

OCHSNER ANNUAL UPDATE IN PEDIATRICS

Pediatric Hypertension

A primary care guide to screening, workup, and when to refer

Andrew Barbera, M.D.

Pediatric Nephrology · Ochsner Health

October 16, 2026

Disclosures

I have no relevant financial relationships with ineligible companies to disclose.

This presentation does not include discussion of off-label or investigational use of any medication or device.

Learning Objectives

By the end of this session, participants will be able to:

- 1 Correctly measure pediatric blood pressure and classify readings using current AAP-based definitions.
- 2 Identify the initial office-based workup appropriate before or alongside a nephrology referral.
- 3 Recognize which findings warrant routine versus urgent referral to pediatric nephrology.

INTRODUCING

Ochsner Pediatric Nephrology

Myself and Sanjna Bharwani M.D. have joined Ochsner as the system's first onsite pediatric nephrologists, building a new subspecialty practice for children with kidney, urinary tract, and blood pressure conditions



Outpatient Clinic

OMC New Orleans - Jefferson Hwy
Subspecialty Clinics



Outpatient, Inpatient, and eConsults

Serve the entire Ochsner network
across all Ochsner facilities



Hypertension Program

Ambulatory BP monitoring and
management for complex cases



Timely Access

Can get same day referrals for
routine or urgent evaluations

How to refer a patient

Andrew Barbera, M.D. · andrew.barbera@ochsner.org · Cell: 251-656-7440 · Fax: 504-842-6160

When in doubt or you just have a question, skip the formal referral -- call us or send a secure chat directly.



PART ONE

Pediatric Hypertension in Primary Care

Screening · Measurement · Classification · Workup · Referral

By the Numbers

U.S. ADULTS

Nearly half have high blood pressure — 119.9 million people (48.1%)¹

Only about 1 in 4 (22.5%) have it under control¹

Costs the U.S. health system an estimated \$219 billion a year¹

A primary or contributing cause of 680,179 deaths nationally in 2024¹

U.S. CHILDREN & ADOLESCENTS

3.5%

of children ages 8–17 meet criteria for hypertension²
≈1.3 million adolescents ages 12–19 already have it nationally³

1 in 10

have elevated BP or hypertension combined — about 1 in 10 kids
7.1% elevated · 3.1% Stage 1 · 0.3% Stage 2 hypertension²

~36,700

LA kids may already meet criteria for hypertension^{2,9}

THE PART THAT SHOULD WORRY US

Most of These Kids Are Never Diagnosed

77%₄

of children with confirmed hypertension across multiple visits were never given the diagnosis

In 2016, Kaelber DC, Pickett F, et al. retrospectively studied nearly 400,000 children across nearly 200 primary care practices, only 23% of kids who met criteria for hypertension on repeated visits were ever diagnosed — and only 10% of those with elevated BP were flagged.⁴

Even when a child was correctly diagnosed and met criteria for medication, only 6% actually received a prescription.⁴

WHY IT MATTERS OVER A LIFETIME

Cardiac damage, already

About 30% of children with primary hypertension already have left ventricular hypertrophy⁵

It tracks into adulthood

Elevated childhood BP predicts essential hypertension later in life⁶

Real cardiac events follow

Hypertensive kids had 2.1x the rate of stroke, MI, and heart failure over 13+ years of follow-up⁷

NOT A SILENT DISEASE

Hypertension Has Symptoms — They're Just Easy to Miss

In a study of 409 children with newly diagnosed hypertension and 150 normotensive controls, 64% of the hypertensive group reported at least one symptom, versus 26% of controls (p<0.001).¹⁰

Symptom	Hypertension	Normal BP
Headache	42%	10%
Chest pain	14%	4.9%
Abdominal pain	10%	4%
Difficulty falling asleep	27%	6%
Daytime tiredness	26%	6%
Trouble concentrating	10%	5%
School failure	10%	3%

All nonspecific, easy to write off as stress, poor sleep hygiene, or growing pains -- which is likely part of why they get missed. The three most common symptoms improved sharply with treatment: headache 42%→6.2%, difficulty falling asleep 27%→1.5%, daytime tiredness 26%→10% (all p<0.001).¹⁰



FROM GUIDELINE TO PRACTICE

Screening Starts at the Well Visit

- ✓ Terminology and thresholds now mirror adult AHA/ACC categories, with adult numbers applying directly starting at age 13.
- ✓ Children with obesity were removed from the reference population, so today's "normal" is a stricter bar than the old 2004 tables.

