Table D.1.e. Fetal health outcomes and physical activity, pregnant and postpartum women

Black font is from original GRADE Evidence Profiles from two systematic reviews (Davenport 2018 *(4)* and Davenport 2019 *(7)*) to support the 2019 Canadian Guideline for Physical Activity Throughout Pregnancy. Red font denotes additions based on WHO update using review of existing systematic reviews. Two systematic reviews were identified that addressed the relationship between physical activity and fetal health outcomes *(14, 16)*.

Quality assessment							№ of participants		Effect		Quality	Importance
№ of studies **Review (AMSTAR 2 rating)**	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Prenatal exercise**	**No exercise**	**Relative (95% CI)**	**Absolute (95% CI)**		
Association between exercise-only interventions and **birthweight <2500 g**												
17 (pooled estimate of effect; n=15 [a,b]; 2 studies synthesized narratively.	randomized trials	serious [c]	not serious	not serious	serious [d]	none	114/1858 (6.1%)	126/1926 (6.5%)	**OR 0.91** (0.70 to 1.20)	**6 fewer per 1,000** (from 12 more to 19 fewer)	⊕⊕◯◯ LOW	CRITICAL
							Narrative synthesis: Two RCTs were included (Intervention, n=158; Control, n=99) and reported no association between prenatal exercise and birthweight <2500 g (Baciuk et al. 2009; deOliveria et al. 2012). **Additional data from studies (n=3) included in the pooled estimate.** All three studies reported no association between prenatal exercise and birth weight <2500 g (Kasawara et al. 2013; Barakat et al. 2016; Ussher et al. 2015). [e]					
Beetham 2019 *(14)* Moderate 2 randomized trials 2 cohort studies		serious [t]	not serious	not serious	serious [d]	none	There was no significant increase in risk of **LBW (< 2500 g)** (RR = 0.44 [95% CI − 0.83 to 1.7], n = 2454, k = 4, I^2 = 0). Results were consistent with no significant differences when limited by study design (RCT, prospective cohort, or retrospective cohort) or by comparison condition.				⊕⊕◯◯ LOW	CRITICAL
Du 2018 *(16)* Low 6 randomized trials		not serious	not serious	not serious	serious [d]	none	Among pregnant women with overweight or obesity, there was no significant difference in the risk of **SGA** between physical activity intervention groups vs. standard antenatal care (RR = 1.02 [95% CI, 0.54 to 1.92], 6 RCTs, n=863, I^2=13%).				⊕⊕⊕◯ MODERATE	CRITICAL

Quality assessment							№ of participants		Effect		Quality	Importance
№ of studies **Review (AMSTAR 2 rating)**	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Prenatal exercise**	**No exercise**	**Relative (95% CI)**	**Absolute (95% CI)**		
Association between exercise-only interventions and **birth weight < 10th percentile**												
10 [f]	randomized trials	not serious	not serious	not serious	serious [d]	none	44/713 (6.2%)	36/549 (6.6%)	**OR 0.98** (0.61 to 1.57)	**1 fewer per 1,000** (from 25 fewer to 34 more)	⊕⊕⊕◯ MODERATE	CRITICAL
							Additional data from one study included in the pooled analysis. Simmons et al. (2016) did not find a relationship between the odds of having a small for gestational age (<10th percentile) baby at birth. [f, g]					
Association between exercise-only interventions and **birth weight >4000 g**												
17 (pooled estimate of effect; n=15[h], 2 studies synthesized narratively)	randomized trials	not serious [i]	not serious	not serious	not serious	none	109/1835 (5.9%)	151/1835 (8.2%)	**OR 0.61** (0.41 to 0.92)	**30 fewer per 1,000** (from 6 fewer to 47 fewer)	⊕⊕⊕⊕ HIGH	CRITICAL
							Narrative synthesis: Two studies were included (Intervention, n=186; Control, n=121) and reported no relationship between prenatal exercise and birthweight > 4000 g (deOliveria et al. 2012; Oostdam et al. 2012). **Additional data from studies (n=4) included in the pooled estimate**. **3/4 studies** reported no relationship between prenatal exercise and birthweight >4000 g (Kasawara et al. 2013; Barakat et al. 2013; Tomic et al. 2013). **1/4 studies** suggested women who were not active during pregnancy had an increased risk of having a baby >4000g [OR 2.53; CI:1.03,6.20] (Barakat et al. 2016).					
Du 2018 *(16)* Low 7 randomized trials		not serious	not serious	not serious	serious [d]	none	Among pregnant women with overweight or obesity, there was no significant difference in the risk of L**GA** between physical activity intervention groups vs. standard antenatal care (RR = 0.90 [95% CI, 0.65 to 1.25], 7 RCTs, n=961, I^2=0%).				⊕⊕⊕◯ MODERATE	CRITICAL

