Hypertension Guidelines: Lessons for Primary Care

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Disclaimer and Financial Disclosure

• I have no financial interests to report
Learning Objectives: Participants will be able to:

- Learners will be able to:
  - Better assess goals for hypertension treatment
  - Explain why controversy surrounds treatment of hypertension
  - Explain how Absolute Risk Reduction (ARR) and its relation to clinical decision making is important to practitioners
  - Understand Relative Risk Reduction (RRR) and how this may inflate the treatment effect and is important to disease centered specialists
  - Learners will be able to use Hypertension as an example of how our increasing focus on disease prevention expands diagnoses and treatment making more people sick and fewer healthy
2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report from the Panel Members Appointed to the Eighth Joint National Committee (JNC 8)


*4 members had relationships to disclose; 13 had no relationships to disclose. Panel members disclosed their relationships and recused themselves from voting on evidence statements and recommendations relevant to their relationships.
What a mess!

- Conflicting Guidelines
- Different treatment goals
- Based on the same scientific data
First Guideline Following JNC 8 was by ACP/AAFP.

Annals of Internal Medicine: Vol. 166, No. 6
ACC/AHA Guidelines came later in 2017
Hypertension: A Moving Target

JNC Classifications: Diastolic Blood Pressure

- **JNC II.** Arch Intern Med. 1980;140:1280-1285.
- **JNC III.** Arch Intern Med. 1984;144:1045-1057.
- **JNC VII.** Arch Intern Med. 2003;289:2560-2572.

**DBP (mm Hg)**

- **80**
- **85**
- **90**
- **95**
- **100**
- **105**
- **110**
- **115**
- **120**
- **125**
- **130**

- **Hyper-tensive**
- **Consider therapy**
- **Mild**
- **Moderate**
- **Severe**
- **High-normal**
- **Normal**
- **Optimal**
- **Prehyper-tension**

**Stage 1**

**Stage 2**

**Stage 3**

**Stage 4**
EO1 Change the color of the font in the yellow bars to something that can be seen better, like dark blue or black like you did in Slide 5.
Eduardo, 4/16/2012
Hypertension: A Moving Target

JNC Classifications: Systolic Blood Pressure

SBP (mm Hg)

<table>
<thead>
<tr>
<th>JNC I</th>
<th>JNC II</th>
<th>JNC III</th>
<th>JNC IV</th>
<th>JNC V</th>
<th>JNC VI</th>
<th>JNC 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISH</td>
<td>ISH</td>
<td>Border-line</td>
<td>Stage 1</td>
<td>Stage 2</td>
<td>Stage 3</td>
<td>Stage 2</td>
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<tr>
<td>Border-line</td>
<td>Normal</td>
<td>High-normal</td>
<td>Normal</td>
<td>Optimal</td>
<td>Optimal</td>
<td>Normal</td>
</tr>
<tr>
<td>Normal</td>
<td>Optimal</td>
<td>Prehypertension</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No recommendations for SBP in JNC I or JNC II

JNC II. Arch Intern Med. 1980;140:1280-1285.
JNC III. Arch Intern Med. 1984;144:1045-1057.
2014 Goal Blood Pressures for Adults: Quick Summary

- For age 60 years and older without diabetes or kidney disease, strong evidence supports Goal BP < 150/90 based on Grade A level evidence.
- For all others, we recommend Goal BP < 140/90 based on expert opinion.
Initial Drug Treatment Recommendations for High Blood Pressure

• Non-Black Population without DM or CKD: Thiazide-type diuretic, CCB, ACEI or ARB
  – B Level Evidence

• Black Population including those with DM: Thiazide-type diuretic or CCB
  – B Level Evidence for general Population and C Level Evidence for DM
Initial Drug Treatment Recommendations for High Blood Pressure

• CKD Population (Black and non-Black, DM or not DM): ACEI or ARB (but not both together in any circumstance)
  – B Level Evidence
Drug Therapy Recommendations

**BLOOD PRESSURE GOALS**

≥ 60 YO:
SBP < 150mmHg
DBP < 90mmHg

<60 YO, DM, CKD:
SBP < 140mmHg
DBP < 90mmHg

**SPECIFIC RECOMMENDATIONS**

African Americans:
*Diuretic/CCB*

CKD:
*ACEI/ARB*

- X Don’t use ACEI + ARB
- ✓ Use evidence-based dosing (HCTZ!)
- ✓ Only use Beta Blockers with compelling indication
SPRINT

• Planned in 2007 by NHLBI
• Large RCT of 9361 subjects
• Does treating BP to lower goal (BP <120 mmHg) compared to goal BP < 140 mmHg result in improved outcomes?

