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Really Underage Drinkers: The Epidemiology of Children's Alcohol Use in the United States

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Abstract

Little attention has been paid to alcohol use by children aged 12 and younger. The present article summarizes findings on the prevalence of alcohol use from U.S. national and statewide surveys of children in grades 6 and younger based on reports located in searches of the literature and the internet. Four national surveys and seven statewide surveys of children's alcohol and drug use were located that present rates of lifetime sipping and tasting, lifetime experience of more than a sip, alcohol use in the past year, use in the past month, and use in the past week. Prevalence rates decrease with the level of involvement assessed. Alcohol use increases with age, doubling between grades four and six, with the largest jump in prevalence between grades five and six. At each grade level, boys are more likely to have used alcohol than girls. African-American children are nearly as likely as white and Hispanic children to have used alcohol. Over the past decade or so, the prevalence of both lifetime and current alcohol use has been declining in children. The failure to assess intensity of children's use hampers evaluation of the level of risk experienced by children. There is a need for ongoing nationwide surveillance of alcohol use in this population and for greater education of parents regarding the dangers of introducing children to alcohol use.

Keywords

Alcohol Use; Epidemiology; Children; Elementary Schoolchildren

Introduction

The release of the NIAAA Task Force Report on College Drinking (Task Force, 2001) has generated renewed interest in the topic of alcohol use and misuse by those too young to drink legally. While media coverage has largely focused on college student drinking, there is considerable alcohol use in younger populations as well. National surveillance data from the 2005 Monitoring the Future survey reveal that three-quarters of American adolescents (75.1%) have had experience with alcohol by their senior year in high school and that forty percent (41.0%) have had some experience by eighth grade, prior to their entry into high school (Johnston et al., 2006).

There is currently little solid information regarding how many children have experience with alcohol, either from retrospective recall by adolescents or from surveys of children themselves. Retrospective reports of the age at first drink are not very reliable for this life stage. Reported age of onset generally increases the older the adolescents questioned (Bailey et al., 1992; Engels et al., 1997; Johnson et al., 1998; Labouvie et al., 1997; Parra et al., 2003). For example, in the

most recent national data from the 2005 Youth Risk Behavior Survey (YRBS), the percentage saying they drank alcohol before age 13 decreased from 33.9% for 9th grade students to 19.3% for 12th grade students (Eaton et al., 2006). That these are not in fact cohort effects, but rather evidence of “forward telescoping,” is shown by the fact that although the percentages decline over time, a similar pattern can be seen in each of the previous surveys (1991–2003; see YRBS Youth Online: Comprehensive Results at <http://apps.nccd.cdc.gov/yrbss/index.asp>). A similar pattern of findings is also obtained in the national Monitoring the Future surveys (see Chapter 6, Johnston et al., 2006). Thus, average or modal age of initiation of alcohol use based on retrospective recall is problematic. Surveys of children are more likely to capture normative data on ages of onset than are retrospectively recalled ages provided by adolescents or adults.

Of the three major federally-sponsored national surveys in the U.S., however, only one includes children 12 years old. The Monitoring the Future (MTF) Study, performed annually, includes adolescents in grades 8, 10 and 12. The biennial Youth Risk Behavior Survey includes only students in grades 9 through 12. Only the National Survey on Drug Use and Health (formerly the National Household Survey on Drug Abuse), carried out annually, includes respondents aged 12 to 17. Unfortunately for our concern with children’s drinking, the 12-year-olds in this survey are not analyzed separately to examine gender, ethnic/racial, or regional differences in rates of child alcohol (or other drug) use.

There are several reasons why it is critical to determine the prevalence of alcohol use in children. First, it is necessary in order to monitor both the need for, and the success of, federally-mandated prevention efforts in the elementary schools. Second, alcohol use is one of the initial stages in the progression into illicit drug use (Kandel, 2002). Knowing how many children have experience with alcohol serves as an indicator of the number potentially at risk for using marijuana and other illicit drugs. Third, childhood onset of alcohol use predicts involvement in alcohol problems, alcohol abuse and dependence in both adolescence and adulthood (DeWit et al., 2000; Grant & Dawson, 1997; Gruber et al., 1996; Hawkins et al., 1997; Pederson & Skronidal, 1998). Fourth, early onset drinking relates to a variety of other problematic outcomes in adolescence, including absences from school, delinquent behavior, drinking and driving, smoking, marijuana and other illicit drug use, sexual intercourse, and pregnancy (Ellickson et al., 2003; Gruber et al., 1996; Stueve & O’Donnell, 2005).

To my knowledge, there has not been a previous review focused on the prevalence and distribution of alcohol use among children. While there have been a number of important studies of alcohol use among elementary students, these studies are of limited use for epidemiologic purposes because their samples were generally drawn from a single school district or community (e.g., Anderson et al., 2005; Andrews et al., 2003; Baumrind, 1985; Bush & Iannotti, 1993; Casswell et al., 1991; Dielman et al., 1984; Dunn & Goldman, 1998; Hawkins et al., 1997; Hipwell et al., 2005; Jackson, 1997; Jahoda & Cramond, 1972; Johnson et al., 1997; Van Kammen et al., 1991). The rates of alcohol use found in these local samples may or may not generalize to the larger child population. Rather than focusing on research based on local samples such as these, a comprehensive search was made to locate nationwide and statewide surveys that include relatively recent data on the prevalence and distribution of alcohol use among children in larger and hopefully more representative samples. For this search, children were defined arbitrarily as students in grades six and below who are generally age 12 or younger.

Due to our present reliance on published and unpublished reports from foundations and government websites, further statistical analyses of these data on children’s alcohol use were not possible. Often, the data sets on which the reports were based are no longer available or the data are not yet available for public use, and secondary analyses were not possible. In those

instances where a report presented separate prevalence rates for sub-groups based on gender, age (or grade), or ethnic/racial background, those are reported here.

