Organizing your clinic for optimal blood pressure control

Presenter:  
Mark Backus, MD, FACP, Cascade Internal Medicine Specialists

Hosted by:  
Oregon Health Authority Transformation Center
Organizing your clinic for optimal blood pressure control

Mark Backus, M.D. FACP
Hypertension

- Target audience for this presentation:
  - Clinic administrators
  - Physician leaders
  - Physician department chairs
  - CCO, tribal and other health system leaders
  - Any provider wanting to improve blood pressure care 😊
Conflicts of interest?

- Minor Stock Holdings
  - Biogen
  - Celgene
  - Bioverative
  - Resmed

No other relationships with any entity producing, selling, marketing, or distributing healthcare goods or services consumed by, or used on, patient
Today’s outline

- Hypertension background information
- Review goals and guidelines
- What is considered good control?
- How is good control assessed? CCO metrics
- Identify blood pressure control in a system
- Strategies for control in clinic and system
NEW per AHA: over 100 million with HTN; 46% of adults
Over ½ are not controlled! (52-61% in the U.S.A.)
Compliance is a big issue (ethnic groups more so)
Worldwide 9.4 million deaths/year—most of the disease burden in low or middle income economies
Worldwide control only 13.8%!
Control decreases risk for heart attack, stroke, kidney disease, heart failure – by large amounts 20–50% over time – well documented
Health Care Costs

- US costs per GDP 17% in 2015
- Per capita $9990 in 2015

- Causes of Death:
  - 1) Heart Disease
  - 2) Cancer
  - 3) Stroke
Health Care Costs

- Causes of hospitalization over age 50:
  - Stroke, heart attack and heart failure dwarf other reasons for admission

- 32% of all health care costs spent on the hospital – it’s the number one category of expenditure
Goals and Guidelines

- ACCORD study 2010
- JNC 8: 2014
- SPRINT study: 2015
- AHA/ACC November 2017 comprehensive guidelines
Joint National Commission

- **JNC 7**: 2003, goals <140/90 (<130/80 DM and CKD)
- **JNC 8**: Age greater than 60: <150/90 and Age 18–59: <140/90. Dissent amongst the experts!
- **CKD or DM**: <140/90
- **General agreement** that age greater than 80: <150/90

- European Society of Hypertension
- Cardiology Joint Committee
- American Society of Hypertension
- International Society of Hypertension

- **AHA/ACC November 2017 Guidelines**: See below. Aggressive reduction in BP!
- *JAMA 2014; 311:507*
American College of Cardiology

Hypertension

2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APH/A/ASH/ASPC/NMA/PCNA CLINICAL PRACTICE GUIDELINE

Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults

A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

American College of Cardiology

- National Heart and Lung Institute: NHLBI
- Started JNC 1977. When disagreements arose in 2013, NHLBI transferred the responsibility from JNC 8, to ACC/AHA, in partnership with 9 other societies to develop the document that just came out in 2017
- 15 sections, and 106 graded recommendations, each with a class of recommendation and level of evidence: 283-page document
Table 1. Applying Class of Recommendation and Level of Evidence to Clinical Strategies, Interventions, Treatments, or Diagnostic Testing in Patient Care* (Updated August 2015)

