

Clinical Practice Guidelines: Pregnancy care

Recently reviewed topics

CONSULTATION DRAFT – October 2018

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Summary

This document provides a summary of recent reviews of the evidence on selected topics relevant to pregnancy care. Changes or additions to guidance since the previous evidence reviews are outlined below.

Cervical length measurement

Measuring women's cervical length at the 18-20 week ultrasound using a threshold of 25 mm has the potential to predict preterm birth but is more accurate when combined with an assessment of relevant maternal factors. Studies in the United States and the United Kingdom suggest that universal cervical length measurement is cost-effective when women with a short cervix (≤ 25 mm) at 18-25 weeks receive vaginal progesterone.

No cost-effectiveness studies from Australia were identified and a number of barriers may prevent or restrict the implementation of a universal cervical length screening program – cost, availability of vaginal progesterone and other treatment options, women's acceptance of transvaginal ultrasound and the perceptions and beliefs of health professionals. Issues of access to ultrasound services (eg due to remote location or language barriers) and availability of accredited trained professionals in some areas may also limit the availability of cervical measurement.

Syphilis

Syphilis infection in pregnancy can result in spontaneous miscarriage or stillbirth or cause congenital syphilis infection. It can be safely treated with antibiotics during pregnancy, which can prevent these complications. Therefore, routine testing for syphilis at the first antenatal visit continues to be recommended.

In light of the current syphilis outbreak in areas of Queensland, the Northern Territory, Western Australia and South Australia, recommendations regarding additional testing for women at high risk of infection or reinfection and for women in areas experiencing an outbreak are now included in these Guidelines.

Prompt treatment of women with confirmed syphilis with intramuscular benzathine penicillin is also recommended.

Chlamydia

Chlamydia is the most frequently reported sexually transmissible infection in Australia. Rates of notifications increased by 8% in 2016 and were highest among women aged younger than 30 years. Chlamydia infection in pregnancy is associated with an increased risk of preterm birth, low birth weight and perinatal mortality and detection and treatment before 20 weeks may reduce the risk of preterm birth in young women. In this context, it is now recommended that women younger than 30 years (rather than 25 years) be offered chlamydia testing. This is consistent with recommendations in other Australian guidelines.

Cytomegalovirus

As there is no treatment that has been clearly shown to reduce the risk of congenital cytomegalovirus, the focus of antenatal care is on prevention. Studies have shown that knowledge about cytomegalovirus among women who are pregnant or planning a pregnancy is limited and that health professionals do not routinely discuss precautions and behavioural interventions to prevent cytomegalovirus with pregnant women. The guidelines continue to recommend that such discussion take place and that women at high risk of cytomegalovirus infection be offered testing. Testing is also recommended when women who have influenza-like symptoms not attributable to another specific infection or when imaging findings suggest fetal infection.

Prolonged pregnancy

Prolonged pregnancy requires careful monitoring and management to reduce the risk of adverse consequences for mother and baby.

Based on moderate quality evidence of fewer perinatal deaths, stillbirths, admission to neonatal intensive care unit, Apgar scores <7 and caesarean sections with induction for prolonged pregnancy compared to expectant management, it is recommended that options in prolonged pregnancy, including induction of labour, are discussed with women.

Summary of recommendations and practice points

The recommendations in this document were developed by the Expert Working Group (EWG) (see Appendices A and B) based on systematic reviews of the available evidence. Additional topics currently under review are included in Appendix C.

Where evidence was limited or lacking, consensus-based recommendations (CBRs) were developed.

For areas beyond the scope of the systematic reviews, practice points (PPs) were developed.

Definition of grades of recommendations

Type	Definition
Evidence-based recommendation (EBR)	Body of evidence can be trusted to guide practice
Qualified evidence-based recommendation (QEER)	Body of evidence can be trusted to guide practice in most situations
CBR	Recommendation formulated in the absence of quality evidence (where a systematic review of the evidence was conducted as part of the search strategy)
PP	Area is beyond the scope of the systematic literature review and advice was developed by the EAC

Recommendations and practice points¹

Recommendation/practice point	Grade	Section	
Routine maternal health tests			
<i>Syphilis</i>			
1	Routinely recommend syphilis testing at the first antenatal visit.	EBR	2.2.1
I	Recommend repeat testing early in the third trimester (28 weeks) for women at high risk of infection or reinfection.	CBR	2.2.2
II	Seek advice from an expert in sexual health or infectious diseases regarding the care of women who test positive and their partners.	CBR	2.3
III	Conduct contact tracing and assessment/testing for other sexually transmitted infections in women with positive serology.	CBR	2.3
2	For women with confirmed syphilis, recommend a single intramuscular dose of 2.4 MU benzathine penicillin as soon as possible, ensuring that women receive treatment at least 30 days before the estimated date of birth.	EBR	2.4
IV	In areas affected by an ongoing syphilis outbreak, recommend testing five times around pregnancy for women who are at risk of syphilis infection or reinfection.	CBR	2.5
V	In areas affected by an outbreak, treat women as soon as possible, without waiting for confirmatory testing, particularly if there is a risk of loss to follow-up.	CBR	2.5

¹ Recommendations are numbered using Arabic numerals (eg 1, 2, 3), consensus-based recommendations using Roman numerals (eg I, II, III) and practice points using letters (eg A, B, C).

Recommendation/practice point	Grade	Section
Targeted maternal health tests		
<i>Chlamydia</i>		
VI	When testing for chlamydia in pregnant women, consider the use of urine samples or self-collected vaginal samples.	CBR 3.2
VII	Routinely discuss and suggest chlamydia testing at the first antenatal visit to pregnant women younger than 30 years.	CBR 3.3
A	Enquiry about a woman's sexual history and that of her current partner may identify women of any age who would benefit from testing for chlamydia and other sexually transmitted infections and/or repeat testing later in pregnancy.	PP 3.3
<i>Cytomegalovirus</i>		
VIII	Offer testing for cytomegalovirus to pregnant women if they come into frequent contact with large numbers of very young children (eg child care workers), have influenza-like symptoms not attributable to another specific infection or when imaging findings suggest fetal infection.	CBR 4.2
IX	Advise pregnant women about hygiene measures to prevent cytomegalovirus infection, including avoiding contact with a child's saliva or urine and hand washing after such exposure.	CBR 4.3
Clinical assessments in late pregnancy		
<i>Prolonged pregnancy</i>		
V	Consider offering membrane sweeping to women who choose induction of labour for prolonged pregnancy.	CBR 5.2.1
B	It may be advisable to avoid membrane sweeping before 41 weeks or in women at greater risk of Group B streptococcus.	PP 5.2.1
3	Discuss options, including induction of labour, with a woman who is nearing prolonged pregnancy.	EBR 5.2.2
C	Advise women to be vigilant of changes (including decreases or increases) in fetal movements, particularly after 41 weeks.	PP 5.3

Introduction

The Australian *Clinical Practice Guidelines: Pregnancy Care* provide evidence-based recommendations to support high quality, safe pregnancy care and contribute to improved outcomes for all mothers and babies. To ensure that the recommendations are current, an ongoing process for evaluation of the evidence is in progress. Stage 1 of the most recent review was completed in October 2017, with National Health and Medical Research Council (NHMRC) approval of recommendations on a range of topics. This document provides current guidance on five topics from Stage 2 of the review – cervical length measurement, syphilis, chlamydia, cytomegalovirus and prolonged pregnancy. The remaining topics in Stage 2 are still under review and are listed in Appendix C. The development of these chapters has followed the key principles and processes outlined in *Procedures and Requirements for Meeting the 2011 NHMRC Standard for Clinical Practice Guidelines*. This involved convening a multidisciplinary committee, the membership of which included a range of health professionals with expertise in providing, developing and researching pregnancy care, a consumer representative and a methodology expert. The content of this document was developed by this group and was not influenced by the funding body. More detail on the guideline development process will be included in the Administrative Report, to be published separately after public consultation.

Application of the Guidelines

Objective of the Guidelines

The Guidelines aim to improve the health and experience of antenatal care of pregnant women and their babies by promoting consistency of care. They provide a summary of the current evidence on aspects of care and are intended to complement the education and skills of health professionals. It is expected that implementation of these Guidelines will improve maternal, fetal and newborn outcomes in the short and longer terms.