Methods

Literature Searches for National Surveys

Initial efforts to locate national surveys of children's alcohol use employed a conventional literature search using both PsycINFO and MEDLINE. These efforts, however, were not very useful. First, the keyword "children" results in a listing of articles mainly comprised of adolescent samples, since adolescents are also technically children. Second, only two published reports were found of national surveys that included children: a convenience sample of 4–6th graders carried out in 1988–89 in various communities around the U.S. (Oetting & Beauvais, 1990), and a series of surveys between 1987 and 1992 sampling children (aged 9–12) and adolescents from locations such as shopping malls around the country (Zastowny et al., 1993). Both of these studies are now somewhat outdated.

A second search of PsycINFO (1967 through March Week 2 2005) using the keywords of "elementary school students" and "children not adolescents," in combination with "alcohol drinking patterns" and "substance use," resulted in 205 references, but contained no national surveys of children's alcohol use. This same search was attempted using MEDLINE (1966 to March Week 2 2005) and resulted in 3,006 references (because MEDLINE did not recognize "elementary school students"). Examination of these 3,006 references also turned up no national surveys of children's alcohol use.

Subsequent efforts relied on searches of internet web sites and U.S. government publications. The most useful publication was Appendix H of the SAMHSA (2000) report on the 1999 National Household Survey on Drug Abuse (NHSDA), which identified national surveys (other than the NHSDA) that had collected data on adolescent drug use, several of which had also collected information from elementary school children.

Description of U.S. National Surveys of Children's Alcohol Use

Four relatively recent U.S. national surveys or series of surveys were located that included questions about children's alcohol and drug use. These are the Partnership Attitude Tracking Study (PATs), the National Survey of Parents and Youth (NSPY), the Health Behaviour in School-aged Children (HBSC) study, and the PRIDE Surveys.

The Partnership Attitude Tracking Study (PATs)—This series of national data sets consists of six multistage stratified random surveys of students in grades four through six carried out for the Partnership for a Drug-Free America in 1993 and annually from 1995 through 1999. These surveys were performed by Audits and Surveys Worldwide, Inc., and each included approximately 2300 students in 150 schools, over-sampling counties with higher proportions of African-American and Hispanic residents. Three classes were systematically selected in each randomly selected school and all students with parental consent in the selected classes completed questionnaires anonymously at school. Alcohol use was assessed by a single question asking if they had ever had more than just a sip of alcohol (Partnership for a Drug-free America, 1999). Participation rates of students were not reported or available.

The National Survey of Parents and Youth (NSPY)—Somewhat more recent national sample data are available from this longitudinal study of youth aged 9 to 18 years old that was designed to evaluate the success of the National Youth Anti-Drug Media Campaign (sponsored by the Office of National Drug Control Policy). Audio computer-assisted self interviews (ACASI) were collected between January, 2000 and June, 2001 from approximately 1,050 9–

11 year olds and approximately 510 12 year olds. Active parental consent was required. Interviews asked whether participants had ever had more than a few sips of alcohol. The response rate for youth aged 9–18 was 65% in this recruitment phase (Waves 1–3) of the research (Hornik et al., 2003).

Health Behaviour in School-aged Children (HBSC) Survey—Information on alcohol use among U.S. 11-year-old children was also collected in a World Health Organization survey of health behavior in 11-, 13-, and 15-year-old schoolchildren carried out in 1997–98 on 120,000 students in 28 countries in many parts of Europe as well as Canada and the United States (Currie et al., 2000). The U.S. sample was tested in April of 1998 as sixth graders and included 1,558 students (average age 11.9 years old). Of the 664 schools selected, 386 agreed to participate (58.1%) and 17,000 (82.8%) of the 20,533 eligible students aged 11, 13, and 15 took part. Children were asked how often they drank alcohol. A second survey performed in 2001–02 reported only weekly alcohol use (Currie et al., 2004). The U.S. sample was tested in November and December of 2001, and included 1,479 students (average age 11.6 years old). The response rate for the 2001 U.S. sample is not yet available.

PRIDE Surveys—In addition to these surveys of lifetime alcohol use, a series of surveys asked about frequency of alcohol use (past year, past month, and past week) in numerous school districts around the country. These surveys cover the academic years from 1997–98 to the present, and are carried out by PRIDE Surveys (Dr. Thomas Gleaton, Director). The surveys include 4–6th graders in those school districts across the U.S. that contracted with Pride Surveys to test their students and report the rates of alcohol and drug use found. The number of participating students in this national convenience sample is generally around 25,000 in each year. Questionnaires through 2004–05 ask separately about the use of beer, wine coolers, and liquor, and starting in 2005–06 ask a single question on alcohol use. Response rates are not available, and breakdowns by gender or ethnic/racial background were not presented in the national summary reports (available at <http://www.pridesurveys.com>).

Internet Searches for Statewide Surveys

An internet search was performed of each of the 50 U.S. state government websites to locate statewide surveys of alcohol and drug use that included children in grade 6 or younger. For example, Pennsylvania's state website can be accessed by using the following URL address: <http://www.state.pa.us>. Substituting each state's 2-letter postal code in this address was usually sufficient to access any state government website (or forwarding to a more recent URL address; some are now <http://www.statename.gov>). Listings of state agencies, offices, departments, boards and commissions were then scanned for likely sponsors of such surveys. These usually included the state Department of Education (Office of State Superintendent of Instruction, or Office of Safe and Drug-free Schools, or Health Education Program), the state Department of Health (Bureau of Alcohol and Drug Abuse, or Addiction Services, or Public Health Statistics, or Epidemiology), the state Department of Mental Health, and the state Commission on Criminal Justice. If a report was not available on a web-page, employee directories were examined and emails were sent to staff members to ask if the state had carried out such a survey or if they could direct me to someone who might know. A copy of each relevant report was then requested.

Description of the U.S. Statewide Surveys of Children's Alcohol Use

As of December, 2006, 39 of the 50 states have (or once had) a statewide alcohol and drug survey that includes sixth grade or younger children as well as older adolescents (see Table 1). Eight states perform these surveys every year (AL, AR, DE, FL, IN, KS, RI, WY). Most other states perform the surveys every other year. The 11 states without such statewide surveys are Alaska (AK), California (CA), Colorado (CO), Illinois (IL), Montana (MT), New Hampshire

(NH), New Jersey (NJ), North Dakota (ND), South Dakota (SD), Vermont (VT), and Wisconsin (WI). Two of these states (CA, CO) do survey children but not on a statewide basis, five states survey 7–12 or 7–11 graders (AK, CA, MT, NJ, ND), two survey 8–12 graders (IL, VT), and four survey 9–12 graders (CO, NH, SD, WI).

