

# Nutrition for Menopause and Beyond

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## Learning Outcomes

- Describe physiological changes associated with menopause.
- Understand weight management in menopausal women.
- Identify the impact of nutrition on gastrointestinal problems, osteoporosis, and breast cancer.
- List common nutrient insufficiencies and food sources of these nutrients.
- Understand the dynamics of dietary supplement use.
- Describe fluid and nutrient needs for active menopausal women.

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Menopause begins between the ages of 45 to 55 for most women, and it is defined by the lack of a menstrual cycle for 12 months. Food and nutrition play significant roles in the health and quality of life of menopausal women. This article will enhance your understanding of the role of nutrition in relationship to the physiological changes that occur during and after menopause and the relevant health concerns of menopausal women. Nutrition is a complex field that encompasses energy intake, exercise, metabolism, biochemistry and physiology, molecular biology, and genetics (Rivlin 2007). The practice of nutrition provides clinical interventions and practical recommendations to reduce disease risk, manage disease, and promote wellness. The intent of this article is to improve your awareness of nutrition-related concerns of menopausal women, allow you to provide nutritional guidance when appropriate, help you to recognize when a referral to a registered dietitian is indicated, and to understand the benefits your clients will receive from nutrition counseling with a registered dietitian.

## **Symptoms of Menopause**

The symptoms of menopause vary among women. Reported symptoms include weight gain, loss of muscle mass, increased abdominal weight gain, mood changes, hot flashes, night sweats, anxiety, dry skin, irregular menstrual bleeding, memory problems, and reduced libido. These symptoms result from changes in hormones, most significantly changes in estrogen and testosterone. Nutrition can play a strong role in preventing and managing changes in body composition. The ability of nutrition to prevent or manage other symptoms of menopause is less clear.

## **Hot Flashes and Night Sweats**

When estrogen levels drop, hot flashes and/or night sweats may be triggered. Nutritional interventions to reduce the frequency and/or severity of hot flashes or night sweats have been generally ineffective. However, a promising pilot study demonstrated that 3 tablespoons of ground flaxseeds per day reduced the frequency and severity of hot flashes (Pruthi et al. 2007). The theory is that estrogen-like compounds in flaxseeds attach to estrogen receptors and helps to alleviate hot flashes. Whole soy foods, such as edamame, also contain estrogen-like compounds that may have similar effects on hot flashes; however, research studies have been unable to demonstrate a positive effect from soy foods.

## **Sarcopenia**

Sarcopenia is defined as the age-related loss of lean body mass. Women lose approximately 3% of their muscle mass each decade after the age of 30 (Mahan and Escott-Stump 2008). It is thought that one-third of this reduction in lean body mass is attributable to age and two-thirds is attributable to inadequate exercise (SCAN 2006). Menopause is associated with increased sarcopenia risk due to declines in hormones that support protein synthesis and increases in catabolic factors, such as inflammation and oxidative stress (Maltais and Dionne 2009). Inadequate protein intake and a sedentary lifestyle augment sarcopenia in menopausal women.

Sarcopenia results in reduced muscle mass and strength, which lead to impaired functionality, increased percentage of body fat and intramuscular body fat, and increased risk for cancer, heart disease, type 2 diabetes, and osteoporosis. Diet and exercise, particularly strength training, will stimulate muscle protein synthesis, slow sarcopenia, and protect a woman's health and functionality.

Dietary protein slows sarcopenia by stimulating muscle protein synthesis, independent from and synergistically with exercise. An increase in protein from traditional recommendations may help reduce sarcopenia (Campbell and Leidy 2007). The Recommended Daily Allowance (RDA) for protein for women is .8 gram (g) per kilogram (kg) of body weight. Menopausal women may need to consume approximately

1.2 g protein per kg of body weight to assist in maintaining lean muscle mass (Mahan and Escott-Stump 2008). That is 50% higher than the RDA. Dietary protein may come from plant or animal sources.

There may be a finite amount of dietary protein that can be utilized from one meal or snack. Although women have not been studied to assess protein utilization, research in men indicates that 30 grams of protein is the maximum usable from food consumed in one a meal (Symons et al. 2009). Thirty grams of protein is the equivalent of approximately 4 ounces of chicken, beef, or fish. Encourage women to incorporate protein-rich foods into all meals and snacks rather than consuming large amounts of protein in one sitting.

**Table 1. Protein content of common foods.**

Food	Grams of protein
2 cups raw spinach	2
1 medium sweet potato	4
½ cup quinoa	5
1 egg	6
1 ounce almonds	6
1 ounce cheddar cheese	7
2 tablespoons peanut butter	8
1 cup low fat yogurt	11
½ cup cottage cheese	14
1 cup black beans	15
3 ounces cod	19
3 ounces chicken breast	21
3 ounces sirloin steak	22
1 cup edamame, shelled	29

*USDA National Nutrient Database*

**Weight Gain**

Women are at risk for weight gain during and after menopause. The age-related decline in resting metabolic rate driven by sarcopenia increases the risk of weight gain. Hormonal changes contribute to body fat redistribution into the abdomen (Mahan and Escott-Stump 2008). Abdominal weight gain is associated with chronic inflammation and increased risk for type 2 diabetes, heart disease, and cancer. Additionally, thyroid hormone function declines with aging (Rivlin 2007). This could play a role in reducing resting metabolic rate, but the reduction is not thought to be significant in healthy women (Rivlin 2007). The prevalence of thyroid disease increases with age and should be assessed and treated medically before attributing weight gain to thyroid disease.