Scope

The Guidelines cover the antenatal care of healthy pregnant women (ie those who do not have identified pre-existing conditions or are at higher risk of complications such as in multiple pregnancy). They are intended for use in all settings where antenatal care is provided, including primary care, obstetric and midwifery practice and public and private hospitals.

The Guidelines do *not* include:

- information on preconception or postnatal care
- advice on clinical management of women and babies when risks are identified through testing or clinical assessment
- discussion of specific topics where a practice is already established (eg testing of blood group and rhesus D status) or where the topic was not considered a priority for inclusion in these Guidelines and advice is given by other organisations (eg vaginal discharge, backache).

Intended audience

The Guidelines are intended for all health professionals who contribute to antenatal care, including midwives, general practitioners (GPs), obstetricians, maternal and child health nurses,² Aboriginal and Torres Strait Islander Health Practitioners; Aboriginal and Torres Strait Islander Health Workers, multicultural health workers, practice nurses, allied health professionals, childbirth and parenting educators and sonographers. The way in which different professionals use these Guidelines will vary depending on their knowledge, skills and role, as well as the setting in which care is provided.

These Guidelines will be of interest and relevance to pregnant women in Australia. In addition, it is expected that policy makers will be able to draw on the Guidelines in the development of policy and the planning and delivery of health services.

Dissemination and review

The Guidelines are available in a mobile device friendly format. Following public consultation, revision and approval by the NHMRC, the chapters in this document will replace the previous versions of the chapters in the online version of the Guidelines.

² Also referred to as child and family health nurses in some jurisdictions.

CLINICAL ASSESSMENTS

1 Preterm birth

1.1 Prediction and prevention

The following section will replace Section 23.3.1 of the Guidelines.

1.1.1 Cervical length measurement

Factors associated with short cervical length

Factors associated with women being at increased risk of short cervical length at mid trimester include:

- previous spontaneous (Cho et al 2017) (Palma-Dias et al 2004) or induced (Miller et al 2015) preterm birth
- previous cervical excisional procedure (Cho et al 2017; Miller et al 2015)
- non-Caucasian ethnicity (Buck et al 2016; Miller et al 2015; van der Ven et al 2015).

Studies were consistent in finding no significant association between women's short cervical length and maternal height (Cho et al 2017; van der Ven et al 2015) or assisted conception (Aboulghar et al 2009; Miller et al 2015). The evidence on the association between cervical length and maternal weight (Cho et al 2017; Kandil et al 2017; Palma-Dias et al 2004) or age (D'Agostini et al 2013; Miller et al 2015; van der Ven et al 2015) was inconsistent.

Accuracy of cervical length measurement

Measuring women's cervical length at the 18-20 week ultrasound using a threshold of 25 mm has the potential to predict preterm birth (Crane & Hutchens 2008; Domin et al 2010; Honest et al 2012) but is more accurate when combined with an assessment of relevant maternal factors (nulliparity, gestational age of previous preterm birth) (Celik et al 2008; To et al 2006). No evidence on harms associated with cervical length measurement was identified.

Universal versus targeted cervical length screening

In settings where universal screening of women's cervical length has been implemented:

- there has been a reduction in preterm births <37 weeks (adjusted odds ratio [aOR] 0.82; 95% confidence interval [CI] 0.76 to 0.88), <34 weeks (aOR 0.74; 95%CI 0.64 to 0.85) and <32 weeks (aOR 0.74; 95%CI 0.62 to 0.90), with similar effect sizes in nulliparous and multiparous women with previous term births (Son et al 2016)
- in a United States study, women were more likely to decline cervical length screening if they were African American (aOR 2.17; 95%CI 1.93 to 2.44), obese (aOR 1.18; 95%CI 1.06 to 1.31), multiparous (aOR 1.45; 95%CI 1.29 to 1.64), aged <35 years (aOR 1.24; 95%CI 1.08 to 1.43), or smokers (aOR 1.42; 95%CI 1.20 to 1.68) (Temming et al 2016)
- after 6 months of implementation, there was no change in rates of acceptance of cervical length screening and rates of spontaneous preterm birth <28 weeks were higher among women who declined screening (aOR 2.01; 95%CI 1.33 to 3.02) (Temming et al 2016).

A study that calculated the number of women needed to screen (NNS) to prevent one early preterm birth found that, with a cut-off of ≤ 15 mm, the NNS in low-risk women would be 1,075 compared to 344 among nulliparous women and 167 among women with a previous preterm birth. At a cut-off of ≤ 20 mm, NNSs were 802, 221 and 97, respectively (Facco & Simhan 2013).

Another study found that targeted screening increased specificity compared to universal screening but sensitivity was reduced and nearly 40% of women with a short cervix were not identified (Miller et al 2015).

Initial transabdominal measurement of cervical length may represent a useful strategy for detecting women with short cervix on transvaginal ultrasound (Cho & Roh 2016; Friedman et al 2013a; Friedman et al 2013b; Kongwattanakul et al 2016; Saul et al 2008). However, the evidence is inconsistent in terms of gestational age and cut-offs and universal transvaginal ultrasound has been found to be more cost-effective than including an initial transabdominal measurement (Miller & Grobman 2013).

Timing of cervical length measurement among women at high risk of preterm birth

Evidence from observational studies suggests that cervical length measurement earlier than 20 weeks may predict cervical shortening and risk of early preterm birth in women at high risk of preterm birth (Banicevic et al 2014; Berghella et al 2003; Owen et al 2004; Souka et al 2011; Vaisbuch et al 2010). However, a cervical length >25 mm does not preclude preterm birth in these women (Caradeux et al 2017; Care et al 2014; Owen et al 2010).

Implementation of universal cervical length measurement

Studies in the United States and the United Kingdom suggest that universal cervical length measurement is cost-effective when women with a short cervix (≤ 25 mm) at 18-25 weeks receive vaginal progesterone (Cahill et al 2010; Crosby et al 2016; Einerson et al 2016; Jain et al 2016; Werner et al 2011). No Australian cost-effectiveness studies were identified.

Transvaginal measurement of cervical length does not significantly increase the time for completion of ultrasound examination and attitudes regarding discomfort or embarrassment; did not differ between women who underwent no cervical length screening or transvaginal or transabdominal screening (Romero et al 2014). However, a number of barriers may prevent or restrict the implementation of a universal cervical length screening program – cost, availability of vaginal progesterone and other treatment options, women's acceptance of, or willingness to undergo, transvaginal ultrasound and the perceptions and beliefs of health professionals (Pedretti et al 2017). Issues of access to ultrasound services (eg due to remote location or language barriers) and availability of accredited trained professionals in some areas may also limit the availability of cervical measurement.

The following section will be included in the Guidelines as new section 23.3.3.

1.1.2 Progesterone treatment for women with a short cervix

A systematic review analysed the effectiveness of progesterone compared to placebo in women with short cervical length (without other risk factors for preterm birth or premature onset of labour). It found that, while preterm birth <34 weeks, <37 weeks and neonatal deaths were reduced in women overall, there was only a reduction of preterm birth <34 weeks in women with a short cervix (Jarde et al 2017).

When studies specific to vaginal progesterone treatment in women with a short cervix were analysed separately, there were statistically significant effects on preterm birth <35 weeks (risk ratio [RR] 0.62; 95%CI 0.42 to 0.92; 1 randomised controlled trial [RCT], moderate quality), preterm birth <34 weeks (RR 0.60; 95%CI 0.41 to 0.89; 2 RCTs, moderate quality), preterm birth <28 weeks (RR 0.55; 95%CI 0.25 to 0.97; 1 RCT; moderate quality) and respiratory distress syndrome (RR 0.51; 95%CI 0.31 to 0.86; 3 RCTs; moderate quality). There were no statistically significant effects on preterm birth associated with intramuscular progesterone in women with a short cervix (1 RCT; low quality).

A modelling study in the United Kingdom found universal cervical length screening and vaginal progesterone for women with a cervical length of ≤ 15 mm was cost-effective (Crosby et al 2016).

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ROUTINE MATERNAL HEALTH TESTS

2 Syphilis

This chapter will replace Chapter 36 in the Guidelines.

Testing for syphilis in pregnancy aims to detect women who have the infection so that they can be treated and transmission to their babies prevented.

