Smoking, alcohol and weight

Primary care in the preconception, pregnancy and postnatal periods

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Addressing smoking, alcohol consumption and weight during preconception, pregnancy and postnatal periods can significantly optimise health outcomes for women and children. GPs can be guided by best-practice recommendations to undertake evidence-based assessment, provide advice and arrange referrals to support women to improve these health behaviours.

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According to the WHO, proactively addressing smoking, alcohol and weight before conception and in pregnancy is one of the most important ways healthcare providers can optimise health outcomes for women and babies.[1,2] Support provided by healthcare providers during the preconception, antenatal and postnatal periods is effective in reducing risks of harm from smoking, alcohol consumption and weight and improving outcomes for current and future pregnancies.[3-5] Pregnant women regard healthcare providers, including GPs, as a trusted information source and welcome their support. Over two-thirds (69%) of pregnant women who smoke want help to quit; over 90% of women indicate they want to be asked about alcohol use in pregnancy, advised of its harms, and supported to abstain; and 80% of women want support regarding their weight gain, nutrition and physical activity.[6-8] Despite women wanting a high level of care, healthcare providers report multiple barriers to providing evidence-based care, including that they do not know what to ask, how to ask, what to advise and where to refer.[9]

Prevalence of risk factors

Smoking

In Australia, 10 to 14% of women of childbearing age (15 to 44 years) smoke tobacco.[10] Although some women will spontaneously quit upon finding out they are pregnant, up to 60% continue to smoke, resulting in about 10% of women smoking during pregnancy.[10,11] Of women who do stop smoking before or during pregnancy, 50 to 70% resume smoking within six months postpartum.[12]

Alcohol

Over half (55%) of women in Australia consume alcohol during pregnancy, often before they know they are pregnant, which is unsurprising given that 76 to 81% of all 18- to 39-year-old women in Australia report consuming alcohol.[10] About 15% of Australian

TABLE 1. BMI CLASSIFICATION AND GUIDELINES FOR GESTATIONAL WEIGHT GAIN[16-18]

Classification of underweight, healthy weight, overweight and obesity according to BMI for nonpregnant adults		
Underweight	<18.5 kg/m^2	
Healthy weight	18.5 to 24.9 kg/m^2	
Overweight	25.0 to 29.9 kg/m^2	
Obesity	≥30 kg/m^2	
Gestational weight gain guidelines* for singleton pregnancies (one fetus)†		
Pre-pregnancy BMI	***Total recommended weight gain (kg)‡***	***Recommended weight gain per week in the 2nd and 3rd trimester (kg)***
Underweight	12.5 to 18.0	0.51 (0.44 to 0.58)
Healthy weight	11.5 to 16.0	0.42 (0.35 to 0.50)
Overweight	7.0 to 11.5	0.28 (0.23 to 0.33)
Obesity	5.0 to 9.0	0.22 (0.17 to 0.27)

Abbreviation: BMI = body mass index.
* The United States Institute of Medicine provides guidance on weight gain in pregnancy based on pre-pregnancy BMI.
† Gestational weight gain guidelines for women having twins, triplets (or more), or women who are from an Asian background, vary from those above.
‡ Calculations assume a 0.5 to 2kg weight gain in the first trimester. The recommended weight gain ranges are indicative only and provide suggested limits rather than specific goals.

women consume alcohol after they know they are pregnant.[10] After pregnancy, 58% of Australian women who are breastfeeding report drinking alcohol.[13]

Weight

Over half (51%) of Australian women report having a body mass index (BMI) outside the healthy weight range at the start of their pregnancy and over 60% gain more weight than recommended during their pregnancy (Table 1).[14-18] Postpartum weight retention is also common: most women retain between one and 5.5 kg at six to 12 months postpartum.[19] Women who gain more weight than recommended during pregnancy retain 3 kg and 4.7 kg more weight at three and 15 years postpartum, respectively, than women who gain within the recommended amount, increasing long-term health risks from overweight and obesity.[20]

For Aboriginal women, historical trauma and factors such as systemic racism, socioeconomic disadvantage and barriers to accessing health care have contributed to higher rates of smoking, high-risk alcohol consumption and weight gain in pregnancy.[21-24]