<table>
<thead>
<tr>
<th>CLASS (STRENGTH OF RECOMMENDATION)</th>
<th>Benefit &gt; Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS I (EVIDENCE)</td>
<td></td>
</tr>
<tr>
<td>Suggested phrases for writing recommendations:</td>
<td></td>
</tr>
<tr>
<td>• Recommended</td>
<td></td>
</tr>
<tr>
<td>• Is indicated/Useful/beneficial</td>
<td></td>
</tr>
<tr>
<td>• Should be performed/administered/used</td>
<td></td>
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<tr>
<td>• Comparative Effectiveness/Phrases:</td>
<td></td>
</tr>
<tr>
<td>• Treatment/strategy A is recommended/indicated in preference to treatment B</td>
<td></td>
</tr>
<tr>
<td>• Treatment A should be chosen over treatment B</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS II (SUGGESTIONS)</th>
<th>Benefit = Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suggested phrases for writing recommendations:</td>
<td></td>
</tr>
<tr>
<td>• Reasonable</td>
<td></td>
</tr>
<tr>
<td>• Can be useful/Effective/beneficial</td>
<td></td>
</tr>
<tr>
<td>• Comparative Effectiveness/Phrases:</td>
<td></td>
</tr>
<tr>
<td>• Treatment/strategy A is probably recommended/indicated in preference to treatment B</td>
<td></td>
</tr>
<tr>
<td>• It is reasonable to choose treatment A over treatment B</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS III (OPINIONS)</th>
<th>Benefit &lt; Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suggested phrases for writing recommendations:</td>
<td></td>
</tr>
<tr>
<td>• May/might be reasonable</td>
<td></td>
</tr>
<tr>
<td>• May/might be indicated</td>
<td></td>
</tr>
<tr>
<td>• Unclear/effectiveness is unknown/unclear/might not be established</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS IV (OPINIONS)</th>
<th>Benefit = Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suggested phrases for writing recommendations:</td>
<td></td>
</tr>
<tr>
<td>• Not recommended</td>
<td></td>
</tr>
<tr>
<td>• Not indicated/useful/Effective/beneficial</td>
<td></td>
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<tr>
<td>• Should not be performed/administered/used</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS V: Be Benefit (RESIDUALITY)</th>
<th>Benefit &lt; Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suggested phrases for writing recommendations:</td>
<td></td>
</tr>
<tr>
<td>• Harmful</td>
<td></td>
</tr>
<tr>
<td>• Causes harm</td>
<td></td>
</tr>
<tr>
<td>• Associated with excess mortality/morbidity</td>
<td></td>
</tr>
<tr>
<td>• Should not be performed/administered/used</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS V: Harm (STRONG)</th>
<th>Benefit &gt; Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suggested phrases for writing recommendations:</td>
<td></td>
</tr>
<tr>
<td>• Potentially harmful</td>
<td></td>
</tr>
<tr>
<td>• Cause harm</td>
<td></td>
</tr>
<tr>
<td>• Associated with excess morbidity/mortality</td>
<td></td>
</tr>
<tr>
<td>• Should not be performed/administered/used</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>LEVEL (QUALITY OF EVIDENCE)</th>
<th></th>
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<tbody>
<tr>
<td>LEVEL A</td>
<td></td>
</tr>
<tr>
<td>• High-quality evidence from more than 1 RCT</td>
<td></td>
</tr>
<tr>
<td>• Meta-analyses of high-quality RCTs</td>
<td></td>
</tr>
<tr>
<td>• Due to one or more RCTs considered high-quality registry studies</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>LEVEL B (Randomized)</th>
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<tbody>
<tr>
<td>LEVEL B-1 (Randomized)</td>
<td></td>
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<tr>
<td>• Moderate-quality evidence from 1 or more RCTs</td>
<td></td>
</tr>
<tr>
<td>• Meta-analyses of moderate-quality RCTs</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>LEVEL C (Observational)</th>
<th></th>
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<tbody>
<tr>
<td>LEVEL C-1 (Observational)</td>
<td></td>
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<tr>
<td>• Randomized or nonrandomized observed or registry studies, observational studies, or registry studies</td>
<td></td>
</tr>
<tr>
<td>• Meta-analysis of such studies</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>LEVEL D (Expert Opinions)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>LEVEL D-1 (Expert Opinions)</td>
<td></td>
</tr>
<tr>
<td>• Consensus of expert opinion based on clinical experience</td>
<td></td>
</tr>
</tbody>
</table>

* A recommendation with ICE indicates the recommendation is weak. More important clinical questions addressed in guidelines do not lend themselves to clinical trials. Although RCTs are unfeasible, there may be very clear clinical consensus that a particular test or therapy is useful or effective.

**The author in the reference section specifically referred to an improved clinical outcome or improved diagnostic accuracy or improved prognostic information.**

For comparative effectiveness (of CARF PA-1 and CARF PA-2 only), studies that support the use of one or more intervention(s) should include direct comparisons of the treatments of strategies being evaluated.

The method of determining quality is evolving, including the application of standardized, widely used and periodically updated evidence grading tools, and to systematic reviews, the incorporation of an Evidence Review Committee.

<table>
<thead>
<tr>
<th>BLOOD PRESSURE CATEGORY</th>
<th>SYSTOLIC mm Hg (upper number)</th>
<th>DIASTOLIC mm Hg (lower number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAL</td>
<td>LESS THAN 120</td>
<td>and</td>
</tr>
<tr>
<td>ELEVATED</td>
<td>120 – 129</td>
<td>and</td>
</tr>
<tr>
<td>HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1</td>
<td>130 – 139</td>
<td>or</td>
</tr>
<tr>
<td>HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2</td>
<td>140 OR HIGHER</td>
<td>or</td>
</tr>
<tr>
<td>HYPERTENSIVE CRISIS (see your doctor immediately)</td>
<td>HIGHER THAN 180</td>
<td>and/or</td>
</tr>
</tbody>
</table>
8.1.2. BP Treatment Threshold and the Use of CVD Risk Estimation to Guide Drug Treatment of Hypertension

<table>
<thead>
<tr>
<th>Recommendations for BP Treatment Threshold and Use of Risk Estimation* to Guide Drug Treatment of Hypertension</th>
</tr>
</thead>
<tbody>
<tr>
<td>References that support recommendations are summarized in Online Data Supplement 23.</td>
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<td><strong>COR</strong></td>
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<td>I</td>
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</tbody>
</table>

*ACC/AHA Pooled Cohort Equations (http://tools.acc.org/ASCVD-Risk-Estimator/*) (13a) to estimate 10-year risk of atherosclerotic CVD. ASCVD was defined as a first CHD death, non-fatal MI or fatal or non-fatal stroke.
Pooled Cohort Risk

- [http://tools.acc.org/ASCVD-Risk-Estimator/]
Cardiovascular Risk Realism

- Do we choose to medicate natural aging?
- What percent of adults have all 7 ideal factors:
  - 0.5 to 15% over various populations**
- For cardiovascular risk, most adult men will cross the 10% risk threshold in their 60s or earlier, even if they have low cholesterol.