Quality assessment							№ of participants		Effect		Quality	Importance
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Prenatal exercise**	**No exercise**	**Relative (95% CI)**	**Absolute (95% CI)**		
Association between exercise-only interventions and **birth weight >90th percentile.**												
11	randomized trials	serious [j]	not serious	not serious	serious [d]	none	96/775 (12.4%)	81/632 (12.8%)	**OR 1.00** (0.71 to 1.40)	**0 fewer per 1,000** (from 34 fewer to 43 more)	⊕⊕◯◯ LOW	CRITICAL
							Additional data from one study included in the pooled analysis. Simmons et al. (2016) reported no relationship between the odds of having a large for gestational age (>90th percentile) baby at birth.					
Association between prenatal exercise and **IUGR**												
1	randomized trial	not serious	serious [k]	not serious	not serious [l]	none	12/166 (7.2%)	11/168 (6.5%)	**OR 1.11** (0.48 to 2.60)	**7 more per 1,000** (from 33 fewer to 89 more)	⊕⊕⊕◯ MODERATE	CRITICAL
							Additional data from one study included in the pooled analysis. Tomic et al. (2013) did not find an association between prenatal exercise and IUGR.					
2 (pooled estimate of effect; n=1[f]; 1 study reported narratively)	cohort studies	serious [m]	serious [k]	not serious	not serious [l]	none	76/533 (14.3%)	69/216 (31.9%)	**OR 0.36** (0.25 to 0.53)	**175 fewer per 1,000** (from 120 fewer to 214 fewer)	⊕◯◯◯ VERY LOW	CRITICAL
							Narrative Summary: Rego et al. (2016) (n=1380) did not find an association between prenatal exercise and IUGR.					
1 study reported narratively	Case control study	not serious [n]	serious [k]	not serious	not serious [l]	none	Narrative summary: Takito et al. (2010) (Cases; n=272; Control; n=546) did not find an association between prenatal exercise and IUGR.				⊕◯◯◯ VERY LOW	CRITICAL

