

# A Review of Evidence-Based Approaches for Reduction of Alcohol Consumption in Native Women Who Are Pregnant or of Reproductive Age

Annika Montag, B.A.<sup>1,2,4</sup>, John D. Clapp, Ph.D.<sup>1</sup>, Dan Calac, M.D.<sup>3</sup>, Jessica Gorman, Ph.D., M.P.H.<sup>4</sup>, and Christina Chambers, Ph.D., M.P.H.<sup>2,4</sup>

<sup>1</sup>Graduate School of Public Health, San Diego State University, San Diego, CA, USA, <sup>2</sup>Department of Family and Preventive Medicine, University of California at San Diego, La Jolla, CA, USA, <sup>3</sup>Southern California Tribal Health Clinic, La Jolla, CA, USA, <sup>4</sup>Department of Pediatrics, University of California at San Diego, San Diego, CA, USA

**Background:** Fetal alcohol spectrum disorders (FASDs) are the leading preventable cause of developmental disabilities in the United States and likely throughout the world. FASDs can be prevented by avoiding alcohol use during pregnancy; however, efforts to prevent risky alcohol consumption in women of childbearing potential have not been universally successful. **Objectives:** Data suggest that successful interventions may require tailoring methods to meet the needs of specific populations and cultures. Key findings of interventions previously tested among American Indian and Alaskan Native (AI/AN) women who are or may become pregnant, data gaps, and promising ongoing interventions are reviewed. **Methods:** A systematic review of the current literature on empirically based interventions among AI/AN women was conducted. Selected alternative approaches currently being tested in AI/AN settings are also described. **Results:** Similar to findings among other populations of women in the United States, a number of interventions have been implemented; however, only a small number have measured results. Approaches have included standard interventions involving hospitalization, inpatient, or outpatient care; wellness education; traditional approaches; and case management for high-risk women. An ongoing Screening, Brief Intervention, and Referral to Treatment (SBIRT) protocol comparing the effectiveness of a web-based culturally adapted tool, or a peer health educator model to standard clinical practice is described. **Conclusion:** Translation of successful interventions from other settings to AI/AN populations holds promise. **Scientific Significance:** FASDs represent a significant health issue with high personal and societal costs. Improvement of interventions to prevent prenatal alcohol consumption in specific populations, including AI/AN women, is a critical public health need.

**Keywords:** fetal alcohol spectrum disorders, alcohol, pregnancy, assessment, intervention, prevention, American Indian and Alaska Native

## INTRODUCTION

Prenatal alcohol exposure is the leading cause of preventable developmental disabilities in the United States. The umbrella term “fetal alcohol spectrum disorders” (FASDs) is applied to the range of conditions resulting from prenatal alcohol exposure. The most severe form, fetal alcohol syndrome (FAS), is characterized by disruption of fetal development, particularly brain development, resulting in neurobehavioral dysfunction, growth abnormalities, and characteristic facial features. Specific effects depend upon timing, pattern, and extent of exposure (1). Binge or heavy episodic drinking, for women defined as consuming four or more drinks on one occasion, is the most risky pattern of consumption associated with increased risk of FASD (2).

Women who do not consume alcohol during pregnancy are *not at risk* for giving birth to children with FASD. Although not all alcohol consumption during pregnancy results in FASDs, there is no known safe level of alcohol consumption for pregnant women. Since a pregnant woman may not be immediately aware that she is pregnant, it is recommended that both pregnant women and women planning to become pregnant refrain from alcohol consumption (3). An additional complicating factor is that more than half of all pregnancies in the United States are unplanned (4) and alcohol consumption may occur during the early, particularly vulnerable, period of gestation when a woman is not yet aware of the pregnancy.

May et al. (5) recently reviewed prevalence estimates obtained using a variety of methods and concluded that FASD is far more prevalent than previously believed. In the United States, FAS is estimated to affect 2–7 persons per 1000 people, and FASD may affect 2–5% of young elementary school children. Rates and risk factors for

FASD vary considerably among different populations depending upon the pattern and prevalence of prenatal drinking; factors that influence those patterns of drinking; and factors that modify risk, such as maternal genetics, nutritional status, and older maternal age (6–8). Accordingly, interventions that are successful in preventing FASD may vary by population.