Impacts on the pregnancy and child

Smoking

Smoking during pregnancy is associated with a wide range of pregnancy complications and adverse outcomes for the woman and her baby. There is a 71% increase in risk of infant mortality due to smoking, and impacts extend to childhood and adulthood (Table 2).[25-56] Cigarette smoke contains over 7000 hazardous chemicals including nicotine, carbon monoxide, tar, benzene and heavy metals such as lead and cadmium. Many of these cross the placenta and enter the fetal circulation.[30] Nicotine causes placental vasoconstriction, impacting placental blood flow, and carbon monoxide binds to haemoglobin causing fetal hypoxia.[30] The resulting deprivation of nutrients and oxygen directly impacts fetal growth and the development of organs including the brain, lungs and adrenal glands. As a teratogen, nicotine can also affect the development of neurotransmitter systems and cause developmental abnormalities in the cerebral cortex, the autonomic nervous system and brainstem nuclei crucial to respiratory control.[30] Quitting smoking before conception or during early pregnancy significantly reduces the risk of complications and adverse outcomes; however, quitting at any time during pregnancy can also result in reductions in risk and provide health benefits for both the woman and baby.[57] Preventing relapse in the postnatal period is also crucial to reduce infant exposure to second-hand smoke and improve breastfeeding outcomes.[12]

Alcohol

Alcohol is also a teratogen and can disrupt the development of the embryo and fetus.[58] Alcohol freely passes across the placenta, resulting in similar blood-alcohol levels in the woman and unborn child.[58] Alcohol consumption at any stage during pregnancy may be associated with adverse child outcomes, including birth defects (first trimester exposure), developmental delay and fetal alcohol spectrum disorder (FASD), and contributes to pregnancy complications and poor obstetric outcomes related to impaired placental blood flow and intrauterine growth restriction (Table 2).[26,31,35,59-61] The risk of harm to the fetus is associated with the amount (quantity, frequency) and timing of alcohol consumption during pregnancy and is influenced by maternal factors including body composition, liver function and genetics.[62]

The 2020 NHMRC *Guidelines to Reduce Health Risks from Drinking Alcohol* state that 'To prevent harm from alcohol to their unborn child, women who are pregnant or planning a pregnancy should not drink alcohol', and that 'For women who are breastfeeding, not drinking alcohol is safest for their baby'.[62] These guidelines recognise that no safe level of alcohol consumption in pregnancy has been identified.

TABLE 2. KEY ADVERSE HEALTH EFFECTS OF SMOKING, ALCOHOL AND WEIGHT ON PREGNANCY, PERINATAL OUTCOMES, POSTNATAL OUTCOMES AND MATERNAL OUTCOMES[25-56]

Health effect	Smoking	Alcohol	Weight
Pregnancy complications			
Miscarriage[26,27]	✓	✓	
Ectopic pregnancy[27]	✓		
Gestational diabetes[28]			✓
Preeclampsia[28]			✓
Premature rupture of membranes[27]	✓		
Placenta previa[27]	✓		
Placental abruption[27]	✓		
Caesarean birth[28,29]			✓
Perinatal outcomes			
Low birthweight[27,30-32]	✓	✓	✓
Fetal craniofacial abnormalities[33]		✓	
Macrosomia[28-29,32]			✓
Stillbirth[27,34,35]	✓	✓	✓
Large for gestational age[29,32]			✓
Small for gestational age[29-32,36]	✓	✓	✓
Preterm birth[27,29,31,36,37]	✓	✓	✓
Fetal growth restriction[27]	✓	✓	
Cleft lip and cleft palate[27]	✓		
Low APGAR scores[38]		✓	
Postnatal/child health effects			
Fetal alcohol spectrum disorder*[36,39]		✓	
Poor gross motor skills[40]		✓	
Growth deficit[41]		✓	
Impaired working memory and executive function[42]		✓	
Intellectual disability[36]		✓	
SIDS[27]	✓	✓	
Respiratory conditions (reduced lung function, asthma, lower respiratory infection)[27]	✓		
Nicotine dependence[43]	✓		
Behavioural disorders/problems†[36,44-46]	✓	✓	
Ear and hearing abnormalities[47]		✓	
Cognitive impairment[30,48]	✓	✓	
Lactation issues[12]	✓		
Early breastfeeding cessation[49]			✓
Overweight and obesity [27,50-52]	✓		✓
Maternal health effects			
Infertility[53-55]	✓	✓	✓
Overweight and obesity[56]			✓

