

# Weapon Carrying among Black Adolescents: A Social Network Perspective

## ABSTRACT

**Objectives.** This report describes the salience of social networks to the phenomena of adolescent weapon carrying.

**Methods.** A random-walk network sampling design was used to survey 113 adolescents about topics, including weapon carrying.

**Results.** In a probability sample of 12- to 15-year-olds, 20.9% reported ever carrying a weapon. Carriers were eight times as likely as noncarriers to report weapon carrying by an older associate, and 19 times as likely to report weapon carrying by a peer. A significant dose-response effect was present.

**Conclusions.** This evidence supports the interpretation that modeling of weapon carrying by personal network members is important for its initiation and maintenance in adolescence. (*Am J Public Health.* 1997;87:1038-1040)

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## Introduction

Violent encounters among youth constitute a major public health problem.<sup>1,2</sup> Possession and use of weapons, particularly guns, are considered proximate causes.<sup>3</sup> Prevention of fatal violence among adolescents may be served, therefore, by understanding the context and determinants of weapon carrying.

Data collected to describe the social network of Black adolescents residing in an urban neighborhood were used to describe prevalence of weapon carrying and its association with network-level factors.

## Methods

The design adopted involved (1) selection of a probability sample of adolescents residing in a defined geographic area, followed by (2) simple random sampling of named associates of interviewees (random-walk network sampling).

With the use of 1990 census data, four contiguous census tracts (Fulton County, Atlanta) containing an estimated 206 12- to 15-year-olds were selected.

A two-stage (blocks, dwellings) area-based probability sample of adolescents was implemented to select initial respondents.<sup>4</sup> Details are given in McGrady et al.<sup>5</sup> Systematic samples were drawn at both the block and the dwelling level to achieve a 25% sampling fraction.

The random-walk sampling design<sup>5</sup> called for three steps for each initial respondent. Second members were randomly selected from associates named by an initial. Third and fourth members were randomly selected from associates of second and third members, respectively.

Individuals named by multiple respondents and selected for interview on multiple occasions were interviewed only once, but counted toward the completion of each affected walk.<sup>6,7</sup>

Data were collected over a 6-month period in 1992 to 1993 through a structured questionnaire administered in pri-

vate. Weapon carrying, violent encounters, and identities and characteristics of associates and their behaviors were assessed, as were other characteristics.

The proportion of initials reporting weapon carrying was estimated as a weighted average, reflecting the probability of inclusion in the sample. Precision was calculated with the successive-difference method for systematic samples.<sup>4</sup> The relationship of factors to weapon carrying was examined with the use of prevalence odds ratios; confidence intervals were calculated by the variance method.<sup>8</sup>

Age at initiation of behavior was considered as time to event or failure time data; separate survival functions were calculated by the life-table method for carriers and noncarriers. The log-rank statistic was used to test for significant differences.<sup>9</sup>

## Results

Forty-eight adolescents (initials), approximately 23% of all 12- to 15-year-olds, were recruited from the target area. Forty-three (89%) agreed to participate. The full three-step, network-sampling random walk beginning with 43 initials yielded a total of 129 unique interviews. At each step, the response rate exceeded 90%. Of the 129 respondents, 113 (72 females and 41 males) were aged 12 to 19 years at the time of interview. These adolescents supplied information on a total of 911 associates, excluding respondents also named as associates. Prevalence estimates are based on the probability sample of 43 adolescents; all other

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results use adolescent ( $n = 113$ ) respondents.

Of 43 initial respondents, 9 (20.9%) reported ever having carried a weapon, a gun, knife, or blade; 26.3% of males compared with 16.7% of females reported weapon carrying.

Because parental and peer role models are established as factors influencing initiation and maintenance of a number of risk behaviors in adolescence—cigarette smoking,<sup>10–13</sup> alcohol, and illicit drug use<sup>14,15</sup>—we examined role modeling of weapon carrying by peers (personal network members whose ages were within 5 years of the respondent's age), older associates (nonrelatives in the respondent's personal network, more than 5 years older than the respondent), and family (relatives more than 5 years older than the respondent).