Addressing FASD among American Indians and Alaska Natives (AI/ANs) is complicated by the heterogeneity of Native populations. Epidemiological studies have found great differences in drinking patterns and FASD prevalence across tribes (9–12). However, there are also shared issues such as historical trauma, displacement, oppression, and a lack of trust in research and interventions imposed from the outside (13,14).

Although a number of approaches to reduce prenatal drinking and FASD among AI/ANs have been implemented, few have been evaluated. The Institute of Medicine recommendations for prenatal alcohol interventions encompass general population approaches, targeted interventions for high-risk women, and indicated interventions for women who have already had an affected child (15). Consistent with that broad range of approaches, we review quantitatively evaluated programs that have aimed to reduce drinking in AI/AN women as well as programs that target high-risk drinkers in general or are specifically intended to reduce prenatal drinking.

Studies were identified using computerized literature searches of all relevant databases, such as PubMed, available through university libraries at the authors' institutions. The reference sections of identified articles were scoured for additional studies meeting inclusion criteria. Time of publication was not limited, i.e., any publication regardless of date of publication was considered for inclusion, up to and including 2 published in 2011. Search terms varied among databases and included AI/AN, American Indian, or Native American; alcohol or drinking; alcohol abuse, substance abuse, or alcoholism; intervention or program; prevention or treatment; and FAS or FASD. Table 1 presents details of the studies covered in our review. We focused our review on both interventions during pregnancy and broader programs that have included at least some women of childbearing age since prevention of prenatal exposure optimally occurs prior to conception.

The purpose of this review was first to determine the number of publications that have quantitatively evaluated interventions among AI/AN women and secondly, to identify approaches and aspects of interventions that may prove useful in designing effective prevention/treatment programs.

## INTERVENTIONS

### Standard Interventions Involving Hospitalization, Inpatient, or Outpatient Care

Few studies have examined the success of various alcohol treatment programs for AI/ANs, and fewer still have included women. Programs that involve hospitalization, detoxification, and inpatient or halfway treatment houses

have produced discouraging results. Westermeyer (16) described a 10-year follow-up of 45 persons (8 women) hospitalized for alcohol-related problems. Seven (2 women) of 42 participants located for follow-up had been abstinent for at least 2 years indicating a high relapse rate. Kivlahan (17) conducted a 2-year follow-up study of 50 AI/AN patients (5 women) treated at a detoxification center. None had been abstinent for the entire follow-up time and detoxification admissions were not significantly different at follow-up. This and two other treatment programs were evaluated by Walker et al. (18). In one study, patients from an inpatient treatment program geared toward AI/ANs were followed for 26 months. Of the 73% of patients (34 men and 10 women) successfully followed, 91% reported continued alcohol dependence or abuse. In another study, patients received treatment at an AI/AN focused halfway house. Although 20% were lost to follow-up, 40 men and 6 women were successfully followed up for 26 months. Of these, 84% remained dependent upon or continued to abuse alcohol. The studies described above illustrate the intractability of the problem of chronic alcohol abuse.

Treatment outcome for AI/ANs in non-Native drug and alcohol programs in California were investigated by Evans et al. (19) and Dickerson et al. (20). Data were drawn from the California Treatment Outcome Project (CalTOP), which had 39 participating programs (21 outpatient, 14 residential, and 4 narcotic replacement) offering assessment and drug counseling, and from the Treatment System Impact (TSI) project, which offered nonviolent drug offenders treatment instead of incarceration or probation. Alcohol was the primary drug problem in the CalTOP sample that included 368 AI/ANs (179 women) and 368 matched non-AI/ANs. Among the AI/ANs still enrolled at 3 months ( $n = 116$ ), there was decreased alcohol use. The TSI project found no significant outcome differences between AI/AN and non-AI/AN samples, but the treatment completion rate was too low for this result to be meaningful.

A randomized clinical trial of naltrexone, alone and in combination with sertraline, for the treatment of alcohol dependence in Alaska Natives and non-Natives in rural locations (21), suggested pharmacotherapy may be helpful in remote areas.

