PREGNANCY AND HYPERTENSION

American College of Obstetricians and Gynecologists definitions for Hypertensive Disorders of Pregnancy	
Hypertension in pregnancy	Systolic BP ≥140, or diastolic BP ≥ 90 mm Hg, or both measured on 2 occasions at least 4 hours apart
Severe-range hypertension	Systolic BP ≥160, or diastolic BP ≥110 mm Hg, or both measured on 2 occasions at least 4 hours apart (unless antihypertensive therapy initiated before this time)
Chronic hypertension	Hypertension diagnosed or present before pregnancy, or before 20 weeks of gestation; or hypertension that is diagnosed for the first-time during pregnancy and that does not resolve in the postpartum period
Gestational hypertension	Hypertension diagnosed after 20 weeks of gestation and a previously normal BP
Chronic hypertension with superimposed preeclampsia	Preeclampsia in a woman with a history of hypertension before pregnancy, or before 20 weeks of gestation
Preeclampsia	Hypertension in pregnancy >20 weeks of gestation and previously normal BP or severe range hypertension, in addition to at least 1 of the following: • Proteinuria (≥300 mg/24-hour urine, or PCR ≥0.3, or dipstick 2+ only if other quantitative methods not available) • Renal insufficiency (creatinine > 1.1 mg/dL or doubling of the serum creatinine concentration in the absence of other renal disease) • Thrombocytopenia (<100× 10^9/L) • Impaired liver function (ALT/AST ≥ 2x upper limit of normal) • Pulmonary edema • New-onset headache or visual disturbances (not due to alternative diagnoses)
Preeclampsia with severe features	• Severe range hypertension (Systolic BP ≥160, or diastolic BP ≥110 mm Hg, or both) • Renal insufficiency (creatinine > 1.1 mg/dL or doubling of the serum creatinine concentration in the absence of other renal disease) • Thrombocytopenia (<100× 10^9/L) • Impaired liver function (ALT/AST ≥ 2x upper limit of normal) • Severe persistent right upper quadrant or epigastric pain unresponsive to medications • Pulmonary edema • New-onset headache or visual disturbances (not due to alternative diagnoses)

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CHRONIC HYPERTENSION <20 WEEKS

Chronic hypertension:
Nonmodifiable risk factors increasing age,
Black race (SDOH)
family history of HTN.

Modifiable risk factors
obesity (approximately 40% of reproductive-aged individuals in the United States)
excess alcohol
tobacco consumption
physical inactivity
diabetes mellitus
chronic kidney disease
diet that is high in sodium and cholesterol

TABLE 1. Diagnostic Criteria for Chronic Hypertension in Pregnancy[11]

Systolic/ Diastolic blood pressure (mm Hg)	ACOG Criteria	ACC/AHA Criteria
<120/80	Normal	Normal
120-129/<80		Elevated
130-139/80-89		Stage 1 hypertension
≥140-159/90-109	Mild hypertension	Stage 2 hypertension
≥160-179/110-119	Severe hypertension	
≥180/120		Hypertensive crisis

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MEASUREMENT

BOX. BLOOD PRESSURE MEASUREMENT GUIDELINES TO IMPROVE ACCURACY OF READINGS[13,14]

- Patient positioning: Seated with back supported and lower extremities uncrossed and flat on the floor
- Select appropriate blood pressure cuff for patient's arm circumference. Arm should be bare. Bottom end of blood pressure cuff should be directly above the bend of the elbow.
- Patients should be rested for at least 5 minutes before obtaining blood pressure
- Patients should avoid caffeinated beverages, tobacco use or exercise in the 30 minutes prior to blood pressure measurement
- Repeat blood pressure if initial blood pressure is >140/90 mm Hg