Eight of the 39 states (MS, NV, NM, NC, OR, VA, WV, WY) used middle-school versions of the Youth Risk Behavior Survey. Nineteen states (AL, AR, FL, HI, KS, KY, LA, ME, MI, MO, NE, OK, OR, PA, SC, TN, UT, WA, WY) used the Communities That Care (CTC) questionnaire (Arthur et al., 2002; Glaser et al., 2005). Three states (AL, OH, WV) used the PRIDE questionnaire, and the remaining states used various other questionnaires.

Seven of the 39 states collected alcohol and drug use data from children younger than sixth grade: Arizona, Delaware, Georgia, Ohio, New York, Rhode Island, and Texas. In describing children's alcohol use at the state level, we focus on five of these seven states. (Georgia was excluded due to an absence of details. Rhode Island was excluded due to copyright issues; to see these data, go to URL:

<http://schn.net.ncpe.uri.edu/QUERIES/FindSch-SALT.idc?SchoolC=800>).

Arizona—Every other year from 1991 through 1999, substance use questionnaires were administered in grades three through twelve to a random sample of public schools (Arizona Criminal Justice Commission, 2002). Questions were read aloud to 3–6th graders by classroom teachers while the children completed their questionnaires. Upon completion, questionnaires were sealed in an envelope. Alcohol questions asked about having ever drunk alcohol (not a sip or two, and not as part of religious ceremonies), use in the past month, and use in the past week. Prevalence rates were reported for 3–6th graders combined. Participation rates were not reported.

Delaware—Statewide surveys of alcohol, tobacco, and other drug use have been carried out annually on fifth, eighth, and eleventh grade students since 1989 (reports from 1995 on are currently available at <http://www.state.de.us/drugfree/data.htm>). In 2004, a total of 7,788 fifth-grade students with passive parental consent were assessed (90% of those enrolled in 5th grade in the state). Questionnaires asked about usual use of alcohol ever, in the past year, and in the past month.

New York—Anonymous surveys of fifth through twelfth grade students were carried out in 1990, 1994, 1998 and 2002 in public and private schools in the state. A statewide survey in 2006 did not include fifth and sixth grade students. In 2002, 2,396 fifth and sixth grade students completed optically scanned questionnaires (Rainone & Marel, 2006). Of the 73 school districts across the state selected to participate, 16 did so. Of the students enrolled in the selected classes in the selected schools, 73.7% completed questionnaires with passive parental consent. Grade, gender and ethnic/racial breakdowns were not provided for the 5–6 graders. Questions asked if they had ever had a drink of alcohol and if they had had a drink in the past 30 days.

Ohio—In 1993, 1996, 1999, and 2002, PRIDE Surveys carried out a statewide assessment of drug use among fourth, sixth, and eighth grade students in Ohio. In 2002, a total of 51,631 fourth graders and 50,369 sixth graders from 297 public school districts and two dioceses participated, representing 84 of the 86 counties in the state (Gleaton, Adams & Pitcock, 2002). Questions asked about the frequency of use of beer, wine coolers, and liquor in the past year.

Texas—Every other year since 1990, the state of Texas has surveyed fourth through sixth grade students (see URL: <http://www.dshs.state.tx.us/sa/research/SchoolSurveys.shtm> for copies of reports). A multistage stratified sampling procedure was used involving stratified

random sampling of school districts, schools within districts, and classrooms within schools. All students in selected classrooms were asked to participate. In 2004, a total of 79,454 elementary students in 69 public school districts took part (Liu, 2005). In all, 83 of 203 selected and alternate school districts took part but not all districts collected elementary school data; 90.1% of elementary students in the selected classrooms completed questionnaires (Dyer et al., 2005). Students were asked how many times they had ever used beer, wine coolers, wine, and liquor.

Results

The following sections present prevalence rates among children for each of several different levels of involvement with alcohol, including lifetime alcohol use (ever tasted alcohol, more than a sip, more than a few sips), use in the past year, use in the past month (or 30 days), and use in the past week. Most national surveys asked about only a single level of involvement with alcohol. For each level of involvement, both national and statewide data are presented, and gender, age/grade, and ethnic/racial differences in rates are presented if available. The last part of each section describes trends over time in children's alcohol use.

Prevalence of Ever Having Tasted Alcohol

Only the HBSC study reports data on the nationwide prevalence of ever having tasted alcohol, the lowest level of experience with alcohol. In 1998, 62% of the boys and 58% of the girls in the U.S. 11-year-old (6th grade) sample had ever tasted alcohol (Currie et al., 2000; modified from rates of never drinkers in Figure 9.4). The U.S. sample ranked 16th highest among the 28 countries studied. Rates of having at least tasted alcohol ranged from 91% of 11-year-old children in Slovakia, 85% in Scotland, 78% in England, 63% in Germany, and 52% in France, to 35% in Norway. In most countries, as in the U.S., more male than female 11-year-olds had ever tasted alcohol.

Prevalence of Having Ever Had More than a Sip of Alcohol

The next level of experience with alcohol, having ever had more than a sip, was assessed in the six nationwide PATS surveys but in none of the statewide surveys. In the PATS surveys, experience with alcohol among 11–12 year olds was twice that among the 9–10 year olds in nearly every annual survey, and tripled between 4th and 6th grade (see Table 2). For example, in 1999, the most recent survey, 9.8% of 4th graders, 16.1% of 5th graders, and 29.4% of 6th graders had ever had more than a sip of alcohol. With respect to gender, 4–6th grade boys were generally more likely than girls to have had more than a sip of alcohol (see Table 2). Racial/ethnic differences in children's alcohol experience differ from those seen in adolescents (Johnston et al., 2006): African-American elementary students were generally only slightly less likely than white students to have had more than a sip of alcohol, and Hispanic children were more likely than white children to have had more than a sip alcohol.