### Comprehensive and/or Community-Based Programs

Community-based programs are more likely to effectively address specific barriers of a particular population and comprehensive programs tackle multiple barriers simultaneously. In 1991, Masis and May (22) described the Tuba City FAS Prevention Project, a multi-faceted approach that incorporated primary, secondary, and tertiary prevention. The community and health care providers were educated through a variety of methods. Prenatal patients were screened for alcohol use and provided information regarding FAS, and high-risk mothers were referred to case management. Referred clients received counseling, social services, and medical services including alcohol treatment programs and voluntary birth control. A diagnostic clinic

TABLE 1. American Indian/Alaska Native interventions for FASD and/or alcohol abuse.

Author/year	Title/program description	Study description	Results	Lessons learned
Westermeyer J and Peake E (1983)	<i>A ten-year follow-up of alcoholic Native Americans in Minnesota</i>	10-year interview follow-up of previously hospitalized alcoholics <i>n</i> = 45 (37♂, 8♀)	42 located: 7 abstinent (5♂, 2♀), 9 died, 26 drinking. 17% stable abstinence	High relapse rate; ≤17% success rate
Kivlahan D et al. (1985)	<i>Detoxification recidivism among urban American Indian alcoholics</i>	2-year follow-up interview of detoxification graduates <i>n</i> = 50 urban AI (45♂, 5♀)	None sober at follow-up. 74% readmitted	Detoxification alone doesn't work
Walker RD et al. (1989)	<i>American Indian alcohol misuse and treatment outcome</i> 3 separate studies from Seattle Treatment Outcome Project	2-year interview and state monitoring follow-up of three urban AI samples: 1. detox ( <i>n</i> = 50) 2. inpatient or halfway house (90) 3. AI focus (46) or not (27)	80% follow-up total: 1. 0/50 abstinent 2. 9% inpatient and 16% halfway house reported less alcohol abuse or dependence 3. AI programs no more successful	Little or no success with any program
Evans E et al. (2006)	<i>Outcomes of drug and alcohol treatment programs among American Indians in California</i>	Pre- and postadmission assessments; 3- and 9-month postinterviews; 1-year pre- and postdriving (DUI), arrest, and mental health records <i>n</i> = 368 AI and 368 non-AI	Both AI and non-AI reduced alcohol-related problems somewhat. AI received fewer services and had shorter retention in residential treatment.	Service intensity needed for retention in residential treatment
Dickerson DL et al. (2011)	<i>American Indians/Alaska Natives and substance abuse treatment outcomes: positive signs and continuing challenges</i>	TSI (Treatment Impact System) project. Treatment by licensed CA programs instead of incarceration /probation. 12-month telephone follow-up. <i>n</i> = 245 AI and non-AI	AI and matched controls (~40% female) had no significant outcome differences. 18.8% completed treatment.	High AI and non-AI dropout rates. Baselines differ suggesting need for culturally tailored, comprehensive programs
O'Malley SS et al. (2008)	<i>Naltrexone alone and with sertraline for the treatment of alcohol dependence in Alaska Natives and non-Natives residing in rural settings: a randomized controlled trial</i>	Randomized controlled clinical trial with three treatment arms. <i>n</i> = 68 AI (27♀) and 33 non-AI	AI and non-AI had higher abstinence with naltrexone only (35%) vs. placebo (12%) but not longer time to heavy drinking. Medicinal compliance 67% and 60%, respectively. 39 women participated. At 18 months, 18 abstinent, 4 drinking less, 10 still drinking, 7 lost to follow-up; 8 pregnant, 4 using birth control, 6 voluntarily sterilized, 14 at risk for pregnancy.	Naltrexone may be helpful in remote communities
Masis & May (1991)	<i>A comprehensive local program for the prevention of fetal alcohol syndrome</i> Primary prevention: community awareness/training providers; Secondary prevention: screening at prenatal clinics; Tertiary prevention: case management	High-risk women referred to case management: counseling, personal support, social services, and medical services (a) detoxification and follow-up and (b) voluntary birth control <i>n</i> = 48 women referred	At 18 months, 18 abstinent, 4 drinking less, 10 still drinking, 7 lost to follow-up; 8 pregnant, 4 using birth control, 6 voluntarily sterilized, 14 at risk for pregnancy.	Good acceptance of program possibly related to: "prevention" designation, based in hospital/clinic, community members as staff, family-oriented approach.

