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ARTICLE

Child Maltreatment in the United States: Prevalence, Risk Factors, and Adolescent Health Consequences

Jon M. Hussey, PhD, MPHa,b, Jen Jen Chang, PhD, MPHa, Jonathan B. Kotch, MD, MPHa

aDepartment of Maternal and Child Health, School of Public Health, and bCarolina Population Center, University of North Carolina, Chapel Hill, North Carolina

The authors have indicated they have no financial relationships relevant to this article to disclose.

ABSTRACT

OBJECTIVES. The purpose of this study was to estimate the prevalence of child maltreatment in the United States and examine its relationship to sociodemographic factors and major adolescent health risks.

METHODS. The National Longitudinal Study of Adolescent Health is a prospective cohort study following a national sample of adolescents into adulthood. The wave III interview, completed by 15,197 young adults in 2001–2002 (77.4% response rate), included retrospective measures of child maltreatment. We used these measures to estimate the prevalence of self-reported supervision neglect, physical neglect, physical assault, and contact sexual abuse during childhood. Next, we investigated the relationship between sociodemographic characteristics and maltreatment. Finally, we examined the association between child maltreatment and adolescent self-rated health; overweight status; depression; cigarette, alcohol, marijuana, and inhalant use; and violent behavior.

RESULTS. Having been left home alone as a child, indicating possible supervision neglect, was most prevalent (reported by 41.5% of respondents), followed by physical assault (28.4%), physical neglect (11.8%), and contact sexual abuse (4.5%). Each sociodemographic characteristic was associated with ≥1 type of maltreatment, and race/ethnicity was associated with all 4. Each type of maltreatment was associated with no fewer than 8 of the 10 adolescent health risks examined.

CONCLUSIONS. Self-reported childhood maltreatment was common. The likelihood of maltreatment varied across many sociodemographic characteristics. Each type of maltreatment was associated with multiple adolescent health risks.

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The National Institute on Drug Abuse did not participate in the design or conduct of the study; in the collection, management, analysis, and interpretation of the data; or in the preparation, review, or approval of the article.

Dr Hussey had full access to all of the data in the study and takes responsibility for the integrity of the data and accuracy of the data analysis.

Persons interested in obtaining data files from Add Health should contact Add Health, Carolina Population Center, 123 W Franklin St, Chapel Hill, NC 27516-2524. E-mail: addhealth@unc.edu.

Dr Chang’s current address is Department of Community Health in Epidemiology, School of Public Health, Saint Louis University, 3545 Lafayette Ave, St Louis, MO 63110.

Key Words
abuse, socioeconomic factors, neglect, adolescent health, prevalence

Abbreviations
Add Health—National Longitudinal Study of Adolescent Health
CAI—computer-assisted self-interviewing
SES—socioeconomic status
OR—odds ratio
aOR—adjusted odds ratio
NCANDS—National Child Abuse and Neglect Data System
CPS—Child Protective Service
NIS—National Incidence Study

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Address correspondence to Jon M. Hussey, PhD, MPH, Department of Maternal and Child Health, School of Public Health, University of North Carolina, 41A Pittsboro St, Chapel Hill, NC 27599-7445. E-mail: jon_hussey@unc.edu.

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How prevalent is childhood maltreatment, which children are at greatest risk, and what are the health consequences? Despite >40 years of sustained research on child abuse and neglect, we are still struggling to answer these basic questions. Although these concerns are best addressed with large, prospective cohort studies of representative community samples, most existing knowledge comes from relatively small, cross-sectional samples of uncertain generalizability. Consequently, there is incomplete and inconsistent information on the prevalence of maltreatment, its sociodemographic risk factors, and its relationship to future health.

Understanding the relationship between childhood maltreatment and adolescent health is particularly important. However, whereas countless studies have linked maltreatment to adult health behaviors, the association between childhood maltreatment and adolescent health has received relatively less attention. This is a critical gap, because adolescence is the developmental period when many health-risk behaviors are initiated and established, with important implications for health throughout the life course.2

Recognizing these shortcomings in data and research, the National Research Council Panel on Research on Child Abuse and Neglect called for including child maltreatment questions in future national surveys as a promising new strategy for improving the quality of evidence on child abuse and neglect.1 The National Longitudinal Study of Adolescent Health (Add Health) responded to this call by including maltreatment measures in its third wave of interviews, collected from a nationally representative sample of 15 197 young adults in 2001–2002. We use this valuable new source of data to update and extend existing national evidence on the prevalence of childhood maltreatment, its association with sociodemographic characteristics, and its impact on adolescent health.

