

6 · Nutrition, Physical Activity, and Healthy Weight



CHAPTER CONTRIBUTORS

COMMITTEE MEMBERS

Maria Prince, MD, MPH (CO-CHAIR)

Office of Chronic Disease Prevention,
Maryland Department of Health and Mental Hygiene

Surina Ann Jordan, PhD (CO-CHAIR)

Zima Health

Barbara Andrews, RD, LD, MS Ed

Center for Cancer Surveillance and Control,
Maryland Department of Health and Mental Hygiene

Debra Celnik, RD, MS, LDN

Office of Chronic Disease Prevention,
Maryland Department of Health and Mental Hygiene

Jinlene Chan, MD, MPH

Anne Arundel County Department of Health

Katherine Clegg Smith, PhD

Johns Hopkins Bloomberg School of Public Health

Jennifer Folliard, RD, MPH

The MayaTech Corporation

Sherry McCammon

American Cancer Society

Carol Miller, RD, MEd, LD

Food Supplement Nutrition Education, UMD Extension

Cheryl Seats, RD, LDN, MEd

Johns Hopkins Medicine

Jovonni R. Spinner, MPH, CHES

Citizen

Nicole Stout, MPT, CLT-LANA

National Naval Medical Center

Carolyn Voorhees, PhD, MS

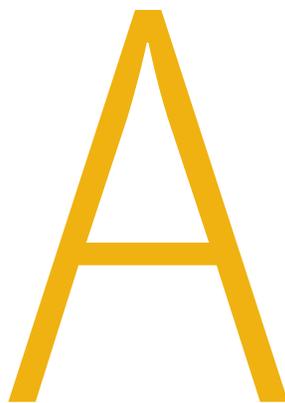
University of Maryland School of Public Health

Peggy Yen, RD, LDN, MPH

National Association of Chronic Disease Directors

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NUTRITION, PHYSICAL ACTIVITY, AND HEALTHY WEIGHT



fourth of all cancers are preventable through healthy lifestyles including healthy diet, physical activity, and healthy weight.¹ Epidemiologic studies show that a diet high in vegetables, fruits, and whole grains and low in animal fat, meat, alcohol, and calories reduces the risk of some of the most common cancers. Studies also show that obesity increases cancer risk.

COMPREHENSIVE CANCER CONTROL STRATEGIES include improved nutrition, increased physical activity, and achievement and maintenance of healthy weight. These steps, along with tobacco prevention and cessation, are the major cancer prevention measures as well as prevention measures for other chronic diseases.

Although these cancer prevention measures are important for the general population, special emphasis on certain target populations is necessary. African American or black, Hispanic or Latino, and low-income Marylanders have higher rates of obesity, poor diet, and physical inactivity. Instilling healthy lifestyle habits in childhood is important because of the rising rates of child and adult obesity. A growing body of evidence suggests a link between fetal exposures and the risk for obesity in adulthood, indicating that women of childbearing age are another important population. These same population groups are also important populations for preventing other chronic conditions impacted by nutrition, physical activity, and healthy

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TABLE 6.1

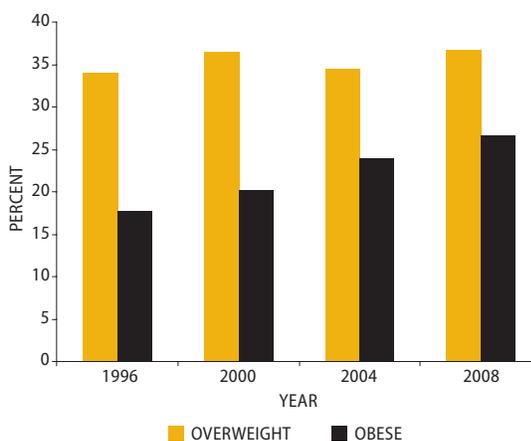
Prevalence of Healthy Weight, Physical Activity, and Adequate Consumption of Fruits and Vegetables among Maryland Adults, 1996, 2000, 2004, 2008

	1996	2000	2004	2008
Healthy weight (not overweight or obese)	48.2%	43.3%	41.5%	36.6%
Regular or sustained physical activity	13.3%	22.3%	n/a	n/a
Engaged in moderate physical activity for 30 minutes or more per day, five or more days per week	n/a	n/a	35.0%	35.6%
Consumption of five or more fruits and vegetables per day	24.7%	27.4%	30.1%	27.2%

Source: Maryland BRFSS, 1996, 2000, 2004, 2008.