TABLE 1. (Continued).

Author/year	Title/program description	Study description	Results	Lessons learned
May PA et al. (2008)	<i>Enhanced case management to prevent fetal alcohol spectrum disorder in northern plains communities</i>	Case management with motivational interviewing and questionnaires at start, shorter at 6 month intervals <i>n</i> = 131 AI women	Mixed but significant benefit for at risk women; pregnancies protected: 149, data on 119 with 76% normal births, 2 FASD	It is feasible to incorporate CM as part of community-based prevention program.
Shore J and Von Fumetti B (1972)	<i>Three alcohol programs for American Indians</i>	All created within AI communities, involved casework, vocational training, AI tailored <i>n</i> = 642 AI/AN	Overall, 28% showed clear improvement at 1–4 years; 47% ♀ and 26% ♂ improved in one of three programs	Methods and philosophy need to be matched to population. Involve community in planning and execution.
Ferguson F (1970)	<i>A treatment program for Navaho alcoholics: results after four years.</i>	Hospitalization, disulfiram, counseling, vocational training; 2-year follow-up; multiple sources <i>n</i> = 115 (4♀) AI/AN arrested $\geq 10\times$ for drunkenness	43% drinking less at 12 and 23% at 24 months; 78% decline in arrests; employment increased; low follow-up rate	Disulfiram may be helpful. Less educated, older, with high arrest rates and less English skills responded best.
Torres Stone RA et al. (2006)	<i>Traditional practices, traditional spirituality, and alcohol cessation among American Indians</i>	3-year interview study <i>n</i> = 732 AI/AN ( $\geq 60\%$ ♀)	Women, older, married, or active in traditional practices or spirituality more likely to cease drinking	Traditional activities and spirituality had significant positive effects on alcohol cessation.
Chong J and Herman-Stahl M (2003)	<i>Substance abuse treatment outcomes among American Indians in the Telephone Aftercare Project.</i>	Enrolled if successfully completed residential program and returning to reservation. Monthly telephone interviews for 6 months. <i>n</i> = 30 AI	30 (21♀) recruited of 41 eligible. Drinking from baseline to 3 mo 91 to 18%, 6 mo 92 to 15%. No control. ASI alcohol score improved.	High loss to follow-up (63% 3 mo, 57% 6 mo). Telephone aftercare may be alternative where in-person aftercare is unavailable.
Hanson JD et al. (2011)	<i>Prevention of alcohol-exposed pregnancies among nonpregnant American Indian women</i>	Telephone intervention of motivational interview, personalized feedback, and 12-month follow-up. <i>n</i> = 231 AI ♀	Most drinks/occasion decreased from 9.8 to 5.3, average drinks/week from 12.9 to 3.3. No control. Self-selected sample.	Project CHOICES may be effectively modified as a telephone-based intervention.

identified children with FAS. The project employed a family-oriented approach and used community members in designing and staffing. Although this study was not designed to evaluate outcomes compared with other intervention approaches, the results were encouraging. Additionally, the program was well accepted by the community and participants with only 3 out of 48 referred women refusing to participate.

As part of the FAS epidemiology and prevention program described by May et al. in 2008 (23), which resulted from the above pilot study, women drinking during pregnancy or who had previously given birth to a child with FASD were provided with enhanced case management (ECM). The enhancement consisted of motivational interviewing (MI) to encourage abstinence from alcohol during pregnancy, abstinence/reduction in alcohol consumption when not pregnant, and/or use of birth control. MI is a process that moves people toward change by nonjudgmentally helping them to see and explore the discrepancy between where they are and where they would like to be in their lives (24). Considerable effort was expended to train all staff members in several relevant prevention techniques, including MI and the Community Reinforcement Approach (25), which includes job placement, marriage and family counseling, social exposure to abstinent alcoholics, and engagement in alternative activities to drinking. At the follow-up time-points (over 24 months), 69.5% of 105 nonpregnant women for whom “fetal protection status” was determined were either not drinking or on birth control. Two of 119 children born during follow-up to women receiving ECM were diagnosed with FASDs, an indication of success in view of the high background risk within the participant population.

