

# IHS Guidelines for Care of Adults with Prediabetes and/or the Metabolic Syndrome in Clinical Settings

(April 2006)

The Indian Health Service (IHS) Division of Diabetes Treatment and Prevention and Area Diabetes Consultants have developed these clinical guidelines for adults with Prediabetes and/or the Metabolic Syndrome. The purpose of these guidelines is to help provide consistent, quality care to adults with Prediabetes and the Metabolic Syndrome and prevent diabetes and cardiovascular disease.

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## 1. Introduction

Prediabetes (PD) and the Metabolic Syndrome (MetS) are related conditions that are often seen together and share a common pathogenesis in obesity and insulin resistance. Important clinical aspects of these conditions are:

- The prevalence of PD and MetS in American Indian and Alaska Native adult populations approaches 30%.
- Both confer high risk for the development of type 2 diabetes.
- Recent clinical trials have demonstrated that progression to diabetes in such high-risk individuals can be averted through behavioral lifestyle interventions.
- Primary care providers can detect and treat patients with PD and MetS.
- Detection and treatment efforts will:
  - Identify undiagnosed diabetes in some patients.
  - Delay the onset of diabetes in others.
  - Assist in the earlier detection of those patients who progress to diabetes.
  - Identify undiagnosed hypertension and undiagnosed dyslipidemia in some patients.
  - Help lay the groundwork for healthy lifestyle choices.
- Both PD and MetS—in the absence of diabetes, hypertension, and dyslipidemia—are weak predictors of cardiovascular disease (CVD). As diabetes develops, the risk of CVD increases 3–4 fold. Therefore, prevention of diabetes in individuals with PD and MetS is the primary strategy for the prevention of CVD.

## 2. Who should be tested for Prediabetes?

American Indian and Alaska Native adults greater than the age of 18 with any of the following risk factors for diabetes should be tested annually:

- Body mass index (BMI)  $\geq 25$  kg/m<sup>2</sup>.
- Hypertension.
- High-density lipoprotein (HDL)  $< 40$  mg/dl in men or  $< 50$  mg/dl in women.
- Triglycerides (TG)  $> 150$  mg/dl.
- Women with a history of gestational diabetes or birth weight  $\geq 9$  lbs (4.0 kg).
- Offspring of a pregnancy complicated by diabetes, gestational diabetes, high birth weight ( $> 9$  lbs or 4.0 kg) or low birth weight ( $< 2.5$  kg or 5.5 lbs).
- Women with polycystic ovarian syndrome (or hyperandrogenic chronic anovulation).
- A family history of type 2 diabetes.

If none of these risk factors exist, testing should begin at the age of 35, at a minimum of every three years.

### 3. Classification and tests used to diagnose Prediabetes

PD is a term used to identify people with degrees of abnormal glucose regulation intermediate between the normal state and the state of diabetes. PD can be diagnosed using either of the following classifications of impaired glucose homeostasis:

Table 1. Classifications of impaired glucose homeostasis.

<b>Classification</b>	<b>Tests Used Diagnostic Values</b>
Impaired glucose tolerance (IGT)	75 gram oral glucose tolerance test (OGTT) 2-hour plasma glucose 140–199 mg/dl
Impaired fasting glucose (IFG)	Fasting plasma glucose (FPG) after 8-hour fast Fasting plasma glucose 100–125mg/dl

A patient may have IFG, IGT, or both at the same time. However, either IFG or IGT may be used to diagnosis PD. No one test is foolproof.

For practical purposes, we recommend using the FPG because it is simple and convenient, and it provides an opportunity to check fasting lipids. An FPG test is best done in the morning after an 8-hour fast. Afternoon values, even after a similar fasting period, tend to be lower. Programs may consider adding a 2-hour OGTT if resources permit because it may identify additional cases of PD, as well as cases of diabetes among those with FPG in the PD range.

