

Trends in Incidence of Cancers Associated with Overweight and Obesity United States 2005–2014



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INTRODUCTION

Overweight- and obesity-related cancers were defined as those classified by IARC as having sufficient evidence for an association with excess body fatness. The International Agency for Research on Cancer (IARC) states that there is enough evidence to show that excess body fatness, including overweight, obesity, and weight gain have been related to at least 13 different types of cancer.

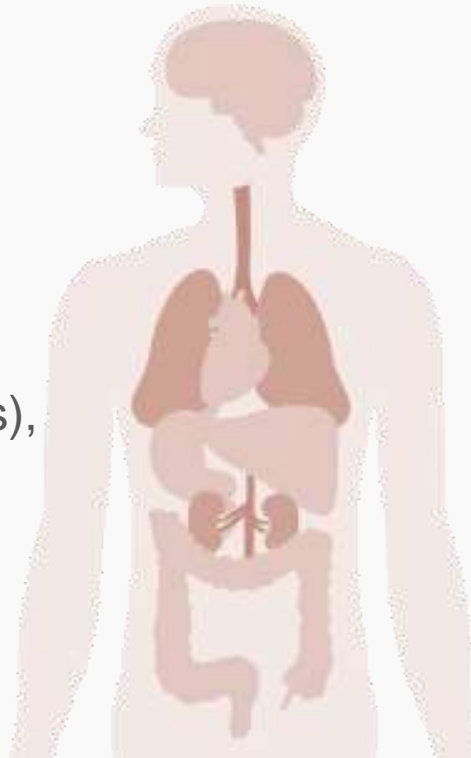
In 2013-2014 data showed that approximately one third of adults in the united states had been overweight with a body mass index (BMI) of 25.0-29.9k9/m2 and around one third were diagnosed with obesity with a BMI of ≥ 30 kg/m2.

INTRODUCTION

**types of cancer
associated
with overweight and obesity**



- Adenocarcinoma of the esophagus
- Cancers of the breast (in postmenopausal women)
- Colon and rectum,
- Endometrium (corpus uterus),
- Gallbladder,
- Gastric cardiac,
- Kidney (renal cell),



- Liver,
- Ovary,
- Pancreas,
- Thyroid; meningioma, and multiple myeloma.
- Overweight and obesity might increase cancer risk through induction of metabolic and endocrine abnormalities, including increases in inflammation and levels of insulin, insulin-like growth factor, and sex hormones.

Method

Describe the methods used to obtain the data



❖ the data was collected by the United States Cancer Statistics this data was used to calculate incidence rates in 2014 and trends during 2005-2014 for cancers related with overweight and obesity.

❖ The USCS used a number of sources that were then used to report official federal cancer statistics through the USCS web-based report

✓ **The USCS data set includes cancer incidence data from**

- CDC's
- National Program of Cancer Registries (NPCR) and the National Cancer Institute's
- Surveillance, Epidemiology, and End Results (SEER) program.

❖ The data collected on new cancer diagnosed during 2005-2014 were obtained from population-based cancer registries associated with NPCR and SEER programs in each state and the district Columbia (DC).

Method

Cancer site for cases
classification



Cancer sites was classified by anatomic site and histology:

- ❖ Cases were first classified by anatomic site using the International Classification of Diseases for Oncology, Third Edition then cases with hematopoietic histologist were classified using the World Health Organization
- ❖ Classification of Tumours of Haematopoietic and Lymphoid Tissues, Fourth Edition
- ❖ Only cases of invasive cancer were included. Postmenopausal breast cancer was defined as breast cancer diagnosed in women aged ≥ 50 years.



Results



results in incidence of overweight and obesity related to cancer according to the population characteristics in 2014.



