

Current recommendations for physical activity during pregnancy



Website: www.uwo.ca/fhs/EPL

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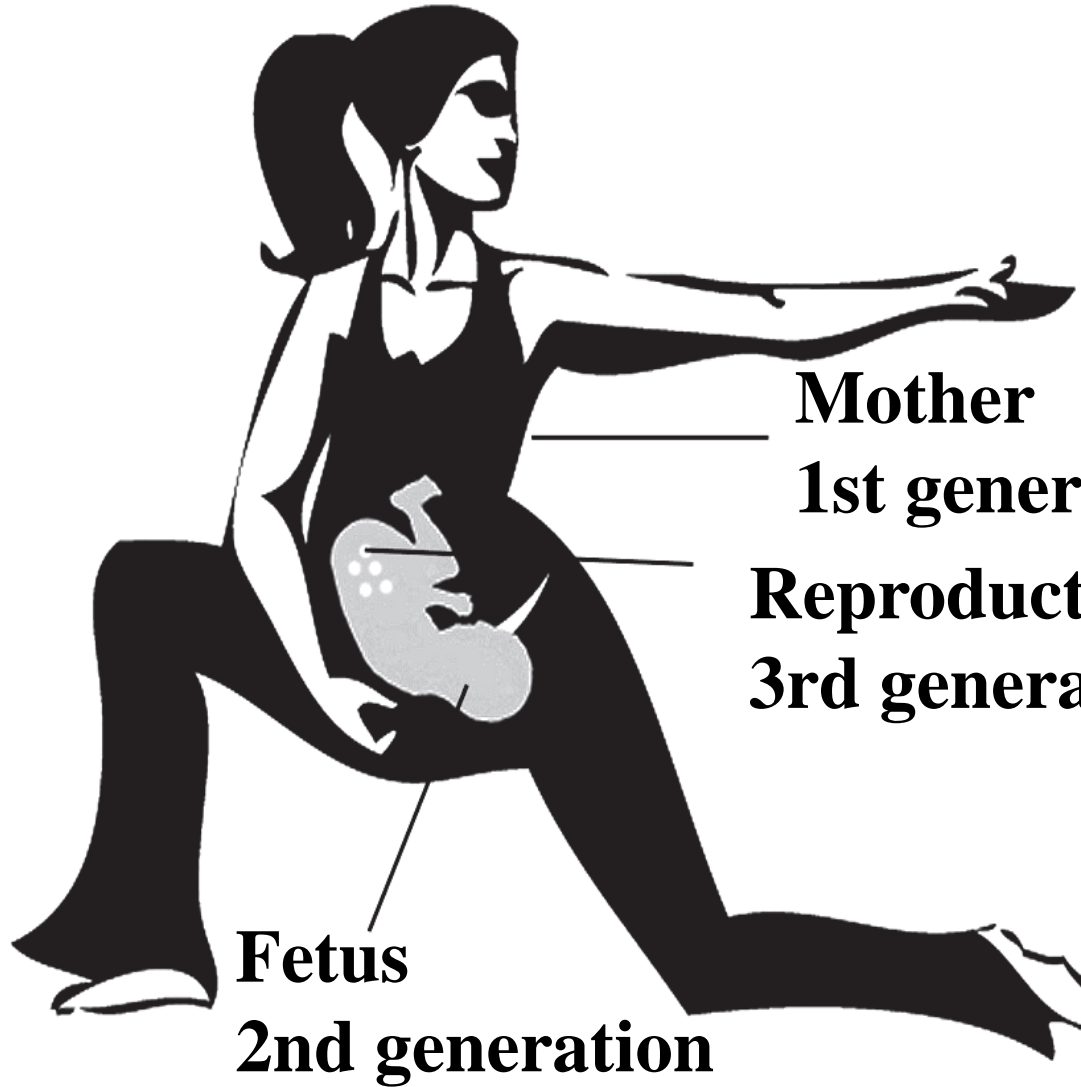
EPL
Exercise and Pregnancy Laboratory

Objectives:

- To determine why physical activity is important during pregnancy
- To observe global guidelines for physical activity during pregnancy
- To introduce *2019 Canadian Guideline for Physical Activity throughout Pregnancy*
- To consider promoting physical activity throughout the day – 24 hours and motivation



Egg that formed you was created when your grandmother was pregnant with your mom



Mother

1st generation

Reproductive cells

3rd generation

Fetus

2nd generation

Epigenetics –fetal programming

Developmental Origins of Health and Disease (DOHaD)

Wojtyła et al. Ann Agric Environ Med. 2012 19(2): 315-326.

