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Reducing Alcohol-Exposed Pregnancies

A Report of the National Task Force on Fetal Alcohol Syndrome and Fetal Alcohol Effect

U.S. Department of Health and Human Services

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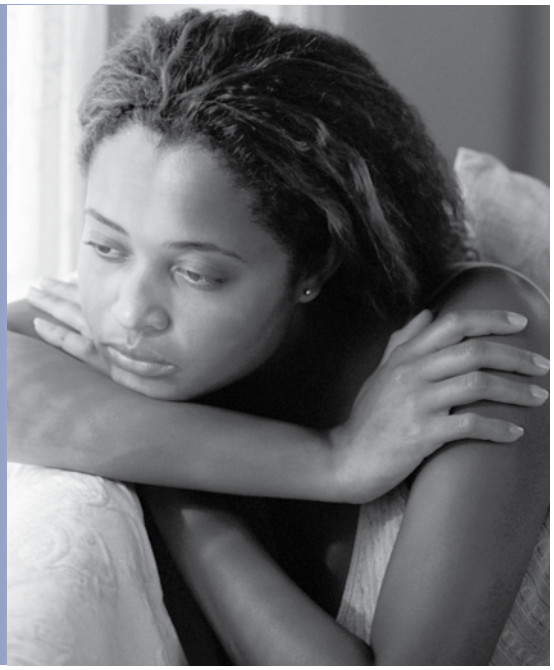

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EXECUTIVE SUMMARY

Drinking alcohol during pregnancy can cause fetal alcohol spectrum disorders (FASDs). The term FASDs is used to define the spectrum of physical, mental, behavioral, and/or learning disabilities that can result from prenatal alcohol exposure. Fetal alcohol syndrome (FAS) is one of the most severe outcomes of drinking alcohol during pregnancy. FASDs are preventable if women do not drink during pregnancy.

Since FAS was first identified in 1973, efforts have been under way to prevent alcohol-exposed pregnancies (AEPs) and reduce the risk of FASDs. While significant progress has been made, alcohol use continues to be prevalent among women of childbearing age. Recent data show that 12% of pregnant women aged 18–44 years reported consuming alcohol during the past month, and about 2% reported binge drinking during that time. Also, 52.4% of nonpregnant women aged 18–44 years reported drinking during the past month, and 11.5% reported binge drinking. These data suggest that more work needs to be done to develop effective, evidence-based FASD prevention strategies to address the diverse needs of all women of childbearing age—those who are pregnant, who are trying to become pregnant, and who might become pregnant.

This report is a collaborative effort of the National Task Force on Fetal Alcohol Syndrome and Fetal Alcohol Effect (NTFFASFAE), the Centers for Disease Control and Prevention's (CDC) National Center on Birth Defects and Developmental Disabilities (NCBDDD) FAS Prevention Team, National Center for Health Marketing Community Guide Branch, and Research Triangle Institute International (RTI). Evidence for this report began with a systematic search of the literature to identify community-level FASD interventions and policies that can prevent AEPs and reduce the prevalence of physical, mental, behavioral, and learning disabilities due to prenatal alcohol exposure. This evidence, along with the findings and recommendations of the U.S. Preventive Services Task Force on behavioral counseling interventions for alcohol misuse, helped lay the groundwork for the information presented in this report. The report reviews the current evidence on prevention strategies to reduce alcohol use and AEPs, provides recommendations on promoting and improving these strategies, and offers future research directions in the field of FASD prevention. It also serves as a guide for those in the research and practice fields interested in selecting and implementing effective, scientifically tested interventions for women at risk for an AEP.

The report highlights the critical importance of alcohol screening using validated screening tools in identifying women at risk for alcohol misuse and AEPs. The prevention strategies described in the report are categorized using a prevention framework of universal, selective, and indicated prevention. Universal prevention interventions attempt to promote the health of the general public or a particular group, regardless of risk, while selective and indicated prevention strategies are more targeted and intensive falling along a continuum of care depending on the severity of the problem.

At this time, research on the effectiveness of universal prevention interventions to reduce AEP or FASDs is insufficient; however, such interventions might contribute to an increase in knowledge and awareness about the risks of alcohol use during pregnancy among the general population, including women of childbearing age. The task force report indicates that universal interventions specific to reducing AEPs require improved evaluation methodologies to determine their effectiveness. The report also recognizes the value of broad-based alcohol policies and environmental changes geared towards the general public in reducing per capita alcohol consumption and excessive alcohol use. Effective population-based alcohol policy efforts could ultimately affect alcohol use among women of reproductive age and the prevention of FASDs.

One of the most widely studied prevention strategies employs brief alcohol interventions targeting at-risk drinking. Studies of brief intervention have been successfully conducted in a wide range of settings, including primary care, emergency departments, and colleges. The report highlights studies of effective, brief interventions for alcohol use tested among the general population and also describes effective interventions targeting pregnant women, preconceptional women, and women at greatest risk for having a baby with an FASD. Selecting effective, evidence-based interventions is an important step towards improved FASD prevention. The challenge ahead is how to ensure that effective strategies are implemented and integrated into existing systems. This requires capacity and commitment at multiple levels, including service providers, insurance companies, policy makers, and consumers, in order to deliver and integrate effective strategies, such as brief interventions, into community-based health and social service settings. Collaboration and strong partnerships across federal, state, and local agencies; academia; medical and social service delivery systems; and consumers are also essential in order to continue to develop a continuum of evidence-based care for women with alcohol use problems.

Based on the evidence provided in this report, the NTFFASFAE proposes several recommendations (Table 1) to support the development, implementation, and expansion of evidence-based strategies to prevent AEPs; to stress the importance of alcohol screening and provider education; and to promote further research on how best to identify and intervene with women at greatest risk for alcohol-affected pregnancies. The task force also puts forward several topics for consideration as future research directions in the FASD prevention arena.

TABLE 1: PREVENTION RECOMMENDATIONS

UNIVERSAL PREVENTION	
Recommendation 1:	Expand and test methodological approaches for assessing the effects of universal prevention strategies on alcohol use patterns and reproductive health outcomes of childbearing-aged women.
Recommendation 2:	Promote the implementation of effective population-based interventions for reducing alcohol-related harms in the general population, including women of childbearing age, as they are validated.
SELECTIVE AND INDICATED PREVENTION	
Recommendation 3:	Ensure that funded intervention studies on alcohol use, abuse, and dependence include analyses of gender and age effects and examine pregnancy outcomes where possible.
Recommendation 4:	Promote the use of evidence-based intervention strategies tested in primary care, emergency rooms, and college settings for use in populations of childbearing-aged women at risk for an alcohol- exposed pregnancy.
Recommendation 5:	Establish formal alcohol screening, using validated instruments, and brief intervention programs that are culturally and linguistically appropriate for women of childbearing age.
Recommendation 6:	Expand the education and training of health and social service professionals in the areas of screening and intervening with women at risk for alcohol-exposed pregnancies.
Recommendation 7:	Ensure access to appropriate alcohol treatment services for women of childbearing age, especially those with treatment barriers, such as pregnant women and adolescents.
Recommendation 8:	Ensure that alcohol treatment options for all childbearing-aged women take into consideration their unique needs, such as pregnancy, co-occurring disorders, and other special treatment needs.
Recommendation 9:	Conduct further research aimed at implementing and evaluating treatment and intensive case-management approaches for women at highest risk of having a child with a fetal alcohol spectrum disorder.
Recommendation 10:	Promote research investigating interventions focused on the potential intergenerational effects of prenatal alcohol use on offspring.

INTRODUCTION

Alcohol misuse is a serious, worldwide public health issue that can result in a wide range of physical, psychological, and social problems affecting the individual, the family, and the community. Drinking alcohol during pregnancy increases a woman's risk of having a baby with birth defects and developmental disabilities. Alcohol consumption during pregnancy is recognized as the cause of fetal alcohol spectrum disorders (FASDs). FASD is a term used to define the spectrum of physical, mental, behavioral, and/or learning disabilities that can result from prenatal alcohol exposure [1]. Fetal alcohol syndrome (FAS) is one of the most severe outcomes of drinking alcohol during pregnancy and is characterized by facial malformations, growth deficits, and neurodevelopmental problems [2]. It should be noted that throughout this report, the terms FAS and FASDs are both used. FAS is used when describing the diagnostic criteria specific to the condition of fetal alcohol syndrome or when reporting surveillance data on the condition. The term FASDs is used when discussing the full range of effects that can occur from drinking during pregnancy. Efforts have been underway for several decades to develop strategies to prevent alcohol-exposed pregnancies (AEPs) and reduce the risk of FASDs.

In 2002, the National Task Force on Fetal Alcohol Syndrome and Fetal Alcohol Effect (NTFFASFAE), a federal advisory committee, released its first recommendations [3]. Among these recommendations were several items focused on prevention, including recommending the reissuance of the U.S. Surgeon General's advisory on drinking during pregnancy [4] and the development of a report to review the evidence for effective prevention and treatment strategies for women at risk for or engaging in prenatal alcohol use. In 2004, after deliberations on and publication of *Fetal Alcohol Syndrome: Guidelines for Referral and Diagnosis* [5], the NTFFASFAE decided to focus its attention on FASD prevention. The Task Force Prevention Working Group (PWG) was established to guide the development of a report describing evidence-based prevention strategies to reduce AEPs and outline recommendations to further promote the implementation of such strategies. To accomplish this, the staff of the Centers for Disease Control and Prevention's (CDC) National Center on Birth Defects and Developmental Disabilities engaged the Community Guide Branch at CDC's National Center for Health Marketing and Research Triangle Institute International (RTI) to assist the PWG in this work. RTI conducted a systematic search of the literature to identify community-level FASD interventions and policies that can prevent alcohol-exposed pregnancies and reduce the prevalence of physical, mental, behavioral, and learning disabilities due to prenatal alcohol exposure. The review focused on community-level interventions and policies because other systematic reviews either have been completed or are currently under way to explore both clinical interventions and population-based strategies addressing alcohol misuse. For example, in 2004, the U.S. Preventive Services Task Force engaged in a systematic review that resulted in clinical recommendations on screening and behavioral counseling interventions in primary care settings to reduce alcohol misuse [6]. Also, the Task Force on Community Preventive Services, coordinated by CDC, is actively engaged in systematic reviews to assess the effectiveness of population-based alcohol prevention strategies that affect people in the general population, including women of childbearing age.

This report reviews the current evidence on prevention strategies to reduce AEPs, provides recommendations on promoting and improving these strategies, and offers future research directions in the field of FASD prevention. This document also serves as a guide for those in the research and practice fields interested in selecting and implementing effective, scientifically tested interventions for women at risk for an AEP. In addition, the report also highlights the importance of continued collaboration across federal, state, and local agencies; academia; medical and social service delivery systems; and families to integrate scientific findings into public health prevention strategies.