2.1 Background

Syphilis is a sexually acquired infection caused by *Treponema pallidum* subs. *pallidum*. In pregnancy, it can result in spontaneous miscarriage or stillbirth or cause congenital syphilis infection. Syphilis in pregnancy can be safely treated with antibiotics, which can prevent these complications.

2.1.1 Syphilis in Australia

Rates of diagnosis of syphilis

Between 2012 and 2016, the notification rate of infectious syphilis increased 107% from 6.9 per 100,000 in 2012 to 14.3 per 100,000 in 2016, with an increase in both men (103%) and women (157%) (Kirby Institute 2017a).³ Rates among women in 2016 were highest in the 15-19 year (11.5 per 100,000), 20-24 year (9.5 per 100,000) and 25-29 year (9.9 per 100,000) age groups. The rate of notification for infectious syphilis among Aboriginal and Torres Strait Islander women was 39 times that among non-Indigenous women (57.1 vs 1.5 per 100,000) (Kirby Institute 2017b).

Geographical distribution

In 2016, infectious syphilis notification rates were highest in remote and very remote areas (49.4 per 100 000) (Kirby Institute 2017a). Increases in notification rates occurred in all regions of residence between 2012 and 2017, with the sharpest increase in regional areas (209%) followed by remote areas (176%). Rates of notification among Aboriginal and Torres Strait Islander people were highest in the Northern Territory (229.6 per 100,000) and Queensland (99.3 per 100,000) (Kirby Institute 2017b), corresponding with regions in which there has been an outbreak of infectious syphilis (see below).

Congenital syphilis

Australia is a country of low prevalence for congenital syphilis. However, coinciding with peaks in infectious syphilis notifications, there have been peaks in cases of congenital syphilis (see below).

Refugee background

An Australian cohort study found higher prevalence among women from humanitarian source countries than among women from non-humanitarian source countries in Africa (1.2-7.5% vs 0-0.3%) and Africa and Asia (2.5% vs 0.4% $p < 0.001$) (Gibson-Helm et al 2014; Gibson-Helm et al 2015).

Risk factors

Syphilis in Australia largely continues to be an infection primarily of men having male-to-male sex in urban settings, and of young heterosexual Aboriginal and Torres Strait Islander people in remote communities (The Kirby Institute 2016). A pregnant woman is at high risk of syphilis infection or reinfection when:

- she is a sexual contact of a person with infectious syphilis
- she or her partner(s) reside in a declared outbreak area (see below)
- she is aged 19 years or younger
- she and/or her partner(s) have sexual partners from high prevalence countries
- she has a male sexual partner who has sex with men
- she engages in intravenous substance use during pregnancy – particularly methamphetamine ('ice')
- she has a sexually transmitted infection in the current pregnancy or within the previous 12 months

³ An expanded infectious syphilis national case definition was implemented in July 2015 in all jurisdictions except for New South Wales, where it was implemented in July 2016. The new case definition includes a subcategory of 'probable' infectious syphilis to capture infectious syphilis cases in people without a prior testing history, particularly young people aged 15–19 years. The probable infectious syphilis cases are included in the number of infectious syphilis notifications in 2015 and 2016.

- she has unprotected vaginal, oral or anal sex with a male partner at high risk of having syphilis
- she has previously had infectious syphilis in pregnancy.

Syphilis outbreak in Australia

In January 2011, an increase of infectious syphilis notifications among young Aboriginal and Torres Strait Islander people was identified in the North-West region of Queensland, which subsequently spread to other regions in north Queensland (Bright & Dups 2016). Subsequent increases in notifications were reported in the Northern Territory and Western Australia in July 2013 and June 2014 respectively, following sustained periods of low notification rates. In March 2017, South Australia declared an outbreak in the Western and Eyre and Far North regions from November 2016 (MJSO 2018). By 30 June 2018, there had been seven confirmed cases of congenital syphilis, six probable cases and six deaths from congenital syphilis (three confirmed and three probable) associated with the outbreak (MJSO 2018). Surveillance reports on the outbreak are published online regularly by the [Multijurisdictional Syphilis Outbreak Working Group](#). Outbreak management is discussed briefly in Section 2.5 and detailed in the Communicable Disease Network Australia (CDNA) [Syphilis CDNA National Guidelines for Public Health Units Version 1.1](#) (see Section 2.7).

Notification

Syphilis is a notifiable disease under the public health acts of all states and territories, and nationally. Cases of reactive serology are reported by pathology laboratories to public health authorities (CDNA 2018). In some jurisdictions, the health professional who diagnoses syphilis is also required to notify the jurisdictional public health authority. Probable or confirmed congenital syphilis must also be notified, including syphilis-related stillbirth (CDNA 2018).

2.1.2 Risks associated with syphilis in pregnancy

Untreated syphilis during pregnancy is associated with stillbirth (Arnesen et al 2015; Gomez et al 2013; Qin et al 2014) and fetal loss, preterm birth, neonatal death, low birthweight and congenital syphilis (Gomez et al 2013; Qin et al 2014). Early treatment of maternal syphilis improves outcomes for the baby (see Section 2.4).

A baby with congenital syphilis may be severely affected at birth (with hepatomegaly, ascites, hydrops, fetal anaemia) or more frequently, may appear unaffected (CDNA 2015). If the diagnosis is not made then, the baby will present later with non-specific complaints (rhinitis, failure to thrive, pneumonia), nearly always within 3 months of birth. Neonates with severe disease have a poorer prognosis.

2.2 Syphilis testing

There are two main classifications of serological tests for syphilis (*T. pallidum*) performed in medical testing laboratories (CDNA 2018):

- treponemal tests, which detect specific treponemal antibodies and can be run on high throughput random access instruments – commonly used assays include enzyme immunoassays (EIAs) and particle agglutination assays (eg *T. pallidum* particle agglutination [TPPA])
- non-treponemal tests, which detect non-specific antibodies and are performed manually – the assay most commonly used is the rapid plasma reagin (RPR).

In Australia, serum from blood specimens is usually screened with a treponemal assay and confirmed with an alternative treponemal assay using a different platform (ie screening with an EIA and confirmation with a TPPA). In people with prior treated syphilis, because the treponemal assays remain reactive for life, an RPR alone is sometimes used to detect reinfection or treatment success (ASHA 2018).

Due to intralaboratory and interlaboratory variation, when a person has a changing non-treponemal antibody result, the current specimen should be tested in parallel with previous specimens.

Point-of-care tests are now available that present results within 15-20 minutes (see Section 2.2.3).

2.2.1 Universal testing

Given the severity of outcomes associated with syphilis during pregnancy (see Section 2.1.2) and the availability of effective treatment (see Section 2.4), routine testing for syphilis at the first antenatal contact is recommended.

Evidence-based recommendation

- 1** Routinely recommend syphilis testing at the first antenatal visit.

2.2.2 Repeat testing for women at high risk of syphilis infection or reinfection

Studies in the United States found that universal testing in the third trimester is not cost-effective when prevalence is low (Albright et al 2015; Shiber & Todia 2014). However, testing and treatment early in the third trimester prevented 78% of cases of congenital syphilis in an area of very high prevalence (Matthias et al 2017). Factors that place a woman at high risk of infection or reinfection are outlined in Section 2.1.1. Testing at additional time points is recommended in areas affected by an ongoing syphilis outbreak (see Section 2.5).

Consensus-based recommendation

- I. Recommend repeat testing early in the third trimester (28 weeks) for women at high risk of infection or reinfection.

2.2.3 Point-of-care testing

In Australia, the only syphilis point-of-care test registered by the Therapeutic Goods Administration is the Determine Syphilis TP™ manufactured by Alere, Abbott (CDNA 2018).

Point-of-care tests for syphilis have sensitivity and specificity in the ranges of 0.70 to 0.92 and 0.93 to 0.99 for Determine™ (Rogozinska et al 2017), 0.60 to 0.83 and 0.96 to 1.00 for SD Bioline Syphilis 3.0 (Smit et al 2013; Rogozinska et al 2017), and 0.95 to 1.00 and 0.97 to 1.00 for SD Bioline HIV/Syphilis Duo Kit (Omoding et al 2014; Bristow et al 2016b; Shakya et al 2016) (moderate to high quality evidence).

