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Increased Violence Involvement and Other Behavioral and Mental Health Factors Among Youth with Firearm Access

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Abstract

Purpose: To examine multiple ways youth may access firearms among a sample of urban, mountain west youth, and explore whether youth reporting various types of violence involvement and other behavioral or mental health factors have differential access to firearms compared to youth who do not report these issues.

Methods: Cross sectional community-based survey of adolescents 10–17 and one of their parents. Main outcomes were youth firearm access and possession, and associated violence, behavioral, and mental health factors. Bivariate and binomial logistic regression, controlling for demographic factors was used to determine associations and predictors.

Results: 1100 youth and 730 parents participated. Nearly half of youth were male; 58.2% were Hispanic, 24.7% non-Hispanic Black, 10.5% multi-racial, 3.9% other and 2.5% White. About 20% were categorized as having possible access to firearms (i.e., youth knows how and/or where to access firearms); 1.9% possessed a firearm. Analyses revealed that being physically aggressive (OR 2.7), risk for future violence perpetration (OR 2.6), using alcohol (OR 2.0), having internalizing symptoms (OR 1.9), peer problems (OR 1.9), and older age (OR 1.26) predicted youth's possible access to firearms. Marijuana use (OR 9.9), parental gun ownership (OR 6.5) and reported delinquency (OR 8.3) predicted youth's firearm possession.

Conclusions: Youth with potential firearm access demonstrate more violence risk and involvement, and other behavioral or mental health issues than youth without potential firearm access. Parental firearm ownership predicts youth firearm possession. It is important for both health care providers and parents to recognize these potentially lethal associations, in order to provide appropriate counseling.

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Keywords

Firearms; adolescents; youth violence; mental health

INTRODUCTION

In 2016, 7,792 United States (U.S.) youth aged 10–24 died from firearms – including 4,648 homicides and 2,843 suicides. This is the highest rate of firearm mortality reported since 2008 (1). Firearms outpace motor vehicles as the leading mechanism of death for 10–24 year olds— with a rate of 12.2 per 100,000, compared to 11.7 per 100,000 in 2016 (2). Though firearm access is “not a necessary or sufficient cause of violence” (4) firearms are involved in 87% of youth homicides and 44% of youth suicides (1). Access to firearms is a crucial factor affecting the outcome of a suicide attempt, as firearms are 90% lethal. Furthermore, firearm injuries were the seventh leading cause of non-fatal violence-related injuries for youth ages 10–24 during 2015 (1). Firearm deaths, hospitalizations and emergency department visits for 10–24 year olds in 2015 accounted for \$17.5 billion in estimated lifetime combined medical and work loss costs (3).

Youth access to firearms of course plays a critical role in whether deleterious sequelae may occur. In 2017, 4.8% of U.S. high school students carried a gun (not for hunting/sport) at least one day in the last year (5), and 4% of 12–18 year olds reported having access to loaded handguns without adult permission (6). In fact, firearm access is the only factor that has been consistently noted as a “necessary prerequisite for a school shooting ” (7). Apart from activities that allow supervised access to firearms (e.g., hunting), it is important to consider the general implications of youth’s access to firearms and other weapons, particularly among youth at high-risk of harming themselves or others.

Research generally shows no difference in the prevalence of mental health issues related to firearm carrying or access (8, 9), though there is mixed evidence related to the association between mental health and violence perpetration. Though the presence of severe mental illness is linked to slightly increased rates of violence, only 4% of violent acts are attributable to mental illness and few involve firearms (10). However, Simonetti found, based on a nationally representative survey, that of the 29% of adolescents living in a home with a firearm, 41% report having easy access to them (9). Youth with easy access also reported greater substance abuse symptoms compared to youth not reporting easy access to firearms in their home. However, there were no differences found for firearm access in youth reporting a mental health diagnoses (such as depression/anxiety/ADHD). Additionally, adolescents who screen positive for violence risk can be over 2.5 times more likely to receive a mental health diagnosis compared to those who screen negative for violence risk (11).

As firearm access is critical to adolescent morbidity and mortality, goals of this study were to examine various ways youth may access firearms, and the range of factors that could be associated with that potential access to firearms. We hypothesize that youth reporting various types of violence involvement and other behavioral or mental health factors will have increased access to firearms compared to youth who do not report these issues.

