binge drinking behavior in the past 30 days was reported by 31 percent of students in high- and middle-income school while 16 percent reported this behavior in low-income schools. Frequent cigarette use was also twice a likely to be reported among students in middle-income schools (14%) than among students in low-income schools (6%).

Tobacco, Alcohol, and Marijuana Use by Income



Income Area	Current cigarette use	Frequent cigarette use*	Binge Drinking*	Drunk driving	Current marijuana use
Low	18%	6%	16%	8%	19%
Middle	26%	14%	31%	12%	27%
High	21%	9%	31%	11%	25%

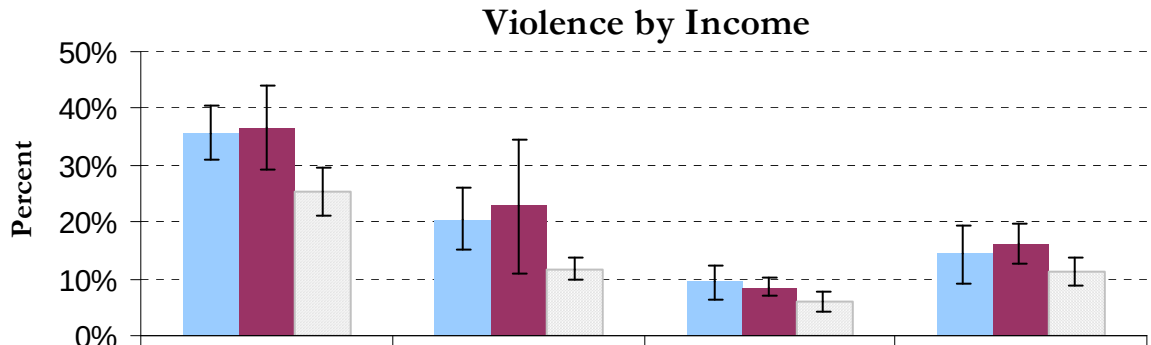
[13] American Cancer Society. "Child and Teen Tobacco Use". 2007. Last Visited July 15, 2008. http://www.cancer.org/docroot/PED/content/PED_10_2X_Child_and_Teen_Tobacco_Use.asp

[14] Insurance Institute for Highway Safety (IIHS). Fatality facts: teenagers 2005. Arlington (VA): The Institute; 2006.

II. *Violence*

Violent behavior among teens is not only a risk for teen health, but has broader implications for school performance and completion when violent behavior occurs on school grounds. This report looked at four survey questions to get a picture of how Connecticut students are exposed to violence. The first asks if the student has been in a physical fight one or more times in the past 12 months, the second asks if the student has carried a weapon on one or more of the past thirty days, the third asks if the student has been threatened or injured by a weapon *on school property* in the past thirty days, and the fourth asks if the student has been hit, slapped or physically hurt on purpose by a boyfriend or girlfriend in the past 12 months.

Income is strongly associated with violent behavior and exposure to violence (Table 2). Students who attended schools that draw from lower income communities were more likely to say that they had been in a fight in the past 12 months (36%), more likely to say they carried a weapon (21%), and more likely to say that they had been threatened with a weapon on school property (9%) than students who came from schools that draw from higher income communities. There was no statistically significant difference, however, between group responses on having been victims of dating violence, or having been in a fight *on school property* in the last 12 months (affirmative responses ranging from 9% in high-income schools to 12% in low-income schools [*data not shown*]).[15] Over 10 percent of high school students reported having been victims of dating violence, regardless of income category.



