



Exercise during pregnancy

This statement has been developed and reviewed by the Women's Health Committee and approved by the RANZCOG Board and Council.

A list of Women's Health Committee Members can be found in [Appendix A](#).

The committee acknowledges the contribution of Dr Kym Guelfi to this document.

Disclosure statements have been received from all members of this committee.

Disclaimer This information is intended to provide general advice to practitioners. This information should not be relied on as a substitute for proper assessment with respect to the particular circumstances of each case and the needs of any patient. This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. The document has been prepared having regard to general circumstances.

First endorsed by RANZCOG: March 2016
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Objectives: To provide guidelines for the prescription of exercise during pregnancy.

Target audience: Health professionals providing antenatal care, accredited exercise physiologists and pregnant women.

Values: The evidence was reviewed by the Women's Health Committee (RANZCOG), and applied to local factors relating to Australia and New Zealand.

Background: This statement was first developed in July 2016 and most recently reviewed in March 2020.

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1. Plain language summary

In the past, pregnant women were discouraged from exercise. However, this was mainly due to social and cultural biases and unfounded concerns about safety for the fetus, rather than based on scientific investigation. Today, the benefits of regular exercise for pregnant women without contraindications are well-established. These include physical benefits for maternal fitness and the prevention of excessive weight gain, as well as benefits for psychological well-being. In addition to these pregnancy-specific benefits, regular exercise confers significant life-long benefits for all adults including reduced risk of cardiovascular disease, type 2 diabetes and some cancers. Despite these important benefits, many women remain inactive, or significantly reduce their exercise participation during pregnancy. This statement summarises recommendations for exercise prescription during pregnancy to assist women to safely and confidently achieve the benefits that can be gained from regular exercise participation.

2. Summary of recommendations

Recommendation 1	Grade
Women without contraindications should participate in regular aerobic and strength conditioning exercise during pregnancy.	Evidence-based Recommendation B
Recommendation 2	Grade
Women should be advised that there is no evidence that regular exercise during an uncomplicated pregnancy is detrimental to the woman or fetus.	Evidence-based Recommendation B
Good Practice Point	Grade
Assessment of medical and obstetric risks should be undertaken to identify potential contraindications to exercise for the pregnant woman prior to commencing an exercise program.	Consensus-based Recommendation
Good Practice Point	Grade
Exercise prescription for the pregnant woman requires appropriate consideration of the frequency, intensity, duration and mode of exercise.	Consensus-based Recommendation
Good Practice Point	Grade
Exercise prescription for the pregnant woman should consider her baseline level of fitness and previous exercise experience.	Consensus-based Recommendation
Good Practice Point	Grade
Exercise prescription for the pregnant woman should take into account the physiological adaptations to pregnancy.	Consensus-based Recommendation

3. Introduction

Regular exercise has many well-established benefits for women with uncomplicated pregnancy. These include physical benefits for maternal fitness and the prevention of excessive weight gain, as well as psychological benefits related to body image, perceived health status and reduced symptoms of depression.¹⁻⁶ There is also growing indication of benefits of regular exercise for the prevention and management of maternal-fetal diseases such as gestational diabetes and pre-eclampsia.^{7,8} Regular exercise during pregnancy has also been associated with shorter and less complicated labour, as well as fewer neonatal complications,⁹⁻¹¹ although the evidence is not conclusive.¹² Regarding the offspring, animal studies have demonstrated benefits of maternal exercise for glucose tolerance, insulin sensitivity and body composition in offspring,¹³ but studies in humans are limited to some preliminary evidence for beneficial effects of maternal exercise on childhood body composition¹⁴ and infant cardiac autonomic control.¹⁵

Importantly, there is no evidence to suggest that regular exercise during an uncomplicated pregnancy is detrimental to the woman or fetus.^{1,16} Accordingly, all women with uncomplicated pregnancy should be encouraged to participate in aerobic and strength conditioning exercise. However, many Australian women do not meet current physical activity guidelines during pregnancy^{17,18} and others significantly reduce their exercise participation during pregnancy.¹⁹ This is of concern given the potential impact on the future health of both the woman and her unborn child.²⁰

Current physical activity guidelines for Australian adults (aged 18 – 64 years)²¹ recommend being active on most, preferably all, days each week. More specifically, adults should aim to accumulate 150 to 300 minutes of moderate intensity physical activity each week, or alternatively, 75 to 150 minutes of vigorous exercise, or some combination of the two. In addition, muscle strengthening exercises should be performed on at least two days per week. At the same time, it is important to reduce sedentary behaviour by minimising the amount of time spent in prolonged sitting and breaking up long periods of sitting as often as possible. These guidelines are also relevant for healthy pregnant women.