METHODS

This cross-sectional study comprises a secondary analysis of baseline survey data associated with a Communities That Care (CTC) intervention focused on youth violence reduction (12, 13). CTC is a process in which community leaders work with scientists to collect data, analyze risk and protective factors, and choose evidence based programs to target specific behaviors of interest. The survey was administered in two communities in a large, urban mountain west city at high-risk for violence (14), from July 2012- March 2013. A random systematic sample of households were identified resulting in an equal probability of selection for each household. If the household met the eligibility criteria (i.e., households with youth ages 10–17 in the home), then the family was invited to participate. Youth could participate even if the parent did not. Verbal consent was obtained from parents, and assent from youth. Confidential face-to-face interviews were conducted with each participant. Study personnel followed a script, and recorded answers on a computer. A \$20 incentive was given to each participant, along with a list of community resources, such as family resource centers, anonymous tip line, mental health services, food banks, and health care facilities. The University of Colorado Boulder Institutional Review Board approved this study.

Study Instruments and Measures

The interview survey consisted of violence risk and protective factor measures obtained from the Denver Youth Survey (15) and the Communities That Care Youth Survey (16, 17). Established measures of risk factors (e.g., demographic characteristics, substance use) for firearm access and possession, as well as factors that may be associated with youth firearm access and possession (violence risk, peer access, other behavioral or mental health characteristics), were also included. Most questions covered ‘past year’ experience, unless otherwise indicated.

Firearm access.—This study explored three distinct aspects of youth firearm access: potential firearm access, self-reported firearm possession, and parent firearm possession.

The *Potential Firearm Access* scale developed from this study assesses youth’s knowledge of how and/or where to access firearms, independent of a time frame. It consists of four questions: 1) *Knows where to get a Handgun* – “if you wanted a handgun, would you know where to get one?” (0=No, 1=Yes); 2) *Easy to get a Firearm* – “if you wanted a handgun, how easy would it be for you to get one?” (0=Very hard or Sort of hard, 1= Sort of easy or Very easy); and 3) *Friends with a Firearm*, measured by two items – “how many of your friends have handguns, pistols, or revolvers?”, and “how many of your friends have rifles or shotguns?” (0=No friends with firearms, 1=Has friend(s) with firearm(s)). Scoring one or higher constituted being positive for *Potential Firearm Access*.

Self-reported Firearm Possession was determined by asking: “During the past year, have you owned or had a gun in your possession?” (0=No, 1=Yes).

Additionally, *Parent Firearm Possession* was measured with only one separate item in the parent’s questionnaire: “During the past year, have you owned or had a gun in your possession?” (0=No, 1=Yes).

Violence risk.—The Violence, Injury, Protection and Risk Screen (VIPRS) (11, 18) consists of 14 items measuring risk and protection, which predict future violence perpetration one year from baseline, with α for the VIPRS = .77. Each item is assigned a positive score (1 if present, 0 if absent), with VIPRS scores ranging from 0 (no risk) to 14 (highest risk). Example items include: “Have you been suspended from school in the past year?” (0=No, 1=Yes).

Violence involvement.—The interview survey included self-reported items measuring youth’s exposure to violence, perpetration of violence, and delinquent behaviors. Items were combined into measures of past year prevalence, indicating whether or not youth had engaged in or been exposed to certain forms of behavior. Validated scales included: Exposure to Violence, Physical Violence Victimization, Total Violence Perpetration, Physical Aggression, Cyberbullying Perpetration and Victimization, Teen Dating Violence Perpetration and Victimization (15, 19).

Other Behavioral and Mental Health Characteristics.—The Strengths and Difficulties Questionnaire (SDQ) (20,21) is an internationally validated broad mental health screen. SDQ subscales for internalizing behaviors, ADHD, conduct problems, peer problems, and pro-social behaviors were included in the interview survey. Additionally, youth also self-reported on whether they have ever been diagnosed with specific mental health disorders, and on suicidal risk such as: “Have you ever seriously considered attempting suicide?”, and “Have you ever actually attempted suicide?” (0=No; 1=Yes). Substance use was determined by asking youth about past year alcohol, marijuana, and other drug use separately.