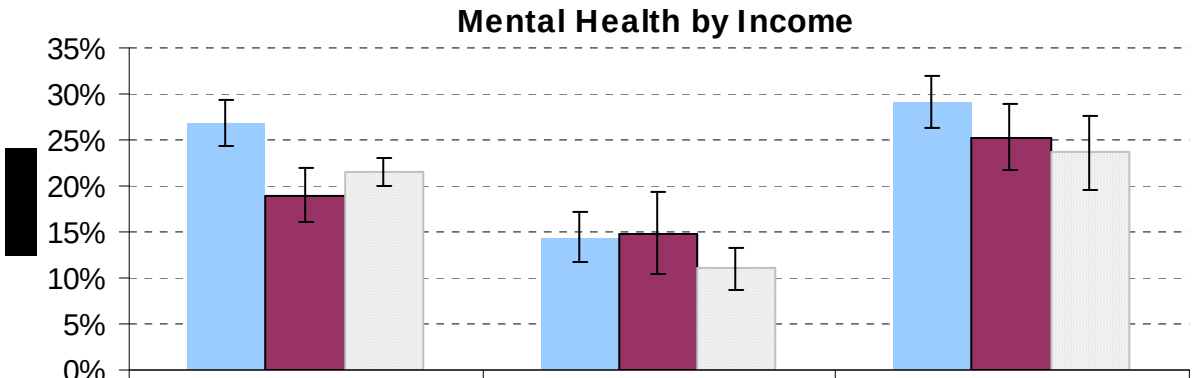
Income area	Been in a Fight*	Carried a Weapon*	Threatened with a Weapon*	Dating Violence
Low	36%	21%	9%	14%
Middle	37%	23%	8%	16%
High	25%	12%	6%	11%

[15] 12 percent of respondents in low-income areas replied affirmatively to having fought on school grounds, 11 percent said so in middle-income areas, and 9 percent in high income areas.

III. *Mental Health*

Assessment of mental health risk factors relied on students' responses to three questions. The first, measuring depression, asked if the student felt sad or hopeless every day for at least two weeks in a row so that they stopped doing usual activities during the past 12 months. The second asked whether the student has seriously considered suicide in the past 12 months. The third question asks how often students get the help they need when feeling sad, empty, hopeless, angry, or anxious.

Respondents in the lowest income category reported higher rates of depression-related thoughts and more difficulty in getting help than the higher income categories (Table 3). Close to 30 percent of youth in schools that draw from low-income areas answered that they experienced symptoms of depression, and roughly the same percentage said that they rarely got the help they needed when experiencing these symptoms. Reports of suicide consideration did not appear to vary greatly by income category.



Income	Depression*	Seriously Considered Suicide	Never/Rarely get the Help they Need*
Low	27%	14%	29%
Middle	19%	15%	25%
High	22%	11%	24%

