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OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

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*Pediatrics*; originally published online July 8, 2013;  
DOI: 10.1542/peds.2013-0163

The online version of this article, along with updated information and services, is located on the World Wide Web at:  
<http://pediatrics.aappublications.org/content/early/2013/07/02/peds.2013-0163>

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American Academy of Pediatrics

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# Firearm Possession Among Adolescents Presenting to an Urban Emergency Department for Assault

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## KEY WORDS

firearms, adolescents, violence, emergency department

## ABBREVIATIONS

CTS—Conflict Tactics Scale

ED—emergency department

RA—research assistant

Dr Carter carried out the analyses, drafted the manuscript, and reviewed and revised the manuscript; Drs Walton and Zimmerman were responsible for the initial conceptualization and design of the study, design of data collection elements, and reviewed and revised the manuscript; Drs Newton and Whiteside assisted with the analysis, drafting of the manuscript, and critical review of the manuscript; Mr Clery assisted with the drafting of the manuscript and critical review of the manuscript; Dr Cunningham was responsible for the initial conceptualization and design of the study, design of data collection elements, aided in the analysis, and reviewed and revised the manuscript; and all authors approved the final manuscript as submitted.

This work was previously presented as Abstract 69, "Carter PM, Newton M, Clery M, Whiteside L, Walton MA, Zimmerman MA, Cunningham RM. Firearm Possession Among Adolescents and Young Adults Presenting to an Urban Emergency Department for Assault," at the Society for Academic Emergency Medicine, May 10, 2012, Chicago, IL.

[www.pediatrics.org/cgi/doi/10.1542/peds.2013-0163](http://www.pediatrics.org/cgi/doi/10.1542/peds.2013-0163)

doi:10.1542/peds.2013-0163

Accepted for publication Apr 25, 2013

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PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

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**WHAT'S KNOWN ON THIS SUBJECT:** Violence involving firearms is a leading cause of death among US youth ages 14 to 24. The emergency department is the primary medical setting for care of assault-injured youth and an underused but important setting for violence-prevention programs.



**WHAT THIS STUDY ADDS:** Among assault-injured youth seeking emergency department care, firearm possession rates are high, most obtained outside of legal channels. Higher rates of negative retaliatory attitudes and substance use among those youth with firearms increases risk of future lethal violence.

## abstract



**BACKGROUND AND OBJECTIVES:** Firearm violence is a leading cause of death among youth. The objectives of this study were (1) determine firearm possession rates and associated correlates among youth seeking care for assault in an emergency department (ED); (2) understand differences in risk factors for youth with firearm possession; and (3) identify firearm possession characteristics in this population: type, reason for possession, and source of firearms.

**METHODS:** Youth (14 to 24 years old) presenting to a Level 1 ED with assault were administered a computerized screening survey. Validated instruments were administered, measuring demographics, firearm rates and characteristics, attitudes toward aggression, substance use, and previous violence history.

**RESULTS:** Among 689 assault-injured youth, 23% reported firearm possession in the past 6 months. Only 17% of those reporting firearm possession obtained the gun from a legal source; 22% reported ownership of highly lethal automatic/semiautomatic weapons and 37.1% reported having a firearm for protection. Logistic regression analysis identified significant correlates of firearm possession, including male gender, higher socioeconomic status, illicit drug use, recent serious fight, and retaliatory attitudes.

**CONCLUSIONS:** ED assault-injured youth had high rates of firearm possession (23.1%), most of which were not obtained from legal sources. Youth with firearm possession were more likely to have been in a recent serious fight, and to endorse aggressive attitudes that increase their risk for retaliatory violence. Future prevention efforts should focus on minimizing illegal firearm access among high-risk youth, nonviolent alternatives to retaliatory violence, and substance use prevention. *Pediatrics* 2013;132:1–9