Statistical analysis

Participation Rates and Sample Size: 1,100 of 1,407 of eligible homes participated- 1100 youth (78%) and 730 parents (52 %) enrolled and completed the survey. The majority of the analysis was based on the 1100 youth responses. In order to analyze the effect of parental firearm ownership, a subset of the initial data set was created based on 730 parent-youth dyads.

Binomial logistic regression controlled for demographic and other associated variables on the two primary outcomes. Measures were dichotomized, and logistic regression models were estimated. Covariates were included in the logistic models if they had a p value of 0.2 or stronger in the bivariate analysis, to ascertain which characteristic were the strongest predictors of firearm access and possession.

The first LR model in tables 4 and 5 used the full data set. The second model used the 730 youth parent dyads to analyze the variable of parental firearm ownership. There were no differences between youth based on parental participation. The tables list the logistic regression odds ratios and 95% confidence intervals for all risk and protective measures by each of the two primary outcomes. Each odds ratio comes from a separate model that controls for covariates. Data was not imputed to account for missing variables- if missing, those cases were dropped from analysis.

RESULTS

Youth Demographics:

Nearly half (46.8%) of youth were male, with a mean age of 15.2 years. Over half reported being Hispanic (58.2%), 24.7% non-Hispanic black, and 10.5% more than one race. The majority (83.8%) qualified for free/reduced lunch (Table 1).

Firearm Access

Nearly 7% of youth said it was 'easy' to get a firearm; 9.5% knew where to get a firearm; and 18.5% said they had a friend with a gun (Table 1). Answering positively to at least 1 of these 3 questions contributed to the composite variable potential firearm access – 19.5% of youth were categorized as having potential firearm access (Cronbach's $\alpha = .71$) (Table 1). As expected, older age, parent owning firearms and being male was associated with youth firearm access. Only 1.9% of youth self-reported firearm possession, and 7.3% of parents reported they owned/possessed a gun (Table 1).

Violence and Other Behavioral or Mental Health Characteristics

Twenty percent of youth screened positive for violence risk on the VIPRS. Additionally, 54.9% reported perpetrating physical aggression and 22.2% experienced physical aggression victimization (Table 2). In terms of substance use, 16.5% report alcohol use within the last year and 17.5% used marijuana within the last year. The SDQ screen showed 13.7% of youth experienced internalizing symptoms, 19.4% hyperactivity symptoms, and 16.3% conduct problems. Additionally, 8.5% self-reported having a depression diagnosis, 4.6% anxiety, and 4.9% bipolar disorder. Nearly a tenth (9.2%) seriously considered suicide and 3% had ever attempted suicide during their lifetime (Table 3).

Association between Violence, Other Behavioral or Mental Health Characteristics and Access to Firearms

Table 2 describes the relationships between youth's substance use, violence characteristics and both potential firearm access and self-reported firearm possession. Nearly all substance use and violence risk and exposure characteristics were associated with youth's potential firearm access or self-reported firearm possession. For example, 45.7% of youth with potential firearm access scored positive on the VIPRS, compared to 13.5% who did not have potential firearm access ($p=.000$); 81% who self-reported firearm possession scored positive on the VIPRS, compared to 19.1% who did not self-report firearm possession ($p=.000$). Several violence perpetration variables revealed similar associations and statistical significance related to potential firearm access and self-reported firearm possession, including cyberbullying, perpetrating physical aggression, perpetrating relational aggression, and total violence perpetration. Violence victimization variables (i.e., physical aggression victimization, cyberbullying victimization), alcohol use and marijuana use were also associated with potential firearm access and self-reported firearm possession.

Most behavioral or mental health characteristics, with one exception, were strongly associated with youth's potential firearm access, including all of the self-reported mental health diagnoses, the SDQ subscales (except internalizing symptoms), and self-reported self-

harm behaviors (i.e., cutting, suicidal ideation/attempt). Several self-reported DSM-V diagnoses (i.e., anxiety, bipolar, depression), and conduct problems on the SDQ were associated with youth firearm possession, though self-harm behaviors, and the remainder of the SDQ subscales were not associated with youth firearm possession (Table 3).

