

## Pediatric HTN Basics

- To confirm HTN, BP should be measured in both arms and in one leg.
  - Normally, BP is 10 to 20 mm Hg higher in the legs than the arms.
  - If the leg BP is lower than the arm BP or if femoral pulses are weak or absent, coarctation of the aorta may be present.
  - Obesity alone is an insufficient explanation for diminished femoral pulses in the presence of high BP.

### Hypertension Staging

<u>SBP or DBP (x 3)</u>	<u>Classification</u>
< 90%	Normal
90 to < 95% >120/80 mmHg in adolescent	Pre-Hypertension
95 to 99% +5 mmHg*	Stage 1 Hypertension
> 99% +5 mmHg	Stage 2 Hypertension

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- Stage 2 HTN  
≥ 99% + 5mmHg
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- Evaluate or refer within 1 week
  - Sooner if symptomatic
- TLC
- Start anti-hypertension medication.

**Clinical Evaluation of Stage 1 and 2 HTN**  
**(> 95% + 5mmHg)**

**All children with persistent BP >95%**

- History: Fmhx, Pmhx, sleep hx, diet, ETOH/smoker, other risk factors\*.
- PE with retinal exam.
- BUN, Creat, electrolytes, UA and urine Cx.
- CBC
- Echocardiogram
- Renal ultrasound
- Fasting lipid panel, fasting glucose.

**Diabetes or chronic kidney disease, Fmhx of HTN, CVD or Diabetes**

- **Clinical Evaluation of Stage 1 or 2 HTN**  
**Additional studies IF indicated**
  
- **In a young child with Stage 1 or any child with Stage 2 HTN**  
***consider:***
  - **Plasma Renin**
  - **Renovascular imaging**
  - **Plasma and urine sterols**
  - **Plasma and urine catecholamines**
  
- **Testing for Target Organ Damage in HTN**
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- **Left Ventricular Hypertrophy**
  - **By Echocardiogram or EKG**
  
  - The most prominent, easily identifiable evidence.
  
  - Children with established HTN should have echocardiographic assessment of LV mass periodically.
  
  - LVH is an indication to start or intensify medical therapy for HTN.

## Therapeutic Lifestyle Changes (TLC)

- **Weight loss**
    - A 10% reduction in BMI can decrease BP 8-12 mmHg.
    - Decreases BP sensitivity to salt.
    - Decreases other CVD risk factors:
      - Dyslipidemia and Insulin resistance
    - May render medications unnecessary
  - **Physical activity**
    - Has little direct effect on BP alone.
    - Important in lowering weight and CVD risk.
    - *Competitive sports should be limited ONLY in the presence of uncontrolled Stage 2 HTN.*
  - TLC: **Diet**
  - **Diet changes can involve:**
    - Portion control\*.
    - Decrease in sugared beverages.
    - Decrease energy dense snacks.
    - More fresh fruit and vegetables.
    - Regular meals including a healthy breakfast.
- **Lower BP in children has been associated with:**
- Higher intake of K<sup>+</sup>, Mg<sup>++</sup>, folate, fiber, and unsaturated fat.
  - Lower intake of saturated fat.

## TLC:

### Dietary Sodium

#### Sodium reduction

- 1 to 3 mm Hg reduction in BP
  - Adequate sodium intake is :
    - 4-8 year olds: 1.2 gm / day
    - 5 year old: 1.5 gm/day
- One RCT showed lower sodium intake in infancy was correlated with lower BP in adolescence.  
(Geleins GS. Hypertension. 1997;29:913.)

## Pharmacotherapy for HTN

- **Indications:**

- Symptomatic HTN
- Secondary HTN
- HTN-ive target organ damage (LVH, retinopathy)
- Diabetes Type 1 or 2
- Persistent HTN despite TLC

- **Goals:**

- BP < 95%
- BP < 90% if child has:
  - Diabetes, Chronic Renal Ds or target organ damage present.