Homicide is the second leading cause of death for all US youth aged 10 to 24 years old and the leading cause of death for African American youth.<sup>1</sup> In 2010, firearms were responsible for 85% of homicide-related deaths among adolescents.<sup>1</sup> US firearm homicide rates are 19.5 times higher than other industrialized nations, with adolescent (15–24 years old) firearm homicide rates 42.7 times higher than children in 22 other developed nations.<sup>2–4</sup> Data from the National Violent Death Reporting System suggest that firearm-related violence is most likely to occur in familiar settings, with 47% of firearm homicides occurring in a home, apartment, or surrounding structure and 25% occurring on local public streets.<sup>5</sup>

National medical organizations,<sup>6–8</sup> including the American Academy of Pediatrics, recognize the importance of violence prevention and have identified assault-injured youth as a population requiring urgent attention.<sup>9–11</sup> In 2011, >900 000 youth, ages 10 to 24, visited the emergency department (ED) because of violence-related injury.<sup>12</sup> Youth with assault-related injury are at high risk for reinjury.<sup>13–18</sup> Sims et al<sup>19</sup> found violently injured youth admitted to trauma units have readmission rates as high as 44% due to assault and 20% mortality due to homicide over a 5-year follow-up; retrospective chart reviews note similar rates.<sup>19–24</sup>

The ED is the primary medical setting for injured adolescents,<sup>25–28</sup> and an important setting for violence-prevention programs.<sup>29–35</sup> Given high rates of reinjury and potential for retaliatory violence, understanding the rates and correlates of firearm possession, past experiences with firearm violence, and source and reason for possession among high-risk assault-injured youth is critical to inform prevention efforts. Previous community-based adolescent firearm prevalence studies have focused primarily on high

school-based samples<sup>34–38</sup> and may neglect higher risk youth who do not attend school.<sup>29,39,40</sup> Previous ED-based samples<sup>30,41</sup> have focused on all adolescents regardless of presenting complaint, and lacked information about firearm acquisition, type, or motivation for possession. No previous studies have focused specifically on firearm possession among high-risk ED assault-injured youth, a critical subgroup to understand for future violence-prevention initiatives.

Primary study objectives were (1) determine the rate and correlates of firearm possession among assault-injured youth presenting to an inner-city ED; (2) understand differences in risk factors among these youth seeking care with and without firearm possession; and (3) identify firearm possession characteristics in this population, including firearm type, reason for firearm possession, and sources of firearms as a means to inform intervention efforts around illegal gun diversion.

## METHODS

### Study Design and Setting

This study presents screening data collected as part of a 2-year longitudinal study focused on assault-injured youth seeking ED care. Hurley Medical Center is the only public hospital in Flint, Michigan, and is the major Level-1 trauma center for the region, providing care for ~75 000 adult and ~25 000 pediatric patients annually. Study procedures were approved by the institutional review board for both Hurley Medical Center and the University of Michigan; a National Institutes of Health certificate of confidentiality was obtained. Flint crime and poverty rates are comparable to other urban centers, such as Detroit, Camden, and Oakland.<sup>42</sup> The study population reflects the population of Flint, Michigan, which is 50% to 60% African American,<sup>43</sup> and our study population

demographics are similar to previous studies conducted among all presenting patients to this ED.<sup>44,45</sup>

### Study Population

ED patients aged 14 to 24 years (February 2010–September 2011) presenting for assault-related injury completed the screening survey. Trained research assistants (RAs) approached patients in treatment areas. Exclusions included sexual assault, child abuse, suicidal ideation/attempt, or conditions precluding ethical consent (Fig 1). Youth <18 years old unaccompanied by a parent/guardian were excluded (13.7%). Unstable trauma patients were recruited on the inpatient floor if they stabilized within 72 hours.

### Study Recruitment

Assault-injured patients were identified through electronic patient logs. Recruitment was 7 days per week; 21 hours per day on Tuesdays and Wednesdays and 24 hours per day Thursdays through Mondays.