BACKGROUND AND EPIDEMIOLOGICAL OVERVIEW

Since it first appeared in the scientific literature in the United States in 1973 [2], FAS has proved to be a challenging condition for both the scientific community and the health care delivery system. Through the efforts of the U.S. Congress, federal agencies, professional organizations, and other nongovernmental organizations, much has been achieved in gaining a better understanding of the effects of prenatal alcohol exposure on the developing fetus and FAS specifically [7]. After more than 30 years of research, there is a consensus in the field that prenatal alcohol exposure is responsible for not only FAS, but also for a spectrum of disorders relative to the amount of exposure. This view was introduced in 1996 in the report of the Committee to Study Fetal Alcohol Syndrome, convened by the Institute of Medicine (IOM) under a congressional mandate to the National Institute on Alcohol Abuse and Alcoholism (NIAAA) [8].

The IOM committee delineated five diagnostic categories: (1) FAS with a history of maternal alcohol exposure; (2) FAS without a history of maternal alcohol exposure; (3) partial FAS[a] with a history of maternal alcohol exposure; (4) alcohol-related birth defects (ARBDs); and (5) alcohol-related neurodevelopmental disorder (ARND). Diagnostic criteria were broadly defined for each of the five categories with a recommendation that research be conducted to "evaluate the utility, reliability, and validity of this scheme for classification and diagnosis" [8]. FAS was described as a characteristic pattern of facial anomalies that included short palpebral fissures, thin upper lip, flattened philtrum, and flat midface; growth retardation; and evidence of central nervous system (CNS) abnormality. In 2000, researchers from the University of Washington in Seattle published a comprehensive approach to diagnosing the full spectrum of conditions resulting from prenatal alcohol exposure using a 4-digit coding system [9]. That same year, the American Academy of Pediatrics recommended use of a similar diagnostic approach to pediatricians and urged them to increase their awareness of FAS, partial FAS, ARND, and ARBD [10].

In an attempt to promote consistent use of uniform diagnostic criteria for FAS, CDC and the NTFFASFAE published guidelines for referral and diagnosis of FAS in 2004 [5]. These guidelines focused on FAS because scientific evidence to support specific clinical criteria for prenatal alcohol-related conditions other than FAS was lacking. These guidelines refined the broad definitions of the IOM report and further delineated aspects of functional central nervous system disorders associated with FAS. The guidelines also endorsed a uniform definition of FASD as "an umbrella term describing the range of effects that can occur in an individual whose mother drank alcohol during pregnancy. These effects may include physical, mental, behavioral, and/or learning disabilities with possible lifelong implications. The term FASD is not intended for use as a clinical diagnosis." One recent study [11] proposed a diagnostic approach to assessing the conditions within the spectrum offering further clarification of the criteria outlined in the 1996 IOM report. More research on determining specific diagnostic criteria for prenatal alcohol-related conditions (e.g., ARND) other than FAS is needed. The NTFFASFAE recently highlighted the critical importance of this issue along with improved diagnostic access and capacity for FASDs and continued support for intervention research and essential services for individuals with FASDs and their families. Task force recommendations in these areas are further detailed in the recent research and policy report, *A Call to Action: Advancing Essential Services and Research on Fetal Alcohol Spectrum Disorders* [12].

Efforts to establish reliable estimates of FAS prevalence have improved over time as clinical definitions have increased in specificity. Population-based surveillance estimates vary depending on the methodology used and the populations being studied. Estimates from CDC range from 0.2 to 1.5 cases per 1,000 livebirths [13–16], while estimates drawn from studies using a variety of methods (passive surveillance, active surveillance, and clinic-based studies) range from 0.5 to 2 cases per 1,000 livebirths [17]. Estimates of FAS in combination with other conditions along the spectrum (partial FAS, ARNDs, and ARBDs) range from 9 to 10 cases per 1,000 livebirths [17, 18]. While all of these estimates have limitations, it is clear that prenatal alcohol exposure can result in birth defects of major organ systems, growth disorders, and damage to multiple structures in the brain resulting in permanent and lifelong disabilities [7].

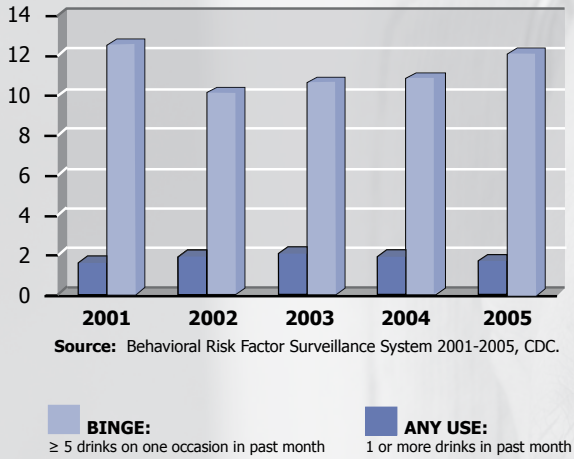
Since 1973, prevention has been a critical component in efforts to reduce prenatal exposure to alcohol and the prevalence of FASDs. The importance of developing effective FASD prevention strategies has been acknowledged through increased congressional support and federal resources devoted to efforts to reduce AEPs, to develop strategies to intervene with women at risk, and to support individuals with FASDs and their families. A timeline outlining national efforts to prevent AEPs is provided in Appendix A.

Despite ongoing efforts to inform women about the risks of alcohol use during pregnancy, alcohol use continues to be prevalent among childbearing-aged women in the United States. While most women reduce alcohol consumption after learning that they are pregnant [19], approximately 500,000 pregnant women report alcohol use within the past 30 days

[a]Partial FAS is "assigned to patients with confirmed maternal alcohol exposure to substantial amounts of alcohol in gestation, some components of the facial features of FAS, and any of the following: evidence of growth deficiency, CNS [central nervous system] neurodevelopmental abnormalities, or a complex pattern of behavioral and cognitive abnormalities." [8]

FIGURE 1.

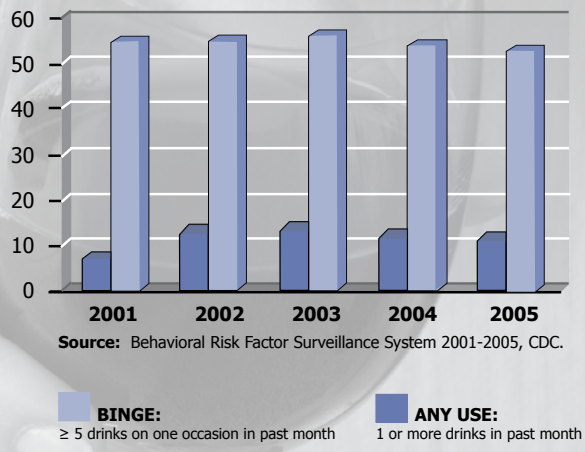
Alcohol Consumption Prevalence Among Pregnant Women Aged 18-44 Years



Source: Behavioral Risk Factor Surveillance System 2001-2005, CDC.

FIGURE 2.

Alcohol Consumption Prevalence Among Non Pregnant Women Aged 18-44 Years



Source: Behavioral Risk Factor Surveillance System 2001-2005, CDC.

Adapted from: Tsai JS, Floyd RF, Bertrand, J. Tracking binge drinking among U.S. childbearing-aged women. Prev Med. 2007;44:298-302

and approximately 80,000 report binge drinking [20]. In 2005, among women aged 18–44 years, 12% of pregnant women reported consuming alcohol during the past month, and about 2% reported binge drinking (defined as 5 or more drinks on one occasion in the past month) during that time (Figure 1). In that same year, 52.4% of nonpregnant women aged 18–44 years reported drinking during the past month, and 11.5% reported binge drinking (Figure 2).

Of further concern is that recent studies find the number of binge episodes has increased among people who report any binge drinking, including women of childbearing age [21, 22]. It is estimated that binge drinking prevalence among childbearing aged women, aged 18–44 years, for the years 2001, 2002, and 2003, was 11.9%, 12.4%, and 13.0%,[b] respectively [22]. This represents an increase of 0.9 million women during that time period who reported engaging in binge drinking [22]. Additionally, younger women are more likely to engage in binge drinking than are their older counterparts [23], which places them at risk for unplanned pregnancies and a host of other negative consequences [24, 25].

[b] Confidence intervals for these percentages were: 11.9% (11.4, 12.3), 12.4% (12.0, 12.9), and 13.0% (12.5, 13.5).

Also, many women do not recognize that they are pregnant until well into their first trimester, and thus might continue to drink during the early critical weeks of fetal development [26, 27]. Recent data indicate that 54.9% of women who might become pregnant[c] reported using alcohol and 12.4% of these women reported binge drinking [28]. These statistics and the fact that almost half of pregnancies in the United States are unplanned [29] emphasize the importance of developing effective prevention strategies to address the diverse needs of all women of childbearing age—those who are pregnant, who are trying to become pregnant, and who might become pregnant.

[c] In this analysis, women who might become pregnant "were defined as those who were not using any type of birth control and provided one of the following reasons: wanted a pregnancy (52.4%), did not care whether pregnancy occurred (19.1%), did not think they would become pregnant (14.3%), did not want to use birth control (5.7%), feared the side effects of birth control (4.2%), thought they were too old to become pregnant (1.8%), could not pay for birth control (1.3%), or had lapsed in use of a method (1.2%). Excluded from this defined category were women who were not sexually active, had a same-sex partner, had no sex partner, had undergone sterilization or hysterectomy, were postpartum breastfeeding, were currently pregnant, had other unspecified reasons for not using birth control, or did not provide any reason." [28]

ALCOHOL SCREENING FOR WOMEN AT RISK

It is recommended that primary care providers routinely screen their adult patients, especially women of reproductive age, for risk of excessive alcohol use or alcohol abuse disorders. Screening in the clinical setting coupled with brief interventions or referral for treatment of alcohol abuse disorders has been found to be an effective prevention strategy for FASDs as detailed in the following paragraphs.

Before intervening with a woman at risk for an AEP, screening for alcohol misuse utilizing a valid screening tool is critical to assessing severity of use and determining which intervention is most appropriate for that particular woman. Before reviewing the various prevention strategies, the need for alcohol screening and the use of appropriate screening tools to identify women at risk will be discussed.