A systematic review (Swartzendruber et al 2015) reported substantial increases in antenatal syphilis testing following introduction of point-of-care syphilis testing in low and middle income countries. Qualitative data revealed that women were highly satisfied with point-of-care syphilis testing. Adequate training for health care workers and supplies of commodities were cited as key implementation barriers. Another study noted the requirement for health professional training (Smith et al 2015).

Studies into the cost-effectiveness of point-of-care testing conducted in developing countries highlighted that point-of-care tests were more cost-effective than RPR both in the field (Sweeney et al 2014) and in the laboratory (Mallma et al 2016). No cost-effective studies conducted in Australia were identified.

More detailed information on the use and limitations of point-of-care tests in Australia is included in [Syphilis CDNA National Guidelines for Public Health Units Version 1.1](#) (see Section 2.7).

2.3 Caring for women with a positive syphilis test result

All cases of syphilis in pregnancy should be discussed with a clinician with expertise in the area (CDNA 2018).

Women with infectious syphilis need to be informed of the infectious nature of the condition, even in the absence of visible lesions or symptoms, and to abstain from sexual activity for 5 days post-treatment, 5 days post treatment of their partners or until symptoms have completely resolved (whichever is longer). The risk of reinfection should be reinforced and the possible signs and symptoms of a new syphilis infection discussed. The importance of follow-up and repeat syphilis serology testing to monitor the response to treatment and detect reinfection should be emphasised and support systems put in place for women who may have difficulty accessing this follow-up. The woman should be informed that she is likely to continue to have positive treponemal specific tests for life, even after successful treatment.

Contact tracing and treatment for the woman's partner(s) are critical to minimise the potential for re-infection as this represents a particular threat to the unborn baby (CDNA 2018). Contacts should be treated presumptively without waiting for serology results. The culture and gender of the interviewer and whether or not they are known to and trusted by the woman are relevant considerations (CDNA 2018).

Consensus-based recommendations

- II. Seek advice from an expert in sexual health or infectious diseases regarding the care of women who test positive and their partners.
- III. Conduct contact tracing and assessment/testing for other sexually transmitted infections in women with positive serology.

2.4 Treatment for women with confirmed syphilis

Systematic reviews found that:

- treatment of syphilis in pregnancy with at least 2.4 MU (1.8 g) benzathine penicillin intramuscularly as a single dose reduces the incidence of congenital syphilis by 97% (95%CI 93 to 98%; 3 studies; moderate quality evidence), stillbirth by 82% (95%CI 67 to 90%; 8 studies; low quality evidence), preterm birth by 64% (95%CI 53 to 73%; 7 studies; low quality evidence) and neonatal deaths by 80% (95%CI 68 to 87%; 5 studies; low quality evidence) (Blencowe et al 2011)
- rates of adverse outcomes were higher among women receiving treatment in the third trimester compared to those treated in the first or second trimester (OR 2.24; 95%CI 1.28 to 3.93), although there was considerable heterogeneity ($I^2=78.3$ to 81.7%) for outcomes other than congenital syphilis (odds ratio [OR] 2.92, 95%CI 0.66 to 12.87; $I^2=48.2\%$, $p=0.165$) (low quality evidence) (Hawkes et al 2013)
- based on the risk of adverse reactions to benzathine penicillin in the general population (pooled absolute risk 0.169%; 95%CI 0.073 to 0.265% $I^2 = 97\%$), risks from treatment among pregnant women are likely to be low (very low quality evidence) (Galvao et al 2013).

Observational studies in settings of very high prevalence were consistent in finding treatment in the first trimester to be more effective than treatment in the third trimester (Hong et al 2017; Zhang et al 2016).

Qualified evidence-based recommendation

- 2 For women with confirmed syphilis, recommend a single intramuscular dose of 2.4 MU benzathine penicillin as soon as possible, ensuring that women receive treatment at least 30 days before the estimated date of birth.

Due to the high risk of mother-to-child transmission during pregnancy, particular care is required to ensure adequate treatment. Further details on monitoring and management of syphilis in pregnancy are given in the [Syphilis CDNA National Guidelines for Public Health Units Version 1.1](#) (see Section 2.7).

2.5 Outbreak management

In the jurisdictions affected by an ongoing syphilis outbreak, syphilis serology testing five times around the pregnancy is recommended for women at risk of infection or re-infection within the outbreak areas: at the booking visit, again at 28 weeks, at 36 weeks, at birth, and 6 weeks post-partum (CDNA 2018). As local guidelines within those areas may recommend different or additional times for testing, it is advisable to seek direction from local authorities (CDNA 2018). In areas where point-of-care tests are used, serology confirmation of current infection or stages should be performed (CDNA 2018).

Women should be reassessed at every antenatal visit for symptoms of syphilis, and/or change in risk factors, and additional testing outside of the routine screening intervals should be considered based on clinical indication. Women at risk of inadequate antenatal care should be screened opportunistically, outside of the set interval where appropriate, whenever they present for care.

Women who present with symptoms consistent with infectious syphilis should be treated at the time of first presentation (CDNA 2018). Women with infectious syphilis diagnosed on serology should be treated as soon as possible (and ideally within 2 days) of diagnosis (CDNA 2018). Contact tracing must be initiated immediately and support provided to ensure that current and previous contacts receive treatment. Women who are named as contacts of syphilis should also be treated at the time of initial presentation without waiting for serology results. Notification of confirmed or probable infectious syphilis in a pregnant woman is an urgent public health priority.

Consensus-based recommendation

- IV. In areas affected by an ongoing syphilis outbreak, recommend testing five times around pregnancy for women who are at risk of syphilis infection or reinfection.
- V. In areas affected by an outbreak, treat women as soon as possible without waiting for confirmatory testing, particularly if there is a risk of loss to follow-up.

2.5.1 Notification of congenital syphilis

One study found that 95% of babies in the Northern Territory meeting CDNA criteria for probable congenital syphilis were not notified between 2009 and 2014 and that improved education regarding CDNA criteria for notification of congenital syphilis is necessary for clinicians and public health staff. This study contributed to the release of new national case definitions for congenital syphilis in July 2015.

2.6 Practice summary: syphilis testing

When: Early in antenatal care or at five key times in areas experiencing an outbreak (see Section 2.5)

Who: Midwife; GP; obstetrician; Aboriginal and Torres Strait Islander health worker; multicultural health worker, infectious diseases specialist, public health unit staff

- Discuss the reasons for syphilis testing:** Explain that it is important to find out whether a woman has syphilis because of the effects that infection can have on the pregnancy and the baby.
- Monitor changes in risk:** Discuss potential symptoms and changes in risk-factors at all antenatal visits, particularly in areas experiencing an outbreak.
- Document and follow-up:** Note the results of syphilis testing in the woman's record, including whether the syphilis is newly diagnosed or was previously treated. Have a follow-up system in place so that women with confirmed syphilis receive timely treatment or referral. Any positive tests should be notified to the relevant public health authority.
- Take a holistic approach:** If a woman is found to be infected with syphilis, important considerations include counselling, contact tracing, partner testing, testing for other sexually transmitted infections (if this has not already been done) and follow-up.

2.7 Resources

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- CDNA (2018) [Syphilis CDNA National Guidelines for Public Health Units Version 1.1](#). Canberra: Communicable Diseases Network Australia.
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TARGETED MATERNAL HEALTH TESTS

3 Chlamydia

This chapter will replace Chapter 40 in the Guidelines.

Antenatal care provides opportunities for testing women from population groups with a high prevalence of chlamydia infection.

3.1 Background

Chlamydia is caused by the bacterium *Chlamydia trachomatis*. Chlamydia infection is asymptomatic in at least 70% of women.

3.1.1 Prevalence of chlamydia

Rates of diagnosis

Chlamydia is the most frequently reported sexually transmissible infection in Australia. The notification rate was relatively stable between 2011 and 2015 and increased by 8% in 2016 (Kirby Institute 2017a). Notifications have been higher in women than in men in all years (457.6 vs 364.3 per 100,000 in 2016). In 2016, the rate of notification in the Aboriginal and Torres Strait Islander population was more than three times that in the non-Indigenous population (1,193 vs 419 per 100,000) (Kirby Institute 2017b).

