



# **A Pocket Guide to** Blood Pressure Measurement in Children

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From the National High Blood Pressure  
Education Program Working Group on  
High Blood Pressure in Children and  
Adolescents.



**U.S. Department of Health and Human Services**  
National Institutes of Health  
National Heart, Lung, and Blood Institute

## Measurement

- Begin routine blood pressure (BP) measurement at 3 years of age.
- Correct cuff size depends on arm size. Practically speaking, correct cuff size equals largest cuff that will fit on the upper arm with room below for the stethoscope head.
- BP should be measured in the right arm of a relaxed, seated child.
- BP measurement by auscultation is the Gold Standard.
- BP by automated device correlates reasonably well with auscultation, with practical advantages of rapid measurement remote from child and elimination of reader error.
- If BP is high by automated device, repeat by auscultation.

## BP Classification/Interpretation

BP is classified by systolic BP (SBP) and diastolic BP (DBP) percentiles for age/sex/height. If SBP or DBP >90th percentile, repeat twice at same office visit before interpreting result.

**Normal BP:** SBP and DBP <90th percentile

⇒ Recheck in 1 year.

**Prehypertension:** SBP or DBP ≥90th percentile to <95th percentile or BP >120/80 mmHg to <95th percentile

⇒ Recheck in 6 months.

⇒ Begin weight management (as appropriate).

**Stage 1 Hypertension (HTN):** SBP and/or DBP ≥95th percentile to ≤99th percentile plus 5 mmHg

⇒ Recheck in 1 to 2 weeks.

⇒ If BP remains at this level on recheck, begin evaluation and treatment including weight management if appropriate.

**Stage 2 HTN:** SBP and/or DBP >99th percentile plus 5 mmHg

⇒ Begin evaluation and treatment within 1 week, immediately if symptomatic.

## Systolic BP Percentile Tables

Since diastolic HTN rarely occurs without systolic HTN in children, the SBP percentile tables on the next page can be used for HTN screening. If a child's SBP on screening is classified as prehypertension or HTN, then both SBP and DBP percentiles should be determined using the tables in the complete report: The Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents. *Pediatrics* 2004 Aug;114(Suppl 2):555-76; or [http://www.nhlbi.nih.gov/health/prof/heart/hbp/hbp\\_ped.htm](http://www.nhlbi.nih.gov/health/prof/heart/hbp/hbp_ped.htm).

## Directions for Use of Tables

1. Heights in the table are given for age at midyear. Use closest height to interpret BP.
2. **Prehypertension** SBP ≥ value from table (90th percentile) to < Stage 1 HTN value; or SBP >120 mmHg to < Stage 1 HTN value.
  - Stage 1 HTN** SBP ≥ value from the table (95th percentile) to ≤ Stage 2 HTN.
  - Stage 2 HTN** SBP > value from table (99th percentile plus 5 mmHg).

For more information go to: [www.nhlbi.nih.gov](http://www.nhlbi.nih.gov).