More specifically, in the absence of contraindications, women should be encouraged to continue their established exercise routines during pregnancy, provided the guidelines below are adhered to. For women that have been inactive prior to pregnancy, exercise can be commenced, within the parameters outlined below. For those women with obstetric complications, the promotion of exercise may still be appropriate under some circumstances with appropriate medical evaluation and suitable modification of the exercise prescription.

Recommendation 1	Grade
Women without contraindications should participate in regular aerobic and strength conditioning exercise during pregnancy.	Evidence-based Recommendation B
Recommendation 2	Grade
Women should be advised that there is no evidence that regular exercise during an uncomplicated pregnancy is detrimental to the woman or fetus.	Evidence-based Recommendation B

4. Discussion and recommendations

4.1 Pre-exercise screening

Assessment of medical and obstetric risks should be undertaken to identify potential contraindications to exercise for the pregnant woman prior to commencing an exercise program. Contraindications to exercise (irrespective of pregnancy) may include cardiovascular disease, poorly controlled asthma, poorly controlled diabetes and bone or joint problems that may be made worse by physical activity. Various screening tools are available to assist with identifying those with signs or symptoms of underlying disease, or individuals that may be at higher risk of an adverse event during exercise irrespective of pregnancy.²² While obese or previously inactive women, and women with pregnancy complications, may benefit from exercise it is important that evaluation on an individual basis is undertaken before commencing an exercise program that can be followed during pregnancy and beyond.

In addition to these contraindications to exercise, pre-exercise screening for the pregnant woman should include consideration of additional medical and obstetric issues such as persistent bleeding, placenta praevia, pre-eclampsia, pregnancy-induced hypertension and indicators of increased risk of premature labour (multiple pregnancy, ruptured membranes, premature contractions or shortened cervical length).

It is acknowledged that there is no literature dealing with the risks of exercise in women with these conditions, so recommendations should be individualised.

Other potential contraindications to exercise during pregnancy include fetal growth restriction, poorly controlled thyroid disease or anaemia. Careful consideration of the specific case details is needed for each individual to decide whether exercise should be recommended, and to what extent, or whether exercise should be advised against altogether. Regardless, exercise should always be introduced slowly, with progress monitored closely. In the absence of medical or obstetric contraindications to exercise, the pregnant woman can be encouraged to proceed with regular aerobic and strengthening exercises during pregnancy as outlined below.

Recommendation 3	Grade
Assessment of medical and obstetric risks should be undertaken to identify potential contraindications to exercise for the pregnant woman prior to commencing an exercise program.	Consensus-based Recommendation

4.2 Exercise prescription during pregnancy

Frequency of exercise. The pregnant woman should aim to be physically active on most, preferably all days of the week. For previously sedentary women and those that are overweight or obese, exercise may be prescribed at a reduced frequency at the commencement of the program (i.e. 3 to 4 days per week on non-consecutive days to provide a day for recovery between sessions).

Duration of exercise. The pregnant woman should aim to accumulate 150 to 300 minutes of moderate intensity physical activity each week. Ideally, this should be achieved by being

active on most days of the week for at least 30 minutes at a time. While no evidence exists for an upper limit to exercise duration, it is probably unwise to extend exercise duration beyond 60 minutes per session, unless the intensity is relatively light. This is primarily related to concerns about thermoregulation (see section 4.3). For previously inactive women and those that are overweight or obese, a shorter duration of exercise (15-20 minutes) may be necessary at the commencement of a program, before slowly building up to 30 minutes.

Intensity of exercise. The precise intensity of exercise prescribed to the pregnant woman will depend on her baseline level of fitness and previous exercise routine. For previously inactive women commencing an exercise program during pregnancy, maintaining a 'moderate' intensity is adequate to obtain benefits for health and well-being. Likewise, a woman accustomed to moderate intensity exercise pre-pregnancy should aim to maintain this level of intensity during pregnancy. However, there is limited research regarding exercise at higher intensities and accordingly, no evidence-based safe upper limit for the intensity of exercise has been established. For women with a high level of fitness that are accustomed to regular vigorous exercise, there is no evidence to suggest that continued participation in vigorous exercise during pregnancy is harmful, provided the woman adjusts her routine based on changes in comfort and tolerance. However, athletes should be wary of excessive exertion as fetal well-being may be compromised above a certain (high) threshold of intensity (with some evidence of transient fetal heart rate decelerations and alterations in umbilical and uterine artery Dopplers immediately post-exercise), although it is not known whether such transient changes impact neonatal outcomes.²³ Special attention should also be paid to ensuring adequate nutrition, hydration and avoidance of overheating. Regardless of baseline level of fitness and previous exercise routine, pregnancy is not a time for serious competition or aiming to reach peak lifetime fitness.