METHODS

Study Design and Sample
In this study we use contractual in-home survey data from Add Health, a nationally representative probability sample of adolescents in grades 7 through 12 in the 1994–1995 school year. The sampling frame for the wave I in-home interview included students who had completed an in-school questionnaire or who were listed on their school enrollment roster. From April to December of 1995, 20 745 wave I in-home interviews were completed (79% response rate). At wave I, a parent, usually the resident mother, also completed an interviewer-assisted questionnaire. Two follow-up interviews have been completed. The wave II in-home interview (88% response rate) was completed in 1996, ~1 year after wave I. In 2001–2002, wave III in-home interviews were completed with 15 197 young adult respondents, aged 18 to 26 (77% response rate). This study is based on the 10 828 wave III respondents who were interviewed at all 3 waves and have a wave III sampling weight. More detailed descriptions of the Add Health study design and sample are available.3 Written parental/guardian consent and adolescent assent were obtained before the wave I and II interviews. At wave III, written consent was obtained from each respondent. All of the Add Health procedures and the present study were approved by the Public Health Institutional Review Board at the University of North Carolina, Chapel Hill.

Maltreatment Measures
The maltreatment measures, included in the wave III interview, are modified versions of questions from previous surveys.4–6 Because of their sensitive nature, all of the maltreatment questions were administered using computer-assisted self-interviewing (CASI). The questions were introduced as follows: “The next set of questions is about your parents or other adults who took care of you before you were in the 6th grade. How often had each of the following things happened by the time you started 6th grade?” “By the time you started 6th grade, how often had your parents or other adult care-givers left you home alone when an adult should have been with you?” [supervision neglect]; “How often had your parents or other adult caregivers not taken care of your basic needs, such as keeping you clean or providing food or clothing?” [physical neglect]; “How often had your parents or other adult care-givers slapped, hit, or kicked you?” [physical assault]; and “How often had one of your parents or other adult care-givers touched you in a sexual way, forced you to touch him or her in a sexual way, or forced you to have sexual relations?” [contact sexual abuse]. Responses were recoded into 4 categories (never, once, twice, or 3 or more times) for prevalence estimates and 2 categories (never or 1 or more times) for regression analysis.

Sociodemographic Measures
Respondent’s self-identified race and Hispanic ethnicity were combined into 6 racial/ethnic categories: non-Hispanic white, Hispanic (of any race), non-Hispanic black, non-Hispanic Asian, non-Hispanic Native American, or “other.” Self-identified multiracial respondents were placed in the “other” category. Parent’s education (less than high school; high school graduate/general education diploma; some college or post–high school business, trade, or vocational schooling; or college graduate) and total family income were reported by the respondent’s parent (usually the biological mother). Income was dichotomized (≤$15 000 vs >$15 000) to distinguish between families falling above and below the 1994 federal poverty level for a family of 4.7 Immigrant status was based on the birthplace of respondents and their parents.
and distinguishes among generation 1 (foreign born to foreign-born parents), generation 2 (US born to foreign-born parents), and generation 3+(US born to US-born parents) youth. The other sociodemographic measures, respondent’s gender, age, and US region of residence, are self-explanatory. All of the sociodemographic measures are from wave I.

Adolescent Health Measures

The health-risk measures include many of the major threats to the short- and long-term health of adolescents. Each of these health risks has been associated with a history of maltreatment in previous studies. With 1 exception, all of the health-risk measures are from wave I. Height and weight data come from standardized wave II interviewer measurements rather than wave 1 adolescent self-reports. All of the health-risk measures were recoded into dichotomous outcomes. To assess self-rated health, responses to the question: “In general, how is your health?” were grouped into 2 categories (excellent/good versus fair/poor). Overweight status was defined as having a BMI-for-age value falling at or above the 85th percentile. Height and weight data were converted into BMI-for-age values using the 2000 Centers for Disease Control and Prevention growth charts. Frequency of experiencing any of 20 depressive symptoms in the past week was measured with a modified version of the Center for Epidemiologic Studies Depression Scale. Responses were scored as follows: 0 = never or rarely; 1 = sometimes; 2 = a lot of the time; and 3 = most of the time or all of the time. To maximize sensitivity and specificity, boys with summary scores of ≥22 and girls with scores of ≥24 were coded as depressed; all others were coded as not depressed.

Five measures of adolescent drug use were constructed: 30-day cigarette use: smoked cigarettes on ≥1 day in the past month (versus no days); regular alcohol use: drank alcohol 2 or 3 days a month or more during the past year (versus once a month or less); binge drinking: consumed ≥5 drinks in a row at least once in the past year (versus never); 30-day marijuana use: used marijuana ≥1 time in the past 30 days (versus no use); and inhalant use: any lifetime use of illicit inhalants, such as glue or solvents (versus no use).