WHEN WE SCREEN

🕒 **Age 3 and up, average risk**

Annual BP measurement at every well-child visit

⚠️ **Any age, higher risk**

Every visit, regardless of age — Extreme prematurity, obesity, kidney disease, congenital heart disease, diabetes, transplant, or a BP-raising medication

Once a reading is flagged abnormal, everything depends on measuring it and interpreting it correctly.



The traditional approach to hypertension in the clinic

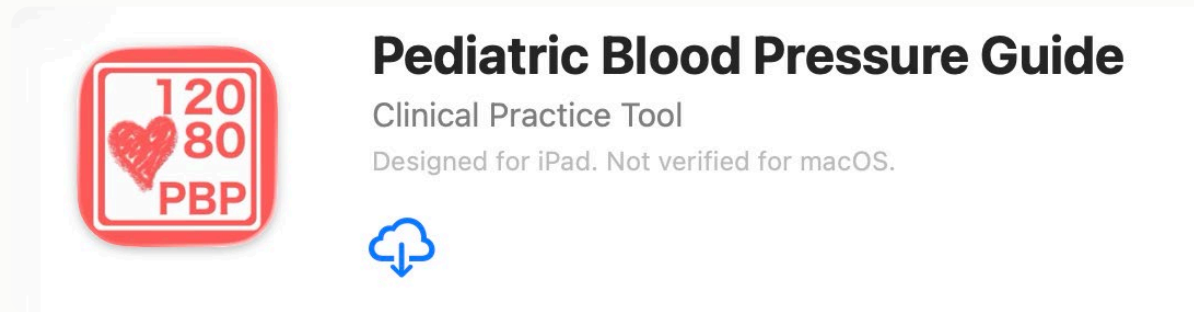
Classification & Definitions

Category	Ages 1-12	Ages 13 and older
Normal	< 90th percentile	< 120 / < 80 mmHg
Elevated	90th to < 95th percentile	120-129 / < 80 mmHg
Stage 1 hypertension	95th percentile to < 95th + 12 mmHg	130-139 / 80-89 mmHg
Stage 2 hypertension	≥ 95th percentile + 12 mmHg	≥ 140 / 90 mmHg

Percentiles are based on sex, age, and height. Reference tables and exact cut-points should be verified against the current AAP Clinical Practice Guideline before this talk is finalized.

AT THE POINT OF CARE

A Quick-Reference App for the Office



Pediatric Blood Pressure

Clinical Practice Guideline Tool

Boy ☒ Girl

Age 8 y

Height 130.5 cm

Percentiles	Systolic	Diastolic
50th	97	58
90th	109	70
95th	112	73
95th + 12mm	124	85

mm Hg



Home ⓘ 🔗 ⚙️

Getting the Measurement Right

Common Errors

Wrong cuff size -- too small inflates the reading; when in doubt, use a size up

Unsupported arm or measurement taken in lower extremity

Single reading from triage without a repeat in the room

Measured right after activity, crying, or while talking

Automated reading not followed up with a manual reading

Readings taken during illness and not followed up

Correct Technique

Cuff bladder covers about 80-100% of arm circumference

Seated, feet supported, arm at heart level, after 5 minutes of quiet rest

Repeat an elevated reading; average the last two of three

Quiet room, no talking, no recent stimulant use

Confirm an abnormal automatic reading by manual before acting on it

WHAT HAPPENS NEXT

From an Accurate Reading to a Diagnosis

Elevated BP

Lifestyle counseling; recheck in 6 months. Still elevated? Recheck again in 6 months. Persists past 12 months (~3 readings) -- send for ABPM and begin diagnostic evaluation.⁸

Stage 1 Hypertension

Recheck in 1-2 weeks, then again at 3 months. Still Stage 1 after 3 visits -- order ABPM, begin diagnostic evaluation, and consider treatment.⁸

Stage 2 Hypertension

Recheck within 1 week or refer to Nephrology within that week. Still Stage 2 on repeat -- diagnostic evaluation including ABPM.⁸

⚠ Home BP monitoring is not a diagnostic substitute

Per the guideline: home BP monitoring should not be used to diagnose hypertension, masked hypertension, or white-coat hypertension -- but it may be a useful adjunct to office and ambulatory BP measurement once hypertension has already been diagnosed.⁸

Across every pathway, the guideline calls for ABPM to confirm it -- when a reading won't go away, that's the recommended next step.⁸

Next: Ambulatory Blood Pressure Monitoring →

Ambulatory Blood Pressure Monitoring

A 24-hour wearable BP monitor that helps distinguish true hypertension from measurement artifact and is often the deciding test before a diagnosis is made.