- Example: 65 y.o. male: SBP 120, Total chol 180, HDL 50—
  - ASCVD risk 10.6%

**JAMA January 9, 2018, vol 319, Num 2
Cardiovascular Risk Realism

- Ideal cardiovascular health: Ideal Seven **
  - No smoking
  - Fasting glucose less than 100
  - Total cholesterol less than 200
  - Blood pressure less than 120/80
  - BMI normal (18.5–25)
  - Exercise 150 min per week, moderate intensity
  - Diet with fruit, vegetables, whole grains, low fat dairy, fish, nuts and limit red meat and sugar

**AHA, 2010
Systolic PPressure INtervention Trial
Systolic PRessure INtervention Trial

- 14,692 patients assessed for eligibility
- 5331 ineligible
- 9361 randomized
- Close to 500 patients on each side discontinued intervention, lost to follow-up or withdrew consent
Systolic PReassure INtervention Trial

![Graph showing systolic blood pressure over years for Standard and Intensive treatments.]

- **SPRINT BP Control**
- **N = 9361**
- **Median F/U = 3.3 years**

**Years**
- **Systolic Blood Pressure (mm Hg)**
  - **136.2 mmHg, 1.8 meds**
  - **121.4 mmHg, 2.8 meds**

**Legend:**
- Standard treatment
- Intensive treatment

---

*SPRINT, NEJM*
SPRINT Outcomes

- Much less endpoint events (243 vs 319): MI, CHF, CVA, acute coronary syndrome
- Death any cause: 155 vs 210
- No outcome difference in patients with CKD (1330 patients vs 1316 patients at baseline (GFR 20–59) as far as long term dialysis or >50% reduction in estimated GFR
- Number needed to treat: 61 for any outcome

* NEJM 2015; 373:2103
SPRINT Serious Adverse Events

- 37% serious events, but not significantly different
- 1793/4678 vs 1736/4683

- Slightly more hypotension, syncope, electrolyte changes, creatinine elevation, NOT more falls or orthostasis

- Serious adverse events most likely related to the intervention: (4.7% vs 2.5%) Number needed to harm: 45
SPRINT > 74 years old

- Subgroup pre-specified was 2636 patients
- Mean age 79.9, 38% women
- Median follow up 3.14 years, significantly decreased events and mortality
- Serious adverse events same in both groups
Summary of SBP goal

- Choice of patients for tighter control includes:

  - Higher cardiac risk
  - Patient preference
  - Particular patient concern for stroke (better evidence)
  - Lack of glaucoma or retinal ischemia issues
  - Lack of orthostatic symptoms
  - DBP > 60
  - Your own philosophy of medicine
Why did <140/<90 get chosen for designating the patient as “controlled”?  
2018 Benchmark: 70.6% (from the 2016 Medicaid 90th percentile)  
Individual CCO improvement target: 10% reduction in gap between the baseline and benchmark, with 2% floor (for quality pool payments)  
Prior benchmarks:
- 2014 64.6%  
- 2015 64.7%  
- 2016 65.9%  
- 2017 68.3%
CCO Incentive Measure Specifics

- Denominator: number of I10 patients of age minus exclusions
- Numerator: number of patients from the denominator with systolic blood pressure less than 140 and diastolic blood pressure less than 90 = “controlled”
- Most recent visit
- Home, or hospital, ambulatory monitor readings are not accepted
- If more than one reading at a visit – using lowest
- If no readings in recording period, assumed not controlled
Why isn’t HTN control better?

**Provider**
- Needs more knowledge on basic treatment of blood pressure
- Needs education on integrating team care
- Needs to be willing to listen to help on follow up and care

**Patient**
- Continues activities that raise BP
- Doesn’t take the pills
- Misses appointment
- Needs help with home monitoring/24 hour monitoring
- White coat hypertension - - anxiety
- Needs information

**System Management**
- Identification of patients
- Patient compliance on return visit
- Follow-up interval selected by the doctor
- Inaccurate measurement
- Medical assistant and team education
Provider Education

Needs more knowledge on basic treatment of blood pressure

- Up to date with most recent guidelines – recent webinar
- How to present to patients with conviction with so many conflicting guidelines over the past few years

Needs education on integrating team care
Provider Education

Needs to be willing to listen to help on follow-up with nurses or pharmacists

Needs to relinquish control – can be difficult!

