Childhood Abuse, Neglect, and Household Dysfunction and the Risk of Illicit Drug Use: The Adverse Childhood Experiences Study

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ABSTRACT. *Objective.* **Illicit drug use is identified in *Healthy People 2010* as a leading health indicator because it is associated with multiple deleterious health outcomes, such as sexually transmitted diseases, human immunodeficiency virus, viral hepatitis, and numerous social problems among adolescents and adults. Improved understanding of the influence of stressful or traumatic childhood experiences on initiation and development of drug abuse is needed.**

Methods. **We examined the relationship between illicit drug use and 10 categories of adverse childhood experiences (ACEs) and total number of ACEs (ACE score). A retrospective cohort study of 8613 adults who attended a primary care clinic in California completed a survey about childhood abuse, neglect, and household dysfunction; illicit drug use; and other health-related issues. The main outcomes measured were self-reported use of illicit drugs, including initiation during 3 age categories: ≤14 years, 15 to 18 years, or as an adult (≥19 years); lifetime use for each of 4 birth cohorts dating back to 1900; drug use problems; drug addiction; and parenteral drug use.**

Results. **Each ACE increased the likelihood for early initiation 2- to 4-fold. The ACE score had a strong graded relationship to initiation of drug use in all 3 age categories as well as to drug use problems, drug addiction, and parenteral drug use. Compared with people with 0 ACEs, people with ≥5 ACEs were 7- to 10-fold more likely to report illicit drug use problems, addiction to illicit drugs, and parenteral drug use. The attributable risk fractions as a result of ACEs for each of these illicit drug use problems were 56%, 64%, and 67%, respectively. For each of the 4 birth cohorts examined, the ACE score also had a strong graded relationship to lifetime drug use.**

Conclusions. **The ACE score had a strong graded relationship to the risk of drug initiation from early adolescence into adulthood and to problems with drug use, drug addiction, and parenteral use. The persistent graded relationship between the ACE score and initiation of drug use for 4 successive birth cohorts dating back to 1900 suggests that the effects of adverse childhood experiences transcend secular changes such as increased availability of drugs, social attitudes toward drugs, and recent massive expenditures and public information campaigns to prevent drug use. Because ACEs seem to account for one half to two third of serious problems with drug use, progress in meeting the national goals for reducing drug use will necessitate serious attention to these types of common, stressful, and disturbing childhood experiences by pediatric practice.** *Pediatrics* **2003; 111:564–572;** ***childhood abuse, domestic violence, drug use, substance abuse, parenteral drug use.***

ABBREVIATIONS. ACE, adverse childhood experience; CTS, Conflict Tactics Scale; CTQ, Childhood Trauma Questionnaire; SD, standard deviation; OR, odds ratio; CI, confidence interval; ARF, attributable risk fraction.

Psychoactive substances have been used and abused for thousands of years.[1] It is now known that illicit drug use increases the risk of behaviors that lead to sexually transmitted diseases, intentional and unintentional injuries, cardiac problems, interpersonal violence, disability, and crime.[2–13] Moreover, parenteral drug use is an important avenue for transmission of hepatitis B and C and the human immunodeficiency virus.[13–16] Because of these multiple serious consequences, substance abuse is 1 of the nation's 10 leading health indicators outlined in *Healthy People 2010*, which includes the goal of reducing the proportion of people who use illicit drugs.[13]

Drug use is usually initiated during adolescence[17]; thus, many national studies have focused on members of this age group,[18] who often find illicit drugs readily available. In fact, a recent national study of 12- to 17-year-olds found that 55% find marijuana easy to obtain.[18] Furthermore, as part of a normal developmental pathway, adolescents often experiment and behave impulsively[19] and seek independence and autonomy.[20] This constellation of inherent behaviors combined with easy access to drugs may contribute to the increased risk of using illicit drugs during adolescence.[19–21]

Despite this body of knowledge about the use of illicit drugs, additional research is needed to understand and assess the influence of experiential factors that may contribute to the initiation and subsequent problems with illicit drug use at any age. Previous studies suggested that early childhood trauma can lead to an array of negative health outcomes and behaviors, including substance abuse, among both adolescents and adults.[22–25] For example, childhood physical and sexual abuse has been shown to be associated with illegal drug use.[26–28] Although these

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studies provide evidence that most substance abusers come from abusive homes, many of these studies have taken a "categorical" approach to examine the relationship between 1 or 2 forms of these childhood exposures and subsequent drug abuse; few studies have examined illicit drug use and abuse in relation to multiple disturbing or stressful childhood exposures. Previous reports from the Adverse Childhood Experiences Study have established that forms of childhood abuse, neglect, and household dysfunction tend to co-occur,[29,30] and the effects of these developmentally disruptive childhood experiences have repeatedly been shown to be strong and cumulative.[29–35]

This study examined the association between 10 categories of adverse childhood experiences (ACEs): abuse (physical, emotional, or sexual); neglect (physical or emotional); and growing up with household substance abuse, criminality of household members, mental illness among household members, and parental discord and illicit drug use. We then use a cumulative stressor model to examine the relationship between the number of ACEs (ACE score) and the initiation of illicit drug use by three age categories. We assess the relationships between the ACE score and lifetime use of illicit drugs for four successive birth cohorts dating back to 1900, problems with illicit drug use, addiction to illicit drugs, and parenteral drug use. Finally, we estimate the proportion of each of these three serious problems of drug abuse that are attributable to adverse childhood experiences.