Invited Review

The developmental origins of adult disease (Barker) hypothesis

Hendrina A. DE BOO and Jane E. HARDING

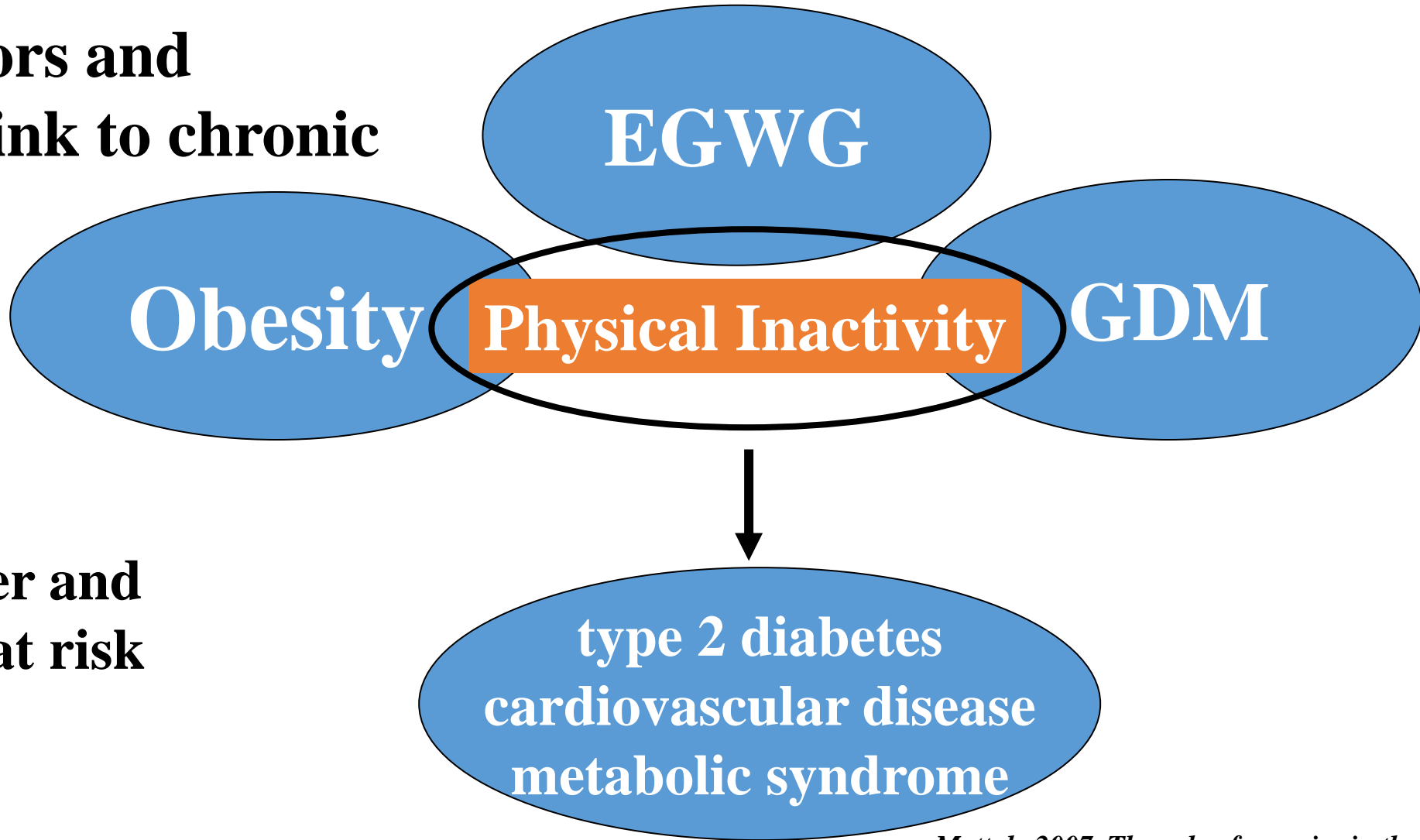
Liggins Institute, Faculty of Medical and Health Sciences, University of Auckland, Auckland, New Zealand

- **Adverse influences early in development, especially *in utero* results in permanent changes in physiology and metabolism, resulting in increased risk of disease in adulthood**

Bad events (chronic disease risk) vs. *Good events* (setting stage for healthy lifestyle)?