Slowing or preventing menopausal weight gain requires careful attention to food. A woman’s diet should be assessed for empty calories – foods that provide calories but no beneficial nutrients. Empty calories from added sugar and added fat may need to be limited. The Dietary Guidelines for Americans (CNPP 2010) limits discretionary calories to 200 calories per day, which for women is 10% of daily calories. The American Heart Association suggests that no more than 100 discretionary calories come from added sugar to reduce heart disease associated with undesirable dietary patterns (Johnson et al. 2009). The largest source of added sugars in the American diet are nondiet soft drinks (Malik, Schulze, and Hu 2006). Calories from

alcohol also must be evaluated in terms of weight management and disease risk. Women need to be aware of their dietary intake and learn to set boundaries on empty calories in order to maintain or lose weight as they age.

A registered dietitian will complete an assessment and create an individualized weight management plan for menopausal women. Provide a referral to a registered dietitian for women in need of assistance in making the necessary dietary changes to lose or maintain weight.

## **Sensory and Gastrointestinal Changes Associated with Aging**

During adulthood and early old age, women experience physiological changes in their sensory and gastrointestinal function. The impact of sensory and gastrointestinal changes on food and beverage intake is significant, as is the impact of diet on sensory and gastrointestinal function. Be aware of the challenges that menopausal women are experiencing when faced with these changes, and refer them to a registered dietitian who can provide a complete nutritional program for optimizing health.

### **Sensory Changes**

Sensory changes are associated with aging to a varying degree depending upon genetics and a woman's lifestyle. Dysgeusia (loss of taste) and hyposmia (loss of smell) can occur due to age, medications, diabetes, liver or kidney disease, hypertension, cigarette smoking, poor dental or nasal hygiene, or deficiencies of zinc or niacin (Mahan and Escott-Stump 2008). A change in sensory function can affect a woman's dietary choices in many different ways. Sensory changes can decrease appetite, leading to loss of lean body mass, or they can increase consumption if satiety is reduced, leading to increased body weight. Women can work to overcome dysgeusia and/or hyposmia with increased use of ingredients such as herbs, spices, vinegars, and/or hot sauce that do not negatively impact health. However, women are susceptible to overconsuming sugar, fat, and/or salt in the quest for satisfaction at mealtime.

Sensory changes can also affect gastrointestinal function. When the capacity to taste or smell is reduced, salivary, stomach, and pancreatic secretions are reduced and could lead to impaired digestion and absorption of food.

Sensory changes create complex nutritional challenges for women. Advise women to seek out registered dietitians who specialize in sensory change and can assist in identifying the cause of dysgeusia or hyposmia and counsel women to achieve and maintain a healthy diet.

### **Gastrointestinal Changes**

More than 30% of men and women over 50 years of age suffer from achlorhydria (Mahan and Escott-Stump 2008). Achlorhydria is incomplete production of stomach acid. Inadequate stomach acid increases the risk of incomplete digestion of food and vitamin B12 deficiency.

Diverticulosis, out pouches in the intestinal tract caused by straining associated with constipation, is even more common than achlorhydria, with more than 60% of adults over 60 years of age suffering from the condition. Diverticulosis is more common in women than men (Mahan and Escott-Stump 2008). Diverticulum have the potential to become inflamed, resulting in a tremendously painful attack; however, only about 20% of people with diverticulosis will experience a diverticulitis attack (Mahan and Escott-Stump 2008). If a diverticulitis attack occurs, your client would be hospitalized, given intravenous antibiotics and fluids, and not be allowed to eat or drink until the inflammation in the intestine subsides. If a client has experienced a diverticulitis attack, she will likely do anything to avoid another. You can help to

increase your clients’ awareness of the severity of an attack and encourage them focus on prevention of painful diverticulitis attacks. With proper attention to a high-fiber diet and adequate fluids, diverticulosis can be prevented and the risk of diverticulosis progressing into painful diverticulitis reduced.

Constipation is a common complaint of menopausal women. Constipation is defined as painful bowel movements, straining at elimination, decreased frequency of bowel movements, hard stool, and incomplete emptying. Constipation is generally a symptom of other underlying issues. Treatment of constipation with fiber pills or laxatives does not help identify the underlying problem. Emphasize the importance of high fiber and fluid intake while making the appropriate referrals. A referral to a registered dietitian and physician will ensure that the underlying cause of constipation is identified and treated appropriately.

