



## CLINICAL PRACTICE GUIDELINES FOR PEDIATRIC HYPERTENSION: WHAT CLINICIANS NEED TO KNOW?

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There are several reasons to focus on childhood hypertension (HTN). Although hypertension in children can be a very silent chronic illness, it increases the risk for adult cardiovascular disease (CVD) and has evidence of accelerated vascular aging in even youth with hypertension. Due to the increase in childhood obesity, it is noted that there is an increase in prevalence of hypertension, 3.5% of children are found to have hypertension.

The new guideline was developed in 2017 by the American Academy of Pediatrics (AAP) and endorsed by American Heart Association.

### DEFINITION OF HYPERTENSION

Unchanged from the previous guidelines, defining abnormal blood pressure (BP) in children 1 to <13 years of age continues to rely on percentile based BP definition that is based upon age, gender and height. However, BP cutoff points for adolescent ≥ 13 years old are the same as in adult in American Heart Association (AHA) guidelines. \*the replacement of the term "prehypertension" with the term "elevated blood pressure"

### FREQUENCY AND METHOD OF BP MEASUREMENT

BP should be measured annually in children and adolescents ≥3 yr of age unless they are high risk. If they have obesity, are taking medications known to increase BP, have known renal disease or urologic malformations, a

TABLE 1. - HTN CLASSIFICATION

Classification	Age 1-13 yrs	Age ≥13 yrs
Normal BP	<90th%	<120/80
Elevated BP*	≥90 <sup>th</sup> % to 95 <sup>th</sup> % or 120/80 to <95 <sup>th</sup> % (whichever is lower)	120/<80 to 129/<80
Stage 1 HTN	≥95 <sup>th</sup> % to <95 <sup>th</sup> %+12 or 130/80 to 139/89 (whichever is lower)	130/80 to 139/89
Stage 2 HTN	≥95 <sup>th</sup> %+12 or ≥140/90 (whichever is lower)	≥140/90

history of aortic arch obstruction/coarctation or diabetes, BP should be checked at every health care encounter.

"Oscillometric devices (more commonly referred to as automated BP devices) that have been validated in the pediatric age group may be used for BP screening in children and adolescents. (Validation status for those devices in the pediatric age group can be checked at [www.dablededucational.org](http://www.dablededucational.org).) If elevated BP is suspected on the basis of oscillometric readings, confirmatory measurements should be obtained by auscultation method because pediatric normative BP values are based on auscultation."

Proper method of BP measurement is important in diagnosis. The child should be seated in a quiet room for 3–5 min before measurement, with the back supported and feet uncrossed on the floor. Arm should be supported at heart level and measure upper extremities BP by using appropriate cuff size. Due to limited data, use of wrist and forearm monitors are not recommended in children.

### 24 HOUR AMBULATORY BLOOD PRESSURE MONITORING (ABPM)

2017 new guidelines endorsed the use of ABPM in diagnosis and management of childhood hypertension. Patients wear a BP cuff for 24 hours and BP is recorded every 20-30 min throughout the day and night. It can capture BP in many settings of the day including home, school and work settings. ABPM allows for evaluation of out-of-office BP and circadian BP patterns which can be abnormal in certain conditions. It can be used to diagnose white coat hypertension (WCH), masked hypertension (MH), and treatment effectiveness. It is cost-effective by reducing unnecessary testing in patients with WCH.

ABPM should be performed for the confirmation of hypertension in children and adolescents with

1. Office BP measurements in the elevated BP category for 1 year or more.
2. Stage 1 HTN over 3 clinic visits.
3. Assessment of hypertension severity in high-risk conditions (history of prematurity, obesity, diabetes, chronic kidney disease, solid organ transplant, obstructive sleep apnea (OSA) etc).

### DIAGNOSIS OF HYPERTENSION

Since BP in children may vary between visits and even in the duration within the

same visit, it is important to obtain multiple measurements over time before making the diagnosis of hypertension. Trained health care professionals in the office setting should make a diagnosis of HTN if a child or adolescent has auscultatory-confirmed BP readings ≥ 95th percentile at 3 different visits. Home BP and school BP should not be used to diagnose hypertension but may be a useful adjunct to office and ambulatory BP measurement after HTN has been diagnosed.