## Girls SBP by Age and Height (Normal SBP is less than the prehypertensive result.)

| Age ↓ | BP Classification  | Systolic BP (mmHg) |            |            |            |            |            |            |
|-------|--------------------|--------------------|------------|------------|------------|------------|------------|------------|
| 3     | <b>Height (cm)</b> | <b>91</b>          | <b>92</b>  | <b>95</b>  | <b>98</b>  | <b>100</b> | <b>103</b> | <b>105</b> |
|       | Prehypertension    | 100                | 100        | 102        | 103        | 104        | 106        | 106        |
|       | Stage 1 HTN        | 104                | 104        | 105        | 107        | 108        | 109        | 110        |
|       | Stage 2 HTN        | 116                | 116        | 118        | 119        | 120        | 121        | 122        |
| 4     | <b>Height (cm)</b> | <b>97</b>          | <b>99</b>  | <b>101</b> | <b>104</b> | <b>108</b> | <b>110</b> | <b>112</b> |
|       | Prehypertension    | 101                | 102        | 103        | 104        | 106        | 107        | 108        |
|       | Stage 1 HTN        | 105                | 106        | 107        | 108        | 110        | 111        | 112        |
|       | Stage 2 HTN        | 117                | 118        | 119        | 120        | 122        | 123        | 124        |
| 5     | <b>Height (cm)</b> | <b>104</b>         | <b>105</b> | <b>108</b> | <b>111</b> | <b>115</b> | <b>118</b> | <b>120</b> |
|       | Prehypertension    | 103                | 103        | 105        | 106        | 107        | 109        | 109        |
|       | Stage 1 HTN        | 107                | 107        | 108        | 110        | 111        | 112        | 113        |
|       | Stage 2 HTN        | 119                | 119        | 121        | 122        | 123        | 125        | 125        |
| 6     | <b>Height (cm)</b> | <b>110</b>         | <b>112</b> | <b>115</b> | <b>118</b> | <b>122</b> | <b>126</b> | <b>128</b> |
|       | Prehypertension    | 104                | 105        | 106        | 108        | 109        | 110        | 111        |
|       | Stage 1 HTN        | 108                | 109        | 110        | 111        | 113        | 114        | 115        |
|       | Stage 2 HTN        | 120                | 121        | 122        | 124        | 125        | 126        | 127        |
| 7     | <b>Height (cm)</b> | <b>116</b>         | <b>118</b> | <b>121</b> | <b>125</b> | <b>129</b> | <b>132</b> | <b>135</b> |
|       | Prehypertension    | 106                | 107        | 108        | 109        | 111        | 112        | 113        |
|       | Stage 1 HTN        | 110                | 111        | 112        | 113        | 115        | 116        | 116        |
|       | Stage 2 HTN        | 122                | 123        | 124        | 125        | 127        | 128        | 129        |
| 8     | <b>Height (cm)</b> | <b>121</b>         | <b>123</b> | <b>127</b> | <b>131</b> | <b>135</b> | <b>139</b> | <b>141</b> |
|       | Prehypertension    | 108                | 109        | 110        | 111        | 113        | 114        | 114        |
|       | Stage 1 HTN        | 112                | 112        | 114        | 115        | 116        | 118        | 118        |
|       | Stage 2 HTN        | 124                | 125        | 126        | 127        | 128        | 130        | 130        |
| 9     | <b>Height (cm)</b> | <b>125</b>         | <b>128</b> | <b>131</b> | <b>136</b> | <b>140</b> | <b>144</b> | <b>147</b> |
|       | Prehypertension    | 110                | 110        | 112        | 113        | 114        | 116        | 116        |
|       | Stage 1 HTN        | 114                | 114        | 115        | 117        | 118        | 119        | 120        |
|       | Stage 2 HTN        | 126                | 126        | 128        | 129        | 130        | 132        | 132        |
| 10    | <b>Height (cm)</b> | <b>130</b>         | <b>132</b> | <b>136</b> | <b>141</b> | <b>146</b> | <b>150</b> | <b>153</b> |
|       | Prehypertension    | 112                | 112        | 114        | 115        | 116        | 118        | 118        |
|       | Stage 1 HTN        | 116                | 116        | 117        | 119        | 120        | 121        | 122        |
|       | Stage 2 HTN        | 128                | 128        | 130        | 131        | 132        | 134        | 134        |
| 11    | <b>Height (cm)</b> | <b>136</b>         | <b>138</b> | <b>143</b> | <b>148</b> | <b>153</b> | <b>157</b> | <b>160</b> |
|       | Prehypertension    | 114                | 114        | 116        | 117        | 118        | 119        | 120        |
|       | Stage 1 HTN        | 118                | 118        | 119        | 121        | 122        | 123        | 124        |
|       | Stage 2 HTN        | 130                | 130        | 131        | 133        | 134        | 135        | 136        |
| 12    | <b>Height (cm)</b> | <b>143</b>         | <b>146</b> | <b>150</b> | <b>155</b> | <b>160</b> | <b>164</b> | <b>166</b> |
|       | Prehypertension    | 116                | 116        | 117        | 119        | 120        | 120        | 120        |
|       | Stage 1 HTN        | 119                | 120        | 121        | 123        | 124        | 125        | 126        |
|       | Stage 2 HTN        | 132                | 132        | 133        | 135        | 136        | 137        | 138        |
| 13    | <b>Height (cm)</b> | <b>148</b>         | <b>151</b> | <b>155</b> | <b>159</b> | <b>164</b> | <b>168</b> | <b>170</b> |
|       | Prehypertension    | 117                | 118        | 119        | 120        | 120        | 120        | 120        |
|       | Stage 1 HTN        | 121                | 122        | 123        | 124        | 126        | 127        | 128        |
|       | Stage 2 HTN        | 133                | 134        | 135        | 137        | 138        | 139        | 140        |
| 14    | <b>Height (cm)</b> | <b>151</b>         | <b>153</b> | <b>157</b> | <b>161</b> | <b>166</b> | <b>170</b> | <b>172</b> |
|       | Prehypertension    | 119                | 120        | 120        | 120        | 120        | 120        | 120        |
|       | Stage 1 HTN        | 123                | 123        | 125        | 126        | 127        | 129        | 129        |
|       | Stage 2 HTN        | 135                | 136        | 137        | 138        | 140        | 141        | 141        |
| 15    | <b>Height (cm)</b> | <b>152</b>         | <b>154</b> | <b>158</b> | <b>162</b> | <b>167</b> | <b>171</b> | <b>173</b> |
|       | Prehypertension    | 120                | 120        | 120        | 120        | 120        | 120        | 120        |
|       | Stage 1 HTN        | 124                | 125        | 126        | 127        | 129        | 130        | 131        |
|       | Stage 2 HTN        | 136                | 137        | 138        | 139        | 141        | 142        | 143        |
| 16    | <b>Height (cm)</b> | <b>152</b>         | <b>154</b> | <b>158</b> | <b>163</b> | <b>167</b> | <b>171</b> | <b>173</b> |
|       | Prehypertension    | 120                | 120        | 120        | 120        | 120        | 120        | 120        |
|       | Stage 1 HTN        | 125                | 126        | 127        | 128        | 130        | 131        | 132        |
|       | Stage 2 HTN        | 137                | 138        | 139        | 140        | 142        | 143        | 144        |
| 17    | <b>Height (cm)</b> | <b>152</b>         | <b>155</b> | <b>159</b> | <b>163</b> | <b>167</b> | <b>171</b> | <b>174</b> |
|       | Prehypertension    | 120                | 120        | 120        | 120        | 120        | 120        | 120        |
|       | Stage 1 HTN        | 125                | 126        | 127        | 129        | 130        | 131        | 132        |
|       | Stage 2 HTN        | 138                | 138        | 139        | 141        | 142        | 143        | 144        |