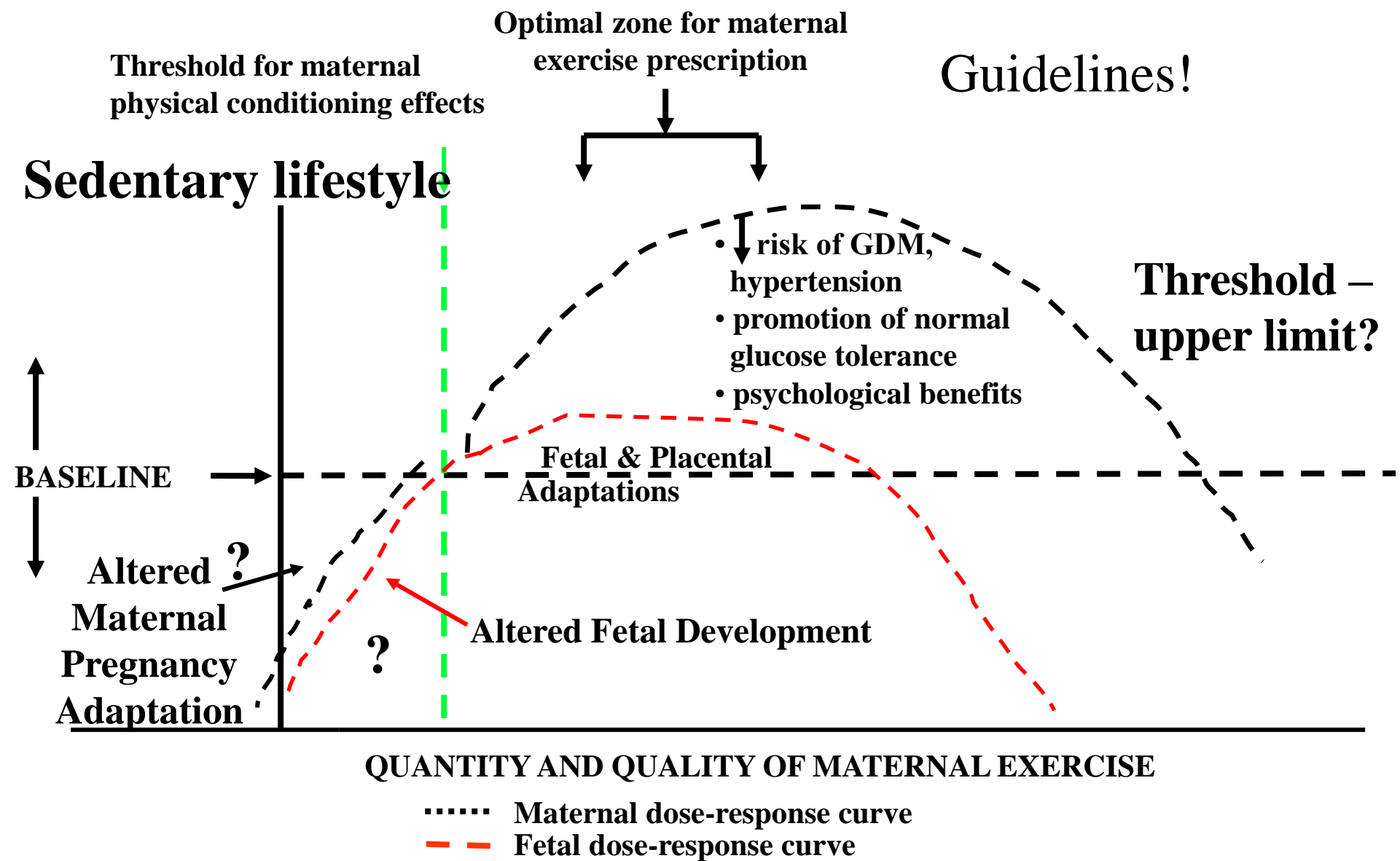
Risk Factors and common link to chronic disease...



Mother and baby at risk

Mottola 2007. The role of exercise in the treatment and prevention of GDM. Curr Sports Med Reports. 6:381-6.

MATERNAL AND FETAL WELL-BEING



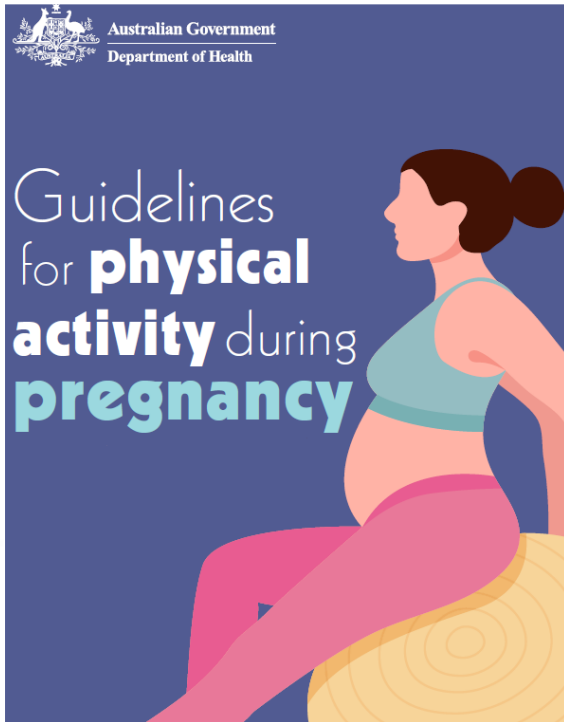
Adapted from Mottola 2008. Performance in the pregnant woman: Maternal & foetal considerations. Chpt.12. In: Physiological Bases of Human Performance during Work & Exercise. Elsevier, USA.

Am J Lifestyle Med. 2014 ; 8(2): 102–121. doi:10.1177/1559827613498204.

Evenson K, Barakat R, Brown W, Dargent-Molina P, Haruna M, Mikkelsen EM, Mottola MF, Owe K, Rousham E, Yeo SA

Guidelines for Physical Activity during Pregnancy: Comparisons From Around the World

9 countries; Australia, Canada, Denmark, France, Japan, Norway, Spain, UK, USA



Pregnant and postpartum women
All pregnant and postpartum women without contraindication should:
•do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week
•incorporate a variety of aerobic and muscle-strengthening activities
•should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits



2019 Canadian Guideline for Physical Activity throughout Pregnancy



November 2020



PROGRAM SPINAKER



Fundusze Europejskie Wiedza Edukacja Rozwój



Rzeczpospolita Polska



Unia Europejska Europejski Fundusz Społeczny



2019 Canadian Guideline for Physical Activity Throughout Pregnancy: Methodology J Obstet Gynaecol Can 2018;



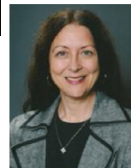
Guideline Consensus Panel



Margie H Davenport



Stephanie May Ruchat



Michelle Mottola

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Critical Outcomes

- **Miscarriage**
- **Stillbirth**
- **Neonatal Death**
- **Preterm Birth**
- **Maternal Mental Health (depression, anxiety)**
- **Excessive gestational weight gain**
- **Postpartum weight retention**
- **Glucose tolerance**
- **Preterm/prelabour rupture of membranes**
- **Diastasis recti**
- **Intrauterine growth restriction**
- **Gestational diabetes mellitus**
- **Preeclampsia**
- **Gestational Hypertension**
- **Cesarean Section**
- **Fetal responses to physical activity (heart rate, blood flow)**
- **Low birth weight (small for gestational age, <2500g)**
- **High birth weight (large for gestational age, >4000g)**
- **Long-term offspring outcomes (obesity, cardiovascular and metabolic diseases)**
- **Neonatal hypoglycemia**

20 critical outcomes

Important Outcomes

- Antepartum haemorrhage
- Inadequate gestational weight gain
- Total gestational weight gain
- Delivery complications (instrumental delivery, length of labour, vaginal tears)
- Gestational age at birth
- Birth defects
- Birth weight
- Lower back pain
- Pelvic girdle pain
- Urinary incontinence
- Offspring developmental milestones (cognitive, psychosocial, motor skills)
- hyperbilirubinemia
- Induction of labour
- Long term maternal outcomes (CVD, osteoporosis, diabetes, hypertension, obesity)
- Adverse outcomes (musculoskeletal injury, trauma, dehydration, hyperthermia, maternal hypoglycemia, fatigue, cardiovascular or respiratory events)
- Body composition (newborn adiposity, body mass index)
- Birth complications (shoulder dystocia, brachial plexus injury, APGAR, NICU, metabolic acidosis)

17 important outcomes

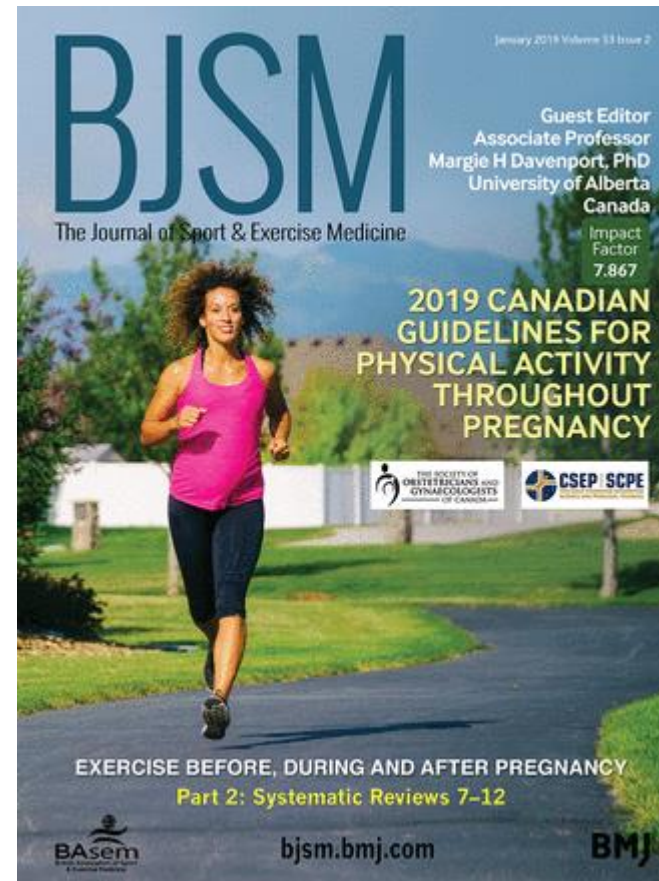
- Searched up to January 6, 2017
- Screened 27,624 titles and abstracts
- 675 unique studies were included
- 12 Systematic reviews published



JOINT SOGC/CSEP CLINICAL PRACTICE GUIDELINE

No. 367, November 2018 (Replaces No. 129, June 2003, Reaffirmed February 2018)

No. 367-2019 Canadian Guideline for Physical Activity throughout Pregnancy



This Clinical Practice Guideline has been prepared by the Guidelines Consensus Panel, reviewed by the Society of Obstetricians and Gynaecologists of Canada (SOGC)'s Maternal Fetal Medicine and Guideline Management and Oversight Committees, and approved by the Board of the SOGC, and the Board of Directors of the Canadian Society for Exercise Physiology (CSEP).

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KEY MESSAGES

1. Exercise reduces the risk of common pregnancy complications.
2. Previously inactive women can safely start exercise with the goal of achieving the recommended minimum activity. Exercise can be initiated at any point during pregnancy.
3. All types of physical activity contribute to a woman's fitness during pregnancy. Activities as simple as walking can reduce pregnancy complications. Aerobic exercise plus other types of exercise (e.g., resistance training) contribute to fitness.
4. Women can achieve the recommended physical activity in this guideline in many ways, including activities, such as walking, that have no added expense.
5. When exercising women should be cautious of activities where falling or direct physical contact may result in harm to themselves or their fetus.

