

## LETTERATURA SCIENTIFICA

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# **ABSTRACT**

**Lundsberg LS; Illuzzi JL; Belanger K; Triche EW; Bracken MB**, “Low-to-moderate prenatal alcohol consumption and the risk of selected birth outcomes: a prospective cohort study”, *Annals of Epidemiology*, Vol 25, No 1, 2015, pp46-54.e3

**Abstract**

**Purpose:** To estimate whether low-to-moderate prenatal alcohol exposure is associated with selected birth outcomes.

**Methods:** Low-to-moderate prenatal alcohol drinking and effects on low birthweight, preterm delivery, intrauterine growth restriction, and selected neonatal outcomes were evaluated among 4496 women and singleton infants. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated using multivariable logistic regression, controlling for confounding variables.

**Results:** Early pregnancy drinking was associated with reduced odds of low birthweight, OR, 0.66 (95% CI, 0.46-0.96) and birth length less than 10th percentile, OR, 0.74 (95% CI, 0.56-0.97). Drinking during the first 3 months showed lower odds for birth length and head circumference less than 10th percentile, OR, 0.56 (95% CI, 0.36-0.87) and OR, 0.69 (95% CI, 0.50-0.96), respectively. Third trimester drinking was associated with lower odds for low birthweight, OR, 0.56 (95% CI, 0.34-0.94) and preterm delivery, OR, 0.60 (95% CI, 0.42-0.87).

**Conclusions:** Our results suggest low-to-moderate alcohol exposure during early and late gestation is not associated with increased risk of low birthweight, preterm delivery, intrauterine growth restriction, and most selected perinatal outcomes. Copyright © 2014 Elsevier Inc. All rights reserved. (Authors' Abstract)

**Easton B; Burd L; Sarnocinska Hart A; Rehm J; Popova S, “The cost of lost productivity due to fetal alcohol spectrum disorder-related premature mortality”, *Journal of Population Therapeutics and Clinical Pharmacology*, Vol 22, No 1, 2015, ppe3-e8**

**Abstract**

**Background:** Individuals with Fetal Alcohol Spectrum Disorder (FASD) have increased mortality as compared to the general population.

**Objectives:** To estimate the productivity losses due to premature mortality of individuals with FASD in Canada in 2011.

**Methods:** A demographic approach with a counterfactual scenario in which nobody in Canada is born with FASD was used. Population estimates were calculated using data on the labour force, unemployment rate, and average weekly wage obtained from Statistics Canada. The number of FASD-related deaths, coded in the International Classification of Diseases, version 10, was estimated based on data from Statistics Canada and pooled prevalence estimates of the major disease conditions associated with FASD were obtained from a meta-analysis. The estimates of FASD-related mortality rates served as a basis for the length of working life span estimation. Once the number of working years lost to premature deaths was derived, productivity losses were computed.

**Results:** It was estimated that in total 327 individuals with FASD aged 20 to 69 (almost twice as many men as women) died in Canada in 2011. As a result, there were 2,877 years of potential employment lost, which translated to a loss ranging from \$88 million to \$126 million. This amount represents the increase in national income, had there been no premature mortality from FASD and the workers with FASD had been typical members of the labour force (without compromised productivity due to FASD).

**Conclusions:** The estimates of productivity losses further reinforce the value of FASD prevention as a primary strategy. Copyright © 2015 Canadian Society of Pharmacology and Therapeutics. All rights reserved. (Authors' Abstract)



## Abstract prof. Vizza

[S D Med.](#) 2015;Spec No:36-43.

# Preconception and prenatal care--useful tools for providers of women's health.

[Landeem LB](#), [Bogue R](#), [Schuneman M](#).

### Abstract

Health care providers have a unique opportunity to change the behaviors of their patients. Preconception and prenatal care allow for interventions to abate risky behaviors that can affect not only the woman but also her developing fetus. If we can assist the reproductive age woman in modifying her high-risk activities, there will be improved birth outcomes and healthier mothers to care for their offspring. Alcohol and tobacco use, sexually transmitted infections and obesity are the top four modifiable risk factors. This article will address the impact that these behaviors have on women and tools to assist the health care provider in changing these bad habits and promoting healthy pregnancies. The theory of "fetal origins of disease" is emerging as one of the most powerful and compelling reasons to engage our patients before and during their pregnancy. Preventive medicine needs to start in the womb if we want to have the highest impact on healthy adulthood.

PLoS One. 2015 May 15;10(5):e0126552. doi: 10.1371/journal.pone.0126552. eCollection 2015.

# Placental Fatty Acid ethyl esters are elevated with maternal alcohol use in pregnancies complicated by prematurity.

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### **Abstract**

The accumulation of fatty acid ethyl esters (FAEEs) in meconium of term newborns has been described as one potential biomarker of maternal alcohol use during pregnancy. FAEEs accumulate in multiple alcohol-exposed fetal tissues and in the placenta. Limited research has focused on the identification of the premature newborn exposed to alcohol in utero. We hypothesized that maternal alcohol use occurs in a significant proportion of premature deliveries and that this exposure can be detected as elevated placental FAEEs. The goals of this study were to 1) determine the prevalence of maternal alcohol use in the premature newborn and 2) investigate whether placental FAEEs could identify those newborns with fetal alcohol exposure. This prospective observational study evaluated 80 placentas from 80 women after premature delivery. Subjects were interviewed for alcohol intake and placental FAEEs were quantified via GC/MS. Receiver Operator Characteristic (ROC) Curves were generated to evaluate the ability of placental FAEEs to predict maternal drinking during pregnancy. Adjusted ROC curves were generated to adjust for gestational age, maternal smoking, and illicit drug use. 30% of the subjects admitted to drinking alcohol during pregnancy and approximately 14% answered questions indicative of problem drinking (designated AUDIT+). The specific FAEEs ethyl stearate and linoleate, as well as combinations of oleate + linoleate + linolenate (OLL) and of OLL + stearate, were significantly ( $p < 0.05$ ) elevated in placentas from AUDIT+ pregnancies. Adjusted ROC Curves generated areas under the curve ranging from 88-93% with negative predictive values of 97% for AUDIT+ pregnancies. We conclude that nearly one third of premature pregnancies were alcohol-exposed, and that elevated placental FAEEs hold great promise to accurately determine maternal alcohol use, particularly heavy use, in pregnancies complicated by premature delivery.

PMID:25978403[PubMed - in process] Free full text

PLoS One. 2015 May 13;10(5):e0124931. doi: 10.1371/journal.pone.0124931. eCollection 2015.

# Early maternal alcohol consumption alters hippocampal DNA methylation, gene expression and volume in a mouse model.

[Marjonen H](#)<sup>1</sup>, [Sierra A](#)<sup>2</sup>, [Nyman A](#)<sup>1</sup>, [Rogojin V](#)<sup>3</sup>, [Gröhn O](#)<sup>2</sup>, [Linden AM](#)<sup>4</sup>, [Hautaniemi S](#)<sup>3</sup>, [Kaminen-Ahola N](#)<sup>1</sup>.

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### Abstract

The adverse effects of alcohol consumption during pregnancy are known, but the molecular events that lead to the phenotypic characteristics are unclear. To unravel the molecular mechanisms, we have used a mouse model of gestational ethanol exposure, which is based on maternal ad libitum ingestion of 10% (v/v) ethanol for the first 8 days of gestation (GD 0.5-8.5). Early neurulation takes place by the end of this period, which is equivalent to the developmental stage early in the fourth week post-fertilization in human. During this exposure period, dynamic epigenetic reprogramming takes place and the embryo is vulnerable to the effects of environmental factors. Thus, we hypothesize that early ethanol exposure disrupts the epigenetic reprogramming of the embryo, which leads to alterations in gene regulation and life-long changes in brain structure and function. Genome-wide analysis of gene expression in the mouse hippocampus revealed altered expression of 23 genes and three miRNAs in ethanol-exposed, adolescent offspring at postnatal day (P) 28. We confirmed this result by using two other tissues, where three candidate genes are known to express actively. Interestingly, we found a similar trend of upregulated gene expression in bone marrow and main olfactory epithelium. In addition, we observed altered DNA methylation in the CpG islands upstream of the candidate genes in the hippocampus. Our MRI study revealed asymmetry of brain structures in ethanol-exposed adult offspring (P60): we detected ethanol-induced enlargement of the left hippocampus and decreased volume of the left olfactory bulb. Our study indicates that ethanol exposure in early gestation can cause changes in DNA methylation, gene expression, and brain structure of offspring. Furthermore, the results support our hypothesis of early epigenetic origin of alcohol-induced disorders: changes in gene regulation may have already taken place in embryonic stem cells and therefore can be seen in different tissue types later in life.

- Abstract

Send to:

Women Birth. 2015 May 4. pii: S1871-5192(15)00046-3. doi: 10.1016/j.wombi.2015.04.003. [Epub ahead of print]

# Fetal alcohol spectrum disorders in Australia - the future is prevention.

[Elliott EJ<sup>1</sup>](#).

## [Author information](#)

### **Abstract**

Fetal alcohol spectrum disorders (FASD) are increasingly recognised throughout Australia as important, but preventable, disorders that result in lifelong problems with health and learning, mental health, behaviour and substance misuse. The role of this article is to highlight current efforts, which are in their infancy, to recognise and prevent FASD in Australia. A federal parliamentary inquiry into FASD (2011), development of an Australian Government 'action plan' to prevent FASD (2013) and the announcement in June 2014 of government funding to progress the plan and appoint a National FASD Technical Network have focused attention on the need for FASD prevention in Australia. Other welcome developments include the formation of Parliamentarians for the Prevention of FASD (2011), revision of guidelines regarding alcohol use in pregnancy by the National Health and Medical Research Council (NHMRC; 2009) and provision of targeted funding for FASD research by the NHMRC (2013). Initiatives by Indigenous communities to restrict access to alcohol and diagnose and prevent FASD have had a significant impact in high-risk communities. The National Organisation for FASD has an important ongoing advocacy and educational remit. Nongovernment organisations such as the Foundation for Alcohol Research and Education have contributed to prevention by developing resources to assist health professionals to advise women about the harms of alcohol use in pregnancy; encouraging men to abstain from alcohol during the pregnancy; drafting a national plan; and advocating for pregnancy warning labels on alcohol. Internationally, in 2014, a charter on prevention of FASD was published in *The Lancet Global Health*, and the World Health Organization released guidelines for identification and management of substance use in pregnancy. Early recognition and support for individuals with FASD is crucial to prevent adverse secondary outcomes; however, primary prevention of alcohol use in pregnancy, and hence FASD, should be our future goal. The causal pathway to drinking in pregnancy is complex and requires a broad social ecological approach. Prevention will take time, must involve all government sectors and should incorporate primary, secondary and tertiary strategies to target both the broader community and populations at high risk of alcohol use during pregnancy.

# "If you can have one glass of wine now and then, why are you denying that to a woman with no evidence": Knowledge and practices of health professionals concerning alcohol consumption during pregnancy.

[Crawford-Williams F](#)<sup>1</sup>, [Steen M](#)<sup>2</sup>, [Esterman A](#)<sup>2</sup>, [Fielder A](#)<sup>2</sup>, [Mikocka-Walus A](#)<sup>3</sup>.

## Author information

### Abstract

#### **BACKGROUND:**

Alcohol consumption during pregnancy has the potential to cause significant harm to the foetus and the current Australian guidelines state that it is safest not to drink alcohol while pregnant. However, conflicting messages often appear in the media and it is unclear if the message to avoid alcohol is being effectively conveyed to pregnant women.

#### **AIMS:**

This research aims to explore the advice that health professionals provide to pregnant women about alcohol consumption; the knowledge of health professionals regarding the effects of alcohol consumption; and their consistency with following the Australian guidelines.

#### **METHODS:**

Ten semi-structured face to face interviews were conducted with health professionals who regularly provide antenatal care. These include midwives, obstetricians, and shared care general practitioners. A six-stage thematic analysis framework was used to analyse the interview data in a systematic way to ensure rigour and transparency. The analysis involved coding data extracts, followed by identifying the major themes.

#### **FINDINGS:**

Health professionals displayed adequate knowledge that alcohol can cause physical and mental difficulties that are lifelong; however, knowledge of the term FASD and the broad spectrum of difficulties associated with alcohol consumption during pregnancy was limited. Although health professionals were willing to discuss alcohol with pregnant women, many did not make this a routine part of practice, and several concerning judgements were noted.

#### **CONCLUSION:**

Communication between health professionals and pregnant women needs to be improved to ensure that accurate information about alcohol use in pregnancy is being provided. Further, it is important to ensure that the national guidelines are being supported by health professionals.

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***KEYWORDS:***

Alcohol drinking; Foetal alcohol spectrum disorders; Health promotion; Pregnancy; Prenatal education

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**Keeffe LM; Kearney PM; Greene RA; Zuccolo L; Tilling K; Lawlor DA; Howe LD,** “Maternal alcohol use during pregnancy and offspring trajectories of height and weight: a prospective cohort study”, *Drug and Alcohol Dependence*, Accepted article early online 12 March 2015

**Abstract**

**Background:** Previous studies have examined associations between alcohol use in pregnancy and offspring birth size but evidence on whether associations persist during childhood is limited.

**Methods:** We examined the association between maternal drinking during pregnancy and trajectories of offspring weight and height from 0-10 years in 7,597 mother-child pairs in the Avon Longitudinal Study of Parents and Children. To strengthen the inference, we compared the maternal alcohol-offspring growth association with the partner alcohol-offspring growth association, to partially control for unmeasured confounding. We also performed sensitivity analyses restricting our analysis to women of white ethnicity and participants with three or more growth measures.

**Results:** Maternal occasional or light daily drinking during pregnancy was not associated with reduced birth weight, birth length or offspring growth trajectories up to age 10 years. The infants of heavy drinking mothers were born 0.78 cm shorter (95% CI -1.34, -0.22) and 0.22 kg lighter (95% CI -0.34, -0.09) than infants of pregnancy abstainers but by age 10 offspring of heavy drinking mothers were of comparable height (mean difference 0.59 cm, 95% CI -0.93, 2.11) and weight (mean difference 0.41 kg, 95% CI -0.70, 1.52). These associations were not observed for heavy partner drinking and were not altered in sensitivity analyses.

**Conclusion:** Maternal occasional or light daily drinking is not associated with birth weight, birth length or postnatal growth, but residual confounding may persist. Maternal heavy drinking may have an intrauterine association with reduced birth weight and length but this association is overcome during childhood. Copyright © 2015 Elsevier Ireland Ltd. All rights reserved. (Authors' Abstract)

**Fitzpatrick JP; Latimer J; Ferreira ML; Carter M; Oscar J; Martiniuk AL; Watkins RE; Elliott EJ**, "Prevalence and patterns of alcohol use in pregnancy in remote Western Australian communities: the Lililwan Project", *Drug and Alcohol Review*, Published early online 19 February 2015

### **Abstract**

**Introduction and Aims:** Alcohol use in pregnancy is thought to be common in remote Australian communities, but no population-based data are available. Aboriginal leaders in remote Western Australia invited researchers to determine the prevalence and patterns of alcohol use in pregnancy within their communities.

**Design and Methods:** A population-based survey of caregivers of all children born in 2002/2003 and living in the Fitzroy Valley in 2010/2011 (n = 134). Alcohol use risk was categorised using the Alcohol Use Disorders Identification Test consumption subset (AUDIT-C) tool. Birth and child outcomes were determined by interview, medical record review and physical examination.

