

# QUICK REFERENCE GUIDE TO DIABETES FOR HEALTH CARE PROVIDERS

A special project of the Michigan Diabetes Outreach Network

## Chapter 13 Diabetes and Hypertension

Hypertension (HTN) is twice as common in persons with diabetes compared to the general population. For persons with diabetes, HTN contributes to the development and progression of chronic complications, such as retinopathy, chronic kidney disease and peripheral vascular disease. Achieving and maintaining normal blood pressure levels can also minimize the risk of developing these complications. Controlling HTN begins with detection and diagnosis. Health care professionals are strongly encouraged to check blood pressure at each visit. Following proper blood pressure monitoring technique is **essential** to obtain accurate blood pressure readings.

### Diagnosis, Classification and Treatment of Blood Pressure

Blood Pressure Classification	Systolic BP mmHg	Diastolic BP mmHg	No Risk Factors*, No TCD/CCD**	At least one risk factor (not DM) No TOD/CCD**	TOD/CCD** and/or diabetes (with or without risk factors)
Normal	< 120	< 80	Lifestyle Changes	Lifestyle Changes	Lifestyle Changes
Prehypertension	120–139	80–89	Lifestyle Changes (up to 12 months)	Lifestyle Changes (up to 6 months)	Lifestyle Changes + Drug Therapy (if SBP > 130 and DBP > 80)
Stage 1 Hypertension	140–159	90–99	Lifestyle Changes + Drug Therapy	Lifestyle Changes + Drug Therapy	Lifestyle Changes + Drug Therapy
Stage 2 & 3 Hypertension	≥ 160	≥ 100	Lifestyle Changes + Drug Therapy	Lifestyle Changes + Drug Therapy	Lifestyle Changes + Drug Therapy

If systolic and diastolic BP fall into two separate categories, use the higher category status.

\*Cardiovascular Risk Factors = hypertension, cigarette smoking, obesity (BMI ≥ 30), physical inactivity, dyslipidemia, diabetes, microalbuminuria, age (over 55 for men; over 65 for women), family history of premature cardiovascular disease (men under age 55 or women under age 65).

\*\*TOD/CCD = Target Organ Damage and Clinical Cardiovascular Disease. TOD includes left ventricular hypertrophy, angina, prior myocardial infarction, prior coronary revascularization, heart failure, stroke or transient ischemic attack, chronic kidney disease, peripheral arterial disease or retinopathy.

According to the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7) and the American Diabetes Association, the goal of treating hypertension is to achieve and maintain blood pressure **less than 130/80 mmHg for persons with diabetes** or chronic kidney disease.

Most persons with high blood pressure, especially those over age 50, will reach their diastolic BP goal when the systolic BP (SBP) is at goal. Therefore, the primary focus of therapy should be to achieve the systolic BP goal.

## Nonpharmacological Treatment

Modification	Recommendation	Average SBP Reduction
<b>Weight Reduction</b>	Maintain normal body weight: Body Mass Index (BMI) of 18.5-24.9	5-20 mmHg per 10 kg weight loss
<b>DASH Eating Plan</b>	Adopt a diet rich in fruits, vegetables and low-fat dairy products with reduced total & saturated fat.  <b><i>See DASH handout at end of guideline.</i></b>	8-14 mmHg
<b>Dietary Sodium Restriction</b>	Reduce total sodium intake to less than 2400 mg/day (~1 teaspoon table salt daily).  Eat more fresh, unsalted foods  Use herbs and spices to season foods  Choose foods with <5% Daily Value for sodium	2-8 mmHg
<b>Physical Activity</b>	Regular aerobic physical activity (brisk walking) at least 30 minutes per day most days of the week.	4-9 mmHg
<b>Moderation of Alcohol Consumption</b>	Limit alcohol intake to 2 drinks per day (men) or 1 drink per day (women)  <i>1 drink = 12 oz beer, 5 oz wine and 1½ oz liquor</i>	2-4 mmHg

Cigarette smoking and caffeine (> 2 cups or more of coffee) can cause a temporary, immediate rise in blood pressure; but does not impact the long-term incidence of hypertension. Additional food nutrients/components linked to improved blood pressure control are adequate intakes of soy, whole grains and folic acid.

## Pharmacological Treatment

More than 2/3 of those with diabetes and HTN will require two or more different medications to achieve the goal BP of less than 130/80 mmHg. See below for evidence-based recommendations for the pharmacological treatment of diabetes and HTN.