Needs regular information about the quality of care and relationship to peers and national standards
Improving provider control

- The number one thing that will improve population control is action after an abnormal reading (usually meaning rapid follow-up). Providers may need reminders on this.
- Any clinic reading over 140 or 90 should prompt: R03.0 or I10 to be on the visit diagnoses and follow up in 4 weeks (possibly longer if lower risk patient)
- Review how to code White Coat syndrome with specific descriptions:
  - I10: white coat blood pressure elevation with underlying hypertension
  - R03.0: white coat blood pressure elevation without underlying hypertension
- Regularly recommending home readings
- Regularly recommending 24-hour blood pressure monitoring
Patient Education

- Education on lifestyle, diet, exercise easily available
- Appointment reminders in multiple formats
- Nurse visits that may be easier to schedule for the patient than to see a provider? Less white coat syndrome
- Have home blood pressure monitors available to check out at the clinic for low income patients
- Make it easy to have 24-hour monitoring – purchase for your clinic
- Chronic care management for patients with compliance issues
- Consequences of untreated high blood pressure
Patient Education

- Continues activities that raise BP
Lifestyle Contributors

- Nicotine use
- Obesity (sleep apnea)
- Exercise
- Diet: Mediterranean Diet, DASH
- Stress
- Sedentary lifestyle
- Alcohol
- Medications
Patient Education – laminated in exam rooms

DID YOU KNOW?
These things raise blood pressure:

- Pain Relievers (NSAIDS such as Advil®, Aleve®, Ibuprofen, Naproxen, or Moxiacam)
- Tobacco
- More than one alcoholic drink a day
- Poor sleep
- Anxiety or worry
- Pain
- Stopping or starting automated medications often related to excess weight
- Exercising within 30 minutes (endurance-type) of taking blood pressure
- Certain other drugs (Venlafaxine, Methylphenidate, and pseudoephedrine)
- High salt diet (aim for diets low in processed foods, fast foods, and no added salt)
- For most people blood pressure is highest in the morning
The real reason dinosaurs became extinct
Patient Education

- Missed appointments (a patient and systems problem)

- If higher than expected missed appointments
  - Is the clinic reminder system adequate?
  - Is the provider disliked?
  - How easy is it contact your clinic?
Patient Education

- Poor compliance with pills:
  - Is the provider prescribing an easy compliance regimen?
  - What about reminders for pills auto-generated on the patients phone?
  - Many pharmacy plans send reminders when refills take longer than expected
Patient Education

- Home blood pressure monitoring/positioning:
  - Addresses White coat syndrome and monitoring

- Utility of 24-hour monitoring (Ambulatory blood pressure monitoring)

- Diet and lifestyle
Body Positioning

Frank started to get a funny feeling that his doctor was a quack.
Body Positioning

- Unsupported back: raises 5–10 mm Hg
- Unsupported or crossed legs: raises 2–8 mm
- Talking during measurement: raises 5–5 mm
- BP arm supported: Unsupported raises 10 mm
- Cuff on bare arm: on clothing raises 10–40 mm
- BP cuff at level of heart, and correct for arm size: raises and lowers variably
- Auscultory gap up to 20% of elderly patients
Was your blood pressure measured correctly today?

Why does it matter?

- Taking your blood pressure the same way, on the same arm every time is important.
- This helps us to get correct numbers, so we can provide the right treatment.

About high blood pressure

- One in three adults has high blood pressure.
- Most people with high blood pressure have no signs or symptoms.
- High blood pressure is a major risk factor for heart attack, stroke, kidney disease, and diabetes complications.
- High blood pressure contributes to nearly 1,000 deaths each year.


We want to get it right!
Non-pharmacologic Strategies

- Weight reduction: 5–20 mmHg/10 kg wt loss
- DASH: 8–14 mm Hg
- Physical exercise: 4–9 mm Hg
- Decrease alcohol: 2–4 mm Hg
- Treat sleep apnea: 3–5 mm Hg
**Dietary Approach to Stop Hypertension**

- DASH diet is recommended by many to lower blood pressure, lose weight, and treat insulin resistance. (11.4 mmHg SBP reduction in the trial)**
- It may decrease the risk of certain kinds of cancer, as well as decrease the risk of stroke, heart disease, kidney stones, diabetes, heart failure.
- Low sodium, high in fruits, vegetables, low or non-fat dairy, less refined grains, low to moderate fat.
- Have a handout available at check out if patients want that.

**N Engl J Med 1997; 336:1117-1124**
IN BRIEF:
Your Guide To Lowering Your Blood Pressure With DASH

What you eat affects your chances of developing high blood pressure (hypertension). Research shows that high blood pressure can be prevented—or lowered—by following the Dietary Approaches to Stop Hypertension (DASH) eating plan, which includes eating less sodium.

High blood pressure is blood pressure higher than 140/90 mmHg, and prehypertension is blood pressure between 120/80 and 139/89 mmHg. High blood pressure is dangerous because it makes your heart work too hard, hardens the walls of your arteries, and can cause the brain to hemorrhage or the kidneys to function poorly or not at all.

If not controlled, high blood pressure can lead to heart and kidney disease, stroke, and diabetes.

But high blood pressure can be prevented—and lowered—if you take these steps:

- Follow a healthy eating plan, such as DASH, that includes foods lower in sodium.
- Maintain a healthy weight.
- Be moderately physically active for at least 3 hours and 30 minutes per week.
- If you drink alcoholic beverages, do so in moderation.