METHODS

The Adverse Childhood Experiences (ACE) Study is a collaboration between the Kaiser Health Plan's Health Appraisal Center in San Diego, CA, and the Centers for Disease Control and Prevention. The overall objective is to assess the impact of numerous, interrelated, ACEs on a wide variety of health behaviors and outcomes.[29] The ACE Study was approved by the Institutional Review Boards of the Southern California Permanente Medical Group (Kaiser Permanente), Emory University, and Office of Human Research Protection, Department of Health and Human Services (formerly Office of Protection from Research Risks, National Institutes of Health). Recent publications from the ACE Study have shown a strong, graded relationship between the number of ACEs and the leading causes of death in the United States[29] and priority health and social problems such as smoking,[30] unintended pregnancies,[31] sexually transmitted diseases,[32] male involvement in teen pregnancy,[33] alcohol problems,[34] and attempted suicides.[35]

Study Population

The study population included adult members of the Kaiser Health Plan who received a standardized medical and biopsychosocial examination at Kaiser's Health Appraisal Center in San Diego, CA. In any 4-year period, 81% of adult members received the examination, and >50 000 members receive it annually. The primary purpose of the evaluation is to perform a complete health assessment rather than provide symptom- or illness-based care. The ACE Study consisted of 2 survey waves (wave I and wave II). Wave I was conducted among 13 494 consecutive members who attended the Health Appraisal Center between August 1995 and March 1996, and the response rate was 70% (n = 9508). Wave II was conducted between June and October 1997 among 13 330 members, and the response rate was 65% (n = 8667). The overall response rate was 68% (18 175 of 26 824).

The ACE questionnaire was mailed to each member 2 weeks after his or her evaluation at the Health Appraisal Center and contained detailed information about ACEs, including abuse (emotional, physical, or sexual) or household dysfunction (parental separation or divorce, domestic violence, substance abuse, crime, or mental illness) as well as additional information about health-related behaviors from adolescence to adulthood. The wave II questionnaire added questions to obtain more thorough information about health topics shown to be important during the analysis of wave I data.[29,31] For these analyses, we used data from wave II only, because it included detailed questions about illicit drug use that were not included in the wave I survey.

Assessment of Representativeness, and Response or Reporting Bias

As part of the wave I study design, the standardized health examination data from the clinic visit were abstracted for both respondents and nonrespondents to the ACE Study questionnaire; this enabled a detailed assessment of the study population in terms of possible bias in demographic characteristics and health-related issues.[36] Although nonrespondents tended to be younger, less educated, or from racial/ethnic minority groups, the probabilities of both psychosocial and health problems were remarkably similar between respondents and nonrespondents after controlling for demographic differences. In addition, assessment of the relationships between childhood sexual abuse and numerous health behaviors, diseases, and psychosocial problems that were abstracted from data from the Health Appraisal Center showed that they were virtually identical for respondents and nonrespondents.[36] Thus, there was no evidence that respondents were biased toward attributing their health problems to childhood experiences such as sexual abuse.[36]

Exclusions From the Study Cohort

We excluded 3 respondents with missing information about race and 35 with missing information about educational attainment. We also excluded 16 people who reported using illicit drugs but did not report age at initiation. Thus, the final study cohort included 99% of the respondents from wave II only (8613 of 8667).

Definition of ACEs

All questions about ACEs pertained to the respondents' first 18 years of life. For questions adapted from the Conflict Tactics Scale (CTS),[37] response categories were "never," "once or twice," "sometimes," "often," or "very often." Questions used to define emotional and physical neglect were adapted from the Childhood Trauma Questionnaire (CTQ).[38] Response categories were "never true," "rarely true," "sometimes true," "often true," and "very often true" and were scored on a Likert scale (1–5), respectively. Some items from the CTQ were reverse-scored on the basis of the context of the question.[38]

Abuse Variables

Emotional abuse and physical abuse were defined by 2 questions from the CTS. For emotional abuse, the questions were as follows: 1) "How often did a parent, stepparent, or adult living in your home swear at you, insult you, or put you down?" 2) "How often did a parent, stepparent, or adult living in your home act in a way that made you afraid that you might be physically hurt?" Responses of "often' or "very often" to either item defined emotional abuse during childhood. For physical abuse, the questions were as follows: "Sometimes parents or other adults hurt children. While you were growing up, that is, in your first 18 years of life, how often did a parent, stepparent, or adult living in your home 1) push, grab, slap, or throw something at you? 2) hit you so hard that you had marks or were injured?" Responses of "sometimes," "often," or "very often" to either item defined physical abuse during childhood.

Contact sexual abuse was defined by 4 questions from Wyatt[39]: "Some people, while they are growing up in their first 18 years of life, had a sexual experience with an adult or someone at least 5 years older than themselves. These experiences may have involved a relative, family friend, or stranger. During the first 18 years of life, did an adult, relative, family friend, or stranger ever 1) touch or fondle your body in a sexual way, 2) have you touch their body in a sexual way, 3) attempt to have any type of sexual intercourse with you (oral, anal, or vaginal), or 4) actually have any type of sexual intercourse with you (oral, anal, or vaginal)?" A "yes" response to any 1 of the 4 questions classified a respondent as having experienced this kind of abuse.

Neglect Variables

For both emotional and physical neglect, sets of 5 CTQ items were used. For emotional neglect, these were 1) "There was someone in my family who helped me feel important or special." 2) "I felt loved." 3) "People in my family looked out for each other." 4) "People in my family felt close to each other." 5) "My family was a source of strength and support." All items were reverse-scored, then summed. Scores of ≥15 (moderate to extreme on the CTQ clinical scale) defined the respondents as having experienced emotional neglect.

The 5 items for physical neglect were 1) "I didn't have enough to eat." 2) "I knew there was someone there to take care of me and protect me." 3) "My parents were too drunk or too high to take care of me." 4) "I had to wear dirty clothes." 5) "There was someone to take me to the doctor if I needed it." Items 2 and 5 were reverse-scored, and all 5 scores were summed. Scores of ≥10 (moderate to extreme on the CTQ clinical scale) were defined as physical neglect.

Household Dysfunction Variables

Having had a battered mother was defined by the following item from the CTS: "Sometimes physical blows occur between parents." How often did your father (or stepfather) or mother's boyfriend do any of these things to your mother (or stepmother)? 1) Push, grab, slap, or throw something at her, 2) kick, bite, hit her with a fist, or hit her with something hard, 3) repeatedly hit her over at least a few minutes, or 4) threaten her with a knife or gun, or use a knife or gun to hurt her." A response of "sometimes," "often," or "very often" to the first or second question or any response except for "never" to the third or the fourth question was considered evidence of having a battered mother.

Parental separation or divorce was defined by a "yes" response to the question, "Were your parents ever separated or divorced?" Mental illness in household was defined by an affirmative response to 1 or both of the following questions: 1) "Was anyone in your household mentally ill or depressed?" 2) "Did anyone attempt to commit suicide?"

