

Primary Prevention of Cancer: Obesity and Cancer

Obesity and Cancer: Risks and Prevention

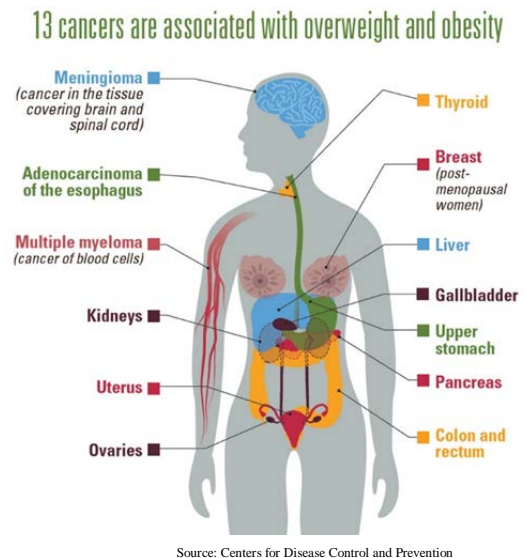
To address obesity and reduce the cancer burden in Maryland, the [2016-2020 Maryland Comprehensive Cancer Control Plan](#) has set the objective to reduce the proportion of adult Marylanders who are obese to 27.5%, by improving access to healthier foods in communities and implementing food and beverage guidelines in public institutions, hospitals, and other sites.¹

In the United States, over one-third of Americans are overweight, and another third of Americans are living with obesity.² Obesity is defined as a condition in which a person has an unhealthy distribution or amount of body fat for their given height, and is measured using the Body Mass Index (BMI).² BMI is calculated by dividing a person's weight in kilograms by their height in meters.³ A BMI score of 25-29.9 is considered overweight, and a BMI in excess of 30 is considered obese.³ Living with excess bodyweight can have a number of negative effects on health, including the development of diabetes, heart disease and stroke, and perhaps most alarmingly, is the relationship between obesity and cancer. Recent studies have shown an association between obesity and at least 13 cancers (**Fig. 1**).⁴

Approximately 631,604 people in the United States were diagnosed with an obesity-related cancer in 2014, which is 40% of all cancer cases diagnosed each year.² However, only one-third (31%) of Americans are aware that obesity is a major preventable risk factor for cancer.⁵ In a recent investigation of modifiable risk factors –behaviors that can prevent cancer– researchers determined that excess body weight accounted for the second-highest proportion of adult cancer cases and deaths (7.8% and 6.5%, respectively), after cigarette smoking.⁴ However, obesity was associated with more than one-third of gallbladder (35.5%), liver (33.9%), and kidney/renal (33.2%) cancers.⁴ The incidence rate of obesity-related cancers was higher in females (218.1 per 100,000 people) than in males (115.00 per 100,000), mainly due to the fact that endometrial, ovarian, and postmenopausal female breast cancers represented 42% of overweight- and obesity-related cancers.²

How are Obesity and Cancer Related?

Inflammation and excess hormone production are believed to put people who are obese at an increased risk for cancer.³ These processes inhibit normal cell growth, which can lead to the development of cancer. For instance, people who are obese tend to have chronic, low-level



inflammation, which can cause damage to DNA overtime. Inflammation of the esophagus from gastro-esophageal reflux disease, for example, is a known risk factor for esophageal adenocarcinoma.³

Fat tissue produces higher levels of estrogen, which has been associated with an increased risk of breast, ovarian, and endometrial cancers.³ Furthermore, fat cells produce hormones known as *adipokines* that promote or hinder the growth of cells. People who are obese have a higher level of adipokines in their blood than those with a healthy weight, which can stimulate more rapid cell production, increasing the risk of abnormal cell growth and the development of cancer.³

Obesity and Cancer in Maryland

Obesity rates in the state of Maryland are similar to national rates.⁶ In 2016, approximately one-third of Maryland adults were normal weight (34.7%), one-third were overweight (34.7%), and almost one-third were considered obese (29.9%).⁶ In 1990, only 10.8% of Maryland adults were considered obese.⁷ Much like the rest of the United States, overweight and obesity in

Table 1: Top 5 Estimated Number of New Cases and Deaths, Obesity-related Cancers, 2017

Type	MD Cases	US Cases	MD Deaths	US Deaths
Breast	5,250	252,710	820	40,610
Colon and rectum	2,430	135,430	860	50,260
Corpus uterus	1,200	61,380	270	10,920
Kidney/Renal	1,110	63,990	240	14,400
Thyroid	1,100	56,870	-	2,010

Maryland have risen, however, seems to have leveled off since the last available comparison data in 2011. The high rate of unhealthy weight in Maryland adults poses a significant public health issue in the state-Maryland saw \$147 billion in medical costs (2008 dollars), and over \$20 billion in lost productivity for the state in 2003.⁸ The American Cancer Society projects that Maryland will see an estimated 31,820 new cases of cancer in 2017, and obesity-related cancers will account for approximately 47% of these new cases (Table 1).^{9, 10}