Age

Among women, rates in the 15-19 year age group have declined (from 2,425 in 2011 to 1,932 per 100,000 in 2016), rates in the 20-24 year age group have remained stable (2,248 in 2011 and 2,399 in 2016) and rates in the 25-29 year age group have increased (from 892 in 2011 to 1,086 per 100,000 in 2016) (Kirby Institute 2017a). In 2016, rates among Aboriginal and Torres Strait Islander women aged 15-19 and 20-29 years were four times and three times higher, respectively, than in the non-Indigenous population (Kirby Institute 2017b).

Geographical distribution

After a steady increase in notifications between 2007 and 2011 in all jurisdictions, rates were stable between 2012 and 2016, except in Queensland, where there was a steady increase (from 410.7 to 480.4 per 100,000). Between 2015 and 2016, rates rose in New South Wales (by 14%) and Western Australia (by 7%) (Kirby Institute 2017a). In 2016, rates varied between remote and very remote regions (806.6 per 100,000), inner and outer regional areas (367.2 per 100,000) and major cities (327.0 per 100,000 in 2016) (Kirby Institute 2017a).

3.1.2 Risks associated with chlamydia in pregnancy

A systematic review of cohort studies (Silva et al 2011) found that chlamydia infection during pregnancy was associated with an increased risk of preterm birth (RR 1.35; 95%CI 1.11 to 1.63), low birth weight (RR 1.52; 95%CI 1.24 to 1.87) and perinatal mortality (RR 1.84; 95%CI 1.15 to 2.94). There was no clear evidence of an increased risk of premature rupture of membranes (RR 1.13; 95%CI 0.95 to 1.34), miscarriage (RR 1.20; 95%CI 0.65 to 2.20) or postpartum endometritis (0.89; 95%CI 0.49 to 1.61).

3.2 Chlamydia testing

The [Australian STI Management Guidelines](#) recommend nucleic acid amplification testing (NAAT) of endocervical, vaginal or anorectal swabs (if the woman has anal sex or anorectal symptoms) and advise consideration of self-collection of samples by pregnant women (ASHA 2018).

3.2.1 Diagnostic accuracy

No recent studies were identified that explicitly compared a diagnostic test to a reference test among pregnant women with uncomplicated pregnancies. Identified studies found that:

- sensitivity and specificity for chlamydia of urine samples relative to endocervical samples were 96.5% (95%CI 90.1 to 99.3%) and 100% (99.8 to 100%) and positive and negative predictive values were 100% (95%CI 95.6 to 100%) and 99.8% (95%CI 99.5 to 100%) (Roberts et al 2011)
- while pregnant women specifically have not been studied, the results available in non-pregnant populations are encouraging for the ability to test and treat women in antenatal care using point-of-care tests (Herbst de Cortina et al 2016).

Consensus-based recommendation

- VI. When testing for chlamydia in pregnant women, consider the use of urine samples or self-collected vaginal samples.

3.2.2 Availability of effective treatment

A cohort study found that, compared to women whose chlamydia infection was detected after 20 weeks or persisted during pregnancy, women whose chlamydia was detected and treated before 20 weeks gestation had a reduced risk of preterm birth in the less than 20 year age group (RR 0.54; 95%CI 0.37 to 0.80) but there was no clear difference in risk for women in other age groups (Folger 2014).

3.2.3 Cost-effectiveness

An Australian cost-effectiveness study (Ong et al 2016) found that, from an Australian Government perspective, chlamydia testing for all women aged 16–25 years old during an antenatal visit was likely to be cost-effective compared with no testing or selective testing, especially with increasing chlamydia prevalence (the study assumed a prevalence of 3%; in 2016 prevalence was 1.9% among women aged 15-19 years, 2.4% among women aged 20-24 years and 1.1% among women aged 24-29 years).

International cost-effectiveness studies found that:

- universal antenatal testing for chlamydia was cost-saving in the Netherlands (estimated overall prevalence 3.9%), with further increases in savings when testing was targeted to pregnant women younger than 30 years of age (Rours et al 2016)
- cost and benefit of universal testing in pregnancy in the United States was reliant on the prevalence of chlamydia – when prevalence was above 16.9% there were net cost savings; at a prevalence of 8%, expenses were \$124.65 million (\$19.34/individual); and at a prevalence of 6.7%, net expenditure for screening was \$249.08 million (\$38.65/individual) (Ditkowsky et al 2017).

3.3 Routine versus targeted testing

No recent studies were identified that directly compared outcomes associated with universal antenatal testing with those associated with targeted or no testing. However, the evidence supports testing of young women in Australia based on:

- the high prevalence of chlamydia in young people in Australia (see Section 3.1.1)
- treatment before 20 weeks reducing the risk of preterm birth among young women (see Section 3.2.2)
- the cost-effectiveness of antenatal screening among women aged 16–25 years (see Section 3.2.3)
- the benefits of consistency between recommendations in national guidelines (eg (ASHA 2018; RACGP 2016)).

Consensus-based recommendation

- VII. Routinely discuss and suggest chlamydia testing at the first antenatal visit to pregnant women younger than 30 years.

Practice point

- A. Enquiry about a woman's sexual history and that of her current partner may identify women of any age who would benefit from testing for chlamydia and other sexually transmitted infections and/or repeat testing later in pregnancy.

3.3.1 Uptake of testing recommendations

An Australian study that assessed clinical uptake of the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) recommendation to test women younger than 25 found that, in 2010, only about one-fifth of participants routinely tested women in this population group (Li et al 2013). The study highlighted the need for national clinical leadership regarding testing for chlamydia among pregnant women. Current RANZCOG guidance is to selectively test women based on local prevalence (RANZCOG 2016).

3.4 Practice summary: chlamydia

When: At the first contact with women younger than 30 years and women who may be at risk of chlamydia based on their sexual history or that of their current partner

Who: Midwife; GP; obstetrician; Aboriginal and Torres Strait Islander health worker; multicultural health worker

- Discuss chlamydia:** Explain the association between chlamydia and preterm birth and low birth weight, that tests for the infection are available and that it is easily treated with antibiotics.
- Take a holistic approach:** If a woman tests positive for chlamydia, important considerations include counselling, contact tracing, partner testing, testing for other sexually transmitted infections and follow-up. Any positive tests should be notified to public health.
- Learn about locally available resources:** Available testing services and support organisations will vary by location.

3.5 Resources

ASHA (2018) [Australian STI Management Guidelines for Use in Primary Care](#). Australasian Sexual Health Alliance.

3.6 References

- ASHA (2018) [Australian STI Management Guidelines for Use in Primary Care](#). Australasian Sexual Health Alliance.
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4 Cytomegalovirus

This chapter will replace Chapter 44 in the Guidelines.

There is limited evidence to support testing women for cytomegalovirus during pregnancy. As cytomegalovirus may be transmitted to the baby and can have serious consequences, the focus is on giving women advice about hygiene measures that reduce their risk of infection.

4.1 Background

Cytomegalovirus is a member of the herpes virus family transmitted by contact with saliva, urine or genital secretions. Most people who acquire the virus after birth experience few or no symptoms. Cytomegalovirus remains latent in the host after primary infection and may become active again particularly during times of compromised immunity, including pregnancy. Congenital cytomegalovirus is the most frequent infectious cause of newborn disability in developed countries (Rawlinson et al 2017).

4.1.1 Incidence

Transmission

Mother-child transmission of cytomegalovirus is higher for maternal primary infection than re-activated (non-primary) infection (30-35% versus 1.4%) (Manicklal et al 2013).

Congenital infection

The rate of symptomatic disease resulting from congenital cytomegalovirus infection has been estimated at 3.7 per 100,000 live births (0.004%) but this may be an underestimate as it is based on voluntary reporting (Naing et al 2016). Based on average global figures in all socioeconomic groups, it has been estimated that each year 437 children in Australia will be born with or develop cytomegalovirus-related disease resulting from primary or non-primary maternal infection (Naing et al 2016).