Three tribally sponsored alcohol abuse programs were reviewed by Shore and Von Fumetti in 1972 (26). All were designed within the Native communities, used case-management and vocational training, obtained participants mainly through court referrals, incorporated principles from Alcoholics Anonymous (AA), and were tailored to the target community. Cultural identity was emphasized and aspects of AA that conflict with tribal mores, such as confession and exclusion of family members, were avoided. In the largest program, which over 3 years treated 64 women, 47% of the women “clearly improved”, whereas 14% were “unimproved”. Involvement of tribal governments and communities led to better acceptance of the programs.

In 2003, Chong and Herman-Stahl (27) evaluated telephone aftercare following treatment at a residential substance abuse program and return to an Indian reservation. The authors noted that telephone contact may be beneficial, where access to in-person aftercare is limited.

Ferguson et al. (28) described an intensive program including probation, detoxification, disulfiram treatment, volunteers facilitating compliance with disulfiram, counseling, vocational training, referral to social services as necessary, and 2-year follow-up including monthly home visits. At 12 months, 43% of participants were drinking less; and at 24 months, 23% were not involved in “destructive drinking.”

### **Incorporating Traditional Approaches**

There may be cultural factors that increase resilience and facilitate alcohol cessation. For example, after interviewing 732 adults regarding alcohol history and potential correlates, Torres Stone et al. (29) concluded that people who participated in traditional activities and spirituality were more likely to cease drinking. This was true whether they had attended treatment programs or not.

Community approaches that incorporate traditional methods have been recognized as successful, including the unique program adopted by the Alkali Lake Band of the Shuswap Indians (30). Impressive decreases in alcohol dependence were obtained by changing community culture to be less tolerant of drinking and by reviving traditional culture. Traditional structures and rituals, such as talking circles, sweat lodges, medicine wheels, and healing ceremonies, have been incorporated into treatment programs. Jilek (31,32) described the Spirit Dance as valuable in treating alcohol abusers. Prue (33), Pascaros (34), and Albaugh (35) portrayed the Native American Church rituals as an alternative to AA. In a community-based, culturally focused wellness study (36) among AI/AN women 18–50 years old, a 10-session intervention incorporating tribal history and culture decreased alcohol consumption and depression while increasing alcohol abstinence and self-esteem.

### **Selected Prevention Approaches Currently Being Adapted and Tested in AI/AN Populations**

Project CHOICES (Changing High-Risk Alcohol Use and Increasing Contraception Effectiveness Study) is a four-session, MI and birth control intervention geared toward women of childbearing age who are not yet pregnant. A pilot study (37) and a randomized controlled trial (38) concluded that this intervention can reduce the risk of alcohol consumption in pregnancy (39). The trial randomized 830 women to receive intervention or information only. Throughout the 9-month follow-up, the intervention group had an approximate twofold reduction in high-risk drinking and improvement in effective use of contraception. Project BALANCE (Birth Control and Alcohol Awareness: Negotiating Choices Effectively), a modified version of Project CHOICES, used a single 2.5-hour session with similarly positive findings (40). Hanson used a modified Project CHOICES telephone intervention among 231 nonpregnant AI/AN women from three Northern Plains communities and documented decreased drinking behaviors and increased contraceptive use (41). Data from this study led to funding for implementation of CHOICES at clinics in the same area.

Another promising approach is Screening and Brief Intervention (SBI), which is a time-limited technique that stresses a reduction in drinking, not abstinence, and can be carried out by someone who is not an addiction treatment specialist. The concept has been used in a number of different settings with modest or mixed results including primary health care (42,43), emergency rooms (44), and college campuses (45). It was successfully used among low-income pregnant women by O'Connor and Whaley

(46). However, a 2009 review of randomized clinical trials of this approach among pregnant women (47) found no difference between treatment and control groups.