If you already have high blood pressure and your doctor has prescribed medicine, take your medicine, as directed, and follow these steps:

The DASH Eating Plan

The DASH eating plan is rich in fruits, vegetables, fat-free or low-fat milk and milk products, whole grains, fish, poultry, beans, nuts, and nuts. It also contains less sodium; sweets, added sugars, and beverages containing sugars; fats, and red meats than the typical American diet. This heart healthy way of eating is also lower in saturated fat, trans fat, and cholesterol and rich in nutrients that are associated with lowering blood pressure—mainly, potassium, magnesium, calcium, protein, and fiber.
Lowering Your Blood Pressure With DASH

What can you do to reduce your risk of developing high blood pressure? Eating a healthy diet, losing weight, exercising regularly, and not smoking are all important factors. But one of the most effective ways to lower your blood pressure is to eat a diet that is rich in fruits, vegetables, whole grains, and other foods that are rich in fibers and low in fat and sodium.

High blood pressure, which is a blood pressure of 120/80 mmHg or higher, is a leading cause of heart disease and stroke. The American Heart Association estimates that 47 million adults in the United States have high blood pressure, which puts them at risk for heart disease, stroke, and kidney disease.

The DASH (Dietary Approaches to Stop Hypertension) diet is a healthy eating plan that is designed to lower blood pressure and improve overall health. The DASH diet is rich in fruits, vegetables, whole grains, and lean proteins, and low in sodium. It is also rich in potassium, magnesium, and calcium, which are all important nutrients for the body.

The DASH diet is easy to follow and includes a variety of foods that are all good for you. It is a healthy way of eating that can help you lose weight, manage your blood pressure, and improve your overall health.

The DASH diet is not a restrictive diet and you can still enjoy your favorite foods if you follow the guidelines. It is a flexible diet that you can adjust to fit your lifestyle and taste preferences.

The DASH diet is a simple and effective way to lower your blood pressure and improve your health. It is a healthy eating plan that can help you live longer and healthier.

Following the DASH diet

The DASH eating plan shown below is based on 2,000 calories a day. The number of daily servings in a food group may vary from those listed depending on your caloric needs. Use this chart to help you plan your menus or take it with you when you go to the store.

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Daily Servings</th>
<th>Serving Sizes</th>
<th>Examples and Notes</th>
<th>Significance of each food group to the plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains and grain products</td>
<td>6-8</td>
<td>1 slice bread</td>
<td>whole wheat bread, English muffin, pita bread, bagels, cereals, grits, oatmeal</td>
<td>Major sources of energy and fiber</td>
</tr>
<tr>
<td></td>
<td>½ - 1 cup</td>
<td>½ cup cooked</td>
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<tr>
<td></td>
<td>dry cereal</td>
<td>rice, pasta, or cereal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td>4-5</td>
<td>1 cup raw</td>
<td>tomatoes, potatoes, peas, carrots, squash, broccoli, turnip greens, collards, kale, spinach, artichokes, beans, sweet potatoes</td>
<td>Rich sources of potassium, magnesium and fiber</td>
</tr>
<tr>
<td></td>
<td>leafy vegetable</td>
<td>½ cup cooked</td>
<td>lettuce, spinach, broccoli, turnip greens, collards</td>
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<tr>
<td></td>
<td>vegetable</td>
<td>6 oz.</td>
<td>tomatoes, potatoes, peas, carrots, squash, broccoli, turnip greens, collards, kale, spinach, artichokes, beans, sweet potatoes</td>
<td>Rich sources of potassium, magnesium and fiber</td>
</tr>
<tr>
<td></td>
<td>vegetable juice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruits</td>
<td>4-5</td>
<td>1 medium</td>
<td>apricots, bananas, dates, grapes, oranges, orange juice, grapefruit, grapefruit juice, melons, mangoes, peaches, pineapples, prunes, raisins, strawberries, tangerines</td>
<td>Important sources of potassium, magnesium and fiber</td>
</tr>
<tr>
<td></td>
<td>fruit</td>
<td>½ cup fresh</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>frozen fruit</td>
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<td></td>
<td></td>
<td>canned fruit</td>
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<tr>
<td></td>
<td></td>
<td>½ cup fruit</td>
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<tr>
<td></td>
<td></td>
<td>juice</td>
<td></td>
<td></td>
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<tr>
<td>Low-fat or fat-free dairy</td>
<td>2-3</td>
<td>1 cup milk</td>
<td>skim or 1% milk, skim or low-fat buttermilk, nonfat or low-fat yogurt, part skim mozzarella cheese, nonfat cheese</td>
<td>Major sources of calcium and protein</td>
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<td></td>
<td></td>
<td>1 cup yogurt</td>
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<td></td>
<td></td>
<td>1 ½ oz.</td>
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<td></td>
<td></td>
<td>cheese</td>
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<tr>
<td>Meats, poultry and fish</td>
<td>6 or less</td>
<td>1 oz. cooked</td>
<td>lean meats (trimmed of visible fat), broiled, roasted or baked; poultry with skin removed, limit egg yolk to four per week</td>
<td>Rich sources of protein and magnesium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>meats, poultry or fish</td>
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<td></td>
<td></td>
<td>1 egg or 2 egg white</td>
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<tr>
<td>Nuts, seeds and legumes</td>
<td>4-5 per week</td>
<td>½ oz. or 1 ½ cup nuts</td>
<td>almonds, filberts, mixed nuts, peanuts, walnuts, sunflower seeds, kidney beans, lentils</td>
<td>Rich sources of energy, magnesium, potassium, protein and fiber</td>
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<td></td>
<td></td>
<td>2 Tbsp.</td>
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<tr>
<td></td>
<td></td>
<td>natural nut butter</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>½ oz. or 2 Tbsp. seeds</td>
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<tr>
<td></td>
<td></td>
<td>seeds</td>
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<tr>
<td></td>
<td></td>
<td>½ cup cooked legumes (dried beans of peas)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fats and oils</td>
<td>2-3</td>
<td>1 tsp. soft margarine, vegetable oil or regular mayonnaise</td>
<td>soft margarine, low-fat mayonnaise, light salad dressing, vegetable oil (such as olive, canola, corn or safflower)</td>
<td>besides fats added to foods, remember to choose foods that contain less fat</td>
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<td></td>
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<td>1 Tbsp. low-fat margarine or mayonnaise</td>
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<tr>
<td></td>
<td></td>
<td>2 Tbsp. light salad dressing</td>
<td></td>
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<tr>
<td>Sweets</td>
<td>5 or less per week</td>
<td>1 Tbsp. sugar</td>
<td>1 Tbsp. jelly or jam</td>
<td>½ ounce jelly beans</td>
</tr>
</tbody>
</table>