FIGURE 6.2

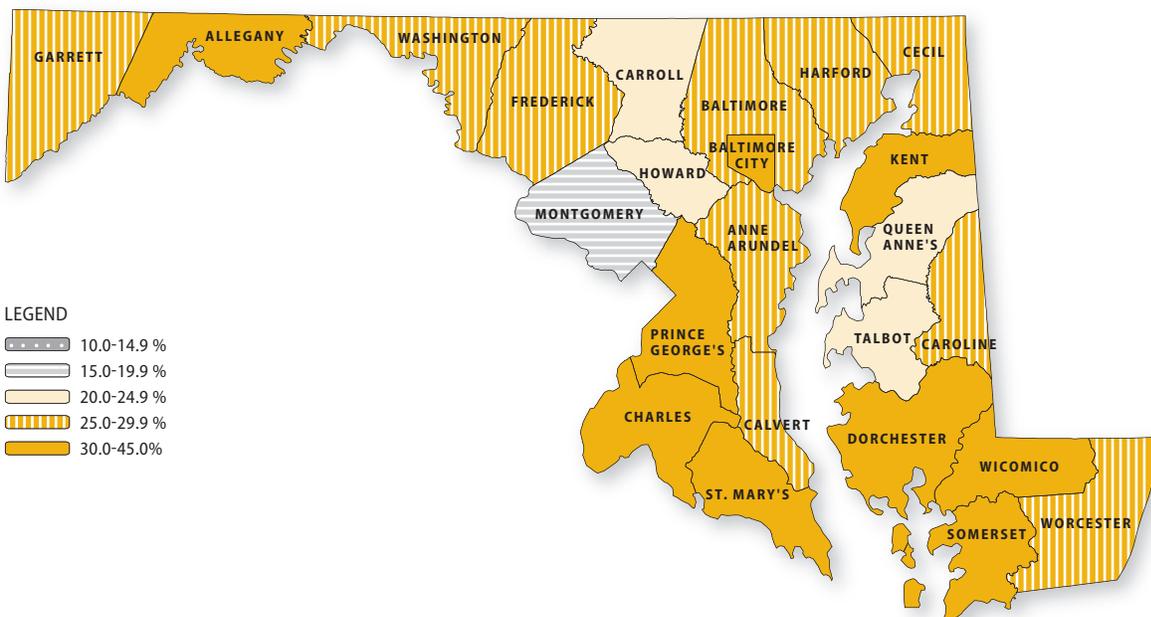
Prevalence of Overweight and Obesity in Maryland, 1996-2008



Source: Maryland BRFSS, 1996, 2000, 2004, 2008.

FIGURE 6.3

Adult Obesity Prevalence in Maryland by Jurisdiction, 2006-2008



Source: Maryland BRFSS, 2006-2008.

weight, such as high blood pressure and diabetes.

This chapter includes three sections:

- Summary of the key obesity, nutrition, and physical activity factors that promote or prevent cancer.
- Description of the social-ecological factors related to nutrition, physical activity, and body weight that impact cancer prevention, and highlights of potential opportunities for cancer prevention related to these factors.
- Goals, objectives, and strategies that detail Maryland-specific targets for action.

Obesity, Nutrition, and Physical Activity Factors that Promote or Prevent Cancer

A summary of the World Cancer Research Fund/American Institute for Cancer Research expert panel on Food, Nutrition, Physical Activity, and the Prevention of Cancer identifies the critical factors that promote or prevent specific cancers and obesity as presented in Figure 6.1² (see pages 4-5).

Obesity Factors and Cancer

OBESITY, OR EXCESS BODY FAT, increases the risk of cancer of the esophagus, pancreas, colorectum, breast, endometrium, and kidney and may increase the risk of cancer in general. Obesity may also increase risk for gallbladder cancer. Excess abdominal fat increases the risk of colorectal cancer and may increase the risk of cancer of the pancreas, breast, and endometrium.³

The leading cause of obesity results from an energy imbalance, meaning too many calories taken in or too few calories expended in activity. A calorie is a unit of measurement for energy. Eating and drinking too many calories and not burning these calories through physical activity results in weight gain in the form of body fat and may lead to overweight and obesity.

The most common way that overweight and obesity are identified is based on Body Mass Index (BMI), which is calculated using height and weight. The Centers for Disease Control and Prevention (CDC) adult and youth BMI calculators can be found at www.cdc.gov. Adults with a BMI between 25 and 29.9 are considered

overweight, and adults with a BMI of 30 or higher are considered obese.⁴ For children over age two and adolescents, BMI scores are considered in terms of percentiles by age and sex. A child with a BMI above the 95th percentile for age and sex is considered obese. A child with a BMI between the 85th and 95th percentile is considered overweight.⁵

Waist circumference, a measure of abdominal fat, is another gauge of health risk in adults related to body size and composition. Waist circumference more than 40 inches in men and more than 35 inches in women indicates increased risk of obesity-related diseases, including cancer.⁶

The prevalence of obesity has increased dramatically in the US and in Maryland in recent decades. In 2008, nearly two-thirds of Maryland adults were either overweight or obese (Table 6.1, Figure 6.2). Figure 6.3 shows the adult obesity prevalence by jurisdiction in Maryland.

THE PREVALENCE OF OBESITY has tripled among children in the United States since 1980.⁷ According to the 2008 Pediatric Nutrition Surveillance Survey, 15.7% of low-income two-to-five-year-old Maryland children are obese. According to the 2009 Youth Risk Behavioral Survey, 12.2% of high

Obesity Burdens Certain Population Groups More Than Others

- **Maryland African American or black women** 39% compared with 23% for white women
Source: Maryland BRFSS, 2008.
- **Maryland adults with less than a high school education** 30% compared to 20% for college-educated adults
Source: Maryland BRFSS, 2008.
- **Maryland adults with an annual household income less than \$15,000** 34% compared to 22.3% for adults with a household income greater than \$75,000
Source: Maryland BRFSS, 2008.
- **Maryland African American or black adolescents** males: 17% vs. 11.8% for whites; females: 13.5% vs. 3.8% for whites Source: Youth Risk Behavior Surveillance System, 2009.
- **Low-income Hispanic or Latino children between the ages of two to five** 18.3% compared to 12.6% for whites and 12.0% for African Americans or blacks

FIGURE 6.1

World Cancer Research Fund/American Institute for Cancer Research Report:
Summary of 'Convincing' and 'Probable' Risk

