

# Healthy Pregnancy: Exercise Programs to Prevent Gestational Hypertension

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## Community Preventive Services Task Force Finding and Rationale Statement Ratified February 2019

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## CPSTF Finding and Rationale Statement

### Context

Regular physical activity is recommended for women before, during, and after pregnancy (DHHS 2018). Physical activity during pregnancy has minimal risks and has been shown to benefit most women, although some modification to exercise routines may be necessary because of normal anatomic and physiologic changes and fetal requirements (ACOG 2017).

Participation in structured exercise programs can help women, especially those who are not otherwise active, obtain regular physical activity throughout pregnancy. Exercise initiated early in pregnancy can help reduce excessive weight gain and prevent gestational diabetes (CPSTF 2017).

This systematic review assessed the effectiveness of exercise programs in preventing gestational hypertensive disorders, defined as new onset high blood pressure during pregnancy. There are four different types of gestational hypertensive disorders: chronic hypertension, gestational hypertension, preeclampsia, and preeclampsia superimposed on chronic hypertension (Vest et al., 2014). This CPSTF finding is specific to one type—gestational hypertension without the development of preeclampsia-eclampsia.

### Intervention Definition

Exercise programs to prevent gestational hypertension engage women in regular exercise from before their 16th week of pregnancy through birth, provided they are otherwise healthy and do not have medical reasons to avoid physical activity.

Programs must include one or both of the following:

- Supervised exercise classes that meet at least three times each week and include 30-60 minutes of moderate-intensity aerobic exercise
- Regular moderate-intensity walking sessions during which women (alone or in a group) walk 90-150 minutes per week or 11,000 steps per day (as monitored by a pedometer)

Programs may also provide the following:

- Supervised resistance training
- Additional education or encouragement on physical activity, nutrition, and weight management

Interventions may be delivered in health system facilities, or in community-based or home settings.

## CPSTF Finding (February 2019)

The Community Preventive Services Task Force (CPSTF) recommends exercise programs for pregnant women based on sufficient evidence of effectiveness in reducing the incidence of gestational hypertension. Additional studies are needed to determine whether exercise programs prevent preeclampsia.

## Rationale

### Basis of Finding

The CPSTF considers recently published systematic reviews to provide program planners and decision-makers with effective intervention options. A team of specialists in systematic review methods and pregnancy health research, practice, and policy selected and evaluated the following published review:

Magro-Malosso E, Saccone G, Di Tommaso M, Roman A, Berghella V. Exercise during pregnancy and risk of gestational hypertension disorders: a systematic review and meta-analysis. *Acta Obstetrica et Gynecologica Scandinavica* 2017;96:921-31.

The team examined a subset of 16 studies from the systematic review that were conducted in 15 high-income countries and 1 upper-middle-income country. The team abstracted supplemental information about study, intervention, and population characteristics.

The CPSTF finding is based on results from the published systematic review and meta-analyses of 17 studies (search period through February 2017), additional analyses of data from 15 of the included studies, and expert input from team members and the CPSTF.

The published review included 17 randomized controlled trials that examined the impact of exercise interventions on gestational hypertensive disorders overall, and specifically on gestational hypertension and preeclampsia. Studies excluded women with chronic hypertension. Primary results are summarized in Table 1 below.

**Table 1: Intervention Effects on Gestational Hypertensive Disorders**

Primary Outcomes examined in the Systematic Review and Meta-Analysis	Number of Studies	Relative Risk (95% Confidence Interval)
Gestational hypertension	17	0.54 (0.40 to 0.74)
Preeclampsia	7	0.79 (0.45 to 1.38)
Gestational hypertensive disorders (outcome based on studies that provided measures for both gestational hypertension and preeclampsia)	8	0.70 (0.53 to 0.93)

The seven studies that examined intervention effects on preeclampsia were favorable, though results were not statistically significant. Two related systematic reviews of lifestyle interventions with physical activity education or

exercise (Muktabhant et al., 2015; Shepard et al., 2017) found no impact on preeclampsia. In light of mixed evidence the CPSTF supports additional research into the relationships between exercise interventions and preeclampsia.

The Magro-Malosso et al. review also examined maternal and birth outcomes (i.e., mode of delivery, birth weight, gestational age at delivery). These results, summarized in Table 2, show a significant reduction in birth by cesarean delivery. There were not significant differences in the remaining birth outcomes.