The intensity of exercise can be monitored based on the heart rate response to exercise and/or ratings of perceived exertion. Pregnancy-specific heart rate zones equivalent to 60-80% of maximal aerobic capacity have been recommended for normal-weight pregnant women (Table 1).²⁴ Within these target ranges, it is advisable for previously sedentary women to commence exercise at the lower end of these zones, while those accustomed to regular exercise may work at the upper end of these zones. For previously inactive overweight or obese women with lower fitness levels, these heart rate zones may be too high for the initiation of an exercise program.²⁵ Instead, a target heart rate of 102 – 124 bpm (for women 20-29 years) or 101 – 120 bpm (for 30-39 years) may be more appropriate.

A more practical way to monitor the intensity of exercise is the rating of perceived exertion,²⁶ which can be used in combination with heart rate, or alone. A rating of 12-14 on the 6-20 scale (Table 2; equating to a perception of working "somewhat hard") reflects exercise of a moderate intensity. For those women with a higher level of fitness that are accustomed to regular vigorous exercise, a rating of 15-16 (equating to "hard") may be appropriate. The "talk test" is another simple gauge of exercise intensity. The intensity of exercise is considered 'moderate' if the woman can comfortably hold a conversation, or 'vigorous' if the woman needs to pause for breath during conversation.

Table 1. Target heart rate zones for normal-weight pregnant women [24]

Maternal age	Target heart rate (bpm)
< 20 years	140 – 155
20 – 29 years	135 – 150
30 – 39 years	130 – 145
> 40 years	125 – 140

Table 2. Rating of perceived exertion

6	
7	very, very light
8	
9	somewhat light
10	
11	fairly light
12	
13	somewhat hard
14	
15	hard
16	
17	very hard
18	
19	very, very hard
20	

Mode of exercise. Provided there are no contraindications pregnant women should be encouraged to participate in both aerobic and strengthening exercises. Aerobic exercises involve continuous activities that use large muscle groups and elevate the heart and breathing rate. Walking is a practical mode of exercise during pregnancy, but must be performed at a 'brisk' pace for aerobic benefit. Other popular modes of exercise during pregnancy include stationary cycling and swimming. The weight-supported nature of these activities may be more comfortable in the latter stages of pregnancy. Stationary cycling may also allow women to work at a higher intensity compared with walking late in pregnancy.²⁷ Meanwhile, swimming and other water-based activities may provide benefits for oedema as a result of the redistribution of extravascular fluid with immersion. However, care should be taken to ensure that the water temperature is appropriate (i.e. not too high). As a guide,

water-based aerobics lasting 45 min in water temperatures up to 33.4 degrees Celsius appear unlikely to raise maternal core temperature above 38 degrees Celsius (with 39 degrees Celsius considered the teratogenic threshold).²⁸ Immersion in heated spas and hydrotherapy pools should be limited in duration²⁸, as these are typically kept at temperatures greater than 32 degrees Celsius. Ultimately, the precise mode of exercise prescribed during pregnancy is probably best informed by the woman's personal preference and enjoyment, provided that the guidelines are adhered to.

For women who are not previously accustomed to running, it is not advisable to commence during pregnancy – although there is a lack of scientific study around this notion. For women who are well-accustomed to running prior to pregnancy, whether to continue should be decided on an individual basis, but there is currently no scientific evidence to support discouraging running for these women, provided they adjust their routine to accommodate changes in comfort and tolerance and monitor intensity appropriately.

With respect to strengthening exercises, there is limited scientific literature available to draw upon to provide evidence-based recommendations. However, muscular conditioning is an important part of the well-rounded exercise program. Women should aim for two sessions of strengthening exercises per week, on non-consecutive days, covering the main muscle groups of the body. Women without prior experience of resistance training can aim to perform 1 – 2 sets of 12 – 15 repetitions for each exercise. Resistance can be provided using light weights, body weight or elasticised resistance-bands. Overall, these strengthening exercises should be perceived to be of “moderate” intensity (rating of perceived exertion 12-14). Movements should be slow and steady and performed with proper breathing technique (i.e. exhalation on exertion). Other sensible precautions include avoiding heavy weight-lifting and activities that involve straining, holding the breath, or that are isometric in nature. Exercises should not be performed lying flat on the back after the first trimester and walking lunges are best avoided to prevent injury to pelvic connective tissue.