Although casual blood glucose (CBG) or random blood glucose (RBG) screening may have a role in detecting people at risk for undiagnosed diabetes, especially in patients with symptoms, there are no cut points with acceptable predictive values for the detection of PD. Therefore, screening for PD with a CBG is not formally recommended at this time; however, we do recognize that some programs will perform screening with “finger stick” CBG glucose, in which case a value of  $\geq 100$ mg/dl (fasting or casual) is a reasonable threshold for further diagnostic testing.

The addition of an A1c test adds little to the predictive value, increases cost, and is not recommended at this time to test for PD or MetS. Serum insulin levels do not aid in the diagnosis or management of PD or MetS, and are not recommended.

### 4. How is the Metabolic Syndrome diagnosed?

Several sets of criteria for MetS have been proposed. The National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) criteria are the most clinically practical criteria and are therefore recommended for use in the IHS. To be diagnosed with MetS, an individual must have three or more of the following:

- A waist circumference  $> 40$  inches (or 102 centimeters) for men, or  $> 35$  inches (or 88 centimeters) for women. The correlation of BMI with waist circumference is variable in patients with high or low muscle mass. Waist circumference is most valuable in detecting

high-risk patients with BMI in the range of 25–35 kg/m<sup>2</sup>. Most patients with BMI  $\geq$  35 kg/m<sup>2</sup> meet the MetS waist circumference criteria, and the waist measurement is not necessary.

- TG  $\geq$  150 mg/dl or on drug treatment for high TG.
- HDL  $<$  40 mg/dl for men and  $<$  50 mg/dl for women, or on drug treatment for low HDL.
- Systolic blood pressure (SBP)  $\geq$  130 mm Hg or diastolic blood pressure (DBP)  $\geq$  85 mm Hg, or on drug treatment for hypertension.
- FPG  $\geq$  100 mg/dl.

To ensure that diabetes risk is adequately assessed, some MetS clinic protocols have required IFG (or IGT) and a measure of central adiposity (waist circumference or BMI) to be two of the three risk factors.

## 5. Commonly used ICD-9 codes for use in documenting Prediabetes and the Metabolic Syndrome

Proper medical record documentation of these conditions can improve clinical care, improve public health surveillance, and help with insurance reimbursement. Although a full discussion of the documentation process is beyond the limits of these guidelines, the following list of ICD-9 codes is intended to help get you started on the documentation process. We encourage you to work closely with your coders to maximize the benefits that proper documentation can provide.

### Prediabetes

If someone meets diagnostic criteria for diabetes, they should be coded as having diabetes, and these PD codes should not be used.

- 790.21 Impaired fasting glucose (IFG)  
Fasting blood glucose 100–125 mg/dl
- 790.22 Impaired glucose tolerance (IGT)  
2-hour OGTT value 140–199 mg/dl
- 790.29 Other abnormal glucose  
Abnormal non-fasting glucose  
Prediabetes, NOS (not otherwise specified)  
Abnormal glucose, NOS

### Metabolic Syndrome

This code can be used when people meet criteria for MetS or any name used in a similar fashion (e.g., dysmetabolic syndrome, Syndrome X, etc.). The first time that the syndrome is documented, we recommend to code also for the individual components of the syndrome. Some will note that a person may have both diabetes and MetS. In the IHS, we recommend that once a person is diagnosed with diabetes, the primary diagnosis should be diabetes and not MetS.

- 277.7 Dysmetabolic Syndrome X (Metabolic Syndrome)

Commonly associated conditions:

272.4	Hyperlipidemia, NEC (not elsewhere classified) / NOS
401.9	Hypertension, NOS
278.00	Obesity, NOS
278.01	Morbid obesity
256.4	Polycystic ovaries
791.0	Proteinuria
701.2	Acquired acanthosis nigricans

## 6. Recommended care for individuals with Prediabetes and the Metabolic Syndrome

People with PD and MetS may have complex physical, psychological, and emotional needs. Patient self-management education and multidisciplinary care coordination are essential to meet these needs. Primary prevention studies have clearly demonstrated that therapeutic lifestyle changes significantly reduce the risk of progression to type 2 diabetes. Continuity-based group and individual support is key to helping people adopt and maintain healthy lifestyle changes.