Abbreviations: APGAR = appearance, pulse, grimace, activity and respiration; SIDS = sudden infant death syndrome.
* Fetal alcohol spectrum disorder refers to a spectrum of adverse effects characterised by severe neurodevelopmental impairment with cognitive and behavioural problems, sometimes associated with facial dysmorphology, congenital anomalies and poor growth.
† For smoking: conduct disorder, attention-deficit hyperactivity disorder and antisocial behaviour; for alcohol: externalising (aggressive and delinquent) and internalising (anxious or depressed and withdrawn) syndromes, poor school attendance.

Weight

Optimising weight before, during and after pregnancy can have immediate and long-term health benefits for women and their children (Table 2). The greatest health improvements may come from preventing or managing unhealthy weight and improving diet and physical activity before conception, with benefits persisting across the pregnancy and postnatal periods.[53]

The mechanism by which maternal weight and related health behaviours influence child health and long-term risk of chronic disease is explained by the developmental origins of health and disease concept.[63] There is strong evidence that a woman's body composition, metabolic health, and diet quality and quantity (over and undernutrition) cause changes to the child's physiology and metabolism via epigenetic and other mechanisms (developmental programming) and consequently influence their child's health trajectory across the life course.[64] For example, high maternal adiposity or high gestational weight gain in utero is associated with adverse fetal development.[65] Although the exact mechanisms are still being determined, it is thought that adverse effects may be mediated through elevated maternal glucose and insulin levels, which drive fetal growth and adiposity and lead to increased birthweight and overweight or obesity during childhood.[63] The extent to which the effects are due to the intrauterine environment, genetic factors and a shared postnatal environment is still to be determined.[66]

Optimising health behaviours in primary care

GPs in Australia provide antenatal care to almost 90% of women in early pregnancy and to 28% of women throughout pregnancy.[67,68] Additionally, 85 to 92% of all Australian women of childbearing age (15 to 44 years) report seeing a GP during the past 12 months, of whom 4 to 7% seek care to reduce or quit smoking, 1 to 2% to reduce their alcohol intake, and 7 to 15% to reach a healthy weight.[69] Between 6 and 17% of women of childbearing age specifically seek GP care for preconception family planning counselling.[69] A large proportion of women (88%) then see their GP again within three to four months after the birth.[68]

Given these opportunities, GPs play a crucial role in supporting women to address health risk factors prior to conception,

TABLE 3. RECOMMENDATIONS FOR ASSESSING AND MANAGING HEALTH RISK FACTORS IN PRIMARY CARE

	Smoking	Alcohol
Ask/ Assess	• If available, offer all women an exhaled breath carbon monoxide assessment • Ask: 'Which best describes you?' – 'I smoke – about the same as before I was pregnant' – 'I smoke – but I've cut down since finding out I was pregnant' – 'I quit smoking during this pregnancy' – 'I quit smoking before this pregnancy' – 'I have never smoked'	• Assess alcohol consumption risk using a validated tool (e.g. the AUDIT-C tool) during preconception, multiple times during pregnancy and at postnatal visits
Advise/ Discuss	• The benefits of quitting (or remaining a nonsmoker) for both the woman and her baby • Treatment options available to assist women to quit (or prevent relapse)	• Abstaining from alcohol during pregnancy, when planning pregnancy or when breastfeeding • Risks of alcohol consumption during pregnancy and when breastfeeding; tailor discussion based on risk level
Assist/ Arrange	• Behavioural support – Provide pregnancy-specific self-help materials – Assist with barrier identification, problem solving and goal setting – Facilitate use of social support – Offer referral to Quitline or local smoking cessation services, including Aboriginal Community Controlled Health Services • NRT if unable to quit with behavioural support alone – First-line NRT: intermittent-use formulations (gum or lozenge or inhaler) – Second-line NRT: nicotine patch (remove patch at night-time to allow an 8-hour break from continuous nicotine delivery) • Readdress smoking with all smokers and recent quitters at all visits	• Based on level of risk, offer referral to locally available telephone or face-to-face coaching, counselling or addiction specialist services, including Aboriginal Community Controlled Health Services

Abbreviations: AUDIT-C = Alcohol Use Disorders Identification Test – Consumption; NRT = nicotine replacement therapy.