### **Screening, Brief Intervention, and Referral to Treatment**

Screening, Brief Intervention, and Referral to Treatment (SBIRT) is an approach that has been used to reduce alcohol use among non-Native populations, including among women of childbearing potential (48–51). Results have been better for moderate and light drinkers but, particularly when a partner participates, have been shown to be effective among heavier drinkers as well (52). The screening portion is applied broadly, for example, to college freshmen (53); emergency room patients (54,55); or Women, Infants, and Children participants (56), to identify persons engaging in risky drinking. Wide-range screening is necessary as 95.2% of people classified as needing alcohol treatment in the 2007 National Survey on Drug Use and Health were unaware that they needed it (57). Brief intervention consists of education and feedback specific to the participant. SBIRT may be provided by a range of health care providers and take various forms. MI may be incorporated into brief interventions. Referral to treatment sets SBIRT apart from SBI and ensures that more severe alcohol abuse problems will receive specialized treatment. An advantage of SBIRT over previous methods of screening and referral to treatment is that even those who screen negative receive information about alcohol consumption consequences.

### **Native American Screening, Brief Intervention, and Referral to Treatment for FASD Prevention**

To reduce risky alcohol consumption and/or improve pregnancy prevention in an AI/AN population, a collaboration between the Southern California Tribal Health Clinic (SCTHC) and investigators at the University of California, San Diego (UCSD) and San Diego State University (SDSU) initiated an FASD prevention project. Using community-based participatory research (CBPR), our partnership aims to address specific barriers and risks (58), increase understanding of and trust in research by the community, obtain high-quality data, and design an effective intervention. We are culturally tailoring two SBIRT methods: one is web-based and the other one is MI-based. Our goals are to compare these NASBIRT (Native American Screening, Brief Intervention, and Referral to Treatment) methods in a randomized sample of 500 women of childbearing age to treatment as usual at 1, 3, and 6 months. To date, IRBs from all three institutions have approved the project, the web-based intervention has been culturally tailored (Jessica Gorman, personal communication), and recruitment has begun.

## **DISCUSSION**

Many of these reviewed studies have limitations including small sample size, low follow-up rates, nonrandom samples, no control groups, no specific analysis of

outcomes for women, and self-reported data. Nonetheless, barriers to be addressed and methods increasing efficacy may be gleaned.

Women want to have healthy children and to give them the best possible start in life. Despite health warning messages, many women have a limited understanding of the health consequences of drinking alcohol during pregnancy and a misperception regarding the amount of alcohol they are consuming (59,60). The factors most likely to compel an AI/AN woman to stop drinking have been identified as pregnancy and childcare (61). However, it is more difficult for dependent than nondependent drinkers to abstain, even during pregnancy. This is not only due merely to the addictive nature of alcohol, but also to the severity of factors inducing women to drink in the first place. In a study by Tenkku (62), binge drinkers were less likely to reduce their drinking during pregnancy than moderate drinkers. In addition to being associated with less reduction in alcohol consumption during pregnancy and greater risk to the fetus, binge drinking is associated with unintended pregnancies (63). Consequently, a two-pronged approach is advocated to prevent FASD: reduce alcohol consumption in women of reproductive potential, particularly binge drinking, and/or reduce unintended pregnancies in women who consume alcohol.

The studies presently reviewed suggest that to create a successful prevention/treatment program, it is important to incorporate community members in all aspects of project design and implementation. In addition to a well-trained Native staff, it is also essential to enlist the cooperation of the entire community from Tribal government, community leaders, and spiritual leaders, to social support groups for abstinent alcoholics. Respect for community and cultural identity is paramount and methods employed can and should consider incorporating traditional activities. Women in different situations will require different approaches. One group of women may be expected to benefit simply from education about the risks of drinking and less effective contraception. Another group, already involved in risky drinking, may respond to MI or more intense case management. Very high-risk women may need medical services, counseling, social services, and pharmacological treatment. Comprehensive programs are preferred but may not be possible due to financial constraints. The high loss to follow-up experienced in many of these studies may be ameliorated by addressing the logistic challenges of the participants: transportation, childcare, and so on; community ownership of the project; and increased community awareness and acceptance of the project. In situations where in-person contact is difficult to achieve, telephone contact may be a viable alternative.

This review has revealed the dearth of relevant studies evaluating the effectiveness of AI/AN interventions for FASD. We look forward to future studies exploring the issue on both the individual and community level. However, by incorporating the lessons learned from these studies, we hope to design more effective interventions to reduce prenatal alcohol exposure and prevent FASD.

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## Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

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