Quality assessment							№ of participants		Effect		Quality	Importance
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Prenatal exercise**	**No exercise**	**Relative (95% CI)**	**Absolute (95% CI)**		
Association between exercise-only interventions and **preterm birth**												
28 (pooled estimate of effect; n=27 [o, h], 1 study reported narratively)	randomized trials	serious [p]	not serious	not serious	serious [d]	none	168/2680 (6.3%)	145/2603 (5.6%)	**OR 1.12** (0.88 to 1.42)	**6 more per 1,000** (from 6 fewer to 22 more)	⊕⊕◯◯ LOW	CRITICAL
							Narrative summary: One study was included (Intervention, n= 34; Control, n=37) and found no association between prenatal exercise and preterm birth (Cavalcante et al. 2009).					
Beetham 2019 *(14)* Moderate 2 randomized trials 2 cohort studies		serious [t]	not serious	not serious	not serious	none	A small, but significant, reduced risk of **preterm birth** existed in babies of mothers who engaged in vigorous physical activity (RR = − 0.20 [95% CI −0.36 to − 0.03], , n = 3025, k = 4, I^2 = 0); however the effect was not significant when limited to the 2 RCTs (RR = − 0.41 [95% CI − 1.64 to 0.82], n = 312, k = 2) or when using only light intensity exercise as a comparison (RR = − 0.16 [95% CI − 0.32 to 0.01] n = 1644, k = 3).				⊕⊕⊕◯ MODERATE	CRITICAL
Du 2018 *(16)* Low 6 randomized trials		not serious	not serious	not serious	serious [d]	none	Among pregnant women with overweight or obesity, there was no significant difference in the risk of **preterm birth** between physical activity intervention groups vs. standard antenatal care (RR = 1.18 [95% CI, 0.59 to 2.39], 6 RCTs, n=737, I^2=0%).				⊕⊕⊕◯ MODERATE	CRITICAL
Association between exercise-only interventions and **neonatal hypoglycemia**												
1	randomized trials	serious [q]	serious [k]	not serious	not serious [l]	none	4/37 (10.8%)	3/37 (8.1%)	OR 1.37 (0.29 to 6.61)	**27 more per 1,000** (from 56 fewer to 287 more)	⊕⊕◯◯ LOW	CRITICAL
Association between prenatal exercise-only interventions and **congenital anomalies**												
1	randomized trials	serious [r]	serious [k]	not serious	not serious [l]	none	9/346 (2.6%)	6/348 (1.7%)	**OR 1.52** (0.54 to 4.32)	**9 more per 1,000** (from 8 fewer to 53 more)	⊕⊕◯◯ LOW	CRITICAL
1	cohort study	serious [s]	serious [k]	not serious	not serious [l]	none	908/18330 (5.0%)	2832/54942 (5.2%)	OR 0.96 (0.89 to 1.04)	2 fewer per 1,000 (from 2 more to 5 fewer)	⊕◯◯◯ VERY LOW	CRITICAL

Abbreviations: CI = confidence interval; LGA = large for gestational age; OR = odds ratio; RCT = randomized clinical trial; RR = risk ratio; SGA = small for gestational age

[a] Two studies reported no cases of birthweight <2500 g (not estimable result) and are not included in the pooled analysis.

[b] Two studies reported data on different sub-groups of women. These studies were counted only once.
[c] Serious risk of bias. High risk of performance (women who did not complete the majority of the intervention [>75%] were excluded) and attrition bias. Reporting bias was an issue in two studies; results were reported narratively. One study included "other risk" of bias (included women who smoked during pregnancy that may have affected birthweight).
[d] Serious imprecision. The 95% CI crosses the line of no effect, and is wide, such that interpretation of the data would be different if the true effect were at one end of the CI or the other.
[e] All three studies reported data that were included in the meta-analysis and additional data reported narratively. These studies were counted only once.
[f] One study reported data on different sub-groups of women. This study was counted only once.
[g] One study reported data that was included in the meta-analysis and additional data reported narratively. This study was counted only once.
[h] Two studies reported data on different sub-groups of women. These studies were counted only once.
[i] No serious risk of bias. Reporting bias was an issue in 3 studies; results were reported narratively.
[j] Serious risk of bias. High performance risk of bias.
[k] Serious inconsistency. Only one study was included.
[l] No serious imprecision; only one study but already downgraded for serious inconsistency for this reason
[m] Serious risk of bias. High risk of performance bias (potentially flawed measurement of the exposure; unknown validity of physical activity measure). Reporting bias was an issue in one study; results were reported narratively.
[n] No serious risk of bias. Reporting bias was an issue in one study; results were reported narratively.
[o] Four studies reported no cases of preterm birth (not estimable result) and are not included in the pooled analysis.
[p] Serious risk of bias. High risk of performance bias (women who did not complete the majority of the intervention [>75%] were excluded). Reporting bias was an issue in one study; results were reported narratively. One study included "other risk" of bias (included women who smoked during pregnancy that may have affected preterm birth).
[q] Serious risk of bias. High risk of performance and attrition bias. Unclear risk of selection bias; it was unknown if sequence was adequately generated.
[r] Serious risk of bias. High risk of performance bias (potentially flawed measurement of the exposure; unknown validity of physical activity measure).
[s] Serious risk of bias. High risk of other bias (all women were smokers which may have affected the odds of congenital anomalies).
[t] Serious risk of bias. High risk of performance and attrition bias. Unclear risk of selection bias.