### Goal 1: Prevent type 2 diabetes

#### A. Nutrition counseling

The IHS highly recommends that weight management counseling be a multidisciplinary approach and include a registered dietitian or a public health nutritionist. All clinical providers should encourage healthier dietary choices. Table 2 provides information on the common nutrition recommendations for PD and MetS.

Ideally, lifestyle changes should be made through a structured program. Such a program should emphasize goal setting, coaching and motivational interviewing, education and skills development, physical activity, self-monitoring, problem solving, behavior change (cognitive restructuring), stress and stimulus control, the importance of social support, and the utilization of community resources. We also highly recommend regular participant contact and follow-up.

Note: The NCEP ATP III guidelines state, “At all stages of dietary therapy, medical providers are encouraged to refer patients to a registered dietitian (RD) or other qualified nutritionists for Medical Nutrition Therapy (MNT).” The MNT encounter includes an individualized assessment, education intervention, and plan for reassessment and follow-up.

Table 2. Common nutrition recommendations for Prediabetes and the Metabolic Syndrome.

Typical Recommendation	Suggested Lifestyle Changes
<p>Moderate weight loss  (7–10% reduction in starting weight or, on average, 20–25 pound weight loss over 6 months)</p>	<p>Caloric intake should be reduced by 250–1,000 calories per day to produce the recommended goal of ½–2 pounds weight loss per week. Calorie reduction should be realistic and achievable and based on an individualized assessment, weight history, dietary intake, physical activity, and weight loss goals.</p> <p>The National Heart, Lung, and Blood Institute recommends the following daily calorie intake:</p> <ul style="list-style-type: none"> <li>• For men: 1,200–1,600 kcal/day. (Also for women who exercise and who weigh &gt; 165 pounds).</li> <li>• For women: 1,000–1,200 kcal/day (most women).</li> <li>• If client is hungry, you may want to increase calories by 100–200/day.</li> <li>• Activity/Exercise: 30–60 minutes/day most days of the week.</li> </ul> <p><b>Weight loss and maintenance is difficult to achieve without exercise and activity.</b></p>
<p>Reduce calorie and modify fat intake (Less saturated fats)</p>	<p>Establish mutually agreed upon goals:</p> <ul style="list-style-type: none"> <li>• Eat smaller portions.</li> <li>• Drink more water and little or no sugar-containing beverages each day.</li> <li>• Choose leaner cuts of beef and pork.</li> <li>• Eat white meat of turkey, chicken, and wild game more often.</li> <li>• Eat fish high in omega-3 fatty acids, no more than 12 ounces per week.</li> <li>• Increase intake of whole fruits and vegetables.</li> <li>• Choose whole grains like rolled oats, barley, bran, and 100% whole grain bread instead of refined, processed carbohydrates like baked products made with white flour.</li> <li>• Choose low-fat or no-fat dairy products.</li> <li>• Use unsaturated vegetable oils that are liquid at room temperature like olive, canola, peanut, safflower, sunflower, corn, soybean, and cottonseed oils, and use soft-tub, squeeze, or spray margarine.</li> <li>• Eat at regular mealtimes.</li> <li>• Use low-fat food preparation (grilling, broiling, boiling, steaming, etc.).</li> <li>• Eat breakfast.</li> <li>• Reduce frequency of eating out, especially in fast food restaurants.</li> </ul>
<p>Patient “self-monitoring” records</p>	<p>Document food intake, physical activity, and feelings. Awareness is a key step in changing behavior. Food and activity diaries help a person become more aware of current lifestyle habits to identify small changes to make toward achieving healthier lifestyle habits.</p>
<p>Education</p>	<p>Education topics focusing on, but not limited to:</p> <p>Healthy Food Choices:</p> <ul style="list-style-type: none"> <li>• Choosing meals and snacks from a variety of foods.</li> <li>• Types of fats (less saturated fat).</li> <li>• Types of carbohydrates (more whole grains and fiber).</li> </ul> <p>Healthy Food Preparation:</p> <ul style="list-style-type: none"> <li>• Appropriate portion sizes.</li> <li>• Understanding the food label.</li> <li>• Recipe modification.</li> </ul> <p>Psychology of Eating Habits:</p> <ul style="list-style-type: none"> <li>• Understanding physical cues of hunger and fullness.</li> <li>• Setting goals.</li> <li>• Enlisting support.</li> <li>• Rewarding yourself.</li> </ul>

## B. Exercise guidelines

Exercise is a cornerstone of treatment for PD and MetS. Regular physical activity is essential for weight loss and has been shown to improve all of the elements that comprise MetS.