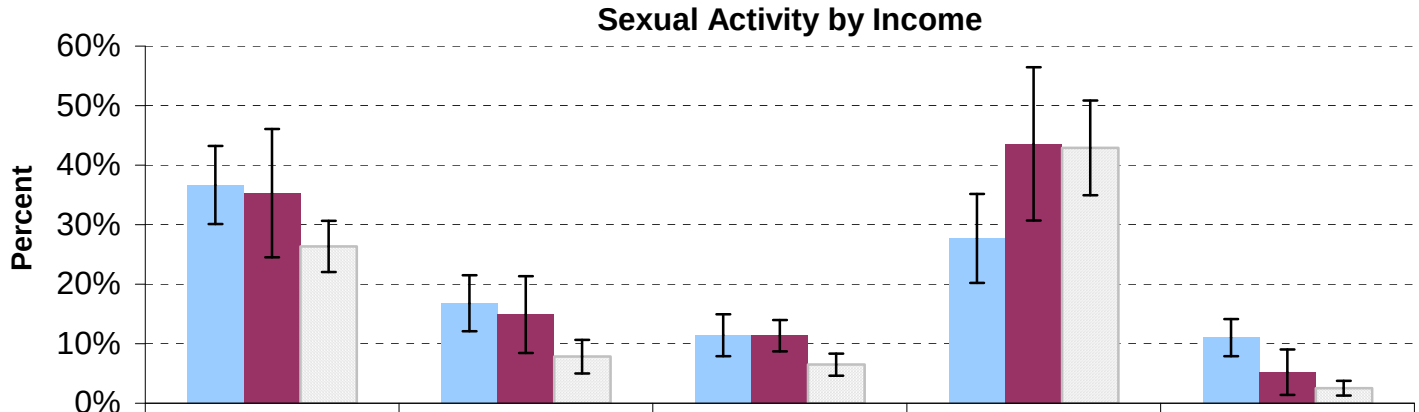
IV. *Sexual Behavior*

Risky sexual behavior among adolescents can lead to adverse health outcomes or pregnancy, which can threaten academic and economic success later in life. Adolescents who engage in sexual activity early are less likely to use contraception and more likely to get pregnant.[16] Teenage pregnancy, in turn, is strongly correlated with poverty, low academic accomplishment, and increased health risks for mother and child.[17] In this report we examine questions on five types of risky behavior: if the student is sexually active (had sex in the last three months), if the student has had more than four sexual partners, if the student's first partner was three or more years older, whether the student used

[16] Manlove J, Terry E, Gitelson L, Papillo AR, Russell S. Explaining demographic trends in teenage fertility, 1980–1995. Family Planning Perspectives 2000;32(4):166–175.
[17]The National Campaign. "Teen Pregnancy – So What?" 2006. Last Visited July 15, 2008. http://www.teenpregnancy.org/whycare/sowhat.asp

a condom during their last encounter (if they have ever had sex), and whether the student had sex before the age of thirteen.

Income measures are significantly associated with the reporting of risky sexual behaviors (Table 4). Four of five questions related to risky sexual activity examined in this report showed that students in schools that draw from low-income areas generally engage in riskier sexual activity. In low-income schools, 37 percent of students reported being sexually active compared to 26 percent in high-income schools. Additionally, 17 percent of students in low-income schools reported having had more than 4 sexual partners in their lifetime compared to 8 percent in high-income schools, and students in low-income schools were more than three times as likely to report having had sex before the age of 13 than students in high-income schools. Yet a question that measured condom use found students in high-income schools were *more* likely to say they had sex without a condom during their last sexual encounter than students in low-income schools. Over 40 percent of students in middle- and high-income schools reported not using a condom during their last encounter, compared to 28 percent in low-income schools who reported not doing so.



Income Area	Sexually Active*	4+ partners*	Older 1st partner*	No condom for last encounter*	Sex before age 13*
Low	37%	17%	11%	28%	11%
Middle	35%	15%	11%	44%	5%
High	26%	8%	6%	43%	3%