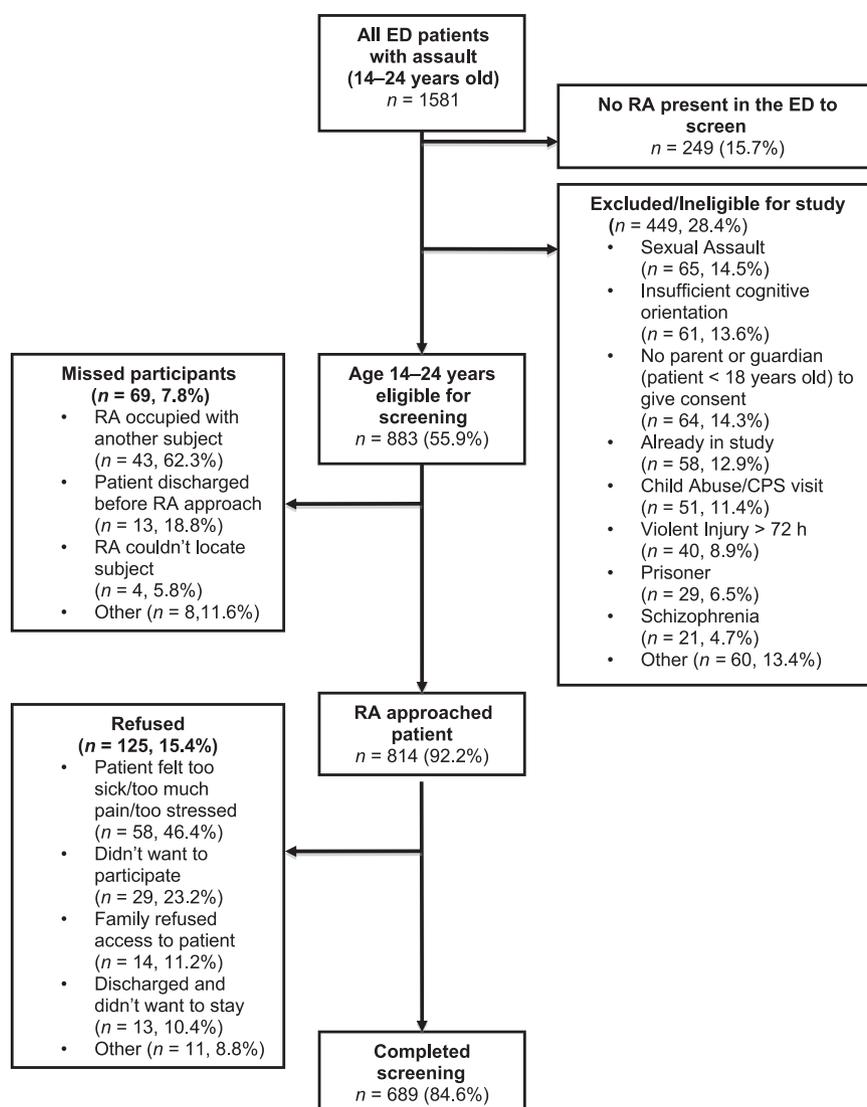
### Study Protocol

After providing written consent, patients self-administered a computerized survey and received a \$1.00 gift. The survey was administered privately; family or friends accompanying the patient were not allowed to observe or participate during administration and this was monitored by the RA. The RA paused the computer survey during medical evaluation or during medical procedures to ensure privacy and to avoid interfering with medical care.

### Outcome Measures

#### *Firearm Possession*

The dependent variable, firearm possession, was defined as gun carriage or gun ownership within the past 6 months. All firearm questions and responses were from the Tulane



**FIGURE 1**  
Recruitment flowchart, February 2010 to September 2011.

National Youth Study and excluded use for hunting or sporting activities. Affirmative answers to any of the 5 questions were coded as possession of a firearm.

Gun carriage was assessed with 3 questions: (1) frequency of gun carriage outside the home; (2) reason for gun carriage outside the home; and (3) source of a handgun carried outside the home.<sup>39,46,47</sup> The response scale for frequency of gun carriage was modified to mirror the conflict tactics scale-2 (never, 1 time, 2 times, 3–5, 6–10, 11–20, more than 20 times). Response choices for

reason for gun carriage outside the home (Didn't carry a gun; Protection; Holding it for someone; Used gun in a crime; To scare someone; To get back at someone; Most of my friends carry guns) and source of handgun carried outside the home (Didn't carry a handgun; Given or loaned by a family member; Snuck it from home; Given/loaned from a friend; Paid cash for it; Traded something for it; Stole it) were also used to characterize gun-related activities.