Assessing Predictors of Potential Firearm Access and Self-Reported Firearm Possession

Two binary logistic regression models were analyzed to identify predictors of *potential* firearm access and for self-reported firearm possession. The first model for each outcome included all of the youth variables that were significant in the bivariate analysis. The second model added in parental firearm ownership.

Model 1 - Potential Firearm Access (Table 4).—Analyzing the youth data without the parent variable revealed several factors that predicted potential firearm access. Age (OR 1.2, 95% CI 1.1, 1.3), screening positive on the VIPRS (OR 1.9 95% CI 1.2, 2.9), engaging in physical aggression (OR 2.3, 95% CI 1.5, 3.5), delinquency (OR 1.7, 1.1, 2.6) using alcohol (OR 2.5, 95% CI 1.6, 3.8), and cyberbullying victimization (OR 1.7, 95% CI 1.1, 2.4) all predicted potential firearm access. When parental firearm ownership was added to the model, screening positive for internalizing symptoms (OR 1.9, 95% CI 1.07, 3.3), and peer problems (OR 1.9, 95% CI 1.1, 3.2), became significant. However, parental firearm ownership did not predict potential firearm access.

Model 2 - Firearm Possession (Table 5).—It is important to note that due to the low number of youth reporting firearm possession (21) the results need to be interpreted with caution due to relatively large confidence intervals. Analyzing all youth data, the only factors that predicted youth's self-reported firearm possession was being male (OR 4.3, 95% CI 1.4, 12.5), marijuana use (OR 8.5, 95% CI 2.6, 28.7), and cyberbullying victimization OR 2.8, 95% CI 1.02, 8.1). When parental firearm ownership was added, being male and cyberbullying dropped out—delinquency (OR 8.3, 95% CI 1.03, 67), marijuana use (OR 9.9, 95% CI 2.6, 37) and parental firearm ownership/possession (OR 6.5, 95% CI 1.8, 22.9) all predicted self-reported firearm possession..

DISCUSSION

We used the construct potential firearm access as a way to categorize youth and explore behavioral factors associated with potential access to firearms. Direct firearm access and/or gun carrying correlates strongly with youth morbidity and mortality. Although few youth (1.9%) in our study self-reported firearm possession, nearly 20% had potential firearm access. Youth's potential firearm access was largely made up of youth who reported their friends have guns (15.3%); a similar rate was found in California, with 13.3% reporting that there was a firearm in at least 1 of their 2 best friend's homes (22). This is concerning for several reasons. Considering suicide - the second leading cause of death for adolescents-it is critical to understand the variety of ways youth may access firearms for a suicide attempt, and determine ways to decrease such access. In addition, as 40% of unintentional firearm deaths for youth 11–14 occur at a friend's house when a firearm is discovered (23) and that the vast majority of unintentional firearm deaths for youth occur (78–84%) in a home while

playing with a gun (24), the idea that 20% have potential access is alarming. Further exploration of what potential access means for adolescent is needed.

This study found that youth with potential firearm access demonstrate higher prevalence of multiple violence and other behavioral or mental health factors. Whether learned via self-reported specific diagnoses or through general mental health screening, diagnoses for anxiety, depression, bipolar disorder, ADHD, conduct problems and suicidal ideation are all associated with potential firearm access. These findings increase the number of behavioral and mental health issues that are found to be associated with access to firearms in a home. Youth who screen positive for ADHD, conduct problems, or peer problems have approximately double the odds of potential firearm access.

Likewise, substance use and many of the violence related behaviors are associated with both potential firearm access and self-reported firearm possession, including cyberbullying perpetration and victimization, physical and relational aggression, general violence involvement, and alcohol and marijuana use. These findings may reflect the risk behavior syndrome (26–5), with potential firearm access being one of those risks. As this study is cross-sectional, our findings cannot determine a temporal relationship between the violence characteristics and potential firearm access. Findings may be explained by the idea that violence involved youth have a greater knowledge and awareness of firearm availability.

Our findings build on Simckes study (26) that found 15% of adolescents who experienced both traditional and cyber bullying had access to loaded guns without adult permission. Our broader definition of potential firearm access showed 27% of youth who were cyberbullied had such access.

