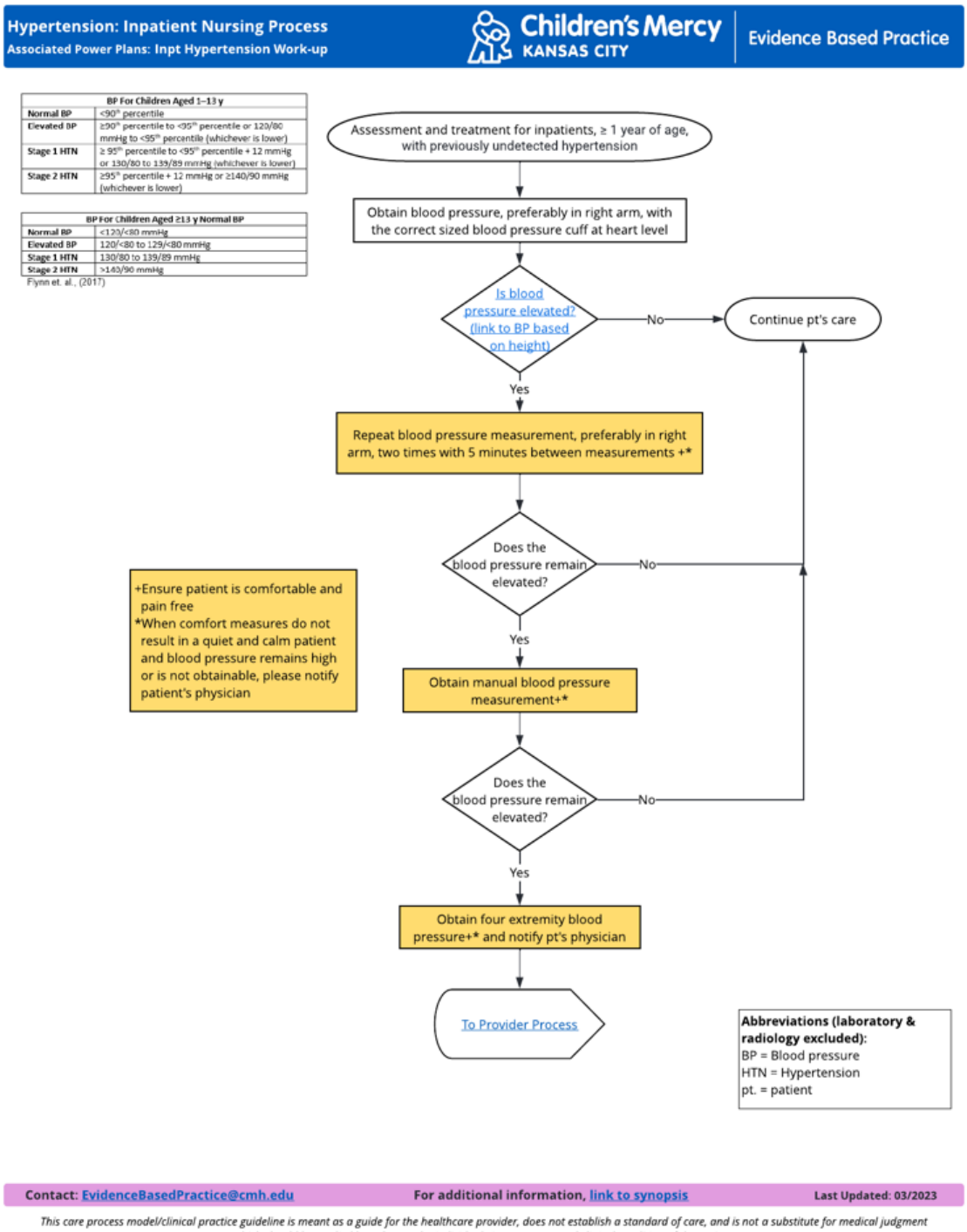
Hypertension Inpatient
Clinical Practice Guideline Synopsis



Hypertension: Inpatient Provider Process

Associated Power Plans: Inpt Hypertension Work-up

Children's Mercy KANSAS CITY | Evidence Based Practice

BP For Children Aged 1–13 y	
Normal BP	<90th percentile
Elevated BP	≥90th percentile to <95th percentile or 120/80 mmHg to <95th percentile (whichever is lower)
Stage 1 HTN	≥ 95th percentile to <95th percentile + 12 mmHg or 130/80 to 139/89 mmHg (whichever is lower)
Stage 2 HTN	≥95th percentile + 12 mmHg or ≥140/90 mmHg (whichever is lower)

BP For Children Aged ≥13 y Normal BP	
Normal BP	<120/<80 mmHg
Elevated BP	120/<80 to 129/<80 mmHg
Stage 1 HTN	130/80 to 139/89 mmHg
Stage 2 HTN	>140/90 mmHg

Flynn et. al., (2017)

Assessment and treatment for inpatients, ≥ 1 year of age, with previously undetected hypertension

Is four extremity blood pressure indicative of coarctation?