Gun ownership was assessed with 2 questions: (1) type of gun owned and (2) source of a handgun paid for with cash.

An affirmative answer to either was characterized as gun ownership. The response scale for type of gun owned (No possession or ownership of a gun; Regular rifle; Automatic or semiautomatic rifle; Regular shotgun; Sawed-off shotgun; Revolver; Automatic or semiautomatic handgun) and source of a handgun paid for with cash (I didn't pay cash for the handgun; Family member; Friend; Drug addict; Drug dealer; Street dealer; Pawnshop or gun shop; Asked someone to buy it; Department or sporting goods store) were further used to characterize gun ownership. Illegal firearm access was defined as any source other than a department/sporting goods store or gun shop/pawnshop. Descriptive questions were asked about the perceived level of difficulty obtaining a handgun and history of purchasing a firearm from a legal or illegal dealer.<sup>39,46,47</sup>

#### Demographic Information

Age, gender, race, ethnicity, employment, and receipt of public assistance were collected using measures from the National Longitudinal Study of Adolescent Health and National Institutes of Health Drug Abuse Treatment Outcome Study of Adolescents.<sup>48–51</sup>

#### Characterization of Assault Resulting in Index ED Visit

Participants were asked about relationships (ie, spouse, girlfriend/boyfriend, friend, stranger) and aggressive behaviors (ie, threatened or used a gun) in the altercation prompting presentation. A modified Conflict Tactics Scale (CTS)<sup>52</sup> similar to the Timeline Followback Spousal Violence Interview<sup>53</sup> was used. This has excellent test-retest reliability.<sup>53,54</sup>

#### Chart Review

Chart review data (admit/discharge) were collected. Five percent of charts were audited; the error rate was 3.1%.<sup>55</sup> A trained RA calculated injury severity scores from ED chart data.<sup>56</sup>

### *Attitudes Toward Violence and Revenge*

Attitudes toward aggression were assessed by using a retaliation subscale of children's perceptions of environmental violence.<sup>57,58</sup> Items were reverse-coded (higher scores indicated more willingness to endorse retaliation). A mean summary score was created for each participant and then all mean summary scores were averaged for the bivariate comparison.

### *Violence and Firearm-Related Violence*

Previous 6-month violence measures (serious physical fight, causing injury requiring treatment) were from the National Longitudinal Study of Adolescent Health.<sup>49,50</sup> Gang affiliation was assessed by using questions from the Tulane Youth Study.<sup>39,46,47</sup> Previous 6-month intimate partner violence was assessed with the revised CTS-2.<sup>59</sup> Frequency of firearm-related aggression or victimization within the past 6 months was assessed by using the modified CTS-2 response scale.

### *Substance Use*

Past 6-month substance use, including alcohol, illicit drug use (cocaine, methamphetamine, inhalants, hallucinogens, marijuana, or street opioids) and non-medical prescription drug use was assessed by using the Alcohol Use Disorders Identification Test and Alcohol, Smoking, and Substance Use Involvement Screening Tests.<sup>60–63</sup> Binge drinking was defined as 5 or more drinks on 1 occasion in the previous 6 months. Substance use measures were dichotomized. Using standard measures from the adolescent health survey<sup>49</sup> with the modified CTS-2 response scale, participants were also asked how often they drank alcohol or used drugs while carrying a weapon (gun or knife).

### **Statistical Analysis**

Descriptive statistics were computed and bivariate analyses conducted

comparing gun possession (yes/no) in relation to demographics, visit characteristics, substance use, and violence. A logistic regression model was constructed with firearm possession (yes/no) as the outcome. Independent variables were included in the model based on theory and significance in the bivariate analysis. Illicit drug use and binge drinking were too highly correlated to be included in one regression model; therefore, given drug use was more common in this population, it was retained in the final model. Gang membership, although included in the descriptive analysis, was dropped from the final model, as only 3% of the sample ( $n = 24$  of 689) endorsed gang membership. There was no evidence of multicollinearity in the final model.

