

## NADI - Hypertension Management Protocol

Disclaimer: The following protocol is by no means all-encompassing and should not be used in place of physician expertise. The purpose of this protocol is to help initiate management of a participant's alleged hypertension and to guide them in the right direction. There are many causes of hypertension and some individuals may require tailored therapy. We will be abiding by the 2017 ACC/AHA guidelines but will also refer to the 2018 European Society of Hypertension (ESH) guidelines when discussing race/ethnicity-specific management.

### Initial Hypertension Diagnosis

#### 1) Measure BP in both arms

#### 2) ALWAYS use higher BP to guide decisions

**STEP 1** We can **never** diagnose hypertension as students, but it is our duty to look out for any elevated blood pressures and determine whether it is of emergent concern. When a participant comes in with elevated blood pressure, we need to confirm the reading is accurate by **taking it again** after the participant has been sitting for about 5 minutes\* without any distractions. We also need to make sure the participant has **not smoked, had caffeine, exercised recently, or been in any unusual emotional distress**. These can all elevate the blood pressure but do not tell us anything about the participant's baseline, resting blood pressure.

\*Note: Participants may not be willing to sit for 5 minutes. If this is the case, proceed to Step 2 with the assumption that the reading was accurate.

**STEP 2** Immediately determine severity of BP based on American Heart Association (AHA) stages (elevated, Stage 1, Stage 2, & hypertensive crisis). If systolic BP > 180 or diastolic BP > 120, you should be alarmed. Even if the patient feels fine, this is a blood pressure reading with severe consequences if not corrected. **You should direct them to go to the ER if hypertensive crisis**. If hypertensive emergency (hypertensive urgency + symptoms of end-organ damage), call 911. Symptoms of end-organ damage include pulmonary edema, neurological deficits, visual deficits or sudden visual changes, stroke, heart attack, oliguria (lack of urination), among several others. There may be situations where the participant has known hypertension but has not taken BP medication yet and that is why the BP is so high. You should still advise them to go to ER or at the very least see primary care physician within 24 hours if asymptomatic. BP should **never** go > 180/120.

**STEP 3** If the participant has stage 2 hypertension, ask them if they know they have diagnosed hypertension (by a physician).

If yes: Do they take medication? Did they take it today? When was the last time they checked their BP? Do they have a BP machine at home? When was the last time they went to the doctor for blood pressure? What is their blood pressure normally?

Refer them to their primary care physician and ask them to follow up **regardless of whether they had their medication**. If they did not take medication, ask them to take medication at the same time daily (no study conclusively shows that it is better to take at night vs. morning, but some studies suggest a greater BP reduction when taking medication at night before bed) and measure blood pressure one hour after taking it as well as one hour before taking it. This will give them a good sense of where the blood pressures are throughout the day. Make sure to clearly state that stage 2 hypertension is serious and can lead to adverse health effects if kept uncontrolled over a long period of time.

If they currently do not have a doctor but have insurance, ask them to find one soon and establish care with them. If they do not have insurance, give them a list of the federally qualified health centers in NJ (on hand in NADI equipment bag) and ask to go to a nearby clinic as soon as possible.

If no: Assess their mood. Do they seem anxious or nervous? White coat hypertension is a real phenomenon and although we don't have white coats, the participant may become anxious or hesitant whenever someone else takes their BP. Ask them to relax and retake. If normal, then good. If not, then treat as essential hypertension.

Ask them if they have seen a doctor recently. If not, why not? Do they have insurance? If they do, tell them to see doctor as soon as possible. If they do not, give them a list of the federally qualified health centers in NJ (on hand in NADI equipment bag) and ask to go to a nearby clinic as soon as possible.

*\*\*\*Future*: Both the ACC/AHA and ESH guidelines state that BP monitoring at home is important and a better way to diagnose hypertension than office monitoring. You are more relaxed at home and can take several readings throughout the day. Encourage participants to buy a BP machine of their own.