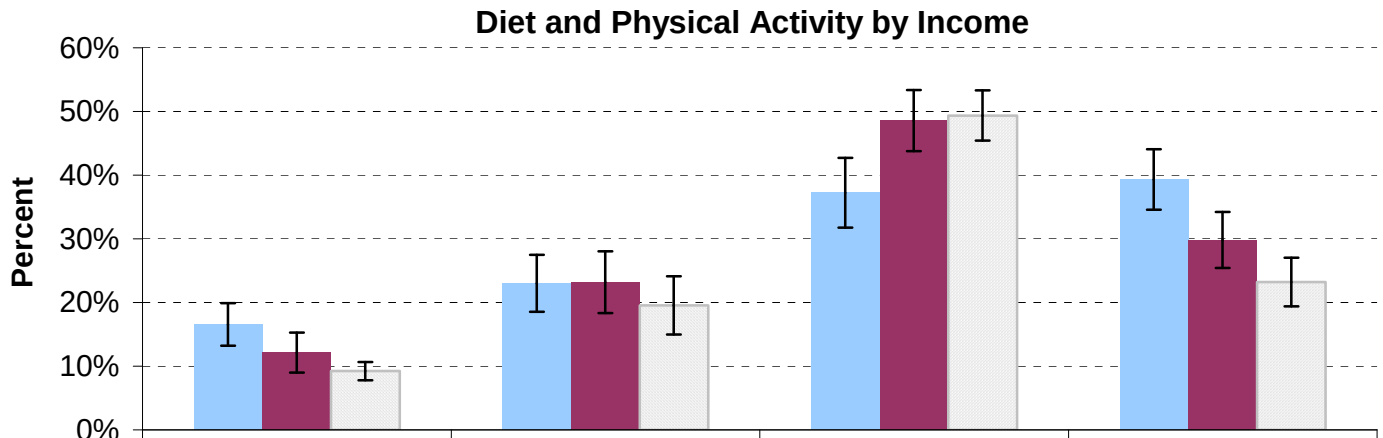
V. *Nutrition and Physical Activity*

Good diet and exercise habits formed in youth are important for ensuring a healthy adulthood. Childhood obesity is associated with higher rates of diabetes, heart problems, and shortened lifespan. The CSHS asks several questions related to diet and physical activity that are associated with overweight or at risk of being overweight. This report looks at the frequency of overweight[18] youth (calculated from students' responses to questions on height and weight), the frequency of youth who say they eat fruits or vegetables five times a day five days a week, the frequency of youth

[18] At or above the 95th percentile for body mass index, by age and sex. Note that the YRBS likely underestimates the prevalence of obesity among teens because respondents are known to exaggerate their height and under-report their weight. While this bias lowers the overall obesity estimates, this should not have an effect on income comparisons.

who say that they are physically active for at least 60 minutes during five of the past seven days, and the frequency of youth who say that they watch more than three hours of television on an average school day.

Income category had an effect on the likelihood that students would report being overweight, participating in physical activity, and watching more than three hours of television (Table 5). Students in schools that draw from lower-income areas were more likely to be overweight, less likely to be physically active, and more likely to watch more than three hours of television on an average school day than students in schools that draw from high-income areas. Students in the low-income category were particularly likely to report watching high levels of television on an average school day, at 39 percent.

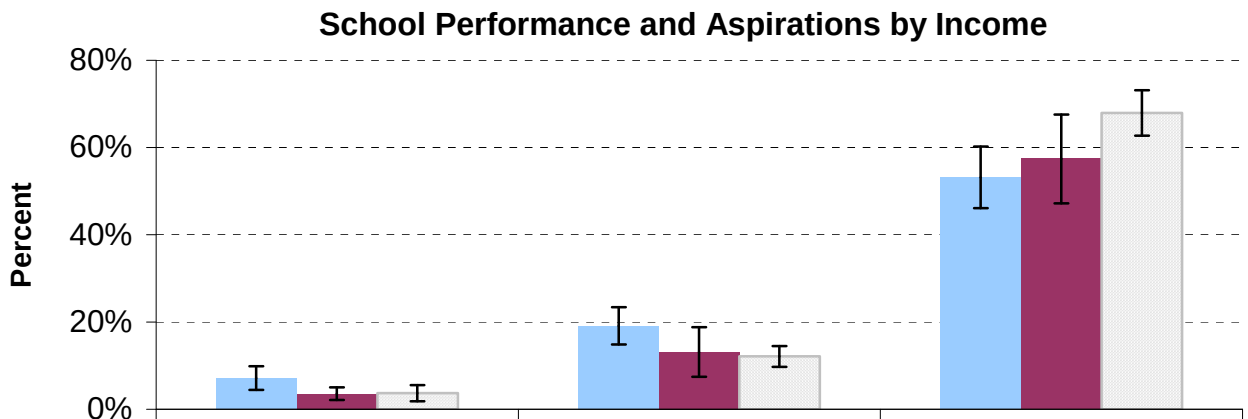


Income Area	Overweight*	Frequently eats fruits & vegetables	Physically active*	3+ hrs of TV*
Low	17%	23%	37%	39%
Middle	12%	23%	49%	30%
High	9%	20%	49%	23%

VI. *Academic Performance and Aspirations*

This report considered students' responses to three questions concerning school performance and aspirations. School performance is measured by the percentage of students who describe their grades as mostly D's and F's and the percentage of students who say they participate in extra curricular activities. Future academic aspirations are measured by the percentage of students who do not expect to complete post-secondary education.