In accord with the U.S. Surgeon General's 2005 Advisory on Alcohol Use in Pregnancy [4], both the American Academy of Pediatrics (AAP) and the American College of Obstetricians and Gynecologists (ACOG) recommend abstinence from alcohol during pregnancy for women who are pregnant or may become pregnant [1]. Also, it has been shown that past drinking habits are highly predictive of subsequent prenatal consumption so it is important to have some measure of prior alcohol use patterns [30–32]. Thus, it is beneficial to identify and, if necessary, modify a woman's alcohol use as early as possible in pregnancy or, ideally, before conception.

Physicians often have difficulty identifying problematic alcohol use, despite its prevalence in medical and other clinical settings [33]. In addition, evidence suggests that physicians are less likely to identify alcohol problems among female patients than among male patients [34]. Clinicians working in prenatal practices face particular challenges. First, many women will reduce their alcohol consumption once their pregnancy is confirmed, but they might have consumed harmful amounts before their pregnancy was known. This means that the standard quantity and frequency questions about current alcohol use might not be helpful. Second, women might underreport their prenatal consumption of alcohol. Reasons include embarrassment, fear, or beliefs that small amounts are inconsequential and not worth reporting [35]. Finally, popular screening instruments such as the CAGE[d] (whose use is taught in most medical schools) were developed for other populations (e.g., heavy drinking males) and are less accurate in identifying risk drinking by women [36].

Screening instruments that are recommended for women include the T-ACE, the TWEAK, and the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) [32, 36–40], along with the CRAFFT for adolescent populations. The name of each instrument, except the AUDIT-C, is an acronym for the first letters of key words in the test's questions. The T-ACE and the TWEAK were specifically developed for use with pregnant women.

The T-ACE consists of four questions that take less than a minute to ask. The questions are:

(**T**) **TOLERANCE:** How many drinks does it take to make you feel high?
(**A**) Have people **ANNOYED** you by criticizing your drinking?
(**C**) Have you ever felt you ought to **CUT DOWN** on your drinking? and
(**E**) **EYE OPENER:** Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover?

The T-ACE has been widely studied among diverse populations and has been proven to be a valuable and efficient tool for identifying a range of alcohol use among pregnant women and their partners, and women with infertility, among others [41–43]. The T-ACE is also included in *Drinking and Reproductive Health, A Fetal Alcohol Spectrum Disorders Prevention Tool Kit*, released by ACOG in 2006.

[d] The questions in the CAGE are: C - Have you ever felt you should cut down on your drinking? A - Have people annoyed you by criticizing your drinking? G - Have you ever felt bad or guilty about your drinking? E - Eye Opener: Have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover? The T-ACE is a modified form of the CAGE developed to screen for alcohol use in pregnant women.

Similar to the T-ACE, the TWEAK was designed to identify risk drinking by pregnant women [32, 38] and consists of four screening questions to elicit:

(T) **TOLERANCE** for alcohol;
(W) **WORRY** or concern by family or friends about drinking behavior;
(E **EYE OPENER**, the need to have a drink in the morning;
(A) "Blackouts" or **AMNESIA** while drinking; and
(K) the self-perception of the need to **CUT DOWN** on alcohol use.

A total score of 2 or more on the TWEAK is suggestive of harmful drinking patterns among obstetric patients [32]. In a study examining the usefulness of the TWEAK for a group of low-income pregnant women participating in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the specificity of the TWEAK was high for all racial and ethnic groups studied using a cut point of 2 or more; however, sensitivity, while high for White, non-Hispanic women, was moderate for Black or African-American and Hispanic women [44].

A recent large epidemiological study examined the use of the AUDIT-C on a sample derived from the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) conducted by the NIAAA [37]. The NESARC AUDIT-C includes modifications to the first three questions of the original AUDIT [45]. The AUDIT-C is based solely on AUDIT items reflecting alcohol consumption.

The AUDIT-C questions are:

- During the last 12 months, about how often did you drink ANY alcoholic beverage?
- Counting all types of alcohol combined, how many drinks did you USUALLY have on days when you drank during the last 12 months?
- During the last 12 months, about how often did you drink FIVE OR MORE drinks in a single day?

The AUDIT-C was developed to meet the challenge of brevity and ease of administration provided by other brief screening instruments.

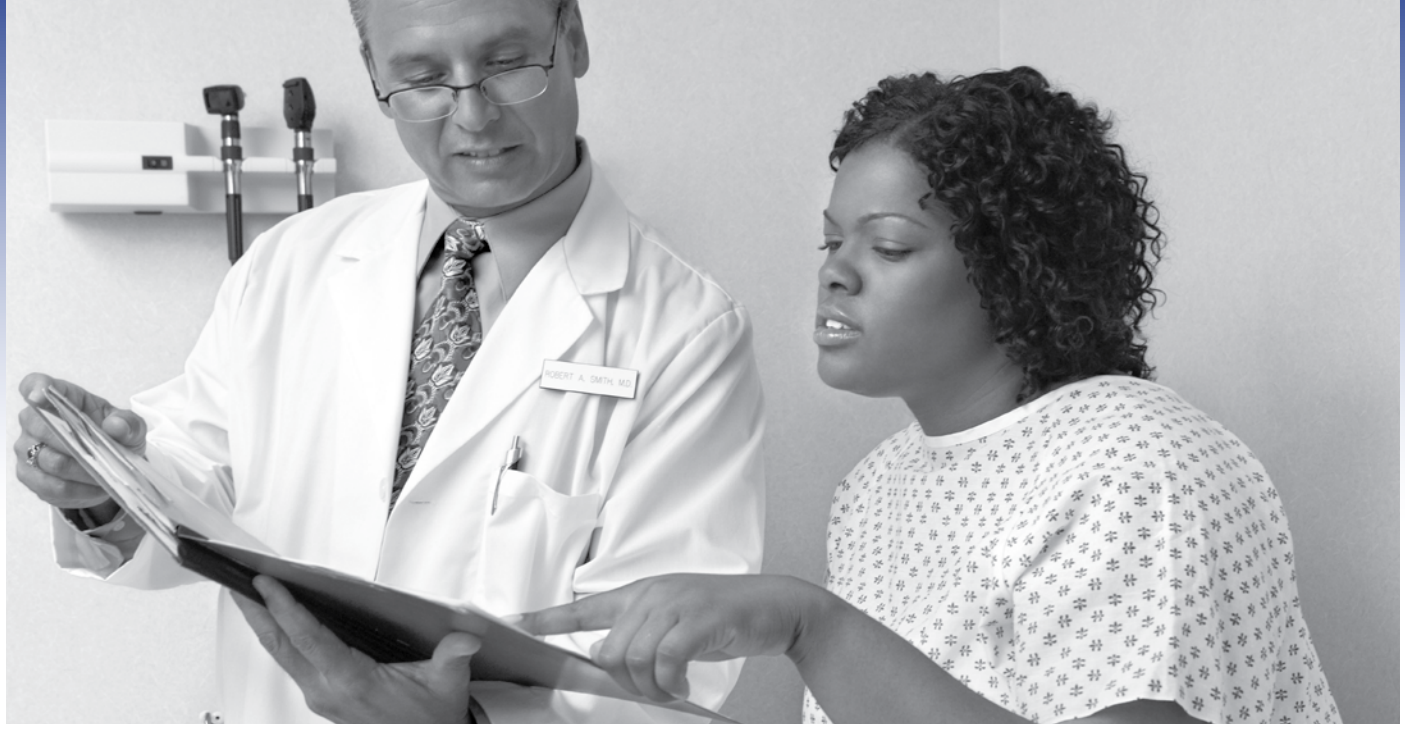
Alcohol use among teenage girls is an important public health concern and has been associated with decreased use of contraception and increased sexual assault and sexually transmitted diseases [46, 47]. The CRAFFT is a brief measure designed specifically to identify substance-related problems among adolescent populations [48].

This tool consists of the following five questions:

(C) Have you ever ridden in a **CAR** driven by someone (including yourself) who was high or had been using alcohol or drugs?
(R) Do you ever use alcohol or drugs to **RELAX**, feel better about yourself, or fit in?
(A) Do you ever use alcohol or drugs while you are by yourself, **ALONE**?
(F) Do you ever **FORGET** things you did while using alcohol or drugs?
(F) Do your family or **FRIENDS** ever tell you that you should cut down on your drinking or drug use?
(T) Have you ever gotten into **TROUBLE** while you were using alcohol or drugs?

The CRAFFT measure is simple to score, inquires about alcohol and drug use, and has been found to have good psychometric properties among a predominantly female sample 14 through 18 years of age [49]. The questions and scoring information for the T-ACE, the TWEAK, the AUDIT-C, and the CRAFFT are in Appendix B.

Consistent use of a screening instrument such as the T-ACE, the TWEAK, AUDIT-C, or the CRAFFT is likely to result in significantly improved identification of pregnant women at risk for alcohol consumption. For example, in one study, 82.8% of 278 T-ACE positive pregnant women consumed alcohol while pregnant. However, physicians correctly identified only 10.8% of the 278 women as being at risk for drinking while pregnant. This is similar to other findings in which, despite widespread use of the usual methods of inquiry about alcohol use as documented in the medical record, the sensitivity of the medical record was significantly less than the T-ACE for all levels of drinking [43]. Screening for alcohol use with validated screening tools has, therefore, been recommended to provide pregnant and preconceptional women with up-to-date, comprehensive, and effective medical care [50, 51].



CURRENT EVIDENCE

In preparation for development of this report, the NTFFASFAE Prevention Working Group embraced several assumptions in their deliberations on selecting FASD prevention strategies:

- Selected strategies must be evidence based.
- A full spectrum of prevention strategies (universal, selective, and indicated) should be considered.
- Interventions considered should target all women of childbearing age who are at risk for an AEP.

The prevention strategies outlined in this report are based on the prevention framework previously adapted by the IOM Committee to Study Fetal Alcohol Syndrome in 1996. The framework provides a spectrum of FASD prevention approaches that include universal, selective, and indicated prevention. Universal prevention is directed at all members of a population or a particular group, regardless of risk, and can include efforts such as supporting abstinence from alcohol use during pregnancy, raising awareness about FASDs, and implementing other broad-based alcohol policy and environmental strategies (e.g., reducing alcohol availability and increasing alcohol taxes). Selective prevention is directed at populations who might be at greater risk for a particular outcome because they are members of a group found to be at greater risk than the general population. For example, these interventions would be targeted to women of childbearing age who drink alcohol. Indicated prevention targets the highest risk individuals (e.g., those who can be identified as high-risk drinkers, abusers, and/or dependent on alcohol). Women who have had a previous AEP, women who are currently pregnant and drinking, or women who drink at high levels and can become pregnant could benefit from indicated prevention approaches. These levels of prevention move along a continuum from universal to indicated, becoming more specific and intensive as the severity of the risk behavior increases. It is important to note that some of the intervention strategies, specifically selective and indicated, discussed in this report might be appropriate for more than one of the categories along the prevention continuum.