**Results:** 127/134 (95%) eligible caregivers participated: 78% were birth mothers, 95% were Aboriginal and 55% reported alcohol use in index pregnancies; 88% reported first trimester drinking and 53% drinking in all trimesters. AUDIT-C scores were calculated for 115/127 women, of whom 60 (52%) reported alcohol use in pregnancy. Of the 60 women who drank (AUDIT-C score  $\geq 1$ ), 12% drank daily/almost daily, 33% drank 2-3 times per week; 71% drank  $\geq 10$  standard drinks on a typical occasion; 95% drank at risky or high-risk levels (AUDIT-C score  $\geq 4$ ). Mean AUDIT-C score was  $8.5 \pm 2.3$  (range 2-12). The most common drinking pattern was consumption of  $\geq 10$  standard drinks either 2-4 times per month (27%) or 2-3 times per week (27%).

**Discussion and Conclusions:** High-risk alcohol use in pregnancy is common in remote, predominantly Aboriginal communities in north western Australia. Prevention strategies to reduce prenatal alcohol use are urgently needed. Copyright © 2015 Australasian Professional Society on Alcohol and other Drugs (APSAD). Published by John Wiley & Sons Ltd. (Authors' Abstract)



**France KE; Donovan RJ; Bower C; Elliott EJ; Payne JM; D'Antoine H; Bartu AE,** “Messages that increase women's intentions to abstain from alcohol during pregnancy: results from quantitative testing of advertising concepts”, *BMC Public Health*, Vol 14, Art No 30, 2014, 13pp

**Abstract**

**Background:** Public awareness-raising campaigns targeting alcohol use during pregnancy are an important part of preventing prenatal alcohol exposure and Fetal Alcohol Spectrum Disorder. Despite this, there is little evidence on what specific elements contribute to campaign message effectiveness. This research evaluated three different advertising concepts addressing alcohol and pregnancy: a threat appeal, a positive appeal promoting a self-efficacy message, and a concept that combined the two appeals. The primary aim was to determine the effectiveness of these concepts in increasing women's intentions to abstain from alcohol during pregnancy.

**Methods:** Women of childbearing age and pregnant women residing in Perth, Western Australia participated in a computer-based questionnaire where they viewed either a control or one of the three experimental concepts. Following exposure, participants' intentions to abstain from and reduce alcohol intake during pregnancy were measured. Other measures assessed included perceived main message, message diagnostics, and potential to promote defensive responses or unintended consequences.

**Results:** The concepts containing a threat appeal were significantly more effective at increasing women's intentions to abstain from alcohol during pregnancy than the self-efficacy message and the control. The concept that combined threat and self-efficacy is recommended for development as part of a mass-media campaign as it has good persuasive potential, provides a balance of positive and negative emotional responses, and is unlikely to result in defensive or unintended consequences.

**Conclusions:** This study provides important insights into the components that enhance the persuasiveness and effectiveness of messages aimed at preventing prenatal alcohol exposure. The recommended concept has good potential for use in a future campaign aimed at promoting women's intentions to abstain from alcohol during pregnancy.

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**Smith L; Savory J; Couves J; Burns E, "Alcohol consumption during pregnancy: cross-sectional survey", *Midwifery*, Vol 30, No 12, 2014, pp1173-1178**

**Abstract**

**Objective:** To assess the prevalence and pattern of alcohol consumption pre-conception and/or during the first trimester using the Alcohol Use Disorders Identification Test (AUDIT), Alcohol Use Disorders Identification Test - Consumption (AUDIT-C) and T-ACE (Tolerance, Annoyance, Cut Down and Eye-Opener) alcohol screening questionnaires, and determine the socio-demographic predictors of drinking in this time period.

**Design:** Cross sectional survey of a consecutive sample of 500 pregnant women attending their first antenatal appointment at approximately 10-11 weeks gestation.

**Setting:** Two antenatal clinics in the South West of England.

**Findings:** Of the 409 women respondents, we found a quarter of women reported drinking alcohol despite being aware they are pregnant. Between two to three in every 100 women reported thinking six or more units on a single occasion (heavy episodic or 'binge' drinking) at least monthly or weekly in the past three months. A similar proportion reported exceeding the recommended drinking limits of one to two units, once or twice a week. The majority of heavy episodic drinkers were otherwise low risk drinkers. 54% of respondents had an AUDIT-C score of 3 or more, and 22.2% a T-ACE score of 2 or more, indicating risk drinking in the pre-conception period. Drinking pre-conception and/or during the first trimester was more likely if women were multiparous and of white ethnicity.

**Key Conclusions:** In this study pregnant women attending an antenatal appointment were willing to complete brief alcohol screening questionnaires. A minority of women reported drinking pre-conception and/or during the first trimester with a small percentage drinking at levels potentially harmful to the fetus.

**Implications for Practice:** Use of these questionnaires would help midwives gather information about alcohol use to help identify women drinking at levels in excess of recommended limits in order that appropriate advice and support be offered. Copyright © 2014 Elsevier Ltd. All rights reserved. (Authors' Abstract)

**Niclasen J; Andersen AM; Strandberg Larsen K; Teasdale TW, “Is alcohol binge drinking in early and late pregnancy associated with behavioural and emotional development at age 7 years?”, *European Child and Adolescent Psychiatry*, Vol 23, No 12, 2014, pp1175-1180**

**Abstract**

The purpose of this study was to investigate associations of maternal binge drinking in early and late pregnancy with child behavioural and emotional development at age seven. It was hypothesised that late exposure is associated with more negative outcomes than early exposure. Differences were expected on the continuous outcome measures, but not on above cutoff scale scores. Data were derived from the Danish National Birth Cohort. Three exposure groups were defined according to binge drinking from three interviews regarding binge episodes in early, middle and late pregnancy. A 'no binge' group included women with no binge episodes reported in any of the interviews, the 'early bingers' reported episodes in the first interview only, and the 'late bingers' in the last part of pregnancy only. The outcome measure was the Strengths and Difficulties Questionnaire (SDQ) used as continuous externalising/internalising scores and above cutoff hyperactivity/inattention, conduct, emotional and peer problems scores. Only women with full information concerning binge drinking from the three interviews, together with full-scale SDQ information on their children at age seven and being term-born, were included in the study (N = 37,315). After adjustment for maternal education, psychiatric diagnoses, age and smoking, children exposed to binge drinking in early and late pregnancy had significantly higher mean externalizing scores at age seven than unexposed children, an effect albeit much less for early binge drinking (relative change in mean 1.02, CI 1.00-1.05) than for late binge drinking (relative change in mean 1.21, CI 1.04- 1.42). No associations were observed for any of the above cutoff outcomes. Exposure to binge drinking in early and late pregnancy is associated with elevated externalizing scores, particularly so in late pregnancy. No increased risk for any of the above cutoff scale scores was observed. Copyright © 2014 Springer-Verlag. (Authors' Abstract)

**Bottorff JL; Poole N; Kelly MT; Greaves L; Marcellus L; Jung M**, “Tobacco and alcohol use in the context of adolescent pregnancy and postpartum: a scoping review of the literature”, *Health and Social Care in the Community*, Vol 22, No 6, 2014, pp561-574

**Abstract**

Adolescent girls are more likely than women of other ages to smoke tobacco or drink alcohol during pregnancy. The health impacts of smoking and drinking for girls and the interconnections between alcohol and tobacco use with adolescent pregnancy underscore the urgent need for integrated approaches to prevent and reduce alcohol and tobacco use among pregnant girls/young women. This article reports on the results of a scoping review of the literature focused on adolescents' use of tobacco and alcohol during pregnancy and postpartum. A search of CINAHL, Medline, Social Science Index and Web of Science identified 40 articles published in the two decades between 1990 and 2012 that met our inclusion criteria related to this age group, pregnancy/motherhood status, and use of both alcohol and tobacco. The review points to compelling gaps in our knowledge and our responsiveness to adolescents aged 19 and under who use alcohol and tobacco during pregnancy and the postpartum period. Research has been primarily descriptive, with separate, parallel streams of investigation to identify trends and predictors of alcohol and tobacco use, prior to, during and following pregnancy. There is a marked lack of effective interventions described in the literature that are designed to prevent or reduce alcohol and tobacco use during pregnancy among adolescent girls; and there are few examples of gender-informed prevention or treatment programmes for this population. Research is needed on interventions that attend to the context of adolescent girls' substance use as well as their preferences and developmental needs for support that encourage sustained behaviour change throughout pregnancy and the postpartum period and that effectively address the influence of partners and friends on use. Copyright © 2014 John Wiley & Sons Ltd. (Authors' Abstract)

**Leppo A; Hecksher D; Tryggvesson K, "Why take chances?' Advice on alcohol intake to pregnant and non-pregnant women in four Nordic countries", *Health Risk and Society*, Vol 16, No 6, 2014, pp512-529**

**Abstract**

In this article we explore the construction of risk in government guidelines on alcohol intake during and before pregnancy in four Nordic countries given that there is no sound evidence linking a low level of alcohol intake during pregnancy to foetal harm. In the article we draw on two sources of data to examine the rationale behind the advice given to pregnant women: health education materials and other government documents, such as guidelines for professionals. We found that in all the four countries the government guidelines advised pregnant women to completely abstain from alcohol consumption, but there was some variation between the countries in the advice for non-pregnant women. The guidance in the four countries also differed in the extent to which they discussed the lack of evidence behind the abstinence advice and the precautionary approach on which the advice was based. In all the four countries the printed and widely circulated health education materials did not explain that the abstinence advice was not based on actual evidence of harm but on a precautionary approach. The other government documents adopted varying strategies for justifying the abstinence advice including not offering information about the uncertainty of the knowledge base, implying that there was evidence that low alcohol consumption was harmful to the foetus, acknowledging that a safe level of alcohol intake during pregnancy could not be specified and explaining the precautionary approach to risk. In this article we argue that the shift from 'estimation of risk' to the 'precautionary principle' is a part of a wider socio-cultural push towards broader employment of the precautionary principle as a strategy to manage uncertainty, and in the context of pregnancy, it is a part of the symbolic struggle to protect the purity of the foetus and construct the 'perfect mother'. Copyright © 2014 Taylor & Francis Group, LLC. (Authors' Abstract)

**Bell JC; Raynes Greenow C; Turner RM; Bower C; Nassar N; O'Leary CM, "Maternal alcohol consumption during pregnancy and the risk of orofacial clefts in infants: a systematic review and meta-analysis", *Paediatric and Perinatal Epidemiology*, Vol 28, No 4, 2014, pp322-332**

**Abstract**

**Background:** The teratogenic effects of maternal alcohol consumption during pregnancy include anomalies of craniofacial structures derived from the cranial neural crest cells. The presence of specific craniofacial anomalies contributes to the diagnosis of fetal alcohol spectrum disorders. Cleft lip and palate [orofacial clefts (OFCs)], also derived from the cranial neural crest cells, are common congenital anomalies, but their relationship with prenatal alcohol consumption is unknown.

**Methods:** To evaluate the association between maternal consumption of alcohol during pregnancy and the occurrence of OFCs in infants, we conducted a systematic review and meta-analyses of published studies. We examined the associations between any alcohol consumption, binge level drinking, and heavy and moderate levels of consumption vs. no or low levels of consumption.

**Results:** After screening 737 publications, we identified 33 studies (23 case-control and 10 cohort studies). There was considerable heterogeneity in individual study design, quality measures and study results. Findings from random effects meta-analyses suggest no relationship between prenatal alcohol consumption and the occurrence of OFCs {pooled odds ratios for any alcohol intake and binge level drinking respectively: cleft lip with or without cleft palate 1.00 [95% confidence interval (CI) 0.86, 1.16] from 18349 participants in 13 studies, 1.04 [95% CI 0.87, 1.24] [8763 individuals, 4 studies]; cleft palate only 1.05 [95% CI 0.92, 1.21] [21459 individuals, 17 studies], 0.94 [95% CI 0.74, 1.21] [7730 participants, 4 studies]}.

**Conclusions:** While we found no association between alcohol consumption during pregnancy and OFCs in infants, the influence of study design, particularly in relation to alcohol exposure measurement and OFC ascertainment cannot be ignored. Copyright © 2014 John Wiley & Sons Ltd. (Authors' Abstract)

**Lucas BR; Latimer J; Pinto RZ; Ferreira ML; Doney R; Lau M; Jones T; Dries D; Elliott EJ, "Gross motor deficits in children prenatally exposed to alcohol: a meta-analysis", *Pediatrics*, Vol 134, No 1, 2014, ppe192-e209**

**Abstract**

**Background and Objectives:** Gross motor (GM) deficits are often reported in children with prenatal alcohol exposure (PAE), but their prevalence and the domains affected are not clear. The objective of this review was to characterize GM impairment in children with a diagnosis of fetal alcohol spectrum disorder (FASD) or "moderate" to "heavy" maternal alcohol intake.

**Methods:** A systematic review with meta-analysis was conducted. Medline, Embase, Allied and Complementary Medicine Database, Cumulative Index to Nursing and Allied Health Literature, PsycINFO, PEDro, and Google Scholar databases were searched. Published observational studies including children aged 0 to  $\leq 18$  years with (1) an FASD diagnosis or moderate to heavy PAE, or a mother with confirmed alcohol dependency or binge drinking during pregnancy, and (2) GM outcomes obtained by using a standardized assessment tool. Data were extracted regarding participants, exposure, diagnosis, and outcomes by using a standardized protocol. Methodological quality was evaluated by using Strengthening the Reporting of Observational Studies in Epidemiology guidelines.

**Results:** The search recovered 2881 articles of which 14 met the systematic review inclusion criteria. The subjects' mean age ranged from 3 days to 13 years. Study limitations included failure to report cutoffs for impairment, nonstandardized reporting of PAE, and small sample sizes. The meta-analysis pooled results ( $n = 10$ ) revealed a significant association between a diagnosis of FASD or moderate to heavy PAE and GM impairment (odds ratio: 2.9; 95% confidence interval: 2.1-4.0). GM deficits were found in balance, coordination, and ball skills. There was insufficient data to determine prevalence.

**Conclusions:** The significant results suggest evaluation of GM proficiency should be a standard component of multidisciplinary FASD diagnostic services. Copyright © 2014 American Academy of Pediatrics. All rights reserved. (Authors' Abstract)

**Scholder SV; Wehby GL; Lewis S; Zuccolo L**, "Alcohol exposure in utero and child academic achievement", *Economic Journal*, Vol 124, No 576, 2014, pp634-667

**Abstract**

We examine the effect of prenatal alcohol exposure on child academic achievement. We use a genetic variant in the maternal alcohol-metabolism gene ADH1B to instrument for alcohol exposure, whilst controlling for the child's genotype on the same variant. We show that the instrument is unrelated to an extensive range of parental characteristics and behaviour. OLS regressions suggest an ambiguous association between alcohol exposure and attainment but there is a strong social gradient in drinking, with mothers in higher socio-economic groups more likely to drink. In contrast to the OLS, the IV estimates show clear negative effects of prenatal alcohol exposure. Copyright © 2014 Royal Economic Society. Published by John Wiley & Sons Ltd. (Authors' Abstract)



**Sayal K; Heron J; Draper E; Alati R; Lewis SJ; Fraser R; Barrow M; Golding J; Emond A; Davey Smith G; Gray R**, "Prenatal exposure to binge pattern of alcohol consumption: mental health and learning outcomes at age 11", *European Child and Adolescent Psychiatry*, Published early online 11 September 2014

**Abstract**

The objective of the study is to investigate whether episodic binge pattern of alcohol consumption during pregnancy is independently associated with child mental health and academic outcomes. Using data from the prospective, population-based Avon Longitudinal Study of Parents and Children (ALSPAC), we investigated the associations between binge patterns of alcohol consumption during pregnancy ( $\geq 4$  drinks per day) and child mental health [as rated by both parent ( $n = 4,610$ ) and teacher ( $n = 4,274$ )] and academic outcomes [based on examination results ( $n = 6,939$ )] at age 11 years. After adjusting for prenatal and postnatal risk factors, binge pattern of alcohol consumption ( $\geq 4$  drinks in a day on at least one occasion) during pregnancy was associated with higher levels of mental health problems (especially hyperactivity/inattention) in girls at age 11 years, according to parental report. After disentangling binge-pattern and daily drinking, binge-pattern drinking was independently associated with teacher-rated hyperactivity/inattention and lower academic scores in both genders. Episodic drinking involving  $\geq 4$  drinks per day during pregnancy may increase risk for child mental health problems and lower academic attainment even if daily average levels of alcohol consumption are low. Episodic binge pattern of drinking appears to be a risk factor for these outcomes, especially hyperactivity and inattention problems, in the absence of daily drinking. Copyright © 2014 Springer-Verlag. (Authors' Abstract)

**Magnus MC; DeRoo LA; Haberg SE; Magnus P; Nafstad P; Nystad W; London SJ,** “Prospective study of maternal alcohol intake during pregnancy or lactation and risk of childhood asthma: the Norwegian Mother and Child Cohort Study”, *Alcoholism: Clinical and Experimental Research*, Published early online 24 January 2014

**Abstract**

**Background:** Many women drink during pregnancy and lactation despite recommendations to abstain. In animals, alcohol exposure during pregnancy and lactation influences lung and immune development, plausibly increasing risk of asthma and lower respiratory tract infections (LRTIs). Studies in humans are few.