Trends—Over the six-year period encompassed by the PATS national surveys (1993–1999), there was a slight decrease among elementary school students in the prevalence of lifetime experience of having had more than a sip of alcohol (see Table 2).

Prevalence of Lifetime Experience of More than a Few Sips of Alcohol

This next level of experience with alcohol was assessed by several different questions and using two different assessment modalities. While the NSPY and the Arizona statewide survey asked children if they had ever had more than a few sips of alcohol, a number of the other statewide surveys asked if the children had ever had a “drink” of alcohol or if they had ever “used” alcohol, both of which imply more than sipping. Although the NSPY data are not yet publicly available, analyses were performed by the contractor (Westat) for the National

Institute on Alcohol Abuse and Alcoholism examining the gender and ethnic/racial distribution of alcohol use experience for ages 9 through 12 (see Table 3). Overall, 9.0% of the 9–12 year olds had had more than a few sips of alcohol in their life, and the prevalence of use differed by age from 6.2% of the 9-year-olds to 15.5% of the 12-year-olds. While boys were somewhat more likely than girls to have had experience with alcohol, the rates were generally not significantly different. There were also no consistent differences in the prevalence of lifetime alcohol use between the white, African American, and Hispanic children at these ages.

These nationwide prevalence rates from the NSPY study are generally lower than those from the following statewide surveys. The NSPY study utilized audio computer-assisted interviews while the state surveys generally used in-school questionnaires to collect the data. Research generally finds the opposite difference in rates as a function of mode of administration (Turner et al., 1998; Vereecken & Maes, 2006; Wright et al., 2001). It may be that the home administration of these interviews reduced their disclosure of ever use relative to in-school questionnaires. Arizona In 1999, 24.4% of the 3–6th graders reported having ever drunk alcohol (not a sip or two, and not as part of religious ceremonies). Delaware Statewide data collected in 2004 show that 20% of fifth graders (21% of boys and 18% of girls) had ever drunk alcohol. New York Overall, in 2002, 21% of 5–6th graders report having had a drink of alcohol at least once in their lives: 17% had drunk wine or wine coolers, 12% had drunk beer, and 7% had drunk liquor. Texas In 2004, 18.3% of 4th graders, 23.4% of 5th graders, and 34.8% of 6th graders had ever drunk alcohol at least once. In all three grades, more males than females had ever had a drink of alcohol (21.9% versus 14.8% in 4th grade; 25.8% versus 21.1% in 5th grade; and 37.0% versus 32.7% in 6th grade). In grades 5 and 6, more African-American and Hispanic students had experience with alcohol than did white (non-Hispanic) students (4th grade: 20.7%, 18.9%, 17.4%, respectively; 5th grade: 26.0%, 25.0%, 21.5%, respectively; 6th grade: 40.3%, 39.7%, 29.0%, respectively).

Trends—Table 4 presents the prevalence of ever alcohol use from 1990 through 2004 for third, fourth, fifth, and sixth graders who participated in the various statewide surveys. These data show a significant decline over time for all grades in the prevalence of lifetime experience with alcohol. In addition, this table illustrates a fair degree of convergence across the states in the prevalence of lifetime experience with alcohol within any given year.

Prevalence of Alcohol Use in the Past Year

The prevalence among children of alcohol use within the past year was reported by the PRIDE national summary reports and the Delaware and Ohio statewide surveys. Table 5 presents PRIDE data on beer, wine cooler, and liquor use in the past year for grades 4–6 from 1997–98 through 2004–05. For all three beverages, the percent who drank in the past year was similar for fourth and fifth graders. Between fifth and sixth grades, however, there was a substantial increase. In the 2004–05 PRIDE Survey, for example, any alcohol use in the past year was reported by 6.9% of 4th graders, 8.6% of 5th graders, and 12.9% of 6th graders.

The only statewide surveys that asked about children's alcohol use in the past year were Ohio and Delaware. Ohio As may be seen in Table 6, the rates of use of each beverage in 2002 are similar to the 4th and 6th grade rates found in 2001–2002 for the national data (Table 5). For both grades and for all three beverages, more African-American than white children had used alcohol in the past year. Delaware In the Spring 2004 survey, use of alcohol in the past year was reported by 6% of fifth graders (7% of boys, 6% of girls), a rate only somewhat lower than that seen among 5th graders in the PRIDE national summary data for 2003–04 (9.7%).

Trends—In both the PRIDE summary national data and the two statewide surveys, there is a decline over the last decade in children's involvement in alcohol use in the past year. Table 5

presents evidence of a statistically significant (but not substantial) decrease in the use of all three beverages between 1997–98 and 2004–05 in the PRIDE national data. Table 6 shows a similar decline between 1993 and 2002 among Ohio 4th and 6th graders. Among Delaware fifth graders, the prevalence of past-year alcohol use decreased as well (from 10% in 1995, 9% in 1996, 10% in 1997, 9% in 1998, 8% in 1999, 8% in 2000, and 2001, to 6% in 2002, to 6% in 2003 and 2004).

Prevalence of Alcohol Use in the Past Month

Reports of alcohol use in the past month are often interpreted as indicating more regular drinking than ever use or use in the past year. In the PRIDE surveys, past month use was derived from the same question on the “usual” frequency of alcohol use as annual use. As may be seen in Table 7, few children report having used alcohol in the past month. In 2004–05, rates of use increased only minimally with grade for all three alcohol beverages. Use of any alcohol in the past month was reported by 3.0% of 4th graders, 3.1% of 5th graders, and 4.1% of 6th graders. Use in the past month occurs for only about a third of those children who have used alcohol in the past year (cf. Table 5).

Statewide surveys that assessed children’s alcohol use in the past month are Arizona, Delaware, and New York. Arizona. In 1999, 6.6% of the 968 participating 3–6th graders reported having drunk alcohol in the last month. Delaware. Use in the past month was reported by 2% of fifth graders (2% of boys, 2% of girls) in 2004. New York. In 2002, five percent of 5–6th grade students had used any alcohol in the past 30 days.