### **RESULTS**

During recruitment, 1581 assault-injured patients (14–24 years old) presented (Fig 1), most (84.5%) during recruitment hours. Research staff approached 92.2% of eligible patients ( $n = 814$ ); 689 (84.6%) completed the survey. Refusals were more likely male (18.0% vs 12.5%,  $P < .05$ ) and less likely African American (10.3% vs 17.1%,  $P < .01$ ). No age differences were noted in refusal rates. The institutional review board did not allow collection of additional chart data from refusals. The mean screen completion time was 30 minutes (SD = 17.5 minutes).

### **Rates of Firearm Possession**

Among assault-injured youth, 23.1% ( $n = 159$ ) reported firearm possession (Table 1) in the past 6 months. Among those with firearms, 41.5% ( $n = 66$ ) reported carrying outside the home in the past 6 months. Of participants with firearms, 67.3% were seen for peer-related violence and 14.5% for intimate partner-related violence; 3.4% reported threatening someone with a firearm during the altercation that

prompted the visit. Of those with firearms, 4 (2.5%) reported an ED mental health visit within the past year.

### **Bivariate Analysis**

Participants with firearms were more likely male, less likely African American, and less likely to receive public assistance (ie, higher socioeconomic status [SES]). Of those with firearms, 14.5% ( $n = 23$ ) were younger than 18 and 32.1% ( $n = 51$ ) have children.

### *Attitudes Toward Violence and Revenge*

Participants with firearms endorsed higher mean levels of aggression and retaliatory attitudes compared with those without firearms (Table 1). Among those with firearms, more believed “revenge was a good thing” (2.1 vs 1.9,  $P < .05$ ) and that it was “ok to threaten to hurt someone else if they try to hurt you” (2.6 vs 2.3,  $P < .01$ ) and “ok to hurt people if they hurt you first” (2.4 vs 2.2,  $P < .01$ ).

### *Experience With Violence and Firearm-Related Violence*

Participants with firearms noted more overall violent experiences in the previous 6 months (Table 1). They were also noted to have higher rates of group fighting (44.0% vs 25.3%,  $P < .001$ ) and gang membership (9.4% vs 0.9%,  $P < .001$ ), although only 2.9% ( $n = 20$ ) of the overall sample ( $n = 689$ ) endorsed gang membership. Participants with firearms were also more likely the victim or the aggressor in firearm-related violence in the past 6 months (Table 1).

### *Substance Use Correlates of Firearm Possession*

Past 6-month binge drinking and illicit drug use were positively associated with firearm possession. Those with firearms had higher rates of prescription opioid use (19.5% vs 11.3%,  $P < .01$ ) and consumption of alcohol