Recommendation 4	Grade
Exercise prescription for the pregnant woman requires appropriate consideration of the frequency, intensity, duration and mode of exercise.	Consensus-based recommendation
Recommendation 5	Grade
Exercise prescription for the pregnant woman should consider her baseline level of fitness and previous exercise experience.	Consensus-based recommendation

Barriers to exercise in pregnancy. Despite the well-established benefits of exercise during pregnancy, many women do not meet the current recommendations for physical activity participation. This is in part related to the numerous barriers to exercise participation for the pregnant woman. These barriers include a lack of time, physical discomfort, fatigue and uncertainty about exercise guidelines and how to exercise safely.^{19,29,30} Accordingly, it may be beneficial for the prescription of exercise to include discussion around strategies to overcome many of these common barriers to exercise during pregnancy.

4.3 Other special considerations for exercise during pregnancy

Additional considerations for the prescription of exercise during pregnancy are included below. Pregnancy is a period of significant physiological adaptation in a healthy woman's

life, with significant cardiovascular, respiratory, metabolic and musculoskeletal changes. Many of these changes have implications for exercise prescription.

- *Increase in body weight.* The increase in body weight as pregnancy progresses is associated with increased loading at the joints. For this reason, weight-supported activities such as water-based exercise or stationary cycling may be more comfortable compared with weight-bearing exercises such as walking in the later stages of pregnancy.
- *Change in weight distribution.* The altered centre of gravity resulting from the change in weight distribution as pregnancy progresses may influence balance. Accordingly, modification of the exercise routine to minimise or avoid fast changes in direction would be a sensible precaution. For this reason, preference may be given to straight-line activities such as walking, swimming or stationary cycling.
- *Increase in ligament laxity.* The increase in ligament laxity associated with pregnancy may have implications for the risk of injury. For this reason, the pregnant woman should take care with weight-bearing exercise and activities involving frequent changes in direction (i.e. court sports). Despite a lack of scientific evidence in this area, it is wise to avoid activities involving jumping. Stretching should always be performed in a slow and controlled manner.
- *Decrease in blood pressure.* To minimise the risk of dizziness or fainting associated with a reduction in blood pressure, the pregnant woman should take care to avoid rapid changes in posture (i.e. from lying or sitting to standing). Exercise should always be completed with a slow and sustained a cool-down and never stopped suddenly.
- *Increase in resting and submaximal heart rate.* This has implications for monitoring of exercise intensity using heart rate, since lower workloads are required to reach pre-pregnancy target heart rates. For this reason, pregnancy-specific heart rate zones are recommended and best used in combination with ratings of perceived exertion.²⁶
- *Increase in metabolic rate.* Animal studies suggest that a substantial increase in core body temperature during embryogenesis is associated with congenital defects. Despite a lack of evidence in humans, the pregnant woman should take precautions to avoid exercising in high temperatures and humidity, ensure adequate hydration and wear loose-fitting clothing. As a guide, up to 35 min of high-intensity exercise (~90% of maximum heart rate) in air temperatures up to 25°C and 45% relative humidity is unlikely to attain a core temperature exceeding 39.0°C.²⁸
- *Enlarged uterus.* As the uterus grows with advancing pregnancy, the weight of the enlarged uterus may obstruct venous return. Therefore, pregnant women in the second and third trimesters should avoid performing exercises in a supine position for prolonged periods of time. Instead, relevant exercises may be modified to be conducted in a sitting or standing posture.
- *Growing fetus.* Although there is no strong scientific evidence regarding the risk of participation in activities with an inherent risk of falling (i.e. horse-riding, learning to ski) or impact trauma to the abdomen (i.e. team sport games), common-sense suggests

that these activities may be best avoided, or at least undertaken with awareness and serious consideration of the potential risks.

- *Weakened pelvic floor.* Activities that involve jumping or bouncing may add extra load to the pelvic floor muscles and are probably best avoided. Targeted exercises to strengthen the pelvic floor muscles are recommended.

Recommendation 6	Grade
Exercise prescription for the pregnant woman should take into account the physiological adaptations to pregnancy, and consider the gestation at which it prescribed.	Consensus-based recommendation

In addition to these special considerations for exercise prescription for the pregnant woman, warning signs to stop exercise and seek medical attention include;

- chest pain
- unexplained shortness of breath
- dizziness, feeling faint or headache
- muscle weakness
- calf pain, swelling or redness
- sudden swelling of the ankles, hands or face
- vaginal bleeding or amniotic fluid loss
- decreased fetal movement
- uterine contractions or pain in the lower back, pelvic area or abdomen (potentially indicating pre-term labour)

5. Conclusion

There are many benefits to be gained from participating in regular exercise during pregnancy. However, many women are insufficiently active to achieve these benefits. The present guidelines are intended to assist women to safely and confidently achieve the benefits that can be gained from regular exercise participation. Importantly, for women that have not previously engaged with exercise, pregnancy may be a time when behavioural intervention may be most effective given the potential for enhanced motivation for change for the benefit of their unborn child. Indeed, pregnancy may be one of the most important times to adopt a routine of regular exercise given that lifestyle during pregnancy imprints the future health of the child.