Finally, participation in violent behavior during the past 12 months was determined from 2 questions: “How often did you get into a serious physical fight?” [violence: serious fight] and “How often did you hurt someone badly enough to need bandages or care from a doctor or nurse?” [violence: hurt someone]. Answers to both questions were recoded into 2 categories: never versus ≥1 time.

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Supervision Neglect (N = 10056)a</th>
<th>Physical Neglect (N = 10324)c</th>
<th>Physical Assault (N = 10262)c</th>
<th>Contact Sexual Abuse (N = 10406)c</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>%b</td>
<td>No. % 95% CI</td>
<td>No. % 95% CI</td>
<td>No. % 95% CI</td>
</tr>
<tr>
<td>Any report</td>
<td>4184 41.5 (39.9–43.1)</td>
<td>1205 11.8 (10.7–12.9)</td>
<td>3013 28.4 (26.9–29.9)</td>
<td>479 4.5 (3.9–5.2)</td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 time</td>
<td>1276 13.1 (12.1–14.1)</td>
<td>471 4.7 (4.1–5.3)</td>
<td>838 8.3 (7.5–9.0)</td>
<td>233 2.4 (1.9–2.9)</td>
</tr>
<tr>
<td>2 times</td>
<td>942 9.3 (8.6–10.0)</td>
<td>217 2.1 (1.7–2.5)</td>
<td>649 5.9 (5.3–6.5)</td>
<td>76 0.5 (0.4–0.7)</td>
</tr>
<tr>
<td>≥3 times</td>
<td>1966 19.1 (18.0–20.3)</td>
<td>517 5.0 (4.4–5.6)</td>
<td>1526 14.2 (13.2–15.2)</td>
<td>170 1.6 (1.3–1.9)</td>
</tr>
</tbody>
</table>

Because of rounding, frequency percentages may not sum to overall percentage. CI indicates confidence interval.

a Total unweighted nonmissing observations.

b All percentages and 95% CIs are weighted and provide nationally representative estimates for the target population.

RESULTS

Prevalence

A substantial proportion of young adults reported a history of ≥1 type of childhood maltreatment (Table 1). Supervision neglect was most common, with 2 of 5 respondents (41.5%) reporting that their parents or other adult caregivers left them home alone at least once when an adult should have been supervising them, and nearly 1 in 5 reporting (19.1%) that it happened ≥3 times. Physical assault, defined as being “slapped, hit, or kicked” by a parent or other adult caregiver, was the second most common type of maltreatment, reported by >1 in 4 respondents (28.4%). Half of those respondents who reported any physical assault, or 14.2% of all respondents, said this happened ≥3 times. The third most prevalent type of maltreatment was physical neglect, defined as an occasion where a parent or other adult caregiver did not meet their child’s basic needs, such as keeping him or her clean or providing food or clothing. More than 1 in 10 respondents (11.8%) recalled ≥1
episode of physical neglect, and 1 in 20 respondents (5.0%) reported ≥3 episodes. Finally, by the time they entered the sixth grade, >1 in 25 respondents (4.5%) said they had been victims of contact sexual abuse perpetrated by a parent or other adult caregiver.

**Sociodemographic Risk Factors**

Several general findings emerged with respect to sociodemographic factors. First, each of the 6 sociodemographic risk factors was associated with ≥1 type of maltreatment. Second, many of the statistically significant crude associations between specific sociodemographic factors and maltreatment persisted after adjusting for other sociodemographic confounders. Finally, the strength of associations between sociodemographic factors and maltreatment varied by type of maltreatment. These results are presented in Table 2. For each type of maltreatment, 2 columns of ORs are presented. The first column reports the crude odds of maltreatment associated with each sociodemographic characteristic. ORs in the second column are adjusted for all of the other sociodemographic factors.

Racial/ethnic group membership is associated with each type of maltreatment but not in a uniform pattern. Unadjusted results show that, relative to the reference group of non-Hispanic whites, Hispanic and Asian adolescents were more likely to report supervision neglect, physical neglect, and physical assault. Black adolescents were more likely to report physical neglect and sexual abuse. Native Americans were more likely to report physical neglect. Finally, those in the “other” racial/ethnic category, predominantly multiracial youth, were more likely to report all 4 types of maltreatment.