Source: The DASH Diet, NIH Publication No. 06-4082. (Rev. 12/16)
Consequences of High Blood Pressure

- People seem most afraid of stroke
- Early death
- Kidney disease
- Dementia
- Vision loss
Systems Improvement!

Changes in your clinic and system are more important for controlling blood pressure than the specific provider, medical assistant or patient population you serve.
Systems Approach is Superior

- Recent Annals of Internal Medicine article***:

- Both multilevel and patient level implementation strategies reduced BP more than usual care in hypertension
  - Either physician or non-physician was effective at the systems level titrating medication with team based care
  - Patient level including health coaching and home BP monitoring
  - Provider education less effective

***Ann Intern Med. 2018;168:110-120
Comparative Effectiveness of Implementation Strategies for Blood Pressure Control in Hypertensive Patients: A Systematic Review and Meta-analysis

Katherine T. Mills, PhD; Katherine M. Obst, MS; Wei Shen, MS; Sandra Molina, MPH; Hui-Jie Zhang, MD, PhD; Hua He, PhD; Lisa A. Cooper, MD, MPH; Jiang He, MD, PhD
## Improving Clinic Systems

<table>
<thead>
<tr>
<th>Implementation Strategy Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient level</strong></td>
<td></td>
</tr>
<tr>
<td>Health coaching (10)</td>
<td>Multiple sessions for patient-centered health education and motivation delivered with the goal of facilitating lifestyle modification and/or medication adherence.</td>
</tr>
<tr>
<td>Home BP monitoring</td>
<td>Self-monitoring of patient BP and recording of measurements either manually or by automatic electronic transmission; BP readings given to providers.</td>
</tr>
<tr>
<td><strong>Provider level</strong></td>
<td></td>
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<tr>
<td>Provider training</td>
<td>Education or training targeting providers on hypertension management, including guideline adherence (treatment goals, lifestyle intervention, and medication titrations), and/or patient communication.</td>
</tr>
<tr>
<td>Audit and feedback (11)</td>
<td>Repeated, periodic summaries of patient outcomes given to providers, such as BP values, so they can evaluate and improve patient care; could also include provider training.</td>
</tr>
<tr>
<td>Electronic decision-support system (11)</td>
<td>Computerized alerts, reminders, or order sets intended to aid providers in point-of-care decision making; could also include provider training.</td>
</tr>
<tr>
<td><strong>Multilevel</strong></td>
<td></td>
</tr>
<tr>
<td>Multilevel strategy without team-based care</td>
<td>Interventions that target barriers to hypertension control at multiple levels but do not include team-based care, such as a combination of provider training and patient health coaching.</td>
</tr>
<tr>
<td>Team-based care with physicians titrating medications (12)</td>
<td>Collaborative provision of care for hypertension by ≥2 providers, including a primary care physician who titrates medications, working collaboratively with patients to accomplish shared treatment goals.</td>
</tr>
<tr>
<td>Team-based care with nonphysician providers titrating medications (12)</td>
<td>Collaborative provision of care for hypertension by ≥2 providers, including a nonphysician team member who titrates medications, working collaboratively with patients to accomplish shared treatment goals.</td>
</tr>
</tbody>
</table>

BP = blood pressure.
* Numbers in parentheses are references.
Improving Clinic Systems

- Annals article summary:
- Patient level and multilevel strategies all reduced blood pressure significantly, with multilevel team based strategies the best
- Provider education alone did not make much difference
- Team based care: nurses, pharmacists, medical assistants, and/or community health workers
- Notice that provider involvement is not mandatory
Improving Clinic Systems