Screening positive on the VIPRS also predicted potential firearm access. Using the VIPRS in the clinical setting may not only help a clinician identify which youth are at risk for perpetrating serious violence; it can raise awareness that these identified youths have a higher potential firearm access. Additionally, other health care personnel,- school psychologists, nurses, counselors- could use these associations to recognize that their adolescent clientele displaying violent behavior or internalizing symptoms, for example are at higher risk for potential firearm access, and address this risk potential risk to increase an adolescent's safety.

As one might surmise, potential firearm access – including youth's knowledge of where and/or how to get a firearm, and thinking it would be easy to do so – is associated with parental firearm ownership. However, in the LR model, parental gun ownership did not predict potential firearm access. This suggests, perhaps, that violent behaviors, alcohol use and mental health issues typical factors found in the risk behavior syndrome and reflective of peer influence are stronger factors that diminish the influence of parental gun ownership when considering potential access to firearms.

Notwithstanding, parental firearm ownership – along with marijuana use and violence involvement – predicted youth self-reported firearm possession. Most of these youth (15 out of 21) said the firearm they possessed was a handgun (data not shown). Though this study did not distinguish who owned the firearm that youth self-reported to possess, the fact that

the odds of possessing a firearm increased so significantly if parents had guns at home suggests that parental gun ownership contributes to youth firearm possession.

The concept of potential firearm access is important to understand. This study found that youth exhibiting a range of behaviors and symptoms (i.e., violence related, other behavioral or mental health factors, alcohol use) are at increased risk for potential firearm access. Given that the predominant component of potential firearm access is having a friend(s) with guns, we suggest asking youth – particularly higher risk youth – about their peers' access to firearms. This also emphasizes the importance of parental monitoring of youth access to firearms and ensuring safe storage of firearms in any home with youth present (27, 28).

For health care practitioners, this study reinforces prior knowledge of factors associated with potential firearm access and raises new concepts. Knowing that a range of violent behaviors and mental health conditions are associated with a youth's increase in potential firearm access can prompt health care providers to address these factors during clinical visits. Screening for violence factors – using the VIPRS, for instance, as well as universal mental health screening tools – can help health care practitioners identify issues to assess further and treat. Furthermore, it can also be helpful in identifying other risks such as youth access to firearms and discussing preventive steps that parents can take to keep youth safe from firearm-related violence. A reverse screening process may work as well – asking about potential access could lead to a more thorough violence and mental health assessment.

Limitations

Causality cannot be determined through this cross-sectional study. Fewer than expected parents (7% compared to national studies of 29–39%) reported firearm possession, which may have limited the utility of using parental ownership as a predictor variable. Parents may have been reticent to report firearm ownership/possession during the in person interview due to worry about being identified to legal authorities: youth's report of firearms in their home could have been a more valid measure, allowing for a more robust analysis. The low numbers of youth reporting firearm possession also created large confidence intervals, leading us to interpret those results with caution. Certainly, this study reflects only one largely urban area, and may not be generalizable to other communities. Further research can explore other sources of firearm access, as well as the concept of what having a friend with a gun may truly mean – that is, does having a friend with a gun provide youth with access to that firearm?

Conclusions

Youth's potential firearm access is a construct that is associated with several violent behaviors, as well as other behavioral and mental health characteristics. Several implications are gleaned from this study. For parents, findings can increase awareness regarding their youth's safety – particularly for youth demonstrating mental health issues or violence-related behaviors. For health care practitioners, identifying these behaviors in a clinical setting may also increase awareness and provide potential opportunities for prevention. Conveying the safe storage message to parents, reducing youth substance use and abuse, and

encouraging parental monitoring of firearm access – particularly in higher risk situations – is critical.

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Abbreviations:

(U.S.)	United States
(VIPRS)	Violence, Injury, Protection and Risk Screen
(SDQ)	Strengths and Difficulties Questionnaire
(ADHD)	Attention Deficit Hyperactivity Disorder
(OR)	Odds Ratio
(CI)	Confidence Interval
(LR)	Logistic Regression
(NS)	Not Significant

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Implications and Contribution:

Nearly 20% of youth demonstrate potential access to firearms. As multiple violence and behavioral characteristics are associated with having firearm access, it is imperative that clinicians recognize this increased risk in youth presenting with a multitude of behavioral risks in order to provide clinical guidance on firearm safety. Additionally, recognizing that parental ownership contributes to an increase in youth firearm possession may provide a framework for clinicians to address firearm safety.