In most cases, associations between racial/ethnic group membership and maltreatment risk weakened after adjusting for other sociodemographic characteristics. For Hispanic and Asian youth, associations with supervision neglect, physical neglect, and physical assault diminished and were no longer statistically significant after adjusting for other sociodemographic factors. After adjustment, black youth were no longer at greater risk of sexual abuse than non-Hispanic white youth but continued to face a greater likelihood of physical neglect. The likelihood of physical neglect for Native Americans dropped and was no longer statistically significant after adjustment. However, unlike the crude odds, the adjusted odds of supervision neglect for Native Americans was statistically significant. Interestingly, sociodemographic risk factors were associated with each type of maltreatment, but the strength of these associations varied by type of maltreatment.

**TABLE 2** Crude and Adjusted Odds of Child Maltreatment According to Sociodemographic Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Supervision Neglect, OR</th>
<th>Physical Neglect, OR</th>
<th>Physical Assault, OR</th>
<th>Contact Sexual Abuse, OR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crude</td>
<td>Adjusted a</td>
<td>Crude</td>
<td>Adjusted a</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.25 b</td>
<td>1.25 b</td>
<td>1.66 b</td>
<td>1.78 b</td>
</tr>
<tr>
<td>Female</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td><strong>Race/ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.31 c</td>
<td>1.08</td>
<td>1.66 b</td>
<td>1.26</td>
</tr>
<tr>
<td>Black</td>
<td>1.00</td>
<td>1.02</td>
<td>1.83 b</td>
<td>1.57 b</td>
</tr>
<tr>
<td>Asian American</td>
<td>1.43 c</td>
<td>1.03</td>
<td>1.75 c</td>
<td>1.60</td>
</tr>
<tr>
<td>Native American</td>
<td>2.00</td>
<td>1.90 d</td>
<td>2.66 c</td>
<td>1.96</td>
</tr>
<tr>
<td>Other</td>
<td>1.40 d</td>
<td>1.38 d</td>
<td>1.69 c</td>
<td>1.51 d</td>
</tr>
<tr>
<td><strong>Parent’s education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; high school</td>
<td>1.18</td>
<td>1.08</td>
<td>2.60 b</td>
<td>2.15 b</td>
</tr>
<tr>
<td>High school</td>
<td>0.95</td>
<td>0.98</td>
<td>1.46 c</td>
<td>1.38 d</td>
</tr>
<tr>
<td>Some college</td>
<td>1.12</td>
<td>1.12</td>
<td>1.67 b</td>
<td>1.61 b</td>
</tr>
<tr>
<td>College graduate</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td><strong>Family income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than $15 000</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>$15 000 or less</td>
<td>1.17</td>
<td>1.19 c</td>
<td>1.93 b</td>
<td>1.52 a</td>
</tr>
<tr>
<td>Missing</td>
<td>1.11</td>
<td>1.12</td>
<td>1.24</td>
<td>1.09</td>
</tr>
<tr>
<td><strong>Immigrant status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generation 1</td>
<td>1.49 c</td>
<td>1.55 c</td>
<td>1.35 d</td>
<td>0.89</td>
</tr>
<tr>
<td>Generation 2</td>
<td>1.34 c</td>
<td>1.13</td>
<td>1.30 d</td>
<td>0.93</td>
</tr>
<tr>
<td>Generation 3+</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td><strong>Region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West</td>
<td>1.42 b</td>
<td>1.30 d</td>
<td>1.24</td>
<td>1.23</td>
</tr>
<tr>
<td>Midwest</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>South</td>
<td>0.90</td>
<td>0.86</td>
<td>1.06</td>
<td>0.94</td>
</tr>
<tr>
<td>Northeast</td>
<td>1.05</td>
<td>0.98</td>
<td>1.08</td>
<td>1.08</td>
</tr>
</tbody>
</table>

a Adjusted for age and all other sociodemographic variables in the table; ref indicates reference group.

b P ≤ .001.

c P ≤ .01.

d P ≤ .05.
graphic adjustment had the least impact on the maltreatment risk of those in the largely multiracial “other” group, for whom the adjusted odds of all 4 types of maltreatment remained significantly elevated.

Both dimensions of childhood socioeconomic status (SES), parent’s education and family income, had independent effects on maltreatment risk. The strongest crude and adjusted associations between parent’s education and maltreatment risk were observed for physical neglect. Specifically, those whose parent had less than a high school education (aOR: 2.15; \( P \leq .001 \)), was a high school graduate (aOR: 1.38; \( P \leq .05 \)), or completed some college (aOR: 1.61; \( P \leq .01 \)) were more likely to report physical neglect than children of college graduates. Those whose parent completed some college were also more likely to report physical assault (aOR: 1.28; \( P \leq .05 \)). Parent’s education was not associated with supervision neglect in the crude or adjusted models. Finally, the odds of contact sexual abuse for those whose parent did not complete high school were substantially reduced and no longer statistically significant after adjustment for other sociodemographic factors.