**Table 2: Intervention Effects on Additional Outcomes**

<b>Additional Outcomes Examined in the Systematic Review and Meta-Analysis</b>	<b>Number of Studies</b>	<b>Relative Risk or Mean Difference (95% Confidence Interval)</b>
Cesarean delivery	14	RR: 0.84 (0.73 to 0.98)
Gestational age at delivery	16	Mean Difference: 0.03 weeks (-0.06 to 0.13)
Birthweight	17	Mean Difference: -57 grams (-117 to -26)
Apgar score at 1 min	11	Mean Difference: 0.01 (-0.15 to 0.17)
Apgar score at 5 min	11	Mean Difference: 0.01 (-0.05 to 0.07)

The review team collected additional information from included studies and generated absolute percentage differences for intervention-attributable effects on gestational hypertension. Results of the CPSTF analysis are included in Table 3 below.

**Table 3: Intervention Effects on Gestational Hypertension**

<b>Development of gestational hypertension without progression to preeclampsia</b>	<b>Number of Studies</b>	<b>Median Absolute Percent Difference in Proportion of Participants Developing Gestational Hypertension (Interquartile Interval)</b>
Gestational hypertension	15	-2.0 percentage points (IQI: -3.5 to -0.3)

Interventions in the included studies provided supervised moderate-intensity aerobic or aerobic and resistance training exercise classes (8 studies), supervised or monitored walking regimens (4 studies), or a mix of supervised and unsupervised sessions (4 studies). Exercise frequency was typically three times per week (11 studies), and sessions lasted 30 to 60 minutes (14 studies). Most participants were enrolled between the 5<sup>th</sup> and 16<sup>th</sup> weeks of gestation (14 studies) and continued the exercise program through the 38<sup>th</sup>-40<sup>th</sup> week (10 studies).

### Applicability and Generalizability Issues

Only two of the 16 studies in the CPSTF analyses evaluated interventions in the United States. Remaining studies were conducted in Spain (8 studies), Norway (2 studies), Denmark (2 study), Italy (1 studies), and Brazil (1 study). Of the studies that reported setting, interventions were offered in clinical settings (6 studies), or homes (4 studies). Six of the 8 included studies from Spain were conducted by the same research group.

### Data Quality Issues

The published systematic review included only randomized controlled trials. Study quality was evaluated using the Cochrane risk of bias assessment tool (Higgins et al. 2011). Two studies from the systematic review were consolidated in the CPSTF assessment as the study populations were identical (Barakat, 2012). Study limitations included incomplete reporting of outcome definitions for, and measurement of, gestational hypertension and preeclampsia, and variation across studies in the exercise program type, duration, and frequency.

### Potential Benefits

The studies included in the Magro-Malosso et al. review examined additional outcomes including development of gestational diabetes and appropriate weight gain during pregnancy (as categorized by 2009 IOM guidelines). The CPSTF examined these outcomes and found meaningful improvements in both attributable to exercise interventions. Results are provided in Table 4.

**Table 4: Additional Benefits Reported in Included Studies**

<b>Additional Potential Benefit Outcomes</b> (direction of beneficial effect)	<b>Number of Studies</b>	<b>Median Absolute Percent Difference in Proportion of Participants</b> (Interquartile Interval)
Development of gestational diabetes (reduced)	11	-2.5 percentage points (IQI: -3.6 to 0.3)
Appropriate weight gain during pregnancy (increased)	8	10.2 percentage points (IQI: 4.2 to 18.1)

The CPSTF previously recommended [lifestyle interventions that include exercise to prevent gestational diabetes](http://www.thecommunityguide.org/findings/diabetes-prevention-lifestyle-interventions-reduce-risk-gestational-diabetes) [www.thecommunityguide.org/findings/diabetes-prevention-lifestyle-interventions-reduce-risk-gestational-diabetes]. The systematic review found strong evidence of effectiveness in reducing rates of gestational diabetes.

The CPSTF postulates additional intervention benefits may include reductions in health care utilization required for diagnostic work-up, enhanced follow-up, and potential treatment associated with gestational hypertension; and enhanced social support for pregnant women participating in group exercise classes. None of the included studies examined these possible benefits.

### Potential Harms

None of the included studies reported harms associated with the interventions. Four of the studies reported there were no exercise-related injuries. One study looked at effects on birth outcomes and found no meaningful and significant differences between study groups for gestational age at delivery, birthweight, or infant apgar scores. Five of the studies reported there were no adverse effects on labor, delivery, maternal, or fetal outcomes.

Two recently published systematic reviews specifically examined birth outcomes among pregnant women enrolled in exercise programs and found no adverse effects attributable to exercise programs (Di Mascio et al. 2016; Magro-Malosso et al. 2017).