	MOUTH, PHARYNX, LARYNX	NASOPHARYNX	OEESOPHAGUS	LUNG	STOMACH	PANCREAS	GALLBLADDER	LIVER	COLORECTUM ⁹
Foods containing dietary fibre									Probable Decreased Risk
Aflatoxins								Convincing Increased Risk	
Non-starchy vegetables ¹	Probable Decreased Risk		Probable Decreased Risk		Probable Decreased Risk				
Allium vegetables					Probable Decreased Risk				
Garlic									Probable Decreased Risk
Fruits ²	Probable Decreased Risk		Probable Decreased Risk	Probable Decreased Risk	Probable Decreased Risk				
Foods containing folate						Probable Decreased Risk			
Foods containing lycopene									
Foods containing selenium ³									
Red meat									Convincing Increased Risk
Processed meat									Convincing Increased Risk
Cantonese-style salted fish		Probable Increased Risk							
Diets high in calcium ⁴									Probable Decreased Risk
Energy-dense foods ⁵									
Low energy-dense foods									
Salt, salted and salty foods					Probable Increased Risk				
Arsenic in drinking water				Convincing Increased Risk					
Matè			Probable Increased Risk						
Sugary drinks									
Alcoholic drinks ⁶	Convincing Increased Risk		Convincing Increased Risk					Probable Increased Risk	Probable Increased Risk
Beta-carotene ⁷				Convincing Increased Risk					
Physical activity									Convincing Decreased Risk
Sedentary living ⁸									
Body fatness			Convincing Increased Risk			Convincing Increased Risk	Probable Increased Risk		Convincing Increased Risk
Abdominal fatness						Probable Increased Risk			Convincing Increased Risk
Adult weight gain									
Adult attained height						Probable Increased Risk			Convincing Increased Risk
Greater birth weight									
Lactation									
Being breastfed									

KEY

- Convincing Decreased Risk
- Probable Decreased Risk
- Probable Increased Risk
- Convincing Increased Risk

- 1 Includes evidence on foods containing carotenoids for mouth, pharynx, larynx; foods containing beta-carotene for oesophagus; foods containing vitamin C for oesophagus.
- 2 Includes evidence on foods containing carotenoids for mouth, pharynx, larynx and lung; foods containing beta-carotene for oesophagus; foods containing vitamin C for oesophagus.
- 3 Includes evidence from supplements on prostate.
- 4 Evidence is from milk and studies using supplements for colorectum.
- 5 Includes fast foods.
- 6 Convincing harm for men and probable harm for women for colorectum.
- 7 The evidence is derived from studies using supplements for lung.
- 8 Judgment for physical activity applies to colon and not rectum.
- 9 Includes evidence on television viewing.

This material has been adapted from the 2007 WCRF/AICR Report Food, Nutrition, Physical Activity and the Prevention of Cancer: a Global Perspective. World Cancer Research Fund International: www.wcrf.org; American Institute for Cancer Research: www.aicr.org

FIGURE 6.1

World Cancer Research Fund/American Institute for Cancer Research Report:
Summary of 'Convincing' and 'Probable' Risk

	BREAST PREMENOPAUSE	BREAST POSTMENOPAUSE	OVARY	ENDOMETRIUM	PROSTATE	KIDNEY	SKIN	WEIGHT GAIN, OVERWEIGHT, AND OBESITY
Foods containing dietary fibre								
Aflatoxins								
Non-starchy vegetables ¹								
Allium vegetables								
Garlic								
Fruits ²								
Foods containing folate								
Foods containing lycopene					■			
Foods containing selenium ³					■			
Red meat								
Processed meat								
Cantonese-style salted fish								
Diets high in calcium ⁴					■			
Energy-dense foods ⁵								■
Low energy-dense foods								■
Salt, salted and salty foods								
Arsenic in drinking water							■	
Matè								
Sugary drinks								■
Alcoholic drinks ⁶	■	■						
Beta-carotene ⁷								
Physical activity		■		■				□
Sedentary living ⁸								■
Body fatness	■	■		■		■		
Abdominal fatness		■		■				
Adult weight gain		■						
Adult attained height	■	■	■					
Greater birth weight	■							
Lactation	□	□						
Being breastfed								■

KEY

- Convincing Decreased Risk
- Probable Decreased Risk
- Probable Increased Risk
- Convincing Increased Risk

- 1 Includes evidence on foods containing carotenoids for mouth, pharynx, larynx; foods containing beta-carotene for oesophagus; foods containing vitamin C for oesophagus.
- 2 Includes evidence on foods containing carotenoids for mouth, pharynx, larynx and lung; foods containing beta-carotene for oesophagus; foods containing vitamin C for oesophagus.
- 3 Includes evidence from supplements on prostate.
- 4 Evidence is from milk and studies using supplements for colorectum.
- 5 Includes fast foods.
- 6 Convincing harm for men and probable harm for women for colorectum.
- 7 The evidence is derived from studies using supplements for lung.
- 8 Judgment for physical activity applies to colon and not rectum.
- 9 Includes evidence on television viewing.

This material has been adapted from the 2007 WCRF/AICR Report Food, Nutrition, Physical Activity and the Prevention of Cancer: a Global Perspective. World Cancer Research Fund International: www.wcrf.org; American Institute for Cancer Research: www.aicr.org

school students were obese and another 15.6% were overweight.⁸ There are no data related to overall obesity rates among Maryland children between ages five and twelve.