Condition	Recommended drug therapy
Type 1 or 2 diabetes with <b>NO</b> cardiovascular risk factors or proteinuria	<b>ACE inhibitor or ARB</b> <b>Thiazide Diuretic</b> (shown to reduce risk of stroke and cardiovascular events)
Type 1 diabetes with any degree of albuminuria	<b>ACE inhibitor</b> (shown to delay the progression of nephroathy)
Type 2 diabetes and microalbuminuria	<b>ACE inhibitor or ARB</b> (shown to delay the progression to macroalbuminuria)
Type 2 diabetes and macroalbuminuria, nephropathy or renal insufficiency	<b>ARB</b> should be strongly considered
Those over age 55 with cardiovascular risk factors (history of cardiovascular disease, smoking, dyslipidemia, overweight)	<b>ACE Inhibitor</b> should be considered (to reduce the risk of cardiovascular events)
Those with recent myocardial infarction (MI)	<b>Beta blocker</b> should be added to current treatment (to reduce mortality)
Those with microalbuminuria or overt nephropathy in which ACE Inhibitors or ARBs are not tolerated	<b>Non-Dihydropyridine Calcium-Channel Blocker</b> should be considered.

## Commonly Used Oral Antihypertensive Medications

Class	Drug (Trade Name)	
<b>Thiazide Diuretics</b>	hydrochlorothiazide (Microzide, HydroDIURIL) indapamide (Lozol)	
<b>ACE Inhibitors</b>	benazepril (Lotensin) enalapril (Vasotec) fosinopril (Monopril)	lisinopril (Prinivil, Zestril) quinapril (Accupril) ramipril (Altace)
<b>ARBs</b>	candesartan (Atacand) irbesartan (Avapro)	losartan (Cozaar) valsartan (Diovan)
<b>Beta Blockers</b>	atenolol (Tenormin) nadolol (Corgard)	metoprolol (Lopressor) metoprolol extended release (Toprol XL)
<b>Dihydropyridine Calcium-Channel Blockers</b>	amlodipine (Norvasc) felodipine (Plendil)	nifedipine long-acting (Adalat CC, Procardia XL)
<b>Non-dihydropyridine Calcium-Channel Blockers</b>	Diltiazem extended release (Cardizem CD, Dilacor XR, Tiazac) diltiazem extended release (Cardizem LA) verapamil immediate release (Calan, Isoptin) verapamil long acting (Calan SR, Isoptin SR) verapamil (Coer, Covera HS, Verelan PM)	
<b>Alpha 1 Blockers</b>	doxazosin (Cardura) prazosin (Minipress)	terazosin (Hytrin)

## Summary

The treatment of HTN involves considerable knowledge of the recommended lifestyle changes and medications. Because high blood pressure is often asymptomatic, lifestyle changes can be difficult to maintain. Since medications may be expensive and may have unpleasant side effects, some stop treating their high blood pressure with unfortunate results. Health care providers should explore these issues and involve the physician, as needed, to help persons with diabetes achieve their blood pressure goal. The keys are to treat hypertension aggressively and to keep blood glucose under good control to minimize the possibility of developing or exacerbating complications.

**For more information on Diabetes and Hypertension, check out the Diabetes and Hypertension independent study module at [www.diabetesinmichigan.org](http://www.diabetesinmichigan.org). Click on independent study modules.**

## References:

The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure, NIH Publication No. 03-5231, National High Blood Pressure Education Program, May 2003.

American Diabetes Association. Position Statement: Treatment of Hypertension in Adults with Diabetes. Practical Diabetology, March 2003.

Wylie-Rosett J. Hypertension and Diabetes: Clinical Synergy and Challenges. On the Cutting Edge, 2004: Vol 25 (4): 4-8.