Risk factors

Cytomegalovirus is a highly prevalent infection in the general population; seropositivity rates in adult women range between 40 and 90%, with the highest rates occurring in individuals from lower socioeconomic background (Naing et al 2016). Primary cytomegalovirus infection occurs following close personal contact and is transmitted via body fluids or objects that are likely to carry infection (eg utensils) between individuals, or vertically across the placenta resulting in congenital infection in the fetus (Naing et al 2016). Children, when infected vertically or in the first few years of life, can shed virus in urine and saliva for many years either continuously or intermittently. Cytomegalovirus therefore spreads readily in settings where preschool children are concentrated (Manicklal et al 2013). This places seronegative pregnant women who work in child care centres or who have a young child in the home or in day care at increased risk of seroconversion.

4.1.2 Risks associated with cytomegalovirus during pregnancy

Adverse effects on the developing baby include late miscarriage and growth restriction (McCarthy et al 2011). About 10% of babies infected with cytomegalovirus are born with symptoms and are at risk of developing sensorineural hearing loss (35%) or cognitive deficits (up to 60%), or of death (4%) (Manicklal et al 2013). Babies with cytomegalovirus who are born without symptoms may have normal hearing at birth but are also at risk of developing long-term neurological sequelae (10-15%), in particular hearing impairment (7-10%) (Manicklal et al 2013). In developed countries, congenital cytomegalovirus accounts for 21% and 24% of cases of hearing loss at birth and 4 years of age, respectively (Manicklal et al 2013).

The risk for long-term outcomes appears to be highest in infants born to mothers with primary infection in the first half of pregnancy (Manicklal et al 2013).

4.2 Testing for cytomegalovirus

4.2.1 Diagnostic accuracy of tests for cytomegalovirus

Up to 50% of maternal cytomegalovirus infections have nonspecific clinical manifestations, and most remain undetected unless specific serological testing is undertaken (Naing et al 2016). The combination of serology tests

for cytomegalovirus-specific immunoglobulin (IgM), IgG and IgG avidity provide improved distinction between primary and secondary maternal infections (Naing et al 2016).

4.2.2 Universal versus targeted testing

The International Congenital Cytomegalovirus Recommendations Group (Rawlinson et al 2017) noted that universal testing of pregnant women for primary cytomegalovirus infection is currently not recommended. The consensus document recommends that cytomegalovirus serology tests (cytomegalovirus-specific IgG, IgM, and IgG avidity) should be offered when a pregnant woman develops an illness with influenza-like symptoms (typically fever, fatigue, and headache) not attributable to another specific infection, or when imaging findings (ultrasound or magnetic resonance imaging [MRI]) are suggestive of fetal cytomegalovirus infection (Rawlinson et al 2017).

4.2.3 Risks and benefits of testing

Maternal screening to identify primary cytomegalovirus infection in pregnancy may allow for early identification of infected infants and such screening programmes have previously been carried out, or are being carried out in certain European countries (eg Italy, Belgium, France, Germany and Sweden) and in Israel (Lim & Lyall 2017). However, difficulties in accurate diagnosis, absence of effective interventions in preventing transmission of cytomegalovirus from mothers with primary cytomegalovirus infection to their infant, possibility of reinfection or reactivation, and the challenges in providing definite prognosis to an individual mother means that universal testing of pregnant women is not currently recommended in most countries including the United Kingdom and North America (Lim & Lyall 2017).

Conclusions on the cost-effectiveness of testing for cytomegalovirus are limited by insufficient evidence on the effectiveness of treatments in preventing congenital cytomegalovirus (Cahill et al 2009).

Consensus-based recommendation

VIII. Offer testing for cytomegalovirus to pregnant women if they come into frequent contact with large numbers of very young children (eg child care workers), have influenza-like symptoms not attributable to another specific infection or when imaging findings suggest fetal infection.

4.2.4 Availability of safe and effective treatments

Cytomegalovirus hyperimmune globulin treatment does not appear to reduce the risk of congenital infection (Blazquez-Gamero et al 2017; Hamilton et al 2014; Revello et al 2014) and the evidence on adverse effects is inconsistent (Chiaie et al 2018; Nigro et al 2015; Revello et al 2014). The evidence on cytomegalovirus antiviral therapy as prophylaxis or treatment is too limited for conclusions to be drawn (Hamilton et al 2014).

4.3 Discussing cytomegalovirus prevention

Prevention of maternal infection using hygiene and behavioural interventions reduces maternal seroconversion rates during pregnancy (Hamilton et al 2014). However, knowledge about cytomegalovirus among women who are pregnant or planning a pregnancy is limited to one in five women (Pereboom et al 2013; Price et al 2014; Thackeray et al 2017) and only one in ten health professionals routinely discuss cytomegalovirus prevention with pregnant women (Shand et al 2018).

Hygiene precautions and behavioural interventions to prevent cytomegalovirus infection in pregnant women

- Do not share food, drinks, or utensils used by young children
- Do not put a child's dummy/soother/pacifier in your mouth
- Avoid contact with saliva when kissing a child
- Thoroughly wash hands with soap and water for 15-20 seconds, especially after changing nappies/diapers, feeding a young child, or wiping a young child's nose or saliva
- Other precautions that can be considered, but are likely to less frequently prevent infection, include cleaning toys, countertops, and other surfaces that come into contact with children's urine or saliva, and not sharing a toothbrush with a young child

Source: (Rawlinson et al 2017).

Consensus-based recommendation

IX. Advise pregnant women about hygiene measures to prevent cytomegalovirus infection, including avoiding contact with a child's saliva or urine and hand washing after such exposure.

4.4 Practice summary: cytomegalovirus

When: Early in pregnancy

Who: Midwife; GP; obstetrician; Aboriginal and Torres Strait Islander Health Practitioner; Aboriginal and Torres Strait Islander Health Worker; multicultural health worker; infectious disease specialist

- Discuss transmission of cytomegalovirus:** Explain that becoming infected with cytomegalovirus during pregnancy can lead to the infection being transmitted to the baby, with one in ten babies born with symptoms of cytomegalovirus at risk of impaired hearing and developmental delay.
 - Take a holistic approach:** Explain that avoiding contact with a young child's saliva and frequent hand washing are the most important measures in controlling the spread of cytomegalovirus and is especially important after contact with articles contaminated with urine or saliva.
 - Document and follow-up:** If a woman is tested for cytomegalovirus, tell her the results and note them in her antenatal record. If a woman has a positive result, seek advice or referral to a health professional with appropriate expertise.
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4.5 Resources

SA Perinatal Practice Guidelines Workgroup (2014) [Cytomegalovirus in pregnancy](#). In: *South Australian Perinatal Practice Guidelines*. Adelaide: SA Health.

4.6 References

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CLINICAL ASSESSMENTS IN LATE PREGNANCY

5 Prolonged pregnancy

This chapter will replace Chapter 62 in the Guidelines.

Prolonged pregnancy requires careful monitoring and management to reduce the risk of adverse consequences for mother and baby.

5.1 Background

For the purposes of these Guidelines, ‘term’ is defined as 37⁰ to 41⁶ weeks gestation and ‘post-term’ as $\geq 42^0$ weeks (AIHW 2018a). However, pregnancy length may differ depending on the woman’s ethnicity, which has implications for monitoring in late pregnancy. A Victorian study found that the average natural onset of labour occurred at 39 weeks in women born in South Asian countries compared to 40 weeks in women born in Australia and New Zealand (Davies-Tuck et al 2017).

5.1.1 Incidence and causes of prolonged pregnancy

In Australia in 2016, 91.7% of babies were born at 37 to 41 weeks and 0.6% of babies were born post-term (AIHW 2018a).

While the aetiology of post-term birth is not well elucidated (Mandrizzato et al 2010), risk factors such as obesity, nulliparity and maternal age greater than 30 years have been associated with an increased risk of post-term birth (Arrowsmith et al 2011; Caughey et al 2009; Heslehurst et al 2017; Roos et al 2010). Placental senescence may play a role in the pathophysiology of post-term birth (Mandrizzato et al 2010), and genetic/epigenetic factors have also been implicated (Schierding et al 2014).

5.1.2 Risks associated with prolonged pregnancy

In a study from the Norwegian Birth Registry (Heimstad et al 2008), the perinatal death rate was 0.018% at day 287 (41 weeks) and 0.51% at day 302+ (>43 weeks). These findings are important in that, even in a setting where early booking allows accurate assessment of gestational age and antenatal services are accessible for most women, post-term pregnancy constitutes a high-risk situation, especially for the baby. In another Norwegian study of nearly two million births from 1967 to 2006, the risk of post-term infant death was strongly associated with fetal growth restriction (Morken et al 2014).