### SIMPLIFIED SCREENING TABLE

It is provided for easier recognition of blood pressures that may require attention.

Please review the table in this link. <http://pediatrics.aapublications.org/content/140/3/e20171904>.

### NEW BP TABLES:

New normative 2017 BP tables are based only on BP readings from normal weight children. The tables include actual heights in cm and inches and also reflect staging system that will help you categorize your patients BP. BP tables can be reviewed in this link <http://pediatrics.aapublications.org/content/140/3/e20171904>. Another handy tool is MDCalc application (also available at <https://www.mdcalc.com/aap-pediatric-hypertension-guidelines>) which has next step management and critical actions.

### EVALUATION OF HYPERTENSION

Evaluation should focus on determining possible causes and/or comorbidities such as OSA, dyslipidemia associated with HTN. In children and adolescents being evaluated for high BP, the provider should obtain a perinatal history, appropriate nutritional history, physical activity history, psychosocial history, and family history and perform a physical examination to identify findings suggestive of secondary causes of HTN.

### PRIMARY AND SECONDARY HYPERTENSION

The characteristics of primary hypertension in children and adolescents are ≥6 years of age, positive family history of HTN, overweight or obese, and/or do not have history or physical examination findings NOT suggestive of a secondary cause of HTN. The new guideline doesn't recommend to do extensive evaluation to find out for secondary causes of HTN for those children.

The most common cause of secondary hypertension in children are renal parenchyma, renovascular diseases, and coarctation of aorta

TABLE 2 - HTN EVALUATION

Classification	Next Step BP Evaluation
Normal BP	Recheck at routine well visit.
Elevated BP	*LSM, U and L extremity BP, Recheck in 6 months by auscultation. After 12 months and 3 auscultatory measurements, start ABPM/diagnostic evaluation. Refer to subspecialist as needed.
Stage 1 HTN	LSM, U and L extremity BP, Recheck in 1-2 weeks, then in 3 months. After 3 visits, ABPM/diagnostic evaluation and initiate treatment. Refer to subspecialist as needed.
Stage 2 HTN	Recheck or refer to subspecialist in 1 week. If symptomatic, refer to ED. LSM

\*LSM-Lifestyle Modifications, U and L- upper and lower.

MANAGEMENT OF HYPERTENSION

LIFESTYLE MODIFICATIONS (LSM)

LSM includes good nutrition, active lifestyle, and sleep well and stress reduction.

The recommended diet is DASH Diet (Dietary approaches to STOP hypertension).

The diet contains high in fruits, vegetables, low-fat milk products, whole grains, fish,

poultry, nuts, and lean red meats; it also includes a limited intake of sugar and sweets along with lower sodium intake.

Regarding physical activity, it is recommended to do 30-40 minutes of moderate to vigorous, aerobic physical activity at least 3 to 5 days per week that improved SBP by an average of 6.6 mm Hg and prevented vascular dysfunction.

FAMILY BASED APPROACH

A family-based approach plays a particular role in conditions that are substantially influenced by lifestyle behaviors. If children and adolescents lack a clear understanding of what is happening inside their bodies, they will not be able to make informed choices in their daily activities.

PHARMACOLOGIC AGENTS

In hypertensive children and adolescents who have failed

lifestyle modifications (particularly those who have LV hypertrophy on echocardiography, symptomatic HTN, or stage 2 HTN without a clearly modifiable factor (obesity)), clinicians should initiate pharmacologic treatment with an ACE inhibitor, ARB, long-acting calcium channel blocker, or thiazide diuretic. LSM should be continued in children requiring pharmacologic therapy.

OVERALL BP GOAL

In children and adolescents diagnosed with HTN, the treatment goal with non-pharmacologic and pharmacologic therapy should be a reduction in systolic blood pressure (SBP) and diastolic blood pressure (DBP) to <90th percentile and <130/80 mm Hg in adolescents ≥ 13 years old.