TABLE 1. Number and annual age-adjusted rate^a of overweight- and obesity-related invasive cancer cases,[†] by selected characteristics—United States,^b 2014

Characteristic	Total		Males		Females	
	No.	Rate (95% CI)	No.	Rate (95% CI)	No.	Rate (95% CI)
Total	631,604	169.7 (169.3–170.1)	194,727	115.0 (114.5–115.5)	436,877	218.1 (217.4–218.7)
Age group (yrs)						
<20	2,230	2.7 (2.6–2.8)	719	1.7 (1.6–1.8)	1,511	3.8 (3.6–4.0)
20–49	60,386	47.2 (46.8–47.6)	20,884	32.5 (32.1–32.9)	39,502	62.1 (61.4–62.7)
50–64	240,299	383.6 (382.0–385.1)	71,518	235.3 (233.6–237.0)	168,781	523.3 (520.8–525.8)
65–74	173,764	658.4 (655.3–661.5)	54,313	440.0 (436.3–443.7)	119,451	850.3 (845.5–855.2)
≥75	154,925	782.1 (778.2–786.0)	47,293	592.1 (586.8–597.5)	107,632	910.4 (904.9–915.8)
Race/Ethnicity [‡]						
White	470,789	170.9 (170.4–171.4)	144,456	114.2 (113.6–114.8)	326,333	222.3 (221.5–223.1)
Black	71,847	186.5 (185.1–188.0)	22,129	134.2 (132.3–136.1)	49,718	226.3 (224.3–228.4)
American Indian/Alaska Native	3,970	162.5 (157.2–167.9)	1,376	121.9 (115.1–129.0)	2,594	197.3 (189.5–205.3)
Asian/Pacific Islander	23,193	128.4 (126.7–130.1)	6,904	87.7 (85.6–89.9)	16,289	162.2 (159.7–164.8)
Hispanic	55,778	150.6 (149.3–152.0)	17,990	108.8 (107.1–110.6)	37,788	188.0 (186.0–189.9)
Census region ^{††}						
Northeast	127,436	185.3 (184.2–186.3)	37,739	122.8 (121.5–124.0)	89,697	239.2 (237.6–240.9)
Midwest	140,687	173.8 (172.9–174.8)	43,173	117.6 (116.5–118.7)	97,514	224.1 (222.7–225.6)
South	230,431	165.7 (165.0–166.4)	73,138	115.5 (114.7–116.4)	157,293	209.5 (208.4–210.5)
West	133,050	159.7 (158.8–160.6)	40,677	105.5 (104.5–106.6)	92,373	208.9 (207.5–210.3)

- ❖ approximately **631,604** persons in the US received a diagnosis of an overweight- or obesity-related cancer.
- ❖ This represents **40%** of the nearly **1.6** million cancers diagnosed each year (**55% of the 799,734** among women and **24%** of the **796,752** among males).
- ❖ rates higher among older persons (ages **≥50** years) and two thirds of cases occurred among persons aged **50–74** years.
- ❖ rate was higher among females (**218.1** per **100,000** population) than among males (**115.0 per 100,000**), because endometrial, ovarian, and postmenopausal female breast cancers make up **42%** (**268,091**) of overweight and obesity-related cancers.
- ❖ The rates by race/ethnicity, with higher incidence among non-Hispanic blacks (black) and non-Hispanic whites (white) compared with other groups.

Results

results in incidence of overweight and obesity related to cancer site during 2005-2014.



TABLE 2. Age-adjusted incidence of overweight- and obesity-related invasive cancer, changes in rates, and estimated percent increase in cancer risk associated with change in BMI, by cancer site and sex — United States,* 2005 and 2014