Weight	
Before and after pregnancy	**During pregnancy**
• Measure weight • Calculate BMI using measured weight and height, and compare to BMI range (Table 1) • Consider other clinical measures of adiposity if available (e.g. waist circumference, body fat percentage) • Ask about eating and physical activity behaviours	• Calculate pre-pregnancy BMI using measured pre-pregnancy weight and height (Table 1) • Determine recommended weight gain range from pre-pregnancy BMI (based on singleton or multiple pregnancy) (Table 1) • Measure current weight and compare with recommended weight gain • Ask about eating and physical activity behaviours
• Benefits of having a weight within the healthy BMI range • Regular self-monitoring of weight • Eating behaviours compared with the Australian Dietary Guidelines • Physical activity levels compared with Australian Physical Activity Guidelines	• Recommended weight gain range and how current weight is tracking • Benefits of gaining weight within recommended range • Self-monitoring of weight • Eating behaviours compared with the Australian Dietary Guidelines for pregnancy • Physical activity levels compared with Australian Physical Activity Guidelines for pregnancy
• If additional weight management support is needed, offer a referral to available services, including: – Dietitian – Exercise physiologist – Culturally appropriate services (e.g. dietitian at Aboriginal Community Controlled Health Services) – Get Healthy in Pregnancy telephone coaching service (NSW and SA only)	

Abbreviation: BMI = body mass index.

during pregnancy and postnatally. In surveys of Australian GPs, less than 20% reported routinely providing antenatal care that addresses smoking, only a third (32%) reported providing advice on alcohol consumption and 50% reported providing advice on weight gain.[9,70,71] In some cases, the proportion of GPs who provide such care during preconception and postnatal periods is even lower.[72]

The Royal Australian College of General Practitioners guidelines and other antenatal guidelines recommend three elements of care to support women to address these risk factors: assessment of risk using a validated tool or objective measure; discussion and advice on risk and behaviour change; and referral to specialist risk-reduction services if required.[23,73-75] Systematic review evidence shows that the delivery of such care is more likely to lead to changes in health behaviour if it involves collaborative conversations that invite the patient's views, tailored discussions based on question-answer sequences and joint decision-making when planning actions to support behaviour change, than provision of advice alone.[76] Recommendations for assessing and managing health risk factors in primary care are summarised in Table 3 and useful resources are listed in the Box.

Smoking

Women who smoke are more likely to quit smoking when pregnant or planning a pregnancy than at any other time.[12] Brief interventions with pregnant women significantly reduce smoking in late pregnancy and rates of low birthweight and preterm birth.[77] Smoking status should be assessed for all women during preconception, pregnancy and postnatal visits. Due to the stigma attached to smoking, in particular during pregnancy, some women may not accurately disclose their smoking status, and identification of smokers may be improved using multiple response questions and exhaled breath carbon monoxide assessment.[78,79] Smoking should be addressed in a supportive, nonjudgemental manner and include a discussion about the benefits of stopping smoking completely and effective ways to quit and continue to abstain from smoking.[80]

Behavioural support to quit smoking should be offered to all women who smoke. Behavioural support strategies include provision of pregnancy-specific