**Methods:** In the Norwegian Mother and Child Cohort Study, we examined maternal alcohol intake during pregnancy and lactation in relation to risk of current asthma at 36 months (49,138 children), recurrent LRTIs by 36 months (39,791 children), and current asthma at 7 years (13,253 children). Mothers reported frequency and amount of alcohol intake each trimester and the first 3 months following delivery. We calculated adjusted relative risk (aRR), comparing children of drinkers to nondrinkers, using Generalized Linear Models.

**Results:** A total of 31.8% of mothers consumed alcohol during first trimester, 9.7% during second trimester, and 15.6% during third trimester. Infrequent and low-dose prenatal alcohol exposure showed a modest statistically significant inverse association with current asthma at 36 months (aRRs ~ 0.85). No association was seen with the highest alcohol intakes during the first trimester when alcohol consumption was most common. RRs of maternal alcohol intake during pregnancy with recurrent LRTIs were ~1, with sporadic differences in risk for some metrics of intake, but without any consistent pattern. For current asthma at 7 years, similar inverse associations were seen as with current asthma at 36 months but were not statistically significant. Among children breastfed throughout the first 3 months of life, maternal alcohol intake during this time was not significantly associated with any of the 3 outcomes.

**Conclusions:** The low levels of alcohol exposure during pregnancy or lactation observed in this cohort were not associated with increased risk of asthma or recurrent LRTIs. The slight inverse associations of infrequent or low-dose prenatal alcohol exposure with asthma may not be causal. Copyright © 2014 Research Society on Alcoholism. Published by John Wiley & Sons Ltd. (Authors' Abstract)

**Chambers CD; Yevtushok L; Zymak Zakutnya N; Korzhynskyy Y; Ostapchuk L; Akhmedzhanova D; Chan PH; Xu R; Wertelecki W**, “Prevalence and predictors of maternal alcohol consumption in 2 regions of Ukraine”, *Alcoholism: Clinical and Experimental Research*, Published early online 3 December 2013

**Abstract**

**Background:** Fetal alcohol spectrum disorders are thought to be a leading cause of developmental disabilities worldwide. However, data are lacking on alcohol use among pregnant women in many countries. The purpose of this study was to evaluate the prevalence and predictors of alcohol consumption by pregnant women in Ukraine.

**Methods:** Cross-sectional screening of pregnant women was conducted in 2 regions of Ukraine during the recruitment phase of an ongoing clinical study that is part of the Collaborative Initiative on Fetal Alcohol Spectrum Disorders. Women attending a routine prenatal visit at 1 of 2 participating regional centers were asked about alcohol consumption. Quantity and frequency of alcoholic beverages consumed in the month around conception and in the most recent month of pregnancy were measured using a standard interview instrument.

**Results:** Between 2007 and 2012, 11,909 pregnant women were screened on average in the second trimester of pregnancy. Of these, 92.7% reported being ever-drinkers. Among ever-drinkers, 54.8% reported drinking alcohol in the month around conception and 12.9% consumed at least 3 drinks on at least 1 day in that time period. In the most recent month of pregnancy, 46.3% continued to report alcohol use and 9.2% consumed at least 3 drinks per day. Significant predictors of average number of drinks or heavier drinking per day in either time period in pregnancy included lower gravidity, being single, unmarried/living with a partner, or separated, lower maternal education, smoking, younger age at initiation of drinking, and higher score on the TWEAK screening test for harmful drinking.

**Conclusions:** These findings support the need for education/intervention in women of childbearing age in Ukraine and can help inform targeted interventions for women at risk of an alcohol-exposed pregnancy. The initiation of a standard screening protocol in pregnancy is a step in the right direction. Copyright © 2013 Research Society on Alcoholism. Published by John Wiley & Sons Ltd. (Authors' Abstract)

**Anderson AE; Hure AJ; Forder P; Powers JR; Kay Lambkin FJ; Loxton DJ, "Predictors of antenatal alcohol use among Australian women: a prospective cohort study", *BJOG*, Vol 120, No 11, 2013, pp1366-1374**

**Abstract**

**Objective:** To identify predictors of antenatal alcohol consumption among women who usually consume alcohol.

**Design:** Prospective cohort study.

**Setting:** Australian Longitudinal Study on Women's Health (ALSWH).

**Population or Sample:** A total of 1969 women sampled from the ALSWH 1973-78 cohort.

**Methods:** Women were included if they were pregnant in 2000, 2003, 2006 or 2009. The relationship between antenatal alcohol consumption and sociodemographics, reproductive health, mental health, physical health, health behaviours, alcohol guidelines and healthcare factors was investigated using a multivariate logistic regression model.

**Main Outcome Measures:** Alcohol use during pregnancy.

**Results:** Most (82.0%) women continued to drink alcohol during pregnancy. Women were more likely to drink alcohol during pregnancy if they had consumed alcohol on a weekly basis before pregnancy (odds ratio [OR] 1.47; 95% confidence interval [95% CI] 1.13-1.90), binge drank before pregnancy (OR 2.28; 95% CI 1.76-2.94), or if they were pregnant while alcohol guidelines recommended low alcohol versus abstinence (OR 1.60; 95% CI 1.26-2.03). Drinking during pregnancy was less likely if women had a Health Care Card (OR 0.63; 95% CI 0.45-0.88) or if they had ever had fertility problems (OR 0.64; 95% CI 0.48-0.86).

**Conclusions:** Most Australian women who drank alcohol continued to do so during pregnancy. Prepregnancy alcohol consumption was one of the main predictors of antenatal alcohol use. Alcohol guidelines, fertility problems and Health Care Card status also impacted antenatal alcohol consumption. Copyright © 2013 Royal College of Obstetricians and Gynaecologists (RCOG). Published by Wiley-Blackwell. (Authors' Abstract)

**Popova S; Lange S; Burd L; Urbanoski K; Rehm J, “Cost of specialized addiction treatment of clients with fetal alcohol spectrum disorder in Canada”, *BMC Public Health*, Vol 13, Art No 570, 2013, 11pp**

**Abstract**

**Background:** Individuals with Fetal Alcohol Spectrum Disorder (FASD) constitute a special population that may be at particularly high risk for substance use. The purpose of the current study was to estimate the utilization of specialized addiction treatment services (SATS) and the associated cost, as a part of the total cost of health care associated with FASD in Canada.

**Methods:** The current study was a modeling study. Data on SATS by lifetime mental disorder status were obtained from the Drug and Alcohol Treatment Information System (DATIS) in Ontario, Canada for 2010/11. The number of clients with FASD who received SATS in Ontario in 2010/11 was estimated, assuming that approximately 37% (confidence interval: 21.6%-54.5%) of individuals with FASD abuse or are addicted to alcohol and/or drugs and that their utilization rate of SATS is the same as those for people with a lifetime mental disorder. The data from DATIS was then extrapolated to the total Canadian population.

**Results:** The cost of SATS for clients with FASD in Canada in 2010/11 ranged from \$1.65 million Canadian dollars (CND) to CND \$3.59 million, based on 5,526 outpatient visits and 9,529 resident days. When the sensitivity analysis was performed the cost of SATS ranged from \$979 thousand CND to \$5.34 million CND.

**Conclusions:** Special attention must be paid to at-risk groups of individuals such as those with FASD, in order to reduce the likelihood of the development of co-morbid substance abuse problems, and thus, reducing the overall burden on Canadian society.

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**Murphy DJ; Mullally A; Cleary BJ; Fahey T; Barry J**, “Behavioural change in relation to alcohol exposure in early pregnancy and impact on perinatal outcomes - a prospective cohort study”, *BMC Pregnancy and Childbirth*, Vol 13, Art No 8, 2013, 8pp

**Abstract**

**Background:** There has been limited research addressing whether behavioural change in relation to alcohol exposure in pregnancy results in better perinatal outcomes.

**Methods:** A cohort study of 6725 women who booked for antenatal care and delivered in a large urban teaching hospital in 2010-2011. A detailed history of alcohol consumption pre-pregnancy and during early pregnancy was recorded at the first antenatal visit with follow-up of the mother and infant until discharge following birth. Adverse perinatal outcomes were compared for 'non-drinkers', 'ex-drinkers' and 'current drinkers'.

**Results:** Of the 6017 (90%) women who reported alcohol consumption prior to pregnancy 3325 (55%) engaged in binge drinking and 266 (4.4%) consumed more than 14 units on average per week. At the time of booking 5649 (94%) women were ex-drinkers and of the 368 women who continued to drink 338 (92%) had a low intake (0-5 units per week), 30 (8%) an excess intake (6-20+ units per week) and 93 (25%) reported at least one episode of binge drinking. Factors associated with continuing to drink in early pregnancy included older maternal age (30-39 years), (OR 1.6; 95% CI 1.3 to 1.8), Irish nationality (OR 3.1; 95% CI 2.2 to 4.3) and smoking (OR 2.6; 95% CI 1.9 to 3.5). Ex-drinkers had similar perinatal outcomes to non-drinkers. Compared to non-drinkers current drinking was associated with an increased risk of intrauterine growth restriction (IUGR) (13% versus 19%, crude OR 1.6; 95% CI 1.1 to 2.2, adjusted OR 1.2; 95% CI 0.8 to 1.8). The greatest risk of IUGR was among women who continued to both drink and smoke, (9% versus 32%, crude OR 4.8; 95% CI 3.3 to 7.0, adjusted OR 4.5; 95% CI 3.1 to 6.7).

**Conclusions:** Public health campaigns need to emphasise the potential health gains of abstaining from both alcohol and smoking in pregnancy. Copyright © 2013 The Author(s); licensee BioMed Central Ltd. (Authors' Abstract)

**Skogerbo A; Kesmodel US; Denny CH; Kjaersgaard MI; Wimberley T; Landro NI; Mortensen EL**, “The effects of low to moderate alcohol consumption and binge drinking in early pregnancy on behaviour in 5-year-old children: a prospective cohort study on 1628 children”, *BJOG*, Vol 120, No 9, 2013, pp1042-1050

**Abstract**

**Objective:** To examine the effects of low to moderate maternal alcohol consumption and binge drinking in early pregnancy on behaviour in children at the age of 5 years.

**Design:** Prospective cohort study.

**Setting:** Neuropsychological testing in four Danish cities, 2003-2008.

**Population:** A total of 1628 women and their children sampled from the Danish National Birth Cohort.

**Methods:** Participants were sampled based on maternal alcohol drinking patterns during early pregnancy. When the children were 5 years of age the parent and teacher versions of the Strengths and Difficulties Questionnaire (SDQ) were completed by the mothers and a preschool teacher, respectively. The full statistical model included the following potential confounding factors: maternal binge drinking or low to moderate alcohol consumption, respectively; parental education; maternal IQ; prenatal maternal smoking; the child's age at testing; the child's gender; maternal age; parity; maternal marital status; family home environment; postnatal parental smoking; prepregnancy maternal body mass index (BMI); and the child's health status.

**Main Outcome Measure:** Behaviour among children assessed by the SDQ parent and teacher forms.

**Results:** Adjusted for all potential confounding factors, no statistically significant associations were observed between maternal low to moderate average weekly alcohol consumption and SDQ behavioural scores (OR1.1, 95%CI 0.5-2.3; OR1.1, 95%CI 0.6-2.1 for the total difficulties scores) or between binge drinking and SDQ behavioural scores (OR1.2, 95%CI 0.8-1.7; OR0.8, 95%CI 0.6-1.2).

**Conclusion:** This study observed no consistent effects of low to moderate alcohol consumption or binge drinking in early pregnancy on offspring behaviour at the age of 5 years.

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**Quattlebaum JL; O'Connor MJ, "Higher functioning children with prenatal alcohol exposure: is there a specific neurocognitive profile?", *Child Neuropsychology*, Vol 19, No 6, 2013, pp561-578**

**Abstract**

Recent attempts to identify a neurocognitive profile of children with prenatal alcohol exposure (PAE) have led to an emerging "generalized deficit" conceptualization marked by diffuse information processing and integration difficulties as opposed to a specific profile. This study examines whether this conceptualization can be extended to higher functioning children with PAE who are without intellectual disability and addresses several limitations of previous research. One hundred twenty-five children aged 6-12 years with social skills deficits, 97 of whom met diagnostic criteria for a Fetal Alcohol Spectrum Disorder (FASD), underwent a comprehensive, multi-informant assessment of neurocognitive, emotional, social, behavioral, and adaptive functioning. Multivariate analyses of variance examined differences in functioning between the PAE group and a nonexposed comparison group with and without controlling for child IQ. Results indicated that the PAE group returned significantly poorer scores than the nonexposed group on every construct assessed, including executive functioning, attention, working/visuospatial memory, linguistic abstraction, adaptive behavior, emotional/behavioral functioning, and social cognition. These differences largely maintained after controlling for IQ and were similar regardless of informant, although teachers reported somewhat fewer group differences. Within the PAE group, no differences were found across FASD subtypes. These results provide evidence extending the emerging generalized deficit conceptualization of children with PAE to those higher functioning individuals without global intellectual disability. Copyright © 2013 Psychology Press; an imprint of Taylor and Francis Group. (Authors' Abstract)



**Humphriss R; Hall A; May M; Zuccolo L; Macleod J**, “Prenatal alcohol exposure and childhood balance ability: findings from a UK birth cohort study”, *BMJ Open*, Vol 3, No 6, 2013, Art No e002718, 9pp

**Abstract**

**Objective:** To investigate the association of prenatal alcohol exposure with balance in 10-year-old children.

**Design:** Population-based prospective longitudinal study.

**Setting:** Former Avon region of UK (Southwest England).

**Participants:** 6915 children from the Avon Longitudinal Study of Parents and Children who had a balance assessment at age 10 and had data on maternal alcohol consumption.

**Outcome Measures:** 3 composite balance scores: dynamic balance (beam-walking), static balance eyes open, static balance eyes closed (heel-to-toe balance on a beam and standing on one leg, eyes open or closed).

**Results:** Most mothers (95.5%) consumed no-to-moderate amounts (3-7 glasses/week) of alcohol during pregnancy. Higher total-alcohol consumption was associated with maternal-social advantage, whereas binge drinking ( $\geq 4$  units/day) and abstinence were associated with maternal social disadvantage. No evidence was found of an adverse effect of maternal-alcohol consumption on childhood balance. Higher maternal-alcohol use during pregnancy was generally associated with better offspring outcomes, with some specific effects appearing strong (static balance eyes open and moderate total alcohol exposure at 18 weeks, adjusted OR 1.23 (95% CI 1.01 to 1.49); static balance eyes closed and moderate total alcohol exposure at 18 weeks, adjusted OR 1.25 (95% CI 1.06 to 1.48). Similar results were found for both paternal and postnatal maternal alcohol exposure. A Mendelian-randomization approach was used to estimate the association between maternal genotype and offspring balance using the non-synonymous variant rs1229984\*A (ADH1B) to proxy for lower maternal alcohol consumption; no strong associations were found between this genotype/proxy and offspring balance.