The recent evidence showing the connection between certain cancers and obesity and the rise in obesity in Maryland reinforces that it is now more important than ever to maintain a healthy lifestyle. In Maryland:

- Almost 24% of adults in Maryland reported not having participated in any physical activity in the last month¹¹
- In 2015, only 31.9% of Maryland adults reported having consuming fruit 2 or more times per day, and 16.8% reported consuming vegetables 3 or more times per day.¹²

Prevention

There are many behaviors that contribute to cancer prevention, including engaging in physical activity, consuming a diet rich in fruits and vegetables, and maintaining a healthy weight. Research has shown that maintaining a normal weight (BMI of 18.5-24.9) throughout one's life is associated with a reduced risk of obesity-related cancers. ²

The Dietary Guidelines for Americans 2015-2020 suggest that individuals should aim to meet their nutrient needs through healthy eating patterns that include nutrient-dense foods. Consuming a variety of vegetables and whole fruits help provide essential vitamin and mineral intake that may have positive health effects. ¹³

Physical activity should include 150 minutes per week of moderate-intensity aerobic physical activity 75 minutes each week of vigorous-intensity aerobic physical activity. ¹⁴

References:

1. 2016-2020 Maryland Comprehensive Cancer Control Plan. Retrieved from: https://ftp.cdc.gov/pub/publications/cancer/ccc/maryland_ccc_plan.pdf
2. Steele, C. et al. Trends in Incidence of Cancers Associated with Overweight and Obesity — United States, 2005–2014. (2017). Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report (MMWR), 66(39)(1052–1058). Retrieved from: <https://www.cdc.gov/mmwr/volumes/66/wr/mm6639e1.htm>.
3. Obesity and Cancer. National Cancer Institute. (January 17, 2017) Retrieved from: <https://www.cancer.gov/about-cancer/causes-prevention/risk/obesity/obesity-fact-sheet#q3>
4. Islami, F. et al. Proportion and Number of Cancer Cases and Deaths Attributable to Potentially Modifiable Risk Factors in the United States. (2017) CA: A Cancer Journal for Clinicians. Retrieve from: <https://www.ncbi.nlm.nih.gov/pubmed/29160902>
5. National Cancer Opinion Survey. American Society of Clinical Oncology. (October 24, 2017). Retrieved from: <https://www.asco.org/advocacy-policy/asco-in-action/national-survey-reveals-most-americans-are-unaware-key-cancer-risk>
6. 2011-2016 Maryland Behavioral Risk Factor Surveillance Survey (BRFSS), Department of Health, received from G. Lavetsky.
7. Adult Obesity in the United States. State of Obesity Project. 2004-2017 Trust for America's Health and Robert Wood Johnson Foundation. <https://stateofobesity.org/adult-obesity/>.
8. Maryland Department of Health. “Obesity.” <https://phpa.health.maryland.gov/ccdpc/healthy-lifestyles/Pages/obesity.aspx>
9. Cancer Statistics Center: Interactive Statistics. (2017). Annual Facts and Figures Report 2017. American Cancer Society. Retrieved from: https://cancerstatisticscenter.cancer.org/?_ga=2.79613143.2104933652.1513196453-219406249.1505742067#!/.
10. Estimated Number of New Cancer Cases and Deaths by State—2017. (2017). American Cancer Society. Retrieved from: <https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2017/estimated-deaths-for-selected-cancers-by-state-us-2017.pdf>.
11. Maryland State Nutrition, Physical Activity and Obesity Profile. CDC. <https://www.cdc.gov/obesity/stateprograms/fundedstates/pdf/maryland-state-profile.pdf>.
12. 2011-2016 Maryland Behavioral Risk Factor Surveillance Survey (BRFSS), Department of Health.
13. Dietary Guidelines for Americans. (2015). U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015 – 2020 Dietary Guidelines for Americans. Retrieved from: <https://health.gov/dietaryguidelines/2015/guidelines/chapter-1/healthy-eating-patterns>.

References, continued:

14. Physical Activity Guidelines: Adults. (2017). Office of Disease Prevention and Health Promotion. Retrieved from: <https://health.gov/paguidelines/guidelines/adults.aspx>

13. Dietary Guidelines for Americans. (2015). U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015 – 2020 Dietary Guidelines for Americans. Retrieved from: <https://health.gov/dietaryguidelines/2015/guidelines/chapter-1/healthy-eating-patterns>.

Figures and Charts:

Figure 1: Obesity-Related Cancers

Steele, C. et al. Trends in Incidence of Cancers Associated with Overweight and Obesity — United States, 2005–2014. (2017). Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report (MMWR), 66(39)(1052–1058). Retrieved From: <https://www.cdc.gov/vitalsigns/obesity-cancer/index.html>

Table 1: Top 5 Estimated Number of New Cases and Deaths, Obesity-related Cancers, Maryland, 2017

Data from: Estimated Number of New Cancer Cases and Deaths by State—2017. (2017). American Cancer Society. Retrieved from: <https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2017/estimated-deaths-for-selected-cancers-by-state-us-2017.pdf>.