**Table 2. Causes of constipation.**

- Achlorhydria
- Celiac disease
- Certain forms of calcium and iron in dietary supplements
- Chronic laxative use
- Diverticulitis
- Hemorrhoids
- Hypothyroid disease
- Inadequate fiber intake
- Inadequate fluid intake
- Irritable bowel syndrome
- Medications
- Sedentary lifestyle

**Table 3. Sources of dietary fiber.**

Food	Grams Dietary Fiber
1 cup split peas	16
1 cup lentils	15
1 cup kidney beans	11
1 cup raspberries	8
1 cup winter squash	6
1 cup steamed broccoli	5
2 tablespoons flaxseeds	5
1 cup yam	5
1 cup Brussels sprouts	4
1 cup blueberries	4
1 apple or pear	4
1 cup oats	4
1 kiwi	3
1 orange	3
2 cups romaine	2

*USDA National Nutrient Database*

## Essential Nutrients

An essential nutrient is a nutrient that supports human life but is not made by the human body and must be consumed through food and beverages. There are seven essential nutrients: carbohydrate, protein, fat, vitamins, minerals, fiber, and water. The macronutrients carbohydrate, fat, and protein provide calories and are rarely deficient in the diets of menopausal women, with the exception of a specific type of fatty acid. There is risk for certain vitamin and mineral deficiencies in menopausal women's diets, and intakes of fiber and water are often insufficient.

Energy (calorie) needs generally decline with age; however, micronutrient needs do not, and, in some cases, the intake of micronutrients should increase. For example, women over 50 years of age need to increase the intake of calcium. Encourage women to consume nutrient-dense foods and avoid empty calories or energy-dense foods in order to meet their micronutrient needs and maintain a healthy body weight. Nutrient-dense foods provide necessary micronutrients in addition to calories, whereas energy-dense foods provide excess calories in small volumes of food without providing many micronutrients.

Women must understand their energy needs and micronutrient needs to make appropriate food choices. Increase your clients' awareness of their individual calorie needs and common nutrient deficiencies. Keep in mind that registered dietitians are uniquely qualified to translate calorie and nutrient information into actionable steps toward better health.

## Energy Needs

Energy needs are dependent on resting metabolic rate, thermic effect of food, and activity level. Teach women to respect their body's energy needs.

## Resting Metabolic Rate

Resting metabolic rate (RMR) is the amount of energy expended to sustain basal physiological function. RMR can be measured by a trained technician on sophisticated equipment. A true RMR measurement is not common because RMR is often measured in a nonresting state with handheld devices, which leads to inaccurate and often falsely elevated RMR measurements. When a quality RMR measurement is not possible, prediction models can be used. The Mifflin-St. Jour prediction model for women (below) includes height, weight, and age:

$$(10 \times \text{body weight kg}) + (6.25 \times \text{height cm}) - (5 \times \text{age years}) - 161 = \text{RMR}$$

### Example RMR Calculation

Example: A 61-year-old woman, 5'5" (65") and 162 pounds

65 inches  $\times$  2.54 = 165 cm (to get height in centimeters)

162 pounds  $\div$  2.2 = 74 kg (to get weight in kilograms)

$(10 \times 69 \text{ kg}) + (6.25 \times 165 \text{ cm}) - (5 \times 61 \text{ years}) - 161 = 1302 \text{ RMR (calories per day)}$

Resting metabolic rate represents a person's minimum daily calorie need. This is an important concept to teach women who desire to lose weight. Consuming fewer calories than what is needed to sustain basal physiological function increases the loss of lean body mass, reduces satiety, and increases appetite.

### Thermic Effect of Food

The thermic effect of food (TEF) is the amount of energy necessary to digest, absorb, and use foods. TEF is estimated to be approximately 10% of resting metabolic rate. This estimate is appropriate for an individual eating throughout the day (as opposed to eating 1-2 large meals a day) and consuming adequate fiber and protein. The thermic effect of food may be less for individuals who skip meals and do not make quality food choices.

### Lifestyle and Exercise Energy Needs

Lifestyle and exercise energy needs vary greatly based on the individual. Activity factors are used to estimate the amount of energy needed to engage in activities of daily living and exercise. To estimate lifestyle and exercise energy needs, multiply the appropriate activity factor below by the predicted RMR.

**Table 4. Lifestyle and exercise activity factors.**

Activity Factor (% RMR)	Activity Description	Work	Exercise
20%	Sedentary	Inactive job, sedentary leisure, e.g., TV watching, reading, computer use	Little or no exercise
30-40%	Lightly Active	Most Americans are in this category; most office workers, white collar professionals and homemakers	Light exercise 1-3 days/week
40-60%	Moderately Active	Those who work in light industry, electrical, carpentry, and building trades	Exercise 3-5 times/ week, 30-60 minutes/ day
60-75%	Very Active	Full-time athletes, military on active duty, miners, and steel workers	Exercises hard 4-7 times/week, 60-90 minutes/day
75-90%	Extremely Active	Heavy physical labor most of the day, e.g., lumberjacks, female construction workers, and miners	Exercise hard 6-7 times/week, 60- 90+ minutes/day

### Common Deficiencies

Women are at risk for not meeting daily nutrient needs for select micronutrients. Women who have chronic illness or are restricting calories are a higher risk for these insufficiencies. See table 6 to identify the Recommended Daily Allowance (RDA) and food sources of the select nutrients commonly deficient in a menopausal woman's diet.