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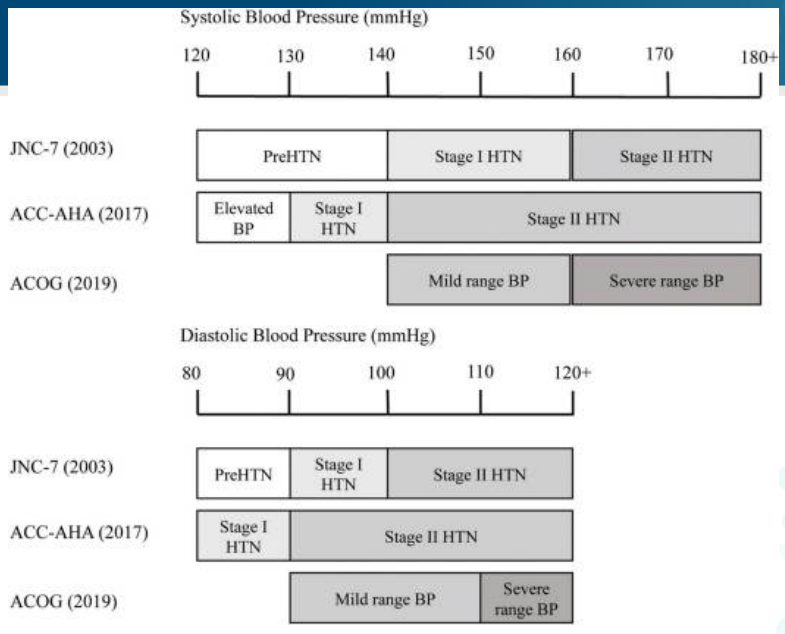
BP CUTOFFS



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BP CUTOFFS

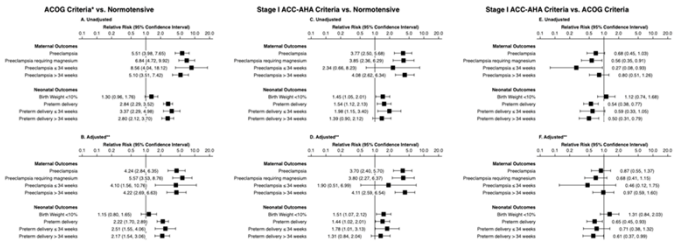

Fig. 2.
Unadjusted and adjusted associations between first trimester blood pressure and outcomes. Unadjusted **(A, C, E)** and covariate-adjusted **(B, D, F)** associations between patient blood pressure at the time of first trimester screen and outcomes. Panels A and B compare patients hypertensive by ACOG criteria to normotensive patients. Panels C and D compare patients hypertensive only by Stage I ACC-AHA criteria to normotensive patients. Panels E and F compare hypertensive only by Stage I ACC-AHA criteria to patients hypertensive by ACOG criteria. ACC-AHA, American College of Cardiology-American Heart Association; ACOG, American College of Obstetricians and Gynecologists.

- Recent retrospective evaluation applying the acc/aha definition of htn (130-139/80-90 mmHg) in first trimester patients
- Stage I ACC-AHA group compared with normals
  - more likely to have preeclampsia (aRR 3.70, 95% CI 2.40–5.70)
  - More likely to have preeclampsia requiring magnesium (aRR 3.80, 95% CI 2.27–6.37).
  - Stage I ACC-AHA group was also more likely to deliver preterm (aRR 1.44, 95% CI 1.02–2.01) and deliver an SGA neonate (aRR 1.51, 95% CI 1.07–2.12).

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Am J Perinatol. 2021 Aug; 38(Suppl 1): e249–e255.

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LIFESTYLE MODIFICATION IN CHTN

TABLE 3. Impact of Lifestyle Modifications for Prevention and Treatment of Chronic Hypertension

Lifestyle Intervention	Dose		Impact on SBP	
			Hypertension	Normotension
Weight loss	The best goal is ideal body weight, but aim for at least a 1-kg reduction in body weight for most adults who are overweight. Expect approximately 1 mm Hg for every 1-kg reduction in body weight.		-5 mm Hg	-2/3 mm Hg
Healthy diet	Consume foods that are rich in fruits, vegetables, whole grains, and low-fat dairy products, with reduced content of saturated and total fat.		-11 mm Hg	-3 mm Hg
Reduced intake of dietary sodium	The optimal goal is < 1500 mg/d, but aim for at least a 1000-mg/d reduction in most adults.		-5/6 mm Hg	-2/3 mm Hg
Enhanced intake of dietary potassium	Aim for 3500-5000 mg/d, preferably by consumption of foods that are rich in potassium.		-4/5 mm Hg	-2 mm Hg
Physical activity	Aerobic	90–150 min/week 65%–75% heart rate reserve	-5/8 mm Hg	-2/4 mm Hg
	Dynamic resistance	90–150 min/week, 50%–80% 1 rep maximum; 6 exercises, 3 sets/exercise, 10 repetitions/set	-4 mm Hg	-2 mm Hg
	Isometric resistance	4 × 2 min (hand grip), 1 min rest between exercises, 30%–40% maximum voluntary contraction, 3 sessions/week, 8–10 week	-5 mm Hg	-4 mm Hg
Moderation in alcohol intake	Alcohol consumption	In individuals who drink alcohol, reduce alcohol to: ■ Men: ≤2 drinks daily ■ Women: ≤1 drink daily	-4 mm Hg	-3 mm Hg