KEY RESOURCES AND GUIDELINES

Smoking

- **RANZCOG 'Supporting smoking cessation during pregnancy – nicotine replacement therapy: general practice version'** https://ranzcog.edu.au/wp-content/uploads/2022/05/Supporting-smoking-cessation-during-pregnancy-nicotine-replacement-therapy-NRT.pdf
- **RANZCOG 'Best practice: smoking and pregnancy'** https://ranzcog.edu.au/wp-content/uploads/2022/05/Smoking-and-pregnancy.pdf
- **RACGP 'Supporting smoking cessation: a guide for health professionals'** https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/supporting-smoking-cessation
- **Quit 'Training and resources for maternity health professionals'** https://www.quit.org.au/resources/maternity-health-professionals/training-and-resources-maternity-health-professionals/
- **Quit 'Quit Centre: providing health professionals with the latest information on smoking cessation'** https://www.quitcentre.org.au/

Alcohol

- **NHMRC Australian guidelines to reduce health risks from drinking alcohol** https://www.nhmrc.gov.au/about-us/publications/australian-guidelines-reduce-health-risks-drinking-alcohol
- **Australian Government Department of Health 'Alcohol during pregnancy and breastfeeding'** https://www.health.gov.au/health-topics/alcohol/alcohol-throughout-life/alcohol-during-pregnancy-and-breastfeeding
- **FASD Hub Australia** https://www.fasdhub.org.au/
- **FASD Hub 'Australian Guide to the diagnosis of FASD'** https://www.fasdhub.org.au/contentassets/32961d4a5cf94de48ebcf985c34d5456/australian-guide-to-the-diagnosis-of-fasd_all-appendices_feb2020_isbn.docx.pdf
- **RACGP 'Guidelines for preventive activities in general practice'** https://www.racgp.org.au/download/Documents/Guidelines/Redbook9/17048-Red-Book-9th-Edition.pdf
- **FARE 'Every moment matters in your pregnancy'** https://everymomentmatters.org.au/
- **RANZCOG 'Substance use in pregnancy'** https://ranzcog.edu.au/wp-content/uploads/2022/05/Substance-use-in-pregnancy.pdf
- **NDARC 'Supporting pregnant women who use alcohol or other drugs'** https://ndarc.med.unsw.edu.au/sites/default/files/ndarc/resources/Supporting%20Pregnant%20Women%20who%20use%20Alcohol%20or%20Other%20Drugs%20Resource.pdf

Weight gain

- **NHMRC 'Clinical practice guidelines for the management of overweight and obesity'** https://www.nhmrc.gov.au/about-us/publications/clinical-practice-guidelines-management-overweight-and-obesity#block-views-block-file-attachments-content-block-1
- **Australian Government Department of Health 'Australian Dietary Guidelines'** https://www.eatforhealth.gov.au/guidelines
- **Australian Government Department of Health 'Physical activity and exercise guidelines for all Australians'** https://www.health.gov.au/health-topics/physical-activity-and-exercise/physical-activity-and-exercise-guidelines-for-all-australians
- **RANZCOG 'Exercise during pregnancy'** https://ranzcog.edu.au/wp-content/uploads/2022/05/Exercise-during-pregnancy.pdf

All

- **Australian Government Department of Health 'Clinical practice guidelines: pregnancy care'** https://www.health.gov.au/resources/publications/pregnancy-care-guidelines

Abbreviations: FARE = Foundation for Alcohol Research and Education; FASD = Fetal Alcohol Spectrum Disorder; NDARC = National Drug and Alcohol Research Centre; RACGP = Royal Australian College of General Practitioners; RANZCOG = Royal Australian and New Zealand College of Obstetricians and Gynaecologists.

self-help materials, barrier identification and problem solving, goal setting and facilitating use of social support.[80,81] Referral to the Quitline is also recommended.[79,82] Nicotine replacement therapy (NRT) should be considered if women are unable to achieve abstinence using nonpharmacological interventions alone.[79,82] The risks and benefits of using NRT should be discussed, and oral NRT formulations offered as first-line pharmacotherapy for pregnant women to minimise exposure of the fetus to nicotine.[79] If oral formulations are not tolerated or provide an insufficient dose to supress cravings, pregnant women can use NRT patches, provided they are removed at night-time to give the fetus a break from continuous nicotine exposure.[82]