As recommended in the Diabetes Prevention Program (DPP), the goal is to exercise 150 minutes a week (e.g., a 30-minute walk, 5 days a week). An alternative strategy is to use a pedometer with the goal of 10,000 steps per day. More complex fitness formulas are not needed for the majority of people. If more vigorous exercise will be attempted, an exercise tolerance test, an exercise prescription, and/or supervision by a fitness professional may be indicated to avoid health risks, over-exertion, and injury.

Patients will benefit from access to resources that can deliver an individualized exercise safety assessment and prescription. Consideration must be given to patient safety, physical limitations, accessibility to exercise activities, and the goals and interests of the patient.

The following table summarizes the criteria for performing stress testing prior to exercise to detect coronary heart disease (CHD) in asymptomatic patients by the degree of exercise intensity in which they will be participating.

Table 3. Criteria for performing stress testing.

CHD risk→ (10-year risk for CHD event)*	Low risk (< 10%)	Moderate risk (10–20%)	High risk (> 20%)
Activity intensity / Examples ↓			
<b>Low**</b> Moderate-paced walking, stretching, activities of daily living	Not necessary	Not necessary	Not necessary
<b>Moderate</b> Fast walking, jogging, swimming, biking	Not necessary	Not necessary, unless atypical CHD symptoms or sedentary	Recommended
<b>Vigorous</b> Interval training, fast running, weight lifting	Not necessary	Recommended	Recommended

\* Refers to the 10-year CHD risk as predicted by the Framingham calculations. Framingham calculators are listed in the appendix.

\*\* Sedentary individuals may experience a higher physiologic response to a lower level of activity, and the heart rate should be monitored to ensure that it correlates with the prescribed activity.

The *FITT* principle may be useful in developing an exercise prescription.

*Frequency:* Beginning: 3–5 days/week  
Goal: 5–7 days/week

*Intensity:* Beginning: Low–moderate  
Goal: Moderate

*Time:* Beginning: 30 minutes intermittent or continuous, as tolerated  
Goal: 30–60 minutes continuous

*Type:* Aerobic: Walking, bicycling, swimming, rowing, cross-country skiing

Incorporate 5–10 minutes of warm-up and cool-down during the exercise session:

- Warm-up by performing the aerobic exercise at low intensity (i.e., walking slowly and gradually increasing pace over 5–10 minutes).
- Cool-down by reducing the pace of exercise over 5–10 minutes, followed by easy stretching. To avoid injury, stretching should be done after the muscles have warmed up. Generally, stretching is best saved for the cool-down period.
- After establishing an aerobic program, consider adding resistance exercises (e.g., weight-lifting, therabands, etc.) for those without CVD, following provider approval and under the direction of a qualified individual. To minimize risk for injury, a weight lifting program should be individualized and under the direction of a qualified person.

### C. Medication

Medication may have a role in preventing or delaying diabetes. Although several currently available medications have been studied, none have been approved for the specific purpose of preventing diabetes. This is an emerging therapeutic intervention, and information is not yet adequate to know the long-term benefits and risks. The decision to use medication in this setting must be made on an individual basis and with the patient’s full understanding.

In the DPP, metformin was found to be associated with sustained weight loss and effective in preventing type 2 diabetes in individuals with the following characteristics:

- BMI  $\geq 35$  kg/m<sup>2</sup>
- Age < 60 years
- Fasting glucose 110–125 mg/dl

### D. Depression screening and treatment

Studies have shown that many patients with PD also have depression and that depression may affect the ability to make lifestyle changes for diabetes prevention. Accordingly, we recommend that patients with PD and MetS be screened for depression and referred for further evaluation and treatment as indicated (see appendix for resources).



