



Health Screening Mini-Session

Blood Pressure Screening

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Outline

- Background & Epidemiology
- Guidelines for BP Screening of Children and Adolescents
- Potential Benefits and Limitations of School-Based BP Screening
- Role of School Nurses in Preventing High BP

Epidemiology & Background

- About 1 in 25 youth ages 12 to 19 have hypertension, and 1 in 10 has elevated blood pressure
- In a classroom of 30 students, 1 student would have hypertension, and about 3 more would have elevated blood pressure.
 - High blood pressure is more common in youth with obesity, boys, adolescents (in comparison to younger children), and Hispanic and non-Hispanic African American children in comparison to non-Hispanic White children
- One study found that only 7% of youth with type 1 diabetes mellitus (T1DM) and 32% of youth with type 2 diabetes mellitus (T2DM) demonstrated knowledge of their BP status
- Higher BP in childhood correlates with higher BP in adulthood
 - Important to identify children with hypertension (HTN) early

<https://www.cdc.gov/bloodpressure/youth.htm>

<https://publications.aap.org/pediatrics/article/140/3/e20171904/38358/Clinical-Practice-Guideline-for-Screening-and>

AAP Screening Guidelines

- American Academy of Pediatrics (AAP) released updated BP screening guidelines in 2017
 - Endorsed by the American Heart Association (AHA) and consistent with guidelines from the National Heart, Lung, and Blood Institute, and the European Society of Hypertension

Simplified BP Table

Screening BP Values Requiring Further Evaluation

Age, y	BP, mm Hg			
	Boys		Girls	
	Systolic	DBP	Systolic	DBP
1	98	52	98	54
2	100	55	101	58
3	101	58	102	60
4	102	60	103	62
5	103	63	104	64
6	105	66	105	67
7	106	68	106	68
8	107	69	107	69
9	107	70	108	71
10	108	72	109	72
11	110	74	111	74
12	113	75	114	75
≥13	120	80	120	80

Definition of Elevated BP and HTN

- High BP and HTN defined from normative distribution of BP data in healthy children
 - BP levels are interpreted based on sex, age, and height

Blood pressure levels for males by age and height percentile

BP (percentile)	Systolic BP (mmHg)							Diastolic BP (mmHg)						
	Height percentile or measured height							Height percentile or measured height						
	5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%
1 year														
Height (in)	30.4	30.8	31.6	32.4	33.3	34.1	34.6	30.4	30.8	31.6	32.4	33.3	34.1	34.6
Height (cm)	77.2	78.3	80.2	82.4	84.6	86.7	87.9	77.2	78.3	80.2	82.4	84.6	86.7	87.9
50 th	85	85	86	86	87	88	88	40	40	40	41	41	42	42
90 th	98	99	99	100	100	101	101	52	52	53	53	54	54	54
95 th	102	102	103	103	104	105	105	54	54	55	55	56	57	57
95 th + 12 mmHg	114	114	115	115	116	117	117	66	66	67	67	68	69	69
2 years														
Height (in)	33.9	34.4	35.3	36.3	37.3	38.2	38.8	33.9	34.4	35.3	36.3	37.3	38.2	38.8
Height (cm)	86.1	87.4	89.6	92.1	94.7	97.1	98.5	86.1	87.4	89.6	92.1	94.7	97.1	98.5
50 th	87	87	88	89	89	90	91	43	43	44	44	45	46	46
90 th	100	100	101	102	103	103	104	55	55	56	56	57	58	58
95 th	104	105	105	106	107	107	108	57	58	58	59	60	61	61
95 th + 12 mmHg	116	117	117	118	119	119	120	69	70	70	71	72	73	73