**Conclusions:** No evidence was found to indicate that moderate maternal alcohol consumption in this population sample had an adverse effect on offspring balance at age 10. An apparent beneficial effect of higher total maternal alcohol consumption on offspring balance appeared likely to reflect residual confounding.

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**Cameron CM; Davey TM; Kendall E; Wilson A; McClure RJ**, “Changes in alcohol consumption in pregnant Australian women between 2007 and 2011”, *Medical Journal of Australia*, Vol 199, No 5, 2013, pp355-357

**Abstract**

**Objective:** To describe the prevalence and distribution of alcohol consumption during pregnancy in an Australian population over a 5-year period.

**Design, Setting and Participants:** Cross-sectional repeated sample, trend analysis of aggregated and stratified alcohol consumption patterns during pregnancy. Pregnant women were enrolled from 2007 to 2011 in the Griffith Study of Population Health: Environments for Healthy Living, a birth cohort study being conducted in south-east Queensland and north-east New South Wales.

**Main Outcome Measures:** Sociodemographic and alcohol consumption data were self-reported at enrolment. Alcohol measures included alcohol consumption (any level) and high-risk alcohol consumption, both during pregnancy (at any stage) and after the first trimester of pregnancy.

**Results:** Of 2731 pregnant women for whom alcohol consumption data were available, a decrease in alcohol consumption was observed over the study period; 52.8% reported alcohol use in 2007 compared with 34.8% in 2011 ( $P < 0.001$ ). The proportion of women who drank alcohol after the first trimester of pregnancy declined from 42.2% in 2007 to 25.8% in 2011. However, high-risk drinking patterns - at all or after the first trimester - did not change over the 5 years ( $P = 0.12$ ). Low-level alcohol consumption was associated with older women ( $P < 0.001$ ), more highly educated women ( $P = 0.01$ ), and women from higher-income households ( $P < 0.001$ ). In contrast, high-risk consumption after the first trimester was associated with lower levels of education ( $P = 0.011$ ) and single-parent status ( $P = 0.001$ ).

**Conclusions:** This study showed a steady and statistically significant decline in the proportion of women who reported drinking alcohol during pregnancy from 2007 to 2011. To further reduce these levels, we need broad public health messages for the general population and localised strategies for high-risk subpopulations.

**Trial registration:** Australian New Zealand Clinical Trials Registry ACTRN12610000931077. Copyright © 2013 Medical Journal of Australia. (Authors' Abstract)

**McCarthy FP; O'Keeffe LM; Khashan AS; North RA; Poston L; McCowan LM; Baker PN; Dekker GA; Roberts CT; Walker JJ; Kenny LC, "Association between maternal alcohol consumption in early pregnancy and pregnancy outcomes", *Obstetrics and Gynecology*, Vol 122, No 4, 2013, pp830-837**

**Abstract**

**Objective:** To investigate the association between alcohol consumption and binge drinking before and during early pregnancy and adverse pregnancy outcomes.

**Methods:** We used data from 5,628 nulliparous pregnant participants recruited to the Screening for Pregnancy Endpoints (SCOPE) study, a prospective cohort study. Participants were interviewed at 15 weeks of gestation and information on alcohol intake before pregnancy and until the time of interview was obtained using a standardized questionnaire. Alcohol intake was classified as occasional (1-2 units per week), low (3-7 units per week), moderate (8-14 units per week), and heavy (greater than 14 units per week). Binge alcohol consumption was defined as consumption of 6 or more alcohol units in one session.

**Results:** Of the 5,628 participants, 1,090 (19%) reported occasional alcohol consumption, 1,383 (25%) low alcohol consumption, 625 (11%) moderate alcohol consumption, and 300 (5%) heavy alcohol consumption. Overall, 1,905 (34%) participants reported binge alcohol consumption in the 3 months before pregnancy, and 1,288 (23%) of these participants reported binge alcohol consumption during the first 15 weeks of pregnancy. Participants who consumed occasional to heavy amounts of alcohol in early pregnancy did not have altered odds of a small-for-gestational-age neonate, reduced birth weight, preeclampsia, or spontaneous preterm birth. Similarly, those who binge drank in early pregnancy did not have altered odds of these adverse pregnancy outcomes.

**Conclusion:** Alcohol consumption in early pregnancy was prevalent in this nulliparous cohort. There was no association between alcohol consumption before 15 weeks of gestation and small for gestational age, reduced birth weight, preeclampsia, or spontaneous preterm birth. Copyright © 2013 American College of Obstetricians and Gynecologists; Lippincott Williams & Wilkins All rights reserved. (Authors' Abstract)

**Pfänder M; Feldmann R; Liebig S, "Alcohol during pregnancy from 1985 to 2005: prevalence and high risk profile", *Sucht*, Vol 59, No 3, 2013, pp165-173**

**Abstract**

**Aims:** This study aimed 1. to examine the prevalence of German children born with prenatal alcohol exposure (PAE) from 1985 to 2005, and asked 2. whether it differed on levels of socioeconomic status (SES) and 3. whether there are differences between abstainers and drinkers during pregnancy in regard to physical, behavioural and sociodemographic features.

**Methods:** 16,978 German mothers, enrolled in the German Health Interview and Examination Survey (KiGGS) were studied.

**Results:** Between 1985 and 2005 13.5 percent of the children were born with PAE. No stable decrease was found over time. Over 20 years, the prevalence of children born with PAE was highest in the upper class. Drinkers differed from abstainers in regard to physical, behavioural and sociodemographic characteristics. High SES women were on a higher risk of alcohol intake during pregnancy.

**Conclusions:** The prevalence of children born with PAE over time indicates that alcohol intake during pregnancy needs further interventions and prevention as no long-lasting decrease was found in the years from 1985 to 2005. Alcohol intake during pregnancy was and still is an issue in women from the upper class. Future research should therefore aim to explain the social gradient. Copyright © 2013 Verlag Hans Huber, Hogrefe AG Publishing. All rights reserved. (Authors' Abstract)

**O'Leary C; Leonard H; Bourke J; D'Antoine H; Bartu A; Bower C**, "Intellectual disability: population-based estimates of the proportion attributable to maternal alcohol use disorder during pregnancy", *Developmental Medicine and Child Neurology*, Vol 55, No 3, 2013, pp271-277

**Abstract**

**Aim:** The aim of this study was to examine the association between maternal alcohol use disorder and intellectual disability in children.

**Method:** All mothers with an International Classification of Diseases (ICD) 9 and/or 10 alcohol-related diagnosis, a proxy for alcohol use disorder, recorded on the Western Australian health, mental health, and drug and alcohol data sets were identified through the Western Australian Data Linkage Unit (n=5614 non-Aboriginal; n=2912 Aboriginal). A comparison cohort of mothers without an alcohol-related diagnosis was frequency matched on maternal age within maternal Aboriginal status and year of birth of their children. Linkage with the Western Australian Midwives Notification System (19832001) identified all births to these mothers (n=10664 and 7907 respectively). Linkage to the Western Australian Intellectual Disability Database and Register of Developmental Anomalies identified cases of intellectual disability with no identified genetic origin (intellectual disability) (n=1487) and fetal alcohol syndrome (n=66). Odds ratios (ORs) and 95% confidence intervals (CIs) for intellectual disability were calculated using logistic regression incorporating generalized estimating equations and used to estimate population-attributable fractions.

**Results:** At least 3.8% (95% CI 2.844.89%) of cases of intellectual disability could be avoided by preventing maternal alcohol use disorder: 1.3% (95% CI 0.811.86%) in non- Aboriginal and 15.6% (95% CI 10.8520.94%) in Aboriginal children. We observed a threefold increase in the adjusted odds of intellectual disability in children of mothers with an alcohol-related diagnosis recorded during pregnancy (non-Aboriginal OR 2.89, 95% CI 1.625.18; Aboriginal OR 3.12, 95% CI 2.134.56), with a net excess proportion of 3.7% and 5.5% respectively. One-third (32%) of children diagnosed with fetal alcohol syndrome had intellectual disability.

**Interpretation:** Maternal alcohol use disorder is the leading known risk factor for intellectual disability with no identified genetic origin.

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**Parackal SM; Parackal MK; Harraway JA, "Prevalence and correlates of drinking in early pregnancy among women who stopped drinking on pregnancy recognition", *Maternal and Child Health Journal*, Vol 17, No 3, 2013, pp520-529**

**Abstract**

Women of child bearing age that regularly drink alcohol are at risk for drinking in early pregnancy. Evidence indicates a majority of women stop alcohol consumption on pregnancy recognition. However, there is a dearth of studies reporting on patterns and correlates of drinking in early pregnancy prior to stopping on pregnancy recognition, which the current study aims to address. In 2005, a New Zealand nationwide cross-sectional survey was conducted on a random sample of 1,256 women aged 16-40 years. Data were collected via an interviewer-administered questionnaire using a web-assisted telephone interviewing system. Of the 1,256 women who participated, 127 (10 %) were currently pregnant and 425 women (34 %) were previously pregnant. Half of currently pregnant women and 37 % of previously pregnant women reported that they ceased drinking on recognising pregnancy. Women categorised as "risky drinkers" and those aged 16-24 years had higher odds to drink and binge drink in early pregnancy, compared with non-risky drinkers and women of other age categories respectively. A majority of women stop alcohol consumption on pregnancy recognition but prior to this, drink at levels posing a risk for the developing foetus. Women most at risk for drinking and binge drinking in early pregnancy were younger in age and exhibited risky drinking behavior prior to pregnancy. A targeted intervention to reduce the risk for an alcohol exposed pregnancy is warranted for sexually active younger women in New Zealand and elsewhere. Copyright © 2013 Springer Science+Business Media, LLC. (Authors' Abstract)

**Sayal K; Draper ES; Fraser R; Barrow M; Smith GD; Gray R, "Light drinking in pregnancy and midchildhood mental health and learning outcomes", *Archives of Disease in Childhood*, Vol 98, No 2, 2013, pp107-111**

**Abstract**

**Objective:** To investigate whether light drinking in pregnancy is associated with adverse child mental health and academic outcomes.

**Design:** Using data from the prospective, population-based Avon Longitudinal Study of Parents and Children (ALSPAC), we investigated the associations between light drinking in pregnancy (< 1 glass per week in the first trimester) and child mental health (using both parent and teacher rated Strengths and Difficulties Questionnaires (SDQs)) and academic outcomes based on Key Stage 2 examination results at age 11 years.

**Participants:** 11-year-old children from ALSPAC with parent (n=6587) and teacher (n=6393) completed SDQs and data from Key Stage 2 examination results (n=10 558).

**Results:** 39% of women had consumed < 1 glass per week and 16%  $\geq$  1 glass per week of alcohol during the first trimester (45% abstaining). After adjustment, relative to abstainers, there was no effect of light drinking on teacher-rated SDQ scores or examination results. In girls, although there was a suggestion of worse outcomes (adjusted regression coefficient=0.38; 95% CI 0.01 to 0.74) on the parent-rated total SDQ score in those exposed to light drinking compared to abstainers, no dose-response relationship was evident.

**Conclusions:** Although the pattern of findings involving parent ratings for girls exposed to light drinking is consistent with earlier findings from this cohort, the overall lack of any adverse effects of light drinking is similar to findings from other recent cohort studies. Light drinking in pregnancy does not appear to be associated with clinically important adverse effects for mental health and academic outcomes at the age of 11 years.

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**Giliberti D; Mohan SS; Brown LA; Gauthier TW**, “Perinatal exposure to alcohol: implications for lung development and disease”, *Paediatric Respiratory Reviews*, Vol 14, No 1, 2013, pp17-21

**Abstract**

In utero alcohol exposure dramatically increases the risk of premature delivery. However, the majority of premature and term newborns exposed to alcohol remain undetected by medical caregivers. There is a desperate need for reliable and accurate biomarkers of alcohol exposure for the term and premature newborn population. The inability to identify the exposed newborn severely limits our understanding of alcohol's pathophysiological effects on developing organs such as the lung. This chapter will review potential advancements in future biomarkers of alcohol exposure for the newborn population. We will discuss alcohol's effects on redox homeostasis and cellular development of the neonatal lung. Finally, we will present the evidence describing in utero alcohol's derangement of innate and adaptive immunity and risk for infectious complications in the lung. Continued investigations into the identification and understanding of the mechanisms of alcohol-induced alterations in the premature lung will advance the care of this vulnerable patient population.

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**Meschke LL; Holl J; Messelt S, “Older not wiser: risk of prenatal alcohol use by maternal age”, *Maternal and Child Health Journal*, Vol 17, No 1, 2013, pp147-155**  
**Abstract**

High levels of alcohol use among pregnant women have been associated with a spectrum of birth defects. Greater maternal age has been related to an increased risk of drinking during pregnancy. Although the context, process, and outcomes of pregnancy and alcohol use vary by maternal age, no studies have examined predictors of prenatal drinking by age. This study addresses this gap by examining potential risk factors associated with prenatal alcohol use (any versus none) by maternal age (< 20, 20-25, 26-34, and 35 years or older). Descriptive and logistic regression analyses were completed on survey data from 9,004 pregnant women from the north central U.S. Descriptive statistics revealed teens in general had a higher level or greater occurrence of risk factors previously identified with prenatal drinking compared to older women, yet women of advanced maternal age (35 years or older) were most likely to drink alcohol during pregnancy. Based on the regression by age, 20-25 year old women had the greatest number of significant risk factors associated with prenatal drinking including being employed, white, unmarried, first birth, smoking prenatally, greater levels of depressed mood, and more experiences related to alcohol abuse. The number and patterns of significant predictors of drinking alcohol while pregnant by age encourage greater investigation of other social, contextual factors that might contribute to the risk of prenatal drinking. This is especially salient for women of advanced maternal age, for whom very few significant predictors emerged. Copyright © 2013 Springer Science+Business Media, LLC. (Authors' Abstract)

**Parazzini F; Cipriani S; Bravi F; Pelucchi C; Chiaffarino F; Ricci E; Vigano P, “A metaanalysis on alcohol consumption and risk of endometriosis”, *American Journal of Obstetrics and Gynecology*, Vol 209, No 2, 2013, pp106.E1-E10**

**Abstract**

**Objective:** To offer a general figure of the available data on the relation between alcohol intake and risk of endometriosis, we conducted a systematic review and a metaanalysis of studies published up to May 2012.

**Study Design:** We carried out a literature search of all case-control and cohort studies published as original articles in English up to May 2012. Only those papers that were published as full-length articles were considered. Pooled estimates of the relative risks (RRs) and the corresponding 95% confidence intervals (CIs) were calculated using fixed or, when significant heterogeneity among estimates emerged, random effects models. A total of 15 studies were identified for the review.

**Results:** The summary estimate was 1.24 (95% CI, 1.12-1.36) for any alcohol intake vs no alcohol intake. Considering the results of the analyses of infrequent, moderate/regular, and heavy alcohol intake vs no alcohol intake, the summary RR estimates were, respectively, 1.14 (95% CI, 0.86-1.52), 1.23 (95% CI, 1.08-1.40), and 1.19 (95% CI, 0.99- 1.43). Three studies reported separate results for current and former drinkers, and the summary RR were 1.42 (95% CI, 1.14-1.76) and 1.09 (95% CI, 0.83-1.43), respectively.

