

# Healthy Eating, Active Living, and Cancer: The Scientific Link



**For the majority of Americans who do not use tobacco products, weight management, good nutrition, and physical activity are the greatest modifiable determinants of cancer risk.<sup>1</sup>** Scientific evidence suggests that approximately one fifth of the cancer cases expected to occur in the United States this year are due to excess weight, poor nutrition, and physical inactivity.<sup>2</sup>

**Currently, 37 percent of adults and 17 percent of youth (ages 2-19) are obese.<sup>3</sup>** Roughly 71 percent of adults are either overweight or obese.<sup>4, 5</sup> Adult obesity more than doubled between 1976-1980 and 1999-2000,<sup>6</sup> but since then has increased only slightly among men.<sup>7</sup> Between the early 1970s and the early 2000s, youth obesity more than tripled,<sup>8</sup> but has largely leveled off. Although obesity rates are no longer increasing dramatically, they are still high, and existing levels of obesity are causing a significant burden of chronic disease. Large racial, ethnic, and geographic disparities in obesity rates exist across all age groups.<sup>9, 10</sup>

**Excess body weight is clearly associated with an increased risk of cancer development and recurrence, as well as decreased risk of survival,<sup>11</sup> for many cancers.** Weight control reduces the risk of cancers of the female breast (postmenopausal),<sup>12</sup> colon and rectum,<sup>13</sup> uterus,<sup>14</sup> kidney,<sup>15</sup> adenocarcinoma of the esophagus,<sup>16</sup> pancreas,<sup>17</sup> ovary,<sup>18</sup> liver, gastric cardia, gall bladder,<sup>19</sup> thyroid, meningioma, and multiple myeloma.<sup>20</sup>

**The reasons for the biological link between excess body weight and cancer are complex.** The relationship is likely related to effects on immune function and inflammation, levels and metabolism of insulin and other hormones, factors related to cell growth, and proteins that make hormones more or less available.<sup>21, 22</sup>

**Regular physical activity reduces cancer risk both directly and by helping to maintain a healthy body weight.** In fact, a recent study found that those with high levels of leisure-time physical activity had lower risk of 13 types of cancer, including cancers of the esophagus, liver, lung, kidney, stomach, endometrium, colon, rectum, head and neck, bladder, and breast, and myeloid leukemia and myeloma.<sup>23</sup> The American Cancer Society (ACS) and other experts recommend that adults engage in at least 150 minutes of moderate intensity or 75 minutes of vigorous intensity activity each week and that children and adolescents engage in at least 1 hour of moderate- or vigorous-intensity activity each day, with vigorous intensity activity at least 3 days per week.<sup>24, 25</sup> Physical activity after a cancer diagnosis has been shown to improve physical functioning, quality of life, and fatigue<sup>26</sup> and may also reduce the risk of recurrence.<sup>27</sup>

**ACS Guidelines recommend consuming a healthy diet, with an emphasis on plant foods.** The Guidelines emphasize portion control for weight management, limiting red and processed meats, eating at least 2.5 cups of fruits and vegetables daily, reducing consumption of sugar-sweetened beverages, choosing whole grains over refined grain products, and limiting alcohol consumption to no more than one drink per day for women and two for men.

**Helping Americans to eat healthy, be physically active, and manage their weight saves lives.** Several recent studies have found that nonsmoking adults who followed cancer prevention guidelines for weight control, diet, physical activity, and alcohol had a lower risk of dying from cancer,<sup>28</sup> cardiovascular disease, and all causes.<sup>29</sup>