Emphasize the importance of a varied diet that includes many different types of nutrient-dense foods. Often the media focuses on a single nutrient or a single food when optimal health is achieved by incorporating many different nutrients from many different foods. Research in nutritional sciences is often done with a

narrow focus, designed to identify the cause-and-effect of a single nutrient or single food. A registered dietitian will synthesize the massive amount of nutrition information available from popular media and from evidence-based literature into meaningful messages that allow your client to understand that a diet made up of unprocessed nutrient-dense foods will outlast the current food trend, prevent deficiencies, and promote optimal health.

## **Vitamin B12**

Vitamin B12 requires intrinsic factor, a compound produced in the stomach, and hydrochloric acid (stomach acid) to be absorbed and used. Intrinsic factor and stomach acid production may be blunted as women age (Mahan and Escott-Stump 2008), thus reducing the absorption of vitamin B12 taken through food and supplements. In surveys conducted in the United States and the United Kingdom, approximately 6% of those over 60 years of age are vitamin B12 deficient, and 20% have marginal status (Allen 2009). A registered dietitian can assess whether dietary sources are adequate and if vitamin B12 taken orally is being absorbed and make appropriate food and supplement recommendations.

## **Folic Acid**

Folic acid is another vitamin that is of concern for women. Adequate folic acid, vitamin B12 and vitamin B6 are required to metabolize homocysteine appropriately. Deficiencies in any of these B vitamins leads to increased homocysteine, which is associated with increased risk for cardiovascular disease and Alzheimer's disease (Mahan and Escott-Stump 2008). Folic acid is also associated with reduced risk for colon cancer (Mahan and Escott-Stump 2008). Grain foods are fortified with folic acid, and folic acid is often added to foods marketed toward women, such as energy bars, (e.g., Luna Bars), and cereals (e.g., Special K). Despite fortification of the food supply, some women remain deficient, potentially due to genetic polymorphisms that inhibit the body's ability to use folic acid appropriately.

Recently there have been reports of increased risk of colon and breast cancer with high intakes of folic acid, which contradicts older studies showing a protective effect of folic acid (CNPP 2010). Those at risk for developing breast or colon cancer or their reoccurrence should take caution with folic acid supplements. It is unclear whether there is truly an increased risk of these cancers related to folic acid or if the risk is related to the dose or form of folic acid.

The tolerable upper limit (TUL) for folic acid is 1000 mcg per day. This TUL is set to prevent masking a vitamin B12 deficiency. Refer concerned women to a registered dietitian who can assess the amount of folic acid consumed naturally through food, in fortified foods, and in supplements and can make recommendations regarding safe supplementation.

## **Vitamin D**

Vitamin D deficiency has been estimated to affect 60-70% of women over the age of 40 (Martins et al. 2007). The deficiency is related to increased risk for osteoporosis, type 2 diabetes, and cancer, in addition to autoimmune conditions, depression, and impaired mobility. Of specific concern for women with osteoporosis is an increased risk for bone loss, bone fractures, falls, and reduced muscle strength and coordination (Dawson-Hughes 2008).

Vitamin D is an interesting nutrient. It is produced in the skin with exposure to the sun's ultraviolet rays; food sources of vitamin D are limited; and it acts more like a hormone than a vitamin. Vitamin D has



widespread and diverse roles in the body and impacts the function of many organ systems, so it should be used with caution.

When serum vitamin D levels are maintained well above the standard cut-off for deficiency, there is the potential to reduce disease risk, improve mood, reduce sarcopenia, and decrease the rate of falls associated with aging (Dawson-Hughes 2008). Accumulating a safe amount of unprotected skin exposure, consuming vitamin D-rich foods, and taking dietary supplements will improve vitamin D status. Vitamin D is a fat-soluble vitamin that is stored in body fat and therefore toxicity is a risk. Recommend that your clients work with a physician to have a blood test to determine vitamin D status and with a registered dietitian to determine the appropriate dose of vitamin D supplementation.

**Table 5. Risk factors for vitamin D deficiency.**

- >50 years old
- Pigmented skin
- Regular use of sunscreen
- Residence north of LA/Atlanta
- Insufficient dietary intake
- High body fat
- Fat malabsorption disorders (celiac disease, inflammatory bowel disease)
- Steroid and seizure medication use

## **Vitamin E**

Vitamin E is a powerful antioxidant. It is associated with reducing the risk of cataracts and macular degeneration, the most common conditions associated with low vision and blindness. Vitamin E may also help to prevent dry skin associated with menopause. Vitamin E has many potential benefits; however, it is often low in women's diets when dietary fat is restricted. Plant-based, fat-rich foods, such as almonds, peanuts, canola oil, hazelnuts, sunflower seeds, and tofu improve vitamin E status. High doses of vitamin E have been reported to increase the risk of hemorrhagic stroke in men (Sesso et al. 2008); therefore supplements should not be taken unless the individual is working with a registered dietitian who can assess individual risk.