Household substance abuse was defined by 2 questions that asked the respondent whether she or he had lived with a problem drinker or alcoholic[40] or with anyone who used street drugs. An affirmative response to living with anyone who was a problem drinker or alcoholic or anyone who used street drugs defined this childhood exposure. An incarcerated household member was defined by a "yes" response to the question, "Did anyone in your household go to prison?"

Definition of Illicit Drug Use Outcomes

Lifetime Use, Age at Initiation

Lifetime use was defined as an affirmative response to the question, "Have you ever used street drugs?" Respondents who answered affirmatively were asked, "How old were you the first time you used them?" The mean age at initiation in years (±standard deviation [SD]) was 19.7 (±6.7; range: 7–54). We grouped the responses to age at initiation into 3 categories: ≤14 years, 15 to 18 years, and ≥19 years. In this study, these groups are described as early adolescence (mean age at initiation in years ± SD: 13.0 ± 1.2), mid-adolescence (16.6 ± 1.1), and adulthood (25.0 ± 7.0).

Other Illicit Drug Use Variables

"Ever had a drug problem," "ever addicted to drugs," and "ever used intravenous drugs" were defined, respectively, as "yes" answers to the following questions: "Have you ever had a problem with street drugs?" "Have you ever considered yourself addicted to street drugs?" "Have you ever injected street drugs?"

Statistical Analysis

Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were obtained from multivariate logistic regression models using SAS (v8.2; SAS, Inc, Cary, NC) that assessed the associations between each of the 10 categories of ACEs and both illicit drug initiation during early adolescence and lifetime use. In additional analyses, number of ACEs was summed for each respondent (ACE score range: 0–10). Because of the relatively small sample sizes, ACE scores of ≥5 were combined. Analyses were conducted with the summed score (1, 2, 3, 4, or ≥5) as dichotomous variables (yes/no) with 0 experiences as the referent. Covariates in all models included age (continuous variable), gender, race (other versus white), and education (high school diploma, some college, or college graduate, versus less than high school). We performed tests for trend (graded relationship) between the ACE score and the likelihood of drug initiation for the 3 age categories, lifetime use, lifetime use by birth cohort, and drug use outcomes (problem, addiction, and parenteral drug use). This was done by entering the ACE score as an ordinal variable into logistic models, with adjustment for the demographic covariates.

People with incomplete information about an ACE were considered not to have had that experience (n = 500; 6%). This exclusion would likely result in conservative estimates of relationships between ACEs and drugs use because people who had potentially been exposed to an experience were misclassified as unexposed. This type of misclassification would potentially bias our results toward the null.[41] However, to assess this potential effect, we repeated our analyses after excluding any respondent with missing information on any 1 of the ACEs and found no substantial differences in the final results.

Attributable risk fractions (ARFs) were calculated using adjusted ORs from logistic regression models based on ≥1 ACE with 0 ACEs as the referent, because a substantial increase in the risk of using illicit drugs was seen for people who reported at least 1 ACE. We used Levin's formula for these calculations: ARF = P_1 (RR − 1)/1 + P_1 (RR − 1), where P_1 is the prevalence of an ACE score ≥1 and RR = OR of ever having drug problems, ever being addicted to drugs, and parenteral drug use for an ACE score ≥1.[42] The ARF is an estimate of the proportion of the health problem (eg, addiction to illicit drugs) that would not have occurred if no people had been exposed to the risk factor being assessed (ACEs).[42]

RESULTS

Characteristics of the Study Population

The study population included 4665 (54%) women and 3948 (46%) men. The mean age (±SD) was 55 years (±15.5 years) for women and 57 years (±14.5 years) for men. Seventy-three percent of women and 75% of men were white; 32% of women and 42% of men were college graduates, and another 42% of women and 39% of men had some college education. Only 8% of women and 7% of men had not graduated from high school.

The prevalence of each specific ACE was higher for women than men except for physical abuse and physical neglect (Table 1). Sixty-seven percent of respondents reported at least 1 of the 10 ACEs; 42% reported 2 or more.

Interrelatedness of ACEs

When a respondent was exposed to 1 of the ACEs, the probability of exposure to any other category of ACE increased substantially (Table 2). The median probability of exposure to any additional category given exposure to the first was 86.5%; for any 2 additional categories, the median probability was 69.5% (Table 2).

Age Adjustment of Drug Use Outcomes

Because illicit drug use is inversely associated with age (a secular trend),[43] we adjusted (by the direct method) the prevalence of lifetime use of illicit drugs to the age distribution of the US population, using the 2000 census.[44] After this age adjustment, the prevalence of illicit drug use in the study cohort increased from 18.5% to 27.0%. This increase demonstrates that the prevalence that we obtained is more

TABLE 1. Prevalence of Each Category of ACE and ACE Score by Gender

Category of ACE	Prevalence (%)		
	Women (n = 4665)	Men (n = 3948)	Total (n = 8613)
Abuse			
Emotional	12.2	7.8	10.2
Physical	25.1	27.9	26.4
Sexual	24.3	17.1	21.0
Neglect			
Emotional	16.7	12.4	14.8
Physical	9.2	10.7	9.9
Household dysfunction			
Battered mother	13.9	12.0	13.0
Parental separation or divorce	25.4	22.6	24.1
Mental illness in household	25.3	14.3	20.3
Household substance abuse	30.5	25.5	28.2
Incarcerated household member	6.9	4.9	6.0
ACE score			
0	31.3	34.2	32.7
1	24.2	27.3	25.6
2	14.8	16.4	15.5
3	10.4	9.3	9.9
4	6.8	4.8	5.9
≥5	12.5	8.0	10.5

likely an artifact of the age distribution of the study population than a reporting bias.

Association Between ACEs and Illicit Drug Use

Each category of ACE increased the likelihood of early drug initiation 2- to 4-fold and also increased the likelihood of lifetime use ($P < .05$; Table 3). In addition, each ACE category increased the likelihood of drug initiation during mid-adolescence and adulthood ($P < .05$; data not shown).