J Obstet Gynaecol Can 2018;000(000):1-10

<https://doi.org/10.1016/j.jogc.2018.07.001>

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Exercise reduces the risk of:

Gestational diabetes ↓ 38%

Gestational hypertension ↓ 39%

Preeclampsia ↓ 41%

Davenport MH, Ruchat S-M, Poitras VJ, et al. Br J Sports Med 2018;52:1367–1375.

Excessive gestational weight gain ↓ 32%

Ruchat S-M, Mottola MF, Skow RJ, et al. Br J Sports Med 2018;52:1347–1356.

Depression ↓ 67%

Davenport MH, McCurdy AP, Mottola MF, et al. Br J Sports Med 2018;52:1376–1385.

Urinary incontinence during pregnancy ↓ 51%, PP ↓ 47%

Davenport MH, Nagpal TS, Mottola MF, et al. Br J Sports Med 2018;52:1397–1404.

Macrosomia ↓ 39%, Instrumental delivery ↓ 24%

Davenport MH, Meah VL, Ruchat S-M, et al. Br J Sports Med 2018;52:1386–1396.

Davenport MH, Ruchat S-M, Sobierajski F, et al. Br J Sports Med 2019;53:99–107.



Physical activity is **NOT** associated with:

Miscarriage, stillbirth, neonatal death

Davenport MH, Kathol AJ, Mottola MF, et al. Br J Sports Med 2019;53:108–115.



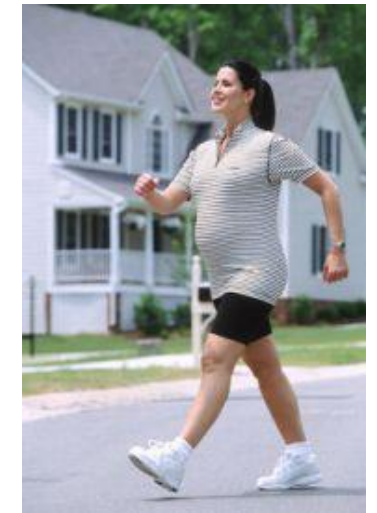
Birth defects

Davenport MH, Yoo C, Mottola MF, et al. Br J Sports Med 2019;53:116–123.

Preterm birth, preterm/prelabour rupture of membranes, low birth weight, induction of labour, neonatal hypoglycemia or birth complications

Davenport MH, Meah VL, Ruchat S-M, et al. Br J Sports Med 2018;52:1386–1396.

Davenport MH, Ruchat S-M, Sobierajski F, et al. Br J Sports Med 2019;53:99–107.



Changes in FHR or uteroplacental blood flow metrics

Skow RJ, Davenport MH, Mottola MF, et al. Br J Sports Med 2019;53:124–133.

https://csepguidelines.ca/wp-content/uploads/2018/10/4208_CSEP_Pregnancy_Guidelines_En_P2A.pdf

Recommendations:

The specific recommendations in the 2019 Canadian Guideline for Physical Activity throughout Pregnancy are provided below.

1

All women without contraindication should be physically active throughout pregnancy.

Specific subgroups were examined:

- Women who were previously inactive.
- Women diagnosed with gestational diabetes mellitus.
- Women categorized as overweight or obese (pre-pregnancy body mass index ≥ 25 kg/m²).

- **PA during 1st trimester did not increase odds of miscarriage or congenital anomalies**
- **Not engaging in PA from 1st trimester increased odds of pregnancy complications**
- **PA encouraged *throughout* pregnancy**

Mottola, Davenport, Ruchat et al.
Br J Sports Med 2018;**52**:1339–1346.

2

Pregnant women should accumulate at least 150 minutes of moderate-intensity physical activity each week to achieve clinically meaningful health benefits and reductions in pregnancy complications.

WHAT PHYSICAL ACTIVITY IS RECOMMENDED DURING PREGNANCY?

3

Physical activity should be accumulated over a minimum of three days per week; however, being active every day is encouraged.

- Lower intensity PA also has benefits, therefore encourage all women to be physically active (even if unable to meet recommendations)
- Highest PA was 7.0 METs (jogging). Safety of chronic high-intensity PA is not known.
- High intensity PA is recommended only in a monitored environment
- Moderate intensity PA is recommended throughout pregnancy

Every minute counts!!

Mottola, Davenport, Ruchat et al.
Br J Sports Med 2018;**52**:1339–1346.

Moderate intensity PA:

Intense enough to increase HR; a person can talk but not sing during activity

Ways to monitor intensity:

Maternal Heart rate – pregnancy-specific target heart rate zones

“Talk test” – maintain a conversation during PA and should reduce intensity if not possible



Mottola, Davenport, Ruchat et al.
Br J Sports Med 2018;52:1339–1346.



27. Mottola MF, Davenport MH, Brun CR, Inglis SD, Charlesworth S, Sopper MM. 2006. VO_{2peak} prediction and exercise prescription for pregnant women. *Med Sci Sports Exerc* 38(8):1389-1395.

28. Davenport MH, Sopper MM, Charlesworth S, Vanderspank D, Mottola MF. 2008. Development and validation of exercise target heart rate zones for overweight and obese pregnant women. *Appl Physiol Nutr Metabol*. 33(5):984-9.