### Related Reviews and Recommendations

The Committee on Obstetric Practice for the American College of Obstetricians and Gynecologists (ACOG) recently reaffirmed their recommendation that women with uncomplicated pregnancies should be encouraged to engage in aerobic and strength-conditioning exercises before, during, and after pregnancy. Recommendations also included an initial clinical assessment to rule out medical contraindications, use of motivational counseling, and an exercise prescription. The goal is for women to get moderate intensity exercise for at least 20-30 minutes per day on most or all days of the week with adjustments, as medically indicated (ACOG 2017).

Two recent systematic reviews conducted for the Cochrane Collaboration examined lifestyle interventions that included various combinations of diet and physical activity interventions for pregnant women. Although the primary focus for each review was different, the target populations and additional outcomes overlapped with analyses in Magro-Malosso et al. review.

- Muktabhant et al. (2015) examined whether interventions that aimed to improve physical activity and nutrition prevented excessive gestational weight gain. A subset analysis determined that incidence rates of maternal hypertension were significantly reduced in the intervention group (relative risk [RR] 0.70, 95% confidence interval [CI] 0.51 to 0.96; 5162 participants, 11 studies). The subset included seven studies that were also in the Magro-Malosso et al. review. No effect was found on preeclampsia (RR 0.95, 95% CI 0.77 to 1.16; 5330; 15).
- Shepard et al. (2017) focused on combined exercise and dietary interventions for the prevention of gestational diabetes. A subset analysis found a favorable, but not statistically significant effect on gestational hypertension (RR 0.78, 95% CI 0.47 to 1.27; 3073 participants, 6 studies). Only one study overlapped with the body of evidence in the Magro-Malosso et al. review. No effect was found on preeclampsia (RR 0.98, 95% CI 0.79 to 1.22; 5366 participants; 8 studies).

### Considerations for Implementation

Based on available evidence, the CPSTF recommends exercise programs for pregnant women to reduce the risk of developing gestational hypertension. The CPSTF also recommends similar interventions to reduce the risk of developing gestational diabetes, another common complication of pregnancy with similar risk factors (e.g., pre-pregnancy overweight or obese status, excessive weight gain during pregnancy).

As effectiveness evidence for these interventions continues to accumulate for additional outcomes (e.g., cesarean delivery), the overall ratio of benefits to costs is likely to increase, making these programs more attractive to health systems and communities. Growing evidence on benefits is also likely to increase patient and provider demand for these interventions.

The CPSTF identified four important considerations for real-world implementation of exercise programs.

- Interventions will likely depend on health plans or health systems to fund or provide facilities and supervision for exercise programs. Walking programs in community settings may reduce cost barriers for both health systems and women.

- Health system referral and enrollment systems will be required to ensure pregnant women can access exercise programs early in their pregnancies.
- Program retention may be increased if barriers to participation, such as childcare requirements, are addressed.
- Preventive benefits are likely to be greater when women join programs early in their pregnancies. It will be challenging, yet important, to expand the goals of early pre-natal visits to include an assessment for moderate-intensity aerobic exercise, an exercise prescription with motivational counseling (ACOG 2017), and enrollment or referral to available programs.

### Evidence Gaps

Additional research and evaluation are needed to fill existing gaps in the evidence base.

- Additional studies are needed to clarify prevention pathways between exercise and preeclampsia, and to include preeclampsia as an outcome in future studies of exercise programs.
- Additional studies should be conducted evaluating U.S. populations and settings. Studies should evaluate effectiveness across participant characteristics including income, level of education, and race/ethnicity. Implementation research should evaluate the effectiveness of community-based exercise programs for pregnant women referred from their initial pre-natal visit.
- Studies should implement and evaluate clinical systems to efficiently assess pregnant women for exercise program eligibility and refer them to available clinic- or community-based group exercise programs. Evaluations should attempt to measure rates of referral, exercise program participation, and retention.
- Studies should investigate program dose-response to identify minimum requirements for supervised group-format exercise and determine whether programs that provide a mix of supervised exercise sessions and physical activity promotion are effective.

### References

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### Disclaimer

The findings and conclusions on this page are those of the Community Preventive Services Task Force and do not necessarily represent those of CDC. Task Force evidence-based recommendations are not mandates for compliance or spending. Instead, they provide information and options for decision makers and stakeholders to consider when determining which programs, services, and policies best meet the needs, preferences, available resources, and constraints of their constituents.

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