The ACE score increased the risk of initiating illicit drugs during early adolescence, mid-adolescence, and adulthood and for lifetime use in a strong graded manner ($P < .05$; Table 4), with initiation during early adolescence having the strongest graded relationship with the ACE score, with exception of experiencing 1 ACE, which was not statistically significant. To test for the significance of all 4 relationships, we entered the ACE score into the logistic models as an ordinal variable. The 4 ordinal ORs for initiation during early adolescence, mid-adolescence, and adulthood and lifetime drug use were 1.4 (95% CI: 1.3–1.5), 1.1 (95% CI: 1.1–1.2), 1.1 (95% CI: 1.1–1.2), and 1.3 (95% CI: 1.2–1.3), respectively. In each model, the coefficient for the ACE score was significant ($P < .01$). These results suggest that for every increase in the number of ACEs, the likelihood of initiation of illicit drug during early adolescence, mid-adolescence, adulthood, or at any age (lifetime) increases by 40%, 10%, 10%, and 30%, respectively.

The ACE Score and Serious Drug Use Problems

The ACE score increased the likelihood of ever having drug problems, ever being addicted to drugs, and parenteral drug use in a dose-response manner ($P < .05$; Table 5). The ordinal ORs for the test for trend between the ACE score and the 3 outcomes were 1.3 (95% CI: 1.2–1.4), 1.3 (95% CI: 1.2–1.4), and 1.4 (95% CI: 1.3–1.5), respectively. Thus, there was a 30% to 40% increase in risk for each of the illicit drug problems as the ACE score increased.

Relationship of ACEs to Illicit Drug Use in Different Birth Cohorts

For each birth cohort, a graded relationship was found between the ACE score and ever using illicit drugs ($P < .05$; Table 6). The strongest relationship was for people who were born between 1900 and 1932, for whom comparison between reporting no ACEs and reporting ≥5 ACEs yielded an OR of 10.7 (95% CI: 2.9–39.2), although the prevalence of illicit drug use was lowest for this group (Table 6). The test for trend between the ACE score and the likelihood of ever using illicit drugs was significant in all 4 birth cohorts: 1963–1978 (1.2; 95% CI: 1.1–1.3), 1948–1962 (1.2; 95% CI: 1.2–1.3), 1933–1947 (1.3; 95% CI: 1.2–1.3), and 1900–1932 (1.4; 95% CI: 1.2–1.6).

ARF

The estimated ARFs for ever having a drug problem, ever being addicted to illicit drugs, and ever using parenteral drugs were 56%, 63%, and 64%, respectively (ie, these percentages were attributed to experiencing 1 or more ACEs).

DISCUSSION

Each of the 10 categories of ACEs was associated with a 2- to 4-fold increase in the likelihood of illicit drug use by age 14 and increased the risk of use into adulthood. Because these ACEs rarely occur in isolation and tend to be highly interrelated,[30,31,45] we examined their cumulative effect on illicit drug use. We found graded relationships between the ACE score and initiation for our 3 categories of age at initiation; this graded relationship was strongest for initiation by age 14. We also found a strong graded relationship between ACEs and reported problems with drugs, addiction to drugs, and parenteral drug

TABLE 2. Prevalence of Reporting of Additional Categories of ACEs Among Respondents Who Reported Exposure to First Category of ACE

First Category of ACE		Emotional Abuse	Physical Abuse	Sexual Abuse	Substance Abuse	Mental Illness	Battered Mother	Member Imprisoned	Parental Conflict	Emotional Neglect	Physical Neglect	Additional ACEs	
												≥1	≥2
Childhood abuse	(N)												
Emotional	876	—	82	42	53	49	40	14	45	59	31	98	90
Physical	2272	31	—	32	41	34	28	11	36	32	20	83	64
Sexual	1809	21	41	—	41	32	23	11	36	26	17	78	58
Childhood neglect													
Emotional	1271	41	58	37	48	41	32	12	43	—	38	93	79
Physical	854	32	53	36	49	37	36	14	43	56	—	89	75
Household dysfunction													
Substance abuse	2429	19	39	31	—	34	30	12	41	25	17	81	60
Mental illness	1747	25	44	33	47	—	24	13	40	29	18	84	65
Battered mother	1122	31	58	36	64	37	—	15	51	36	28	95	82
Incarcerated household member	515	23	46	38	56	42	33	—	46	28	23	90	74
Overt parental marital conflict*	2078	19	40	31	48	34	28	11	—	26	18	82	60
Median		25	46	36	48	37	30	12	43	29	20	86.5	69.5
Range		19–41	39–82	31–42	41–64	32–49	23–40	11–15	36–51	25–59	17–38	78–98	58–90

* Respondents reporting parental separation or divorce.

use. The ARFs for these drug use outcomes were large, ranging from 56% to 64%.

Our finding that the graded relationship was strongest for early adolescence is not surprising. The temporal proximity of ACEs and the cumulative effect of experiencing multiple ACEs may explain the strength of this relationship. Children and adolescents, who are exposed to the types of childhood experiences that we examined, may have feelings of helplessness, chaos, and impermanence and may have problems self-regulating affective states. Thus, illicit drug use may serve as an avenue to escape or dissociate from the immediate emotional pain, anxiety, and anger that likely accompany such experiences.[46,47] The current findings are supported by previous studies that have reported associations between forms of childhood abuse and substance abuse in adolescents.[46,48,49] The adverse developmental and emotional impact of these interrelated childhood experiences, combined with behaviors inherent among this age group,[19–21] all may contribute to the especially strong graded relationship that we found in this age group.

We also demonstrated graded relationships between the ACE score and risk of initiating illicit drugs during mid-adolescence and adulthood. In the case of adult initiation, we can be certain that the exposure (ACEs) preceded the initiation. Information that the initiation of illicit drug use during adulthood is associated with adverse experiences during childhood underscores the powerful long-term effects of ACEs on vulnerability to illicit drug use.[43,47]

The ACE score also had strong graded relationships to the likelihood of ever having problems with illicit drugs, being addicted to drugs, or using drugs parenterally. Given the many deleterious health, social, and economic consequences of these problems, the public health implications of these findings are myriad. This type of information may provide insights into the likely determinants of drug use and how illicit drugs become integrated into human communities, although there are many prohibitions against them.[50] In the era of the human immunodeficiency virus epidemic and high rates of hepatitis C among parenteral drug users,[51–55] the contribution of ACEs to injected drug use is especially important.