- Yes → Consult Cardiology Consider ECHO
- No

Is blood pressure greater than 95th percentile + 30 mm Hg specific to age and gender?

- Yes → Are HTN crisis findings present?
  - Yes → Pt experiencing hypertension emergency: Transfer to PICU for in-depth evaluation and BP control using continuous infusion of short-acting antihypertensive medication
  - No → Patient experiencing hypertension urgency: Consult Renal Service
- No

Evaluate:
- Review medication list for HTN associated drug
  - Consider observation without further evaluation if HTN associated with toxidrome
- Assess plotted BMI
- Obtain history for symptoms of obstructive sleep apnea
- Assess for renal/abdominal bruits
- Assess for femoral pulses

Obtain labs:
- Electrolytes, creatinine, & serum calcium
- Plasma aldosterone
- Plasma renin activity
- Urinalysis
- Free T4

Radiology:
- Renal Ultrasound

Hypertensive crisis findings
- Encephalopathy
- Seizures
- Facial palsy
- Retinopathy
- Intracerebral hemorrhage
- Acute kidney injury
- Heart Failure
- Cardiac arrhythmias
- Cushing's Triad

Renal Ultrasound
- Order with Doppler if concerned for renovascular hypertension (e.g. elevated renin/aldosterone, abdominal bruits, hypokalemia with metabolic alkalosis)
- Otherwise ultrasound without Doppler is sufficient

Are labs or radiology indicative of renal abnormalities?

- Yes → Consult: Renal Service → If patient is continuing to receive antihypertensive(s) at discharge; patient to f/u in renal clinic within a month
- No → Prescribe antihypertensive(s) and/or lifestyle modifications → Does the blood pressure remain elevated?
  - Yes → Consult: Renal Service
  - No → Continue pt's care

Abbreviations (laboratory & radiology excluded):
BP = Blood pressure
HTN = Hypertension
pt = patient

Contact: EvidenceBasedPractice@cmh.edu | **For additional information,** link to synopsis | **Last Updated: 03/2023**

This care process model/clinical practice guideline is meant as a guide for the healthcare provider, does not establish a standard of care, and is not a substitute for medical judgment which should be applied based upon the individual circumstances and clinical condition of the patient.

Objective of Guideline

Update clinicians on initial diagnostic measures and therapy prior to consulting with the Nephrology sub-specialty. This update will improve health outcomes in children with previously undiagnosed hypertension by establishing a pathway for diagnosis, initiation of treatment, and proper follow-up.

Definition

Hypertension is defined as average systolic blood pressure (SBP) and/or diastolic blood pressure (DBP) that is ≥ 95th percentile for gender, age, and height on ≥ 3 occasions. In children ≥ 13 years of age, hypertension is defined as an SBP and/or DBP ≥ 130/80 mmHg (Flynn et al., 2017).

Target Users

- Providers and staff nurses caring for hospitalized patients who have been found to have elevated blood pressure after more than, or equal to, three measures.

Target Population

Inclusion Criteria

- ≥ 1 year of age
- No prior diagnosed of hypertension
- Currently admitted to a medical inpatient unit

Exclusion Criteria

- < 1 year of age
- Admitted to a surgical service or intensive care unit

AGREE II

The AAP national guideline that provided guidance to the Hypertension committee (Flynn et al., 2017). See Table 1 for AGREE II.