Cancer site	%	2005	2014	2005–2014		% Increase in risk for cancer per 1 kg/m ² increase in BMI ^b
		Rate ^a (95% CI)	Rate ^a (95% CI)	% Change in rates	Average annual percent change in rates ^b	
Breast [in postmenopausal women]	31	90.5 (90.1–91.0)	92.6 (92.2–93.0)	2	0.2	2
Colon and rectum	22	49.7 (49.4–49.9)	38.4 (38.2–38.6)	-23	-2.9 ^b	2
Male		58.1 (57.7–58.5)	44.1 (43.7–44.4)	-24	-3.1 ^b	
Female		43.1 (42.8–43.4)	33.7 (33.4–34.0)	-22	-2.8 ^b	
Kidney (renal cell)	9	14.4 (14.2–14.5)	15.4 (15.2–15.5)	7	0.7 ^b	5
Male		19.5 (19.3–19.7)	20.9 (20.7–21.1)	7	0.7 ^b	
Female		10.2 (10.0–10.3)	10.6 (10.4–10.7)	4	0.4	
Endometrium (corpus uteri) (female only)	8	23.9 (23.7–24.1)	26.5 (26.3–26.8)	11	1.1 ^b	8
Thyroid	8	10.3 (10.2–10.4)	14.4 (14.3–14.6)	40	4.0 ^b	1
Male		5.3 (5.1–5.4)	7.4 (7.2–7.5)	40	4.0 ^b	
Female		15.2 (15.0–15.4)	21.3 (21.1–21.5)	40	4.0 ^b	
Pancreas	7	11.7 (11.6–11.9)	12.6 (12.5–12.7)	7	0.8 ^b	2
Male		13.3 (13.1–13.5)	14.4 (14.2–14.5)	8	0.8 ^b	
Female		10.5 (10.3–10.6)	11.1 (10.9–11.2)	6	0.7 ^b	
Multiple myeloma	4	5.6 (5.5–5.7)	6.0 (6.0–6.1)	8	1.1	2
Male		6.9 (6.7–7.0)	7.5 (7.3–7.6)	9	1.2 ^b	
Female		4.6 (4.5–4.8)	4.9 (4.8–5.0)	6	1.1 ^b	
Liver	4	5.5 (5.4–5.6)	7.0 (7.0–7.1)	29	2.9 ^b	5
Male		8.8 (8.6–8.9)	11.2 (11.0–11.3)	28	2.9 ^b	
Female		2.7 (2.6–2.8)	3.4 (3.3–3.5)	26	2.5 ^b	
Ovary (female only)	3	13.1 (12.9–13.2)	11.0 (10.8–11.2)	-16	-2.0 ^b	1
Adenocarcinoma of the esophagus	2	2.9 (2.8–2.9)	2.9 (2.8–2.9)	-1	-0.5	9
Male		5.5 (5.4–5.7)	5.4 (5.2–5.5)	-3	-0.7 ^b	
Female		0.8 (0.7–0.8)	0.8 (0.7–0.8)	2	-0.4	
Gastric cardia	1	1.9 (1.9–2.0)	2.1 (2.0–2.1)	8	1.2 ^b	4
Male		3.4 (3.3–3.5)	3.6 (3.5–3.7)	7	1.1 ^b	
Female		0.8 (0.7–0.8)	0.8 (0.8–0.9)	6	0.8 ^b	
Gallbladder	1	1.1 (1.1–1.2)	1.1 (1.1–1.2)	-1	-0.1	5
Male		0.8 (0.7–0.8)	0.8 (0.8–0.8)	3	0.1	
Female		1.4 (1.4–1.5)	1.4 (1.3–1.5)	-1	-0.1	
Meningioma	<1	0.1 (0.1–0.2)	0.1 (0.1–0.1)	-29	-3.8 ^b	4
Male		0.1 (0.1–0.1)	0.1 (0.1–0.1)	-17	-2.7 ^b	
Female		0.2 (0.1–0.2)	0.1 (0.1–0.1)	-35	-4.0 ^b	
All overweight- and obesity-related cancers	—	173 (173–174)	170 (169–170)	-2	-0.3 ^b	—
All overweight- and obesity-related cancers except colorectal cancer	—	123 (123–124)	132 (131–132)	7	0.8 ^b	—
Cancers not related to overweight and obesity	—	306 (305–306)	267 (267–268)	-13	-1.4 ^b	—