Our estimates of the ARFs for serious forms of illicit drug use are of an order of magnitude rarely seen in epidemiology and public health. The current analysis suggests that approximately two thirds (64%) of parenteral drug use is attributable to the types of abusive or traumatic childhood experiences that we studied. Preventing, treating, and understanding the effects of ACEs pose major challenges, but the idea that dealing with ACEs may reduce the burden of parenteral drug use provides a greater impetus for meeting these challenges.

We age-adjusted the prevalence of lifetime illicit drug use to take into account that the ACE study population has an older mean age than the general US population (36 years).[56] The apparent low prevalence of lifetime illicit drug use (18.5%) in our study cohort was increased substantially to 27% after age adjustment and seems to be an artifact of the age

TABLE 3. Prevalence and Adjusted OR* of Initiation of Illicit Drugs During Early Adolescence (≤14 Years) and Lifetime Use of Illicit Drugs by Category of ACE

Category of ACE	Initiation of Illicit Drug Use				
	N	%	≤14 Years OR	%	Lifetime OR
Abuse					
Emotional					
No	7737	2.4	1.0 (Referent)	16.9	1.0 (Referent)
Yes	876	7.0	2.4 (1.8–3.4)	33.2	2.1 (1.7–2.5)
Physical					
No	6341	2.2	1.0 (Referent)	15.1	1.0 (Referent)
Yes	2272	4.6	1.8 (1.4–2.4)	28.0	2.0 (1.8–2.3)
Sexual					
No	6804	2.1	1.0 (Referent)	16.1	1.0 (Referent)
Yes	1809	5.8	2.8 (2.1–3.7)	27.8	2.0 (1.8–2.3)
Neglect					
Emotional					
No	7342	2.3	1.0 (Referent)	16.9	1.0 (Referent)
Yes	1271	5.7	2.4 (1.8–3.3)	27.7	1.8 (1.6–2.1)
Physical					
No	7759	2.6	1.0 (Referent)	18.4	1.0 (Referent)
Yes	854	5.3	2.5 (1.8–3.7)	19.9	1.3 (1.1–1.6)
Household dysfunction					
Mentally ill household member					
No	6866	2.0	1.0 (Referent)	15.6	1.0 (Referent)
Yes	1747	6.0	2.3 (1.8–3.1)	29.9	1.9 (1.7–2.2)
Witnessed violence against mother					
No	7491	2.4	1.0 (Referent)	17.3	1.0 (Referent)
Yes	1122	6.0	2.1 (1.5–2.9)	27.1	1.6 (1.4–1.9)
Substance abuse in home					
No	6184	1.3	1.0 (Referent)	13.6	1.0 (Referent)
Yes	2429	6.8	3.7 (2.8–4.9)	31.2	2.1 (1.8–2.4)
Parental separation/divorce					
No	6535	1.7	1.0 (Referent)	15.4	1.0 (Referent)
Yes	2078	6.5	2.5 (1.9–3.4)	28.3	1.7 (1.5–1.9)
Incarcerated household member					
No	8098	2.5	1.0 (Referent)	17.8	1.0 (Referent)
Yes	515	8.7	3.3 (2.2–4.8)	29.9	1.9 (1.5–2.4)
Total	8613	2.8	—	18.5	—

* ORs adjusted for gender baseline age, race, and educational attainment.

TABLE 4. Prevalence and Adjusted OR* for the Relationship Between the ACE Score and Age at Initiation of Illicit Drug Use and Lifetime Use

ACE Score†	Age at Initiation of Drug Use								
	N	≤14 Years		15–18 Years		Adult (≥19 Years)		Lifetime	
		%	OR	%	OR	%	OR	%	OR
0	2812	0.7	1.0 (Referent)	3.8	1.0 (Referent)	4.8	1.0 (Referent)	9.4	1.0 (Referent)
1	2205	1.5	1.5 (0.9–2.7)	6.5	1.4 (1.1–1.8)	7.2	1.4 (1.1–1.8)	15.2	1.5 (1.2–1.8)
2	1338	3.1	2.9 (1.6–5.0)	9.3	1.8 (1.3–2.4)	9.8	1.9 (1.5–2.4)	22.3	2.3 (1.9–2.8)
3	849	4.7	4.0 (2.3–7.1)	10.6	1.9 (1.4–2.6)	10.3	1.9 (1.4–2.6)	25.6	2.5 (2.0–3.2)
4	507	4.1	3.8 (2.0–7.2)	13.4	2.7 (1.9–3.8)	11.2	2.1 (1.5–3.0)	28.8	3.1 (2.4–4.0)
≥5	902	9.9	9.1 (5.4–15.2)	14.3	2.5 (1.9–3.3)	13.2	2.5 (1.9–3.2)	37.4	4.3 (3.5–5.4)
Total	8613	2.8	—	7.7	—	8.0	—	18.5	—

* ORs adjusted for gender, baseline age, race, and educational attainment.
† The trend for increasing ORs as the ACE score increases is significant ($P < .05$) in each model.

distribution of the study. This adjusted prevalence compares to other national studies,[57,58] such as the Epidemiologic Catchment Area Study in which the prevalence for lifetime use of illicit drugs was 30%.[58]

To control further for age, we examined the relationship between the ACE score and lifetime illicit drug use by birth cohort. The graded relationship that we found between the ACE score and lifetime illicit drug use for each of 4 birth cohorts dating back to 1900 suggests that the effects of ACEs on drug use behavior transcend secular changes in the availability and type of drugs used,[1] social mores, and the implementation of efforts to prevent drug abuse. Thus, the strong association between the ACE score and drug use for the oldest birth cohort offers compelling evidence that the impact of ACEs on illicit drug use is a consistent phenomenon over time that transcends secular changes, perhaps as a result of the inherent biological effects of ACEs on the neurodevelopment of children[22] that likely increases the risk of drug use.