## Boys SBP by Age and Height (Normal SBP is less than the prehypertensive result.)

| Age<br>↓ | BP<br>Classification | Systolic BP (mmHg) |            |            |            |            |            |            |
|----------|----------------------|--------------------|------------|------------|------------|------------|------------|------------|
|          |                      |                    |            |            |            |            |            |            |
| 3        | <b>Height (cm)</b>   | <b>92</b>          | <b>94</b>  | <b>96</b>  | <b>99</b>  | <b>102</b> | <b>104</b> | <b>106</b> |
|          | Prehypertension      | 100                | 101        | 103        | 105        | 107        | 108        | 109        |
|          | Stage 1 HTN          | 104                | 105        | 107        | 109        | 110        | 112        | 113        |
|          | Stage 2 HTN          | 116                | 117        | 119        | 121        | 123        | 124        | 125        |
| 4        | <b>Height (cm)</b>   | <b>99</b>          | <b>100</b> | <b>103</b> | <b>106</b> | <b>109</b> | <b>112</b> | <b>113</b> |
|          | Prehypertension      | 102                | 103        | 105        | 107        | 109        | 110        | 111        |
|          | Stage 1 HTN          | 106                | 107        | 109        | 111        | 112        | 114        | 115        |
|          | Stage 2 HTN          | 118                | 119        | 121        | 123        | 125        | 126        | 127        |
| 5        | <b>Height (cm)</b>   | <b>104</b>         | <b>106</b> | <b>109</b> | <b>112</b> | <b>116</b> | <b>119</b> | <b>120</b> |
|          | Prehypertension      | 104                | 105        | 106        | 108        | 110        | 111        | 112        |
|          | Stage 1 HTN          | 108                | 109        | 110        | 112        | 114        | 115        | 116        |
|          | Stage 2 HTN          | 120                | 121        | 123        | 125        | 126        | 128        | 128        |
| 6        | <b>Height (cm)</b>   | <b>110</b>         | <b>112</b> | <b>115</b> | <b>119</b> | <b>122</b> | <b>126</b> | <b>127</b> |
|          | Prehypertension      | 105                | 106        | 108        | 110        | 111        | 113        | 113        |
|          | Stage 1 HTN          | 109                | 110        | 112        | 114        | 115        | 117        | 117        |
|          | Stage 2 HTN          | 121                | 122        | 124        | 126        | 128        | 129        | 130        |
| 7        | <b>Height (cm)</b>   | <b>116</b>         | <b>118</b> | <b>121</b> | <b>125</b> | <b>129</b> | <b>132</b> | <b>134</b> |
|          | Prehypertension      | 106                | 107        | 109        | 111        | 113        | 114        | 115        |
|          | Stage 1 HTN          | 110                | 111        | 113        | 115        | 117        | 118        | 119        |
|          | Stage 2 HTN          | 122                | 123        | 125        | 127        | 129        | 130        | 131        |
| 8        | <b>Height (cm)</b>   | <b>121</b>         | <b>123</b> | <b>127</b> | <b>131</b> | <b>135</b> | <b>139</b> | <b>141</b> |
|          | Prehypertension      | 107                | 109        | 110        | 112        | 114        | 115        | 116        |
|          | Stage 1 HTN          | 111                | 112        | 114        | 116        | 118        | 119        | 120        |
|          | Stage 2 HTN          | 124                | 125        | 127        | 128        | 130        | 132        | 132        |
| 9        | <b>Height (cm)</b>   | <b>126</b>         | <b>128</b> | <b>132</b> | <b>136</b> | <b>141</b> | <b>145</b> | <b>147</b> |
|          | Prehypertension      | 109                | 110        | 112        | 114        | 115        | 117        | 118        |
|          | Stage 1 HTN          | 113                | 114        | 116        | 118        | 119        | 121        | 121        |
|          | Stage 2 HTN          | 125                | 126        | 128        | 130        | 132        | 133        | 134        |