Among babies born post-term in Australia in 2016 (AIHW 2018b):

- 52% were born vaginally, 31% were born by caesarean section and 17% were instrumental vaginal births (among babies born at 37-41 weeks, 54% were born vaginally, 33% by caesarean section and 13% were instrumental vaginal births)
- 5.9% weighed more than 4,500 g (compared with 1.3% of babies born at 37 to 41 weeks)
- 1.9% had Apgar scores lower than seven at 5 minutes (compared with 1.4% of babies born at 37 to 41 weeks).

The perinatal death rate was 2.2 per 1,000 births (compared to 1.5 per 1,000 births for babies born at 37 to 41 weeks) (AIHW 2018b).

Potential risks for the mother associated with post-term pregnancy include prolonged labour, postpartum haemorrhage and perineal tears. It is likely that some of these outcomes result from intervening when the uterus and cervix are not ready for labour (Caughey & Musci 2004). Women may also experience anxiety, particularly if the woman perceives her prolonged pregnancy as high risk (ACOG 2004; Heimstad et al 2007a).

5.2 Options in prolonged pregnancy

Policies vary on intervening in low-risk prolonged pregnancies. Offering labour induction after 41⁰ weeks is recommended in the United Kingdom (NICE 2008; updated 2017) and the United States (ACOG 2014). Factors to be considered include the results of fetal assessment, the women’s Bishop’s score, gestational age and the woman’s preferences, after discussion of available alternatives and their risks and benefits (ACOG 2004; Norwitz et al 2007).

5.2.1 Sweeping the membranes

Procedures for cervical ripening, such as membrane sweeping, may be of benefit in preventing prolonged pregnancy, particularly in first pregnancies (Mandrizzato et al 2010). Membrane sweeping involves the health professional introducing a finger into the woman's cervical os and 'sweeping' it around the circumference of the cervix during an vaginal examination, with the aim of separating the fetal membranes from the cervix and triggering the release of prostaglandins (NICE 2008; updated 2017).

A Cochrane review (n=2,797) (Boulvain et al 2005) found an association between membrane sweeping, and reduced frequency of pregnancy continuing beyond 41 weeks (RR: 0.59; 95%CI: 0.46 to 0.74) and 42 weeks (RR: 0.28; 95%CI: 0.15 to 0.50). The strength of the review was limited by small sample sizes and heterogeneity of the studies and possible publication bias for some outcomes. Subsequent RCTs have had inconsistent findings, with some confirming reduced prolonged pregnancy in low-risk women (de Miranda et al 2006; Yildirim et al 2010) and others finding no significant effect on pregnancy duration, particularly if performed before 41 completed weeks (Hill et al 2008; Kashanian et al 2006; Putnam et al 2011).

Membrane sweeping does not appear to increase the risk of maternal or fetal complications (eg infection) (Boulvain et al 2005; de Miranda et al 2006; Yildirim et al 2010) but is associated with discomfort during the procedure and other adverse effects (eg bleeding, irregular contractions) (Boulvain et al 2005).

Consensus-based recommendation

X. Consider offering membrane sweeping to women who choose induction of labour for prolonged pregnancy.

Practice point

B. It may be advisable to avoid membrane sweeping before 41 weeks or in women at greater risk of Group B streptococcus.

5.2.2 Induction of labour for prolonged pregnancy

Induction of labour is widely practised with the aim of preventing stillbirth and reducing perinatal morbidity (eg shoulder dystocia in large babies).

Following is a summary of a Cochrane review on induction of labour for improving birth outcomes for women at or beyond term has recently been published (Middleton et al 2018), updated with the results of a recent RCT (Grobman et al 2018).

Compared with a policy of expectant management, a policy of labour induction for prolonged pregnancy (>39 weeks) was associated with fewer (all-cause) perinatal deaths (risk ratio (RR) 0.37, 95% confidence interval (CI) 0.17 to 0.80; 21 trials, 16,056 infants; moderate-quality evidence) (Augensen et al 1987; Bergsjø et al 1989; Chanrachakul & Herabutya 2003; Cole et al 1975; Dyson et al 1987; Egarter et al 1989; Gelisen et al 2005; Grobman et al 2018; Hannah et al 1992; Heimstad et al 2007b; Henry 1969; Herabutya et al 1992; James et al 2001; Kortekaas et al 2014; Martin et al 1978; Martin et al 1989; NICHD 1994; Sahraoui et al 2005; Sande et al 1983; Suikkari et al 1983; Walker et al 2016). There were fewer stillbirths in the induction group (RR 0.38, 95% CI 0.14 to 1.01; 21 trials, 16,056 infants; moderate-quality evidence) (Augensen et al 1987; Bergsjø et al 1989; Chanrachakul & Herabutya 2003; Cole et al 1975; Dyson et al 1987; Egarter et al 1989; Gelisen et al 2005; Hannah et al 1992; Heimstad et al 2007b; Henry 1969; Herabutya et al 1992; James et al 2001; Kortekaas et al 2014; Martin et al 1978; Martin et al 1989; NICHD 1994; Sahraoui et al 2005; Sande et al 1983; Suikkari et al 1983; Walker et al 2016).

Rates of neonatal intensive care unit admission were lower (RR 0.89, 95%CI 0.81 to 0.98; 14 trials, 14,627 infants; moderate-quality evidence) (Augensen et al 1987; Brane et al 2014; Chanrachakul & Herabutya 2003; Gelisen et al 2005; Grobman et al 2018; Hannah et al 1992; Heimstad et al 2007b; Herabutya et al 1992; Kortekaas et al 2014; Miller et al 2015; Nielsen et al 2005; Ocon et al 1997; Roach & Rogers 1997; Walker et al 2016) and fewer babies had Apgar scores less than seven at 5 minutes in the induction groups compared with expectant management (RR 0.70, 95% CI 0.50 to 0.98; 16 trials, 9,047 infants; moderate-quality evidence) (Brane et al 2014; Chanrachakul & Herabutya 2003; Dyson et al 1987; Gelisen et al 2005; Hannah et al 1992; Heimstad et al 2007b; Herabutya et al 1992; James et al 2001; Kortekaas et al 2014; Miller et al 2015; NICHD 1994; Nielsen et al 2005; Ocon et al 1997; Roach & Rogers 1997; Walker et al 2016; Witter & Weitz 1987). There was no evidence of a difference for neonatal trauma (RR 1.00, 95%CI 0.65 to 1.54; 4 trials, 10,351 infants; low-quality evidence) between groups (Hannah et al 1992; Heimstad et al 2007b; NICHD 1994).

For women in the policy of induction arms of trials for prolonged pregnancy, there were fewer caesarean sections compared with expectant management (RR 0.89, 95%CI 0.83 to 0.94; 28 trials, 17,834 women; moderate-quality evidence) (Augensen et al 1987; Bergsjø et al 1989; Brane et al 2014; Breart et al 1982; Chakravarti & Goenka 2000;

Chanrachakul & Herabutya 2003; Cole et al 1975; Dyson et al 1987; Egarter et al 1989; Gelisen et al 2005; Grobman et al 2018; Hannah et al 1992; Heimstad et al 2007b; Henry 1969; Herabutya et al 1992; James et al 2001; Kortekaas et al 2014; Martin et al 1978; Martin et al 1989; Miller et al 2015; NICHD 1994; Nielsen et al 2005; Ocon et al 1997; Roach & Rogers 1997; Sahraoui et al 2005; Tylleskar et al 1979; Walker et al 2016; Witter & Weitz 1987); and a marginal increase in operative vaginal births with induction (RR 1.02, 95% CI 0.95 to 1.10; 19 trials, 15,337 women; moderate-quality evidence) (Augensen et al 1987; Bergsjø et al 1989; Brane et al 2014; Breart et al 1982; Cole et al 1975; Egarter et al 1989; Grobman et al 2018; Hannah et al 1992; Heimstad et al 2007b; Henry 1969; Herabutya et al 1992; James et al 2001; Kortekaas et al 2014; Martin et al 1978; Martin et al 1989; Nielsen et al 2005; Ocon et al 1997; Tylleskar et al 1979; Walker et al 2016).