Smoking should be addressed at every antenatal appointment with smokers and recent quitters.[79,82] Rates of relapse to smoking after birth are high (50 to 70%) so it is vital that ongoing cessation support is provided at all postnatal visits for women who have quit during or before pregnancy.[12] For women who are breastfeeding and are unable to achieve abstinence using nonpharmacological interventions alone, NRT should be discussed. Minimal amounts of nicotine are excreted into breast milk and absorption of nicotine through the infant gut is minimal. All forms of NRT can be used while breastfeeding (patch or oral). Infant exposure may be further reduced by breastfeeding immediately before using intermittent NRT formulations.[82,83]

Alcohol

Systematic reviews show that brief behavioural support delivered by healthcare providers can effectively support women to abstain from alcohol consumption during pregnancy and pregnancy planning.[5,84] In line with this evidence, international and national clinical guidelines recommend that during preconception and pregnancy, clinicians provide all women with: an assessment of alcohol consumption using a validated tool; advice not to consume alcohol during pregnancy and discussion of the risks; and referral to specialist services, such as telephone-based coaching services, Aboriginal Community Controlled Health Services, or local Drug and Alcohol Clinical Services.[17,85,86]

The Alcohol Use Disorders Identification Test – Consumption (AUDIT-C) tool is one tool recommended for assessing alcohol intake and can be used for women during preconception, pregnancy and postnatal periods.[87] AUDIT-C identifies whether a woman is consuming alcohol and provides a total score that categorises the risk of harm. For pregnant women, the following cut-off points have been established to reflect the risk of harm to the unborn child: no risk (total AUDIT-C score = 0); low risk (total AUDIT-C score of 1 to 2); medium risk (total AUDIT-C score of 3 to 4); and high risk (total AUDIT-C score of 5 or higher).[88] It is recommended that referral for counselling and to clinical drug and alcohol services is offered to women drinking at medium or high risk levels, with engagement of addiction specialists for women at high risk or when alcohol dependency is known or suspected.[17] Alcohol withdrawal can be harmful for women and their babies and requires inpatient supervision by experts.[89]

Weight

Routine measurement of weight and other clinical indicators of adiposity is recommended at clinical visits for all nonpregnant women of childbearing age for monitoring and early identification of women at risk of an unhealthy weight.[90] Measured weight and height is recommended because of inaccuracies of self-reporting.[91] Regular assessment of weight also provides a record of pre-pregnancy weight and BMI, enabling weight tracking from conception and the provision of accurate recommendations on gestational weight gain (Table 1).[91]

For pregnant women, routine measurement of weight at each antenatal visit enables early detection of weight gain at a rate that is below or above recommendations and maximises the potential impact of behavioural support and referral.[92] Following pregnancy, there are no set recommendations for how quickly women should return to a healthy weight and BMI; however, it is recommended that women lose additional pregnancy weight so it is not carried into subsequent pregnancies and later life.

Brief behavioural support delivered by healthcare providers can effectively support women to abstain from alcohol consumption during pregnancy and pregnancy planning

It is recommended that GPs discuss the benefits of a healthy weight for life stage with all women, explore the context of the behaviours that contribute to an unhealthy weight, and support women to plan their dietary and physical activity behaviour change.[16,17] Referral to allied health professionals, including dietitians, is recommended for women before, during and after pregnancy if additional weight management and behavioural support is needed.[16,17] Intensive weight loss interventions, including very low energy diets, weight loss medications or bariatric surgery, may be appropriate for nonpregnant women depending on their individual circumstances but are not appropriate during pregnancy.[16]

Further considerations

In this article, we refer to pregnant 'women' to reflect research evidence; however, we acknowledge that pregnancy care is also provided to transgender and gender diverse people. Engaging with partners and families of pregnant women to support changes to health behaviours is important, as is consideration of the partner's health during the preconception period. These issues could not be covered within the scope of this article; however, they should be taken into account when providing care to women. Care provision to pregnant women who use e-cigarettes also requires consideration. As evidence and best practice recommendations become available in this emerging space, specific guidance to general practice will need to be provided.

Conclusion

GPs play an important role in proactively providing care for women during the preconception, antenatal and postnatal periods. Provision of best practice assessment and care addressing smoking, alcohol and weight can reduce risks and optimise health outcomes for women and their babies. MT

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A list of references is included in the website version of this article (www.medicinetoday.com.au).

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