**TABLE 1** Patient Characteristics for Violently Injured ED Patients With and Without Gun Possession

	Gun Possession, <i>n</i> = 159, 23.1%	No Gun Possession, <i>n</i> = 530, 76.9%	Total, <i>n</i> = 689
<b>Demographics</b>			
Age, mean (SD)	19.9 (2.4)	19.7 (2.7)	19.8 (2.6)
Male gender <sup>a</sup>	113 (71.3)	234 (44.2)	347 (50.4)
African American <sup>b</sup>	85 (53.5)	334 (63.0)	419 (60.8)
Public assistance <sup>b</sup>	101 (63.5)	404 (76.2)	505 (73.3)
<b>Characteristics of ED presentation</b>			
Conflict prompting presentation			
Nonpartner violence	109 (68.6)	350 (66.0)	459 (66.6)
Intimate partner violence <sup>b</sup>	23 (14.5)	135 (25.5)	158 (22.9)
Injury Surveillance Score, mean (SD)	3.0 (4.7)	2.4 (3.5)	2.6 (3.8)
Threatened with gun today <sup>p</sup>	5 (3.4)	2 (0.4)	7 (1.1)
Disposition from the ED (admitted) <sup>b</sup>	37 (23.3)	69 (13.2)	106 (15.4)
<b>Past 6-month substance use</b>			
Binge drinking <sup>a</sup>	63 (39.6)	144 (27.2)	207 (30.0)
Illicit drug use <sup>a</sup>	106 (66.7)	261 (49.3)	367 (53.3)
<b>Attitudes toward aggression</b>			
Aggressive attitudes, <sup>p</sup> mean summary score (SD)	2.6 (0.6)	2.5 (0.5)	2.5 (0.5)
<b>Past 6-month experiences with violence</b>			
Serious physical fight <sup>c</sup>	136 (85.5)	422 (79.6)	558 (81.0)
Caused injury requiring treatment <sup>a</sup>	73 (45.9)	109 (20.6)	182 (26.4)
Any intimate partner violence <sup>b</sup>	120 (75.5)	338 (63.8)	458 (66.5)
<b>Past 6-month experiences with firearm-related violence<sup>d</sup></b>			
Victim of assault <sup>b</sup>	91 (57.2)	225 (42.5)	316 (45.9)
Victim of gun violence <sup>c</sup>	34 (21.4)	78 (14.7)	112 (16.3)
Victim of penetrating trauma <sup>b</sup>	49 (30.8)	97 (18.3)	146 (21.2)
Threatened by gun <sup>a</sup>	93 (58.5)	176 (33.2)	269 (39.0)
Pulled gun in fight <sup>a</sup>	35 (22.0)	5 (0.9)	40 (5.8)
Shot or stabbed another person <sup>b</sup>	13 (8.2)	13 (2.5)	26 (3.8)
Used gun in fight with dating partner <sup>a</sup>	10 (6.3)	4 (0.8)	14 (2.0)

All values are *n* (%) unless noted otherwise.

<sup>a</sup> *P* < .001.

<sup>b</sup> *P* < 0.01.

<sup>c</sup> *P* < 0.05.

<sup>d</sup> Including current ED visit.

before a physical fight (33.3% vs 19.8%, *P* < .01). They also reported using substances while carrying a weapon (gun or knife), with 16.4% reporting alcohol use and 17.6% reporting drug use at least once.

### Firearm Types and Methods of Acquisition of Firearms

Youth reported firearm possession primarily for protection (37.1%), although some note they were “holding it for someone” (10.1%), or because their “friends carry guns” (8.8%). Among those carrying a gun outside the home, respondents primarily reported access to a handgun through either cash purchase (17.7%) or receiving it from

a friend (17.1%). Only 17% (*n* = 27) reported purchasing a handgun with cash from a plausibly legal source (department/sporting goods store or pawnshop/gun shop), whereas the remainder purchased the firearm illegally (either from a clearly illegal source or underage purchases from a legal source [*n* = 2]) or did not endorse a method of acquisition. More than half the sample (51.6%) reported that it would be little or no trouble to obtain a firearm.

Among the assault-injured youth in our sample (Table 2), respondents were noted to possess high levels of rapid-fire weapons with 17.6% (*n* = 28) of youth noting ownership of automatic or semiautomatic weapons (rifles

or handguns). Of these youth with automatic/semiautomatic weapons, 32.1% (*n* = 9) endorsed the view that “revenge was a good thing,” 14.3% (*n* = 4) reported that they carried a gun “to scare someone” or “to get back at someone,” and 1 of these participants had a mental health visit within the past year at the site ED. Of those with automatic or semiautomatic weapons, only 5 (17.9%) reported acquiring them from a clearly legal source.

### Multivariate Logistic Regression Analysis

In the multivariate logistic regression model (Table 3), illicit drug use, past 6-month serious fight, and high levels of retaliatory attitudes were associated with firearm possession among assault-injured ED youth. Male individuals and those with higher SES status (ie, not receiving public assistance) were more likely to possess a gun. Age and race were not significant predictors of firearm possession.

### DISCUSSION

This is the first study to report firearm-possession rates, associated risk behaviors, and to characterize the types of firearms and methods of firearm acquisition among a consecutive, systematically obtained sample of high-risk assault-injured youth presenting to the ED. Results have implications for firearm diversion policy as well as hospital- and community-based initiatives to prevent potentially recurrent lethal violence among assault-injured youth.