## **Calcium**

Calcium is crucial for preventing or treating osteoporosis and may reduce hypertension. Only 4% of women meet the RDA for calcium (Mahan and Escott-Stump 2008). Even though supplements of calcium are often necessary to meet the RDA, dietary sources of calcium provide many essential nutrients, unlike supplements, which provide calcium alone or in combination with only a few other nutrients. For example, dark, leafy greens provide fiber, potassium, and folic acid in addition to calcium.

Dietary supplements may be necessary to provide calcium; however, there are concerns relating to the side effects of calcium supplements. Calcium carbonate increases bloating and constipation and certain brands may be contaminated with lead. Calcium citrate is more tolerable. Drug-nutrient and nutrient-nutrient interactions are also concerns. Calcium interacts with multiple medications and other nutrients. Refer women who are considering calcium supplements to a registered dietitian who can create a personal supplement regimen that addresses the dose, form, and brand of calcium supplements.

## Potassium

Potassium is related to blood pressure regulation. Insufficient potassium contributes to hypertension. Potassium is widespread in plant foods; however, many women are not meeting daily recommendations for potassium. Recommend an abundance of vegetables, fruits, and legumes to encourage adequate intake of potassium.

## Magnesium and Zinc

Magnesium and zinc are two critical minerals that may be low in women's diets. Magnesium is involved in bone development and preventing osteoporosis, as well as regulating mood and muscle relaxation. Zinc is important for strengthening the immune system, building strong bones, and healing wounds. Deficiencies in zinc lead to reduced appetite and decreased sense of smell. Multivitamin and mineral formulas may not have adequate magnesium and zinc to enhance bone health, mood, and the immune system. A registered dietitian may recommend additional supplements when needed.

## Omega-3 Fatty Acids

Omega-3 fatty acids are concentrated in oily fish such as trout or salmon and work to reduce inflammation. Omega-3 fatty acids also help to regulate cellular function, including neurological function (Mahan and Escott-Stump 2008). These essential fatty acids come in small amounts through food, and many women do not get enough, which leads to low-grade, chronic inflammation and increases the risk for chronic disease, particularly cancer, heart disease, and diabetes (Mahan and Escott-Stump 2008). Encourage women to consume oily fish twice weekly. A registered dietitian is able to teach women how to shop for and choose omega-3-rich fish, answer questions regarding how fish are caught and raised, provide guidance on preparing various species of fish, and recommend dietary supplements for those who do not and/or cannot meet their omega-3 fat needs through food.

**Table 6. Selected nutrients, roles, RDA, and food sources.**

Nutrient	Physiological Roles	Recommended Dietary Allowance (RDA)	Food Sources
Calcium	Bone formation Blood pressure regulation	1000-1200 mg	Sardines Lowfat yogurt Almonds Spinach White beans Lowfat milk Lowfat cheese
Folic acid	Energy production Produce and maintain cells Prevent cancer cell growth Prevent anemia Regulation of homocysteine	400 mcg	Fortified cereal Black eyed peas Lentils

			White beans Spinach, cooked
Magnesium	Supports metabolism Neuromuscular function (muscle contraction) Bone metabolism Mood regulation	320 mg	Halibut Spinach, cooked Oat bran Brown rice Refried beans Pumpkin seeds Brazil nuts
Omega-3 fatty acids	Reduce inflammation Enhance brain function Cell membrane function	1.1 gram	Trout Salmon Sardines Herring Walnuts Pumpkin seeds Flaxseeds Soy foods Dark leafy greens
Potassium	Blood pressure regulation Electrolyte	4700 mg	Sweet potato Tomato paste Beet greens Baked potato White beans
Vitamin B12	Energy production Regulation of homocysteine Detoxification Central and peripheral nervous system dysfunction Muscle power and strength	2.4 mcg	Clams Oysters Crab Tuna Beef
Vitamin D	Maintain calcium balance and bone metabolism Muscle function and growth Impact aerobic capacity, muscle strength, power, and endurance	400 IU (currently under review and will likely increase)	Sunshine Herring Salmon Halibut Catfish Mackerel
Vitamin E	Antioxidant	15 IU	Raisin bran Almonds Sunflower

			seeds Canola oil Asparagus
Zinc	Bone formation Immune function	8 mg	Ground beef Oysters Dark meat Turkey Pork

## Fiber

Adequate fiber intake prevents constipation and diverticulosis, promotes a healthy weight, and prevents heart disease, type 2 diabetes, and cancer. The Recommended Daily Allowance for women 50 years of age and older is 21 grams of fiber per day. However, the RDA may not be adequate to prevent diabetes, weight gain, or heart disease. Many women do not meet recommendations for fiber, particularly those on low-calorie or low-carbohydrate diets. Encourage the consumption of vegetables, fruits, whole grains, beans, peas, and lentils. See table 3 for the fiber content of common foods. Supplements of fiber are not as beneficial as consuming plant foods to meet nutrient need. Unlike plant foods, supplements do not provide additional beneficial nutrients.