Trends—Table 7 shows that rates of alcohol use in the past month generally declined between 1997–98 and 2004–05 for all three beverages for the 6th grade students in the PRIDE national data. Table 8 shows that the prevalence of children’s alcohol use in the past month declined over time in the Arizona and New York statewide surveys. Where rates of use were already very low (for the 4th and 5th graders in the PRIDE surveys and for the 5th graders in Delaware), however, there was no further decline over time (possibly a “basement effect”).

Prevalence of Weekly Alcohol Use

Children have rarely been asked about their use of alcohol in the past week. In the HBSC Study, children were asked how often they drank beer, wine (or wine coolers) or spirits (never, <once/month, every month, every week, every day). In the 1998 U.S. 11-year-old (6th grade) sample, 8% of the boys and 7% of the girls drank every week or more often (Figure 9.5, Currie et al., 2000). Only in Greece, Israel, the Czech Republic, England, Wales, and Slovakia did a larger percentage of 11-year-old boys drink weekly. Among girls, English, Welsh, and Greek girls were more likely to drink weekly than American girls. In the 2001 U.S. 11-year-old sample, 3.9% of the boys and 3.2% of the girls consumed alcohol weekly (Figure 3.8, Currie et al., 2004). This rate for the U.S. boys was well below the study average of 7.3% for 11-year-old boys, while the prevalence for U.S. girls was slightly above the study average of 3.0% for 11-year-old girls. Comparison of the U.S. rates for 1998 and 2001 suggests a decline in weekly alcohol use.

Only a single statewide survey asked about weekly alcohol use in children. In Arizona in 1999, 4.7% of the 3–6th graders reported having drunk alcohol in the last week. The prevalence of use in the last week declined slightly over time: from 5.5% in 1993 and 6.8% in 1995, to 4.2% in 1997 and 4.7% in 1999.

Discussion

What is clear from the above reports on national and statewide samples is that substantial numbers of children do in fact have experience with alcohol. The percentage of children who have experience with alcohol differs as a function of the level of alcohol involvement inquired about (from a sip or taste to more than a few sips ever to use in the past year, past month, or past week), as a function of the grade, gender, and ethnicity of the children, and as a function of the year the survey was conducted. Having had at least a taste of alcohol was reported by about 60 percent of 11-year-olds in the 1998 HBSC study. Having had more than a sip was reported by about a third as many children that age in the PATS survey and in the statewide surveys. Prevalence rates for ever use were greater than for alcohol use in the past year. Generally, in surveys that asked both questions, around a third of children who had ever used alcohol reported its use in the past year as well, and use in the past month occurred in only about a third of those children who reported use in the past year (see Table 4). In general, the rates of alcohol use were consistent across those surveys that were performed in the same year and that asked about the same level of alcohol involvement.

While prevalence rates of alcohol use increased substantially between grades four and six, a consistent finding in these reports was that the greatest difference in rates was between grades five and six. This jump in prevalence is also seen in prospective developmental studies (see Kosterman et al., 2000). One of the basic principles of prevention research is that it be appropriately timed, that is, that it be initiated prior to the onset of the targeted behavior (Nation et al., 2003). This would suggest that primary preventive interventions for child alcohol use would best be targeted in fifth grade to reduce or delay this pattern of early onset. Alcohol use interventions on fifth-grade or younger students, however, show inconsistent results. For children this young, successful programs have also involved parents and other family members in the intervention (see, for example, Loveland-Cherry et al., 1999). At this age, prevention programs should focus on building family, school, and individual protective factors and reducing family, school, and individual risk factors for involvement in problem behavior conceived more broadly than just alcohol use (see Jessor, 1993).

Most of the surveys that presented data on gender differences found that boys were more likely than girls to have experience with alcohol. The older the children, however, the less difference there was between the sexes (e.g., Texas data reported by Liu, 2005). This finding is consistent with results for adolescents that show only a small gender difference (see Johnston et al., 2006). With respect to race, the most surprising finding is that African-American children were not significantly less likely to have used alcohol than were other children; this is in contrast to results found among adolescents (see Johnston et al., 2006). This result suggests that African American children are at just as much risk for early onset drinking as are other children.

An important finding of the current review is that the prevalence of ever use and of current use of alcohol among children has been declining substantially over time, particularly in surveys covering the last decade. The consistency of this finding across the several national and statewide surveys argues for the validity of this result, despite the inability of the present review to control for sampling design changes over time or changes in the demographic composition of the resulting samples from year to year. This decline is also consistent with trend analyses of the YRBS and MTF national survey data indicating that over time fewer adolescents report starting to use alcohol before age 13 and that adolescents are reporting older ages of onset (Faden, 2006).

Despite the relatively low prevalence of current (past year, past month, past week) alcohol use among children in the U.S., the evidence linking early alcohol use initiation to negative outcomes in adolescence and adulthood argues for the importance of preventive interventions

in childhood, prior to adolescence. It is clear from previous research that children are first introduced to alcohol use by parents or other relatives in a family context (see Jackson, 1997; Jahoda & Cramond, 1972; Johnson et al., 1997). Such precocious socialization into alcohol use can reflect either Old World cultural beliefs regarding the role of alcohol in gustatory or celebratory occasions, or the belief that introducing children to alcohol use as part of family dinners or events serves to inoculate them from involvement in problematic drinking later in life. This implies that primary prevention to delay onset of drinking should target not only the children themselves but also their parents. At present, most prevention programs in the schools focus on educating children about the dangers of alcohol and other drug use and on enhancing their peer refusal skills. Parents also need to be involved and made aware of the linkage between early alcohol exposure and problems in adolescence and later life, and need to be actively discouraged from offering their children drinks or involving them in adult drinking practices. Successful preadolescent prevention programs that involve parents, such as Project Northland (Stigler et al., 2006) and the Iowa Strengthening Families Program (Spoth et al., 2006), could certainly be modified for use in this somewhat younger population. The successful Child and Parent Relations Project (Loveland-Cherry et al., 1999; Loveland-Cherry et al., reported in Donovan et al., 2004) also involves parents and already targets children in 4th through 6th grades.