Table 1

AGREE II[a] Summary for the Guideline Author (Flynn et al., 2017)

Domain	Percent Agreement	Percent Justification^
Scope and purpose	100%	The aim of the guideline, the clinical questions posed and target populations **were** identified. The aim of the guideline, the clinical questions posed and target populations **were not** found in the guideline.
Stakeholder involvement	87%	The guideline **was developed** by the appropriate stakeholders and represents the views of its intended users. The guideline **did not** include appropriate stakeholders (such as XXX) nor the viewpoints if the intended user.
Rigor of development	88%	The process used to gather and synthesize the evidence, the methods to formulate the recommendations and to update the guidelines **were** explicitly stated. The guideline developers **did no**t provide how the evidence was gathered and synthesized, how the recommendations were formulated nor how the guidelines will be updated.
Clarity and presentation	100%	The guideline recommendations **are** clear, unambiguous, and easily identified; in addition, different management options are presented. The guideline recommendations **are not** easily found, vague nor easily found nor are management options provided.
Applicability	97%	Barriers and facilitators to implementation, strategies to improve utilization and resource implications **were addressed** in the guideline. The guideline **did not** address implementation barriers and facilitators, utilization strategies, nor resource costs associated implementation.
Editorial independence	100%	The recommendations **were not** biased with competing interests. It is **unclear** if the recommendations were biased by competing interests.

Note: Three EBP Scholars completed the AGREE II on this guideline.

Practice Recommendations

Please refer to the AAP Clinical Practice Guidelines for Screening and Management of High Blood Pressure in Children and Adolescents for full practice recommendations, evaluations, and treatment recommends (Flynn et al., 2017).

Additional Questions Posed by the CPG Committee

- No additional clinical questions were posed for this review

Measures:

- Frequency CPG is accessed on EBP website
- Use of Inpt Hypertension Workup Power Plan

Value Implications

The following improvements may increase value by reducing healthcare costs and non-monetary costs (e.g., missed school/work, loss of wagers, stress) for patients and families and reducing costs and resource utilization for healthcare facilities.

- Decreased in unwarranted variation in care
- Early recognition and management of hypertension
- High value utilization of subspecialty resources

Potential Organizational Barriers

- Inconsistent access to correctly sized blood pressure equipment
- Inconsistency in skills required to accurately obtain blood pressure using a sphygmomanometer

Potential Organizational Facilitators

- Standardized order set serving as decision support tool
- Collaboration among nursing staff, inpatient providers, and nephrologists

Diversity/Equity/Inclusion

- Our aim is to provide equitable care. These issues were discussed with the Committee, reviewed in the literature, and discussed prior to making any practice recommendations.

Power Plan

- Inpt Hypertension Work-up

Associated Policies

- None

Guideline Preparation

This product was prepared by the Evidence Based Practice (EBP) Department in collaboration with the Hypertension CPG Committee composed of content experts at Children's Mercy Kansas City. The development of this product supports the Quality Excellence and Safety initiative to promote care standardization that is evidenced by measured outcomes. If a conflict of interest is identified, the conflict will be disclosed next to the committee member's name.

Hypertension CPG Committee Members and Representation

- Doug Blowey, MD | Nephrology | Committee Chair
- Codi Cutburth, MSN, RN | Nursing | Committee Member
- Ali Felton-Church, MD, FAAP | Hospital Medicine | Committee Member

- Nathan Beins, MD, MHPE | Nephrology | Committee Member

EBP Team Members

- Kathleen Berg, MD, FAAP | Hospitalist, Evidence Based Practice
- Jarrod Dusin, MS, RD, LD, CPHQ | Evidence Based Practice

Guideline Development Funding

The development of this guideline was underwritten by the following departments:

- Evidence Based Practice
- Nephrology
- Hospital Medicine

Approval Process

- This product was reviewed and approved by the Hypertension Committee, content expert departments/divisions, and the EBP Department
- Products are reviewed and updated as necessary every 3 years within the EBP Department at CMKC. Content expert teams are involved with every review and update.

Approval Obtained

Department/Unit	Date Approved
Nephrology	3/2023
Hospital Medicine	3/2023
Medical Executive Committee	5/2023

Date for Next Review

- May 2026

Disclaimer:

When evidence is lacking or inconclusive, options in care are provided in the guideline and the power plans that accompany the guideline.

These guidelines do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those individuals involved in providing health care are expected to use their judgment in determining what is in the best interests of the patient based on the circumstances existing at the time.

It is impossible to anticipate all possible situations that may exist and to prepare guidelines for each. Accordingly, these guidelines should guide care with the understanding that departures from them may be required at times.

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References

Agarwala, B. N., Bacha, E., Cao, Q. L., & Hijazi, Z. M. (2015). Clinical manifestations and diagnosis of coarctation of the aorta. UpToDate. Post, T. W. (Ed), UpToDate, Waltham, MA.

Flynn, J. T., Kaelber, D. C., Baker-Smith, C. M., Blowey, D., Carroll, A. E., Daniels, S. R., . . . Urbina, E. M. (2017). Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. *Pediatrics*. doi:10.1542/peds.2017-1904