Table 3. Heart rate ranges for pregnant women^a

Maternal age	Intensity ^b	Heart rate range (beats/min)
<29	Light	102–124
	Moderate	125–146
	Vigorous	147–169 ^c
30+	Light	101–120
	Moderate	121–141
	Vigorous	142–162 ^c

^aTarget heart rate ranges were derived from peak exercise tests in medically screened low-risk pregnant women.^{27,28}

^bModerate-intensity physical activity (40% to 59% heart rate reserve; HRR); vigorous-intensity physical activity (60% to 80% HRR).

^cAs there is minimal information regarding the impact of physical activity at the upper end of the vigorous-intensity heart rate ranges, women wishing to be active at this intensity (or beyond) are encouraged to consult their obstetric care provider.

Mottola, Davenport, Ruchat et al.
Br J Sports Med 2018;52:1339–1346.

4

Pregnant women should incorporate a variety of aerobic and resistance training activities to achieve greater benefits. Adding yoga and/or gentle stretching may also be beneficial.



Mottola, Davenport, Ruchat et al.
Br J Sports Med 2018;52:1339–1346.

5

Pelvic floor muscle training (e.g., Kegel exercises) may be performed on a daily basis to reduce the risk of urinary incontinence. Instruction in proper technique is recommended to obtain optimal benefits.

- **Instruction in proper technique important (pelvic floor physiotherapist)**

Mottola, Davenport, Ruchat et al.
Br J Sports Med 2018;**52**:1339–1346.

6

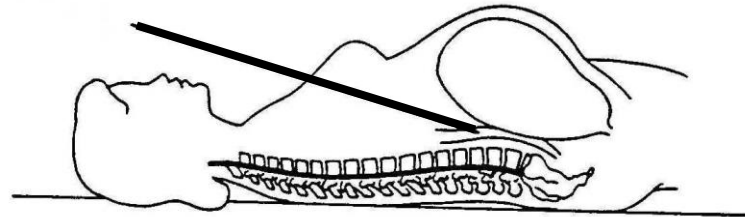
Is supine exercise associated with adverse maternal and fetal outcomes? A systematic review

Mottola MF, Nagpal TS, Bgeginski R, et al. Br J Sports Med 2019;53:82–89.

- **Evidence weak regarding supine position**

Pregnant women who experience light-headedness, nausea or feel unwell when they exercise flat on their back should modify their exercise position to avoid the supine position.

INFERIOR VENA CAVA (ABDOMINAL AORTA?)



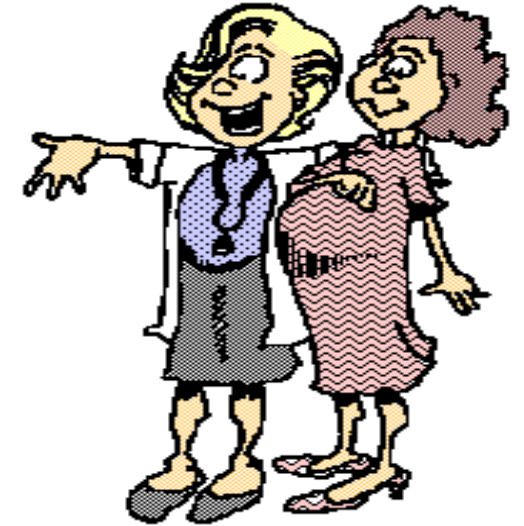
**SUPINE
BLOOD FLOW MAY BE RESTRICTED**

Mottola, Davenport, Ruchat et al.
Br J Sports Med 2018;52:1339–1346.

The following guidance is based on the expert opinion of the *Guidelines Consensus Panel*.

Safety Precautions:

- **Avoid activities that involve physical contact or danger of falling (fetal trauma)**
 - **Avoid but not limited to: horseback riding, downhill skiing, ice hockey, gymnastics, or Olympic lifts**
- **Avoid non-stationary cycling as this may carry a higher risk of falling due to changes in body mechanics and ability to respond to environment as pregnancy progresses**
- **Alternatives are activities with less risk of falling or physical contact**
- **Avoid vigorous PA in excessive heat, especially high humidity (e.g. hot yoga)**
- **Warm up and cool down important**
- **Ligaments may become relaxed therefore cautious of range of movement**



Resistance training:

- **Must adhere to the safety considerations**
- **“Mixed” interventions combining aerobic and resistance training activities better improvements in pregnancy outcomes than aerobic alone**
- **Avoid holding one’s breath (Valsalva maneuver) especially if experience light-headedness**



Mottola, Davenport, Ruchat et al.
Br J Sports Med 2018;52:1339–1346.

- **Athletic competition or exercising significantly above recommendations should consult with obstetric care provider to clarify risk and make modifications**
- **Elite athletes who continue to train are advised to seek supervision by an obstetric care provider with knowledge of the impact of vigorous-intensity PA**
- **IOC released a 5-part series of recommendations to guide elite athletes [British Journal Sports Medicine]**



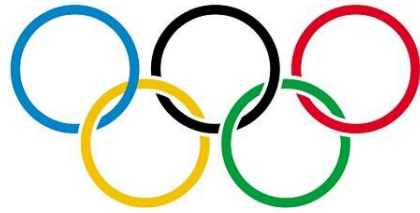
Mottola, Davenport, Ruchat et al.
Br J Sports Med 2018;52:1339–1346.

Exercise and pregnancy in recreational and elite athletes: 2016/2017 evidence summary from the IOC expert group meeting, Lausanne. Part 5. Recommendations for health professionals and active women *Br J Sports Med* 2018;52:1080-85.