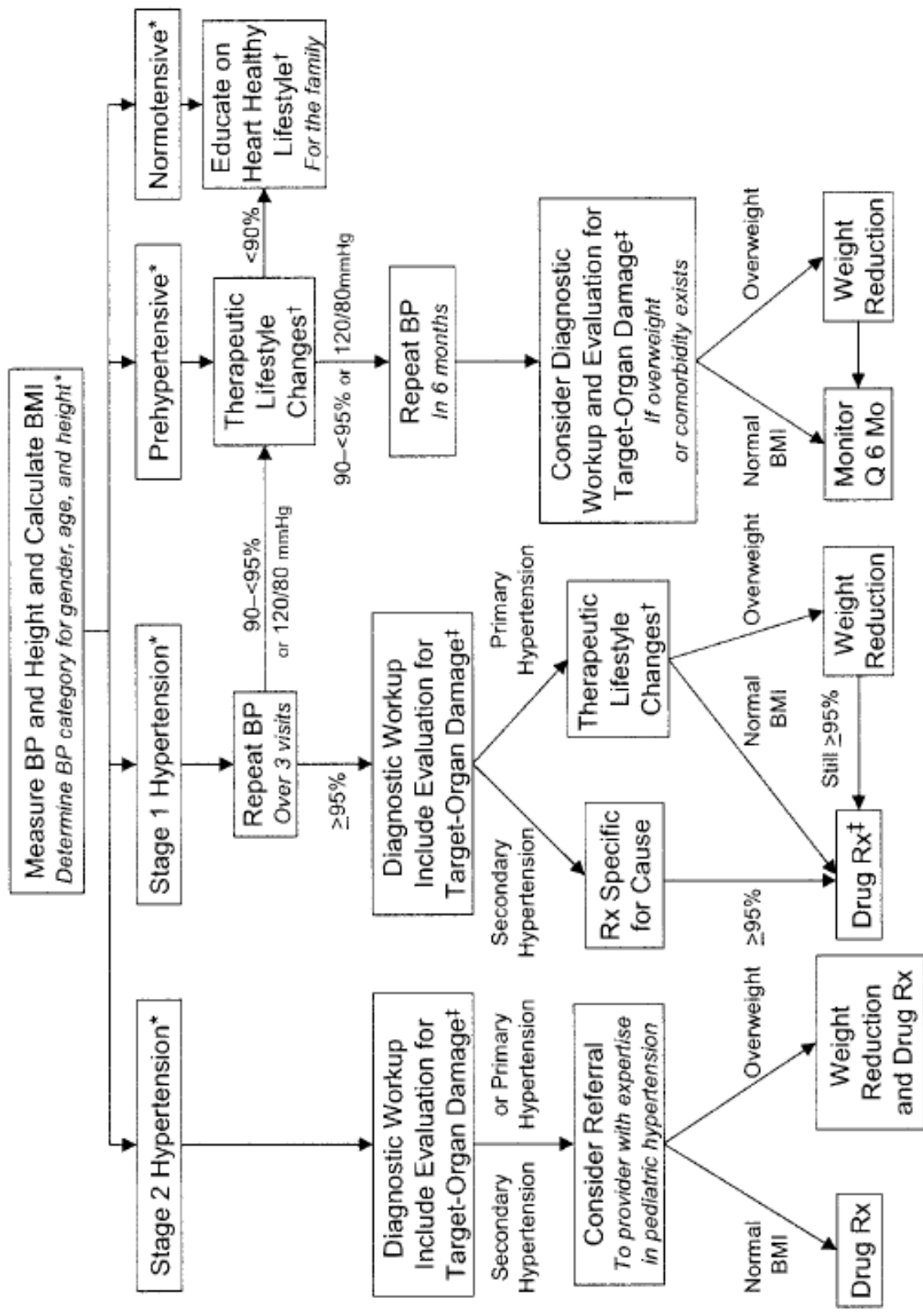


Fig 1. Management algorithm. Rx indicates prescription; Q, every. \*, See Tables 3, 4, and 5; †, diet modification and physical activity; ‡, especially if younger, very high BP, little or no family history, diabetic, or other risk factors.



# Measure Blood Pressure Annually

- Use a cuff large enough to cover 80% of the arm
- Diagnose hypertension using NHLBI tables  
[http://www.nhlbi.nih.gov/health/prof/heart/hbp/hbp\\_ped.htm](http://www.nhlbi.nih.gov/health/prof/heart/hbp/hbp_ped.htm)
- Or use Envision NM BP% & BMI% Cheat Sheet.

Blood Pressure 95% by Age, Sex and Height %

AGE	BOYS HEIGHT %		GIRLS HEIGHT %	
	50%	90%	50%	90%
2 Yr	106/61	109/63	105/63	108/65
5 Yr	112/72	115/74	110/72	112/73
8 Yr	116/78	119/79	115/76	118/78
11 Yr	121/80	124/82	121/79	123/81
14 Yr	128/82	132/84	126/82	129/84
17 Yr	136/87	139/88	129/84	131/85

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