6. References

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Appendices

Appendix A Women's Health Committee Membership

Name	Position on Committee
Professor Yee Leung	Chair and Board Member
Dr Gillian Gibson	Deputy Chair, Gynaecology
Dr Scott White	Deputy Chair, Obstetrics and Subspecialties Representative
Associate Professor Ian Pettigrew	Member and EAC Representative
Dr Kristy Milward	Member and Councillor
Dr Will Milford	Member and Councillor
Dr Frank O'Keefe	Member and Councillor
Professor Sue Walker	Member
Dr Roy Watson	Member and Councillor
Dr Susan Fleming	Member and Councillor
Dr Sue Belgrave	Member and Councillor
Dr Marilyn Clarke	ATSI Representative
Associate Professor Kirsten Black	Member
Dr Thangeswaran Rudra	Member
Dr Nisha Khot	Member and SIMG Representative
Dr Judith Gardiner	Diplomate Representative
Dr Angela Brown	Midwifery Representative, Australia
Ms Adrienne Priday	Midwifery Representative, New Zealand
Ms Ann Jorgensen	Community Representative
Dr Rebecca Mackenzie-Proctor	Trainee Representative
Dr Leigh Duncan	Maori Representative
Prof Caroline De Costa	Co-opted member (ANZJOG member)
Dr Christine Sammartino	Observer

Appendix B Overview of the development and review process for this statement

i. Steps in developing and updating this statement

This statement was developed in July 2016 and most recently reviewed in March 2020. The Women's Health Committee carried out the following steps in reviewing this statement:

- Declarations of interest were sought from all members prior to reviewing this statement.
- Structured clinical questions were developed and agreed upon.
- An updated literature search to answer the clinical questions was undertaken.
- At the February 2020 teleconference, the existing consensus-based recommendations were reviewed and updated (where appropriate) based on the available body of evidence and clinical expertise. Recommendations were graded as set out below in Appendix B part iii)

ii. *Declaration of interest process and management*

Declaring interests is essential in order to prevent any potential conflict between the private interests of members, and their duties as part of the Women's Health Committee.

A declaration of interest form specific to guidelines and statements was developed by RANZCOG and approved by the RANZCOG Board in September 2012. The Women's Health Committee members were required to declare their relevant interests in writing on this form prior to participating in the review of this statement.

Members were required to update their information as soon as they become aware of any changes to their interests and there was also a standing agenda item at each meeting where declarations of interest were called for and recorded as part of the meeting minutes.

There were no significant real or perceived conflicts of interest that required management during the process of updating this statement.

iii. *Grading of recommendations*

Each recommendation in this College statement is given an overall grade as per the table below, based on the National Health and Medical Research Council (NHMRC) Levels of Evidence and Grades of Recommendations for Developers of Guidelines.³¹ Where no robust evidence was available but there was sufficient consensus within the Women's Health Committee, consensus-based recommendations were developed or existing ones updated and are identifiable as such. Consensus-based recommendations were agreed to by the entire committee. Good Practice Notes are highlighted throughout and provide practical guidance to facilitate implementation. These were also developed through consensus of the entire committee.

Recommendation category		Description
Evidence-based	A	Body of evidence can be trusted to guide practice
	B	Body of evidence can be trusted to guide practice in most situations
	C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
	D	The body of evidence is weak and the recommendation must be applied with caution
Consensus-based		Recommendation based on clinical opinion and expertise as insufficient evidence available
Good Practice Note		Practical advice and information based on clinical

	opinion and expertise
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Appendix C Full Disclaimer

This information is intended to provide general advice to practitioners, and should not be relied on as a substitute for proper assessment with respect to the particular circumstances of each case and the needs of any patient.

This information has been prepared having regard to general circumstances. It is the responsibility of each practitioner to have regard to the particular circumstances of each case. Clinical management should be responsive to the needs of the individual patient and the particular circumstances of each case.

This information has been prepared having regard to the information available at the time of its preparation, and each practitioner should have regard to relevant information, research or material which may have been published or become available subsequently.

Whilst the College endeavours to ensure that information is accurate and current at the time of preparation, it takes no responsibility for matters arising from changed circumstances or information or material that may have become subsequently available.