Kari Bø,^{1,2} Raul Artal,³ Ruben Barakat,⁴ Wendy J Brown,⁵ Gregory A L Davies,⁶ Michael Dooley,⁷ Kelly R Evenson,⁸ Lene A H Haakstad,⁹ Bengt Kayser,¹⁰ Tarja I Kinnunen,¹¹ Karin Larsen,¹² Michelle F Mottola,¹³ Ingrid Nygaard,¹⁴ Mireille van Poppel,¹⁵ Britt Stuge,¹⁶ Karim M Khan¹⁷



“The 2016 IOC expert group meeting in Lausanne revealed a significant lack of high-quality evidence specific to pregnant elite athletes and especially the impact of high-intensity exercise and extreme doses of exercise during pregnancy on maternal and newborn outcomes, as well as an athlete’s ability to return to their competitive peak after childbirth. The advice and recommendations given here are therefore based on scientific evidence when available, and on consensus between 16 experts representing different countries, healthcare systems and disciplines.”



Br J Sports Med 50:571–589, 2016

Consensus statement

Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part 1—exercise in women planning pregnancy and those who are pregnant

Kari Bø,¹ Raul Artal,² Ruben Barakat,³ Wendy Brown,⁴ Gregory A L Davies,⁵ Michael Dooley,⁶ Kelly R Evenson,^{7,8} Lene A H Haakstad,⁹ Karin Henriksson-Larsen,¹⁰ Bengt Kayser,¹¹ Tarja I Kinnunen,^{12,13} Michelle F Mottola,¹⁴ Ingrid Nygaard,¹⁵ Mireille van Poppel,¹⁶ Britt Stuge,¹⁷ Karim M Khan¹⁸

Part 2 ...the effect of exercise on the fetus, labour and birth; BJSM 2016; 50:1297–05.

Part 3 ... exercise in the post partum period; BJSM 2017; 51:1516-25.

Part 4 Recommendations for future research; BJSM 2017; 51:1724-26

Part 5 Recommendations for health professionals and active women; BJSM 2018; 52:1080-1085.



Table 4. Safety precautions for prenatal physical activity

- Avoid physical activity in excessive heat, especially with high humidity.
- Avoid activities that involve physical contact or danger of falling.
- Avoid scuba diving. Fetus not protected from decompression sickness & gas embolism.
- Lowlander women (i.e., living below 2500 m) should avoid physical activity at high altitude (>2500 m). Those considering physical activity above those altitudes should seek supervision by an obstetric care provider with knowledge of the impact of high altitude on maternal and fetal outcomes.
- Those considering athletic competition or exercising significantly above the recommended guideline should seek supervision by an obstetric care provider with knowledge of the impact of high-intensity physical activity on maternal and fetal outcomes.
- Maintain adequate nutrition and hydration – drink water before, during, and after physical activity.
- Know the reasons to stop physical activity, and consult a qualified health care provider immediately if they occur (see [Table 5](#)).

Mottola, Davenport, Ruchat et al.
Br J Sports Med 2018;**52**:1339–1346.

Table 5. Reasons to stop physical activity and consult a health care provider

- Persistent excessive shortness of breath that does not resolve upon rest
 - Severe chest pain
 - Regular and painful uterine contractions
 - Vaginal bleeding
 - Persistent loss of fluid from the vagina indicating rupture of the membranes
 - Persistent dizziness or faintness that does not resolve upon rest
-

All women should stop activity and seek medical attention if they experience any of the symptoms identified in [Table 5](#).

Mottola, Davenport, Ruchat et al.
Br J Sports Med 2018;**52**:1339–1346.

SUMMARY

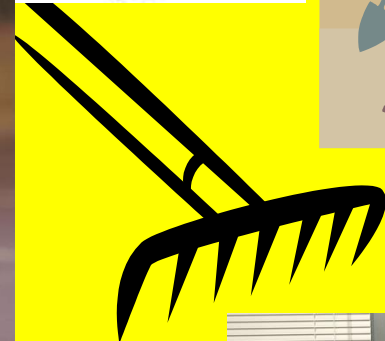
- **Represents a foundational shift in our view of PA**
- **From recommended behaviour to improve quality of life**
- **To a specific prescription for PA to reduce pregnancy complications and optimize health for two/three generations**
- **Important to implement into clinical practice for lifelong benefits for mother and child**



Mottola, Davenport, Ruchat et al.
Br J Sports Med 2018;52:1339–1346.

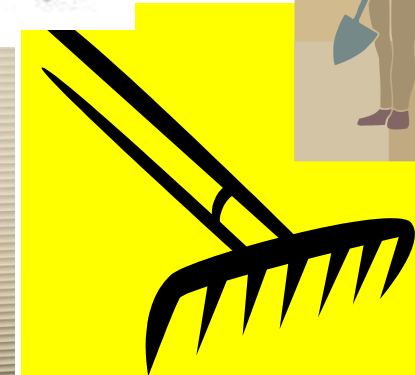
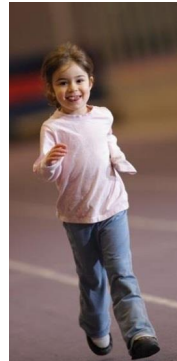
Promotion of Active Living

- Pregnancy is time when many individuals change to a healthier lifestyle
 - improve eating habits
 - quit smoking
 - stop alcohol use
 - moderate caffeine consumption
 - think about **active living**



Ways to be physically active:

- Increase steps taken per day – park farther away; take stairs; pedometers
- Rake leaves; cut grass
- Gardening
- Shoveling snow!!
- Play with kids!