## Goal 2: Reduce risk of cardiovascular disease

Therapies directed at specific risk factors will reduce CHD risk.

### A. Control blood pressure

Blood pressure (BP) should be measured at every visit.

The target BP for patients with PD and MetS is < 140/90 mm Hg. In patients with coexisting chronic kidney disease (CKD), the target is < 130/80 mm Hg. Anti-hypertension medications should be used if necessary to achieve these targets.

Patients with a systolic BP of 120–139 mm Hg and/or a diastolic BP of 80–89 mm Hg are said to have pre-hypertension. Lifestyle interventions should be implemented in these patients at this stage to help prevent or delay the development of hypertension. Examples of lifestyle interventions include weight reduction, sodium restriction, and physical activity.

### B. Control lipids

Lipid testing should be done annually. Fasting lipoprotein (total cholesterol, low-density lipoprotein (LDL) cholesterol, HDL cholesterol, and TG) should be obtained after a 9–12-hour fast. Additional testing may be needed to adjust pharmacologic therapy. In most laboratories, LDL cholesterol is calculated from a formula that is not valid when the TG level is above 400 mg/dl. In this circumstance, a “direct LDL” assay is an alternative measurement.

#### i. LDL cholesterol control is the primary target of therapy

In people with known CHD or CHD equivalent (e.g., diabetes, peripheral arterial disease, abdominal aortic aneurysm, or symptomatic carotid artery disease), the LDL cholesterol goal is < 100 mg/dl. Pharmacologic agents should be used if needed to achieve this target. In addition, the NCEP ATP III has recently supported the optional LDL cholesterol goal of < 70 mg/dl for some patients with known CHD who are at very high risk, such as those with recent acute coronary syndromes, multiple risk factors, or continued tobacco use. At this time, it is not clear whether this goal applies to all people with CHD.

Although people with established diabetes are felt to have the equivalent of CHD and are treated as noted above, people with PD and MetS alone do not appear to have the equivalent CHD risk. Therefore, people with PD and MetS alone are treated to the same targets as for those in the general population according to their 10-year risk probability for CHD (Framingham risk score). There is no single target value. The targets vary based on assessment of CHD risk factors and are further modified by calculation of the patient’s 10-year risk for CHD as determined by the Framingham criteria found in the appendix to these guidelines. Although the Framingham risk factor assessment is useful, it does underestimate risk in American Indians and Alaska Natives. American Indian and Alaska Native-specific risk assessment is currently in development using Strong Heart Study data.

#### ii. Triglyceride and non-HDL cholesterol are secondary targets

After assurance that LDL cholesterol targets have been met, it is appropriate to consider TG and non-HDL cholesterol.

Non-HDL cholesterol is a strong predictor of CHD risk, and is the total cholesterol minus the HDL cholesterol. The non-HDL cholesterol target value is generally 30 mg/dl higher than the LDL cholesterol target values. Non-HDL cholesterol is particularly useful when LDL cholesterol cannot be calculated due to elevated TG or when lipid specimens are collected in the non-fasting state.

If the TG level is  $\geq 500$  mg/dl, the patient is at risk for pancreatitis and treatments should be instituted.

When the TG level is 200–499 mg/dl, the non-HDL cholesterol value should be determined. Treatment of TG, including use of pharmacologic agents, should be done until the non-HDL cholesterol target has been achieved.

When the TG level is borderline high (150–199 mg/dl), lifestyle modification should be emphasized. Calculation of the non-HDL cholesterol value is not required, but may be useful.

iii. Isolated low HDL cholesterol is not currently a target

Although research suggests that raising HDL cholesterol will reduce CHD risk, the evidence is insufficient to specify a goal of therapy. However, we recommend that isolated low HDL cholesterol levels be acted upon in those with CHD or CHD risk equivalents after reaching LDL cholesterol goals.