Weapon carriers were 17.8 times more likely to attribute weapon carrying to a peer than noncarriers, and 8.8 times more likely to attribute weapon carrying to an older associate (Table 1; crude odds ratio). When considered by gender, these associations were stronger and significant for peers (odds ratio [OR] = 36.8 for males and 20.8 for females), and equally strong though not significant for older associates (OR = 6.8 for males and 6.6 for females). When the percentage of associates identified as weapon carriers were considered as the extent or dose of modeling, statistically significant trends of increasing odds with increasing dose were observed overall, for older associates, and peers (Table 1). Significant trends overall and for peers were also observed for males and females considered separately (data not shown). Time precedence of these associations can be examined by categorizing associates as to whether they were known prior to respondent's initiation of weapon carrying. When this approach is used, there is no change in the measured association of modeling by family members; the odds ratio for older associates is reduced to 2.73; and the odds ratio for peers is reduced from 17.8 to 5.3 but continues to be statistically significant (95% confidence interval = 1.6, 17.3).

Because respondents were occasionally named by other respondents as associates, estimation of concordance between self-reported and respondent-attributed behavior is possible. In 127 of 176 instances (72.2%) in which a respondent's behavior was described by another, attributed and self-reported behavior agreed. In 44 of 49 discordant reports,

**TABLE 1—Association of Modeling Behavior<sup>a</sup> and Weapon Carrying<sup>b</sup>: Percentage of Modelers Considered as Dose, All Adolescent Respondents ( $n = 113$ ), Atlanta Ga, 1992 to 1993**

Category of Modeler	Crude OR (95% CI <sup>c</sup> )	% (Dose)	Weapon Carrier			Odds	OR	$\chi^2$ (Trend)
			Yes	No	Total			
Any associates	7.07 (2.5, 20.3)	0	12	67	79	0.18	1.00	26.78
		1–10	2	7	9	0.29	1.60	
		11–20	9	6	15	1.50	8.38	
		>20	8	2	10	4.00	22.33	
Peers <sup>d</sup>	17.80 (5.3, 59.1)	0	13	76	89	0.17	1.00	41.79
		1–10	0	1	1	0.00	0.00	
		11–20	5	5	10	1.00	5.85	
		>20	13	0	13	27.00	157.85	
Older associates <sup>e</sup>	8.80 (0.9, 89.7)	0	28	81	109	0.35	1.00	4.67
		>20	3	1	4	3.00	8.68	
Family <sup>f</sup>	1.80 (0.5, 6.3)	0	26	74	100	0.35	1.00	1.09
		1–10	0	1	1	0.00	0.00	
		11–20	1	1	2	1.00	2.85	
		>20	4	6	10	0.67	1.90	

Note. OR = odds ratio; CI = confidence interval.

<sup>a</sup>Implemented as the proportion of named associates to whom the behavior was attributed.