Confirms the diagnosis

Distinguishes sustained hypertension from a single elevated office reading

Unmasks white-coat & masked HTN

Identifies office-only elevation, and true hypertension missed in clinic

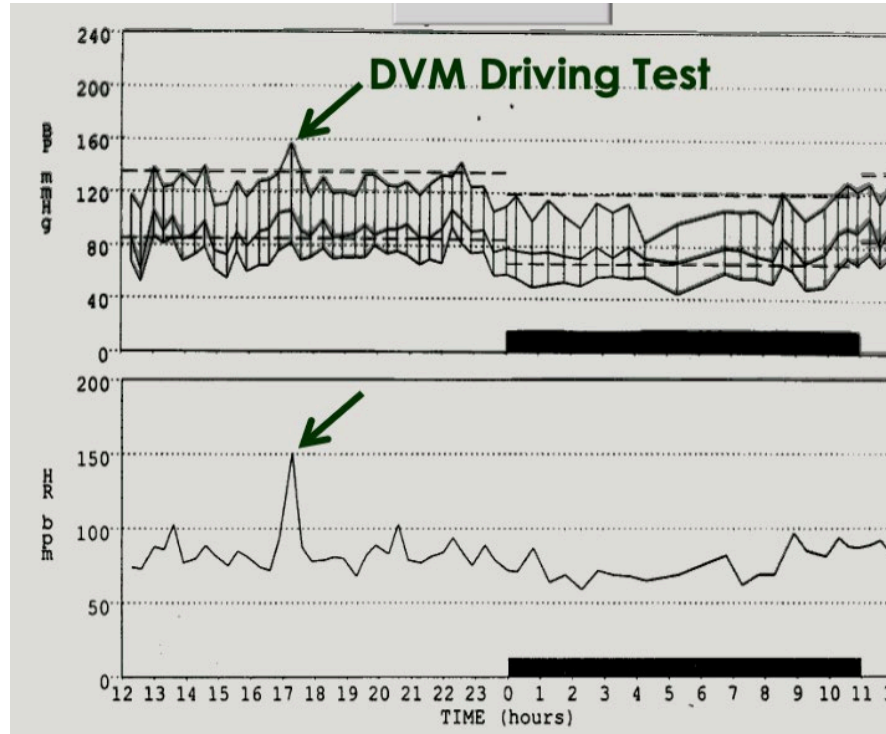
Guides higher-risk patients

Recommended for CKD, obesity, diabetes, repaired coarctation, and solid organ transplant recipients

We can order and interpret ABPM directly even before an outpatient workup is complete. Goal is to have a dedicated set of units for our Pediatrics offices to use.

WHAT THE STUDY PRODUCES

Reading an ABPM Printout



It's also cost-effective as a first step!
\$2.4 million per 1000 patients if imaging is held

In a cohort of 126 children referred for elevated office BP, ordering ABPM up front was more cost-effective than treating on office readings alone -- largely because it reliably identifies white-coat hypertension, sparing those kids the cost of an unnecessary workup and medication they didn't need.¹¹

BEFORE THE WORKUP

Causes of Pediatric Hypertension

White Coat Hypertension

30–40%

of referrals for elevated office BP -- another reason correct measurement and, when needed, ABPM matter so much

Secondary Hypertension

20–30%

of confirmed hypertension. Renal causes make up the large majority of these (~85%); cardiovascular, drug-related, endocrine, and tumor causes are all much less common

Essential (Primary) Hypertension

70–80%

of confirmed hypertension -- and the share climbing fastest, tracking the childhood obesity epidemic

THE MOST LIKELY CAUSE SHIFTS WITH AGE

Neonates (0–6 mo)

1. Congenital malformation
2. Renal parenchymal
3. Renovascular

Infants / Preschool (0.5–4 yr)

1. Renal parenchymal
2. Renovascular
3. Cardiovascular

School Age (5–12 yr)

1. Essential ($\pm$ obesity)
2. Renal parenchymal
3. Renovascular

Adolescents (13–18 yr)

1. Essential ($\pm$ obesity)
2. Renal parenchymal
3. Renovascular

Initial Office Evaluation

What's helpful to have in hand before -- or alongside -- a referral

History

Birth history (premie)

Family history of hypertension, kidney disease, or early cardiovascular disease

Snoring, witnessed apnea, daytime sleepiness

Growth trajectory and weight history

Medications and substance use, including stimulants and decongestants

Exam

Accurate height, weight, and BMI percentile

Four-limb BP if coarctation is a concern

Signs suggesting a secondary or syndromic cause (rashes, edema, acanthosis, etc)