Information from the neurosciences supports the biological plausibility of our findings. The biological processes that occur when children are exposed to stressful events such as recurrent abuse or witnessing domestic violence can negatively disrupt early

TABLE 5. Relationship of the ACE Score to Ever Having a Drug Problem, Ever Being Addicted to Drugs, or Injecting Illicit Drugs

ACE Score†	*N*	Ever Had Drug Problem		Ever Addicted to Drugs		Ever Injected Drugs	
		%	OR*	%	OR*	%	OR*
0	2812	1.3	1.0 (Referent)	0.8	1.0 (Referent)	0.3	1.0 (Referent)
1	2205	3.0	1.9 (1.3–2.9)	2.1	2.3 (1.4–3.8)	0.5	1.6 (0.7–4.0)
2	1338	3.9	2.0 (1.3–3.2)	3.1	2.7 (1.6–4.7)	1.2	3.0 (1.3–7.1)
3	849	5.0	2.5 (1.6–4.0)	4.1	3.5 (2.0–6.0)	1.4	3.5 (1.4–8.7)
4	507	7.5	4.2 (2.6–6.9)	3.9	3.4 (1.8–6.4)	1.0	2.4 (0.8–7.4)
≥5	902	12.0	6.5 (4.3–9.6)	9.2	7.7 (4.7–12.7)	4.3	10.1 (4.6–22.0)
Total	8613	4.0	—	2.9	—	1.1	—

* ORs adjusted for gender, baseline age, race, and educational attainment.
† The trend for increasing ORs as the ACE score increases is significant ($P < .05$) in each model.

TABLE 6. Prevalence and Adjusted OR* for Lifetime Use of Illicit Drugs by ACE Score, Stratified by Birth Cohort

ACE Score†	Ever Used Illicit Drugs (Birth Cohort; Year)											
	1963–1978			1948–1962			1933–1947			1900–1932		
	N	%	OR	*N*	%	OR	*N*	%	OR	*N*	%	OR
0	178	24.7	1.0 (Referent)	568	26.8	1.0 (Referent)	916	7.0	1.0 (Referent)	1150	0.4	1.0 (Referent)
1	217	36.9	1.7 (1.1–2.6)	519	34.3	1.4 (1.1–1.9)	696	9.5	1.6 (1.1–2.3)	773	1.3	3.3 (1.1–10.7)
2	145	42.1	1.9 (1.2–3.2)	361	44.6	2.2 (1.6–2.9)	467	14.1	2.4 (1.6–3.5)	365	2.7	7.3 (2.3–23.6)
3	109	41.3	2.0 (1.2–3.4)	256	50.4	2.8 (2.0–3.9)	278	14.8	2.6 (1.7–4.0)	206	1.0	2.3 (0.4–12.7)
4	61	44.3	2.6 (1.4–5.0)	179	48.0	2.6 (1.8–3.7)	159	18.2	3.4 (2.0–5.5)	108	3.7	9.9 (2.4–40.7)
≥5	130	57.7	3.6 (2.2–6.0)	345	56.8	4.0 (2.9–5.4)	288	20.8	4.1 (2.8–6.2)	139	4.3	10.7 (2.9–39.3)
Total	840	39.5	—	2228	40.5	—	2804	11.6	—	2741	1.3	—

* ORs adjusted for gender, baseline age, race, and educational attainment.
† The trend for increasing ORs as the ACE score increases is significant ($P < .05$) in each model.

development of the central nervous system. This may in turn impede their ability to cope with negative or disruptive emotions,[59] leading to problems with emotional and behavioral self-regulation later in life.[22] Thus, behaviors such as substance use may manifest as a means to help regulate emotional states.

A potential weakness of studies with retrospective reporting of childhood experiences is that respondents may have difficulty recalling certain events. For example, longitudinal follow-up of adults whose childhood abuse was documented has shown that their retrospective reports of such abuse are likely to underestimate actual occurrence.[60,61] Difficulty recalling childhood events likely results in misclassification (classifying people who truly were exposed to ACEs as unexposed) that would bias our results toward the null. Another potential source of underestimation of the strength of these relationships is related to the lower number of childhood exposures reported by older people in our study. This could be an artifact caused by premature mortality in people with multiple adverse childhood exposures; the clustering of multiple risk factors among people with multiple childhood exposures is consistent with this hypothesis.[29] Thus, this potential weakness may have resulted in underestimates of the true relationships between ACEs and the illicit drug use outcomes.[41]

Our data cannot provide certainty about the temporal relationship between ACEs and drug use that was initiated before age 19 because both the exposure and the outcome were reported as occurring at 18 years or younger. Despite these limitations, the powerful association observed between the ACE score and initiation of illicit drugs by age 14 merits serious consideration.

The prevalence of childhood exposures that we report is nearly identical to those reported in surveys of the general population. We found that 16% of the men and 25% of the women met the case definition for contact sexual abuse, similar to findings by Finkelhor et al[62] that 16% of men and 27% of women had been sexually abused. As for physical abuse, 28% of the men from our study reported experiencing this as boys, which closely parallels the percentage found (31%) in a recent population-based study of Ontario men that used questions from the same scales.[63] The similarity of the estimates from the ACE study to those of population-based studies suggests that our findings are likely to be applicable in other settings.

CONCLUSION

ACEs were common with close to two thirds reporting 1 or more. The number of ACEs to which a person is exposed had a strong graded relationship to the risk of drug initiation from early adolescence into adulthood and to problems with drug use, drug addiction, and parenteral use. The persistent graded relationship between the ACE score and initiation of drug use for 4 successive birth cohorts dating back to 1900 suggests that the effects of ACEs transcends secular changes such as increased availability and type of drugs used, social attitudes toward drugs, and recent massive expenditures and public information campaigns to prevent drug use.[50,64] Because ACEs seem to account for one half to two thirds of serious problems with drug use, progress in meeting the national goals for reducing drug use will neces-

sitate serious attention to these types of stressful and disturbing childhood experiences by pediatric practice.