SPRINT

• **P:** 50 years or older with Systolic BP 130-180 mm Hg & increased CVD Risk but not stroke or diabetes (9361)

• **I:** More intensive Medication Vs “Standard” BP Control

• **C:** Goal BP < 120 vs BP < 140 mm Hg

• **O:** Composite Outcome of MI, ACS, stroke, HF, or CV death
Table 2. Primary and Secondary Outcomes and Renal Outcomes.*

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Intensive Treatment</th>
<th>Standard Treatment</th>
<th>Hazard Ratio (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no. of patients (%)</td>
<td>% per year</td>
<td>no. of patients (%)</td>
<td>% per year</td>
</tr>
<tr>
<td>All participants (N = 4678)</td>
<td>243 (5.2)</td>
<td>1.65</td>
<td>319 (6.8)</td>
<td>2.19</td>
</tr>
<tr>
<td>Primary outcome††</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>97 (2.1)</td>
<td>0.65</td>
<td>116 (2.5)</td>
<td>0.78</td>
</tr>
<tr>
<td>Acute coronary syndrome</td>
<td>40 (0.9)</td>
<td>0.27</td>
<td>40 (0.9)</td>
<td>0.27</td>
</tr>
<tr>
<td>Stroke</td>
<td>62 (1.3)</td>
<td>0.41</td>
<td>70 (1.5)</td>
<td>0.47</td>
</tr>
<tr>
<td>Heart failure</td>
<td>62 (1.3)</td>
<td>0.41</td>
<td>100 (2.1)</td>
<td>0.67</td>
</tr>
<tr>
<td>Death from cardiovascular causes</td>
<td>37 (0.8)</td>
<td>0.25</td>
<td>65 (1.4)</td>
<td>0.43</td>
</tr>
<tr>
<td>Death from any cause</td>
<td>153 (3.3)</td>
<td>1.03</td>
<td>210 (4.5)</td>
<td>1.40</td>
</tr>
<tr>
<td>Primary outcome or death</td>
<td>332 (7.1)</td>
<td>2.25</td>
<td>423 (9.0)</td>
<td>2.90</td>
</tr>
<tr>
<td>Participants with CKD at baseline (N = 1330)</td>
<td>14 (1.1)</td>
<td>0.33</td>
<td>15 (1.1)</td>
<td>0.36</td>
</tr>
<tr>
<td>Composite renal outcome†</td>
<td>10 (0.8)</td>
<td>0.23</td>
<td>11 (0.8)</td>
<td>0.26</td>
</tr>
<tr>
<td>≥50% reduction in estimated GFR‡‡</td>
<td>6 (0.5)</td>
<td>0.14</td>
<td>10 (0.8)</td>
<td>0.24</td>
</tr>
<tr>
<td>Kidney transplantation</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Incident albuminuria‡§‡‡</td>
<td>49/526 (9.3)</td>
<td>3.02</td>
<td>59/500 (11.8)</td>
<td>3.90</td>
</tr>
<tr>
<td>Participants without CKD at baseline (N = 3332)</td>
<td>127 (3.8)</td>
<td>1.21</td>
<td>37 (1.1)</td>
<td>0.35</td>
</tr>
<tr>
<td>≥30% reduction in estimated GFR to &lt;60 ml/ min/1.73 m²§ §§</td>
<td>110/1769 (5.2)</td>
<td>2.00</td>
<td>135/1831 (7.4)</td>
<td>2.41</td>
</tr>
</tbody>
</table>

* CI denotes confidence interval, and CKD chronic kidney disease.
† The primary outcome was the first occurrence of myocardial infarction, acute coronary syndrome, stroke, heart failure, or death from cardiovascular causes.
‡ The composite renal outcome for participants with CKD at baseline was the first occurrence of a reduction in the estimated GFR of 50% or more, long-term dialysis, or kidney transplantation.
§ Reductions in the estimated GFR were confirmed by a second laboratory test at least 90 days later.
¶ Incident albuminuria was defined by a doubling of the ratio of urinary albumin (in milligrams) to creatinine (in grams) from less than 10 at baseline to greater than 10 during follow-up. The denominators for number of patients represent those without albuminuria at baseline.
|| No long-term dialysis or kidney transplantation was reported among participants without CKD at baseline.