Labs & Imaging

CMP, CBC, Hgb A1c, TSH, Free T4, Lipid panel

Urinalysis, with reflex microscopy

Renal ultrasound for children under 6 or with an abnormal history/exam

Echocardiogram to assess for congenital cardiac disease and left ventricular hypertrophy

CHOOSING A FIRST AGENT

Initiating Antihypertensive Therapy

Calcium Channel Blockers

First-line option for essential or secondary hypertension

Poor choice for renin-dominant hypertension

Less ideal in significant obesity

ACE Inhibitors / ARBs

First-line option for essential or secondary hypertension

Ideal for renin-dominant hypertension

Important synergy with diuretics

High risk in pregnancy and with dehydration

Beta Blockers

Favored in patients with cardiac disease, CKD, or anxiety disorder

Less favorable side-effect profile, especially in obesity

Diuretics

Often the optimal second agent, especially as a fixed combination

First-line in some obesity- and steroid-associated hypertension

When to Refer to Pediatric Nephrology

Routine

Confirmed Elevated BP or Stage 1 hypertension on repeat, correctly-measured readings across two or more visits

Urgent (days, not months)

Stage 2 hypertension, hypertension with an abnormal urinalysis or renal function, or a known risk factor including cancer, sickle cell disease, CKD, and/or transplant history

Emergent -- send to the ED

Symptomatic severe hypertension -- headache, vomiting, visual changes, altered mental status, or seizure

Key Takeaways

- ④ Measurement technique fixes more "hypertension" than any test -- right cuff, arm at heart level, repeat before acting.
- ④ Adult thresholds apply at 13; younger children need a percentile lookup by age, sex, and height.
- ④ A partial/full workup is a fine reason to refer -- send what you have and we'll fill in the gaps.
- ④ We're here for routine, urgent, and emergent referrals -- reach out any time.

References

1. Centers for Disease Control and Prevention. High Blood Pressure Facts. Prevalence/control: NHANES 2017–March 2020; cost estimate for 2019; mortality estimate (680,179 deaths) for 2024, CDC Multiple Cause of Death data.
2. Al Kibria GM, Swasey K, Sharmeen A, Day B. Estimated Change in Prevalence and Trends of Childhood Blood Pressure Levels in the United States After Application of the 2017 AAP Guideline. *Prev Chronic Dis*. 2019;16:180528.
3. Jackson SL, Zhang Z, Wiltz JL, et al. Hypertension Among Youths — United States, 2001–2016. *MMWR Morb Mortal Wkly Rep*. 2018;67(27):758–762.
4. Kaelber DC, Pickett F, et al. Diagnosis and Medication Treatment of Pediatric Hypertension: A Retrospective Cohort Study. *Pediatrics*. 2016;138(6):e20162195.
5. Sinha MD, Azukaitis K, Sladowska-Kozłowska J, et al. Prevalence of Left Ventricular Hypertrophy in Children and Young People With Primary Hypertension: Meta-Analysis and Meta-Regression. *Front Cardiovasc Med*. 2022;9:993513.
6. Bao W, Threefoot SA, Srinivasan SR, Berenson GS. Essential Hypertension Predicted by Tracking of Elevated Blood Pressure From Childhood to Adulthood: The Bogalusa Heart Study. *Am J Hypertens*. 1995;8(7):657–665.
7. Robinson CH, Hussain J, Jeyakumar N, et al. Long-Term Cardiovascular Outcomes in Children and Adolescents With Hypertension. *JAMA Pediatrics*. 2024;178(7):688–698.
8. Flynn JT, Kaelber DC, Baker-Smith CM, et al. Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. *Pediatrics*. 2017;140(3):e20171904. — BP classification and definitions used throughout this talk, and the basis for the follow-up/diagnosis timeline and home BP monitoring guidance on the "From an Accurate Reading to a Diagnosis" slide.
9. U.S. Census Bureau. QuickFacts: Louisiana. Vintage 2025 population estimate (total population and percent under 18) — basis for the Louisiana-specific estimate on the "By the Numbers" slide.
10. Croix B, Feig DI. Childhood Hypertension Is Not a Silent Disease. *Pediatr Nephrol*. 2006;21(4):527–532. — symptom prevalence table on the "Hypertension Has Symptoms" slide.
11. Swartz SJ, Srivaths PR, Croix B, Feig DI. Cost-Effectiveness of Ambulatory Blood Pressure Monitoring in the Initial Evaluation of Hypertension in Children. *Pediatrics*. 2008;122(6):1177–1181. — cost-effectiveness callout on the "Reading an ABPM Printout" slide.