## Water

Dehydration is a risk for women as they age. The sensation of thirst decreases with age, and various factors increase the risk for dehydration in menopausal women (Mahan and Escott-Stump 2008). Medications such as laxatives and diuretics may increase fluid losses, and many women restrict fluids due to a fear of leakage with urinary incontinence. Exercises that mitigate urinary incontinence can improve fluid status. The RDA for women is 2.7 liters of water daily. While all fluids, including caffeinated and sweetened beverages “count” toward fluid intake (Campbell 2007), encourage women to consume ample amounts of water. For those with weight-management concerns, limit caloric fluids such as soda, coffee and espresso drinks, juice, energy drinks, and fruit drinks.

## Dietary Supplements

The dietary supplement industry is growing and is fueled by the consumer’s desire to improve health, performance, and longevity. Unfortunately, marketing, not science, drives the creation and promotion of the majority of dietary supplements. Dietary supplements should be supplemental to one’s diet. Encourage women to fulfill their nutrition needs from whole foods and only then seek out dietary supplements to fill nutritional needs not met by their diet.

Consider the source of dietary supplements to ensure that the product is safe and that the label states the ingredients accurately. Look for quality-control indicators on the label. The United States Pharmacopeia (USP) and Good Manufacturing Practices (GMP) inspect dietary supplements to ensure the product meets label claims; however, the limitations to these certifications are that they are voluntary, they are not done at random, and there is incomplete testing for contaminants.

Quality control measures do not test effectiveness. To understand whether or not a dietary supplement is effective an understanding of the science behind the product is required. Due to interaction between

nutrients and genes, certain nutrients may be more risky for people with certain genotypes. It is increasingly important to follow the science of supplementation from reputable, unbiased sources. Without scientific validation there is a risk for making recommendations based on strong marketing rather than true health benefits, which puts women at risk for taking either unnecessary or unsafe dietary supplements. Databases that synthesize the vast amounts of research are available to practitioners who are interested in making dietary supplement recommendations. Two reputable resources are the Natural Standard and the Natural Medicines Comprehensive Database.

It is well established that nutrients from dietary supplements are less effective than nutrients from food. There is synergy between nutrients in food that cannot be replicated in a dietary supplement. Encourage women to choose nutrition-dense foods first and dietary supplements second.

Health and fitness professionals should not profit off the sale of dietary supplements. It should be disclosed if you are selling dietary supplements so the client is aware of the inherent bias that comes from the sale of supplements.

A registered dietitian will conduct a thorough health history, including a family healthy history in order to identify gaps in a woman’s diet due to food choices or increased nutrient needs. The dietitian will then make safe recommendations that will include details on the indications for supplements, what products to use, which nutrient forms, the appropriate dosages, when to take supplements, and the duration of supplement use. The registered dietitian will also address drug-nutrient and nutrient-nutrient interactions and may monitor biomarkers to assess change in nutrient needs.

Health Concerns

Osteoporosis and breast cancer are chronic diseases that are common to women. These are conditions may occur throughout the lifespan and can affect both men and women; however, they predominantly affect menopausal women.

Osteoporosis

A major cause of disability for women is osteoporosis. Osteoporosis reduces the quality of bone, making it porous. The diagnostic criteria for osteoporosis is based on bone mineral content more than 2.5 standard deviations below the young adult mean. Osteopenia is low bone mineral content 1-2.5 standard deviations below the young adult mean.

Bone is continuously remodeled over the lifespan. Bone remodeling involves the resorption of a small area of bone tissue by osteoclasts, followed by the replacement of this tissue with new bone synthesized by osteoblasts. Approximately 10% of bone is remodeled each year (Poulsen, Moughan, and Kruger 2007). Nutrition plays a strong role in the bone remodeling process. Multiple nutrients are involved in stimulating and/or inhibiting each step of the remodeling process.

Table 7. Nutrients and factors that affect bone health.

Beneficial nutrients	Detrimental factors in excess
Boron Calcium Copper	Alcohol Caffeine Sodium

Zinc	Fluoride
Fluoride	Protein
Magnesium	Phosphorus
Phosphorus	Vitamin A (excess or insufficiency)
Potassium	Omega-6 fatty acids
Vitamin C	Estrogen depletion (amenorrhea, menopause, or early oophorectomy)
Vitamin D	
Vitamin K	
Folic acid	
Omega-3 fatty acids	
Protein	
Phytoestrogens	
Probiotics	
(Cashman 2007)	

Prevention of osteoporosis and the slowing of bone loss are important to women. Ten million individuals have osteoporosis and another 34 million have osteopenia (Cashman 2007). Uncontrollable risk factors for osteoporosis include white ancestry, family history, and genetics. Sarcopenia complicates low bone density by reducing muscle strength and increasing fall risk. Without a fall and fracture, osteoporosis is benign. By the age of 65, 1 in 3 persons fall each year. Of those who fall, 20-30% sustain moderate or severe injuries, half of which are fractures (Dawson-Hughes 2008). There is a 20% death rate following a fracture in an older adult (Mahan and Escott-Stump 2008).