Blood pressure levels for females by age and height percentile

BP (percentile)	Systolic BP (mmHg)							Diastolic BP (mmHg)						
	Height percentile or measured height							Height percentile or measured height						
	5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%
1 year														
Height (in)	29.7	30.2	30.9	31.8	32.7	33.4	33.9	29.7	30.2	30.9	31.8	32.7	33.4	33.9
Height (cm)	75.4	76.6	78.6	80.8	83.0	84.9	86.1	75.4	76.6	78.6	80.8	83.0	84.9	86.1
50 th	84	85	86	86	87	88	88	41	42	42	43	44	45	46
90 th	98	99	99	100	101	102	102	54	55	56	56	57	58	58
95 th	101	102	102	103	104	105	105	59	59	60	60	61	62	62
95 th + 12 mmHg	113	114	114	115	116	117	117	71	71	72	72	73	74	74
2 years														
Height (in)	33.4	34.0	34.9	35.9	36.9	37.8	38.4	33.4	34.0	34.9	35.9	36.9	37.8	38.4
Height (cm)	84.9	86.3	88.6	91.1	93.7	96.0	97.4	84.9	86.3	88.6	91.1	93.7	96.0	97.4
50 th	87	87	88	89	90	91	91	45	46	47	48	49	50	51
90 th	101	101	102	103	104	105	106	58	58	59	60	61	62	62
95 th	104	105	106	106	107	108	109	62	63	63	64	65	66	66
95 th + 12 mmHg	116	117	118	118	119	120	121	74	75	75	76	77	78	78

Definition of Elevated BP and HTN

Updated Definitions of BP Categories and Stages

For Children Aged 1-13 y	For Children Aged ≥13 y
Normal BP: <90th percentile	Normal BP: <120/<80 mm Hg
Elevated BP: ≥90th percentile to <95th percentile or 120/80 mm Hg to <95th percentile (whichever is lower)	Elevated BP: 120/<80 to 129/<80 mm Hg
Stage 1 HTN: ≥95th percentile to <95th percentile + 12 mmHg, or 130/80 to 139/89 mm Hg (whichever is lower)	Stage 1 HTN: 130/80 to 139/89 mm Hg
Stage 2 HTN: ≥95th percentile + 12 mm Hg, or ≥140/90 mm Hg (whichever is lower)	Stage 2 HTN: ≥140/90 mm Hg

Frequency of Screening in Clinical Practice

- For children without risk factors or conditions associated with HTN, BP is measured beginning at three years of age during annual health supervision visits.
- For children ≥ 3 years of age with risk factors for HTN, BP measurement is recommended at every health care encounter.
- Children < 3 years of age with risk factors for HTN should have BP measurements taken at each health supervision visit.

BP Measurement Technique

- BP in childhood may vary considerably between visits and even during the same visit
- If a high BP measurement is obtained by an oscillometric device, confirmation by auscultatory measurement is required for accuracy.
- The correct choice of cuff is important for accurate BP measurement.

Common Pharmacologic Agents Associated With Elevated BP in Children

Over-the-counter drugs	Decongestants
	Caffeine
	Nonsteroidal anti-inflammatory drugs
	Alternative therapies, herbal and nutritional supplements
Prescription drugs	Stimulants for attention-deficit/hyperactivity disorder
	Hormonal contraception
	Steroids
	Tricyclic antidepressants
Illicit drugs	Amphetamines
	Cocaine

Potential Benefits and Limitations of School-Based Blood Pressure Screening

- No organization recommends universal BP screening in schools
 - According to AAP, there is limited evidence to support universal school-based BP screening

Potential Benefits:

- Observational studies demonstrate that school measurements can be reliable and that longitudinal follow-up is feasible
- School-based BP measurement can be a useful tool to identify children who require further evaluation and supplement the monitoring of diagnosed HTN
- School-based BP screening can identify those at greatest risk for undiagnosed hypertension, such as children from minority groups
- School-based BP screening programs can identify children with limited access to medical care

Biggest Limitation:

- High proportion of children who are screened for BP in a school setting may be false positives

Role of the School Nurse in Monitoring and Preventing High BP

- Promoting ideal health behaviors (not smoking, normal BMI, physical activity at goal levels, and a healthy diet)
- Collaborating with pediatric PCPs in monitoring BP

Thank you!

Please reach out with any questions!

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