- ❖ Incidence was highest in the Northeast compared with other U.S. Census regions.
- ❖ incidence rates in **2014** were higher among males than among females for colorectal cancer (**44.1 per 100,000** versus **33.7 per 100,000**),
- ❖ kidney cancer (**20.9 versus 10.6**),
- ❖ pancreatic cancer (**14.4 versus 11.1**),
- ❖ liver cancer (**11.2 versus 3.4**),
- ❖ adenocarcinoma of the esophagus (**5.4 versus 0.8**),
- ❖ multiple myeloma (**7.5 versus 4.9**),
- ❖ gastric cardia cancer (**3.6 versus 0.8**)
- ❖ Females had higher rates than did males of thyroid cancer (**21.3 versus 7.4**) and gallbladder cancer (**1.4 versus 0.8**).
- ❖ incidence rates were higher for postmenopausal breast cancer (**92.6 per 100,000**) than for endometrial cancer (**26.5 per 100,000**) and ovarian cancer (**11.0 per 100,000**).

incidence rates decreased significantly each year

TABLE 2. Age-adjusted incidence of overweight- and obesity-related invasive cancer, changes in rates, and estimated percent increase in cancer risk associated with change in BMI, by cancer site and sex — United States,* 2005 and 2014

Cancer site	%	2005		2014		2005–2014		% Increase in risk for cancer per 1 kg/m ² increase in BMI ^b
		Rate ^a (95% CI)	Rate ^a (95% CI)	% Change in rates	Average annual percent change in rates ^b			
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Colon and rectum	22	49.7 (49.4–49.9)	38.4 (38.2–38.6)	-23	-2.9 ^b	2		
Male		58.1 (57.7–58.5)	44.1 (43.7–44.4)	-24	-3.1 ^b			
Female		43.1 (42.8–43.4)	33.7 (33.4–34.0)	-22	-2.8 ^b			
Kidney (renal cell)	9	14.4 (14.2–14.5)	15.4 (15.2–15.5)	7	0.7 ^b	5		
Male		19.5 (19.3–19.7)	20.9 (20.7–21.1)	7	0.7 ^b			
Female		10.2 (10.0–10.3)	10.6 (10.4–10.7)	4	0.4			
Endometrium (corpus uteris) (female only)	8	23.9 (23.7–24.1)	26.5 (26.3–26.8)	11	1.1 ^b	8		
Thyroid	8	10.3 (10.2–10.4)	14.4 (14.3–14.6)	40	4.0 ^b	1		
Male		5.3 (5.1–5.4)	7.4 (7.2–7.5)	40	4.0 ^b			
Female		15.2 (15.0–15.4)	21.3 (21.1–21.5)	40	4.0 ^b			
Pancreas	7	11.7 (11.6–11.9)	12.6 (12.5–12.7)	7	0.8 ^b	2		
Male		13.3 (13.1–13.5)	14.4 (14.2–14.5)	8	0.8 ^b			
Female		10.5 (10.3–10.6)	11.1 (10.9–11.2)	6	0.7 ^b			
Multiple myeloma	4	5.6 (5.5–5.7)	6.0 (6.0–6.1)	8	1.1	2		
Male		6.9 (6.7–7.0)	7.5 (7.3–7.6)	9	1.2 ^b			
Female		4.6 (4.5–4.8)	4.9 (4.8–5.0)	6	1.1 ^b			
Liver	4	5.5 (5.4–5.6)	7.0 (7.0–7.1)	29	2.9 ^b	5		
Male		8.8 (8.6–8.9)	11.2 (11.0–11.3)	28	2.9 ^b			
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Ovary (female only)	3	13.1 (12.9–13.2)	11.0 (10.8–11.2)	-16	-2.0 ^b	1		
Adenocarcinoma of the esophagus	2	2.9 (2.8–2.9)	2.9 (2.8–2.9)	-1	-0.5	9		
Male		5.5 (5.4–5.7)	5.4 (5.2–5.5)	-3	-0.7 ^b			
Female		0.8 (0.7–0.8)	0.8 (0.7–0.8)	2	-0.4			
Gastric cardia	1	1.9 (1.9–2.0)	2.1 (2.0–2.1)	8	1.2 ^b	4		
Male		3.4 (3.3–3.5)	3.6 (3.5–3.7)	7	1.1 ^b			
Female		0.8 (0.7–0.8)	0.8 (0.8–0.9)	6	0.8 ^b			
Gallbladder	1	1.1 (1.1–1.2)	1.1 (1.1–1.2)	-1	-0.1	5		
Male		0.8 (0.7–0.8)	0.8 (0.8–0.8)	3	0.1			
Female		1.4 (1.4–1.5)	1.4 (1.3–1.5)	-1	-0.1			
Meningioma	<1	0.1 (0.1–0.2)	0.1 (0.1–0.1)	-29	-3.8 ^b	4		
Male		0.1 (0.1–0.1)	0.1 (0.1–0.1)	-17	-2.7 ^b			
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Cancers not related to overweight and obesity	—	306 (305–306)	267 (267–268)	-13	-1.4 ^b	—		