Rates of firearm possession were notably higher in our study than previous ED studies, likely reflecting our focus on a high-risk sample of youth seeking care for assault rather than general ED patient populations.<sup>31,41,64</sup> The high rates of firearm possession in this population, combined with the finding that assaulted youth with firearms had

**TABLE 2** Characteristics of Gun Possession Among Violently Injured Patients Presenting to ED, *n* = 159

Type of gun possession	
Rifle	24 (15.1)
Automatic or semiautomatic rifle	16 (10.1)
Shotgun	29 (18.2)
Sawed-off shotgun	9 (5.7)
Revolver (regular handgun)	18 (11.3)
Automatic or semiautomatic handgun	19 (12.0)
Did not endorse a specific type of gun	96 (60.4)
Method of handgun acquisition (cash purchases)	
Family member	15 (9.4)
Friend	37 (23.3)
Drug addict	8 (5.0)
Drug dealer	13 (8.2)
Street dealer	17 (10.7)
Pawnshop or gun shop	12 (7.6)
Someone purchased for me	4 (2.5)
Department or sporting goods store	17 (10.7)
Did not endorse paying cash for a handgun	69 (43.4)

All values are *n* (%). Participants were allowed to select all answers that applied to their gun possession. Questions excluded gun possession for hunting or target-shooting activities.

higher rates of retaliatory attitudes and substance use, highlight the importance of focusing ED and community violence prevention interventions among this subgroup. Most firearms in our study were likely obtained illegally, with almost a quarter of the sample

**TABLE 3** Multivariate Logistic Regression Predicting Gun Possession Among Adolescent ED Patients (14 to 24 Years Old) Presenting for a Violent Injury

Risk Factors for Gun Possession	AOR (95% CI)
Age	1.04 (0.97–1.12)
Male gender <sup>a</sup>	2.76 (1.83–4.18)
Not receiving public assistance <sup>b</sup>	1.51 (1.01–2.26)
African American	0.84 (0.57–1.23)
Illicit drug use <sup>b</sup>	1.63 (1.10–2.42)
Retaliatory attitudes <sup>b</sup>	1.58 (1.09–2.28)
Serious fight within previous 6 mo <sup>b</sup>	1.73 (1.02–2.93)

AOR, adjusted odds ratio; CI, confidence interval.

<sup>a</sup> *P* < .001.

<sup>b</sup> *P* < 0.05.

endorsing ownership of automatic/semiautomatic weapons that are large-clip, high rate-of-fire weapons, or may be modified to these highly lethal weapon types (ownership of guns for target shooting or hunting was excluded). This, along with high carriage rates (41.5%), suggests opportunities for improved law enforcement around firearm diversion and improved policies around weapon access among high-risk youth.

Participants in our study, consistent with school-based studies,<sup>65</sup> endorsed protection as a primary reason for ownership. These school-based studies found an association between carrying firearms and exposure to community violence.<sup>65</sup> The perceived need to own and carry firearms for protection among respondents with assault injury suggests a need to address youth's perceived and real feeling of safety through individual and community intervention.

Although causality cannot be determined because of the cross-sectional nature of the study, among an already high-risk group of assault-injured patients, those with firearms were more likely engaged in violent and aggressive firearm-related activities over the previous 6 months. They were also more likely to have pulled a firearm in a fight, shot or stabbed another person, used a gun in a fight with an intimate partner, or caused injury requiring treatment than their peers without firearms. It is important to note that few youth were involved in a gang. Taken together, these findings demonstrate that even if the main reason youth reported that they obtained a gun was for protection, they are often both carrying and using the weapon. In combination with high rates of substance use reported before the altercation, and higher rates of substance use seen in youth with firearms, this is particularly concerning for inadvertently increasing

the risk of a firearm moving from a protective device to impulsive use and lethal outcomes.

As in previous studies, male youth were more likely to have firearm possession.<sup>39,41,64,66</sup> It is important to note, however, that 30% of youth with firearms were female, highlighting the need to include both genders in injury-prevention efforts. Of note, and contrary to previous ED studies, youth with higher SES status were more likely to own a gun.<sup>41,64</sup> As would be hypothesized, race was not predictive of firearm possession. Overall, white males, not on public aid seeking care for assault were more likely to possess a gun than their African American male counterparts receiving public assistance.