C. Anti-platelet therapy

Anti-platelet therapy has known benefits in patients who have CHD and those at risk for CHD and thus apply to people with PD and MetS. Patients with a 10-year risk probability for CHD  $\geq 10\%$  should be considered as candidates for anti-platelet therapy with the individual's benefits and risks considered prior to use.

D. Tobacco cessation counseling, if needed

Avoiding or quitting smoking may be the single most important intervention to reduce risk for CVD. In a recent large multinational study, smoking and abnormal lipids were the two most important risk factors for acute myocardial infarctions worldwide (Yusuf et al., 2004). Oral tobacco use also increases risk for CVD by increasing blood pressure and lipid abnormalities.

Current tobacco use (smoking or oral tobacco) should be documented in the patient's chart and a referral made to a program for tobacco cessation counseling.

Resources for smoking cessation assistance are included in the appendix.

## 7. Tracking and follow-up for Prediabetes and the Metabolic Syndrome

Tracking and follow-up of patients with PD and MetS is essential.

The rate of conversion from PD to diabetes is 10–28% per year, and higher for individuals with glucose values in the upper limits of PD. Accordingly, patients should be monitored for progression to diabetes every 6 months. Glucose testing more frequently is not indicated unless symptoms develop.

On follow-up, some patients previously meeting IFG or IGT criteria may have normal glucose values. This may represent successful treatment or merely reflect test variability. These individuals remain at high risk for progression to diabetes and thus should continue to be monitored.

Follow-up for hypertension or dyslipidemia may require additional visits in between glucose testing.

## 8. Other tests in the course of routine care

### Insulin

Although useful in research settings or in certain specific clinical situations, the routine testing of an insulin level is not recommended.

### Markers of systemic inflammation

There is interest in the role of the inflammation system in the development of diabetes and CVD. However, it is not clear how the measurement of these markers changes clinical management. Therefore, the routine use of these markers is not recommended.

### Ovarian-Pituitary Axis hormones

The decision to measure leutinizing hormone and/or follicle stimulating hormone (LH/FSH) should be based on clinical history and exam findings suggesting disturbances of this hormonal system.

### Thyroid function

The decision to evaluate thyroid stimulating hormone should be based on clinical history and exam findings suggesting disturbances of this hormonal system.

### Microalbuminuria

Measurement of urine microalbuminuria may be useful because it is a strong predictor of CVD, may change BP targets, and influence choice of anti-hypertensive agents.

### A1c

At this time, A1c or other glycosylated protein measurement has no role in the diagnostic or clinical management of PD or MetS.

