

**A Guide to**

**Blood Pressure Measurement  
in Children**

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BIHS as a reference guide to assist in clinical practice by

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## Blood pressure levels for boys and girls by age and height percentile

|             |                  | BOYS<br>Systolic BP<br>(mmHg) |                  |                  | BOYS<br>Diastolic BP<br>(mmHg) |                  |                  | GIRLS<br>Systolic BP<br>(mmHg) |                  |                  | GIRLS<br>Diastolic BP<br>(mmHg) |                  |                  |
|-------------|------------------|-------------------------------|------------------|------------------|--------------------------------|------------------|------------------|--------------------------------|------------------|------------------|---------------------------------|------------------|------------------|
|             |                  | Percentile of Height          |                  |                  |                                |                  |                  | Percentile of Height           |                  |                  |                                 |                  |                  |
| Age (years) | BP Percentiles   | 5 <sup>th</sup>               | 50 <sup>th</sup> | 95 <sup>th</sup> | 5 <sup>th</sup>                | 50 <sup>th</sup> | 95 <sup>th</sup> | 5 <sup>th</sup>                | 50 <sup>th</sup> | 95 <sup>th</sup> | 5 <sup>th</sup>                 | 50 <sup>th</sup> | 95 <sup>th</sup> |
|             |                  | 1                             | 50 <sup>th</sup> | 80               | 85                             | 89               | 34               | 37                             | 39               | 83               | 86                              | 90               | 38               |
|             | 95 <sup>th</sup> | 98                            | 103              | 106              | 54                             | 56               | 58               | 100                            | 104              | 107              | 56                              | 58               | 60               |
| 2           | 50 <sup>th</sup> | 84                            | 88               | 92               | 39                             | 42               | 44               | 85                             | 88               | 91               | 43                              | 45               | 47               |
|             | 95 <sup>th</sup> | 101                           | 106              | 110              | 59                             | 61               | 63               | 102                            | 105              | 109              | 61                              | 63               | 65               |
| 3           | 50 <sup>th</sup> | 86                            | 91               | 95               | 44                             | 46               | 48               | 86                             | 89               | 93               | 47                              | 49               | 51               |
|             | 95 <sup>th</sup> | 104                           | 109              | 113              | 63                             | 65               | 67               | 104                            | 107              | 110              | 65                              | 67               | 69               |
| 4           | 50 <sup>th</sup> | 88                            | 93               | 97               | 47                             | 50               | 52               | 88                             | 91               | 94               | 50                              | 52               | 54               |
|             | 95 <sup>th</sup> | 106                           | 111              | 115              | 66                             | 69               | 71               | 105                            | 108              | 112              | 68                              | 70               | 72               |
| 5           | 50 <sup>th</sup> | 90                            | 95               | 98               | 50                             | 53               | 55               | 89                             | 93               | 96               | 52                              | 54               | 56               |
|             | 95 <sup>th</sup> | 108                           | 112              | 116              | 69                             | 72               | 74               | 107                            | 110              | 113              | 70                              | 72               | 74               |
| 6           | 50 <sup>th</sup> | 91                            | 96               | 100              | 53                             | 55               | 57               | 91                             | 94               | 98               | 54                              | 56               | 58               |
|             | 95 <sup>th</sup> | 109                           | 114              | 117              | 72                             | 74               | 76               | 108                            | 111              | 115              | 72                              | 74               | 76               |
| 7           | 50 <sup>th</sup> | 92                            | 97               | 101              | 55                             | 57               | 59               | 93                             | 96               | 99               | 55                              | 57               | 59               |
|             | 95 <sup>th</sup> | 110                           | 115              | 119              | 74                             | 76               | 78               | 110                            | 113              | 116              | 73                              | 75               | 77               |
| 8           | 50 <sup>th</sup> | 94                            | 99               | 102              | 56                             | 59               | 61               | 95                             | 98               | 101              | 57                              | 58               | 60               |
|             | 95 <sup>th</sup> | 111                           | 116              | 120              | 75                             | 78               | 80               | 112                            | 115              | 118              | 75                              | 76               | 78               |
| 9           | 50 <sup>th</sup> | 95                            | 100              | 104              | 57                             | 60               | 62               | 96                             | 100              | 103              | 58                              | 59               | 61               |
|             | 95 <sup>th</sup> | 113                           | 118              | 121              | 76                             | 79               | 81               | 114                            | 117              | 120              | 76                              | 77               | 79               |
| 10          | 50 <sup>th</sup> | 97                            | 102              | 106              | 58                             | 61               | 63               | 98                             | 102              | 105              | 59                              | 60               | 62               |
|             | 95 <sup>th</sup> | 115                           | 119              | 123              | 77                             | 80               | 82               | 116                            | 119              | 122              | 77                              | 78               | 80               |
| 11          | 50 <sup>th</sup> | 99                            | 104              | 107              | 59                             | 61               | 63               | 100                            | 103              | 107              | 60                              | 61               | 63               |
|             | 95 <sup>th</sup> | 117                           | 121              | 125              | 78                             | 80               | 82               | 118                            | 121              | 124              | 78                              | 79               | 81               |
| 12          | 50 <sup>th</sup> | 101                           | 106              | 110              | 59                             | 62               | 64               | 102                            | 105              | 109              | 61                              | 62               | 64               |
|             | 95 <sup>th</sup> | 119                           | 123              | 127              | 78                             | 81               | 83               | 119                            | 123              | 126              | 79                              | 80               | 82               |
| 13          | 50 <sup>th</sup> | 104                           | 108              | 112              | 60                             | 62               | 64               | 104                            | 107              | 110              | 62                              | 63               | 65               |
|             | 95 <sup>th</sup> | 121                           | 126              | 130              | 79                             | 81               | 83               | 121                            | 124              | 128              | 80                              | 81               | 83               |
| 14          | 50 <sup>th</sup> | 106                           | 111              | 115              | 60                             | 63               | 65               | 106                            | 109              | 112              | 63                              | 64               | 66               |
|             | 95 <sup>th</sup> | 124                           | 128              | 132              | 80                             | 82               | 84               | 123                            | 126              | 129              | 81                              | 82               | 84               |
| 15          | 50 <sup>th</sup> | 109                           | 113              | 117              | 61                             | 64               | 66               | 107                            | 110              | 113              | 64                              | 65               | 67               |
|             | 95 <sup>th</sup> | 126                           | 131              | 135              | 81                             | 83               | 85               | 124                            | 127              | 131              | 82                              | 83               | 85               |
| 16          | 50 <sup>th</sup> | 111                           | 116              | 120              | 63                             | 65               | 67               | 108                            | 111              | 114              | 64                              | 66               | 68               |
|             | 95 <sup>th</sup> | 129                           | 134              | 137              | 82                             | 84               | 87               | 125                            | 128              | 132              | 82                              | 84               | 86               |
| 17          | 50 <sup>th</sup> | 114                           | 118              | 122              | 65                             | 67               | 70               | 108                            | 111              | 115              | 64                              | 66               | 68               |
|             | 95 <sup>th</sup> | 131                           | 136              | 140              | 84                             | 87               | 89               | 125                            | 129              | 132              | 82                              | 84               | 86               |