There are several important limitations to the present summary of research that should be kept in mind. The most important limitations are that the representative national surveys were not very recent (five or more years old), and that the most recent national surveys (the PRIDE surveys) were not designed to be nationally representative. In addition, there was no information for the PATS surveys regarding the participation rates of the elementary school students. Despite this, there is some reason to believe that these surveys may be representative of the larger population. Both the PATS surveys and the PRIDE surveys assessed older students as well as the children reported upon here, and found adolescent prevalence rates comparable to those reported for the national MTF survey for the same year (see, for example, Pride Surveys, 2003). This convergent validity may generalize to the child data as well. Furthermore, there is test-retest as well as collateral report evidence that supports the validity of children's self-reports of their alcohol use, though more research is needed in this area (see review in Donovan et al., 2004).

The fact that most of the reports fail to describe the context and levels of alcohol experience for the children surveyed is a further limitation of the present results. While the present review was careful to establish the minimum level of alcohol experience reported by the children, it was generally not possible to characterize their usual patterns of consumption. Questions on their frequency of use, the usual number of drinks they consume, and the greatest amount they have ever had are generally not asked in these surveys. In addition, their sipping or tasting of alcohol may have only been in the context of religious services or observances, or as part of family celebrations (e.g., New Year's Eve or wedding receptions) or family dinners. Given that most of the extant surveys have a broader focus on children's substance use (alcohol, tobacco, marijuana, cocaine, amphetamine, inhalants, etc.), alcohol-specific concerns such as these were usually not attended to.

Despite the limitations in these data, it is better to have even problematic information on the national prevalence of alcohol use among children than to have no information at all or to ascribe inappropriately broad generality to prevalence rates based on local samples. Both the absence of any recent national survey of alcohol use among children and the problematic aspects of the data sets reported on here argue for the need to institute ongoing nationwide surveillance of this population. Given the many negative outcomes of early initiation of alcohol use mentioned in the introduction (later delinquency, alcohol dependence, drug abuse, etc.), it is critical to monitor the prevalence of alcohol use among children. This would permit us to

track and perhaps to forestall potentially problematic trends and to identify areas or subpopulations in need of more intensive and innovative interventions or services.

It is clear from this review that attention to children's alcohol use cannot wait until they are adolescents. Substantial numbers of children do have experience with alcohol. While monitoring the nationwide prevalence of children's alcohol use is a positive step in the right direction, this needs to be accompanied by increased levels of research on children's alcohol use. It is possible that fewer studies have been conducted in this area due to the perception of a number of barriers to this research. One barrier is the misperception that few children drink, so there is little variation to explain. Hopefully, this review serves to dispel this perception. A second barrier is that access to elementary school populations is often denied by school districts due to an unfounded belief that asking children about alcohol and drug use instigates such use. I am frankly unaware of any solid research showing such an effect. Even if this were true, answering several survey questions about alcohol use is surely a very minor risk given children's daily exposure to parental drinking, alcohol advertisements on television, radio, and billboards, and in magazines, and alcohol use portrayals on prime-time television and even in G-rated animated movies (Center on Alcohol Marketing and Youth, 2005; Christenson et al., 2000; Goldstein et al., 1999). Folding studies of child alcohol use into a broader concern with children's health-related behavior can help to reduce the likelihood of school board disapproval of the research. A third barrier sometimes raised is the anticipation that parents will be reluctant to consent to their child's participation in alcohol research. Looking at the local community studies cited in the introduction, however, there is little evidence to suggest that parental consent rates for these child studies are any lower than rates seen in studies of adolescents. Across the seven studies cited that reported rates of active parental consent, the mean rate was 79%; if we delete Andrews et al. (2003), which included first through fifth graders and required commitment for a 3-year longitudinal project, the mean rate of parental consent was 84%. Where passive parental consent procedures were used, very high rates of consent were found; for example, in the Dunn and Goldman (1998) study, only 2% of parents withheld their children from the research. Parental consent thus appears to be less of a barrier to studies of children's alcohol use than is gaining access to the elementary school classrooms in the first place. Should school districts impede easy access to child samples, community survey research techniques have been shown to be a successful, but expensive, alternative (see Hipwell et al., 2005).

Additional topics that should be covered in surveillance studies of child alcohol use include greater information on the intensity and patterning of their current use of alcohol (e.g., frequency of use, usual and greatest intake, frequency of "binge" drinking, and contexts of use), as well as more information on their earliest use (e.g., age at first use, source of the alcohol, context of use, amount consumed, reaction to the alcohol). Such information can help to structure secondary intervention efforts in this population.

In addition to instituting enhanced ongoing surveillance of alcohol use among children, greater support is needed for longitudinal research on the antecedent risk factors for the initiation of alcohol use in childhood and for its escalation in adolescence. Etiological studies of alcohol use initiation have only rarely studied childhood onset. The most consistent adolescent risk factors for the initiation of alcohol use include parental and peer approval and models for drinking and drug use as well as adolescents' own prior involvement in delinquent behavior (Donovan, 2004). Additional variables for which there is less support are positive alcohol expectancies, sensation seeking, impulsivity, anxiety and depression. There are thus a variety of variables that need to be examined to determine if they also serve as risk factors for the initiation of alcohol use in childhood. It is of course entirely possible that a completely different set of antecedent variables reflecting genetic risk for alcoholism or early-onset psychopathology or child maltreatment accounts for the childhood onset of alcohol use.

Although we know that parents and the home are the primary sources for children's first experience with alcohol, there is no current research examining ethnic, racial, and religious group differences in parents' attitudes toward child drinking and in their explicit socialization of their children into alcohol use. To the extent that children are introduced to alcohol in the home, school prevention programs are unlikely to be effective. It is not clear, however, whether learning to drink in a family context actually serves to protect early-onset drinkers from later alcohol abuse or dependence. The only relevant longitudinal research (Dielman et al., 1989) suggests that this is not the case, but this question was not a major focus of that prevention study.