Table 1:

Demographic Characteristics and Self-Reported Youth Firearm Access

	Total	Easy to Get Firearm			Knows Where to Get Firearm			Friends with Guns ¹			Potential Firearm Access ²			Self-reported Firearm Possession ³		
		Yes %	No %	p-value	Yes %	No %	p-value	Yes %	No %	p-value	Yes %	No %	p-value	Yes %	No %	p-value
Total N	1100	71	1029	-	105	995		204	896	-	215	885	-	21	1079	-
Total Percent (row) ⁴		6.5	93.5		9.5	90.5		18.5	81.2		19.5	80.5		1.9	98.1	
Sex ⁵																
Male	46.8	58.6	46.1	0.11	62.7	45.3	.003	50.3	46.2	0.39	22.2	77.8	.067	76.2	46.3	.025
Female	52.6	41.4	53.4		37.3	54.1		49.7	53.1		17.4	82.6		23.8	53.1	
Race and Ethnicity ⁵																
Hispanic	58.2	55.7	58.6	0.72	55.9	58.6	0.15	57.7	58.8	0.39	57.7	58.8	0.28	58.2	66.7	0.29
Non-Hispanic Black	24.7	22.9	24.7		20.6	25.1		25.2	24.6		22.6	25.1		9.5	25	
>1 Race	10.5	14.3	10.3		17.6	9.8		13.5	9.8		14.4	9.5		10.4	19	
Other or Don't Know	3.9	5.7	3.9		2.9	4.6		1.8	4.2		2.9	4.1		0	4	
White	2.5	1.4	2.6		2.9	2.4		1.8	2.5		2.4	2.5		4.8	2.5	
Age Group ⁵ (years)																
10-12	39	12.9	40.6	.000	20.6	40.6	.000	14.1	43.6	.000	18.8	44.2	.000	9.5	39.1	.01
13-15	39.1	44.3	38.8		39.2	39.1		46	36		45.2	37.6		47.6	39.1	
16-17	21.8	42.9	20.6		40.2	20.3		39.9	18.4		36.1	18.2		42.9	21.7	
Free/Reduced Lunch	83.8	74.1	84.7	.35	80	84.4	0.30	84.6	83.8	0.61	82.2	84.3	0.52	81.3	84	0.1
Parent Owns or Possesses a Firearm [*] n=730	7.3	20.8	6.4	.000	20	5.8	.000	7.8	7.4	0.9	12.8	6.1	.005	29.4	6.8	.000

* p .05

** p<.01

*** p<.001

¹ Includes handguns, rifles or shotguns.

- ² Computed variable combining “Easy to get Firearm”, “Knows where to get a Handgun”, and “Friends with Guns”.
- ³ Excludes carrying firearm to go hunting, target shooting or to a gun show. Includes carrying firearm to work, school, in the car, to clubs or bars, when going out alone and/or when going out with friends
- ⁴ “Total” row represents row percentages.
- ⁵ Demographic variables presented as column percentages.

Table 2:

Youth Firearm Access by Violence Risk, Perpetration and Victimization, and Substance Use