## How to measure manual systolic blood pressure using a Doppler and Greenlight sphygmomanometer

1. Ensure the child is comfortable
2. Apply the cuff, ensure the internal bladder encircles 90-100% of the upper arm circumference
3. The arrow on the cuff should be placed over the brachial artery
4. The first BP reading should be estimated by placing a Doppler over the pulse and pumping up the cuff, when the pulse sound disappears this is your estimated BP, now deflate the cuff quickly
5. Keep the Doppler over the pulse, pump the cuff up to a pressure 30mmHg higher than the estimated BP
6. Reduce the pressure slowly (you should see a green light on the right hand side of the monitor, this indicates that the pressure is reduced at the correct speed)
7. The 1<sup>st</sup> repetitive sound is recorded as the systolic BP
8. If you need to repeat the BP you should wait 1 minute to give the vessels a chance to refill.
9. Record the systolic BP measurement immediately



To obtain a diastolic reading use a stethoscope rather than Doppler. For instructions on how to measure BP with a stethoscope, please refer to CPC guidelines available on the GOSH intranet.

## Accurate sizing of blood pressure cuffs in children



**The internal bladder length (inflatable section) of the cuff must encircle 90-100% of the circumference of the upper arm**

Accurate sizing of the cuff is important for obtaining accurate blood pressure readings. Ensure you measure the bladder correctly, the length of the bladder is the most important measurement and must cover 90-100% of the upper arm. (This may appear too large in some children, however smaller cuffs will not adequately occlude the arterial pulse).

# Measuring BP

**Measure with: automated monitor (Philips)**

**The internal bladder (inflatable area) of the cuff must encircle 90-100% of the circumference of the upper arm**

Always use the arm as the 1<sup>st</sup> choice for measurement