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CHTN COMPLICATIONS

Pregnancy Complications in Chronic HTN

Complications of Chronic HTN	
Preeclampsia	• 17-25% develop superimposed preeclampsia (vs 3-5% in general population); often before 34 weeks • Black >White • Worse Birth Outcomes • Difficulty distinguishing HTN vs Preeclampsia: Preeclampsia must always be considered
Fetal Growth Restrictions	• 10-20% of births associated with FGR with Chronic HTN (~1.5 X greater than general population) • Estimates may be higher: 41% & 21% with & without superimposed preeclampsia
Placental Abruption	• Frequency of 1.56% in Chronic HTN • 2.4 X ↑ risk of placental abruption in Chronic HTN
Preterm Birth	• Preterm Delivery Rates 12-34% in Chronic HTN pregnancies but can be as high as 60-70% in severe HTN (vs 10-12% in general US population • ↑ risk in untreated Chronic HTN • ↑ deliveries at <37 weeks, ↑ fetal demise
C-Section	• As expected, if concern for fetal or maternal well-being, C-section more likely in Chronic HTN • 2.7X great odds of C-section with Chronic HTN (even controlling for superimposed preeclampsia)

Sibai BM et a. NEJM 1998;339:667-71
Chappell LDC et al. Hypertension 2008;51:1002-9
Zetterstrom K et al. BJOG 2008;115:1436-42
Vanek M LIGO 2004;86:7-11

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TABLE 2. Maternal and Fetal Risks of Chronic Hypertension in Pregnancy[2,13,21,22,51]

Maternal risks	Odds/risk ratio	Fetal risks	Odds/risk ratio
Preeclampsia	5.1 (4.0-6.5)	SGA <10th percentile	1.8 (1.2-2.6)
Maternal mortality	1.7 (1.2-2.4)	Preterm birth <37 wks	1.3 (1.2-1.3)
Myocardial infarction	3.4 (2.2-5.1)	Preterm birth <34 wks	3.1 (2.0-4.8)
Stroke	3.4 (2.8-4.1)	Stillbirth	1.7 (1.6-1.8)
Peripartum cardiomyopathy	3.8 (3.3-4.3)	Placental abruption	1.4 (1.4-1.5)
Acute kidney injury	14.6 (12.1–17.7)		

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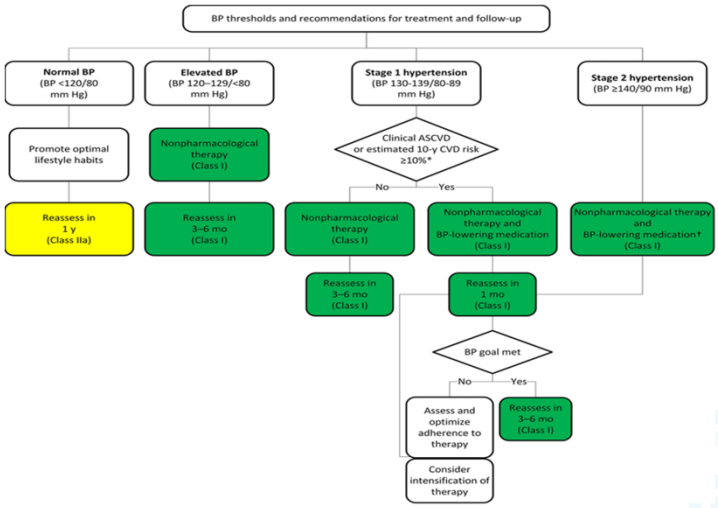
MED MANAGEMENT

- No absolute drug recommendations (from any society)
- Recommendations to discontinue ACE/ARB (at least 48 hours – UK NICE)
- Preconception counseling (see lifestyle management)
- Recent Study:
- No difference between labetolol vs nifedipine for initial management
- Thiazide diuretics – current guidelines recommend switching but small trials suggest safety



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