Pediatricians play a prominent role as family health advisors during childhood and adolescence development. Pediatricians who identify drug use among their patients must take the time to screen the family for potential forms of abuse, and household dysfunction. As such, recommendations set by the American Academy of Pediatrics, which emphasize the role of the pediatrician in family support programs, will likely facilitate in the evolving efforts to prevent and treat children who have experienced growing up in stressful household environments, and subsequently may reduce the occurrence of illicit drug use and serious drug use problems.[65] Continued medical education programs that provide pediatricians with the skills to assess psychosocial issues in pediatric care will also contribute to these evolving efforts.[65]

REFERENCES

1. Coleman P. Overview of substance abuse. *Prim Care.* 1993;20:1–18
2. Sly DF, Quadagno D, Harrison DF, Eberstein I, Riehman K. The association between substance use, condom use and sexual risk among low-income women. *Fam Plann Perspect.* 1997;29:132–136
3. Shafer MA, Boyer CB. Psychosocial and behavioral factors associated with risk of sexually transmitted diseases, including human immunodeficiency virus infection, among urban high school students. *J Pediatr.* 1991;119:826–833
4. van den Hoek A. STD control in drug users and street youth. *Genitourin Med.* 1997;73:240–244
5. Crowe AV, Howse M, Bell GM, Henry JA. Substance abuse and the kidney. *Q J Med.* 2000;93:147–152
6. Ghuran A, Nolan J. Recreational drug misuse: issues for the cardiologist. *Heart.* 2000;83:627–633
7. Henry JA. Metabolic consequences of drug misuse. *Br J Anaesth.* 2000; 85:136–142
8. Matlock T, Slate JR, Saarnio DA. Familial variables and domestic violence. *J Ark Med Soc.* 1995;92:222–224
9. Smith JW. Addiction medicine and domestic violence. *J Subst Abuse Treat.* 2000;19:329–338
10. Brookoff D, O'Brien KK, Cook CS, Thompson TD, Williams C. Characteristics of participants in domestic violence. Assessment at the scene of domestic assault. *JAMA.* 1997;277:1369–1373
11. Bennett LW. Substance abuse and the domestic assault of women. *Soc Work.* 1995;40:760–771
12. Easton CJ, Swan S, Sinha R. Prevalence of family violence in clients entering substance abuse treatment. *J Subst Abuse Treat.* 2000;18:23–28
13. US Department of Health and Human Services. *Healthy People 2010, I: Understanding and Improving Health and Objectives for Improving Health, Part A.* 2nd ed. Washington, DC: US Government Printing Office; 2000
14. Singer M, Stopka T, Siano C, et al. The social geography of AIDS and hepatitis risk: qualitative approaches for assessing local differences in sterile-syringe access among injection drug users. *Am J Public Health.* 2000;90:1049–1056
15. Thorpe LE, Ouellet LJ, Levy JR, Williams IT, Monterroso ER. Hepatitis C virus infection: prevalence, risk factors, and prevention opportunities among young injection drug users in Chicago, 1997–1999. *J Infect Dis.* 2000;182:1588–1594
16. Prevalence of hepatitis C virus infection among clients of HIV counseling and testing sites–Connecticut, 1999. *MMWR Morb Mortal Wkly Rep.* 2001;50:577–581
17. Kandel DB. Persistent themes and new perspectives on adolescent substance use: a lifespan perspective. In: Jessor R, ed. *New Perspectives on Adolescent Risk Behavior*. Cambridge, UK: Cambridge University Press; 1998:43–89
18. Substance Abuse and Mental Health Services Administration. *Summary of Findings from the 2000 National Household Survey on Drug Abuse*. Rockville, MD: Office of Applied Studies; 2001 (NHSDA Series H-13, DHHS Publication No. [SMA] 01-3549
19. Baer JS, MacLean MG, Marlatt GA. Linking etiology and treatment for adolescent substance abuse: toward a better match. In: Jessor R, ed. *New Perspectives on Adolescent Risk Behavior*. Cambridge, UK: Cambridge University Press; 1998:192–220
20. Steinberg L. *Adolescence.* 5th ed. Boston, MA: McGraw Hill; 1999
21. Reif CJ, Elster AB. Adolescent preventive services. *Prim Care.* 1998;25: 1–21
22. Van der kolk BA, Perry JC, Herman JL. Childhood origins of self-destructive behavior. *Am J Psychiatry.* 1991;148:1665–1671
23. Kendall-Tackett KA, Williams LM, Finklehor D. Impact of sexual abuse on children: a review and synthesis of recent empirical studies. *Psychol Bull.* 1993;113:164–180
24. Osofsky J D. The impact of violence on children. *Future Child.* 1999;9: 33–49
25. Mullen PE, Martin JL, Anderson JC, Romans SE, Herbison GP. Childhood sexual abuse and mental health in adult life. *Br J Psychiatry.* 1993;163:721–732
26. Heffernan K, Cloitre M, Tardiff K, Marzuk PM, Portera L, Leon AC. Childhood trauma as a correlate of lifetime opiate use in psychiatric patients. *Addict Behav.* 2000;25:797–803
27. Kendler KS, Bulik CM, Silberg J, Hettema JM, Myers J, Prescott CA. Childhood sexual abuse and adult psychiatric and substance abuse disorders in women: an epidemiological and cotwin control analysis. *Arch Gen Psychiatry.* 2000;57:953–959
28. Rohsenow DJ, Corbett R, Devine D. Molested as children: a hidden contribution to substance abuse? *J Subst Abuse Treat.* 1988;5:129
29. Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the Adverse Childhood Experiences (ACE) Study. *Am J Prev Med.* 1998;14:245–258
30. Anda RF, Croft JB, Felitti VJ, et al. Adverse childhood experiences and smoking during adolescence and adulthood. *JAMA.* 1999;282:1652–1658
31. Dietz PM, Spitz AM, Anda RF, et al. Unintended pregnancy among adult women exposed to abuse or household dysfunction during their childhood. *JAMA.* 1999;282:1359–1364
32. Hillis SD, Anda RF, Felitti VJ, Nordenberg D, Marchbanks P. Adverse childhood experiences and sexually transmitted diseases in men and women: a retrospective study. *Pediatrics.* 2000;106(1). Available at: www.pediatrics.org/cgi/content/full/106/1/e11
33. Anda RF, Felitti VJ, Chapman DP, et al. Abused boys, battered mothers, and male involvement in teen pregnancy. *Pediatrics.* 2001;107(2). Available at: www.pediatrics.org/cgi/content/full/107/2/e19
34. Dube SR, Anda RF, Felitti VJ, Edwards VJ, Croft JB. Adverse childhood experiences and personal alcohol abuse as an adult. *Addict Behav.* 2002; 27:713–725
35. Dube SR, Anda RF, Felitti VJ, Chapman D, Williamson DF, Giles WH. Childhood abuse, household dysfunction and the risk of attempted suicide throughout life span: findings from the Adverse Childhood Experiences Study. *JAMA.* 2001;286:3089–3096
36. Edwards VJ, Anda RF, Nordenberg DF, Felitti VJ, Williamson DF, Wright JA. Bias assessment for child abuse survey: factors affecting probability of response to a survey about childhood abuse. *Child Abuse Negl.* 2001;25:307–312
37. Straus M, Gelles RJ. *Physical Violence in American Families: Risk Factors and Adaptations to Violence in 8,145 Families*. New Brunswick, NJ: Transaction Press; 1990
38. Bernstein DP, Fink L, Handelsman L, et al. Initial reliability and validity of a new retrospective measure of child abuse and neglect. *Am J Psychiatry.* 1994;151:1132–1136
39. Wyatt GE. The sexual abuse of Afro-American and white American women in childhood. *Child Abuse Negl.* 1985;9:507–519
40. Schoenborn CA. Exposure to alcoholism in the family: United States, 1988. *Adv Data.* 1991;205:1–13
41. Rothman KJ. *Modern Epidemiology.* Boston, MA: Little, Brown; 1986
42. Haddix AC, Teutsch SM, Shaeffer PA, Dunet DO. *Prevention Effectiveness: A Guide to Decision Analysis and Economic Evaluation.* New York, NY: Oxford University Press; 1996
43. Robins LN. The natural history of drug abuse. *Acta Psychiatr Scand Suppl.* 1980;284:7–20
44. Klein RJ, Schoenborn CA. *Age Adjustment Using the 2000 Projected U.S. Population, 2001.* Hyattsville, MD: National Center for Health Statistics; 2001. DHHS Publ. No. [PHS] 2001-1237
45. Finkelhor D. Improving research, policy, and practice to understand child sexual abuse. *JAMA.* 1998;280:1964–1965
46. Bensley LS, Spieker SJ, Van Eenwyk JV, Schoder J. Self-reported abuse history and adolescent problem behaviors. II. Alcohol and drug use. *J Adolesc Health.* 1999;24:173–180
47. Lebling C. Child abuse as precursor to adult abuse of alcohol and drugs. *Med Law.* 1986;5:239–245
48. Dembo R, Williams L, Wothke W, Schmeidler J, Brown CH. The role of