Childhood obesity and overweight have not been directly linked to cancer, but obese children are more likely to become obese adults. Children who are obese after age six have a more than 50% chance of being obese as adults. Seventy percent of children overweight at ages 10 to 17 were obese as young adults.⁹

Certain nutrition and physical activity factors have not been linked directly to cancer but are linked to obesity, which is a risk factor for certain cancers.¹⁰ Eating energy-dense foods (see explanation and examples below), drinking sugar-sweetened beverages such as soda, and being sedentary including television-viewing are associated with increased risk for obesity. Eating low-energy-dense foods, being physically active, and having been breastfed as an infant are associated with decreased risk for obesity. Eating low-energy-dense foods such as fruits and vegetables and being physically active are also directly linked with cancer prevention and will be discussed in the following sections.

CALORIES, ENERGY DENSITY, AND INTAKE OF FAT

INCREASED CONSUMPTION OF ENERGY-DENSE FOODS can cause weight gain and, when coupled with a sedentary lifestyle, can lead to overweight and obesity.¹¹ Foods such as french fries, doughnuts, and fast food burgers and shakes have a relatively small food volume compared to their calorie content; in other words, a high energy density. Many of them also offer few nutrients necessary for good health.

Portion sizes of many foods have also increased over the past 40 years, adding dietary calories that often go unnoticed until they lead to weight gain. The healthiest way to reduce calorie intake is to eat smaller portion sizes, especially for foods with added sugar and fat.¹² These dietary constituents and the foods that provide them are often high in calories but offer few or no essential nutrients.

SUGAR-SWEETENED BEVERAGES

INCREASED CONSUMPTION OF SUGAR-SWEETENED BEVERAGES has been associated with weight gain, overweight,

and obesity.¹³ Much of the added sugar in American diets comes from sugar-sweetened beverages such as carbonated soda and fruit drinks. American adults have increased their intake of sodas and fruit drinks by 100% in fewer than 20 years.¹⁴ Children get almost 11% of their total calories from sugar-sweetened beverages.¹⁵ Overweight young people, ages 2 to 19, consume a higher proportion of their calories from carbonated soft drinks than their non-overweight counterparts.¹⁶

BREASTFEEDING

IN ADDITION TO THE ASSOCIATED BENEFIT of lactation in reducing the risk of developing breast cancer in the mother and the multiple well-known benefits of breastfeeding for an infant, breastfeeding for at least six months is recommended because of probable reduced risk of future obesity for the infant.¹⁷

SEDENTARY BEHAVIOR

SEDENTARY BEHAVIOR HAS BEEN LINKED TO OBESITY.¹⁸ Sedentary behaviors are those that result in prolonged sitting such as watching television and playing video games. Being sedentary is not the same as lacking physical activity. Evidence suggests that increasing physical activity levels may not be effective if levels of sedentary behavior remain high.¹⁹ Americans are more sedentary than they used to be. Over two-thirds of adults report watching television for more than two hours a day. Another 25% say they use a computer outside of work for more than two hours a day.²⁰ Television viewing is also related to consumption of calorie-dense foods and drinks, further contributing to weight gain, overweight, and obesity.

Nutrition Factors and Cancer

FRUITS AND VEGETABLES

FRUITS AND VEGETABLES have a relatively large volume compared to their calorie content and are considered low-energy-dense foods. Eating a low-energy-dense diet can help people lower their calorie intake while maintaining feelings of fullness and controlling hunger sensation.²¹

The United States Department of Agriculture (USDA) “2010 Dietary Guidelines Advisory Committee (DGAC) Report” recommends eating a diet mostly of foods of plant origin. Experts have

long promoted consumption of fruits and vegetables to prevent cancer and other chronic diseases, like obesity, diabetes, and cardiovascular disease. One recent study failed to confirm an association between fruit and vegetable intake and overall cancer risk²² but there is evidence that diets high in vegetables and fruits probably protect against cancers of the mouth, pharynx, larynx, esophagus, and stomach.²³ Allium vegetables (such as onions, garlic, leeks, and shallots), chicory, and Jerusalem artichokes have been shown to protect against stomach cancer, and garlic has been shown to have protective value against colon and rectal cancer.²⁴

The wide array of vitamins, minerals, and antioxidants found in fruits and vegetables provide natural defenses for overall cell health and maintenance. Antioxidants such as carotenoids are powerful organic compounds that can protect against cancers of the mouth, pharynx, larynx, and lung. Beta-carotene (found, for example, in carrots and spinach) and lycopenes (abundant in cooked tomatoes), are types of carotenoids thought to enhance the function of the immune system and protect from various cancers such as prostate cancer.²⁵

The Centers for Disease Control and Prevention “State Indicator Report on Fruits and Vegetables, 2009” provides information on fruit and vegetable consumption in Maryland. According to the report, about 15% of Maryland adults and even fewer adolescents are consuming the minimum recommended amount of fruits and vegetables every day (Table 6.1).²⁶ Increasing the proportion of Americans consuming the recommended daily servings of fruit and vegetables is a national health objective, and has been measured as part of the US Department of Health and Human Services Healthy People 2010 Objectives.