1. for meningioma (-3.8% per year),
 2. colorectal cancer (-2.9%),
 3. and ovarian cancer (-2.0%).
 4. Incidence rates increased significantly each year during this period for six cancers:
 5. thyroid cancer (4.0% per year),
 6. liver cancer (2.9%), gastric cardia cancer (1.2%),
 7. endometrial cancer (1.1%), pancreatic cancer (0.8%),
 8. and kidney cancer (0.7%).
- The incidence rates were stable for adenocarcinoma of the esophagus, gallbladder cancer, multiple myeloma, and postmenopausal breast cancer.
 - During 2005–2014, declines were observed in the overall incidence of overweight- and obesity-related cancers (-2%), colorectal cancer (-23%), and cancers not known to be related to overweight and obesity (-13%).

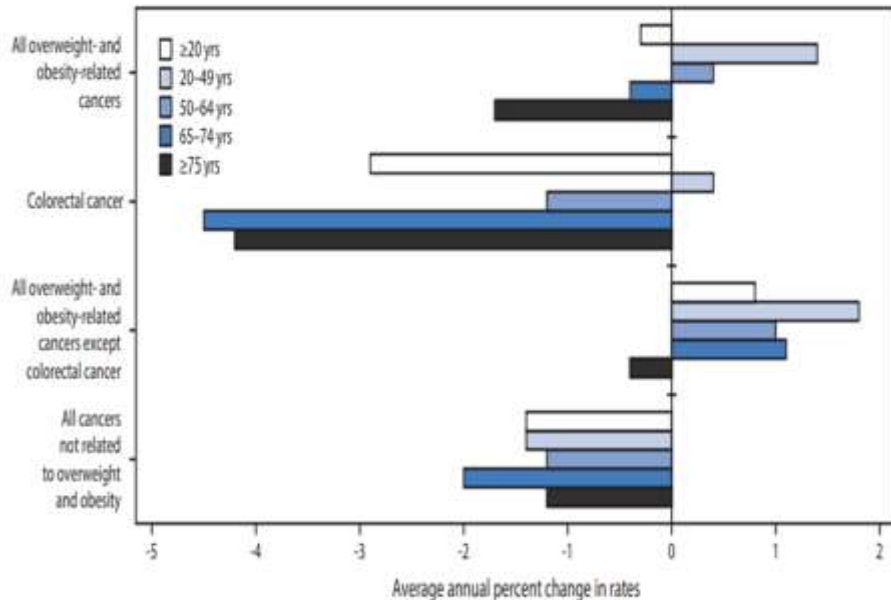
Conclusion



**Annual percent change in incidence
of overweight and obesity related to
cancer according to
age group**



FIGURE 1. Average annual percent change* in overweight- and obesity-related invasive cancer incidence rates† among adults — United States,‡ 2005-2014



- Increased use of colorectal cancer screening tests likely contributed to the decline in colorectal cancer; when colorectal cancer was excluded from overweight- and obesity-related cancers, a 7% increase in overall incidence was observed.