Students in the low-income category reported poorer school performance and aspirations than students in the high-income category (Table 6). Students who attend schools that draw from low-income areas were less likely than students in high-income drawing schools to participate in after-school activities, more likely to describe their grades as mostly Ds and Fs, and more likely to report that they will not complete post-secondary education. 68 percent of students in high-income schools reported participating in extracurricular activities, compared to only 53 percent in low-income schools.



Income Area	Grades are Ds and Fs*	Will not complete post-secondary education*	Extracurricular activities*
Low	7%	19%	53%
Middle	4%	13%	57%
High	4%	12%	68%

Discussion

Low-income families frequently live in neglected, unsafe communities with crumbling-to-nonexistent public infrastructure and poor access to quality education, healthcare, and counseling services. These environments can form harmful behaviors among youth and can inhibit the ability to establish healthy behaviors such as regular physical activity or participation in after-school programs. Income-stratified student responses to the 2007 CSHS are generally consistent with expectations, in light of the many adverse conditions that accompany low-income communities. Students in schools with high concentrations of low-income students tended to report higher exposure to violence and risky sexual behavior, and were more likely to report weight problems, depression, poor school performance, and low post-secondary aspirations.

Some risky behaviors, most notably substance abuse, were reported with less frequency among students in low-income schools, which suggests a more complex relationship between income and behavior. Students in low-income schools were close to half as likely to report binge drinking behavior as students in middle- and high-income schools, and were more than half as likely to report frequent cigarette use than students in middle-income schools. While the differences between income categories were not statistically significant for the three other substance abuse questions included in this report, students in low-income schools reported the lowest frequency in all of them. Many factors, either independently or in combination, may account for this correlation, though this report lacks the data to comment on their relative likelihoods. It is possible, for example, that students in low-income schools are less likely to have the financial means to be frequent smokers, binge drink, or participate in expensive behaviors. In other words, low income may "protect" youth from deleterious behavior like substance abuse similar to how low income can prevent healthy behavior like frequent physical activity. Research using the national YRBS sample has found

evidence to suggest that income effects are present with respect to risky behavior among youth.[19] Other explanations, such as varying anti-drug program effectiveness or cultural differences, could also play a role. Further research should examine patterns of substance abuse and related behavior for a wider range of activities across income in order to confirm whether the correlations found in this report represent a broader trend.

Students in low-income schools also more frequently reported using condoms during their last sexual intercourse than students in middle- and high-income schools. Condom-use differences between income categories ran contrary to the direction of correlation observed with other sexual behavior questions—students in low-income schools more often reported risky sexual behavior for every other examined question. This finding also runs contrary to previous research on the topic of condom use among women aged 15-44 in the United States, which found the opposite correlation between condom use and income.[20] The CSHS results may be partially due to youth in high-income school relying more frequently on other forms of contraception. CSHS data show that students in the high-income category were 2.5 times more likely to say they used birth control pills than students in the low-income category. In addition, research suggests that youth are particularly sensitive to price, which may explain the discrepancy between CSHS results and results from surveys that include a broader age range.[21] Alternatively, the lower reported use of condoms among middle- and high-income students might be made clearer if students in these schools are more or less likely to engage in certain types of romantic relationships. A recent study found evidence that suggests that relationship characteristics, such as the length of the relationship or the quality of communication between couples, are correlated with condom use.[22] Students in low-income schools were more likely to report having four or more sexual partners, which could be related to higher condom use. Regardless of what drives the difference between low-income responses and middle- and high-income responses to this question, it may be useful to stress the importance of condoms for prevention of sexually transmitted diseases, including HIV/AIDS, and promote condom use in addition to other contraceptives. The important preventive and contraceptive benefits of condom use should make further inquiry into this issue a high priority.