TREATMENT IN SPECIAL POPULATION

Children and adolescents with chronic kidney disease (CKD) or Diabetes Mellitus (DM) should be evaluated for HTN at each medical encounter and treated if BP is ≥95th percentile or >130/80 mm Hg in adolescents ≥13 years of age. For CKD patients, HTN should be treated to lower 24-hour MAP to <50th percentile and screened yearly to diagnose masked hypertension (MH) by ABPM.

In observance of World Kidney Day, being a pediatric nephrologist, I would like to raise awareness of childhood hypertension in our community. Texas Tech Pediatric Nephrology clinic is providing 24 hour ABPM services, screening, diagnosis and treatment of hypertension and kidney diseases. If you would like to make referral/appointment, please call 915-215-5700. We are excited to celebrate "Kidney Health For Everyone Everywhere" with you.

INVESTIGATIONS

All Patients- Urinalysis, Comprehensive metabolic profile (CMP), Lipid profile (fasting /Non-Fasting HDL and total Cholesterol). Renal Ultrasound, <6 yrs of age or abnormal Urinalysis (UA) or renal function.

Obese Patients- Add HbA1c, AST/ALT (Fatty liver), fasting lipid panel.

Optional test- Fasting serum glucose, TSH, Drug Screen, Sleep Study, CBC- if growth delay and abnormal renal function.

ECHOCARDIOGRAPHY

Echocardiography is used to diagnose left ventricular hypertrophy (LVH) that is the end organ damage of the consequence of HTN. It should be deferred in initial diagnosis stage of hypertension but recommended to do at the time of consideration of pharmacologic treatment of HTN in the new guideline.

RESOURCES

Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents <http://pediatrics.aappublications.org/content/early/2017/08/21/peds.2017-1904>

HOORAY! IT'S SPRING- HELLO ALLERGY SEASON

BY: DR. RICARDO REYNA  
COMMUNITY PEDIATRICIAN

A chool! It's the time of year when seasonal allergies peak. I think it's safe to say that most parents are excited when the weather begins to change and Spring is in the air. Among other things, it means their kids will have nicer weather for more outdoor play. But the nicer weather can present a challenge for children who have spring allergies. April through June can be a frustrating time of year, as it can bring about watery eyes, runny noses and endless sneezing. And for kids with asthma and allergies, this can add another layer of complexity to their treatment plan. In fact, about 80-90% of kids who have asthma also have allergies, or allergic asthma.

When kids with allergic asthma are exposed to an allergen, they can develop inflammation in their lungs.

This may cause asthmatic symptoms such as nighttime awakenings, coughing, wheezing and shortness of breath. It may also contribute to more trips to the doctor's office, urgent care visits and missed days of school. The good news is that when you treat allergies, asthma is much easier to control. In order to control it, sometimes kids need a comprehensive, multi-faceted plan that is targeted at their allergies also.

Remember, steps to help control allergies/Asthma in patients should include knowing their symptoms, learning what your patients are allergic to, limiting indoor exposures, limiting outdoor exposures, trying medication and considering allergy shots if symptoms are severe. Let's avoid the typical Spring, when your nose does more running than you do!



# MEDCARES: YOUR LOCAL CHILD ABUSE RESOURCE

BY: VANESSA VELEZ, DNP CPNP-PC DIRECTOR, MEDCARES CLINIC AT EL PASO CHILDREN'S HOSPITAL

Child maltreatment in the pediatric population is becoming more prevalent in today's society and is being seen more frequently in the primary care and hospital setting. Often times, "red flags" of child maltreatment are dismissed during the physical exam of a pediatric patient; therefore, being unreported or undocumented. Identifying suspected abuse and reporting suspected abuse to Child Protective Services (CPS) can be a challenging and difficult for the pediatrician. Early identification and intervention is essential to the protection of the child and has the potential to stop the abuse from continuing, and can even be lifesaving. Child maltreatment consists of physical abuse, sexual abuse, emotional abuse, and neglect. Child maltreatment has been known to have significant long-term medical and mental health morbidity, placing the victim at a higher risk of developing a variety of behavioral and functional problems (Kellogg, 2007).