## References

- <sup>1</sup> Kushi LH, Doyle C, McCullough M, et al, and the American Cancer Society 2010 Nutrition and Physical Activity Guidelines Advisory Committee. American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention. *CA Cancer J Clin* 2012; 62:30-67.
- <sup>2</sup> American Cancer Society. *Cancer Facts & Figures 2017*. Atlanta: American Cancer Society, 2017.
- <sup>3</sup> Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of Obesity and Trends in Body Mass Index Among US Children and Adolescents, 1999-2010. *JAMA* 2012; 307(5).
- <sup>4</sup> U.S. Department of Health and Human Services (HHS). Centers for Disease Control and Prevention (CDC). National Center for Health Statistics (NCHS). Table 53: Selected health conditions and risk factors, by age: United States, selected years 1988-1994 through 2013-2014. *Health, United States, 2015*. Available at <http://www.cdc.gov/nchs/data/abus/abus15.pdf#053>. Accessed October 3, 2016.
- <sup>5</sup> Ogden, 2012.
- <sup>6</sup> Ogden CL and Carroll MD. *NCHS Health E-Stat: Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, Trends 1960-1962 Through 2007-2008*. NCHS, CDC. June 2010. Available online at [http://www.cdc.gov/NCHS/data/hestat/obesity\\_adult\\_07\\_08/obesity\\_adult\\_07\\_08.pdf](http://www.cdc.gov/NCHS/data/hestat/obesity_adult_07_08/obesity_adult_07_08.pdf). Accessed January 23, 2012.
- <sup>7</sup> Flegal, 2012.
- <sup>8</sup> Ogden C and Carroll M. *NCHS Health E-Stat: Prevalence of Obesity Among Children and Adolescents: United States, Trends 1963-1965 Through 2007-2008*. NCHS, CDC. June 2010. Available online at [http://www.cdc.gov/nchs/data/hestat/obesity\\_child\\_07\\_08/obesity\\_child\\_07\\_08.htm](http://www.cdc.gov/nchs/data/hestat/obesity_child_07_08/obesity_child_07_08.htm). Accessed January 23, 2012.
- <sup>9</sup> Flegal, 2012.
- <sup>10</sup> Ogden, 2012.
- <sup>11</sup> Kushi, 2012.
- <sup>12</sup> Chan DSM, Vieira AR, Aune D, et al. Body mass index and survival in women with breast cancer—systematic literature review and meta-analysis of 82 follow-up studies. *Ann Oncol* 2014; 25 (10): 1901-1914.
- <sup>13</sup> World Cancer Research Fund (WCRF) and American Institute for Cancer Research (AICR). *Continuous Update Project Report. Food, Nutrition, Physical Activity, and the Prevention of Colorectal Cancer*. Washington, DC: WCRF/AICR; 2011.
- <sup>14</sup> WCRF and AICR. *Continuous Update Project Report. Food, Nutrition, Physical Activity, and the Prevention of Endometrial Cancer*. Washington, DC: WCRF/AICR; 2013.
- <sup>15</sup> WCRF and AICR *Continuous Update Project Report. Diet, Nutrition, Physical Activity, and Kidney Cancer*. Washington, DC: WCRF/AICR; 2015.
- <sup>16</sup> WCRF and AICR. *Continuous Update Project Report. Food, Nutrition, Physical Activity, and the Prevention of Esophageal Cancer*. Washington, DC: WCRF/AICR; 2016.
- <sup>17</sup> WCRF and AICR. *Continuous Update Project Report. Food, Nutrition, Physical Activity, and the Prevention of Pancreatic Cancer*. Washington, DC: WCRF/AICR; 2012.
- <sup>18</sup> WCRF and AICR. *Continuous Update Project Report. Food, Nutrition, Physical Activity, and the Prevention of Ovarian Cancer*. Washington, DC: WCRF/AICR; 2014.
- <sup>19</sup> WCRF and AICR. *Continuous Update Project Report: Diet, Nutrition, Physical Activity and Gallbladder Cancer*. Washington, DC: WCRF/AICR; 2015.
- <sup>20</sup> Lauby-Secretan B, Scoccianti C, Loomis D, et al. Body Fatness and Cancer – Viewpoint of the IARC Working Group. *N Engl J Med* 2016; 375: 8.
- <sup>21</sup> Kushi, 2012.
- <sup>22</sup> Iyengar NM, Hudis CA, Dannenberg AJ. Obesity and cancer: local and systemic mechanisms. *Annu. Rev. Med.* 2015;66:297–309. doi: 10.1146/annurev-med-050913-022228.
- <sup>23</sup> Moore SC, Lee IM, Weiderpass E, et al. Association of Leisure-Time Physical Activity With Risk of 26 Types of Cancer in 1.44 Million Adults. *JAMA Intern Med.* 2016. doi:10.1001/jamainternmed.2016.1548
- <sup>24</sup> Kushi et al, 2012.
- <sup>25</sup> U.S. Department of Health and Human Services. *2008 Physical Activity Guidelines for Americans*. Washington (DC): U.S. Department of Health and Human Services; 2008. ODPHP Publication No. U0036. Available at <http://www.health.gov/paguidelines>.
- <sup>26</sup> Schmitz KH, Courneya KS, Matthews C, et al. American College of Sports Medicine Roundtable on Exercise Guidelines for Cancer Survivors. *Medicine & Science in Sports & Exercise* 2010; 42(7):1409-1426.
- <sup>27</sup> Rock CL, Doyle C, Demark-Wahnefried W, et al. Nutrition and Physical Activity Guidelines for Cancer Survivors. *CA Cancer J Clin* 2012; doi: 10.3322/caac.21142.
- <sup>28</sup> Kohler LN, Garcia DO, and Harris RB. Adherence to Diet and Physical Activity Cancer Prevention Guidelines and Cancer Outcomes: A Systematic Review. *Cancer Epidemiol Biomarkers Prev* 2016; 25(7): 1018-28.
- <sup>29</sup> McCullough ML, Patel AV, Kushi LH, et al. Following Cancer Prevention Guidelines Reduces Risk of Cancer, Cardiovascular Disease, and All-Cause Mortality. *Cancer Epidemiol Biomarkers Prev* 2011; 20(6): 1089-97.