Limitations to the data

Because the CSHS produces self-reported data, it is subject to some interpretive limitations. All CSHS data are reported by the students themselves (with the exception of income estimates, which were derived from data collected by the State Department of Education) and are therefore subject to a range of possible response biases. Elements such as the wording of survey questions, student maturity, and cultural norms can all have an effect upon how students respond.[23] Social or cultural

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[19] Gruber J. Risky behavior among youths: an economic analysis. Working paper No. 7781, National Bureau of Economic Research, Cambridge MA (2000).

[20] Bankole A, Darroch JE, Singh S. Determinants of Trends in Condom Use in the United States, 1988-1995 Family Planning Perspectives 1999 Nov; 31(6)

[21] Research on cigarette taxes, for example, supports that taxes affect youth behavior more strongly than adult behavior. See, e.g., J. Gruber, Youth smoking in the U.S.: prices and policies. Working paper no. 7506, National Bureau of Economic Research, Cambridge MA (2000); L. Liang and F.J. Chaloupka, Differential effects of cigarette price on youth smoking intensity, *Nicotine Tob Res* 4 (2002), pp. 109–114.; CDC, Tobacco use among middle and high school students—United States, 1999, *JAMA* 283 (2000)

[22] Wilson EK, Koo HP. "Associations between low-income women's relationship characteristics and their contraceptive use." Perspectives on Sexual and Reproductive Health. 2008 Sep; 40(3)

[23] Brener ND, Kann L, Kinchen S, et al. Methodology of the Youth Risk Behavior Surveillance System. MMWR 2004;53(No. RR-12)

tendencies to over- or under-report different behaviors, for example sexual behavior, may vary in unmeasured ways across gender, race, or age boundaries and can affect study results. Questions on the CSHS are researched in order to minimize the effect of such biases and maximize validity. Before the surveys are administered, proctors also stress the importance of telling the truth and reassure survey-takers that all responses are anonymous. Nevertheless, the true extent of response bias cannot be known without validity tests, and such tests have only been done for questions on weight and height.[24]

The statistical analyses conducted in this report do not prove a causal relationship between income-category and youth risk behavior. The income categories used in this report are highly correlated with race, and may also be highly correlated with a number of other factors that could have an impact on youth risk behavior. Small cell sizes prevented meaningful analysis of race-adjusted data, and other potentially relevant data, such as school quality or community characteristics, were not available. The inability to adjust for confounding variables severely limits the validity of any inferences about causality, or about the mechanisms that may drive any associations observed in this report.

Additionally, income category is imputed using school-level variables, and therefore is not necessarily reflective of a respondent's actual income. That is, all students who attend a school whose student body is more than 20 percent eligible for FRPMs will be labeled as coming from a low-income school but may not be low-income themselves. The result is that, to the degree that an income effect exists on the individual level rather than just the school level, differences in student replies by income category would be attenuated. Therefore, it is likely that many of the differences in behavior by income observed in this report are narrower than they would be if students were categorized by family income. School-level concentrations of low-income students, however, were the most accurate approximations of individual income available. An evaluation of income effects upon risk behavior would be greatly improved with the addition of student-level income data to the CSHS. Since high-school students are not expected to be able to accurately report their family income, income level could perhaps be estimated through an income-marker, for example the receipt of FRPMs.

Policy Implications

This report shows that there are widespread differences in risk behaviors between youth in schools of varying poverty concentrations. Information on the link between income and risky behaviors can help policymakers and public health practitioners gain awareness of the unique challenges facing Connecticut's many communities. It will assist in the development of the most appropriate and effective interventions to reduce harmful behaviors in the most at-risk populations. Some examples of policies that should be explored based upon the findings in this report include:

- Provide increased funding and opportunities for Physical Education and nutrition education in school curriculums in low-income schools.
- In school health curriculums, promote dual contraceptive use of condoms in addition to other contraceptives to prevent pregnancy and sexually transmitted diseases.

24 The CDC found that students tended to over-report their height by a couple centimeters and underreport their weight by an average of 3.5 pounds. Therefore CSHS likely underestimates the prevalence of obesity in high schools. Ibid.