- Educating medical assistants
- Blood pressure control visits without the provider (nurse or MA)
- Non provider reminders for follow-up visit interval
- Every patient with blood pressure issues should have a home cuff and bring it in for review to see if it’s working, along with home readings
- “Body positioning of the patient” flier posted in the exam room
- Patient education posted in rooms
- Almost always two BP readings, entering the lower reading
- Making sure the EMR has one data point to assess, mapping correctly
Assessing Blood Pressure Control

- The blood pressure control should be evaluated per provider and per clinic.
- The general standard is for <140/90, in 70% of hypertensives, although this may change over time, probably up to 80%.
- White coat hypertension makes up a lot of uncontrolled patients, typically 10–20% of hypertensive patients.
- If white coat hypertension and other extenuating circumstances such as severe orthostatic hypotension, advanced chronic kidney disease, or pregnancy are included, then control 85% or more is unusual.
Assessing Provider Control

- Query each provider for total patients (1 year look back)
- Subset for I10, and it used to be about a third of patients would be identified hypertensive patients, with variations between 28 and 33% based on patient demographic if they are all identified
- If the AHA guidelines (11/2017) are widely adopted, it will swell toward 46%, gradually
- Assess for BP > 140 or > 90 and NOT: I10 to look for missing hypertension patients, or the code R03.0
Assessing Provider Control

- Review the data with provider.
- Run specific lists for patients that need follow up and treatment
- Create an ongoing system to routinely assess patients needing attention, once a month?
- Have a designated quality control position – how is that funded?
White Coat Hypertension

- Code this specifically in your progress notes and problem lists to show the world you are aware of the issue.
- Listed as with hypertension (I10 or without R03.0)
- Always document with ambulatory monitor
Improving Clinic Systems – Nurse Visit

- One of the most important changes to practice management of hypertension in the clinic:
  - Identify a reading over 140/90* on any patient at any time
  - Code in that progress note I10 or R03.0
  - Follow up in 4 weeks most of the time – could be a nurse or provider visit

*After sitting at least 5 minutes, two readings if necessary
Cascade Internal Medicine Specialists work flow:

Nurse/medical assistant blood pressure visits

- Bring patient back and make sure their arm is bare without bunching up clothing. Have them sit in a comfortable position, per the red diagram, with no muscles activated.
- In progress note, use either I10 or R03.0 for assessment diagnosis, depending on which the provider used in the last encounter. If they are on blood pressure medications, it should always be I10.
- Wait 5 minutes (or more) and document under “Plan” the initial time to sit down, then 5 min time.
- Check blood pressure with the automated Welch Allyn cuff (biceps), ensure the size is correct. If it’s never been done consider checking both arms, and use the higher reading arm. Differences up to 10 mm Hg are common, more than 20 is abnormal.
- Do three measurements in total.
- Check their cuff if they brought it. It should be within 10 mm Hg for the systolic reading (top).
- Do a fourth standing reading, waiting a minute after standing up to get that reading.
- Document their cuff reading and the four readings in the plan section.
In the vitals: average all three sitting readings and enter one value: Mean of systolic and diastolic (see example)

Any systolic value less than 105, or greater than 160 should be run by a provider

Bill 99211 nurse visit, put “prn” in the follow up and click “done”

Example: 138/80, 142/78, 128/77

138 plus 142 plus 128 = 408 divided by three is 136

80 plus 78 plus 77 = 237 divided by three is 78

Enter 136/78 in the vitals
Improving Systems Management

- Consider a physician champion for education of providers and medical assistants
- Consider a proficiency award for over 70%
  - A logo for an award
  - A cash incentive
  - Friendly competition
Veterans Administration is progressive!
Veterans Administration is progressive!

- Telehealth daily calls available
- Nurse follows up and makes recommendations to the provider
- Pharmacists can take over BP management and prescribe separate from the provider, and do their own appointments
- Nurse care managers run their registries and call patients if they need to be seen, and to discuss compliance, diet, and medications
Improving Clinic Systems

- Medical assistant Education:
  - Body positioning with flyer in room
  - No clothing under the BP cuff
  - Two readings with patient at rest
  - Review the auscultory gap
  - Palpation method for systolic blood pressure
Improving Clinic Systems

- Have information laminated and posted
- Available for patient if they desire
  - Body positioning visual
  - Body positioning stats for affecting blood pressure
  - Lifestyle contributions
  - Non-pharmacologic strategies
  - Dietary strategies
  - Ideal 7 visual
Newer Ideas for Systems Control

- Chronic care management – reaching out from the clinic for high risk patients, and can be directed at hard to control hypertension patients
- Community health workers
- Health coaching at the insurance level
- Health insurance provisions with home visits
- Self-monitoring with telemonitoring
Improving Provider Control

- Should have an update on blood pressure education at least once a year
- Could provide an incentive for that
- See separate clinical blood pressure talk already arranged this year
  - Is recorded and for CME
- Improving patient compliance by:
  - Once a day drugs
  - Combination drugs
  - Cheap generics
  - Helpful ideas: phone reminders, coffee pot!
Improving Provider Control