**Conclusion:** The present metaanalysis provides evidence for an association between alcohol consumption and endometriosis risk. Further studies are needed to clarify whether alcohol consumption may exacerbate an existing disease or could be related to the severity of the disease. Copyright © 2013 Mosby, Inc. All rights reserved. (Authors' Abstract)

**O'Leary CM; Taylor C; Zubrick SR; Kurinczuk JJ; Bower C**, "Prenatal alcohol exposure and educational achievement in children aged 8-9 years", *Pediatrics*, Vol 132, No 2, 2013, ppE468-E475

**Abstract**

**Objective:** This study examines the relationships between the dose, pattern, and timing of prenatal alcohol exposure and achievement in reading, writing, spelling, and numeracy in children aged 8 to 9 years.

**Methods:** Data from a randomly selected, population-based birth cohort of infants born to non-Indigenous women in Western Australia between 1995 and 1997 (n = 4714) (Randomly Ascertained Sample of Children born in Australia's Largest State Study cohort) were linked to the Western Australian Midwives' Notification System and the Western Australian Literacy and Numeracy Assessment statewide education testing program. The records for 86% (n = 4056) of the cohort were successfully linked with education records when the children were aged 8 to 9 years. The associations between prenatal alcohol exposure and achievement of national benchmarks in school numeracy, reading, spelling, and writing tests and nonattendance for the tests was examined. Logistic regression was used to generate adjusted odds ratios (aOR) and 95% confidence intervals (CI), adjusting for potential confounding factors. The referent group included children of mothers who previously drank alcohol but who abstained during pregnancy.

**Results:** Children were twice as likely not to achieve the benchmark for reading after heavy prenatal alcohol exposure during the first trimester (aOR 2.26; 95% CI 1.10-4.65) and for writing when exposed to occasional binge drinking in late pregnancy (aOR 2.35; 95% CI 1.04-5.43). Low-moderate prenatal alcohol exposure was not associated with academic underachievement.

**Conclusions:** The type of learning problems expressed depends on the dose, pattern, and timing of prenatal alcohol exposure. Copyright © 2013 American Academy of Pediatrics. All rights reserved. (Authors' Abstract)

**Skagerstrom J; Alehagen S; Haggstrom Nordin E; Arestedt K; Nilsen P, "Prevalence of alcohol use before and during pregnancy and predictors of drinking during pregnancy: a cross sectional study in Sweden", *BMC Public Health*, Vol 13, Art No 780, 2013, 10pp**

**Abstract**

**Background:** There is a paucity of research on predictors for drinking during pregnancy among women in Sweden and reported prevalence rates differ considerably between studies conducted at different antenatal care centres. Since this knowledge is relevant for preventive work the aim of this study was to investigate these issues using a multicenter approach.

**Methods:** The study was conducted at 30 antenatal care centers across Sweden from November 2009 to December 2010. All women in pregnancy week 18 or more with a scheduled visit were asked to participate in the study. The questionnaire included questions on sociodemographic data, alcohol consumption prior to and during the pregnancy, tobacco use before and during pregnancy, and social support.

**Results:** Questionnaires from 1594 women were included in the study. A majority, 84%, of the women reported alcohol consumption the year prior to pregnancy; about 14% were categorized as having hazardous consumption, here defined as a weekly consumption of > 9 standard drinks containing 12 grams of pure alcohol or drinking more than 4 standard drinks at the same occasion. Approximately 6% of the women consumed alcohol at least once after pregnancy recognition, of which 92% never drank more than 1 standard drink at a time. Of the women who were hazardous drinkers before pregnancy, 19% reduced their alcohol consumption when planning their pregnancy compared with 33% of the women with moderate alcohol consumption prior to pregnancy. Factors predicting alcohol consumption during pregnancy were older age, living in a large city, using tobacco during pregnancy, lower score for social support, stronger alcohol habit before pregnancy and higher score for social drinking motives.

**Conclusions:** The prevalence of drinking during pregnancy is relatively low in Sweden. However, 84% of the women report drinking in the year preceding pregnancy and most of these women continue to drink until pregnancy recognition, which means that they might have consumed alcohol in early pregnancy. Six factors were found to predict alcohol consumption during pregnancy. These factors should be addressed in the work to prevent alcohol-exposed pregnancies.

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**Popova S; Yaltonskaya A; Yaltonsky V; Kolpakov Y; Abrosimov I; Pervakov K; Tanner V; Rehm J**, “What research is being done on prenatal alcohol exposure and fetal alcohol spectrum disorders in the Russian research community?”, *Alcohol and Alcoholism*, Published early online 23 October 2013

**Abstract**

**Aims:** Although Russia has one of the highest rates of alcohol consumption and alcohol-attributable burden of disease, little is known about the existing research on prenatal alcohol exposure (PAE) and Fetal Alcohol Spectrum Disorders (FASDs) in this country. The objective of this study was to locate and review published and unpublished studies related to any aspect of PAE and FASD conducted in or using study populations from Russia.

**Methods:** A systematic literature search was conducted in multiple English and Russian electronic bibliographic databases. In addition, a manual search was conducted in several major libraries in Moscow.

**Results:** The search revealed a small pool of existing research studies related to PAE and/or FASD in Russia (126: 22 in English and 104 in Russian). Existing epidemiological data indicate a high prevalence of PAE and FASD, which underlines the strong negative impact that alcohol has on mortality, morbidity and disability in Russia. High levels of alcohol consumption by women of childbearing age, low levels of contraception use, and low levels of knowledge by health and other professionals regarding the harmful effects of PAE put this country at great risk of further alcohol-affected pregnancies.

**Conclusions:** Alcohol preventive measures in Russia warrant immediate attention. More research focused on alcohol prevention and policy is needed in order to reduce alcohol-related harm, especially in the field of FASD. Copyright © 2013 Medical Council on Alcohol. Published by Oxford University Press. All rights reserved. (Authors' Abstract)

**Niclasen J, "Drinking or not drinking in pregnancy: the multiplicity of confounding influences", *Alcohol and Alcoholism*, Published early online 8 October 2013**

**Abstract**

**Aims:** Studies investigating associations between prenatal exposure to low-moderate doses of alcohol and mental health development in childhood are inconsistent. The aim of the present study was to compare women who drink and who do not drink alcohol in pregnancy on a number of potential confounding variables, and to investigate whether any latent variables could be identified among these.

**Methods:** Data were obtained from the Danish National Birth Cohort. Exposure: cumulated alcohol intake in full pregnancy (n = 63,464). The women were subdivided into intake groups 0, > 0-10, > 10-30, > 30-90 and > 90 units of alcohol in full pregnancy. Hereafter, the abstainers were subdivided into an all-time and a pregnancy-abstaining group, and the high intakers (> 90) were subdivided into a high (> 90-180) and a very high (> 180) intake group.

**Outcome:** Self-reported and register-based information on socio-demographic and lifestyle factors, and latent variables from an exploratory factor analysis.

**Results:** Significant differences were observed between the intake groups on virtually all parameters. Significant differences were observed between the abstaining groups and the high-intake groups. The exploratory factor analyses identified a number of latent variables between the potential confounding variables.

**Conclusion:** Differences on confounding factors may in part explain the lack of consistency in the literature investigating prenatal exposure to low-moderate doses of alcohol and mental health development. It is cautiously concluded that the failure to control for these factors introduces residual and/or unmeasured confounding into the analyses, and thus masks the potential (small) effect of being exposed to low doses of alcohol in pregnancy. It is recommended that future studies control for factor scores rather than for the observed variables as is practice today. Copyright © 2013 Medical Council on Alcohol. Published by Oxford University Press. All rights reserved. (Author's Abstract)

**Zuccolo L; Lewis SJ; Smith GD; Sayal K; Draper ES; Fraser R; Barrow M; et al,** "Prenatal alcohol exposure and offspring cognition and school performance: a 'Mendelian randomization' natural experiment", *International Journal of Epidemiology*, Published early online 24 September 2013

**Abstract**

**Background:** There is substantial debate as to whether moderate alcohol use during pregnancy could have subtle but important effects on offspring, by impairing later cognitive function and thus school performance. The authors aimed to investigate the unconfounded effect of moderately increased prenatal alcohol exposure on cognitive/educational performance.

**Methods:** We used mother-offspring pairs participating in the Avon Longitudinal Study of Parents and Children (ALSPAC) and performed both conventional observational analyses and Mendelian randomization using an ADH1B variant (rs1229984) associated with reduced alcohol consumption. Women of White European origin with genotype and self-reported prenatal alcohol consumption, whose offspring's IQ score had been assessed in clinic (N = 4061 pairs) or Key Stage 2 (KS2) academic achievement score was available through linkage to the National Pupil Database (N = 6268), contributed to the analyses.

**Results:** Women reporting moderate drinking before and during early pregnancy were relatively affluent compared with women reporting lighter drinking, and their children had higher KS2 and IQ scores. In contrast, children whose mothers' genotype predisposes to lower consumption or abstinence during early pregnancy had higher KS2 scores (mean difference +1.7, 95% confidence interval +0.4, +3.0) than children of mothers whose genotype predisposed to heavier drinking, after adjustment for population stratification.

**Conclusions:** Better offspring cognitive/educational outcomes observed in association with prenatal alcohol exposure presumably reflected residual confounding by factors associated with social position and maternal education. The unconfounded Mendelian randomization estimates suggest a small but potentially important detrimental effect of small increases in prenatal alcohol exposure, at least on educational outcomes. Copyright © 2013 International Epidemiological Association. Published by Oxford University Press. All rights reserved. (Authors' Abstract)

**Alvik A; Aalen OO; Lindemann R, “Early fetal binge alcohol exposure predicts high behavioral symptom scores in 5.5-year-old children”, *Alcoholism: Clinical and Experimental Research*, Published early online 26 July 2013**

**Abstract**

**Background:** Fetal binge alcohol exposure has been associated with neurobehavioral and cognitive symptoms. This study explored whether binge drinking mainly before recognition of pregnancy predicted high symptom scores on the Strengths and Difficulties Questionnaire (SDQ) in 5.5-year-old children.

**Methods:** In a population-based, longitudinal study representative of pregnant women in Oslo, Norway, questionnaires were answered at 17 and 30 weeks of pregnancy, 6 months after term, and at child age 5.5 years (n = 1,116, constituting 66% of the original cohort). Logistic regression analyses identified factors predicting high SDQ scores, and multiple regression analyses identified direct effects on the SDQ Total.

**Results:** Binge exposure ( $\geq 5$  standard units per occasion [SU<sub>po</sub>]) during pregnancy week 0 to 6, that is, 0 to 4 weeks after conception, predicted scores in the Abnormal and Borderline range on the SDQ in 5.5-year-olds, after adjusting for other confounding variables. Very early binge exposure less often than once a week predicted high symptom scores on the SDQ Total ( $p=0.05$ ) and Hyperactivity/Inattention (significant), while exposure at least once a week demonstrated a 3- to 5-fold significant increase in high symptom scores on Total, Emotional, and Conduct problems. Reporting  $\geq 8$  SU<sub>po</sub> had stronger predictive power than reporting 5 to 7 SU<sub>po</sub>. The results were not explained by participants reporting major lifetime depression. Other predictive factors, although weaker, were maternal symptoms of depression and anxiety during the child's infancy. High education (mother and father), high income (maternal partner), higher child birth weight, and child female sex reduced the likelihood of high SDQ symptom scores. Path analysis demonstrated early binge exposure to have a direct effect on the SDQ Total score.

**Conclusions:** Binge drinking up to 4 weeks after conception had a strong and direct predictive effect on SDQ symptom scores in 5.5-year-olds. These results strongly support the advice to avoid binge drinking when planning pregnancy.

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**Burns L; Breen C; Bower C; O'Leary C; Elliott EJ**, "Counting fetal alcohol spectrum disorders in Australia: the evidence and the challenges", *Drug and Alcohol Review*, Published early online 25 April 2013

**Abstract**

**Issues:** Alcohol exposure in utero is associated with a range of adverse outcomes in pregnancy and can cause long-term disability. Fetal alcohol spectrum disorder (FASD) is an umbrella term to describe a range of effects from prenatal alcohol exposure including fetal alcohol syndrome (FAS). Determining the prevalence of FASD is challenging.

**Approach:** This narrative review collates information on the prevalence of FASD in Australia and documents the various methods used for attaining estimates and the limitations of the available data.

**Key Findings:** Birth prevalence of FASD is most commonly measured through clinic-based studies, passive surveillance systems and active case ascertainment. Alcohol use in pregnancy and FAS in Australia is predominantly monitored through passive surveillance systems and under-ascertainment of cases is likely. State- and territory-based studies have reported birth prevalence rates of FAS of between 0.01 and 0.68 per 1000 live births. Prevalence rates of FASD have not been estimated in Australia. As reflected in the international data, Australian studies have found higher rates of FAS among some Indigenous communities. This likely reflects patterns of alcohol use and other socioeconomic risk factors.

**Implications:** Under-recognition of FASD reflects incomplete and inconsistent data collections recording alcohol use in pregnancy, lack of awareness among health professionals and a lack of diagnostic and support services.

**Conclusion:** Accurate measurement of FASD prevalence is crucial to inform policy, resource and service development in the areas of health, education, justice and community. There is a need for consensus on the collection and best use of data.

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**Kelly Y; Iacovou M; Quigley MA; Gray R; Wolke D; Kelly J; Sacker A**, “Light drinking versus abstinence in pregnancy - behavioural and cognitive outcomes in 7-year-old children: a longitudinal cohort study”, *BJOG: An International Journal of Obstetrics and Gynaecology*, Published early online 17 April 2013

**Abstract**

**Objective:** To assess whether light drinking in pregnancy is linked to unfavourable developmental outcomes in children.

**Design:** Prospective population-based cohort.

**Setting:** UK.

**Population:** Ten thousand five hundred and thirty-four 7-year-olds.

**Methods:** Quasi-experimental using propensity score matching (PSM) to compare children born to light (up to 2 units per week) and non-drinkers.

**Main Outcome Measures:** Behavioural difficulties rated by parents and teachers; cognitive test scores for reading, maths and spatial skills.

**Results:** Ordinary least squares (OLS) regression and PSM analyses are presented. For behavioural difficulties, unadjusted estimates for percentage standard deviation (SD) score differences ranged from 2 to 14%. On adjustment for potential confounders, differences were attenuated, with a loss of statistical significance, except for teacher-rated boys' difficulties. For boys, parent-rated behavioural difficulties: unadjusted, -11.5; OLS, -4.3; PSM, -6.8; teacher-rated behavioural difficulties: unadjusted, -13.9; OLS, -9.6; PSM, -10.8. For girls, parent-rated behavioural difficulties: unadjusted OLS -2.9; PSM, -4.5; teacher-rated behavioural difficulties: unadjusted, -2.4; OLS, 4.9; PSM, 3.9. For cognitive test scores, unadjusted estimates for differences ranged between 12 and 21% of an SD score for reading, maths and spatial skills. After adjustment for potential confounders, estimates were reduced, but remained statistically significantly different for reading and for spatial skills in boys. For boys, reading: unadjusted, 20.9; OLS, 8.3; PSM, 7.3; maths: unadjusted, 14.7; OLS, 5.0; PSM, 6.5; spatial skills: unadjusted, 16.2; OLS, 7.6; PSM, 8.1. For girls, reading: unadjusted, 11.6; OLS, -0.3; PSM, -0.5; maths: unadjusted, 12.9; OLS, 4.3; PSM, 3.9; spatial skills: unadjusted, 16.2; OLS, 7.7; PSM, 6.4.