- Design and target anti-smoking and drinking messaging for increased effectiveness in middle- and high-income communities.
- Increase parent and community awareness of prevalent youth behavior risks and provide opportunities for parents and communities to become engaged in youth risky behavior prevention.

Conclusion

This report shows that youth who attend schools with high concentrations of students from low-income families are more likely to behave in ways that jeopardize their health and safety. Students from schools with high concentrations of students from low-income families were more likely to report poor diet, physical inactivity, depression, exposure to violence, poor school performance, and risky sexual behavior. Many of these behaviors carry serious health risks (present and future) whose consequences fuel the cycle of poverty. On the other hand, students from these schools were less likely to report risky behaviors such as frequent smoking, binge drinking, and sex without a condom, all of which raise the possibility that students in low-income schools are less likely to have the financial means to engage in more costly behaviors.

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Appendix A

The 2007 CSHS had a final sample of 2074 students. The first stage of sampling had a response rate of 78 percent (46 of 59 selected schools). The second stage of sampling also had a response rate of 78 percent (2072 of 2659 selected students). Therefore the overall response rate was 0.78 * 0.78, which equals 61 percent. The table below breaks down the sample by several demographics in each of the three income categories used in this report.

Demographics

		Low-Income FRPM > 20% Percent	Middle-Income FRPM >10% <20% Percent	High-Income FRPM < 10% Percent
Sex	Female.....	47%	43%	54%
	Male.....	53%	56%	45%
Race	White.....	35%	81%	89%
	Black.....	32%	7%	2%
	Hispanic.....	29%	9%	5%
	Other.....	4%	4%	3%
Grade	9th.....	30%	25%	25%
	10th.....	27%	25%	24%
	11th.....	20%	22%	30%
	12th.....	20%	28%	21%

Note: The proportions that appear in this table and throughout this report are derived using weighted frequencies. The CSHS is weighted by sex, race, and grade so that these demographic proportions in the sample match their proportions in the population.

Sex, grade, and race of the students were all determined from questions included in the survey questionnaire. Students were asked, "What is your sex?" and, "In what grade are you?" with multiple-choice answers to determine sex and grade. To determine a student's race, the CSHS uses two separate questions. The first asks whether the student is Hispanic or Latino, to which the student can answer 'yes' or 'no', and the second asks the student to identify their race or races from a list of five categories (American Indian/Alaskan Native, Asian, black or African American, white, Native Hawaiian or other Pacific Islander). In this report, students who filled in white as their only race were coded as white, students who filled in black or African American as their only race were coded as black, and students who identified themselves as Hispanic or Latino, regardless of their answer to the subsequent question on race, where coded as Hispanic.