Check out cupboard!!!

- PA does not need to be in a supervised setting or with specific equipment
- Activities as simple as walking can have positive benefits

150 mins/week, \approx 30 mins/5 days

Motivation/ accountability

- Face to face (phone calls)
- Pedometers
- Technology tools – wear wrist; download phone apps
- Text messaging
- Other tools to enhance and promote healthy habits

What happens during the day and the other 23 ½ hours?

Dr. Mike Evans –
“Let’s make our day harder”



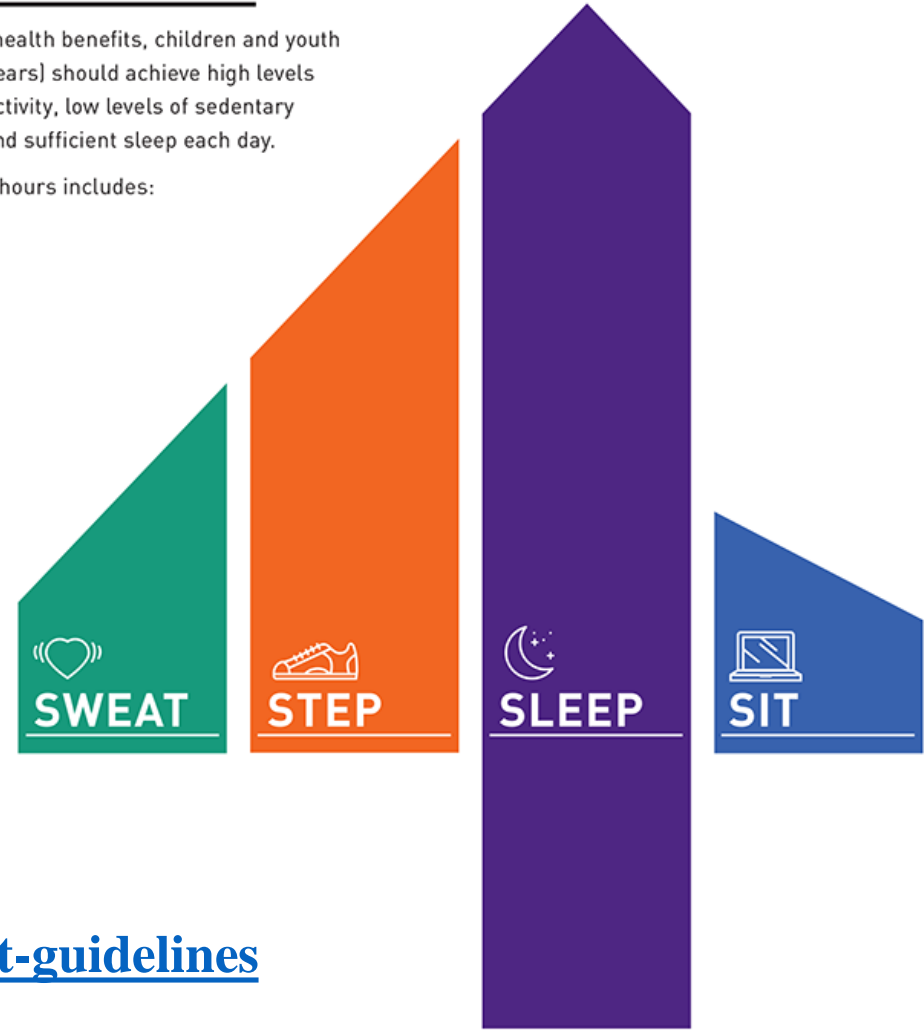
24 hr movement guidelines for children & youth



GUIDELINES

For optimal health benefits, children and youth (aged 5–17 years) should achieve high levels of physical activity, low levels of sedentary behaviour, and sufficient sleep each day.

A healthy 24 hours includes:



SWEAT

MODERATE TO VIGOROUS PHYSICAL ACTIVITY

An accumulation of at least 60 minutes per day of moderate to vigorous physical activity involving a variety of aerobic activities. Vigorous physical activities, and muscle and bone strengthening activities should each be incorporated at least 3 days per week;

STEP

LIGHT PHYSICAL ACTIVITY

Several hours of a variety of structured and unstructured light physical activities;

SLEEP

SLEEP

Uninterrupted 9 to 11 hours of sleep per night for those aged 5–13 years and 8 to 10 hours per night for those aged 14–17 years, with consistent bed and wake-up times;

SIT

SEDENTARY BEHAVIOUR

No more than 2 hours per day of recreational screen time; Limited sitting for extended periods.

<http://www.csep.ca/en/guidelines/24-hour-movement-guidelines>

Preserving sufficient sleep, trading indoor time for outdoor time, and replacing sedentary behaviours and light physical activity with additional moderate to vigorous physical activity can provide greater health benefits.



Questions?



“Little Feet – Big Responsibility”