**Conclusion:** The findings suggest that light drinking during pregnancy is not linked to developmental problems in mid-childhood. These findings support current UK Department of Health guidelines on drinking during pregnancy. Copyright © 2013 Royal College of Obstetricians and Gynaecologists (RCOG). Published by Wiley-Blackwell. (Authors' Abstract)

**Day NL; Helsel A; Sonon K; Goldschmidt L, “The association between prenatal alcohol exposure and behavior at 22 years of age”, *Alcoholism: Clinical and Experimental Research*, Published early online 26 February 2013**

**Abstract**

**Background:** Prenatal alcohol exposure (PAE) affects central nervous system development, growth, and morphology at higher exposure levels. Little is known about the effects of PAE at lower exposure levels or in young adults. Research on children with higher levels of PAE has shown that PAE predicts behavior problems. The question remains whether these effects are permanent or ameliorated by maturation into adulthood.

**Methods:** These data are from a longitudinal study of PAE. Mothers were recruited from a prenatal clinic and interviewed during their fourth prenatal month, seventh month, and delivery. In the postpartum, mothers and offspring were seen at 8 and 18 months, and 3, 6, 10, 14, 16, and 22 years.

**Results:** At 22 years, PAE significantly predicted behavior as measured with the adult self-report. These findings were significant controlling for covariates. Exposure at each trimester predicted increased behavior problems on the Total Score, Internalizing, Externalizing, Attention, and Critical Items scales. Use across pregnancy predicted a higher rate of behavior problems compared to no use and use in the first trimester only.

**Conclusions:** The effects were dose-response and significant at each trimester of pregnancy. However, duration across pregnancy was a better predictor than drinking during the first trimester only. Binge drinking was not a better predictor of outcome compared to average daily volume (ADV), and within categories of ADV, binge drinking did not predict more problems than nonbinge drinking. Thus, there is no safe level or safe time during pregnancy for women to drink. These data demonstrate that the effects of PAE, even at low to moderate levels, extend into young adulthood and are most likely permanent. Copyright © 2013 Research Society on Alcoholism. Published by Wiley-Blackwell. (Authors' Abstract)

**O'Leary CM; Jacoby PJ; Bartu A; D'Antoine H; Bower C, "Maternal alcohol use and sudden infant death syndrome and infant mortality excluding SIDS", *Pediatrics*, Published early online 25 February 2013**

**Abstract**

**Background:** Improvements in the rate of infant mortality (death in first year of life) have not occurred in recent years. This study investigates the association between maternal alcohol-use disorder and sudden infant death syndrome (SIDS) and infant mortality not classified as SIDS using linked, population-based health and mortality data.

**Methods:** Exposed mothers were identified through the presence of an International Classification of Diseases 9/10 alcohol diagnosis, a proxy for alcohol-use disorder, recorded on health, mental health, and/or drug and alcohol datasets (1983-2005). Comparison mothers without an alcohol diagnosis were frequency matched to exposed mothers on maternal age within maternal race and year of birth of their children. All offspring with their birth recorded on the Midwives Notification System compose the exposed (n = 217841) and comparison (n = 567054) cohorts. Cases of SIDS (n = 303) and infant mortality excluding SIDS (n = 598) were identified through linkage with the Western Australian Mortality Register. Analyses were conducted by using Cox regression and results presented as adjusted hazard ratios (aHRs) and 95% confidence intervals (CIs).

**Results:** The highest risk of SIDS occurred when a maternal alcohol diagnosis was recorded during pregnancy (aHR 6.92, 95% CI 4.02-11.90) or within 1 year postpregnancy (aHR 8.61, 95% CI 5.04-14.69). An alcohol diagnosis recorded during pregnancy more than doubled the risk of infant deaths (excluding SIDS) (aHR 2.35, 95% CI 1.45-3.83). Maternal alcohol-use disorder is attributable for at least 16.41% (95% CI 9.73%-23.69%) of SIDS and 3.40% (95% CI 2.28%-4.67%) of infant deaths not classified as SIDS.

**Conclusions:** Maternal alcohol-use disorder is a significant risk factor for SIDS and infant mortality excluding SIDS. Copyright © 2013 American Academy of Pediatrics. All rights reserved. (Authors' Abstract)

**Kesmodel US; Bay B; Wimberley T; Eriksen HL; Mortensen EL, “Does binge drinking during early pregnancy increase the risk of psychomotor deficits?”, *Alcoholism: Clinical and Experimental Research*, Published early online 15 February 2013**

**Abstract**

**Background:** The potential effects of binge drinking during pregnancy on child motor function have only been assessed in a few, small studies. We aimed to examine the effects of binge alcohol consumption during early pregnancy, including number of binge episodes and timing of binge drinking, on child motor function at age 5.

**Methods:** We performed a prospective follow-up study of 678 women and their children sampled from the Danish National Birth Cohort based on maternal alcohol consumption during pregnancy. At 5 years of age, the children were tested with the Movement Assessment Battery for Children. Parental education, maternal IQ, prenatal maternal smoking, the child's age at testing, sex of child, and tester were considered core confounders, while the full model also controlled for prenatal maternal average alcohol intake, maternal age and prepregnancy body mass index, parity, home environment, postnatal parental smoking, health status, participation in organized sport, and indicators for hearing and vision impairment.

**Results:** There were no systematic or significant differences in motor function between children of mothers reporting isolated episodes of binge drinking and children of mothers with no binge episodes. No association was observed with respect to the number of binge episodes (maximum of 12) and timing of binge drinking.

**Conclusions:** In this study, we found no systematic association between isolated episodes of binge drinking during early pregnancy and child motor function at age 5. Copyright © 2013 Research Society on Alcoholism. Published by Wiley-Blackwell. (Authors' Abstract)

**Mallard SR; Connor JL; Houghton LA**, “Maternal factors associated with heavy periconceptional alcohol intake and drinking following pregnancy recognition: a post-partum survey of New Zealand women”, *Drug and Alcohol Review*, Published early online 11 January 2013

**Abstract**

**Introduction and Aims:** Alcohol consumption during pregnancy places the foetus at risk of Foetal Alcohol Spectrum Disorders. Little is known about the current prevalence and patterns of alcohol consumption before and following pregnancy recognition in New Zealand.

**Design and Methods:** A retrospective survey of 723 post-partum women resident in maternity wards located across New Zealand was conducted using a self-administered questionnaire. Maternal sociodemographic and obstetric characteristics and alcohol intake before and after pregnancy recognition were assessed.

**Results:** Of the 968 women invited to participate, 78% agreed. Eighty-two percent of women reported consuming alcohol prior to pregnancy and 20% reported typically consuming > 4 New Zealand standard drinks per occasion. Overall, 34% of women reported drinking at some time during pregnancy. Twelve percent of pregnancies were at high risk of heavy alcohol exposure in early gestation. In fully adjusted analysis, pregnancies most at risk were those of indigenous Maori women, Pacific women, smokers and drug users. Almost one-quarter (24%) of drinkers continued to drink following pregnancy recognition, and in fully adjusted analysis, continuing to drink was positively associated with frequency of alcohol consumption before pregnancy ( $P < 0.001$  for linear trend).

**Discussion and Conclusions:** To reduce the burden of alcohol-related harm to the foetus, these findings suggest that New Zealand alcohol policy should be focused not only on promoting total abstinence when planning a pregnancy and when pregnant, but also on reducing 'binge drinking' culture and the frequent consumption of lower levels of alcohol. Copyright © 2013 Australasian Professional Society on Alcohol and other Drugs (APSAD). Published by Wiley-Blackwell. (Authors' Abstract)

**Han JY; Choi JS; Ahn HK; Kim MH; Chung JH; Ryu HM; Kim MY; Yang JH; Nava Ocampo AA**, “Foetal and neonatal outcomes in women reporting ingestion of low or very low alcohol intake during pregnancy”, *Journal of Maternal-Fetal and Neonatal Medicine*, Vol 25, No 11, 2012, pp2186-2189

**Abstract**

**Objective:** This study aimed to assess the pregnancy outcomes of women who reported social intake of low or very low alcohol levels during pregnancy.

**Methods:** Obstetric and foetal outcomes were assessed in a prospective cohort of 1667 pregnant women who reported low or very low alcohol consumption during pregnancy (cases) and 1840 alcohol-abstainer women (controls).

**Results:** Among cases, alcohol consumption occurred during the first 4.4 (median) weeks of pregnancy, with a median ingestion of 1.0 (0.01-6.0) drinks/week, equivalent to 7.6 (0.09-47.5) g/week. Cigarette smoking was reported approximately four times more often in the exposed group than in the controls ( $p < 0.001$ ). Pregnancy outcomes were similar between groups. There were 37 (2.4%) babies born with malformations in the exposed group and 41 (2.4%) in the control group ( $p = 0.9$ ).

**Conclusions:** Low-to-very low levels of alcohol ingestion during pregnancy do not appear to be associated with adverse maternal or foetal outcomes. Copyright © 2012 Informa Healthcare. (Authors' Abstract)

**O'Leary CO; Jacoby P; D'Antoine H; Bartu A; Bower C, "Heavy prenatal alcohol exposure and increased risk of stillbirth", *BJOG*, Vol 119, No 8, 2012, pp945-952**

**Abstract**

**Objective:** To investigate the association between heavy prenatal alcohol exposure and stillbirth.

**Design:** Data linkage cohort study.

**Setting:** Western Australia (WA).

**Population:** The exposed cohort included mothers with an alcohol-related diagnosis (International Classification of Diseases, ninth/tenth revisions) recorded in health data sets and all their offspring born in WA (1983-2007). Mothers without an alcohol-related diagnosis and their offspring comprised the comparison cohort.

**Methods:** Exposed and comparison mothers were identified through the WA Data Linkage System. Odds ratios for stillbirth at 20 + weeks of gestation were estimated by logistic regression, stratified by Aboriginal status.

**Main Outcome Measures:** The proportion of stillbirths at 20 + weeks of gestation is presented per 1000 births, as well as adjusted odds ratios (aOR) and 95% confidence intervals (95% CI), and population-attributable fractions.

**Results:** Increased odds of stillbirth were observed for mothers with an alcohol-related diagnosis at any stage of their life for both non-Aboriginal (aOR 1.36; 95% CI 1.05-1.76) and Aboriginal (aOR 1.33; 95% CI 1.08-1.64) births. When an alcohol diagnosis was recorded during pregnancy, increased odds were observed for non-Aboriginal births (aOR 2.24; 95% CI 1.09-4.60), with the highest odds of Aboriginal stillbirth occurring when an alcohol diagnosis was recorded within 1 year postpregnancy (aOR 2.88; 95% CI 1.75-4.73). The population-attributable fractions indicate that 0.8% of non-Aboriginal and 7.9% of Aboriginal stillbirths are the result of heavy alcohol consumption.

**Conclusions:** Prevention of heavy maternal alcohol use has the potential to reduce stillbirths. The lack of an association between exposure during pregnancy and Aboriginal stillbirth in this study needs further investigation. Copyright © 2012 Royal College of Obstetricians and Gynaecologists (RCOG). Published by Wiley-Blackwell. (Authors' Abstract)



**Conover EA; Jones KL**, "Safety concerns regarding binge drinking in pregnancy: a review", *Birth Defects Research Part A: Clinical and Molecular Teratology*, Vol 94, No 8, 2012, pp570-575

**Abstract**

**Background:** There is ongoing debate about the risks to the fetus associated with maternal binge drinking. This makes it difficult to counsel patients about the potential risks associated with their use of alcohol during pregnancy.

**Methods:** This article reviews the literature on animal and human studies regarding binge drinking (four to five drinks at one time in humans, or the equivalent in laboratory animals).

**Results:** Animal studies provide evidence that high doses of alcohol over a short period of time can be more damaging than lower doses over a long period of time. Human data are more inconsistent, especially in terms of the association with malformations. Although neurobehavioral effects are the most commonly reported adverse outcome, some studies do not find such an association. Conclusions are confounded by the design of many studies, which fail to document pattern and total amount of alcohol consumption at one time. In addition, it has been suggested there is a bias against the null effect in publications.

**Conclusion:** Although the evidence in humans is not conclusive, the incidence of binge exposures in pregnancy is high, and it appears prudent to counsel patients to avoid this exposure whenever possible. Women inadvertently exposed to a single binge episode of alcohol early in the first trimester before pregnancy recognition can be reassured that the risks for adverse effects in their baby are likely low if they are able to discontinue use for the duration of the pregnancy. Unfortunately, there may be some residual fetal risk. Copyright © 2012 Wiley-Liss, Inc. (Authors' Abstract)

**Chen XC; Coles CD; Lynch ME; Hu XP**, "Understanding specific effects of prenatal alcohol exposure on brain structure in young adults", *Human Brain Mapping*, Vol 33, No 7, 2012, pp1663- 1676

**Abstract**

Prenatal alcohol exposure (PAE) is associated with various adverse effects on human brain and behavior. Recently, neuroimaging studies have begun to identify PAE effects on specific brain structures. Investigation of such specific PAE effects is important for understanding the teratogenic mechanism of PAE on human brain, which is critical for differentiating PAE from other disorders. In this structural MRI study with young adults, PAE effects on the volumes of automatically segmented cortical and subcortical regions of interest (ROIs) were evaluated both through a group difference approach and a parametric approach. In the group difference approach (comparing among two PAE and a control groups), a disproportionate PAE effect was found in several occipital and temporal regions. This result is inconsistent with previous studies with child samples. Moreover, a gender difference in PAE effect was shown in some cortical ROIs. These findings suggest that sampling and gender may be important factors for interpreting specific PAE effects on human brain. With the parametric approach, it was demonstrated that the higher the PAE level, the smaller the entire brain, the lower the IQ. Several cortical and subcortical ROIs also exhibited a negative correlation between the PAE level and ROI volume. Furthermore, our data showed that the PAE effect on the brain could not be interpreted by the PAE effect on general physical growth until the young adult age. This study provides valuable insight into specific effects of PAE on human brain and suggests important implications for future studies in this field. Copyright © 2012 Wiley Periodicals Inc. (Authors' Abstract)

**Cornman Homonoff J; Kuehn D; Aros S; Carter TC; Conley MR; Troendle J; Cassorla F; Mills JL**, “Heavy prenatal alcohol exposure and risk of stillbirth and preterm delivery”, *Journal of Maternal- Fetal and Neonatal Medicine*, Vol 25, No 6, 2012, pp860-863

**Abstract**

We prospectively identified 96 women consuming at least 4 drinks/day during pregnancy by screening 9628 pregnant women. In these women with heavy prenatal alcohol use, there were three stillbirths and one preterm delivery; 98 matched nondrinking women had no stillbirths and two preterm births. Preterm rates did not differ significantly. The stillbirth rate was higher in the exposed group ( $p = 0.06$ ). Additional investigation showed the stillbirth rate in the exposed population (3.1%) was significantly higher ( $p = 0.019$ ) than the reported Chilean population rate (0.45%). Our data suggest that heavy alcohol consumption may increase the risk for stillbirth but not preterm delivery.