DIETARY FIBER

CONSUMPTION OF DIETARY FIBER may influence cancer risk in two ways. 1) Some, but not all, studies show that consumption of dietary fiber is linked to a probable decrease in colon cancer risk. 2) Foods high in dietary fiber are more often low-energy, nutrient-dense foods. Therefore, high-fiber foods are highly recommended for obesity preven-

tion.²⁷ Dietary fiber can be found in whole grains, legumes, beans, fruits, and vegetables. In general, foods that are minimally processed will contain more dietary fiber when compared to their processed counterparts. For example, 100% whole grain bread will have more fiber per serving than white bread, and a whole apple will have more fiber per serving than applesauce. Dietary fiber dilutes fecal contents, decreases transit time, and increases stool weight. The exact mechanism of how dietary fiber in the colon may be associated with decreased cancer risk is still unknown.

RED MEAT

SOME STUDIES have found that the consumption of red meat and the cooking of meat by broiling, grilling, or smoking is associated with a higher risk of some cancers. Red meat is any flesh from animals that have more red than white muscle fibers, such as beef, goat, and lamb.²⁸

The mechanism for the association between red meat, high-temperature cooking of meat, and cancer is not completely clear but may be due to the formation of heterocyclic amines and polycyclic aromatic hydrocarbons when protein-rich meat is cooked at high temperature. Both of these compounds are carcinogens in animal studies as well as recent human studies.^{29,30}

SALT

UNDERSTANDING THE RELATIONSHIP of salt consumption and gastric/stomach cancer continues to be an active area of research. Studies have examined the possible correlation between salt intake and the presence of *H. pylori*, the bacterium that is a cause of stomach cancer, stomach ulcers, and chronic gastritis. It has been published that “based on the considerable evidence from ecological, case-control, and cohort studies worldwide and the mechanistic plausibility, limitation on salt and salted food consumption is a practical strategy for preventing gastric cancer.”³¹

PROCESSED FOODS

MANY KNOWN OR SUSPECTED TOXINS AND CARCINOGENS find their way into the food supply or are created by food processing methods. These toxins and carcinogens include pesticides, heavy metals, and nitrates. These issues are covered in more detail in Chapter 8: Environmental/Occupational Issues and Cancer.

In particular, consumption of processed meats has been linked to colon cancer^{32,33} and may cause cancers of the esophagus, lung, stomach, and prostate.³⁴ Processed meat is commonly defined as meats preserved by smoking, curing, salting, or the addition of chemical preservatives. Processed meats such as hot dogs and bacon are preserved with sodium nitrite to improve their flavor and appearance. Many deli meats and pickled, fried, or smoked foods also contain sodium nitrate. During the digestion process, sodium nitrate is converted to nitrosamine, which is a carcinogen.

Acrylamides are a byproduct of high-temperature cooking methods such as frying, baking, or broiling, and are found at especially high levels in foods such as potato chips and french fries. Studies in rodents have shown that acrylamides pose a risk for several types of cancer. However, the evidence is still incomplete regarding the health risks for humans.³⁵

NUTRITIONAL SUPPLEMENTS

A COMPREHENSIVE REVIEW OF STUDIES concluded that the strength of the evidence on efficacy for primary prevention of cancer of using multivitamin/mineral supplementation such as vitamin D and vitamin E was “very low.”³⁶ In fact, a recent report from the National Institutes of Health states that “supernutritional levels of vitamins taken as supplements do not emulate the apparent benefits of diets high in foods that contain those vitamins, and we now know that taking vitamins in supernutritional doses can cause serious harm.” Beta-carotene, which some people take as a supplement, has been shown to increase the number of new cases of lung cancer in study participants with asbestos exposure or smoking history and is associated with a higher death rate.³⁷ People at higher risk for cancer or those unable to meet the recommended daily intake of certain nutrients from their diet alone should consider talking to their health professional before taking vitamin and/or mineral supplements.

ALCOHOL

THE MORE ALCOHOL A PERSON DRINKS, the higher the risk of developing oral, pharynx, larynx, esophagus, liver, and colorectal cancers. Women who drink even a glass or two of alcohol daily have a higher risk of breast cancer.³⁸ General guidelines advise no more than one drink per day for women and two drinks for men. (The drink-size reference guideline is 12 ounces of beer or wine cooler, 5 ounces of wine, or 1.4 ounces of an 80-proof distilled spirit.)³⁹

Tobacco use combined with excessive drinking appears to promote higher rates of oral and head and neck cancers.⁴⁰ Researchers are investigating the exact mechanism connecting alcohol consumption and cancer/tumor growth and potential methods of risk reduction, including the relationship of the B-vitamin folate to the alcohol and colon and breast cancer associations.⁴¹

Because light-to-moderate amounts of alcohol consumption can also have beneficial health effects on heart disease prevention, medical professionals should discuss the risks and benefits of alcohol consumption with their patients and the importance of limiting intake.

Physical Activity and Cancer

PHYSICAL ACTIVITY is an important determinant of overall health and specifically of cancer risk.⁴²

Evidence supports the role of physical activity in the prevention of many types of cancer.^{43,44,45,46} Physically active people have a significantly lower risk of colon, breast, prostate, and endometrial cancers than do inactive people.^{47,48} In addition, physical activity is a way to reduce weight and to maintain a healthy weight throughout the lifespan. Because obesity is a known risk factor for the development of cancer, physical activity may also indirectly impact an individual’s risk for cancer by preventing obesity.⁴⁹

Individual recommendations for physical activity are an important part of cancer prevention and can easily be implemented into individual lifestyles. Physical activity is safe for most people and essential for healthy aging. Preexisting medical conditions, disability, or limitations related to aging should be considered when recommending a physical activity program but

almost everyone can be active in some way.⁵⁰ While there is no level of physical activity that absolutely reduces cancer risk, evidence does support the substantial health benefits of physical activity. Thirty to 60 minutes of moderate daily physical activity is estimated to reduce the risk of colon, breast, prostate, and endometrial cancer by 20% to 40%.⁵¹

According to the 2008 Maryland BRFSS, 76% of Maryland adults reported participating in some form of physical activity in the past 30 days, mirroring the national average which has remained steady for ten years. However, only 36% of Maryland adults report participating in moderate physical activity at levels recommended for substantial health benefit (Table 6.1, pages 4-5).