## CLINIC OVERVIEW

In 2009, the 81st Texas Legislature added Chapter 1001, Texas Health and Safety Code, to establish the Medical Child Abuse Resources and Education System (MEDCARES) grant program in an effort to improve the assessment, diagnosis, and treatment of child abuse and neglect. The grant program also aimed to increase child abuse prevention, education and efforts to increase partnerships with community organizations, such as Child Protective Services and Law Enforcement. In 2012, Center for the Prevention of Child Abuse, MedCARES Clinic was established at El Paso Children's Hospital.

El Paso Children's Hospital (EPCH) Center for the Prevention of Child Abuse, MedCARES Clinic, is the only agency in the West Texas Region and Southern New Mexico which provides a complete and comprehensive medical evaluation for child abuse and neglect. The mission of the MedCARES Clinic is to provide medical services, emotional support, education and resources to address the medical and psychosocial needs for children who have become victims of child abuse or those at-risk.

Child abuse specialists (Physicians, Advanced Practice Nurses, Forensic Nurse Examiners, Sexual Assault Nurse Examiners, Medical Social Workers, etc.) provide timely and accurate diagnosis, treatment and give support to in-

vestigations. Angelica Machorro, M.D., F.A.A.P. serves as medical director for the MedCARES Clinic. Dr. Machorro is a board certified pediatrician with experience in treating victims of child abuse and neglect. MedCARES Clinic Director, Vanessa Velez, DNP, CPNP-PC, CP-SANE is a Doctor of Nursing Practice, Pediatric Nurse Practitioner with over 10 years' experience in child abuse and neglect. Dr. Velez also holds a Post-Doctoral Forensic Nursing Certification and is a Certified Pediatric Sexual Assault Nurse Examiner.

At EPCH, the MedCARES Clinic provides services to include forensic medical exams, follow-up forensic medical exams, forensic photographs, testing and treatment for sexually transmitted infections (STIs), crisis intervention, referrals for long term counseling, Crime Victim Compensation, and other medical services as needed. In addition to providing direct services, the MedCARES staff also provides education and training to those who work on the front lines with children at risk (law enforcement, child protective services, district attorney's office) as well as other members of the public (parents, teachers, students, medical professionals).

If a pediatrician suspects child abuse and/or neglect, or if the patient is at-risk, a referral is warranted to the MedCARES Clinic for further evaluation. Refer to table 3 for examples of reasons for referral to the MedCARES Clinic:

## PHYSICAL EXAMINATION FINDINGS OF POSSIBLE ABUSE

There are several factors to take into account when assessing a child for possible abuse. These factors include age and development of the child, severity and age or timing of the injury, careful consideration of the explanation provided by caregiver of how the injury occurred, mechanism of trauma, and ruling out possible diseases that can be mistaken for child abuse. General physical examination findings suggesting abuse include the following: Any injury to a young, perambulatory infant, including bruises, mouth injuries, fractures, and intracranial or abdominal injuries; Multiple injuries in different stages of healing; Patterned injuries, injuries to nonbony or other unusual locations, such as over the torso, ears, face, neck, or upper arms; Significant injuries that are unexplained;

Any additional evidence of child neglect (Christian, 2015). During physical examination of a child, the mnemonic "TEN 4" is an effective and easy way to identify bruising to the following areas which are cause for concern of abuse: T: torso; E: ear; N: neck; and 4: in children less than or equal to 4 years of age and in ANY infant under the age of 4 months (Christian, 2015).

## POPULATION SERVED

Since 2015, the MedCARES Clinic has assessed, diagnosed and treated over two thousand four hundred (2,400) children who were victims of child abuse and neglect and/or at-risk for child maltreatment (Figures 1 and 2). In addition, an estimated nine hundred (900) children will receive medical services related to child abuse and neglect from the MedCARES team in fiscal year 2019.