Participants with firearms were noted to have more aggressive attitudes compared with those without firearms, suggesting aggressive attitudes and subsequent retaliation are major contributors to violent firearm-related injury. ED studies have shown that assault-related injuries among youth are often the result of long-standing disagreements<sup>28</sup> and that retaliation may be an underlying cause for violence.<sup>67,68</sup> These findings are important because health behavior models,<sup>69</sup> which are key to many violence-prevention efforts, suggest the first step to decreasing future aggression would be to modify aggressive attitudes.

Although peer violence was the source of the altercation prompting medical care in most cases, we found dating/intimate partner violence was also highly associated with firearm possession. This finding is concerning for escalation of future partner violence to lethal means with the firearm they note that they possess. Also, many of these youth are parents themselves, raising concern for the safe gun storage and the need to restrict firearm access from their young children.

Our study finds higher rates of binge drinking and other illicit drug use among assault-injured patients with firearms. In this regard, youth with firearms, who are more likely to also be binge drinking and/or using illicit drugs, including drinking before a fight, increases concerns about potential firearm discharge. Interventions addressing firearms among youth should also assess and intervene for alcohol and other drug use to decrease the risk of harm with impulsive behavior that may occur with youth and substance use.

Several study limitations are noted. Although our sample reflected the racial composition of the city in which it was located, future studies are needed with samples containing other racial/ethnic groups. Causal attributions are not possible with a cross-sectional study design and the single urban site limits generalizability to other settings. Exclusion of patients presenting for suicidal

ideation and acute sexual assault may underestimate true firearm-possession rates. Although a potential limitation, the use of a self-report survey has been shown to have high reliability and validity among adolescents for self-reported risk behaviors, including alcohol and drug use.<sup>70–77</sup>

These findings have implications for injury-prevention efforts at the community and law-enforcement levels in terms of the high numbers of firearms obtained illegally, the ease of obtaining illegal and highly lethal firearms, including automatic/semiautomatic weapons, diversion of legally obtained firearms, as well as hospital ED-based initiatives among assaulted youth seeking care. Previous research has demonstrated the immediate post-injury time is an ideal time to capitalize on a teachable moment with preventive interventions.<sup>28,78</sup> Previous ED screening, brief intervention, and referral to treatment approaches have focused on

substance use,<sup>79–81</sup> with a recent study showing positive findings for intervening for both substance use and youth violence among younger less violence-involved youth.<sup>45,82</sup> Interventions for hospitalized assault-injured youth have shown promise linking hospitalized youth with community-level resources.<sup>17,30,83–86</sup> Future ED-based injury-prevention interventions or case management approaches for youth with assault-related injuries may have the potential to decrease the likelihood that a youth who is seeking care today with an assault-related injury will use a firearm lethally or be a victim of firearm violence.

## ACKNOWLEDGMENTS

The authors acknowledge Debra L. Novak-Haas and Wendi Muhl for their assistance in manuscript preparation. We also thank the patients and medical staff of Hurley Medical Center for their support of this project.

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**FINANCIAL DISCLOSURE:** The authors have indicated they have no financial relationships relevant to this article to disclose.

**FUNDING:** This study was funded by National Institute on Drug Abuse R01 024646 (PI, Dr Cunningham), which had no direct role in the current study design, collection, analysis, or interpretation, writing of this manuscript, or the decision to submit this paper for publication. This research was also supported, in part, by the Michigan Youth Violence Prevention Center Cooperative Agreement No. 5U01CE001957-02 (PI, Dr Zimmerman) from the Centers for Disease Control and Prevention. Dr. Carter authored the first draft of this manuscript. No honoraria, grants, or other forms of payment were received from any of the co-authors for producing this manuscript. Funded by the National Institutes of Health (NIH).

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*Pediatrics*; originally published online July 8, 2013;

DOI: 10.1542/peds.2013-0163

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