| 10       | <b>Height (cm)</b>   | <b>130</b>         | <b>133</b> | <b>137</b> | <b>141</b> | <b>146</b> | <b>150</b> | <b>153</b> |
|          | Prehypertension      | 111                | 112        | 114        | 115        | 117        | 119        | 119        |
|          | Stage 1 HTN          | 115                | 116        | 117        | 119        | 121        | 122        | 123        |
|          | Stage 2 HTN          | 127                | 128        | 130        | 132        | 133        | 135        | 135        |
| 11       | <b>Height (cm)</b>   | <b>135</b>         | <b>137</b> | <b>142</b> | <b>146</b> | <b>151</b> | <b>156</b> | <b>159</b> |
|          | Prehypertension      | 113                | 114        | 115        | 117        | 119        | 120        | 120        |
|          | Stage 1 HTN          | 117                | 118        | 119        | 121        | 123        | 124        | 125        |
|          | Stage 2 HTN          | 129                | 130        | 132        | 134        | 135        | 137        | 137        |
| 12       | <b>Height (cm)</b>   | <b>140</b>         | <b>143</b> | <b>148</b> | <b>153</b> | <b>158</b> | <b>163</b> | <b>166</b> |
|          | Prehypertension      | 115                | 116        | 118        | 120        | 120        | 120        | 120        |
|          | Stage 1 HTN          | 119                | 120        | 122        | 123        | 125        | 127        | 127        |
|          | Stage 2 HTN          | 131                | 132        | 134        | 136        | 138        | 139        | 140        |
| 13       | <b>Height (cm)</b>   | <b>147</b>         | <b>150</b> | <b>155</b> | <b>160</b> | <b>166</b> | <b>171</b> | <b>173</b> |
|          | Prehypertension      | 117                | 118        | 120        | 120        | 120        | 120        | 120        |
|          | Stage 1 HTN          | 121                | 122        | 124        | 126        | 128        | 129        | 130        |
|          | Stage 2 HTN          | 133                | 135        | 136        | 138        | 140        | 141        | 142        |
| 14       | <b>Height (cm)</b>   | <b>154</b>         | <b>157</b> | <b>162</b> | <b>167</b> | <b>173</b> | <b>177</b> | <b>180</b> |
|          | Prehypertension      | 120                | 120        | 120        | 120        | 120        | 120        | 120        |
|          | Stage 1 HTN          | 124                | 125        | 127        | 128        | 130        | 132        | 132        |
|          | Stage 2 HTN          | 136                | 137        | 139        | 141        | 143        | 144        | 145        |
| 15       | <b>Height (cm)</b>   | <b>159</b>         | <b>162</b> | <b>167</b> | <b>172</b> | <b>177</b> | <b>182</b> | <b>184</b> |
|          | Prehypertension      | 120                | 120        | 120        | 120        | 120        | 120        | 120        |
|          | Stage 1 HTN          | 126                | 127        | 129        | 131        | 133        | 134        | 135        |
|          | Stage 2 HTN          | 139                | 140        | 141        | 143        | 145        | 147        | 147        |
| 16       | <b>Height (cm)</b>   | <b>162</b>         | <b>165</b> | <b>170</b> | <b>175</b> | <b>180</b> | <b>184</b> | <b>186</b> |
|          | Prehypertension      | 120                | 120        | 120        | 120        | 120        | 120        | 120        |
|          | Stage 1 HTN          | 129                | 130        | 132        | 134        | 135        | 137        | 137        |
|          | Stage 2 HTN          | 141                | 142        | 144        | 146        | 148        | 149        | 150        |
| 17       | <b>Height (cm)</b>   | <b>164</b>         | <b>166</b> | <b>171</b> | <b>176</b> | <b>181</b> | <b>185</b> | <b>187</b> |
|          | Prehypertension      | 120                | 120        | 120        | 120        | 120        | 120        | 120        |
|          | Stage 1 HTN          | 131                | 132        | 134        | 136        | 138        | 139        | 140        |
|          | Stage 2 HTN          | 144                | 145        | 146        | 148        | 150        | 151        | 152        |