An important caveat in understanding this framework is that these various intervention approaches together make up a comprehensive approach to preventing FASDs. As stated by the IOM committee in 1996, "a comprehensive FAS prevention program should provide multiple and overlapping levels of reinforcement, incentives, and controls" to prevent prenatal alcohol exposure, which would consist of both population-based strategies and more targeted individual-level interventions [6]. The NTFFASFAE recognizes this as well and is also committed to identifying what specific approaches are most effective based on the evidence to date. Studies exploring the effectiveness of multilevel FASD prevention approaches are currently underway and will be discussed further in the *Future Research Directions* section of this report.

The following sections describe interventions that show the most promise in prevention of AEPs and also provide recommendations, developed and approved by the NTFFASFAE, to help guide future actions in the areas of research, service delivery, education and training, and policy development.

Universal Prevention

Within the field of FASDs, universal prevention has been defined as those interventions that educate or raise awareness of the general public or women of childbearing age [8] about the dangers of drinking during pregnancy. Several universal interventions have focused on FASD prevention, relying on mass media, educational materials, media campaigns, and alcohol beverage labeling.

One published study of a mass media (posters and tear-off cards) campaign found an overall increase in knowledge and awareness of the risks of alcohol use during pregnancy among African-American and Latina adolescents [52]. The use of warning posters is another health strategy that educates communities about health and safety risks associated with drinking. They are often posted at points-of-purchase to reach most consumers, including moderate, heavy, and potential drinkers. Warning posters often supplement ongoing alcohol-education programs and reinforce the federally required health notices on alcohol beverage containers. Past research indicates that warning posters boost knowledge of alcohol risks [53, 54]. For example, follow-up surveys in New York City conducted one year following the introduction of the warning posters, showed an increase (14%) in awareness that birth defects are a consequence of drinking during pregnancy [54].

Kaskutas and Graves [53] evaluated the relationship between exposure to multiple sources of health messages about the risk of drinking during pregnancy and awareness and behavior related to this risk. A national sample was interviewed and the results suggested that the level of knowledge increased with an increasing number of different message sources (e.g., posters, warning labels, and advertisements). Among women of childbearing age (aged 18–40 years), significantly more women who were pregnant during the last year had a discussion about alcohol and the risk of birth defects in comparison with women who were not pregnant. Also, the pregnant women who drank were significantly more likely to report limiting their drinking for health reasons in comparison with the nonpregnant women.

In 1988, the U.S. Congress passed the Alcoholic Beverage Warning Label Act, requiring that a warning label must be attached to all containers of alcohol beverages. The warning label portion that was applicable to drinking during pregnancy stated the following: "Government Warning: (1) According to the Surgeon General, women should not drink alcoholic beverages during pregnancy because of the risk of birth defects [55]." Hankin and colleagues [56, 57] examined exposure to the warning label and its effect on drinking during pregnancy among inner-city African-American women attending a prenatal clinic. After implementation of the label law, there was a significant decrease in drinking among nonrisk drinkers, but no decrease in alcohol consumption was detected among heavier drinkers.

As previously shown, universal prevention efforts to reduce AEPs or FASDs have demonstrated increased awareness and knowledge about the topic of alcohol use and pregnancy, but rarely provide data on changes in alcohol consumption or reduced risk of an AEP. Thus, there is insufficient evidence on the effectiveness of universal approaches that prevent AEPs or FASDs. More research is needed to further explore the effect of these kinds of strategies.

When defined more broadly, universal prevention approaches targeting the general public focus on limiting alcohol consumption through alcohol policies and environmental changes. These broad-based strategies are important in changing social and cultural norms, as well as in regulating activities and environments that promote excessive alcohol use among the general population, including women of

childbearing age. Although not directly focused on preventing FASDs, they could have an indirect effect on FASDs by decreasing alcohol consumption among women of reproductive age. Following are two important examples of recent initiatives exploring the efficacy of population-based efforts to reduce alcohol consumption and availability and to increase public awareness about alcohol-related harms.

The Community Guide, as mentioned previously, is led by the Task Force on Community Preventive Services and is supported by CDC [58]. The Task Force on Community Preventive Services makes recommendations on the use of population-based public health programs and policies based on the scientific evidence on what practices have worked to improve health and to identify interventions that have not been adequately researched to help inform the public health agenda. Community Guide systematic reviews have been conducted for several health topics, including tobacco use, physical activity, vaccine-preventable diseases, diabetes, and cancer. The Task Force on Community Preventive Services recently selected "excessive alcohol consumption" as a priority topic area for systematic review. Although all reviews are not yet completed, proposed interventions to be evaluated include: enhanced enforcement of laws prohibiting the illegal sale of alcohol to minors, limiting alcohol outlet density and zoning restrictions, limiting alcohol advertising exposure, and increasing alcohol taxes. The Community Guide offers a systematic, evidence-based approach to identifying population-based interventions to reduce alcohol-related harms. Recommendations on these interventions will be available soon.

The World Health Organization (WHO) has recognized the importance of alcohol policy internationally since it began in 1946. In recent years, several publications have been developed that emphasize the public health impact of alcohol across the world and have outlined strategies to reduce the harmful consequences of alcohol consumption. In 2003, the WHO Alcohol and Public Policy Group (APPG) conducted an extensive review of the literature that focused on 31 policy-relevant prevention strategies and interventions. These were further classified into seven categories: (1) regulating physical availability of alcohol, (2) pricing and taxation, (3) altering the drinking context, (4) education and persuasion, (5) regulating alcohol promotion, (6) drinking–driving countermeasures, and (7) treatment and early intervention.

The WHO noted the following strategies as best practices: minimum legal age purchase regulations, government monopoly of retail sales, restricted hours or days of sales, outlet density restrictions, increase in alcohol taxes, sobriety check points, lowered blood alcohol content (BAC) limits, drivers license suspension, graduated licensing for novice drinkers, and brief interventions[e] for hazardous drinkers. Less effective practices were also noted, though less effective was not intended to imply that the practices should not be considered, only that there was a lack of research to support their effectiveness. The less effective strategies included: voluntary codes of responsible practice in serving alcohol, alcohol-free activities, alcohol education in schools, college student education, public service messages, warning labels, designated drivers, and ride services. Future research considerations include the support of general, population-based strategies due to their cost-effective and synergistic effects, as well as support of harm reduction and high-risk group strategies. Such strategies include screening and brief interventions, server interventions, enforcement of minimum purchase age, advertising bans, and advertising content or exposure restrictions. While the WHO publication did not focus on interventions targeted specifically to women of childbearing age, it highlights the importance of an evidence-based approach to selecting alcohol prevention strategies [59]. These kinds of population-based, alcohol policies, if implemented successfully, could ultimately affect alcohol use among women and the prevention of FASDs.

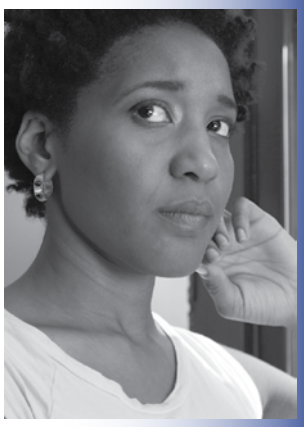
Overall, these results indicate that universal prevention interventions to reduce AEPs might have limited effects; however, better methodological approaches to assess the effects of these strategies for women of childbearing age are warranted. It is also important to recognize that universal prevention approaches play an essential role in reducing alcohol-related harms, limiting per capita alcohol consumption, and raising awareness about the dangers of excessive alcohol use and the risks associated with alcohol use during pregnancy.

Universal Prevention

Recommendation 1:
Expand and test methodological approaches for assessing the effects of universal prevention strategies on alcohol use patterns and reproductive health outcomes of childbearing-aged women.

Recommendation 2:
Promote the implementation of effective population-based interventions for reducing alcohol-related harms in the general population, including women of childbearing age, as they are validated.

[e] Brief alcohol interventions are time-limited sessions aimed at motivating the client to change his or her alcohol-related behaviors using a variety of self-help and preventive strategies.

Selective and Indicated Prevention

Selective prevention strategies target individuals who are at greater risk for a particular outcome because they are members of a subgroup known to be at higher risk than the general population. Specifically, in regards to FASDs, selective prevention strategies are directed to women of childbearing age who misuse alcohol. These interventions typically are more targeted and intensive compared to universal prevention interventions and can include outreach, screening, referral, and brief intervention activities with the intent of promoting the health of the mother and preventing or minimizing harm to the fetus. Indicated prevention strategies involve a screening process to identify individuals who exhibit early signs of problems related to alcohol use and assist individuals to decrease or discontinue their use of alcohol.

Both selective and indicated strategies are important in FASD prevention and fall along a continuum depending on the severity of the problem. The following sections discuss effective preventive interventions, using selective and indicated strategies, to assist individuals who are risk drinkers, including women who are pregnant and women of childbearing age.

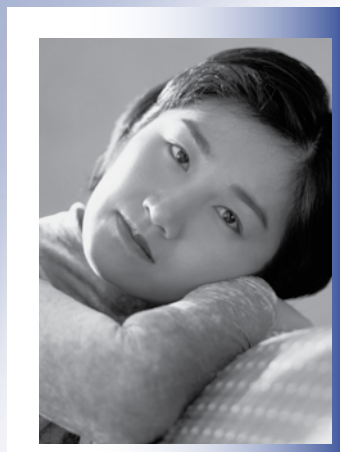
After reviewing the literature, the NTFFASFAE identified brief alcohol interventions as the most promising approach to reducing alcohol use. Effectiveness of brief interventions has been demonstrated in multiple settings and with specific population groups. Various federal organizations, medical boards, businesses and other groups are also recognizing the effectiveness of these strategies in reducing alcohol and drug misuse in the United States. Several significant recommendations and actions related to alcohol screening and brief interventions can be found in Appendix C.

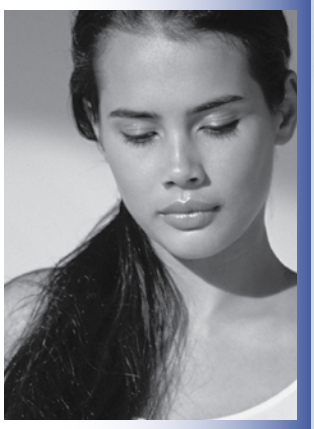
Brief Alcohol Interventions: General Population

Primary Care Settings.