## MANAGEMENT AND FOLLOW-UP CARE

It is everyone's duty to report child abuse; if you suspect it, sense it, or see it, you must report it. Successful management begins with awareness and attention to the child's needs. Child abuse cases can be difficult to evaluate and medical specialist are helpful in determining the exact cause of injuries or if there is confirmed abuse. If the pediatrician is uncertain about whether to report a suspicion to CPS, consultation with the MedCARES Clinic can be a resource. The MedCARES team specializes in the assessment of suspected abuse. Involving the MedCARES team early in the process can improve the accurate and comprehensive assessment and provide the treatment and resources needed to ensure the safety and well-being of the child.

For more information and to refer a patient to El Paso Children's Hospital, Center for the Prevention of Child Abuse, MedCARES Clinic, please call 915.242.8560.

FIGURE 1. CHILD ABUSE AND NEGLECT CONFIRMED CASES.

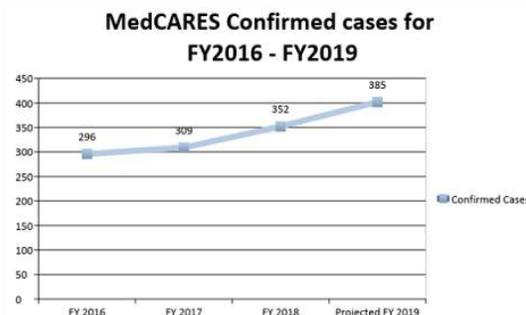


FIGURE 2. CHILD ABUSE AND NEGLECT AT-RISK AND PREVENTION CASES.

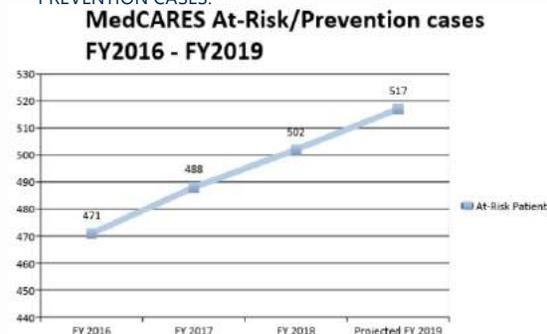


TABLE 3 - REASONS FOR REFERRAL TO MEDCARES

Reasons for Referral to MedCARES	
<ul style="list-style-type: none"> <li>● Out-cry of sexual abuse or inappropriate touching</li> <li>● Concerns for possible sexual abuse</li> <li>● Positive for Sexually Transmitted Infection(s)</li> <li>● Pregnancy</li> <li>● Unattended physical problems or medical abandonment</li> </ul>	<ul style="list-style-type: none"> <li>● Unexplained injury and/or bruising</li> <li>● Bruises, bites, and welts</li> <li>● Burns</li> <li>● Alcohol and/or drug abuse</li> <li>● Underweight or exhibits other signs of malnutrition</li> <li>● Family history of domestic violence</li> <li>● Multiple cases of CPS involvement</li> </ul>

## 2019 PEDIATRIC GRAND ROUNDS

The First & Third Wednesday of Every Month

Breakfast: 7:30-8 a.m. Grand Rounds: 8-9 a.m.  
Academic Education Center (AEC), 2nd Floor, 4800 Alberta Avenue

<b>APRIL 3RD, 2019</b>	Auto-Immune Encephalitis	Eyal Muscal, MD., MS.
<b>APRIL 17TH, 2019</b>	Pediatric Tuberculosis	Andrea Cruz, MD.
<b>MAY 1ST, 2019</b>	Pediatric Heart Failure	Sudheer Gorla, MD
<b>MAY 15TH, 2019</b>	Pediatric Depression/Anxiety	Shivani Mehta, MD.
<b>JUNE 5TH, 2019</b>	Neonatology	Vlad Ianus, MD.
<b>JUNE 19TH, 2019</b>	Breastfeeding	Jack Newman, MD.

## MEDCARES APRIL AND MAY



### APRIL

- NATIONAL CHILD ABUSE PREVENTION MONTH
- NATIONAL MINORITY HEALTH MONTH
- SEXUAL ASSAULT AWARENESS AND PREVENTION MONTH
- STI AWARENESS MONTH



### MAY

- GLOBAL YOUTH TRAFFIC SAFETY MONTH
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