At the same time, family income was independently associated with 3 types of maltreatment. Relative to families with incomes \( > \$15,000 \), children in low-income families faced an increased risk of supervision neglect (aOR: 1.19; \( P \leq .05 \)), physical neglect (aOR: 1.52; \( P \leq .001 \)), and contact sexual abuse (aOR: 1.83; \( P \leq .001 \)).

Significant crude associations were found between immigrant status and supervision neglect, physical neglect, and physical assault, with children of foreign-born parents at greater risk of these forms of maltreatment. However, only supervision neglect remained significantly associated with immigrant generation after adjustment; first-generation youth were 1.55 times as likely as third-generation-plus respondents (\( P \leq .01 \)) to report being left home alone as a child when an adult should have been with them.

### Maltreatment and Adolescent Health

Each type of maltreatment was associated with \( \geq 8 \) of the 10 adolescent health outcomes examined (Table 3). Self-rated fair/poor health was more likely among victims of supervision neglect (aOR: 1.49; \( P \leq .01 \)), physical neglect (aOR: 1.57; \( P \leq .01 \)), physical assault (aOR: 1.38; \( P \leq .05 \)), and contact sexual abuse (aOR: 1.65; \( P \leq .05 \)). A significant but substantively weak association was found between physical assault and overweight status (aOR: 1.20; \( P \leq .05 \)). Depression was more common among victims of supervision neglect (aOR: 1.36; \( P \leq .01 \)), physical neglect (aOR: 1.74; \( P \leq .001 \)), and physical assault (aOR: 1.75; \( P \leq .001 \)).

Maltreatment also was associated with increased cigarette, alcohol, and other drug use during adolescence. All 4 types of maltreatment increased the likelihood of 30-day cigarette use, with adjusted odds ranging from 1.22 for physical assault (\( P \leq .01 \)) to 1.80 for contact sexual abuse (\( P \leq .001 \)). Similarly, all 4 types of maltreatment were associated with an increased likelihood of regular alcohol use and binge drinking during adolescence. The adjusted odds of regular adolescent alcohol use ranged from 1.24 for victims of physical assault (\( P \leq .01 \)) to 1.60 for victims of contact sexual abuse (\( P \leq .05 \)).

The associations between maltreatment type and binge drinking were similar to those for regular alcohol use. Relative to the other 4 drug use behaviors, the association between maltreatment and marijuana use was particularly strong. Net of sociodemographic factors, adolescent marijuana use was more common among victims of childhood supervision neglect (aOR: 1.59; \( P \leq .001 \)), physical neglect (aOR: 1.76; \( P \leq .001 \)), physical assault (aOR: 1.57; \( P \leq .001 \)), and contact sexual abuse (aOR: 2.00; \( P \leq .001 \)). Lifetime use of illicit inhalants (eg, glue, solvents) was more likely among victims of supervision neglect (aOR: 1.79; \( P \leq .001 \)), physical assault (aOR: 1.39; \( P \leq .01 \)), and contact sexual abuse (aOR: 1.67; \( P \leq .05 \)).

Finally, childhood maltreatment was related to ado-

### Table 3: Association Between Child Maltreatment and Adolescent Health Risks

<table>
<thead>
<tr>
<th>Health Outcome</th>
<th>Supervision Neglect, OR</th>
<th>Physical Neglect, OR</th>
<th>Physical Assault, OR</th>
<th>Contact Sexual Abuse, OR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crude</td>
<td>Adjusted*</td>
<td>Crude</td>
<td>Adjusted*</td>
</tr>
<tr>
<td>Fair/poor health</td>
<td>1.50*</td>
<td>1.49*</td>
<td>1.72*</td>
<td>1.57*</td>
</tr>
<tr>
<td>Depression</td>
<td>1.08</td>
<td>1.09</td>
<td>1.20</td>
<td>1.07</td>
</tr>
<tr>
<td>30-d cigarette use</td>
<td>1.32*</td>
<td>1.36*</td>
<td>1.74*</td>
<td>1.74*</td>
</tr>
<tr>
<td>Regular alcohol use</td>
<td>1.23b</td>
<td>1.30b</td>
<td>1.53b</td>
<td>1.51b</td>
</tr>
<tr>
<td>Binge drinking</td>
<td>1.32b</td>
<td>1.50b</td>
<td>1.24b</td>
<td>1.25b</td>
</tr>
<tr>
<td>30-d marijuana use</td>
<td>1.35b</td>
<td>1.59b</td>
<td>1.76b</td>
<td>1.76b</td>
</tr>
<tr>
<td>Any inhalant use</td>
<td>1.75b</td>
<td>1.79b</td>
<td>1.21</td>
<td>1.35</td>
</tr>
<tr>
<td>Violence: serious fight</td>
<td>1.56b</td>
<td>1.50b</td>
<td>1.80b</td>
<td>1.60b</td>
</tr>
<tr>
<td>Violence: hurt someone</td>
<td>1.63b</td>
<td>1.52b</td>
<td>1.70b</td>
<td>1.49b</td>
</tr>
</tbody>
</table>

* Models were adjusted for gender, age, race/ethnicity, parent’s education, family income, immigrant generation, and US region.