The Center for Substance Abuse Treatment's Treatment Improvement Protocol (TIP) Series #34, *Brief Interventions and Brief Therapies for Substance Abuse* [60] describes brief alcohol interventions as time-limited sessions aimed at motivating the client to change his or her alcohol-related behavior using a variety of methods and different types of health providers. Brief intervention studies have been conducted successfully in a wide range of health care settings, including hospitals and primary health care locations [61–68]. Individuals recruited from such settings are likely to have some contact with a health care professional over the course of study participation and, therefore, would have potential alcohol-related professional assistance available if needed. Nonetheless, many or most of these patients would not be identified as having an alcohol problem by their health care provider and would not ordinarily receive any alcohol-specific intervention. The results of the many clinical trials have been evaluated and summarized in meta-analyses and reviews by Bien et al. [69], Kahan et al. [70], Wilk et al. [71], Poikolainen [72], Ballesteros et al.[73]; Whitlock et al. [74], and Beich et al. [75].

Most of the brief alcohol intervention clinical trials were conducted in primary care settings. In 2004, the U.S. Preventive Services Task Force (USPSTF) [74] conducted a systematic review of the evidence for the efficacy of behavioral counseling interventions in primary care to reduce at-risk or harmful alcohol use by adults. There were 12 trials that met their quality and relevance inclusion criteria (adequate randomization; maintenance of comparable groups; high follow-up rates; equal, reliable, and valid measurements; clear definitions of the interventions; consideration of important outcomes; and intention-to-treat analysis). Results indicated that participants in the experimental groups reduced their average number of drinks per week by a 13%–34% greater rate than participants in control groups. Also, the proportion of participants in the experimental groups who reported drinking at safe or recommended drinking levels was 10%–19% greater than controls.





From this meta-analysis, the USPSTF concluded that: (1) brief interventions can reduce alcohol use for at least 12 months among younger and older adults; (2) both younger and older adults are receptive to this approach; and (3) that results remain mixed on longer term use and the reduction of alcohol-related harm. The USPSTF also reported that evidence on the effectiveness of counseling to reduce alcohol consumption during pregnancy was limited; however, studies among the general adult population indicated that behavioral counseling interventions were effective among women of childbearing age. Across meta-analytic reviews [69–75], some key elements of successful brief interventions have emerged. These include the use of feedback on drinking behavior; advice to change; goal setting for change; more than one contact or some follow-up, or both; provider training (varied from 15 minutes to 2.5 hours); and additional staff or system supports for screening or assessment. However, implementation of brief interventions in "real world" settings is slow, pointing out the need to address time, payment, and logistical barriers to begin to make these strategies a part of standard clinical practice.

Emergency Medical Settings.

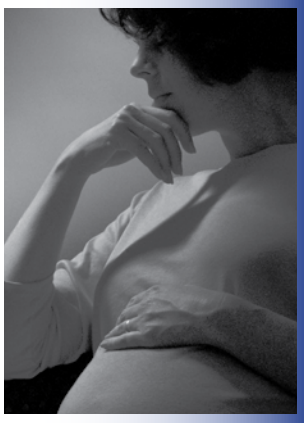
The emergency department (ED) has long been considered an important venue for identifying and intervening with patients who have alcohol problems, with a special emphasis on those presenting with injuries [76–87] as it provides a "window of opportunity" when the individual might be more vulnerable, open to seeing the connection between current consequences and his or her drinking or drug abuse, and motivated to change [83, 84, 86]. In one of the first studies conducted in a Level 1 trauma center, patients who screened positive for risk drinking were randomized into an intervention or control procedure. The intervention was a single motivational interview (approximately 30 minutes in length). At follow-up, the intervention group demonstrated an average reduction in drinking of 22 drinks per week compared with a 7–drink reduction per week for the control group [88].

An additional randomized trial [89] targeted injured ED patients who screened positive for at-risk drinking. Participants in the tailored message booklet with brief advice group significantly decreased their average weekly alcohol consumption by 48.5% and those in both of the "brief advice" groups (tailored or generic) significantly decreased their average consumption in comparison with the "no brief advice" group. Additionally, younger adult females (aged 19–22 years) who received brief advice were the most likely to decrease their heavy episodic drinking. Also, a systematic review on screening and brief interventions (SBI) for alcohol problems in EDs [90] was recently conducted as a supplement to a review previously conducted by the USPSTF. Four of the included studies [91–94] were conducted in EDs and all demonstrated positive outcomes. In general, the studies found a significantly lower incidence of alcohol-related injuries, drinking and driving, and alcohol-related problems [93]. It was also noted that following a brief intervention, over 50% of the patients subsequently reported a reduction in alcohol use [91, 94]. Additionally, two of the included studies demonstrated that brief interventions in the ED were effective at increasing referrals of patients to substance abuse treatment centers [91, 92]. To this end, the study of ED interventions focused on alcohol issues has proven to be effective and constitutes fertile ground for future research, including studies of reproductive-aged women and the prevention of AEPs.

College Settings.

Drinking among college students has long been recognized as a significant problem with far reaching public health implications [95, 96]. Female college students are especially at risk for alcohol-related negative consequences, including sexual assault and unplanned pregnancies [24, 25]. Despite these negative consequences, college women have steadily increased their levels of alcohol consumption [97]. These trends exist in disquieting contrast to the increased college and community prevention efforts during the same time period, suggesting a continued need for more effective intervention approaches.

Fortunately, brief intervention approaches have been shown to be low-cost, effective treatment alternatives for alcohol problems among college populations. Effective college drinking prevention programs frequently employ multicomponent approaches to brief intervention strategies, combining



cognitive–behavioral[f] skills training with norms clarification[g] and motivational enhancement[h] [96]. These strategies are similar to those that youth report that they use themselves to reduce or stop their own drinking [98]. Collectively, individual- and group-focused brief interventions have proven valuable in both preventing and treating alcohol problems among male and female college students [99–106]. For example, the Alcohol Skills Training Program (ASTP) is a cognitive–behavioral alcohol prevention program designed to teach basic principles of moderate drinking and ways to cope with high-risk situations for excessive alcohol consumption [106]. The ASTP has been shown to reduce drinking rates and associated problems at both 1- and 2-year follow-ups [102]. The Brief Alcohol Screening and Intervention for College Students (BASICS) [107] consists of an individualized alcohol assessment and feedback intervention during two 50-minute sessions. Several studies have shown the efficacy and effectiveness of BASICS with high-risk college students, with results indicating that clients who received the BASICS program showed significantly greater reductions in negative alcohol-related consequences and lower reported drinking quantities compared with a high-risk control sample over a 4-year follow-up period [108]. A recent study, designed specifically for women, examined alcohol use among freshman college students using a single session, brief motivational intervention that focused on female-specific reasons for drinking [105]. Results revealed that, compared with an assessment-only control group, the group that received the brief intervention drank fewer drinks per week, drank fewer drinks at peak consumption events, and had fewer alcohol-related consequences over a 10-week follow-up period. Further, the intervention that targeted women's reasons for drinking was more effective in reducing consumption for participants with high social and enhancement motivations for drinking.

[f] Cognitive-behavioral skills training works to change a person's problematic beliefs about a behavior using specific tools and techniques to help modify the behavior (e.g., documenting the frequency of the behavior, learning how to manage stress, developing strategies to avoid situations that trigger the behavior [96].)

[g] Norms clarification examines a person's perceptions about the acceptability of a particular behavior and uses data to challenge beliefs about the tolerance for the behavior as well as beliefs about the number of people who engage in the behavior [96].

[h] Motivational enhancement interventions are designed to stimulate a person's intrinsic desire or motivation to change their behavior; these are similar to motivational interviewing interventions [96].

Results from these studies suggest that brief multicomponent interventions aimed at college students, and those specifically designed for women, are effective and should be considered when treating college-aged women in multiple care settings.

Selective and Indicated Prevention: Brief Alcohol Interventions – General Population

Recommendation 3:
Ensure that funded intervention studies on alcohol use, abuse, and dependence include analyses of gender and age effects, and examine pregnancy outcomes where possible.

Recommendation 4:
Promote the use of evidence-based intervention strategies tested in primary care, emergency rooms, and college settings for use in populations of childbearing-aged women at risk for an alcohol-exposed pregnancy.

Brief Alcohol Interventions: Pregnant Women

Pregnant women, who are generally motivated to change their behaviors and only infrequently have severe alcohol problems, might be especially receptive to a brief intervention [109]. Many studies and demonstration projects have shown that health providers can intervene with pregnant women who consume alcohol. In 2001, a review of 22 alcohol intervention studies in prenatal clinics was conducted [110]. Thirteen of these studies were single-treatment interventions of varying types. Many of them were able to show that women could be screened and recruited successfully in prenatal care settings and that women were also able to reduce their drinking during pregnancy. Nine of the remaining studies did use comparison groups when conducting interventions. Overall, the authors concluded that brief interventions in controlled trials can produce positive results (reduced alcohol use). The authors also recommended that brief interventions and motivational interviewing are two approaches that can be used by health professionals when intervening with pregnant women. However, it was also noted that many of the studies reviewed

were limited by lack of control groups, small numbers of heavy drinkers, and an inability to evaluate the effects of treatment, suggesting that more research in this area is needed.

Two more recent randomized trials of brief interventions for alcohol use by pregnant women highlight current research advances in this area. The first study by Chang and colleagues [111] was a randomized trial to test the effectiveness of a brief intervention in the reduction of prenatal alcohol use by 304 women when a partner was included. The women had positive T-ACE results and were considered at risk for drinking while pregnant. All completed initial diagnostic and postpartum interviews. Less than 20% of the participants were abstinent from alcohol at enrollment, which occurred at a median of 11.5 weeks of gestation. Those who drank averaged more than 1.5 drinks per episode. With a 95% follow-up rate, prenatal alcohol use declined in both the treatment (brief intervention) and control groups. Factors associated with increased prenatal alcohol use after randomization included more years of education, extent of previous alcohol consumption, and temptation to drink in social situations. Brief interventions for prenatal alcohol use reduced subsequent consumption most significantly for the women with the highest consumption initially. Moreover, the effects of the brief intervention were significantly enhanced when a partner participated.

Another study by O'Connor and Whaley [112] involved 255 pregnant women who reported drinking alcohol and were participants in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) program. These women were randomized by WIC center to an assessment only or brief intervention group. The brief intervention consisted of 10- to 15-minute sessions of counseling by a nutritionist. Participants were followed to the third trimester of pregnancy. The majority (87%) of the women required only one brief intervention to attain abstinence from alcohol use. Women in the brief intervention were five times more likely to report abstinence from alcohol use after intervention than the women in the assessment only group, although women in the assessment only group also reduced their prenatal alcohol use significantly. Women who were heavier drinkers (drinking two or more drinks maximum per drinking occasion) and received brief interventions had better newborn outcomes of higher birthweights and lengths, and lower mortality rates.