While previous research shows that early initiation of alcohol use results in many problematic outcomes in both adolescence and adulthood (see the introduction), it is unclear how much alcohol use (basically what dosage) before what age conveys the most risk for later negative developmental outcomes. Nor is it clear what personality characteristics (e.g., temperament, sensation-seeking, risk-taking, impulsivity, rebelliousness) or disorders (e.g., attention deficit hyperactivity, conduct disorder, mood disorders) or what aspects of the family environment (e.g., parental alcoholism, drug abuse, child neglect and maltreatment, parental separation, parental monitoring) serve to either buffer or exacerbate the negative impact of starting to drink so young. There needs to be a much greater investment of research effort into describing and understanding alcohol use among those children who initiate use before they enter adolescence.

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Statewide Surveys of Drug and Alcohol Use that Include Children (Grade 6 or Younger)

Table 1

State	Grades	Latest	Design	State	Grades	Latest	Design
AL	6-12	2006	Annual	MO	6,8,10,12	2006	Biennial
AZ	3-12	1999	-----	NE	6,8,10,12	2005	Biennial
AR	6,8,10,12	2005	Annual	NV	6-12	2005	Biennial
CT	5-12	1997	-----	NM	6-8	2000	-----
DE	5,8,11	2005	Annual	NY	5-12	2002	-----
FL	6-12	2006	Annual	NC	6-12	2005	Biennial
GA	6-12	2005	Biennial	OH	4,6,8,10,12	2002	-----
HI	6,8,10,12	2003	-----	OK	6,8,10,12	2006	-----
ID	6,8,10,12	2006	Biennial	OR	6,8,11	2000	-----
IN	6-12	2006	Annual	PA	6,8,10,12	2005	Biennial
IA	6,8,11	2005	Triennial	RI	4-12	2006	Annual
KS	6,8,10,12	2006	Annual	SC	6-12	2002	-----
KY	6,8,10,12	2006	Biennial	TN	6-8	2002	-----
LA	6-8,10,12	2004	Biennial	TX	4-12	2004	Biennial
ME	6-12	2006	Biennial	UT	6,8,10,12	2005	Biennial
MD	6,8,10,12	2004	Biennial	VA	6-8	1993	-----
MA	6-12	2004	Biennial	WA	6,8,10,12	2006	Biennial
MI	6,8,10,12	2001	-----	WV	6-12	2005	-----
MN	6,9,12	2004	Triennial	WY	6-12	2005	Biennial
MS	6-12	2005	Biennial	WY	6,8,10,12	2006	Biennial

Note. Dashes indicate that no fixed interval separates surveys, or that only one survey has been performed, or that the series of surveys has been discontinued or modified so that it now does not include grade 6 or younger students. State names are indicated by the following postal codes: AL=Alabama, AZ=Arizona, AR=Arkansas, CT=Connecticut, DE=Delaware, FL=Florida, GA=Georgia, HI=Hawaii, ID=Idaho, IN=Indiana, IA=Iowa, KS=Kansas, KY=Kentucky, LA=Louisiana, ME=Maine, MD=Maryland, MA=Massachusetts, MI=Michigan, MN=Minnesota, MS=Mississippi, MO=Missouri, NE=Nebraska, NV=Nevada, NM=New Mexico, NY=New York, NC=North Carolina, OH=Ohio, OK=Oklahoma, OR=Oregon, PA=Pennsylvania, RI=Rhode Island, SC=South Carolina, TN=Tennessee, TX=Texas, UT=Utah, VA=Virginia, WA=Washington, WV=West Virginia, WY=Wyoming.

Lifetime Prevalence (%) of More than a Sip of Alcohol by Age, by Grade, by Gender and by Ethnic/Racial Background—PATS National Sample Data (1993–1999).

Table 2

	1993	1995	1996	1997	1998	1999
<u>Total Sample</u>						
Combined	19	18	20.0	20.7	18.6	15.2
<u>Age</u>						
9–10 Years Old	10	13	10.2	9.2	10.6	9.0
11–12 Years Old	23	18	22.3	26.6	20.6	21.0
<u>Grade</u>						
4 th Grade	---	---	---	9.2	8.5	9.8
5 th Grade	---	---	---	22.1	15.7	16.1
6 th Grade	---	---	---	31.0	31.7	29.4
<u>Gender</u>						
Boys	---	---	24.1	24.1	23.3	20.4
Girls	---	---	16.0	17.3	13.1	10.1
<u>Ethnic/Racial Group</u>						
White	---	---	19.9	21.5	18.2	14.8
African American	---	---	18.8	16.8	16.9	15.4
Hispanic	---	---	24.7	22.4	24.9	18.4
n:	2265	2424	2569	1922	2258	2397

Note. Dashes indicate percentage breakdowns that were not reported. From Adelma Lilliston, Partnership for a Drug-free America, unpublished communication, December 20, 2002.

Lifetime Prevalence (% , numbers in parentheses) of More Than a Few Sips of Alcohol, by Age and Gender, and by Age and Ethnic/Racial Background (NSPY Round I Data, 2000–2001).

	Age 9	Age 10	Age 11	Age 12	Total
Total Sample					
Combined	6.2 (936)	5.5 (1070)	9.2 (971)	15.5 (1230)	9.0 (4207)
Gender					
Boys	6.8 (504)	7.1 (538)	12.3 (509)	16.0 (638)	10.5 (2189)
Girls	5.6 (432)	3.8 (532)	5.9 (462)	15.1 (592)	7.5 (2018)
Ethnic-Racial Group					
White	6.8 (597)	5.6 (729)	10.0 (616)	15.6 (815)	9.4 (2757)
African American	5.4 (153)	5.7 (143)	5.2 (157)	15.6 (180)	7.8 (633)
Hispanic	4.9 (154)	6.1 (160)	9.8 (152)	17.6 (180)	9.4 (646)

Note. From Westat Corporation, unpublished communication to Dr. Susan Martin (National Institute on Drug Abuse), Feb. 4, 2004.