** P \( \leq .001 \)

b P \( \leq .05 \)
lescent violent behavior. The likelihood of getting into a serious fight was positively associated with a childhood history of supervision neglect (aOR: 1.50; \( P \leq .001 \)), physical neglect (aOR: 1.60; \( P \leq .001 \)), physical assault (aOR: 1.50; \( P \leq .001 \)), and contact sexual abuse (aOR: 1.50; \( P \leq .05 \)). Similarly, the odds of hurting someone badly enough that he or she required medical attention were greater among victims of supervision neglect (aOR: 1.52; \( P \leq .001 \)), physical neglect (aOR: 1.49; \( P \leq .001 \)), physical assault (aOR: 1.41; \( P \leq .001 \)), and contact sexual abuse (aOR: 1.55; \( P \leq .05 \)).

**DISCUSSION**

The rich Add Health data have enabled us to conduct the most comprehensive analysis to date, with a national probability sample, on the prevalence of, risk factors for, and adolescent health consequences of childhood maltreatment. Noteworthy contributions of this analysis include the provision of nationally representative data on childhood maltreatment; national estimates on the prevalence of 4 major types of maltreatment, including 2 forms of neglect; a detailed examination of maltreatment risk factors that yields new findings with respect to racial/ethnic, socioeconomic, and immigrant status differences; and some of the strongest evidence to date linking child maltreatment to multiple adolescent health risks.

**Prevalence: Comparison to Previous Estimates**

The quality of national surveillance data on child maltreatment is poor. In the United States, the only source of annual prevalence data on child maltreatment, the National Child Abuse and Neglect Data System (NCANDS), is thought to greatly underestimate the true magnitude of victimization by counting only those cases known to state child protective service (CPS) agencies. NCANDS estimates that 1.2% of US children were maltreated in 2004. The other major source of US maltreatment data is the periodic National Incidence Study (NIS), which augments CPS reports with those from other community professionals who are likely to have contact with maltreated children (eg, child care providers, teachers, hospital staff, and investigatory agencies). The superior NIS methodology yields much higher estimates than NCANDS, suggesting that from 2.3% to 4.2% of US children are maltreated each year. However, a serious limitation of the NCANDS and the NIS is their failure to count cases of maltreatment known only to perpetrators and their victims.

By including perpetrators and/or victims of maltreatment in their samples, general population surveys are an important alternate source of data on the prevalence of child maltreatment. Indeed, the nationally representative surveys of this type that have been conducted indicate that child maltreatment is much more prevalent than NCANDS and NIS data suggest. For example, a nationally representative survey of parents yielded prevalence estimates of physical and sexual abuse that were at least 4 to 5 times greater than NIS figures.

Add Health prevalence estimates are generally consistent with those from previous national surveys. Like past surveys, neglect is the most prevalent and sexual abuse the least prevalent type of maltreatment. Although our estimate of supervision neglect (41.5%) is higher than the 21.3% estimate from an earlier Gallup survey, the latter was based on parent reports and, unlike Add Health, only asked about neglect committed by the responding parent (versus all adult caregivers). The prevalence of childhood physical neglect in the Add Health sample (11.8%) is quite similar to the Gallup finding that 13.7% of parents had been unable to provide their child with the food they needed. More than 1 (28.4%) in 4 Add Health respondents report being “slapped, hit, or kicked” by an adult caregiver at least once during childhood. Although much lower than previous national estimates of spanking and corporal punishment, this estimate for physical assault is most similar to the rates of 15.8% and 20.9% obtained from 2 previous surveys that measured relatively severe forms of physical abuse, including hitting with a fist and kicking. Finally, 4.5% of young adults in the Add Health sample reported contact sexual abuse by a parent or adult caregiver before the sixth grade. Although this estimate of adult caregiver sexual abuse during childhood is understandably lower than estimates that include teenage victimizations and all possible perpetrators, it is comparable to those from the National Youth Victimization Prevention Study, in which 3.3% of 10- to 16-year-olds reported being sexually abused by a family member, and the Gallup survey of parents, which found that 5.7% of 9- to 12-year-olds had ever experienced contact sexual abuse by a family or nonfamily member.