The trends varied substantially by age group:

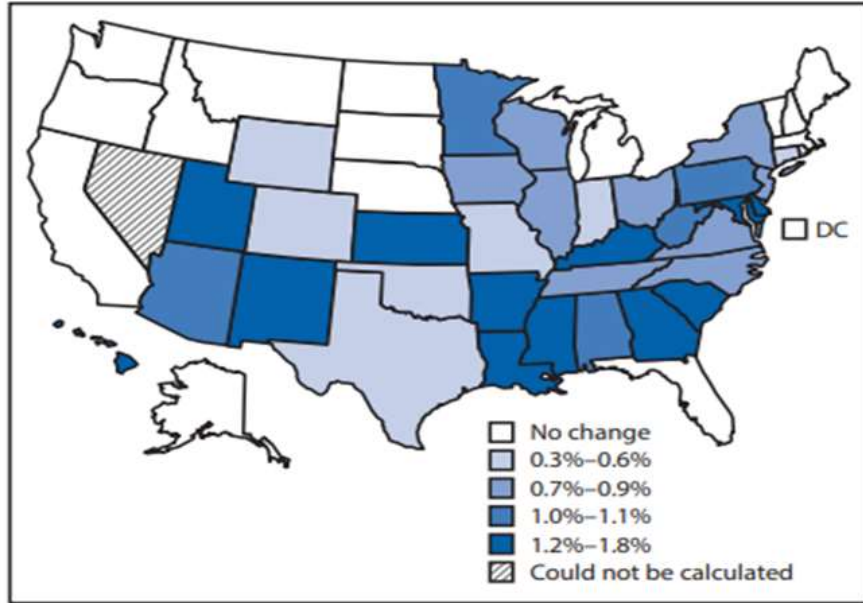
- the rate for all overweight- and obesity-related cancers increased significantly among persons aged **20–49 years** and **50–64 years**, and decreased among those aged **65–74 years** and **≥75 years**;
- colorectal cancer rates declined in all age groups except in persons aged **20–49 years**; and rates for overweight and obesity-related cancers (excluding colorectal cancers) increased among all age groups except persons aged **≥75 years**

Conclusion

Annual average change in incidence of overweight and obesity related to cancer according to state



FIGURE 2. Average annual percent change in incidence of overweight- and obesity-related cancers,* by quartile — United States, 2005–2014



* Except colorectal cancer.

- ❖ Because of reductions in colorectal cancer rates, approximately **224,800** cases have been averted since **2005**.
- ❖ However, during this same period, **211,800** excess cases from other overweight- and obesity-related cancers have occurred. Incidence rates of overweight- and obesity-related cancers (excluding colorectal cancer) increased significantly in **32 states (0.3%–1.8%)**, and did not change in **16** states and the District of Columbia.

Conclusion

- ❖ Women who are overweight or have obesity are approximately two to four times as likely as are women with healthy weight to develop endometrial cancer
- ❖ Observational studies have provided evidence that even a 5kg (11 pound) increase in weight since early adulthood is associated with
 - increased risk for overweight- and obesity related cancers



- ❖ the continued need for public health strategies to prevent and control overweight and obesity in children and adults and help communities make it easier for people to be physically active and eat healthfully



Reference

- ✓ Steele, C. B., Thomas, C. C., Henley, ; S Jane, Massetti, G. M., Galuska, D. A., Agurs-Collins, T., Puckett, M., & Richardson, L. C. (2017). Morbidity and Mortality Weekly Report Vital Signs: Trends in Incidence of Cancers Associated with Overweight and Obesity — United States, 2005–2014. Centers for Disease Control and Prevention, 6(66), 1052–1058.



Thank you