# DASH Eating Plan

Food Group	Servings based on:			Examples Serving Sizes	Comments
	1600 Calories	2000 Calories	3100 Calories		
Grains/Grain products	6 per day	7-8 per day	12-13 per day	1 slice bread ½ - 1 cup ready-to-eat cereal ½ cup cooked rice, pasta, cereal	Choose whole grains. On the food label, look for whole wheat flour as first ingredient and at least 2 grams fiber per serving.
Vegetables	3-4 per day	4-5 per day	6 per day	1 cup raw leafy vegetables ½ cup cooked vegetable 6 oz vegetable juice	Choose variety of vegetables. Rich sources of potassium, magnesium and fiber.
Fruits	4 per day	4 - 5 per day	6 per day	1 medium fruit ¼ cup dried fruit ½ cup fresh, frozen or canned fruit 4 oz fruit juice	Choose variety of fruits. Good source of potassium, magnesium and fiber.
Low-fat or fat-free dairy products	2-3 per day	2 - 3 per day	3-4 per day	8 oz 1%, ½ % or skim milk 6-8 oz yogurt 1 ½ oz cheese	Major source of calcium and protein. Choose low-fat and fat-free dairy products.
Lean meats, poultry and fish	1-2 per day	2 per day	2-3 per day	3 oz cooked lean meat, skinless poultry or fish	Choose lean and trim away visible fats. Bake, boil, roast, broil versus frying
Nuts, seeds and dried beans	3 per week	4-5 per week	1 per day	1/3 cup or 1½ oz nuts 1 Tbsp or ½ oz seeds ½ cup cooked dried beans	Rich source of energy, magnesium, potassium, protein and fiber.
Fats and oils	2 per day	2 - 3 per day	4 per day	1 tsp soft tub margarine 1 Tbsp low-fat mayonnaise 2 Tbsp light salad dressing 1 tsp vegetable oil	High in calories. Limit portions. Limit saturated fats (solid at room temperature). Best oils: canola, olive
Sweets	0	5 per week	2 per day	1 Tbsp sugar, jam or jelly ½ oz jelly beans 8 oz lemonade	Sweets should be low in fat

The DASH (**D**ietary **A**pproaches to **S**top **H**ypertension) Study was a National Institutes of Health research project. Following the DASH Eating Plan lowered blood pressure levels in those with normal and elevated blood pressure levels without reducing sodium or using drugs. Source: <http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/index.htm>

# How to Lower Calories on the Dash Eating Plan

## To increase fruits

- Eat a medium apple instead of 4 shortbread cookies (save 80 calories).
- Eat ¼ cup dried fruit instead of a 2 oz bag of pork rinds (save 230 calories).

## To increase vegetables:

- Have a hamburger that's 3 oz meat instead of 6 oz. Add ½ cup of carrots and ½ cup spinach. (save 200 calories)
- Instead of 5 oz chicken, have a stir-fry with 2 oz chicken, 1½ cup raw vegetables and 1 Tbsp oil. (save 50 calories).
- Add fresh or frozen vegetables to soups, pastas or rice.

## To increase low-fat or fat-free dairy products:

- Drink skim milk instead of 2% milk (save 30 calories per cup) or whole milk (save 60 calories per cup).
- Have ½ cup low-fat frozen yogurt instead of 1½ oz chocolate bar (save 110 calories).

## Other calorie saving tips:

- Use low-fat or fat-free condiments.
- Use half the amount of regular vegetable oil, soft or liquid margarine or salad dressing.
- Eat smaller portions, cutting back gradually.
- Read food labels to compare fat content (low-fat and fat-free does not always mean lower in calories).
- Limit foods with lots of added sugar (pies, cakes, cookies, candy, chocolate, ice cream, sherbet, regular soft drinks and fruit drinks)
- Eat fruits canned in their own juice.
- Snack on fruit, raw vegetables or unbuttered, unsalted popcorn.
- Drink water or club soda.

## Tips for reducing salt:

- Choose more fresh, unsalted foods.
- Avoid salting homemade foods. Flavor with spices.
- Read food labels and look for:
  - foods with **< 5% of Daily Value** for sodium
  - **≤ 140 mg sodium per serving:** beverages, fats, oils, meat, fish and poultry
  - **≤ 240 mg sodium per serving:** snack foods, desserts, cereals, breads, grains, pasta, processed fruits and vegetables, nut butters, nuts/seeds, salad dressings or condiments
  - **≤ 600 mg sodium per serving:** frozen meals, main dishes, sandwiches or fast foods.
  - **≤ 480 mg per serving:** soups; all other foods

### Michigan Diabetes Outreach Networks - Strengthening Diabetes Care in Michigan

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MDON is funded by a grant from the Diabetes Control & Prevention Program of the Michigan Department of Community Health.

Revised Nov 08