**Sociodemographic Correlates of Maltreatment**

Examining crude and adjusted relationships between sociodemographic risk factors and maltreatment yields several important insights. First, the influence of sociodemographic factors varies by type of maltreatment. For example, whereas parent’s education is associated with the risk of physical neglect, it is not associated with supervision neglect. This lack of uniformity in the effects of sociodemographic risk factors suggests that each type of maltreatment has a somewhat distinct etiology.

The disproportionate representation of different racial/ethnic groups in the child welfare system is an issue of ongoing concern and conjecture. The extent to which these disparities stem from racial/ethnic differentials in other sociodemographic risks (eg, poverty) or from bias in the detection, reporting, and substantiation of maltreatment is uncertain. Although we find significant crude relationships between selected racial/ethnic groups and each type of maltreatment, a compar-
ison of crude and adjusted odds shows that most of these associations weaken, and many are no longer statistically significant, after adjusting for other sociodemographic variables. This suggests that racial/ethnic differences in the prevalence of self-reported child maltreatment are largely because of underlying differences in other sociodemographic risks. Noteworthy exceptions include the elevated odds of supervision neglect among Native Americans and physical neglect among black adolescents after adjustment. The sociodemographic characteristics were least successful at explaining the elevated risk of maltreatment among members of the largely multiracial other race group, for whom the adjusted odds remained significant for all 4 types of maltreatment. Future studies should examine additional factors that may account for the elevated risk of maltreatment (particularly sexual abuse) among multiracial youth.

Migration and the process of adaptation to American society place unique strains on immigrant parents and their children. However, although nearly 1 in 5 US children now live in immigrant families, little is known about their risk of maltreatment. Adjusting for no other factors, we find that first- and second-generation youth are more likely to experience supervision neglect, physical neglect, and physical assault. However, after adjusting for other sociodemographic characteristics, only supervision neglect remains significantly associated with immigrant status. First-generation youth were 1.55 times as likely to report being left home alone without adult supervision during childhood. To our knowledge, this is the first national study to examine the relationship between immigrant status and maltreatment.

This is also the first national study to examine the independent effects of education and income on the risk of abuse and neglect. The 2 main sources of national data on child maltreatment, NCANDS and NIS, fail to measure parental education, and only the latter contains income data. Although income affects a parent’s ability to invest in goods (eg, housing, food, and clothing) and services (eg, child care and health care) that impact child well-being, education is presumably associated with parenting knowledge and skills. We found that both components of SES are important. The critical role of poverty in the etiology of child maltreatment is apparent; children in low-income families were 1.52 times as likely to report physical neglect and 1.83 times as likely to report contact sexual abuse even after adjusting for the influence of education and other sociodemographic factors. Parent education matters too, as reflected by its independent association with physical neglect.

Maltreatment and Adolescent Health

Nationally representative data on adolescent health risks associated with child abuse and neglect are extremely limited. To date, only a handful of national studies have examined the adolescent health consequences of physical and sexual abuse, and none have examined the adolescent health consequences of neglect, the most common type of maltreatment. Add Health provided an opportunity to examine, on a national basis, the consequences of physical abuse, sexual abuse, and neglect for a much broader set of adolescent health risks than has been possible previously.

Each type of maltreatment is associated with ≥8 of the 10 major adolescent health risks examined. Associations between childhood sexual abuse and adolescent health risks were particularly strong. Victims of sexual abuse were 1.60 times as likely to engage in regular alcohol use and binge drinking, 1.65 times as likely to report fair or poor health, 1.80 times as likely to be current cigarette users, and 2.00 times as likely to have reported recent marijuana use.

Also noteworthy is the finding that, in many cases, adjusting for sociodemographic characteristics strengthened the association between maltreatment and health. This pattern of negative confounding is most evident for adolescent drug use, where the adjusted odds are greater than the crude odds in 17 of 20 instances. This suggests that some sociodemographic factors associated with an increased risk of maltreatment are associated with a decreased risk of adolescent drug use (eg, immigrant status). Consequently, estimated associations between maltreatment and adolescent drug use may be biased downward in low SES and minority samples or when sociodemographic differences between maltreated and nonmaltreated youth are not adequately controlled for.