Many women have two health goals as they age: protect their bones and lose weight. Unfortunately, weight loss contributes to bone loss. Studies show that a 10% weight loss results in a 1-2% bone loss (Shapses and Riedt 2006). There is greater bone loss with weight loss in women weighing 132 pounds or less compared with women with higher body weights (Shapses and Riedt 2006). Older women will be more likely to lose bone as they lose weight. A postmenopausal woman who loses as little as 5% of body weight increases her fracture risk (Shapses and Riedt 2006). To reduce bone loss, emphasize slow weight loss, adequate calcium intake, appropriate vitamin D status, and weight-bearing exercise (Shapses and Riedt 2006).

**Breast Cancer**

Nutrients and bioactive components of food may suppress or reverse carcinogenesis (the process in which normal cells are transformed into carcinogenic cells). Lifestyle factors can impact, positively or negatively, each step of the carcinogenic process, initiation, promotion, and progression. Dietary factors that contribute to carcinogenesis are excess calorie intake, especially saturated fat intake, alcohol, and environmental chemicals consumed on or in foods, adult weight gain, and inadequate antioxidants and fiber.

Red meat and processed meat seem to increase the risk of breast cancer. The Nurse’s Health Study indicated that high intakes of red meat and dairy were associated with increased risk of breast cancer, especially in premenopausal women (Mahan and Escott-Stump 2008). More specifically, three or more 3-ounce servings of processed meat per week increased the risk of breast cancer (Cho et al. 2006). The increased risk of breast cancer related to red meat and processed meats may be due to polycyclic aromatic hydrocarbons (PACs) and nitrates. PACs are carcinogens formed in charred meat and nitrates are preservatives used in deli meats and processed meats.

Alcohol dramatically increases the risk for breast cancer. More than 1-2 servings of alcohol per day

increases the risk of breast cancer in women, especially when there is a history of routine alcohol consumption, benign breast disease, and/or hormone replacement therapy (Cummings et al. 2009). A meta-analysis of studies reported that postmenopausal women who drank alcohol had a 22% increased risk of breast cancer compared with those who do not drink alcohol (Cummins et al. 2009). It has been estimated that every additional 10 grams of alcohol is associated with a 10% increase in risk (Smith-Warner et al. 1998). Ten grams of alcohol is found in 3 ounces of wine, 12 ounces of beer, and 1 ounce of liquor.

The Nurse's Health Study found that adult weight gain is also associated with increased risk for breast cancer. Compared with women who maintain their weight, postmenopausal women who gained 22 pounds from age of 18 increased their risk of breast cancer by 18%. Those who gained 55 pounds or more increased their risk for breast cancer by 45% (Eliassen et al. 2006). Women who lost 22 pounds or more and did not use hormone replacement therapy had a lower risk of breast cancer compared with women who maintained their weight (Eliassen et al. 2006). Based on this research, encourage women to maintain their weight throughout adulthood to reduce their risk of cancer. A body mass index (BMI) of 21-23 throughout adulthood is recommended to protect against cancer (WCRF/AICR 2007).

Fruits and vegetables provide chemoprotective nutrients, such as fiber and antioxidants. Aim for at least five ½-cup servings per day. Vegetable and fruit intake seems to be related to reduced incidence of cancer, reduced reoccurrence of cancer, and a better prognosis following cancer. However, research results are conflicting due to the nature of studying a condition that takes years to develop. It may be that vegetable and fruit intake must be higher than what has been achieved in clinical trials in order to have a significant affect on breast cancer risk reduction. There is physiologically plausibility that the nutrients concentrated in vegetables and fruits will block the initiation, promotion, and progression of cancer. Certain bioactive food components in plant foods may be uniquely protective. Indoles, carotenoids, and flavonoids are components of plant foods that have been linked with reduced breast cancer risk (Mahan and Escott-Stump 2008). Indoles are found in cruciferous vegetables, carotenoids in yellow, orange, and green vegetables, and flavonoids in tea, dark chocolate, berries, apples, and pears.

Advise women to limit foods that increase their risk and emphasize nutrients that are known to be protective. Cancer is a disease that takes years to develop. Women can fight cancer throughout their lifespan by making quality food choices. The American Institute for Cancer Research has set forth a practical list of lifestyle factors to emphasize for all women. Their recommendations are summarized in table 8. Registered dietitians will synthesize this information into a realistic eating pattern that women can sustain to prevent cancer or recover optimally from a cancer diagnosis.