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**Ramadoss J; Magness RR**, “Vascular effects of maternal alcohol consumption”, *American Journal of Physiology: Heart and Circulatory Physiology*, Vol 303, No 4, 2012, ppH414-H421

**Abstract**

Maternal alcohol consumption during pregnancy is a significant field of scientific exploration primarily because of its negative effects on the developing fetus, which is specifically defined as fetal alcohol spectrum disorders. Though the effects on the mother are less explored compared with those on the fetus, alcohol produces multiple effects on the maternal vascular system. Alcohol has major effects on systemic hemodynamic variables, endocrine axes, and paracrine factors regulating vascular resistance, as well as vascular reactivity. Alcohol is also reported to have significant effects on the reproductive vasculature including alterations in blood flow, vessel remodeling, and angiogenesis. Data presented in this review will illustrate the importance of the maternal vasculature in the pathogenesis of fetal alcohol spectrum disorders and that more studies are warranted in this field. Copyright © 2012 the American Physiological Society. (Authors' Abstract)

**Chiodo LM; Bailey BA; Sokol RJ; Janisse J; Delaney Black V; Hannigan JH,** Recognized spontaneous abortion in mid-pregnancy and patterns of pregnancy alcohol use”, *Alcohol*, Vol 46, No 3, 2012, pp261-267

**Abstract**

Alcohol consumption during pregnancy is one potential risk factor for spontaneous abortion (SAb). Prior research suggested that heavy drinking during pregnancy was associated with significantly increased rates of SAb, but results for lower levels of drinking have been inconsistent. We examined the association between different levels and patterns of prenatal alcohol consumption and SAb in a high-risk inner-city sample. We hypothesized that higher levels, binge patterns, and more frequent drinking would be associated with increased rates of SAb. The quantity and frequency of self-reported periconceptional and repeated in-pregnancy maternal drinking volumes per beverage type were assessed with semi-structured interviews in a prospective subsample of 302 African- American mothers. Relations between various measures of prenatal alcohol exposure and SAb were assessed using logistic regression. After controlling for various potential confounders, there was a significant positive relation between average absolute alcohol use per day across pregnancy and SAb. Greater frequency of drinking episodes also predicted SAb: an average of even one day of drinking per week across pregnancy was associated with an increase in the incidence of SAb. However, contrary to our hypothesis, neither the amount of alcohol drunk per drinking day nor a measure of binge drinking was significantly related to SAb after controlling for confounders. Differences in when women who drank at risk levels initiated antenatal care may have under-estimated the impact of alcohol on SAb in this low-SES urban African-American sample. Some drinking measures averaged across pregnancy may have under-estimated consumption and overestimated risk of SAb, but other risk drinking measures that avoid this limitation show similar relations to SAb. Identifying fetal risk drinking in pregnant women is critical to increasing the effectiveness of interventions that reduce risk level alcohol consumption and protect from pregnancy loss. Copyright © 2012 Elsevier Inc. All rights reserved. (Authors' Abstract)

**Fraser SL; Muckle G; Abdous BB; Jacobson JL; Jacobson SW, “Effects of binge drinking on infant growth and development in an Inuit sample”, *Alcohol*, Vol 46, No 3, 2012, pp277-283**

**Abstract**

Prenatal exposure to an average of 0.5 oz absolute alcohol per day (the equivalent of 7 standard drinks per week) during pregnancy has been found to be associated with numerous adverse effects on pre- and postnatal development. In the animal model, concentrated alcohol exposure has been found to lead to more adverse effects than exposure to the same total quantity of alcohol ingested in smaller doses over a longer period of time. The primary aim of this study is to determine whether, in a population where binge drinking is common but total alcohol consumption across pregnancy is low, prenatal exposure to alcohol is associated with effects on prenatal growth, visual acuity and cognitive development during infancy. The second aim is to determine which of several indicators of alcohol consumption best predicts pre- and postnatal outcomes. Data were collected from 216 Inuit women and their infants living in Nunavik, the northern region of Québec. Maternal interviews were conducted during mid-pregnancy and at 1 and 6 months postpartum. Birth weight, length, and head circumference were assessed at delivery. Visual acuity and cognitive development were assessed at 6 months of age. In this population in which infrequent heavy episodic drinking is common, even occasional binge exposure was associated with reduced prenatal growth and poorer visual acuity at 6 months of age. A simple dichotomous measure of binge drinking during pregnancy provided the best predictor of fetal growth and 6-month acuity. The population studied here is unusual in terms of its pattern of binge alcohol consumption. To our knowledge, this is the first study to observe effects of binge drinking during pregnancy on infant growth and development in a sample where the average daily alcohol intake is low (< 0.5 ounces). Copyright © 2012 Elsevier Inc. All rights reserved. (Authors' Abstract)

**Lebel C; Mattson SN; Riley EP; Jones KL; Adnams CM; May PA; Bookheimer SY; et al, "A longitudinal study of the long-term consequences of drinking during pregnancy: heavy in utero alcohol exposure disrupts the normal processes of brain development", *Journal of Neuroscience*, Vol 32, No 44, 2012, pp15243-15251**

**Abstract**

Exposure to alcohol in utero can cause birth defects, including face and brain abnormalities, and is the most common preventable cause of intellectual disabilities. Here we use structural magnetic resonance imaging to measure cortical volume change longitudinally in a cohort of human children and youth with prenatal alcohol exposure (PAE) and a group of unexposed control subjects, demonstrating that the normal processes of brain maturation are disrupted in individuals whose mothers drank heavily during pregnancy. Trajectories of cortical volume change within children and youth with PAE differed from those of unexposed control subjects in posterior brain regions, particularly in the parietal cortex. In these areas, control children appear to show a particularly plastic cortex with a prolonged pattern of cortical volume increases followed by equally vigorous volume loss during adolescence, while the alcohol-exposed participants showed primarily volume loss, demonstrating decreased plasticity. Furthermore, smaller volume changes between scans were associated with lower intelligence and worse facial morphology in both groups, and were related to the amount of PAE during each trimester of pregnancy in the exposed group. This demonstrates that measures of IQ and facial dysmorphology predict, to some degree, the structural brain development that occurs in subsequent years. These results are encouraging in that interventions aimed at altering "experience" over time may improve brain trajectories in individuals with heavy PAE and possibly other neurodevelopmental disorders. Copyright © 2012 Society for Neuroscience. (Authors' Abstract)

**Hepper PG; Dornan JC; Lynch C**, “Fetal brain function in response to maternal alcohol consumption: early evidence of damage”, *Alcoholism: Clinical and Experimental Research*, Published early online 14 September 2012

**Abstract**

**Background:** Studies of the adverse neurobehavioral effects of maternal alcoholic consumption on the fetus have been largely confined to the postnatal period, after exposure to alcohol has finished. This study explored the brain function of the fetus, at the time of exposure to alcohol, to examine its effect on information processing and stability of performance.

**Methods:** Five groups of fetuses, defined by maternal alcohol consumption patterns, were examined: control (no alcohol); moderate (5 to 10 units/wk either drunk evenly across the week or as a binge, in 2 to 3 days); heavy (20+ units/wk drunk evenly or as a binge). Fetal habituation performance was examined on 3 occasions, separated by 7 days, beginning at 35 weeks of gestation. The number of trials required to habituate on each test session and the difference in performance across test sessions were recorded.

**Results:** Fetuses exposed to heavy binge drinking required significantly more trials to habituate and exhibited a greater variability in performance across all test sessions than the other groups. Maternal drinking, either heavily but evenly or moderately as a binge, resulted in poorer habituation, and moderate binge drinking resulted in greater variability compared with no, or even, drinking.

**Conclusions:** Decreased information processing, reflected by poorer habituation, and increased variability in performance may reflect the initial manifestations of structural damage caused by alcohol to the brain. These results will lead to a greater understanding of the effects of alcohol on the fetus's brain, enable the antenatal identification of fetal alcohol spectrum disorders, and lead to the early implementation of better management strategies. Copyright © 2012 Research Society on Alcoholism. Published by Wiley-Blackwell. (Authors' Abstract)



**Anderson AE; Hure AJ; Powers JR; Kay Lambkin FJ; Loxton DJ, “Determinants of pregnant women's compliance with alcohol guidelines: a prospective cohort study”, *BMC Public Health*, Published early online 13 September 2012**

**Abstract**

**Background:** In 2009, Australian alcohol guidelines for pregnancy changed from low to no alcohol intake. Previous research found a high proportion of pregnant Australian women drank during pregnancy; however, there has been limited investigation of whether pregnant women comply with 2009 alcohol guidelines. The purpose of this study was to provide an assessment of pregnant women's compliance with 2009 Australian alcohol guidelines and identify predictors of such compliance, including previous drinking behaviour.

**Methods:** Cross-sectional analysis of prospective data from the 1973--1978 cohort of the Australian Longitudinal Study on Women's Health was conducted. Women aged 30--36 years who were pregnant at the 2009 survey and had data on alcohol use were included (n = 837). Compliance with 2009 alcohol guidelines for pregnancy was defined as no alcohol intake. Predictors of compliance were analysed using multivariate logistic regression, controlling for area of residence, in three separate models to account for multicollinearity between measures of previous alcohol intake (compliance with 2001 guidelines; frequency and quantity; bingeing). Private health insurance, household income, and illicit drug use were entered into all models and retained if significant.

**Results:** 72% of pregnant women did not comply with the 2009 alcohol guidelines and 82% of these women drank less than seven drinks per week, with no more than one or two drinks per drinking day. The odds of complying with abstinence increased by a factor of 3.48 (95% CI 2.39-5.05) for women who previously complied with the 2001 alcohol guidelines and decreased by a factor of 0.19 (95% CI 0.08-0.66) if household incomes were \$36,400 or more. In other models the odds of complying were lower for women who consumed alcohol before pregnancy at least weekly (OR = 0.40, 95% CI 0.25-0.63) or binged (OR  $\geq$  0.18, 95% CI 0.10-0.31) and were higher for those who abstained (OR = 45.09; 95% CI 8.63-235.49) prior to pregnancy.

**Conclusion:** Most pregnant women did not comply with alcohol guidelines promoting abstinence. Prior alcohol behaviour was the strongest predictor of compliance during pregnancy, suggesting alcohol use should be addressed in women of child-bearing age. The study is limited by the relatively short timeframe between the official introduction of the 2009 guidelines and the date the surveys were sent out. Widespread dissemination of the guidelines may be necessary to help increase guideline compliance by pregnant women. Copyright © 2012 The Author(s); licensee BioMed Central Ltd. (Authors' Abstract)

Commentary on: Roberts SC; Ammon Avalos L; Sinkford D; Greene Foster D, 'Alcohol, tobacco and drug use as reasons for abortion', *Alcohol and Alcoholism*, Published early online 22 August 2012 [R094338]

**O'Leary CM**, "Alcohol and pregnancy: do abstinence policies have unintended consequences?", *Alcohol and Alcoholism*, Published early online 4 September 2012

**Abstract**

Most policies and guidelines recommend that women abstain from alcohol during pregnancy. This can be difficult to achieve in developed nations where the majority of women consume alcohol and almost half of pregnancies are unplanned, leading to many pregnancies being exposed to alcohol prior to pregnancy awareness. Concerns have been raised that abstinence policies may lead women in this situation to terminate their pregnancy out of fear that they have harmed their baby; however, the evidence is limited. A recent study found that while few women reported alcohol as the reason for seeking an abortion, in almost all cases where alcohol was the reason, the women were either binge drinking or reported alcohol-related problems and the pregnancy was unplanned. Copyright © 2012 Medical Council on Alcohol. Published by Oxford University Press. All rights reserved. (Author's Abstract)

**Roberts SC; Ammon Avalos L; Sinkford D; Greene Foster D, “Alcohol, tobacco and drug use as reasons for abortion”, *Alcohol and Alcoholism*, Published early online 22 August 2012**

**Abstract**

**Aims:** Concern about the effects of alcohol and drug use during pregnancy is intertwined with debates about abortion. There is concern that alcohol abstinence recommendations lead women using low levels of alcohol to terminate otherwise wanted pregnancies. This study examines how women describe alcohol, tobacco and/or drug use (ATOD) as reasons for deciding to have abortions and assesses the differences between women reporting and not reporting ATOD as reasons for deciding to have an abortion.

**Methods:** Data come from the UCSF Turnaway Study which recruited 956 women seeking an abortion at one of 30 US clinics between 2008 and 2010. Mixed methods were used and data were analyzed through thematic coding and logistic regression.

**Results:** Nearly 5% reported ATOD as a reason for abortion. Women worried that their ATOD had affected their baby's health and that their or their partner's ATOD would influence parenting. Most women (84%) who reported alcohol as a reason binge drank or had an alcohol-problem symptom in the month before discovering their pregnancy. Sixtyone percent who reported drugs as a reason used drugs, with 88% using more than once/week. Although two-thirds smoked tobacco, no woman reported tobacco alone as a reason. Ninety-eight percent of women reporting ATOD as a reason had unintended pregnancies.

**Conclusion:** Women reporting ATOD as a reason drink at levels exceeding a low threshold and do not appear to be terminating otherwise wanted pregnancies. Thus, findings are inconsistent with hypotheses that abstinence recommendations and punitive policies lead women using low levels of alcohol or using drugs to terminate otherwise wanted pregnancies. Copyright © 2012 Medical Council on Alcohol. Published by Oxford University Press. All rights reserved. (Authors' Abstract)

**Carter RC; Jacobson JL; Molteno CD; Jiang H; Meintjes EM; Jacobson SW; Duggan C,** “Effects of heavy prenatal alcohol exposure and iron deficiency anemia on child growth and body composition through age 9 years”, *Alcoholism: Clinical and Experimental Research*, Published early online 15 August 2012

**Abstract**

**Background:** Prenatal alcohol exposure has been associated with pre- and postnatal growth restriction, but little is known about the natural history of this restriction throughout childhood or the effects of prenatal alcohol on body composition. The objective of this study was to examine the effects of heavy prenatal alcohol exposure on longitudinal growth and body composition.

**Methods:** Eighty-five heavy drinking pregnant women ( $\geq 2$  drinks/d or  $\geq 4$  drinks/occasion) and 63 abstaining and light-drinking controls ( $< 1$  drink/d, no bingeing) were recruited at initiation of prenatal care in an urban obstetrical clinic in Cape Town, South Africa and prospectively interviewed during pregnancy about alcohol, smoking, drug use, and demographics. Among their children, length/height, weight, and head circumference were measured at 6.5 and 12 months and at 5 and 9 years. Percent body fat (BF) was estimated at age 9 years using bioelectric impedance analysis.

**Results:** In multiple regression models with repeated measures (adjusted for confounders), heavy alcohol exposure was associated with reductions in weight (0.6 SD), length/height (0.5 SD), and head circumference (0.9 cm) from 6.5 months to 9 years that were largely determined at birth. These effects were exacerbated by iron deficiency in infancy but were not modified by iron deficiency or measures of food security at 5 years. An alcohol-related postnatal delay in weight gain was seen at 12 months. Effects on head circumference were greater at age 9 than at other age points. Although heavy alcohol exposure was not associated with changes in body composition, children with fetal alcohol syndrome (FAS) and partial fetal alcohol syndrome (PFAS) had lower percent BF than heavy exposed nonsyndromal and control children.

**Conclusions:** Heavy prenatal alcohol exposure is related to prenatal growth restriction that persists through age 9 years and an additional delay in weight gain during infancy. FAS and PFAS diagnoses are associated with leaner body composition in later childhood.

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**Chen JH, “Maternal alcohol use during pregnancy, birth weight and early behavioral outcomes”, *Alcohol and Alcoholism*, Published early online 14 August 2012**

**Abstract**

**Aims:** To examine the effect of maternal alcohol use during pregnancy on infant behavioral outcomes and birth weight, and to investigate the differential susceptibility of infant behavioral outcomes and birth weight to prenatal alcohol exposure.

**Methods:** Data on children born to women taking part in the United States National Longitudinal Survey of Youth (NLSY) (n = 1618) were analyzed using the sibling fixedeffects model, which helps adjust for maternal, genetic and social confounders when examining effects of pre-natal exposure to possible toxins such as alcohol. Mothers were classified as non-drinkers, light-to-moderate drinkers and heavy drinkers according to their frequency of alcohol use during pregnancy. Infants' behavioral outcomes were assessed using the modified Rothbart Infant Behavior Questionnaire in the NLSY, which measures three dimensions of behavioral outcomes: positive mood, fearfulness and difficultness.

**Results:** Estimates from the model indicated that drinking during pregnancy was positively associated with infant difficultness, but not with positive mood or fearfulness. Further analysis by frequency of alcohol use suggested that both light-to-moderate and heavy drinking were associated with an increase in infant difficultness. Additionally, while low-to-moderate drinking during pregnancy was associated with infant difficultness, drinking at this level was not associated with low birth weight.