Prevention of Cancer through Healthy Eating and Physical Activity

Coordinated action to reduce the nutrition, obesity, and physical activity risk factors related to cancer in Maryland is required.

SUCH ACTION HAS BEEN CONDUCTED in many areas throughout Maryland, and is highlighted in the “Maryland Comprehensive Cancer Control Plan Progress Report,” which can be viewed at www.marylandcancerplan.org.

Marylanders need to make better food and beverage choices, become more physically active, and lose weight. However, individual lifestyle decisions are greatly influenced by the larger social and ecological environment including family and peers. (See the Social Ecological Model on page 10.) This environment can be modified through policies and practices that make healthier choices easier. Everyone who lives and works in Maryland should be able to make healthy life choices about nutrition, physical activity, and attaining and maintaining a healthy weight by having easy, affordable, and equitable access to accurate health information, healthy foods, and safe, enjoyable, and convenient places for physical activity.

To accomplish this, a comprehensive approach is required that engages all levels of the Social Ecological Model, reflects the diverse needs and cultural preferences of communities and populations, and involves collaboration across industry,

community organizations, employers, healthcare providers, health plans, nongovernmental organizations, and local, state, and federal governments. Licensed childcare, schools, workplaces, and communities serve as potential venues that can be modified to improve access to information, healthy food choices, and safe, convenient places for physical activity.

Institutions and Organizations

CHILDCARE AND SCHOOLS

CHILDREN AND ADOLESCENTS spend much of their time away from home in childcare or in schools. These settings present opportunities to model normal healthy eating and physical activity behaviors as well as provide age-appropriate health and physical education. The Maryland State Department of Education (MSDE) and the US Department of Agriculture (USDA) have required the development and implementation of wellness policies in all schools since the 2006-2007 school year.⁵² Existing Maryland Board of Education nutrition and physical activity policies such as the Management and Operations Memorandum provide guidance for foods of minimal nutritional value (MOM-12). Local compliance with state-level guidance has not been assessed statewide. Further work is still needed in both the school and childcare settings to meet the nutrition and physical activity guidelines for children. Examples of policies and practices to promote healthier behaviors in childcare and school settings include putting nutrition and physical activity parameters in the assessment of childcare quality and requiring schools to provide recommended levels of physical activity for children of all ages through physical education classes or recess, consistent with national and state guidance.^{53,54}

WORKPLACES

WORKPLACES PLAY A CRITICAL PART in the effort to increase opportunities for healthy eating and physical activity. In 2009, there were more than 2.5 million adults employed in Maryland, with the average full-time employee spending 9.2 hours per day at work.⁵⁵ Compelling incentives exist for workplace health promotion, as healthy employees are likely to be more productive and

Social Ecological Model

The **Social Ecological Model** provides a way of thinking about the factors related to preventing cancer. It describes the spheres of influence for interventions from the individual to the much broader level of social structure and policy. Interventions at the individual and interpersonal levels are supported by those implemented at the broader levels of the model.

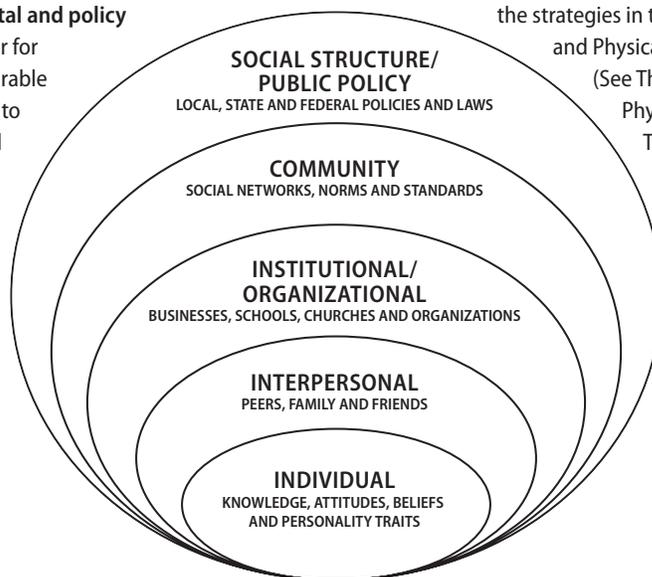
Implementing environmental and policy interventions makes it easier for individuals to engage in desirable behaviors and more difficult to engage in behaviors harmful to health.

Changes in the “built environment,” such as increasing the availability and accessibility of fresh fruits and vegetables or improving community

infrastructure to promote walking and bicycling, can increase opportunities for healthy eating and physical activity in communities. Achieving these changes requires collaboration among all sectors of society: government, business, media, healthcare and health professionals, public and private organizations, and individuals, as outlined in the model.

The **Social Ecological Model** is also used to organize the strategies in the Maryland Nutrition and Physical Activity Plan 2006-2016. (See The Maryland Nutrition and Physical Activity Plan text box.)