When a 25% reduction in Cardio-Vascular outcomes is reported, this is the mental image that many see. 250 of 1000 lives saved from the scourge of CVD.
SPRINT Trial: Relative Risk Reduction
25% Reduction in Composite CV Outcomes

Green: 16 (1.6% of total) patients treated will benefit from the treatment, representing a reduction in bad outcomes from 68 (6.8%) to 52 (5.2%). This is approx. 25% relative reduction in CV outcomes.
SPRINT Results

• Number Needed to Treat (NNT) = 63 based on ARR of 1.6%
• A small minority of patients treated (1.6%) will benefit from the new goal BP < 120 mmHg
Harms

• SPRINT investigators compare the harms in this study (more frequent than the improved outcome) to the severity of the CV death, MI, ACS, HF and stroke

• Harms may be worthwhile if we are confident that we will see the benefit, less so if we don’t.
SPRINT Trial: Absolute Risk Reduction
1.6% Reduction in Composite CV Outcomes

Green: Positive Benefit from Treatment
Red: Serious Harm from Treatment
Purple: 52(5.2%) patients with poor CV Outcomes
Gray: Treated with 2-3 medications without benefit
Relationship between the Spectrum of the Abnormality and Treatment Benefit in Hypertension

## Benefit across the Spectrum of Hypertension*

<table>
<thead>
<tr>
<th>Degree of Hypertension</th>
<th>5-year Risk of Bad Event</th>
<th>Chance of Benefit</th>
<th>Number needed to Treat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Treatment</td>
<td>Treatment</td>
<td></td>
</tr>
<tr>
<td>Severe [Diastolic BP 115-129]</td>
<td>80%</td>
<td>8%</td>
<td>72%</td>
</tr>
<tr>
<td>Moderate [Diastolic BP 105-114]</td>
<td>38%</td>
<td>12%</td>
<td>26%</td>
</tr>
<tr>
<td>Mild [Diastolic BP 90-104]</td>
<td>32%</td>
<td>23%</td>
<td>9%</td>
</tr>
<tr>
<td>Very Mild [Diastolic BP 90-100]</td>
<td>9%</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>Mild to Severe** [Systolic BP 130-180]</td>
<td>6.8%*</td>
<td>5.2%*</td>
<td>1.6%*</td>
</tr>
</tbody>
</table>


**From SPRINT. No Treatment Group is Usual Treatment and Treatment Group is Intensive BP Goal< 120 mmHg and at 3.2 years instead of 5.
HOPE 3 Trial

- Tested concept of Poly-pill in population at moderate risk for CV Disease
  - Candesartan (ARB) and HCTZ versus Placebo
  - 2 other interventions were compared: Rosuvastatin alone, and Rosuvastatin + Candesartan/HCTZ together
HOPE 3 Trial

- Randomized Controlled Clinical Trial
- Intermediate C-V Risk patients
- Over 12,000 subjects
- Average BP reduction was Systolic 6.2 mmHg and Diastolic 3.2 mmHg
HOPE 3 Trial Results

- No benefit from lowering Blood Pressure at over 5 years
Summary

• Evidence demonstrates that for elderly without diabetes and at high CV Risk, a goal BP < 120 mmHg significantly reduces Stroke, MI, ACS, HF and CV death in a small number of patients.

• This effect has not been shown in those at intermediate or low risk or who are younger
Summary

• Patients and their primary care physicians must decide whether the identified benefit is worth the costs

• Patient preferences, values, worries and personal factors should guide your therapeutic recommendations
Doctor Patient Interaction on Prevention

Primary Prevention

Secondary Prevention

Tertiary Prevention

Quaternary Prevention

Risk Factors

Disease

Well-being

Symptoms

Time line
How do we apply disease-based guides to patient-centered care?

**Disease-Centered**

Evidence-based

**DOCTOR**

**Patient-Centered**

Preferences

Values

Goals

Multi-morbidity
Questions?