family factors, physical abuse, and sexual victimization experiences in high-risk youths' alcohol and other drug use and delinquency: a longitudinal model. *Violence Vict.* 1992;7:245–266
49. Malinosky-Rummell R, Hansen DJ. Long-term consequences of childhood physical abuse. *Psychol Bull.* 1993;114:68–79
50. National Association for Public Health Policy. A public health approach to mitigating the negative consequences of illicit drug abuse. *J Public Health Policy.* 1999;20:268–281
51. Bensley LS, Van Eenwyk J, Simmons KW. Self-reported childhood sexual and physical abuse and adult HIV-risk behaviors and heavy drinking. *Am J Prev Med.* 2000;18:151–158
52. Thomas DL, Vlahov D, Solomon L, et al. Correlates of hepatitis C virus infections among injection drug users. *Medicine.* 1995;74:212–220
53. Trends in injection drug use among persons entering addiction treatment–New Jersey, 1992–1999. *MMWR Morb Mortal Wkly Rep.* 2001; 50:378–381
54. Alter MJ, Kruszon-Moran D, Nainan OV, et al. The prevalence of hepatitis C virus infection in the United States, 1988 through 1994. *N Engl J Med.* 1999;341:556–562
55. Hunter GM, Stimson GV, Judd A, Jones S, Hickman M. Measuring injecting risk behaviour in the second decade of harm reduction: a survey of injecting drug users in England. *Addiction.* 2000;95:1351–1361
56. US Census Bureau. *Resident Population Estimates of the United States by Sex, Race, and Hispanic Origin: April 1, 1990 to July 1, 1999, With Short-Term Projection to November 1, 2000.* Washington, DC: Population Estimates Program, Population Division, US Census Bureau; 2000
57. Substance Abuse and Mental Health Services Administration. National Household Survey on Drug Abuse Population Estimates 1998. Rockville, MD: Office of Applied Studies (NHSDA Series H-9, DHHS Publication No. [SMA] 99-3327)
58. Anthony JC, Helzer JE. Syndromes of drug abuse and dependence. In: Robins LN, Regier DA, eds. *Psychiatric Disorders in America: The Epidemiologic Catchment Area Study.* New York, NY: Free Press; 1991:116–154
59. Perry BD, Pollard R. Homeostasis, stress, trauma, and adaptation: a neurodevelopmental view of childhood trauma. *Child Adolesc Psychiatr Clin N Am.* 1998;7:33–51
60. Della Femina D, Yeager CA, Lewis DO. Child abuse: adolescent records vs. adult recall. *Child Abuse Negl.* 1990;14:227–231
61. Williams LM. Recovered memories of abuse in women with documented child sexual victimization histories. *J Trauma Stress.* 1995;8: 649–673
62. Finkelhor D, Hotaling G, Lewis IA, Smith C. Sexual abuse in a national survey of adult men and women: prevalence, characteristics, and risk factors. *Child Abuse Negl.* 1990;14:19–28
63. MacMillan HL, Fleming JE, Trocme N, et al. Prevalence of child physical and sexual abuse in the community: results from the Ontario Health Supplement. *JAMA.* 1997;278:131–135
64. Kleiman MAR. An informed approach to substance abuse: drugs and drug policy—the case for a slow fix. *Iss Sci Technol.* 1998;15:45–52
65. American Academy of Pediatrics, Committee on Early Childhood and Adoption, and Dependent Care. The pediatrician's role in family support programs. *Pediatrics.* 2001;107:195–197

DARING TO SMOKE

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Parker-Pope T. *Cigarettes*. New York, NY: New Press; 2001

Submitted by Student

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