Brief Alcohol Interventions: Preconceptional Women

In the late nineties, the CDC sponsored a multisite, single-arm study (Project CHOICES) to test the feasibility and effect of a motivational intervention to reduce alcohol consumption or increase the use of effective contraception, or both, among nonpregnant women who were at risk for an AEP. This was the first study to target a group at risk because of both contraceptive and alcohol use patterns. The intervention included four brief, motivational interviewing (MI) counseling sessions with a mental health professional and one contraceptive counseling session with a family planning clinician. Of the 230 eligible women, 190 were enrolled in the study, and 143 (75.3%) completed a 6-month follow-up interview. At 6-month follow-up, 68.6% were no longer at risk for an AEP. Of those, 12.6% reduced drinking only; 23.1% used effective contraception only; and 32.9% reduced drinking and used effective contraception. The results were consistent across the diverse sites. The promising results from this innovative, dual-focused (alcohol use and contraception) approach used in Project CHOICES provided the basis for the development of a randomized clinical trial (RCT) to further test these methods [113]. In the Project CHOICES RCT, Floyd and colleagues [114] randomized 830 nonpregnant women in an MI trial and followed 593 of them for 9 months. At follow-up, the intervention group was found to have a significant decrease in the risk for AEPs, including a significant decrease in risky drinking (eight or more drinks per week or five or more standard drinks in a day), and a significant increase in effective contraceptive use.

An additional study based on Project CHOICES targeted nonpregnant college women of a mid-Atlantic university who were at risk for an AEP. Compared to the control group, the intervention group was found to have a significant decrease in the risk for AEPs and a significant increase in using contraception effectively at the 1-month follow-up [115].

Various methods have been used to increase knowledge about alcohol use and pregnancy, including news reports, articles in the popular press, public service announcements, and billboards. Few studies have assessed the effectiveness of these efforts on the knowledge of FASDs, attitudes about drinking during pregnancy, and women's actual alcohol consumption during pregnancy. One study [116] examined the use of, knowledge about, and attitudes toward alcohol among women requesting emergency contraception or a pregnancy test, or both. This study also evaluated the effects of a brief intervention in educating participants about the risks of FASDs via an educational pamphlet with a follow-up immediately after reading the pamphlet. The study demonstrated statistically significant improvement in mean knowledge scores.

Selective and Indicated Prevention: Brief Interventions – Pregnant and Preconceptional Women

Recommendation 5:
Establish formal alcohol screening, using validated instruments, and brief intervention programs that are culturally and linguistically appropriate for women of childbearing age.

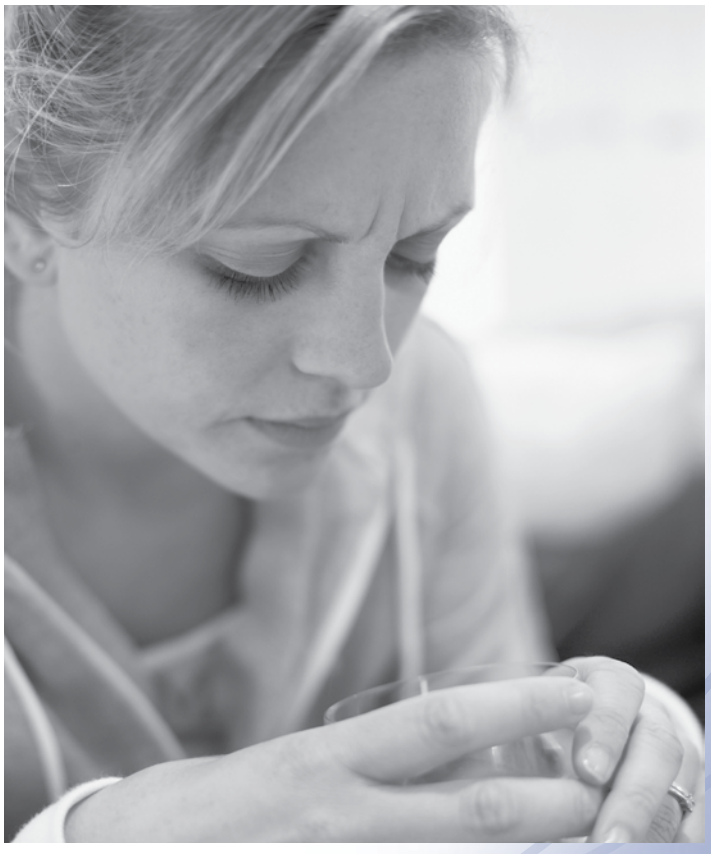
Recommendation 6:
Expand the education and training of health and social service professionals in the areas of screening and intervening with women at risk for alcohol-exposed pregnancies.

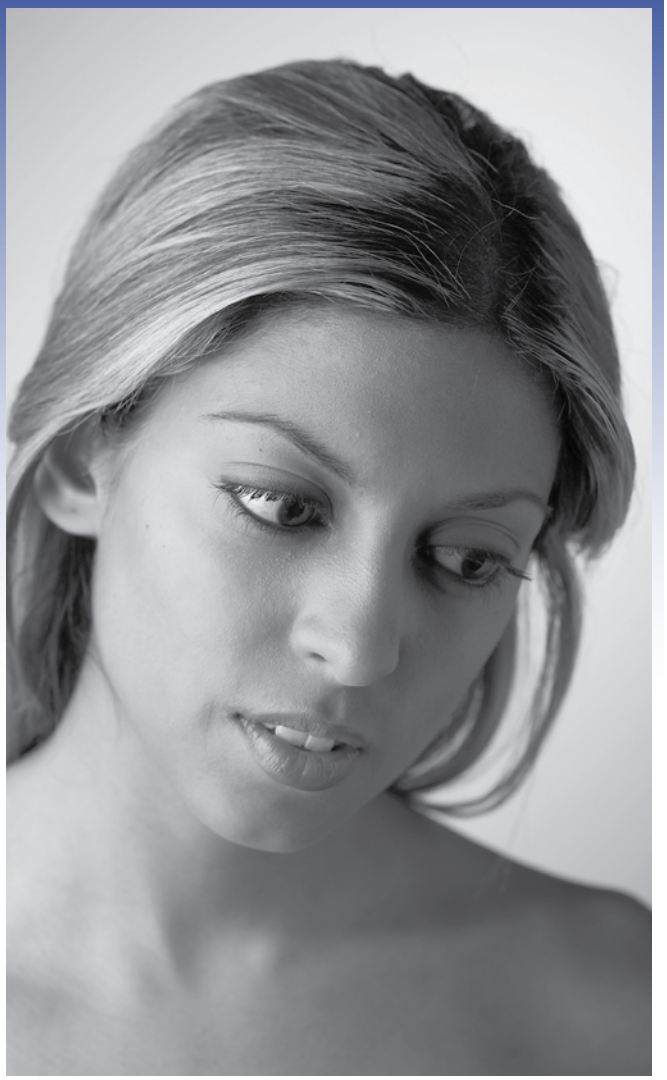
Interventions for Women at Highest Risk

Effective approaches to FASD prevention among the highest risk women (i.e., mothers who have previously given birth to an alcohol-affected child) could have a significant effect on the problem. However, reaching women at highest risk is difficult and their treatment is complex. In reviewing the prevention literature addressing alcohol misuse, there were many substantive studies that did not include gender-specific findings because of the small number of female participants. Given the many differences between males and females in alcohol dependence and its effects, more gender-specific research and analyses of available data are clearly needed.

Studies confirm the heightened vulnerability of women to alcohol dependence in that women advance more quickly from regular use to dependence and treatment than do men [117]. Ensuring that childbearing-aged women who are alcohol dependent are deftly identified and treated requires a continuum of health care services that includes initial screening, in-depth assessment, specialized treatment, and relapse prevention [118]. Brief interventions alone are not considered adequate treatment for this population [119]. Further, ensuring long-term abstinence after treatment requires intensive case management and aftercare [120]. Evidence-based treatment options for alcohol-dependent childbearing-aged women include both behavioral and pharmacological interventions. For those who are pregnant while still using alcohol, treatment is complex [121, 122], and even further specialized when those who are pregnant are still adolescents [123].

Women with Alcohol Dependence.
Substance abuse treatment programs specifically designed for women can be beneficial in improving treatment outcomes. Improvements can include changes in substance use, mental health symptoms, perinatal or birth outcomes, employment, self-reported health status, and HIV risk reduction [124]. Strategies in the treatment of alcohol dependence disorders include treatment matching (level and intensity) and modality matching (specific therapies) [125, 126]. In a landmark, large-scale study (Project MATCH) [127], three prevailing behavioral therapies used in the treatment of alcohol dependent adults — Cognitive Behavioral Therapy (CBT), Twelve-Step Facilitation (TSF), and Motivational Enhancement Therapy (MET) — were matched with a variety of client attributes to test the benefits of treatment matching. The study consisted of two parallel randomized controlled studies, one conducted among alcohol dependent participants receiving outpatient therapy and the other conducted among participants receiving aftercare therapy following inpatient or day treatment in a





hospital. The overall aim of each study was to determine the responses of subgroups of participants to CBT, TSF, and MET as measured by the percentage of days abstinent (PDA) and the average number of drinks per drinking day (DDD). Study participants were randomized into the three treatment therapies over a 12-week period and assessed at five follow-up periods: 3, 6, 9, 12, and 15 months. Participants in the CBT and TSF conditions were seen weekly and those in the MET condition were seen for four sessions at the first, second, sixth, and twelfth weeks. Project MATCH participants showed significant and sustained improvements in increased PDA and decreased number of DDD. Results also found no clinically significant outcome differences in the three treatment conditions overall and significant matching results only for psychiatric severity and TSF (in support of assigning outpatient clients without psychopathology to TSF). Overall, the study findings supported the utility of all three treatment therapies with the potential for cost-savings for the four-session MET, which was lower in intensity but equally as effective as the others. The only gender-related effect reported in the study was that gender was predictive of the PDA for those participants receiving aftercare therapy. Males reported fewer abstinent days than females over the follow-up period.