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## 10. Appendices

### Nutrition Recommendations for Prediabetes and the Metabolic Syndrome

Goal: Treat underlying causes (overweight/obesity and physical inactivity)\*

Total Calories (Energy)	Balance energy intake and expenditure to prevent weight gain or lose weight. Must evaluate patient's readiness for change and consider patient's cultural background and usual eating habits.
Protein	~15% of total calories or 0.8 g/kg body weight/day.
Cholesterol	< 200 g (fats of animal origin).
Saturated Fat	< 7% of total calories: Fats of animal origin and trans fats (see below).
Trans Fatty Acids	Reduce intake by avoiding products with hydrogenated and partially hydrogenated oils, such as stick margarine, vegetable shortening, and commercial bakery and deep fried foods and snacks.
Polyunsaturated Fat	Up to 10% of total calories: Safflower, sunflower, and corn oils.
Monounsaturated Fat	Up to 20% of total calories: Avocados; olives; olive, peanut, and canola oils; nuts, such as almonds, pecans, hazelnuts, walnuts, and peanuts (1 oz ~ 5 times/week).
Total Fat	25–35% of total calories (TG > 500mg/d, reduce fat intake to 15%).
Carbohydrate**	<p>50–60% of total calories: Reduce consumption of sugar and refined, low-fiber carbohydrate foods. Recommend 5–9 servings of whole fruits, vegetables, and 3 or more servings of whole grains.</p> <p>There is a strong positive association between a high glycemic load (GL) and risk for CHD.</p> <p style="text-align: center;">GL = glycemic index (GI) % x grams of carbohydrate per serving</p> <p>A low GI/GL diet includes high fiber; whole grain cereals and breads made with oats, barley, bran, and whole seeds; and all types of whole fruits and vegetables (except potatoes). For more information, visit the following website: <a href="http://www.glycemicindex.com">www.glycemicindex.com</a>.</p> <p>** If the effect of the high carbohydrate diet elevates TG and lowers HDL (atherogenic dyslipidemia), recommend isocalorically-substituting monounsaturated fats for carbohydrate foods (e.g., omit 1 slice bread, and add 3 tsp olive oil or 12 whole almonds).</p>
Fiber	20–30 g/day (Encourage 10–25 g/day soluble fiber: Whole grains, rolled oats, oat bran, barley, dried beans, peas, legumes, and most fruits and vegetables.)
Plant Stanols/Sterol	2g/day: Benecol and Take Control margarine (~ 2 servings/day).
Soy Products	25g/day: Textured soy protein, tofu, tempeh, soy milk, etc.
Omega-3 Fatty Acids	<p>Eat up to 12 ounces/week of a variety of fish and shellfish low in mercury, such as salmon, Atlantic herring, sardines, and cod. Limit albacore tuna and fish from local lakes, rivers, and coastal waters, such as Rainbow Trout to 6 ounces/week. Avoid shark, swordfish, king mackerel, and tilefish.</p> <p>Children and pregnant and nursing mothers are at highest risk of excessive mercury exposure. For more detailed information on mercury in fish and shellfish visit the following websites: <a href="http://www.cfsan.fda.gov/seafood1.html">www.cfsan.fda.gov/seafood1.html</a> or <a href="http://www.epa.gov/ost/fish">www.epa.gov/ost/fish</a>.</p> <p>Other sources include: Flaxseed; flaxseed, canola, and soybean oils; raw soybeans; walnuts; and fish oil supplement ~ 900 mg/day. Omega-3 fatty acid supplements may be most beneficial in treatment of severe hypertriglyceridemia.</p>
Vitamins/Minerals	<p><u>Folate</u>: ≥ 400 mcg/day: Enriched cereal grains, bread and bread products, and dark green leafy vegetables.</p> <p><u>Vitamin B-6</u>: 1.3 mg/dl/day: Fortified grains, organ meats, and soy-based meat substitutes.</p> <p><u>Vitamin E</u>: 12 IU women, 15 IU men: Olive oil, wheat germ, nuts, and seeds.</p>
Considerations for Hypertension (DASH Diet)	<p><u>Calcium</u>: 1,200–1,500 mg/day: Low-fat dairy products (recommend 3 c skim or 1% milk daily).</p> <p><u>Potassium</u>: 3,500 mg/day: Fruits, vegetables, and whole grains.</p> <p><u>Magnesium</u>: 400 mg/day: Lean meat, fish and poultry, dry beans, peas and lentils, nuts, seeds, whole grains, and dark green vegetables.</p> <p><u>Sodium</u>: ≤ 2,400 mg/day</p>
Alcohol	If alcohol is consumed, limit to 2 drinks/day for men and 1 drink/day for women.

\*Trial diet and exercise (12 weeks)