Limitations

Limitations of this study include our reliance on adult retrospective reports of childhood maltreatment experiences, which are affected by memory and willingness to report sensitive experiences. Based on previous research, we suspect that maltreatment is underreported in this sample, which would bias prevalence estimates downward. Similarly, underreporting of other sensitive risk behaviors and health outcomes is possible. We also acknowledge the possibility of nonrandom recall of childhood maltreatment, which could bias observed relationships with maltreatment upward or downward. Importantly, Add Health used a number of procedures aimed at minimizing these potential sources of error. The maltreatment questions were administered using CASI, and audio-CASI was used for sensitive questions on substance use and violence. Audio-CASI is thought to elicit more accurate reporting of sensitive sexual, drug use, and violent behaviors. Furthermore, to improve accuracy of lifetime event data, the wave III interview used an event history calendar as a memory aid. Finally, we note that whereas 23% of eligible participants did not provide a wave III interview, this non-
response was accounted for with poststratification adjustment of sample weights.

Several limitations of our 4 maltreatment measures also should be acknowledged. First, these measures only capture events occurring before the sixth grade (approximate age 11 years). Consequently, our findings only apply to preadolescent maltreatment. The sociodemographic risk factors and health consequences associated with adolescent maltreatment may differ. Second, both measures of neglect required subjective judgments. Supervision neglect was defined as being left home alone when an adult “should have been with you.” Similarly, physical neglect required respondents to evaluate whether or not their parents had “taken care of” their basic needs. These subjective judgments may vary according to other respondent characteristics. Third, the measure of physical assault combines 3 distinct actions into 1 question (slapping, hitting, and kicking) and potentially captures a wide range of severity, from a light slap on the wrist through life-threatening assaults. Fourth, our measure of supervision neglect most likely includes many instances of inadequate supervision that would not meet official CPS criteria for this type of maltreatment. However, our relatively high prevalence estimate for supervision neglect is consistent with national data showing that many young children are routinely left home alone. According to the 1997 Survey of Income and Program Participation, 9.3% of US children aged 5 to 11 years (representing 2.6 million grade-school youth) are regularly left home alone without adult supervision. Whether or not these circumstances qualify as official supervision neglect, which is not consistently defined in the child welfare system, they do place children at greater risk of multiple adverse adolescent health-risk behaviors and, therefore, merit further attention.

CONCLUSIONS
Childhood maltreatment is prevalent, and its adverse consequences are many. Conservative estimates place the number of US children victimized by maltreatment each year at close to 1 million and the annual number of child deaths caused by abuse or neglect at nearly 1500. In the United States, annual government spending on child welfare services now exceeds $20 billion. However, despite the magnitude and significance of this problem, a lack of good data on the prevalence, causes, and consequences of abuse and neglect continues to undermine prevention, detection, and treatment efforts. Two major factors that limit the value of much existing evidence are the uncertain generalizability of findings from clinical and convenience samples and a narrow focus on the unique subset of maltreatment victims that comes to the attention of caseworkers and community sentinels. By including cases of maltreatment that are only known to perpetrators and their victims and by producing findings that generalize to a known population, community-based probability samples are an important resource for improving the quality of evidence brought to bear on the problem of child abuse and neglect.

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FDA SIGNALS IT’S OPEN TO DRUG TRIALS THAT SHIFT MIDCOURSE

“Clinical trials of medicines are traditionally performed in a ‘blinded’ fashion so that the findings will remain secret until the studies are completed. But regulators and the pharmaceutical industry are increasingly interested in starting to use a very different model that lets studies change as they go along, based on early results. Drug companies have begun to perform such adaptive trials for their new medicines, hoping for more efficient tests that could save millions of dollars. The Food and Drug Administration, meanwhile, is sending increasingly encouraging signs that it is open to considering the results of such trials. In a move that could lay the groundwork for greater future use of such studies, Scott Gottlieb, an FDA deputy commissioner, is set to announce today plans to develop regulatory guidelines for adaptive trials. . . . Advocates of adaptive designs say they can involve a reduction of 30% or more in the number of patients needed in a trial, and can save time as well. They also say that adaptive trials carry major benefits for patients, who have reduced odds of getting a less-effective treatment. . . . Bristol-Myers Squibb Co. is planning a migraine-drug trial that will use adaptive principles to help determine how much medicine to give. The study will start with 10-15 different doses, far more than the three or four the company would typically give in a traditional trial. As data comes in, new patients will be routed to the doses showing the best results, so by the end only a few doses will remain active. But researchers and regulators say that such trials also raise serious questions. Perhaps the biggest concern is that allowing access to ongoing trial results could introduce bias if the sponsor or the doctors running the trial—or the patients taking part in it—learn about them and consciously or unconsciously change their conduct on an ad hoc basis. Another worry is that preliminary findings could leak out to investors. Adaptive designs can work, but they are also ‘much more open to abuse,’ says Truce Turnbull, a professor of statistics as Cornell University in Ithaca, NY.”

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