Together these plans can guide efforts to improve the diets and physical activity habits of Marylanders for prevention of cancer as well as other chronic diseases.



incur lower medical costs. There has also been strong evidence that worksite programs are effective to reduce obesity among workers through such measures as providing healthy foods options in the workplace and encouraging physical activity during scheduled breaks.⁵⁶

HEALTHCARE

THE HEALTHCARE SECTOR, including healthcare providers and health plans, has an important role in terms of influencing behavior change. Healthcare providers are often trusted sources of information regarding lifestyle changes to improve health status. In addition, health insurance plan coverage of preventive services (for example, cancer screening tests) has been shown to increase the likelihood of people obtaining these important services.⁵⁷ Improving health plan coverage, incentives for risk reduction behaviors, and benefits for other preventive services such

The Maryland Nutrition and Physical Activity Plan

Goals and objectives in this chapter align with the recommendations set forth in the Maryland Nutrition and Physical Activity Plan. In 2003, the state of Maryland was awarded a cooperative agreement from the Centers for Disease Control and Prevention to engage community and state-level stakeholders to develop a comprehensive plan to address obesity across the lifespan of Maryland residents. In 2006, a ten-year framework for action was published. The Maryland Nutrition and Physical Activity Plan focuses on healthy eating and physical activity through changes across the Social Ecological Model in the community, healthcare, school, and worksite settings. The ten-year plan is currently housed within the Maryland Health Eating and Active Lifestyle Coalition, a 501(c)(3) nonprofit and is available for download at www.healthyactivemaryland.org. The coalition provides annual plan updates and networking meetings to more than 200 member organizations.

as weight management and behavioral change counseling may increase the number of people who receive these services.

Communities

SOCIAL NORMS AND STANDARDS

CHANGING SOCIAL NORMS AND STANDARDS to support healthy eating, physical activity, and attaining and maintaining a healthy weight requires Maryland community members to recognize that obesity is a problem and that relatively small changes can be made by making healthier choices. A recent initiative in Maryland aims to create an environment that supports these healthy choices. (See Healthiest Maryland text box).

Public Policies

LOCAL, STATE, AND FEDERAL GOVERNMENTS have a tremendous influence on the environment in which we work, live, and play. Decisions affecting transportation planning, residential and business development, and zoning regulations influence safety, accessibility, and affordability. In addition, governmental health and social programs have an impact on health behaviors. Policies to enhance opportunities for physical activity and decrease sedentary behaviors should be considered. Some examples include implementing the Maryland bike and pedestrian plan, promoting local recreation/parks programs and Safe Routes to Schools (SR2S) initiatives, and embracing Smart Growth principles for planning and development to reduce urban sprawl.^{58,59,60} Strategies that could improve retail access to fruits and vegetables include promoting virtual supermarkets and healthy corner stores programs,

Healthiest Maryland

The Maryland Health Quality and Cost Council, chaired by the Lt. Governor and Secretary of Health, was established by Executive Order in 2007 to develop recommendations for improving healthcare quality and reducing healthcare costs in the state. In 2009, the Health Quality and Cost Council recommended the promotion of Healthiest Maryland, a statewide movement to create a culture of wellness—an environment that makes the healthiest choice an easy choice. The three components of Healthiest Maryland are Healthiest Maryland Businesses, Healthiest Maryland Communities, and Healthiest Maryland Schools. Within each of the sectors, there is a peer-to-peer recruitment campaign to engage leadership and conduct an organizational assessment, referral to resources and technical assistance, and recognition of successful implementation of policies and environmental change. In addition, corresponding state-level policies and environmental changes will contribute to the culture of wellness throughout Maryland.

using incentives for grocery stores to relocate in food deserts, and increasing the use of Electronic Benefits Transfer at local farmers markets.^{61,62} Another approach considered by some states and local jurisdictions is enacting an excise tax on sugary beverages or other unhealthy foods, which increases the cost to the consumer. Such policies have a potential to impact individual behaviors, such as implementation of tobacco excise taxes have contributed to decreases in tobacco use.⁶³

Focusing attention on policies and programs that impact broader levels of the social ecological model have a greater potential for influencing individual and peer networks. The following goals, objectives and strategies to decrease cancer risks through optimal nutrition, physical activity and achieving a healthy weight strongly emphasize these broader targets.

GOALS - OBJECTIVES - STRATEGIES

GOAL

Reduce the burden of cancer in Maryland by improving the nutrition and physical activity and promoting the healthy weight of Marylanders across the lifespan.

TARGETS (2016)

- **Increase the proportion of Maryland adults consuming at least five fruits and vegetables per day to 32%* (2008 Baseline: 27%).**
Source: Maryland BRFSS.
- **Maintain the proportion of Maryland adults engaging in moderate physical activity for 30 minutes or more per day, five or more days per week at 36%* (2008 Baseline: 36%).**
Source: Maryland BRFSS.
- **Reduce the proportion of Maryland adults engaging in no leisure time physical activity to 19%* (2008 Baseline: 24%).**
Source: Maryland BRFSS.
- **Increase the proportion of Maryland adults who are at a healthy weight (18.0 >= BMI <= 25.0) to 44%* (2008 Baseline: 35.5%).**
Source: Maryland BRFSS.
- **Reduce the proportion of low-income children (ages 2-4) who are obese to 14.1% (2008 Baseline: 15.7%).**
Source: Maryland Pediatric Nutrition Surveillance Survey, 2008.