**STEP 4**: If they have stage 1 hypertension or elevated systolic blood pressure (SBP = 120-129), they do not require immediate physician attention; however, guidelines recommend initiation of non-pharmacologic therapy and health education (explained below in Step 5). Please use your judgement when telling them they do not need pharmacologic therapy or need to see a doctor yet. If they are young (< 25), blood pressure should generally be lower than 115/75. If it's Stage 1, you should recommend them to see physician.

Ask participants to take BP at home or at a pharmacy/supermarket to make sure it does not elevate. Ask same questions as Step 3 and follow diagnosed hypertension algorithm as explained in Step 3. A blood pressure < 130/80 is good for elderly people and those with comorbidities such as diabetes. **Do not ever tell someone to further reduce blood pressure by taking more medication. Remember, we are not physicians and should not be coaching patients on changing dosage or medication in any way.**

**STEP 5: ALL PARTICIPANTS SHOULD RECEIVE EDUCATION REGARDLESS OF DIAGNOSIS.**

**A.** The #1 studied and validated diet for hypertension is the DASH (Dietary Approaches to Stop Hypertension) diet. Refer to figures for more information on the DASH diet and how to explain it to participants.

Key items to tell participants:

1. Potassium-rich, sodium-low foods are best. Fruits and green, leafy vegetables are good for this.
2. Reduce sodium intake to < 1,500 mg/day. Foods high in sodium include breads, frozen foods, processed foods. Pizza is extremely high in salt.
3. Eats foods with a low glycemic index. While not directly related to hypertension management, many people have both hypertension and diabetes or are at least at risk for diabetes, so eating foods with a low glycemic index is crucial to preventing diabetes.
4. Portion size is the hallmark of a proper diet. You can choose to eat whatever you like as long as you control your portion sizes.



The DASH diet (Dietary Approaches to Stop Hypertension) has been shown to help lower blood pressure and prevent heart disease, stroke, diabetes and even some forms of cancer. It focuses on eating more fresh fruits and vegetables.

This is a guide to how much of each food group you should eat every day, based on eating 2,000 calories per day.

## Following the DASH Eating Plan

Use this chart to help you plan your menus—or take it with you when you go to the store.

Food Group	Servings Per Day			Serving Sizes	Examples and Notes	Significance of Each Food Group to the DASH Eating Plan
	1,600 Calories	2,000 Calories	2,600 Calories			
Grains*	6	6–8	10–11	1 slice bread 1 oz dry cereal† ½ cup cooked rice, pasta, or cereal	Whole wheat bread and rolls, whole wheat pasta, English muffin, pita bread, bagel, cereals, grits, oatmeal, brown rice, unsalted pretzels and popcorn	Major sources of energy and fiber
Vegetables	3–4	4–5	5–6	1 cup raw leafy vegetable ½ cup cut-up raw or cooked vegetable ½ cup vegetable juice	Broccoli, carrots, collards, green beans, green peas, kale, lima beans, potatoes, spinach, squash, sweet potatoes, tomatoes	Rich sources of potassium, magnesium, and fiber
Fruits	4	4–5	5–6	1 medium fruit ¼ cup dried fruit ½ cup fresh, frozen, or canned fruit ½ cup fruit juice	Apples, apricots, bananas, dates, grapes, oranges, grapefruit, grapefruit juice, mangoes, melons, peaches, pineapples, raisins, strawberries, tangerines	Important sources of potassium, magnesium, and fiber
Fat-free or low-fat milk and milk products	2–3	2–3	3	1 cup milk or yogurt 1½ oz cheese	Fat-free (skim) or low-fat (1%) milk or buttermilk; fat-free, low-fat, or reduced-fat cheese; fat-free or low-fat regular or frozen yogurt	Major sources of calcium and protein
Lean meats, poultry, and fish	3–6	6 or less	6	1 oz cooked meats, poultry, or fish 1 egg‡	Select only lean; trim away visible fats; broil, roast, or poach; remove skin from poultry	Rich sources of protein and magnesium
Nuts, seeds, and legumes	3 per week	4–5 per week	1	⅓ cup or 1½ oz nuts 2 Tbsp peanut butter 2 Tbsp or ½ oz seeds	Almonds, hazelnuts, mixed nuts, peanuts, walnuts, sunflower seeds, peanut butter, kidney beans, lentils, split peas	Rich sources of energy, magnesium, protein, and fiber