Some studies have found that self-help organizations such as Alcoholics Anonymous (AA) are cost-effective adjuncts to treatment [128, 129] in that they provide daily and weekly opportunities for support [129]. In the original Project MATCH Study, AA attendance was encouraged for participants in the TSF and MET intervention groups. In a follow-up study of Project MATCH at 3 years, 49% of participants from all three treatment groups reported attending AA in the 90-day period before the follow-up interview [130]. Gender-related effects were not reported. A recent Cochrane review [128], however, found no conclusive evidence on the effectiveness of AA or TSF interventions in reducing alcohol use and achieving abstinence, although the authors also acknowledged that there were some limitations in the studies reviewed. Additional studies on the effectiveness of AA and other 12-step programs are needed.

Studies have investigated the efficacy of pharmacological interventions (naltrexone and acamprosate) for alcohol dependence treatment in specialized and nonspecialized settings, with and without behavioral interventions. While reviews of earlier studies found both naltrexone and acamprosate efficacious in treating alcohol dependence [131, 132], a more recent randomized controlled trial funded by NIAAA found efficacy for naltrexone with or without behavioral interventions, but did not find efficacy for acamprosate alone or in combination with behavioral interventions [133]. Samples used in these studies included both men and women; however sample sizes for women tended to be smaller than for men.

Guidelines for prescribing medications (naltrexone, acamprosate, and disulfiram) have been published by NIAAA in their recent clinical guide, *Helping Patients Who Drink Too Much* [134]. The guide also indicates that pharmacotherapy for alcohol dependence is most effective when combined with some behavioral support but not necessarily specialized, intensive alcohol counseling. Also, it is important to know that none of these medications have been approved by the U.S. Federal Drug Administration for use during pregnancy, but they might prove to be useful in reducing alcohol dependence among general populations, including nonpregnant, childbearing-aged women in specialized and nonspecialized primary care settings. Substance abuse treatment protocols are also available from the Substance Abuse and Mental Health Services Administration (SAMHSA) [118, 135] for various audiences, including pregnant women, that can be beneficial to clinicians in primary and specialized care settings.

Tailored Substance Abuse Treatment Interventions. There is a growing literature describing the availability and efficacy of substance abuse treatment for women, including those who are pregnant [122, 136–137]. Tailoring substance abuse treatment to women often leads to better outcomes [138]. Availability of prenatal care and onsite therapeutic childcare and access to comprehensive programming are some of the factors found to enhance treatment completion, length of stay, and positive child and mother outcomes, and to reduce mental health problems [122].

Other studies have evaluated supportive educational interventions among very high-risk substance-abusing women. One study [139] focused on pregnant and postpartum substance-abusing mothers and their families, while another study [140] focused on young women with FASDs. In both studies, women were enrolled in an intensive, one-on-one intervention. The primary focus of the intervention was to assist the participants in obtaining drug and alcohol treatment, staying in recovery, considering family planning, and addressing the complex issues that arise as a result of dysfunctional lives (i.e., lack of housing, domestic violence, and child custody and other legal issues) through relationship-oriented, intensive one-on-one support and education. The results were positive for treatment participation, abstinence from alcohol use, and use of reliable birth control. There was also a decrease in subsequent pregnancies in the target populations.

For the prevention of FASDs, one strategy growing increasingly possible is to identify and seek out women who are at known risk for producing children with FASDs because they have already borne an alcohol-affected child [141, 142]. U.S. data indicate that these are women with high rates of both unintended and alcohol-exposed pregnancies [143]. Data from South Africa indicate that these might be women who have poor nutrition and possibly have FASDs themselves [142]. Overall, the level of risk for producing a child with an FASD is influenced by environmental and behavioral conditions that vary between populations and among individual women, and by family genetic histories. One feasible method for finding and serving women at known risk for bearing a child with an FASD is through specialized FASD diagnostic clinics [144, 145]. Another method is through community mobilization for outreach, identification, and service provision to women at known risk for an AEP, as part of a multilevel, comprehensive FASD prevention program [146]. Descriptive data about these high-risk women emphasize the importance of providing social support and mental health treatment as well [144].

In sum, there are many types of interventions that can be implemented for women of childbearing age who require support to abstain from alcohol use before, during, and after pregnancy. Studies indicate that active, tailored interventions can decrease alcohol use and subsequent AEPs among these high-risk women, with benefits to their offspring as well.

Intergenerational Strategies for Prevention and Intervention. Education is an important area of intervention for families and children of alcoholics, because alcohol dependence and FASDs can be intergenerational phenomena. An estimated 13%–25% of children of alcoholics are likely to become alcoholics themselves [147]. These findings underscore the need for preventive efforts aimed at addressing familial predispositions for alcohol abuse among children of alcoholics, especially with women of child-bearing age. Information about parental alcoholism can also be useful in assessing risk for an AEP. A recent review on prevention and intervention strategies for working with children of alcoholics [148] highlighted several basic prevention elements that should be included across existing intervention programs for children of alcoholics. These include: (1) providing accurate information and education about alcohol, (2) promoting specific social skills and coping strategies, (3) providing social support and addressing socioemotional issues, and (4) identifying alternative activities to substance use. For individuals with FASDs who are raising children, tailored and intensive education and support for these caregivers are especially important to prevent alcohol dependence among their children.

Interventions for Women at Highest Risk

Recommendation 7:
Ensure access to appropriate alcohol treatment services for women of childbearing age, especially those with treatment barriers, such as pregnant women and adolescents.

Recommendation 8:
Ensure that alcohol treatment options for all childbearing-aged women take into consideration their unique needs, such as pregnancy, co-occurring disorders, and other special treatment needs.

Recommendation 9:
Conduct further research aimed at implementing and evaluating treatment and intensive case-management approaches for women at highest risk of having a child with a fetal alcohol spectrum disorder.

Recommendation 10:
Promote research investigating interventions focused on the potential intergenerational effects of prenatal alcohol use on offspring.

FUTURE RESEARCH DIRECTIONS

The following paragraphs outline a number of areas for further exploration and research to improve efforts to reduce AEPs.

Improved Surveillance and Monitoring:
Over the past 30 years, considerable progress has been made in the area of FASD prevention. Unfortunately, one major barrier to evaluating prevention programs has been the lack of baseline prevalence data on FAS and other alcohol-related conditions. Standardized, long-term FASD surveillance methods to track the spectrum of conditions and the continued monitoring of risk factors and behaviors of childbearing-aged women need to be in place in order to better measure the prevalence of FASDs, understand the populations at greatest risk, and assess if evidence-based interventions are having an effect. Also, finding ways to identify women at highest risk because of prior alcohol-affected pregnancies is another surveillance measure that could inform FASD prevention efforts.

How Brief Interventions Work:
It is clear that brief alcohol interventions should be widely disseminated, supported, and integrated into medical, social service, and other venues. Brief interventions can be done in a variety of ways using cognitive behavioral approaches or motivational interviewing techniques; can be delivered in different settings; and have been tested with diverse populations, including pregnant and nonpregnant women. However, more research is needed to better understand how brief interventions work. Deconstructing these types of interventions to discover which components are essential for success can help inform implementation of these types of interventions. Specific components needing further exploration include: the optimal number of sessions required in an intervention; the training and qualifications needed to deliver the interventions, the most effective modes of delivery (e.g., face to face, self help, and online), and effective adaptation of brief interventions to different cultures.

Women's Contraceptive Practices:
Several brief interventions and longer term intensive interventions for women at highest risk have been successful in using a dual approach focused on reducing alcohol consumption or improving effective contraception, or both. Many pregnancies in the United States are unplanned [29], so continued efforts to better understand the role of family planning in preventing FASDs is critical, especially when working with preconceptional women.

Use of the Internet and Other Technologies:
Consumer use of e-health tools, such as the Internet and other kinds of electronic technologies, continues to grow. These methods are appealing not only because of lower cost, ease of use, and interactivity, but also because they provide a degree of anonymity when dealing with a potentially sensitive topic such as alcohol misuse. A 2006 Internet survey conducted by the Pew Internet and American Life Project revealed that 8 out of 10 American adults had looked online for health information, making this an important vehicle for communicating important health messages [149]. In addition, the U.S. Department of Health and Human Services recently published the report, *Expanding the Reach and Impact of Consumer e-Health Tools* [150]. This report provided a review of recent research pertaining to e-health tools used with various health topics. The report indicated that, while the research is promising, the body of knowledge about which groups will engage in and benefit from e-health methods remains unclear. Studies evaluating the feasibility and effectiveness of Web-based alcohol interventions have also been conducted [151–153]. Federal agencies are posting regular blogs and podcasts about health topics on their websites, while other health and advocacy groups have begun to explore the use of YouTube™, Facebook©, and text messaging as ways to reach certain target audiences. More research on the effectiveness of new technologies to communicate health information or to deliver personalized interventions to women of childbearing age is needed if we are to take advantage of these technologies as innovative tools to help reduce AEPs.

Multilevel FASD Prevention Approaches:
While current evidence points to screening and brief intervention as a promising approach to prevention of AEPs, it is important to recognize that efforts are also underway to assess the effectiveness of multilevel, communitywide approaches to preventing FASDs. Two studies, funded by the NIAAA, are testing the FASD prevention framework put forward by the IOM in 1996. The first study targets participants from four Northern Plains Indian communities, two control groups, and one urban research site. Using research and prevention techniques developed previously, this project is assessing the effectiveness of comprehensive, communitywide FASD prevention at the universal, selective, and indicated levels, and is identifying those specific strategies that are most successful. Some of the strategies being tested include: targeted messages to specific groups, routine screening for alcohol use, brief alcohol interventions, motivational enhancement therapy, community motivation, case management, and policy advocacy. The project also monitors various epidemiological characteristics of the communities such as maternal risk factors for FASDs and the diagnosis

of FAS and related conditions, and uses a combination of control and pre- and post-measure designs to assess the specific prevention techniques.

The second study is a multisite efficacy trial of a comprehensive, communitywide FASD prevention program (with urban and rural components) in the Western Cape Province of South Africa. The prevention site is matched with four comparison communities. This study is similar to the previous one in that it will also evaluate the effectiveness of specific indicated, selective, and universal prevention techniques. This trial is unique in that it has been modified to address the comorbid condition of HIV/AIDS that many South African women face in addition to dealing with an alcohol problem or having a child with an FASD, or both. It also is unique in that the prevention strategies are delivered by indigenous workers. This project uses methods similar to those of the previous study to monitor maternal risk factors and diagnosis of FAS and also assesses specific prevention techniques using comparison communities and pre- and post-prevention designs.

More research is needed on multilevel approaches to FASD prevention. These two studies will yield important findings on the feasibility and effectiveness of multilevel FASD prevention approaches and could potentially provide more direction on how these interventions should be developed, implemented, and evaluated. Also, related to this is the question of how to measure the effect of multiple prevention efforts. Recently, researchers at the University of Washington assessed the effect of multilevel prevention efforts in the state of Washington over the past 30 years [154]. While more work needs to be done in determining the best methods of evaluating multilevel approaches, the Washington study is a good example of how existing data can be used to describe progress made in a community over an extended period of time.