*(The target for 2016 is taken from the Maryland Nutrition and Physical Activity Plan, published in May 2006 (<http://fha.maryland.gov/pdf/cdp/npaplan.pdf>).

OBJECTIVE 1

By 2015, ensure that Maryland has a team of personnel and dedicated resources sufficient to implement and evaluate cancer prevention strategies related to nutrition, physical activity, and obesity prevention and treatment.

STRATEGIES

- 1 **EXPLORE MECHANISMS** (including identifying novel funding sources and/or leveraging other public and private initiatives with similar goals) to provide dedicated funding to support nutrition and physical activity policy implementation and environmental changes.

- 2 **IMPLEMENT A STATEWIDE SURVEILLANCE SYSTEM** that can be used to measure the reach and impact of the strategies for Objectives 2-6.

OBJECTIVE 2

By 2015, ensure that at least 25% of Maryland businesses have policies and supports for promoting healthy eating and physical activity.

STRATEGIES

- 1 **ESTABLISH MECHANISMS** for obtaining a baseline and tracking the healthy eating and physical activity policies of workplaces and business, and for providing technical assistance to interested workplaces and businesses on improving workplace policies, programs, and support for nutrition, physical activity, and lactation support for workers.
- 2 **ASSESS AND ADDRESS BARRIERS** for Maryland workplaces and businesses to establish worksite wellness programs that encourage healthier behaviors and meet their workers' health and wellness needs.
- 3 **ENCOURAGE WORKPLACE WELLNESS INITIATIVES** through a recognition program for businesses with model policies and practices.
- 4 **ESTABLISH STATE-LEVEL POLICIES** and supports to promote healthy eating and physical activity for state employees.

OBJECTIVE 3

By 2015, ensure that 50% of Maryland licensed child-care facilities will have policies to promote healthy eating and physical activity.

STRATEGIES

- 1 **INCORPORATE NUTRITION** and physical activity wellness policy standards in the voluntary Quality Rating Improvement System assessment for licensed childcare in order to measure and track the proportion of licensed childcare facilities meeting Objective 3.
- 2 **INCLUDE NUTRITION** and physical activity-related educational requirements in childcare-provider credentialing and continuing education.
- 3 **EXPLORE POTENTIAL STATE POLICIES** for promoting healthy eating and physical activity in licensed childcare, before and after school care programs, and summer camp including maximizing implementation and utilization of the Supplemental Nutrition Assistance Program (SNAP); Supplemental Nutrition Program for Women, Infants, and Children (WIC);

GOALS - OBJECTIVES - STRATEGIES

Child and Adult Care Food Program; At Risk Afterschool Meals Program; and Summer Food Service Program.

OBJECTIVE 4

By 2015, ensure that 100% of Maryland public school systems will have policies to promote healthy eating and physical activity.

STRATEGIES

- 1 RECRUIT SCHOOL LEADERSHIP** to complete an assessment of their wellness policies in order to measure and track the progress of Objective 4.
- 2 ENHANCE THE INFRASTRUCTURE** for providing nutrition and physical activity technical assistance to schools.
- 3 ENCOURAGE THE IMPLEMENTATION** of school wellness policies through a recognition program for schools with model policies and practices.
- 4 ASSESS AND ADDRESS BARRIERS** to implementation of nutrition and physical activity policies in schools.
- 5 PROMOTE MAXIMUM IMPLEMENTATION AND UTILIZATION** of subsidized food programs such as School Breakfast and Lunch, SNAP, WIC, Child and Adult Care Food Program, At Risk Afterschool Meals Program, and Summer Food Service Program.

OBJECTIVE 5

By 2015, create policies that promote access to healthy food and opportunities for physical activity in 75% of Maryland jurisdictions.

STRATEGIES

- 1 RECRUIT LOCAL CIVIC LEVEL LEADERS** to complete assessments of current policies that promote community health in order to measure and track progress on Objective 5.
- 2 IMPLEMENT PROGRAMS** to promote access to healthy foods for high-risk communities (ie: virtual supermarkets, healthy corner stores, and use of Electronic Benefits Transfer for WIC, SNAP participants at farmers' markets).
- 3 IMPLEMENT PROGRAMS** to promote opportunities for physical activity in high-risk communities with county park and recreation programs.

- 4 DEVELOP MODELS AND GUIDELINES** for built environment policies that promote nutrition and physical activity through PlanMaryland, the state's comprehensive plan for growth and development.
- 5 ESTABLISH A MECHANISM** to provide nutrition and physical activity technical assistance to local jurisdictions to draft and implement these policies.
- 6 ENCOURAGE LOCAL GOVERNMENT** and community-based nutrition and physical activity promotion through a recognition program for local governments and community organizations with model policies and practices.

OBJECTIVE 6

By 2015, implement a communications strategy to encourage Marylanders to be aware of their weight status and steps they can take to achieve a healthy weight.

STRATEGIES

- 1 CROSS-PROMOTE CANCER PREVENTION** and healthy eating, physical activity, and healthy weight messages from public health service providers and community health partnerships.
- 2 EXPLORE A METHOD TO COLLABORATE WITH MARYLAND INSURANCE COMPANIES** and the Maryland Insurance Commission to improve/increase provider reimbursement rates for providing evidence-based prevention, assessment, and treatment for children and adults who are overweight and obese.
- 3 IMPLEMENT A SOCIAL MARKETING CAMPAIGN** targeting at-risk Marylanders to empower them to take advantage of the policies and programs being implemented throughout Maryland and in local communities that make it easier to make healthier choices.

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