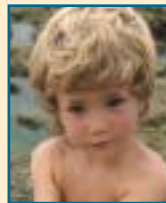


Measuring Up: How to Take Children's Blood Pressure

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Pat's Pressure

Pat, 5, presented to his GP with a history of occasional headaches. Taken with the standard blood pressure cuff, his blood pressure was 110/60 mmHg.



Pat's mother insisted he be referred to a pediatric nephrologist for a second opinion.

Using an appropriate sized cuff, his blood pressure was 120/80 mmHg.

Is Pat hypertensive? For more, go to page 105.

Hypertension often begins in childhood, and can carry on into adulthood. Education, anticipatory guidance, early detection, accurate diagnosis, and effective therapy may improve long-term outcomes of children and adolescents affected by this "silent killer". Measuring blood pressure in children is not only a science, but also an art.

A 3 to 5 minute resting period prior to testing is key.

What's the technique?

The quality of blood pressure monitoring also depends on correct technique and sufficient

What are the options?

Mercury sphygmomanometers retain highest accuracy.

- Advantages: Simple technique and baseline correction.
- Used for all measurements in the Task Force tables for children (Table 1).¹
- Disadvantages: Limited availability due to occupational health hazards and risk of environmental contamination.

Aneroid sphygmomanometer is the next best method.

- Advantages: Handy design and portability.
- Disadvantages: Highly sensitive to any mechanical strain; require technical inspection every six months, including recalibration.

Automated oscillometric devices are useful but expensive and require significantly more maintenance and calibration.

- Advantages: Very helpful evaluating infants, small children in whom resting, quiet, auscultatory readings are difficult to obtain.
- Disadvantages: Recording depends on anatomical position, elasticity, and size of the artery. Size, histo-anatomy, and distribution of the surrounding tissue affect accuracy (especially circumference of measurement site).

Table 1

Blood pressure readings for children by age and height percentiles (mmHg)

Age	Girls			Boys		
	5 th Pc	50 th Pc	95 th Pc	5 th Pc	50 th Pc	95 th Pc
One year	101/57	104/58	107/60	98/55	102/53	106/59
Six years	108/71	111/73	114/75	109/72	114/74	117/76
12 years	120/79	123/80	126/82	119/79	123/81	127/83
17 years	126/83	129/84	132/86	132/85	136/87	140/89

As adapted from Update on the 1987 Task Force on High Blood Pressure in Children and Adolescents.

resting period prior to testing. There is no point struggling with an irritated/crying child, as the value will have no meaning. Prevent disturbing external patient influences during measurement (*i.e.* hustle and bustle, noise, *etc.*). The pressure in the cuff should not be decreased any faster than 3 mmHg/second. The cuff should encircle 80% to 100% of the arm circumference; length should be two-thirds of the arm.

Inappropriately small cuffs will give aberrantly high readings; inappropriately large cuffs will underestimate the true reading. The results displayed by the device should not be rounded up or down towards expected values.

What about ABPM?

Ambulatory blood pressure monitoring (ABPM) entails repeated measurements of blood pressure throughout a 24-hour period,

providing a better approximation of true blood pressure level than single measurements. Cuff and ABPM measurements cannot be used interchangeably, either for clinical management or in trials of antihypertension agents; these mea-

Cuff pressure should not be decreased any faster than 3 mmHg/second.

surements should, therefore, be evaluated according to ABPM standard tables.²

When's the right time?

The American Heart Association recommends all children three and older have annual blood pressure measurements.

Measurements should be taken after three to five minutes of resting and repeated twice at each visit.

Children should have measurements taken while sitting with their arm at heart level. Infants' measurements should be taken while supine.



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When is a child's pressure high?

Children with blood pressure reading > 95th percentile should have them repeated on at least three subsequent visits before they can be labeled as hypertensive. Normograms devised by the task force depend on height as well as gender (Table 1).

Only with proper technique will the quality of blood pressure monitoring be commensurate with the importance of hypertension as one of the most relevant health problems. CME

Take-home message



- All children and adolescents should have their blood pressures measured in a quiet, resting state, using an aneroid sphygmomanometer and an appropriately sized blood pressure cuff

References

1. National High Blood Pressure Education Program Working Group on Hypertension Control in Children and Adolescents: Update on the 1987 task force report on high blood pressure in children and adolescents: a working group report from the National High Blood Pressure Education Program. *Pediatrics* 1996; 98(4Pt1):649-58.
2. Gellermann J, Kraft S, Ehrich JH: 24-hour ambulatory blood pressure monitoring in young children. *Pediatr Nephrol* 1997; 11(6):707-10.

Further references available—contact *The Canadian Journal of CME* at cme@sta.ca.

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