	Total %	Easy to Get Firearm			Knows Where to Get Firearm			Friends with Guns ¹			Potential Firearm Access ²			Self-reported Firearm Possession ³		
		Yes %	No %	p-value	Yes %	No %	p-value	Yes %	No %	p-value	Yes %	No %	p-value	Yes %	No %	p-value
Total N	1100	71	1029	-	105	995		204	896		215	885		21	1079	
Total Percent	-	6.5	93.5	-	9.5	90.5	-	18.5	81.2		19.5	80.5		1.9	98.1	
Risk for Violence⁴	20.3	55.7	17.8	.000	54.9	16.7	.000	49.7	14.4	.000	45.7	13.5	.000	81	19.1	.000
Violence Perpetration⁴	13.8	32.9	12.4	.000	34.3	11.6	.000	28.8	10.9	.000	27.4	10.3	.000	47.6	13.2	.000
<i>Cyberbullying</i>		82.9	52.7	.000	84	51.8	.000	82.8	49.9	.000	81.6	48.4	.000	81	54.4	.015
<i>Physical Aggression</i>		48.6	27.3	.000	40.6	27.6	.006	45.4	25.7	.000	42	25.4	.000	42.9	28.6	0.15
<i>Relational Aggression</i>		3.2	1.3	0.20	2.3	1.3	0.45	2.8	0.9	0.08	2.2	1.1	0.192	5	1.3	0.16
<i>Teen Dating Violence</i>	1.5															
<i>Delinquency</i>	9.6	27.1	8.8	.000	28.4	8.1	.000	22.7	7.3	.000	43.1	17	.000	57.1	9.1	.000
Violence Victimization⁴	29.7	45.7	23.5	.000	45.1	22.9	.000	50.9	20.2	.000	47.1	19.4	.000	71.4	24.2	.000
<i>Cyberbullying</i>		42.9	20.7	.000	45.1	19.8	.000	42.9	18.3	.000	39.4	17.9	.000	61.9	21.4	.000
<i>Physical Aggression</i>	22.2															
<i>Teen Dating Violence</i>	3	6.3	1.2	.002	4.5	1.3	.02	3.4	1.3	0.06	3.4	1.2	.043	5	1.5	0.23
Substance Use⁴	16.5	47.1	14.4	.000	43.1	14	.000	46	10.9	.000	40.4	10.3	.000	66.7	15.7	.000
<i>Alcohol</i>		44.3	15.5	.000	37.3	15.5	.000	44.2	12.3	.000	36.5	12.4	.000	91	16.3	.000
<i>Marijuana</i>	17.5															

¹ Includes handguns, rifles or shotguns.

² Computed variable combining “Easy to get Firearm”, “Knows where to get a Handgun”, and “Friends with Guns”.

³ Excludes carrying firearm to go hunting, target shooting or to a gun show. Includes carrying firearm to work, school, in the car, to clubs or bars, when going out alone and/or when going out with friends.

⁴ Each outcome is presented as columns, comparing “Yes” or “No”; i.e. Of those (6.5%) youth who report that it is easy to get a firearm, 55.7 % are VIPRS +; comparatively, of those youth who report that No, they do not have easy access to firearms, 17.8% are VIPRS +.

⁵ VIPRS= Violence Injury Protection and Risk Screen

Table 3: Self-reported Behavioral and Mental Health Characteristics and Youth Firearm Access

	Total %	Easy to Get Firearm			Knows Where to Get Firearm			Friends with Guns ¹			Potential Firearm Access ²			Self-reported Firearm Possession ³		
		Yes %	No %	p-value	Yes %	No %	p-value	Yes %	No %	p-value	Yes %	No %	p-value	Yes %	No %	p-value
<i>Total N</i>	1100	71	1029	-	105	995		204	896		215	885		21	1079	
Total	%	6.5	93.5	-	9.5	90.5	-	18.5	81.2	-	19.5	80.5	-	1.9	98.1	-
Self-Reported Mental Health Diagnoses⁴	14	25.7	13.2	.004	23	13.1	.007	25.9	11.9	.000	24.3	11.6	.000	38.1	13.5	.001
<i>ADHD</i>	3.1	4.3	3.2	0.58	4	3.1	0.61	5.6	2.7	.051	5.8	2.5	.013	9.5	3	0.09
<i>Anxiety</i>	4.6	8.6	4.4	0.11	7	4.4	0.24	12.3	3.2	.000	10.2	3.3	.000	14.3	4.5	.034
<i>Bipolar</i>	4.9	12.9	4.4	.002	11	4.3	.003	9.9	4.1	.002	9.7	3.9	.001	4.8	4.9	0.97
<i>Depression</i>	8.5	15.7	8.1	.027	10	8.4	0.59	16	7.2	.000	14.1	7.3	.002	23.8	8.2	.01
<i>PTSD</i>	2.3	5.7	2	.041	4	2	0.21	5.6	1.7	.002	4.9	1.6	.006	4.8	2.2	0.43
Strengths and Difficulties Questionnaire⁴	16.3	42	14.6	.000	32.7	14.7	.000	29.4	13.5	.000	27.7	13.1	.000	52.4	15.7	.000
<i>Internalizing Symptoms</i>	13.7	10.1	14	0.37	13.9	13.7	0.96	17.8	13	0.1	17.5	12.9	0.08	19	13.5	0.46
<i>Peer Problems</i>	16.5	20.3	16.2	0.38	25.7	15.5	.009	27	14.6	.000	26.7	14.1	.000	19	16.5	0.75
<i>Hyperactivity</i>	19.4	11.5	5.2	.001	14.4	8.2	.006	22.6	13.6	.001	29.5	17	.000	2.4	1.8	.61
<i>Total Difficulties</i>	17.2	27.5	16.5	.018	27.7	16.2	.004	28.2	15.4	.000	28.6	14.6	.000	28.6	17.1	0.17
Self-Harm Behaviors⁴	10.5	14.3	10.2	0.1	17	9.7	.006	16.6	9.4	.000	16.3	9.1	.000	20	10.3	0.05
<i>Suicide Attempted</i>	3	80	44.8	0.13	66.7	44.4	0.21	68.4	39.2	.000	66.7	37	.000	100	45.7	0.13
<i>Suicide Considered</i>	9.2	7.9	9.3	0.72	10.2	9.1	0.72	13.1	8.2	0.06	13.5	7.8	.03	10	9.1	0.9