## Overview of Guidelines for Exercise Testing/Prescription

Reference	Frequency	Intensity	Time	Type	Exercise Treadmill Testing (ETT)
<b>DPP Study</b>	3–7 days	Low–moderate	150 min/wk	Aerobic	If history or symptoms suggestive of CVD <i>or</i> if man over 40 or woman post-menopausal not on hormone replacement therapy, ETT is indicated.
<b>ACSM Exercise and weight loss</b>	5–7 days	Moderate	Minimum: Aerobic 2.5 hr/wk Goal: 3.3–5 hr/wk, continuous. Intermittent for certain people.	Aerobic and resistance	No guidelines provided.
<b>ACSM Exercise and Hypertension</b>	5–7 days	Moderate	>30 min, continuous or accumulated aerobic physical activity/day.	Aerobic supplemented with resistance training	Dependent upon risk classification. Generally, if doing light exercise, no test needed.
<b>Dr. Galloway Exercise and Diabetes</b>	3–5 days	Low–moderate, depending upon complications present	>30 min, continuous with 5–10 min warm-up and cool-down.	Aerobic	Recommended if have 1+ risk factors (in presence of diabetes) or at physician's discretion. However, stress testing could provide opportunity to discover CAD before clinically manifested.
<b>ACSM Exercise and Type 2 Diabetes</b>	3–7 days, minimum cumulative of 1,000 kcal/wk	Low–moderate	>30–60 min, continuous or accumulated aerobic exercise/day.	Aerobic and resistance	Recommended if have diabetes and age > 35 years.
<b>AHA Exercise in prevention and treatment of CVD</b>	5–7 days	Moderate	>30 min	Aerobic	Questionable efficacy for healthy people. At the discretion of the physician for vigorous exercise in patients with known CVD.
<b>ADA Exercise and Diabetes</b>	No specifics	Depends on presence of complications	No specifics	Aerobic: Emphasized need for 5–10 min warm-up and cool-down.	Indicated if at high risk for CVD (gives guidelines). Physician discretion if exercise intensity will be <60% MHR.

MHR Maximum heart rate. Preferably determined by maximal graded exercise test. Estimated by:  $(220 - \text{age})$ .

THR Target heart rate. Determined by MHR and desired exercise intensity. Used in the exercise prescription.

Definitions for intensity (these vary somewhat in the literature):

Low: 20–40% MHR

Moderate: 40–70% MHR

High: >70% MHR

## Blood cholesterol and lipids

The appendix of the *At-A-Glance: Quick Desk Reference* by the NCEP ADP III provides further information on the risk determination and treatment for elevated cholesterol levels. The quick reference guide, as well as the full report, are available at the following website:  
<http://www.nhlbi.nih.gov/guidelines/cholesterol/index.htm>

A risk assessment tool for estimating 10-year risk of developing hard CHD is available at the following website:  
<http://www.nhlbi.nih.gov/guidelines/cholesterol/index.htm>

## Depression screening and treatment

National Institute of Mental Health  
<http://www.nimh.nih.gov>

## Diabetes prevention

American Diabetes Association  
<http://www.diabetes.org/>

Diabetes Prevention Program  
Northern Navajo Medical Center  
PO Box 160  
Shiprock, New Mexico 87420  
Phone: 505.368.6345  
<http://www.preventdiabetes.com/>

National Diabetes Education Program  
The Small Steps–Big Rewards Program’s publication titled, *Your Game Plan for Preventing Type 2 Diabetes: Health Care Provider’s Toolkit*, is available at the following website:  
[http://www.ndep.nih.gov/campaigns/SmallSteps/SmallSteps\\_index.htm](http://www.ndep.nih.gov/campaigns/SmallSteps/SmallSteps_index.htm)

## Exercise and nutrition

The American College of Sports Medicine’s Position Statement is available at the following website:  
<http://www.acsm.org/publications/positionStands.htm>

American Heart Association  
<http://my.americanheart.org/portal/professional>

Aim for a Healthy Weight Education Kit (for primary care providers)  
[http://www.nhlbi.nih.gov/health/prof/heart/obesity/aim\\_kit/index.htm](http://www.nhlbi.nih.gov/health/prof/heart/obesity/aim_kit/index.htm)

The American Medical Association’s *Assessment and Management of Adult Obesity: A Primer for Physicians* is available at the following website:  
<http://www.ama-assn.org/ama/pub/category/10931.html>



## **Hypertension**

The physician reference card from the JNC 7 (Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure) is available at the following website: <http://www.nhlbi.nih.gov/guidelines/hypertension/phycard.pdf>

## **Tobacco cessation**

American Lung Association's Freedom From Smoking Program  
<http://www.lungusa.org>

American Cancer Society  
<http://www.cancer.org>