- In Sri Lanka: Fixed low dose triple combination antihypertensive medication vs usual care for blood pressure control
- 20 mg telmisartan, 2.5 mg amlodipine, and 12.5 mg chlorthalidone
- The triple pill increased the proportion of patients achieving target blood pressure vs usual care at 6 months (70% vs 55% respectively)
- Average difference in blood pressure: -9.8/-5 mm Hg
- Probably most helpful in health care settings around the world that are resource challenged for drug supply, access to care, and limited health care workers, however the concept is still relevant in our country
### Improving Blood Pressure Control

**Administrator checklist**

**Provider:**
- [ ] Has had education: clinical webinar
- [ ] Has a designated nurse or MA for BP follow up available at 4 weeks
- [ ] Understands the tools available to him or her such as handouts, clinic flow, and where to order 24 hour ambulatory monitors
- [ ] Knows his or her BP control and sees it updated monthly
- [ ] Knows how to use I10 and R03.0 codes for any abnormal reading

**Clinic Set Up:**
- [ ] Regularly identifies BP control and outliers and presents to providers
- [ ] Has organized a separate nurse visit with correct BP technique and billing and how to get that information to the provider
- [ ] Has educated Medical assistants on the correct way to measure blood pressure
- [ ] Has posted information in exam rooms
- [ ] Has information for patients at check out if necessary
- [ ] Consider automated BP monitors for exam rooms

**Patient education:**
- [ ] Has been advised to get a home monitor by provider or staff
- [ ] Is aware of activities that raise blood pressure
- [ ] Is aware of diet that lowers blood pressure
- [ ] Knows the goal blood pressure goal for his/her care
Summary

- The last slide was the money slide 😊
What Is High Blood Pressure?

Blood pressure is the force of blood pushing against blood vessel walls. It is measured in millimeters of mercury (mm Hg).

High blood pressure (HBP) means the pressure in your arteries is higher than it should be. Another name for high blood pressure is hypertension.

Blood pressure is written in two numbers, such as 120/80 mm Hg. The top, systolic, number is the pressure when the heart beats. The bottom, diastolic, number is the pressure when the heart rests between beats.

Normal blood pressure is below 120/80 mm Hg. If you’re an adult and your systolic pressure is 120 to 129 and your diastolic pressure is less than 80, you have elevated blood pressure. High blood pressure is a pressure of 130/80 systolic or higher, or 80 diastolic or higher, that stays high over time.

High blood pressure usually has no signs or symptoms. That’s why it is so dangerous. But it can be managed.

Nearly half of the American population over age 20 has HBP and many don’t even know it. Not treating high blood pressure is dangerous. HBP increases the risk of heart attack and stroke. Make sure you get your blood pressure checked regularly and treat it the way your doctor advises.

Am I at higher risk of developing HBP?

There are risk factors that increase your chances of developing HBP. Some you can control, and some you can’t.

Those that can be controlled are:
- Inactivity and exposure to secondhand smoke
- Diabetes
- Being obese or overweight
- High cholesterol
- Unhealthy diet (high in sodium, low in potassium, and drinking too much alcohol)
- Physical inactivity
High blood pressure is often the first domino in a chain or “domino effect” leading to devastating consequences, like:

- **Stroke**: HPD can cause blood vessels in the brain to burst or leak more easily.
- **Vision Loss**: HPD can cause the vessels in the eye to leak or break more easily.
- **Heart Failure**: HPD can cause the heart to enlarge and fail to pump blood to the body.
- **Heart Attack**: HPD damages arteries that can become blocked.
- **Kidney Disease/Failure**: HPD can damage the blood vessels around the kidneys that filter blood.
- **Sexual Dysfunction**: This can be erectile dysfunction in men or loss of libido in women.

A simple blood pressure check is the first step to preventing the “domino effect.”

Learn more at heart.org/hbp.
https://www.heart.org/-/media/files/health-topics/high-blood-pressure/what-can-i-do-to-improve-my-blood-pressure-chart-ucm_486661.pdf?la=en&hash=59BCB9AD3C32AA384FE3E46E65D519B91A92DE03
Summary

- To Improve Blood Pressure Control:
  - Educate Providers about new guidelines, follow up in 4 weeks or less for abnormal readings, and use ambulatory blood pressure monitors
  - Educate Patients on managing their hypertension with home monitoring, and relevant self care information
  - Structure your Clinic around team-based care with well educated ancillary providers contributing separate visits, and readily available information
Farewell Trail near Tumalo Falls
References


References

Thank you!

This webinar is a service of the Oregon Health Authority Transformation Center.

- For more information about this presentation, contact Transformation.Center@state.or.us
- Find more resources for controlling high blood pressure here: https://www.oregon.gov/oha/HPA/CSI-TC/Pages/Hypertension-TA.aspx
- Sign up for the Transformation Center’s technical assistance newsletter: https://www.surveymonkey.com/r/OHATransformationCenterTA