¹Includes handguns, rifles or shotguns.

²Computed variable combining “Easy to get Firearm”, “Knows where to get a Handgun”, and “Friends with Guns”.

³Excludes carrying firearm to go hunting, target shooting or to a gun show. Includes carrying firearm to work, school, in the car, to clubs or bars, when going out alone and/or when going out with friends.

⁴Each outcome is presented as columns, comparing “Yes” or “No”; i.e. Of those (6.5%) youth who report that it is easy to get a firearm, 25.7 % have any self-reported mental health diagnosis; comparatively, of those youth who report that “No”, they do not have easy access to firearms, 13.2% have any self-reported mental health diagnosis

Table 4:

Full Logistic Regression Model- Potential Firearm Access, with and without Parental Gun Ownership Variable.

		<i>Potential Firearm Access Without Parent Data (n=1100)</i>			<i>Potential Firearm Access with Parent Data (n=730)</i>		
		Adjusted Odds Ratio	95% CI		Adjusted Odds Ratio	95% CI	
Demographic Variables	Age	1.19 *	1.09	1.3	1.26 *	1.14	1.4
Violence Perpetration	Positive VIPRS	1.9 *	1.2	2.9	2.6 *	1.63	4.1
	Physical Aggression	2.3 *	1.5	3.5	2.65 *	1.62	4.3
	Delinquency	1.7 *	1.1	2.6	1.6 *	1.01	2.7
Violence Victimization	Cyberbullying	1.7 *	1.1	2.5	1.5	.91	2.7
Substance Use	Alcohol	2.5 *	1.6	3.8	2.02 *	1.2	3.8
	Marijuana	1.1	.7	1.8	1	.56	1.8
Strengths and Difficulties Questionnaire	<i>Internalizing Symptoms</i>	1.14	.68	1.9	1.88 *	1.07	3.3
	<i>Peer Problems</i>	1.5	.97	2.3	1.9 *	1.1	3.2
Parents with Guns at Home					1.4	.8	2.1

* = Significant

Variables significant in bivariate analysis but not in the logistic regression are not presented.

Table 5:

Logistic Regression – Youth Possession of Firearms, with and without Parental Gun Ownership Variable

		<i>Self-Reported Firearm Possession without parents n=1100</i>			<i>Self-Reported Firearm Possession with parents N=730</i>		
		Adjusted Odds Ratio	95% CI		Adjusted Odds Ratio	95% CI	
Demographic Variables	Age	1.09	.83	1.4	1.05	.78	1.4
	Sex	.23 *	.08	.72	.396	.129	1.2
Violence Perpetration	Delinquency	7.6	.93	62.6	8.3 *	1.03	67
Violence Victimization	Cyberbullying	2.8 *	1.02	8.1	2.2	.63	7.7
Substance Use	Alcohol	1.69	.49	5.8	2.3	.46	11.8
	Marijuana	8.5 *	2.6	28.7	9.9 *	2.6	37
Parents with Guns at Home					6.5 *	1.8	22.9

* = Significant

Variables significant in bivariate analysis but not in the logistic regression are not presented.