Table 4
Trends in Prevalence (%) of Ever Having Had a Drink or Having Used Alcohol in Statewide Samples Between 1990 and 2004

	Year														
	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
Arizona	---	39	---	31	---	29	---	20	---	24	---	---	---	---	---
3–6 th Grades	---	---	---	---	---	25	27	28	25	25	25	25	22	19	20
Delaware	---	---	---	---	---	29	30	34	28	29	28	29	25	21	21
5 th Grade	---	---	---	---	---	22	24	22	21	22	22	21	19	17	18
Boys	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Girls	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
New York	---	---	---	---	36	---	---	---	24	---	---	---	21	---	---
5–6 th Grades	31	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Texas	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4 th Grade	31	---	25	---	25	---	22	---	22	---	19	---	19	---	18
Boys	38	---	31	---	33	---	27	---	25	---	23	---	22	---	22
Girls	25	---	19	---	18	---	17	---	18	---	16	---	15	---	15
5 th Grade	39	---	29	---	30	---	29	---	28	---	26	---	23	---	23
Boys	45	---	34	---	36	---	33	---	33	---	31	---	26	---	26
Girls	32	---	23	---	25	---	24	---	24	---	21	---	20	---	21
6 th Grade	57	---	46	---	43	---	40	---	39	---	38	---	34	---	35
Boys	61	---	51	---	49	---	44	---	42	---	41	---	37	---	37
Girls	53	---	42	---	36	---	36	---	36	---	36	---	31	---	33

Note. Dashes indicate that no statewide survey data were collected in that year.

Table 5
Prevalence (%) of Alcohol Use in the Past Year by Beverage and by Grade—PRIDE Survey Data

	Academic Year							
	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Beer								
4 th Grade	7.7	6.3	6.3	6.1	5.0	6.3	4.2	4.3
5 th Grade	8.2	8.2	6.6	6.7	4.9	6.4	5.6	5.1
6 th Grade	15.0	11.9	9.3	10.2	11.0	9.0	8.7	7.4
Wine Coolers								
4 th Grade	6.6	5.9	6.8	6.4	4.3	6.1	4.4	4.0
5 th Grade	9.5	8.6	8.3	8.1	5.8	7.9	6.7	5.5
6 th Grade	18.4	14.3	11.7	12.5	14.9	11.2	10.3	8.7
Liquor								
4 th Grade	2.4	1.9	2.3	2.1	1.5	2.1	1.9	1.7
5 th Grade	3.7	3.5	3.1	3.0	2.5	2.7	2.8	2.6
6 th Grade	8.9	6.9	5.2	5.4	6.4	5.3	5.2	4.9
Any Alcohol								
4 th Grade	---	---	10.7	---	---	---	7.0	6.9
5 th Grade	---	---	12.6	---	---	---	9.7	8.6
6 th Grade	---	---	16.7	---	---	---	14.3	12.9
N:	26,086	34,540	28,726	25,120	22,507	72,025	22,255	37,345

Note. Dashes indicate data were not reported. Cell percentages are from PRIDE Survey national summary reports for each year, available at: <http://www.pridesurveys.com/Reports/index.html>.

Table 6
Prevalence (%) of Alcohol Use in the Past Year by Beverage and by Grade—Ohio Statewide Survey Data

	Year			
	1993	1996	1999	2002
<u>Beer</u>				
4 th Grade	9.6	7.1	6.3	5.4
6 th Grade	20.6	17.1	16.7	11.7
<u>Wine Coolers</u>				
4 th Grade	8.7	5.8	5.6	5.6
6 th Grade	20.6	18.4	18.9	15.8
<u>Liquor</u>				
4 th Grade	2.5	1.5	1.6	1.7
6 th Grade	9.3	6.4	6.4	5.2

Note. From “Ohio Student Survey 2002: Alcohol, tobacco, illicit drugs, violence, and related behaviors: Executive summary” by T. J. Gleaton, Jr., R. D. Adams, and M. Pitcock, Pride Surveys Inc., 2002, pp. 6–11.

Table 7
Prevalence (%) of Alcohol Use in the Past Month by Beverage and by Grade—PRIDE Surveys

	Academic Year							
	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Beer								
4 th Grade	2.1	2.2	2.2	2.2	1.9	2.6	1.9	1.9
5 th Grade	2.2	1.8	1.5	2.3	1.2	2.0	2.0	2.0
6 th Grade	4.7	3.9	2.3	2.8	3.3	2.6	3.1	2.4
Wine Coolers								
4 th Grade	2.2	2.2	2.6	2.4	1.6	2.5	1.8	1.6
5 th Grade	2.5	2.2	2.1	2.5	1.3	2.5	2.5	1.9
6 th Grade	5.4	4.8	3.1	3.6	5.1	2.9	4.0	2.8
Liquor								
4 th Grade	0.7	0.6	0.8	0.8	0.5	0.9	0.8	0.8
5 th Grade	0.8	0.8	0.7	0.9	0.5	0.9	1.1	0.9
6 th Grade	3.0	2.2	1.3	1.6	2.0	1.4	1.9	1.6
Any Alcohol								
4 th Grade	---	---	4.2	---	---	---	3.1	3.0
5 th Grade	---	---	3.0	---	---	---	3.8	3.1
6 th Grade	---	---	4.4	---	---	---	5.6	4.1
N:	26,086	34,540	28,726	25,120	22,507	72,025	22,255	37,345

Note. Dashes indicate data were not reported. Cell percentages are from PRIDE Survey national summary reports for each year, available at: <http://www.pridesurveys.com/Reports/index.html>.

Table 8
Trends in Prevalence (%) of Alcohol Use in the Past Month in Statewide Samples (1990–2004)

	Year														
	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
Arizona 3–6 th Grades		4		10		11		6		7					
Delaware 5 th Grade						2	1	2	3	2	2	2	2	2	2
Boys						3	2	3	4	3	2	3	2	2	2
Girls						2	1	2	3	1	1	2	1	1	2
New York 5–6 th Grades	8								6				5		

Note. Dashes indicate that no statewide survey data were collected in that year, or the data were not reported (e.g., NY 1994).