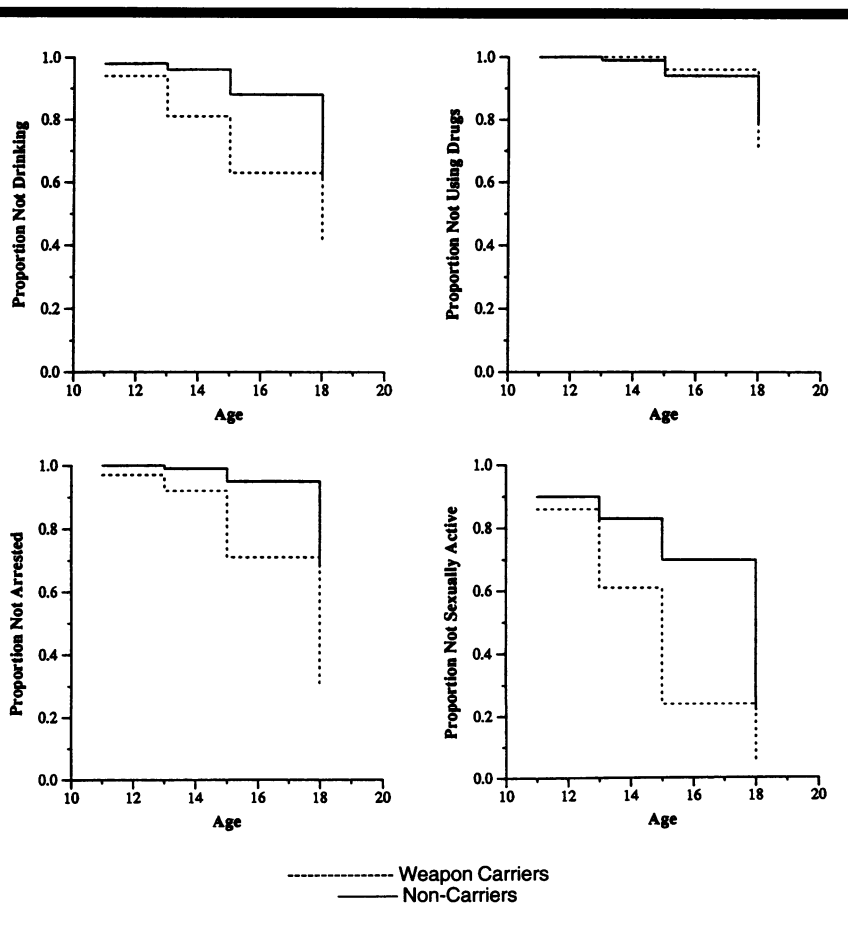
<sup>b</sup>Ever carrying a gun, knife, or blade.

<sup>c</sup>Calculated by variance method.

<sup>d</sup>Named associates who are within 5 years of the respondent's age.

<sup>e</sup>Nonrelatives more than 5 years older than the respondent.

<sup>f</sup>All relatives not meeting the definition of peer.



**FIGURE 1—Age at initiation of selected behaviors.**

self-report identified the respondent as a weapon carrier.

For a number of experiences—including arrest, use of alcohol and drugs, and initiation of sexual activity—respondents were asked to give their age at the first experience. These data, analyzed as “experience-free” survival times, provide another perspective on the correlation of weapon carrying with behaviors (Figure 1). With the exception of first occurrence of drug use, weapon carriers exhibited other risk behaviors at earlier ages; the differences are statistically significant: alcohol ( $\chi^2 = 7.776$ ,  $P < .01$ ), sex ( $\chi^2 = 6.853$ ,  $P < .01$ ), arrest ( $\chi^2 = 7.946$ ,  $P < .01$ ).

## Discussion

The estimated prevalence of weapon carrying among 12- to 15-year-olds serves as one element of a description of weapon carrying in adolescence. Prior research documents a range of prevalence, 14% to 83%, for a variety of populations of youth.<sup>16-19</sup> In this study, the estimate—20.9% of 12- to 15-year-olds—is for a population, well defined demographically and geographically, in an urban neighborhood in which 97% of residents are African American, 61% of families have incomes below poverty level (1990 census), and 41% of families have no employed members.

We propose that weapon carrying is an adaptation to a local social environment; description of this environment serves, then, as another important element characterizing the behavior. The social environment “seen” by our network data consists of relatives and friends. Considering the impact of this environment on adolescent weapon carrying provides contrast to the perspective that suggests the behavior is a defensive response to a dangerous environment.<sup>20-22</sup> Associations

of weapon carrying with modeling by network members provide evidence for learned attitudes and norms about weapons. In the face of a shared dangerous environment, network variables help distinguish carriers from noncarriers, a capability potentially useful for prevention efforts. □

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