Universal Approaches to Prevention:

As indicated previously, universal prevention strategies to prevent AEPs can play an important role in FASD prevention efforts in terms of education and public awareness about the risks of drinking during pregnancy; however, carefully crafted evaluation studies are needed. Also, broad-based universal strategies to reduce alcohol misuse and abuse should not be overlooked because they do not directly prevent FASDs. Many of these kinds of interventions have been effective in regulating alcohol-related activities and reducing alcohol consumption rates, and have the potential to change societal norms about alcohol use among the general population.

CONCLUSIONS

This report offers a review of effective strategies to reduce alcohol misuse and AEPs by using universal, selective, and indicated prevention approaches and outlines recommendations to guide the successful implementation of such strategies. Carefully controlled evaluation studies of FASD prevention strategies must continue to be a priority in FASD research. These are important in tracking those prevention strategies that are working and in assessing possible new approaches to reducing AEPs. Also, very few prevention studies measure pregnancy outcomes such birthweight, head circumference, presence of facial features, or neurocognitive functioning — features related to FASDs. Future prevention studies should include pregnancy outcome measures where appropriate and possible. This would contribute greatly to better understanding the effect of these efforts on preventing FASDs, rather than relying solely on proxy measures of FASD prevention such as reductions in women's alcohol consumption rates.

Another challenge ahead is how to ensure that effective strategies are implemented and integrated into existing systems. This not only requires support and commitment at multiple system levels, including service providers, insurance companies, policy makers, and consumers, but also involves the development of local capacity needed to deliver and integrate effective strategies, such as brief interventions, into community-based health and social service settings. Finally, collaboration and strong partnerships across federal, state, and local agencies; academia; and medical and social service delivery systems, and with consumers are essential to continue the development of a continuum of evidence-based care for women with alcohol use problems and to help reduce the risk of AEPs.

ACRONYMS

AA	Alcoholics Anonymous
AAP	American Academy of Pediatrics
APPG	Alcohol and Public Policy Group
ACOG	American College of Obstetricians and Gynecologists
ARBD	Alcohol-Related Birth Defects
ARND	Alcohol-Related Neurodevelopmental Disorder
AUDIT-C	Alcohol Use Disorders Identification Test-C
BAC	Blood Alcohol Content
CBT	Cognitive Behavioral Therapy
CDC	Centers for Disease Control and Prevention
CMS	Centers for Medicare and Medicaid Services
DDD	Drinks per Drinking Day
DHHS	Department of Health and Human Services
ED	Emergency Department
FAE	Fetal Alcohol Effect
FASDs	Fetal Alcohol Spectrum Disorders
FAS	Fetal Alcohol Syndrome
ICCFAS	Interagency Coordinating Committee on Fetal Alcohol Syndrome
IOM	Institute of Medicine
MI	Motivational Interviewing
MET	Motivational Enhancement Therapy
NCBDDD	National Center on Birth Defects and Developmental Disabilities
NESARC	National Epidemiologic Survey on Alcohol and Related Conditions
NIAAA	National Institute on Alcohol Abuse and Alcoholism
NOFAS	National Organization on Fetal Alcohol Syndrome
NTFFASFAE	National Task Force on Fetal Alcohol Syndrome and Fetal Alcohol Effect
PDA	Percent Days Absent
RTI	Research Triangle Institute International
SAMHSA	Substance Abuse and Mental Health Services Administration
SBI	Screening and Brief Interventions
TIP	Treatment Improvement Protocol
TSF	Twelve-Step Facilitation
WHO	World Health Organization

APPENDIX A: Timeline of National Efforts To Prevent Alcohol-Exposed Pregnancies

Date	Noteworthy Activity
1973	Fetal alcohol syndrome (FAS) first identified in the United States by Kenneth L. Jones, David W. Smith, Christy N. Ulleland and Ann P. Streissguth.
1977	National Institute on Alcohol Abuse and Alcoholism (NIAAA) organized first research conference on FAS.
1977	First federal advisory on alcohol use during pregnancy (initially not an abstinence message) published in the U.S. Federal Drug Administration (FDA) Drug Bulletin and Centers for Disease Control's Morbidity and Mortality Weekly Report.
1978	NIAAA conducted its first public service campaign with print materials, posters, and television spots.
1978	NIAAA-funded prevention program established in Seattle, Washington; other prevention programs followed.
1981	First U.S. Surgeon General's advisory on alcohol use during pregnancy indicating that there is no known safe amount of alcohol to drink during pregnancy.
1983	First municipal ordinance requiring posting of alcohol and pregnancy warning signage in certain establishments issued in New York City.
1989	Mandatory labeling of birth defects message on alcohol beverages was implemented.
1990	National Organization on FAS was established, with state affiliates created over time.
1991	CDC's Fetal Alcohol Syndrome Program began.
1997	American College of Obstetricians and Gynecologists and American Academy of Pediatrics joint statement on alcohol use and pregnancy published in *Guidelines for Perinatal Care, 4th edition*.
1996	Institute of Medicine Report on Fetal Alcohol Syndrome Diagnosis, Epidemiology, Prevention and Treatment published.
1996	Interagency Coordinating Committee on FAS, coordinated by NIAAA, was created.
1998	The National Task Force on Fetal Alcohol Syndrome and Fetal Alcohol Effect was mandated by U.S. Congress.
2002	The Fetal Alcohol Spectrum Disorders (FASDs) Center for Excellence within the Substance Abuse and Mental Health Services Administration (SAMHSA) was mandated by Congress.
2003	SAMHSA's FASD Center for Excellence convened the first-ever "Building FASD State Systems" meeting with additional meetings to follow.
2004	*Fetal Alcohol Syndrome: Guidelines for Referral and Diagnosis* released by CDC and the National Task Force on Fetal Alcohol Syndrome and Fetal Alcohol Effect and endorsed by the March of Dimes, the National Organization on Fetal Alcohol Syndrome, the Center for Science in the Public Interest, AAP, and ACOG.
2005	Release of the updated U.S. Surgeon General's Advisory on Alcohol Use in Pregnancy.
2007	ACOG, in collaboration with CDC, releases *Drinking and Reproductive Health, A Fetal Alcohol Spectrum Disorders Prevention Tool Kit*.

APPENDIX B: Alcohol Screening Tools

T-ACE

T – Tolerance How many drinks does it take to make you feel high?

A – Annoyed Have people Annoyed you by criticizing your drinking?

C – Cut Down Have you ever felt you ought to Cut down on your drinking?

E – Eye-opener Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover?

Scoring: The T-ACE is considered to be positive with a score of two or more. "Yes" answers to the A, C, and E questions are each given one point. A reply of more than two drinks to the T question is scored two points.

TWEAK

T – Tolerance How many drinks can you hold (or how many drinks does it take before you begin to feel the first effects of alcohol)?

W – Worried Have close friends or relatives worried or complained about your drinking in the past year?

E – Eye opener Do you sometimes take a drink in the morning when you first get up?

A – Amnesia Has a friend or family member ever told you things you said or did while you were drinking that you could not remember?

K - Cut down: Do you sometimes feel the need to cut down on your drinking?

Scoring: A woman receives two points on the tolerance question if she reports that she can hold more than five drinks without falling asleep or passing out. A "Yes" to the worry question scores two points, and responding "Yes" to the last three questions scores one point each. A score of two or more is considered a positive screen and requires further assessment.

CRAFFT

C Have you ever ridden in a CAR driven by someone (including yourself) who was high or had been using alcohol or drugs?

R Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in?

A Do you ever use alcohol or drugs while you are by yourself, ALONE?

F Do you ever FORGET things you did while using alcohol or drugs?

F Do your family or FRIENDS ever tell you that you should cut down on your drinking or drug use?

T Have you ever gotten into TROUBLE while you were using alcohol or drugs?

Scoring: Each question on the CRAFFT is given a score of one point and a cut point of two provides moderate sensitivity and excellent specificity for identifying alcohol use disorders among adolescents. It is recommended that any positive answer on this measure be followed by further assessment of pattern of use to increase sensitivity and to guide decisions about the need for intervention.

AUDIT - C

The three questions on the AUDIT-C screener, taken from the original Alcohol Use Disorders Identification Test (AUDIT) assessment tool, are:

(1) During the last 12 months, about how often did you drink ANY alcoholic beverage?

(2) Counting all types of alcohol combined, how many drinks did you USUALLY have on days when you drank during the last 12 months?

(3) During the last 12 months, about how often did you drink FIVE OR MORE drinks in a single day?

Scoring: Scores range from zero to four on each question. The AUDIT-C demonstrates good sensitivity and specificity at a cut point of three or greater for identifying risk drinking among nonpregnant and pregnant women, and performs well among different racial and ethnic groups.

APPENDIX C: Efforts To Support Alcohol Screening and Brief Intervention

In 2004, the U.S. Preventive Services Task Force, coordinated by the Agency for Healthcare Research and Quality, released recommendations on screening and behavioral counseling interventions for alcohol misuse. Based on a systematic review of the literature, the task force recommended that health providers screen all adolescent and adult patients in primary care settings for alcohol misuse and provide counseling interventions for those identified as risky or harmful drinkers. Referral to more intensive treatment options was recommended for those clients with alcohol dependence or abuse [6].

The Purchaser's Guide to Clinical Preventive Services: Moving Science into Coverage was published in 2006 [155]. This guide, developed in a collaborative effort between CDC and the National Business Group on Health, translates clinical guidelines and medical evidence to assist large employers with the information to help them select, define, and implement preventive medical benefits in over 40 different health areas. This guide not only recognizes the importance of alcohol misuse screening among the adult population, but also recommends alcohol misuse screening for pregnant women and women planning a pregnancy.

In January 2007, new billing codes allow the U.S. Centers for Medicare and Medicaid Services (CMS) to reimburse for alcohol and drug screening services, including codes for both alcohol screening and brief intervention and counseling [156]. More and more medical boards, businesses, and other organizations are recognizing the effectiveness of these strategies in reducing alcohol and drug misuse in the United States.

The Substance Abuse and Mental Health Services Administration currently funds 17 state-based screening, brief intervention, referral, and treatment programs. CDC and the NIAAA have also recognized the effectiveness and importance of screening and brief intervention through the development of provider tool kits focused on screening and brief intervention guidelines for women of childbearing age specifically, and the adult population in general.

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For more information about fetal alcohol spectrum disorders, go to www.cdc.gov/ncbddd/fas.