## Glycemic Index

Low GI (<55), Medium GI (56-69) and High GI (70>)

Grains / Starches		Vegetables		Fruits		Dairy		Proteins	
Rice Bran	27	Asparagus	15	Grapefruit	25	Low-Fat Yogurt	14	Peanuts	21
Bran Cereal	42	Broccoli	15	Apple	38	Plain Yogurt	14	Beans, Dried	40
Spaghetti	42	Celery	15	Peach	42	Whole Milk	27	Lentils	41
Corn, sweet	54	Cucumber	15	Orange	44	Soy Milk	30	Kidney Beans	41
Wild Rice	57	Lettuce	15	Grape	46	Fat-Free Milk	32	Split Peas	45
Sweet Potatoes	61	Peppers	15	Banana	54	Skim Milk	32	Lima Beans	46
White Rice	64	Spinach	15	Mango	56	Chocolate Milk	35	Chickpeas	47
Cous Cous	65	Tomatoes	15	Pineapple	66	Fruit Yogurt	36	Pinto Beans	55
Whole Wheat Bread	71	Chickpeas	33	Watermelon	72	Ice Cream	61	Black-Eyed Beans	59
Muesli	80	Cooked Carrots	39						
Baked Potatoes	85								
Oatmeal	87								
Taco Shells	97								
White Bread	100								
Bagel, White	103								



	Nonpharmacological Intervention	Goal	Approximate Impact on SBP		
			Hypertension	Normotension	Reference
Weight loss	Weight/body fat	Best goal is ideal body weight, but aim for at least a 1-kg reduction in body weight for most adults who are overweight. Expect about 1 mm Hg for every 1-kg reduction in body weight.	-5 mm Hg	-2/3 mm Hg	(S4.4-2)
Healthy diet	DASH dietary pattern†	Consume a diet rich in fruits, vegetables, whole grains, and low-fat dairy products, with reduced content of saturated and total fat.	-11 mm Hg	-3 mm Hg	(S4.4-7, S4.4-8)
Reduced intake of dietary sodium	Dietary sodium	Optimal goal is <1500 mg/d, but aim for at least a 1000-mg/d reduction in most adults.	-5/6 mm Hg	-2/3 mm Hg	(S4.4-10, S4.4-12)
Enhanced intake of dietary potassium	Dietary potassium	Aim for 3500-5000 mg/d, preferably by consumption of a diet rich in potassium.	-4/5 mm Hg	-2 mm Hg	(S4.4-14)
Physical activity	Aerobic	<ul style="list-style-type: none"> <li>■ 90-150 min/wk</li> <li>■ 65%-75% heart rate reserve</li> </ul>	-5/8 mm Hg	-2/4 mm Hg	(S4.4-19, S4.4-20)
	Dynamic resistance	<ul style="list-style-type: none"> <li>■ 90-150 min/wk</li> <li>■ 50%-80% 1 rep maximum</li> <li>■ 6 exercises, 3 sets/exercise, 10 repetitions/set</li> </ul>	-4 mm Hg	-2 mm Hg	(S4.4-19)
	Isometric resistance	<ul style="list-style-type: none"> <li>■ 4 × 2 min (hand grip), 1 min rest between exercises, 30%-40% maximum voluntary contraction, 3 sessions/wk</li> <li>■ 8-10 wk</li> </ul>	-5 mm Hg	-4 mm Hg	(S4.4-21, S4.4-78)
Moderation in alcohol intake	Alcohol consumption	In individuals who drink alcohol, reduce alcohol‡ to: <ul style="list-style-type: none"> <li>■ Men: ≤2 drinks daily</li> <li>■ Women: ≤1 drink daily</li> </ul>	-4 mm Hg	-3 mm Hg	(S4.4-20, S4.4-24, S4.4-25)

B. You should explain the above chart and show how much each intervention can reduce one's BP. In addition to diet, aerobic physical exercise is important to reduce one's BP. This means every week, participants should be doing mild-moderate exercise at least 30 minutes a day, 3 times a week. Walking is a good exercise as long as you walk consistently for 30 minutes without stopping.