**Conclusion:** The findings suggest that maternal alcohol use during pregnancy is a risk factor for infant behavioral outcomes, after taking into account many confounding factors. Infant behavioral outcomes appear to be more vulnerable to light-to-moderate levels of alcohol use during pregnancy than birth weight is. Copyright © 2012 Medical Council on Alcohol. Published by Oxford University Press. All rights reserved. (Author's Abstract)

**Kuehn D; Aros S; Cassorla F; Avaria M; Unanue N; Henriquez C; Kleinsteuber K; et al, "A prospective cohort study of the prevalence of growth, facial, and central nervous system abnormalities in children with heavy prenatal alcohol exposure", *Alcoholism: Clinical and Experimental Research*, Published early online 23 July 2012**  
**Abstract**

**Background:** Most children who are exposed to large quantities of alcohol in utero do not develop fetal alcohol syndrome (FAS). Population-based prospective data on the risk of developing components of fetal alcohol spectrum disorders (FASD), however, are limited. **Methods:** This was a prospective cohort study of 9,628 women screened during their first prenatal appointment in Chile, which identified 101 who consumed at least 4 drinks/d (exposed) matched with 101 women with no reported alcohol consumption during pregnancy (unexposed). Detailed alcohol consumption data were collected during the pregnancy. Children were evaluated up to 8.5 years of age by clinicians masked to exposure status.

**Results:** One or more functional central nervous system abnormalities were present in 44.0% (22/50) of the exposed children compared to 13.6% (6/44) of the unexposed ( $p = 0.002$ ). Growth restriction was present in 27.2% (25/92) of the exposed and 12.5% (12/96) of the unexposed ( $p = 0.02$ ). Abnormal facial features were present in 17.3% (14/81) of the exposed children compared to 1.1% (1/89) of the unexposed children ( $p = 0.0002$ ) by direct examination. Of the 59 exposed children with data available to detect at least 1 abnormality, 12 (20.3%) had no abnormalities. Binge drinking from conception to recognition of pregnancy (OR = 1.48 per day, 95% CI: 1.15 to 1.91,  $p = 0.002$ ) and after recognition of pregnancy (OR= 1.41 per day, 95% CI: 1.01 to 1.95,  $p = 0.04$ ) and total number of drinks consumed per week from conception to recognition of pregnancy (OR = 1.02 per drink, 95% CI: 1.01 to 1.04,  $p = 0.0009$ ) were significantly associated with abnormal child outcome.

**Conclusions:** After exposure to heavy alcohol consumption during pregnancy, 80% of children had 1 or more abnormalities associated with alcohol exposure. Patterns of alcohol use that posed the greatest risk of adverse outcomes were binge drinking and high total weekly intake. Functional neurologic impairment occurred most frequently and may be the only sign to alert physicians to prenatal alcohol exposure. Copyright © 2012 Research Society on Alcoholism. Published by Wiley-Blackwell. (Authors' Abstract)

**Falgreen Eriksen HL; Mortensen EL; Kilburn T; Underbjerg M; Bertrand J; Stovring H; Wimberley T; Grove J; Kesmodel US**, "The effects of low to moderate prenatal alcohol exposure in early pregnancy on IQ in 5-year-old children", *BJOG*, Published early online 20 June 2012

**Abstract**

**Objective:** To examine the effects of low to moderate maternal alcohol consumption during early pregnancy on children's intelligence (IQ) at age 5 years.

**Design:** Prospective follow-up study.

**Setting:** Neuropsychological testing in four Danish cities 2003-2008.

**Population:** A cohort of 1628 women and their children sampled from the Danish National Birth Cohort.

**Methods:** Participants were sampled based on maternal alcohol consumption during pregnancy. At 5 years of age, children were tested with the Wechsler Preschool and Primary Scale of Intelligence - Revised (WPPSI-R). Parental education, maternal IQ, maternal smoking in pregnancy, the child's age at testing, gender, and tester were considered core confounding factors, whereas the full model also controlled for maternal binge drinking, age, BMI, parity, home environment, postnatal smoking in the home, health status, and indicators for hearing and vision impairments.

**Main Outcome Measures:** The WPPSI-R.

**Results:** No differences in test performance were observed between children whose mothers reported consuming between one and four or between five and eight drinks per week at some point during pregnancy, compared with children of mothers who abstained. For women who reported consuming nine or more drinks per week no differences were observed for mean differences; however, the risks of low full-scale IQ (OR 4.6; 95% CI 1.2-18.2) and low verbal IQ (OR 5.9; 95% CI 1.4-24.9) scores, but not low performance IQ score, were increased.

**Conclusions:** Maternal consumption of low to moderate quantities of alcohol during pregnancy was not associated with the mean IQ score of preschool children. Despite these findings, acceptable levels of alcohol use during pregnancy have not yet been established, and conservative advice for women continues to be to avoid alcohol use during pregnancy. Copyright © 2012 Royal College of Obstetricians and Gynaecologists (RCOG). Published by Wiley-Blackwell. (Authors' Abstract)

**Kesmodel US; Bertrand J; Stovring H; Skarpness B; Denny CH; Mortensen EL; et al,** “The effect of different alcohol drinking patterns in early to mid pregnancy on the child's intelligence, attention, and executive function”, *BJOG*, Published early online 20 June 2012

**Abstract**

**Objective:** To conduct a combined analysis of the estimated effects of maternal average weekly alcohol consumption, and any binge drinking, in early to mid pregnancy on general intelligence, attention, and executive function in 5-year-old children.

**Design:** Follow-up study.

**Setting:** Neuropsychological testing in four Danish cities 2003-2008.

**Population:** A cohort of 1628 women and their children sampled from the Danish National Birth Cohort.

**Methods:** Participants were sampled based on maternal alcohol consumption during early pregnancy. At age 5 years, the children were tested for general intelligence, attention, and executive function. The three outcomes were analysed together in a multivariate model to obtain joint estimates and P values for the association of alcohol across outcomes. The effects of low to moderate alcohol consumption and binge drinking in early pregnancy were adjusted for a wide range of potential confounding factors.

**Main Outcome Measures:** Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R), the Test of Everyday Attention for Children at Five (TEACH-5), and the Behavior Rating Inventory of Executive Functions (BRIEF) scores.

**Results:** Multivariate analyses showed no statistically significant effects arising from average weekly alcohol consumption or any binge drinking, either individually or in combination. These results replicate findings from separate analyses of each outcome variable.

**Conclusions:** The present study contributes comprehensive methodological and statistical approaches that should be incorporated in future studies of low to moderate alcohol consumption and binge drinking during pregnancy. Furthermore, as no safe level of drinking during pregnancy has been established, the most conservative advice for women is not to drink alcohol during pregnancy. However, the present study suggests that small volumes consumed occasionally may not present serious concern. Copyright © 2012 Royal College of Obstetricians and Gynaecologists (RCOG). Published by Wiley-Blackwell. (Authors' Abstract)



**Kesmodel US; Falgreen Eriksen HL; Underbjer M; Kilburn TR; Stovring H; Wimberley T; Mortensen EL, "The effect of alcohol binge drinking in early pregnancy on general intelligence in children", *BJOG*, Published early online 20 June 2012**

**Abstract**

**Objective:** To examine the effects of binge alcohol consumption during early pregnancy, including the number of binge episodes and the timing of binge drinking, on general intelligence in 5-year-old children.

**Design:** Follow-up study.

**Setting:** Neuropsychological testing in four Danish cities 2003-2008.

**Population:** A cohort of 1617 women and their children sampled from the Danish National Birth Cohort.

**Methods:** Participants were sampled on the basis of maternal alcohol consumption during pregnancy. At 5 years of age the children were tested with six subtests from the Wechsler Preschool and Primary Scale of Intelligence - Revised (WPPSI-R). Parental education, maternal IQ, prenatal maternal smoking, the child's age at testing, the gender of the child, and tester were considered core confounding factors, whereas the full model also controlled for prenatal maternal average alcohol intake, maternal age, maternal prepregnancy body mass index (BMI), parity, home environment, postnatal parental smoking, health status, and indicators for hearing and vision impairment.

**Main Outcome Measure:** WPPSI-R.

**Results:** There were no systematic or significant differences in general intelligence between children of mothers reporting binge drinking and children of mothers with no binge episodes, except that binge drinking in gestational weeks 1-2 significantly reduced the risk of low, full-scale IQ (OR 0.54; 95% CI 0.31–0.96) when adjusted for core confounding factors. The results were otherwise not statistically significantly related to the number of binge episodes (with a maximum of 12) and timing of binge drinking.

**Conclusions:** We found no systematic association between binge drinking during early pregnancy and child intelligence. However, binge drinking reduced the risk of low, fullscale IQ in gestational weeks 1-2. This finding may be explained by residual confounding.

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**Skogerbo A; Kesmodel US; Wimberley T; Stovring H; Bertrand J; Landro NI; Mortensen EL**, "The effects of low to moderate alcohol consumption and binge drinking in early pregnancy on executive function in 5-year-old children", *BJOG*, Published early online 20 June 2012

### **Abstract**

**Objective:** To examine the effects of low to moderate maternal alcohol consumption and binge drinking in early pregnancy on children's executive functions at the age of 5 years.

**Design:** Follow-up study.

**Setting:** Neuropsychological testing in four Danish cities 2003-2008.

**Population:** A cohort of 1628 women and their children sampled from the Danish National Birth Cohort.

**Methods:** Participants were sampled based on maternal alcohol drinking patterns during early pregnancy. When the children were 5 years old, the parent and teacher forms of the Behaviour Rating Inventory of Executive Function (BRIEF) were completed by the mothers and a preschool teacher. Parental education, maternal IQ, prenatal maternal smoking, the child's age at testing, and the child's gender were considered core confounding factors. The full model also included maternal binge drinking or low to moderate alcohol consumption, maternal age, parity, maternal marital status, family home environment, postnatal parental smoking, pre-pregnancy maternal body mass index (BMI), and the health status of the child.

**Main Outcome Measures:** The BRIEF parent and teacher forms.

**Results:** Adjusted for all potential confounding factors, no statistically significant associations between maternal low to moderate average weekly consumption and BRIEF index scores were observed. In adjusted analyses, binge drinking in gestational week 9 or later was significantly associated with elevated Behavioural Regulation Index parent scores (OR 2.04, 95% CI 0.33-3.76), and with the risk of high scores on the Metacognitive Index assessed by the teacher (OR 2.06, 95% CI 1.01-4.23).

**Conclusions:** This study did not observe significant effects of low to moderate alcohol consumption during pregnancy on executive functioning at the age of 5 years. Furthermore, only weak and no consistent associations between maternal binge drinking and executive functions were observed. Copyright © 2012 Royal College of Obstetricians and Gynaecologists (RCOG). Published by Wiley-Blackwell. (Authors' Abstract)

**Underbjerg M; Kesmodel US; Landro NI; Bakketeig L; Grove J; Wimberley T; Kilburn TR; Svaerke C; Thorsen P; Mortensen EL**, “The effects of low to moderate alcohol consumption and binge drinking in early pregnancy on selective and sustained attention in 5-year-old children”, *BJOG*, Published early online 20 June 2012

**Abstract**

**Objective:** The aim was to examine the effects of low to moderate maternal alcohol consumption and binge drinking in early pregnancy on children's attention at 5 years of age.

**Design:** Prospective follow-up study.

**Setting:** Neuropsychological testing in four Danish cities 2003-2008.

**Population:** A cohort of 1628 women and their children sampled from the Danish National Birth Cohort.

**Methods:** Participants were sampled based on maternal alcohol consumption during pregnancy. At 5 years of age, the children were tested with the recently developed Test of Everyday Attention for Children at Five (TEACH-5). Parental education, maternal IQ, maternal smoking in pregnancy, the child's age at testing, gender, and tester were considered core confounding factors, whereas the full model also controlled the following potential confounding factors: maternal binge drinking or low to moderate alcohol consumption, age, body mass index (BMI), parity, home environment, postnatal smoking in the home, child's health status, and indicators for hearing and vision impairments.

**Main Outcome Measures:** TEACH-5 attention scores.

**Results:** There were no significant effects on test performance in children of mothers drinking up to 8 drinks per week compared with children of mothers who abstained, but there was a significant association between maternal consumption of 9 or more drinks per week and risk of a low overall attention score (OR 3.50, 95% CI 1.15-10.68). No consistent or significant associations were observed between binge drinking and attention test scores.

**Conclusions:** The findings suggest an effect of maternal consumption of 9 or more drinks per week on attention functions in children, but the study detected no effects of lower levels of maternal consumption and no consistent effects of maternal binge drinking. Copyright © 2012 Royal College of Obstetricians and Gynaecologists (RCOG). Published by Wiley-Blackwell. (Authors' Abstract)

**McBride N; Carruthers S; Hutchinson D**, “Reducing alcohol use during pregnancy: listening to women who drink as an intervention starting point”, *Global Health Promotion*, Published early online 4 May 2012

**Abstract**

**Objectives:** This study assesses factors that contribute to alcohol consumption during pregnancy and identifies potential intervention strategies to reduce consumption.

**Methods:** The study sample includes 142 pregnant women who attended a public hospital for prenatal health care in Perth, Western Australia. All participants returned a selfcompletion survey.

**Results:** Women who discontinued drinking during pregnancy were significantly more likely to be engaged in full time home duties and had completed less formal education. Women who continued to drink were more likely to have drunk in previous pregnancies and during the preconception period. Nearly 40% of high risk women reported a negative comment in response to their drinking. One-third of women in the risky group were advised by a health professional not to drink alcohol. Women were most likely to drink in their own home or at the home of a friend.

**Conclusions:** Participatory research with women who drink while pregnant can assist in identifying potential intervention strategies that have resonance with this group and therefore more potential for creating behaviour change. Implications. The World Health Organization recognises, and has done for over 10 years, that alcohol use during pregnancy which results in Foetal Alcohol Spectrum Disorder is the leading cause of environmental-related birth defects and mental retardation in the Western world. Copyright © 2012 International Union for Health Promotion and Education. Published by Sage Publications. (Authors' Abstract)

**Bazzo S; Battistella G; Riscica P; Moino G; Marini F; Geromel M; Czerwinsky L,** “Evaluation of the impact of the image used in a communication campaign to raise awareness about the effects of alcohol use during pregnancy”, *Alcohol and Alcoholism*, Published early online 2 May 2012

**Abstract**

**Aims:** To assess the impact of the advertising image used in the health communication campaign 'Mummy Drinks Baby Drinks', aimed to raise awareness about the effects of drinking alcohol during pregnancy in the childbearing-aged population of the Local Health Authority of Treviso (Italy). The image depicted a foetus inside a glass of a local alcoholic drink.

**Methods:** A survey using a semi-structured self-reported questionnaire was carried out. The questionnaire was administered to a consecutive series of 690 parents or caregivers who accompanied children aged 0-2 years in the vaccination clinics of the Local Health Unit, during a 30-day period 1 year after the start of the campaign. The questionnaire measured the level of exposure to the image, emotional reactions and awareness of the health messages conveyed by the image.

**Results:** Overall, 84% of the respondents said that they remembered the image. Almost all (93%) recalled the warning message and 53% recalled the health behaviours suggested by the campaign. The image generally seemed to arouse a high emotive impact: 38% indicated distress and 40% liking as a general opinion, while ~50% expressed distress emotions and 13% were pleasantly affected when reflecting on the feelings evoked. We did not find unequivocal relationships between the level and kind of emotional reactions and the recalling of the health behaviours.

**Conclusion:** The image obtained a high level of visibility. It was effective in spreading the health message conveyed by the campaign, regardless of the level and kind of emotive impact evoked. Copyright © 2012 Medical Council on Alcohol. Published by Oxford University Press. All rights reserved. (Authors' Abstract)