There was no clear difference between groups for perineal trauma (RR 1.21, 95%CI 0.95 to 1.55; 5 trials; 9,394 women; low-quality evidence) (Brane et al 2014; Grobman et al 2018; Heimstad et al 2007b; Kortekaas et al 2014; Walker et al 2016), postpartum haemorrhage (RR 1.09 95%CI 0.92 to 1.30, 5 trials; 3,315 women; low-quality evidence) (Brane et al 2014; Chanrachakul & Herabutya 2003; Heimstad et al 2007b; Kortekaas et al 2014; Walker et al 2016), or length of maternal hospital stay (average mean difference [MD] -0.34 days, 95% CI -1.00 to 0.33; 5 trials; 1,146 women; very low quality evidence) (Augensen et al 1987; Dyson et al 1987; James et al 2001; Miller et al 2015; Witter & Weitz 1987).

Evidence-based recommendation

3 Discuss options, including induction of labour, with a woman who is nearing prolonged pregnancy.

5.3 Surveillance in women with prolonged pregnancy

Increased fetal and maternal surveillance aims to identify risk of adverse outcomes and ensure timely induction of labour if indicated (eg fetal compromise or oligohydramnios). Definitive recommendations for fetal surveillance are hampered by the absence of randomised controlled trials demonstrating that fetal surveillance decreases perinatal morbidity or mortality between 41 and 42 weeks or in post-term pregnancies (ACOG 2014).

After 42 weeks, increased antenatal monitoring may include twice-weekly cardiotocography and ultrasound estimation of maximum amniotic pool depth (NICE 2008; updated 2017) although the evidence to support this practice is not strong. Specialist referral or consultation is likely to be required.

Practice points

C. Advise women to be vigilant of changes (including decreases or increases) in fetal movements, particularly after 41 weeks.

5.4 Discussing prolonged pregnancy

Women should be provided with appropriate information and support to assist them in making an informed choice between scheduled induction for a prolonged pregnancy or monitoring without induction (or delayed induction). This should include that:

- most women go into labour spontaneously by 42 weeks
- there are risks associated with pregnancies that last longer than 42 weeks
- women with prolonged low-risk pregnancies may be offered membrane sweeping to 'trigger' labour, which involves the health professional separating the membranes from the cervix as part of a vaginal examination; it is safe but may cause discomfort and vaginal bleeding
- if pregnancy is prolonged, additional surveillance and management plans will be put into place following specialist consultation, to reduce the risk of adverse outcomes
- the importance of contacting a health professional promptly if they have any concerns about changes in fetal movements (including decreases, absence or unusually increased) (see Chapter 22 of the Guidelines).

5.5 Practice summary: prolonged pregnancy

When: At antenatal visits from 39 weeks onwards

Who: Midwife; GP; obstetrician; Aboriginal and Torres Strait Islander Health Practitioner; Aboriginal and Torres Strait Islander Health Worker; multicultural health worker

- Discuss the likelihood of prolonged pregnancy:** Explain to the woman that pregnancy beyond 42 weeks is unlikely if dating is accurate.
- Discuss why interventions may be offered:** Explain that the risk of complications increases from 42 weeks gestation. Decisions about management are made after considering the risks and benefits and taking the woman's preferences into account.
- Discuss the need for fetal surveillance:** Explain that increased fetal monitoring is necessary from 41 weeks, to ensure that there are no risks to the baby from the pregnancy continuing.
- Take a holistic approach:** As well as the potential for women to experience anxiety if pregnancy is prolonged, consider practical difficulties (eg when the woman has travelled to give birth or arranged additional support around the estimated date of birth) and provide advice on relevant community supports (eg available financial assistance).

5.6 Resources

ACOG (2014) Practice bulletin no. 146: Management of late-term and postterm pregnancies. *Obstet Gynecol* 124(2 Pt 1): 390-96.

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APPENDICES

A Membership of the Expert Working Group

Expert Working Group Members	Discipline/expertise/special Interest	Position and organisation	Location
<i>Co-chairs</i>			
Professor Jeremy Oats	Obstetrics & Gynaecology	Obstetrician Chair Victorian Consultative Council on Obstetric and Paediatric Mortality and Morbidity Professorial Fellow Melbourne School of Population & Global Health, University of Melbourne	VIC
Professor Caroline Homer AO	Midwifery	Co-Director Maternal and Child Health Program, Burnet Institute Distinguished Professor of Midwifery, University of Technology Sydney	NSW
<i>Members</i>			
Dr Martin Byrne	GP Obstetrics	GP & Chair, GP Obstetric Advisory Committee, RANZCOG	QLD
Ms Ann Catchlove (Jorgensen)		Consumer representative	VIC
Dr Marilyn Clarke	Aboriginal and Torres Strait Islander representative	Obstetrics and gynaecology specialist, Grafton	NSW
Ms Leah Hardiman		Consumer representative	QLD
Ms Tracy Martin	Midwifery	Chair, Maternity Services Inter-Jurisdictional Committee, Principal Nursing and Midwifery Office, WA Health	WA
Professor Sue McDonald	Midwifery, Perinatal Health	Professor of Midwifery, La Trobe University	VIC
Assoc Prof Philippa Middleton	Perinatal Epidemiology	Principal Research Fellow, Healthy Mothers, Babies and Children SA Health and Medical Research Institute/The University of Adelaide	SA
Ms Natalija Nesvadba	Migrant and refugee women representative	Manager, Multicultural Services, Mercy Hospitals	VIC
Professor Michael Permezel	Obstetrics & Gynaecology	RANZCOG (former RANZCOG President)	VIC
Adjunct Professor Debra Thoms	Midwifery	Commonwealth Chief Nursing and Midwifery Officer, Department of Health	ACT
Ms Cindy Turner	Midwifery	Australian College of Midwives	NT

**Australian Government Department of Health
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Ms Jenny Ramson Ampersand Health Science Writing

CONSULTATION DRAFT

B Terms of reference

The Expert Working Group will oversee the review and revision of the National Evidence-based Clinical Practice Guidelines – Antenatal Care (incorporating both Modules I and II of the Guidelines). The role of the Expert Working Group will include:

- providing advice, expertise and direction in relation to the combining of the two modules, and the review of the Guidelines to promote optimal care for pregnant women across Australia;
- reviewing the existing Guidelines to identify topics and guidelines that require updating;
- advising on the review of national and international literature on antenatal care to inform amendments required to the existing Guidelines;
- identifying any new topics and drafting new evidence-based guidelines for inclusion in the Guidelines;
- developing a plan and strategies to promote and disseminate the finalised Guidelines to ensure clinical uptake of the Guidelines;
- advising on the development of a consultation strategy (in the event that the review results in major changes to the existing Guidelines or the inclusion of new guidelines); and
- ensuring the review is conducted in accordance with the National Health and Medical Research Council's (NHMRC) protocols and submitted to the NHMRC for approval.

C Topics currently under review

Lifestyle considerations

Nutrition, nutritional supplements and physical activity

Vaccines (including influenza, pertussis, varicella)

Clinical assessments

Weight and body mass index

Maternal health testing

Diabetes

Anaemia

Group B streptococcus

Cervical abnormalities

Fetal chromosomal anomalies

Ultrasound assessment for women who have cell-free DNA testing for chromosomal anomalies

CONSULTATION DRAFT

Acronyms and abbreviations

ACOG	American College of Obstetricians and Gynecologists	MU	
aOR	adjusted odds ratio	NAAT	nucleic acid amplification testing
ASHA	Australasian Sexual Health Alliance	NHMRC	National Health and Medical Research Council
CBR	consensus-based recommendation	NNS	number needed to screen
CDNA	Communicable Disease Network Australia	OR	odds ratio
CI	confidence interval	PP	practice point
DALY	disability-adjusted life-year	QEBR	qualified evidence-based recommendation
EBR	evidence-based recommendation	RANZCOG	Royal Australian and New Zealand College of Obstetricians and Gynaecologists
EIA	enzyme immunoassay	RCT	randomised controlled trial
GP	general practitioner	RPR	rapid plasma regain
HIV	human immunodeficiency virus	TPPA	<i>T. pallidum</i> particle agglutination
Ig	immunoglobulin	WHO	World Health Organization
MJSO	Multijurisdictional Syphilis Outbreak Working Group		
MRI	magnetic resonance imaging		