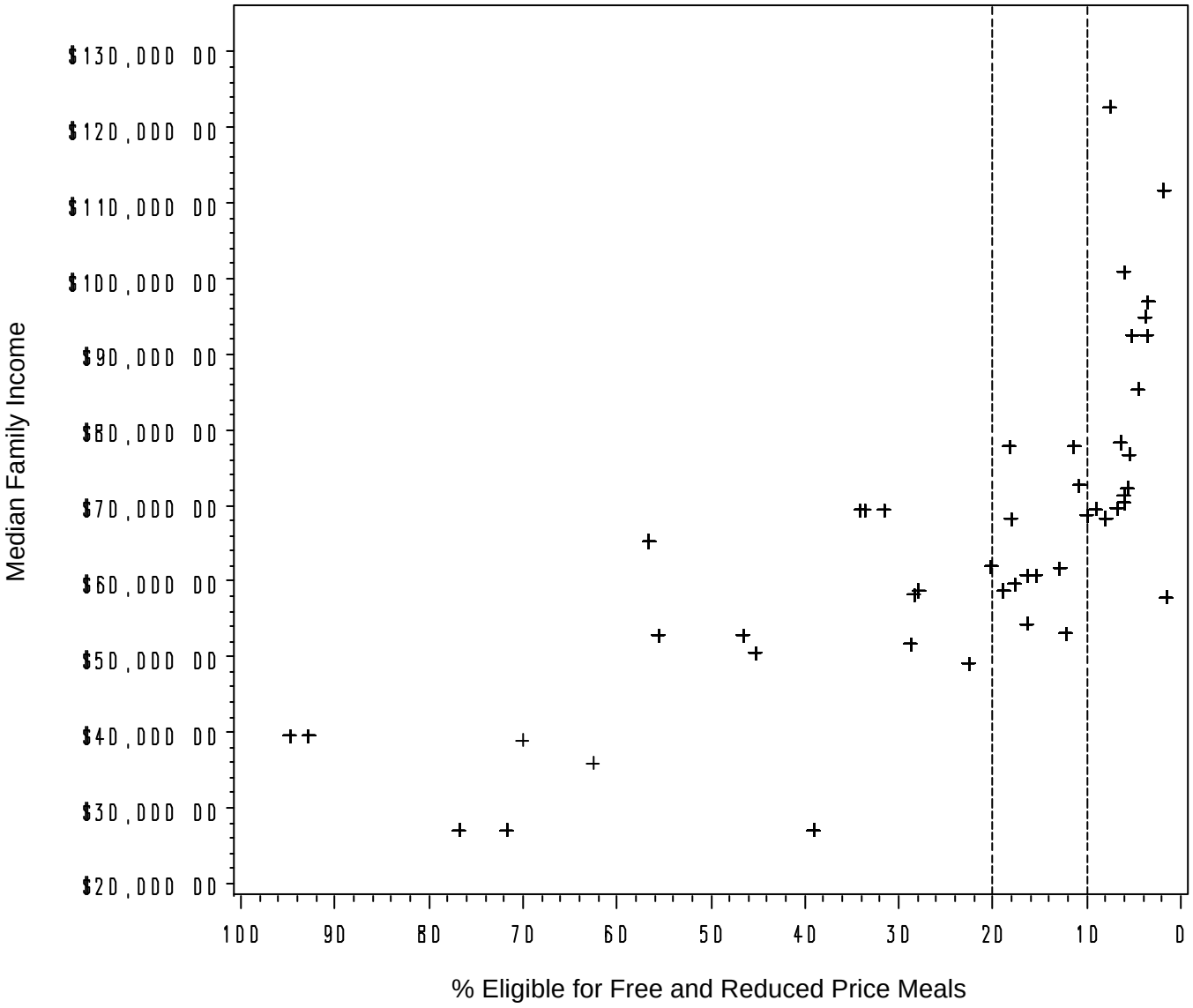
Appendix B

The Connecticut Department of Public Health included two separate income-related variables with the 2007 CSHS survey results: The percentage of students eligible for free and reduced price meals at each school, and the median family income of the town in which each school is located. We determined that school-level income data would be a more accurate estimation of student incomes because town-level incomes may not accurately reflect the median incomes of students who attend public schools in the town.

Both income measures are highly correlated. The figure that appears on the following page is a plot of the percent of students eligible for free and reduced price meals in each of the participating schools by the median family income of the surrounding town (as reported by the 2000 U.S. Census). The two dotted lines in the graph indicate the boundary lines between income categories used in this report. Those observations that appear to the left of the dotted lines were assigned to the low-income category, those observations appearing between the dotted lines were assigned to the middle-income category, and those observations appearing to the right of the dotted lines were assigned to the high-income category. The scatter plot exhibits a strong correlation between the FRPM variable and town-level median income.

The income boundaries we selected were narrow, and concentrated in the lower FRPM eligibility range because the data was skewed towards the higher percentages (that is, observations were concentrated in the low percentages). A normal probability plot of the data by FRPM eligibility percentage, also displayed below, demonstrates this more clearly, showing that almost 90 percent of the survey responses came from schools where the FRPM eligibility was under 50 percent. In order increase statistical power for income category comparisons, income boundaries were also chosen so that each category had an adequate number of observations.

Free and Reduced Price Meals:
Eligibility by Town-Level Median Family Income



Free and Reduced Price Meals: Normal Probability Plot