**Table 8. World Cancer Research Fund and American Institute for Cancer Research recommendations for cancer prevention.**

1. Be as lean as possible without becoming underweight.
2. Be physically active for at least 30 minutes every day.
3. Avoid sugary drinks. Limit consumption of energy-dense foods.
4. Eat a variety of vegetables, fruits, whole grains, and legumes, such as beans.
5. Limit consumption of red meats (such as beef, pork, and lamb) and avoid processed meats.
6. If consumed at all, limit alcoholic drinks to 2 for men and 1 for women a day.
7. Limit consumption of salty foods and foods processed with salt (seen as sodium on the ingredient list).
8. Don't use supplements to protect against cancer.
9. It is best for mothers to breastfeed exclusively for up to 6 months and then add other liquids and foods. \*



10. After treatment, cancer survivors should follow the recommendations for cancer prevention.\*

\*Special Population Recommendations  
WCRF/AICR, 2007

### **Physically Active Women**

In this age group there are athletes who have spent a lifetime enjoying exercise mixed with novice athletes experiencing the joys of exercise for the first time. Active women have increased fluid, calorie, carbohydrate, protein, and antioxidant needs. Experienced athletes may identify the need to fuel their active lifestyle; however, novice athletes may be fearful of calories and carbohydrates contributing to weight gain (which may counter their motivation to participate in exercise). An understanding of the motivation and goals for participation in exercise will help you to communicate nutrient needs to recreational and masters-level female athletes.

In general, women will overestimate the amount of calories expended in exercise and underestimate the number of calories consumed. Increase women's awareness regarding how calorie expenditure varies with the frequency, intensity, time, and type of exercise. This will help women understand how to best fuel their body without overcompensating in calorie intake.

### **Fluid and Electrolyte Needs for Activity**

Fluids and electrolytes are both required for maintaining normal hydration. Due to the reduction in thirst sensation with aging, older athletes must weigh themselves before and after exercise to determine if they are meeting their fluid needs during exercise. Any change in body weight during exercise is the result of fluid changes during exercise. A weight loss greater than 2% of body weight following an exercise session increases the risk for dehydration and will negatively affect exercise enjoyment and performance (SCAN 2006). Weight gain as a result of overhydration during exercise puts women at risk for hyponatremia – an electrolyte imbalance characterized by low blood sodium.

General guidelines for optimal hydration have been developed and can be modified for women based on their individual needs (SCAN 2006). Women should start exercise hydrated, as indicated by the production of diluted urine. Consuming 16-24 ounces of fluid in the hour prior to exercise will help to achieve fluid balance prior to exercise. Hydration can be maintained during exercise by consuming 3-8 ounces of fluid every 15-20 minutes. Measuring body weight before and after exercise will help to identify how much fluid is appropriate to consume during exercise. Following exercise, 24-32 ounces of fluids consumed with electrolytes and protein from food will help restore fluid balance, enhance rehydration, and promote recovery.

Sodium is the primary electrolyte lost in sweat during exercise. Prevent hyponatremia by identifying women at risk for the condition and by advising appropriate fluid and sodium intake. Women who participate in long-duration activities (lasting more than 4 hours), drink plain water, have salty sweat, or use nonsteroidal anti-inflammatory drugs prior to exercise are at risk for hyponatremia. Advise women to consume sodium with fluids during prolonged exercise.

### **Carbohydrate Needs for Activity**

Carbohydrate is the primary and preferred nutrient to fuel exercise. It is the macronutrient concentrated in vegetables, fruits, grains, and legumes. A finite amount of carbohydrate can be stored as glycogen in the liver and muscles. When this store of glycogen is depleted during exercise, exercise will not be sustained.



When glycogen stores are low, a greater percentage of calories from protein (lean muscle mass) will be burned during exercise. This is counterproductive to the maintenance of lean body mass. Encourage women to consult with a sports dietitian to ensure that they consume adequate carbohydrate in their diet so that they initiate exercise with full glycogen stores. This is particularly important for high-intensity exercise and/or endurance exercise lasting longer than 60-90 minutes.

During endurance exercise, women must consume fluids, carbohydrates, and electrolytes. For exercise less than an hour, water is sufficient. When exercise lasts longer than 90 minutes, consumption of carbohydrates during exercise is indicated and is crucial for the enjoyment of exercise and optimal exercise performance. Most women need approximately 60 grams of carbohydrate per hour of exercise. Sports dietitians will assist in creating a personalized fueling plan that is palatable and tolerated by the client to ensure that a mixture of carbohydrate sources is used to meet your clients' needs and that consumed carbohydrate can be absorbed through the gastrointestinal tract.

Following exercise, fluids, carbohydrate, protein, and antioxidants help to replenish glycogen stores, stimulate muscle recovery, and support the immune system. Foods that provide carbohydrate replenish glycogen and provide antioxidants to support the immune system. Protein-rich foods help to stimulate muscle protein synthesis and reduce muscle soreness. Consuming a balanced meal or snack immediately following exercise is recommended to meet these nutritional needs. Recovery sports products are convenient and provide carbohydrate and protein, but they do not provide the necessary antioxidants to support optimal recovery from exercise. Encourage women to choose whole foods rather than sports products. If appetite or digestion is impaired following exercise, a fruit smoothie is generally palatable and acceptable and will provide the required nutrients for exercise recovery.

This is an exciting time to educate women regarding food choices that optimize their personal health and understand the power of food to improve their quality of life, prevent disease, improve functionality, and support exercise.

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