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Severe Obesity with Cancer:How should we do?
重度肥胖合并癌症：怎么办?

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癌症与肥胖Cancer and obesity

- **癌症：人类健康第一杀手**
- Cancer: The number one killer of human health

- **肥胖：影响人数最多的人类健康问题**
- Obesity: a human health problem that affects the largest number of people

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癌症与肥胖发病情况
Incidence of cancer and obesity

- 癌症：发病率有增长与有下降
- Cancer: Incidence increases and decreases

- 肥胖：发病率快速增长
- Obesity: Rapid increase in incidence

- **肥胖（重度肥胖）并癌症等情况会越来越多**
- Obesity (severe obesity) and/with cancer are increasing

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Cancer incidence and mortality in China, 2016

Rongshou Zheng [1], Siwei Zhang [1], Hongmei Zeng [1], Shaoming Wang [1], Kexin Sun [1], Ru Chen [1], Li Li [1], Wenqiang Wei [1] ✉, Jie He [2] ✉

2000-2016年中国癌症发病率与死亡率趋势

3.1 发病趋势

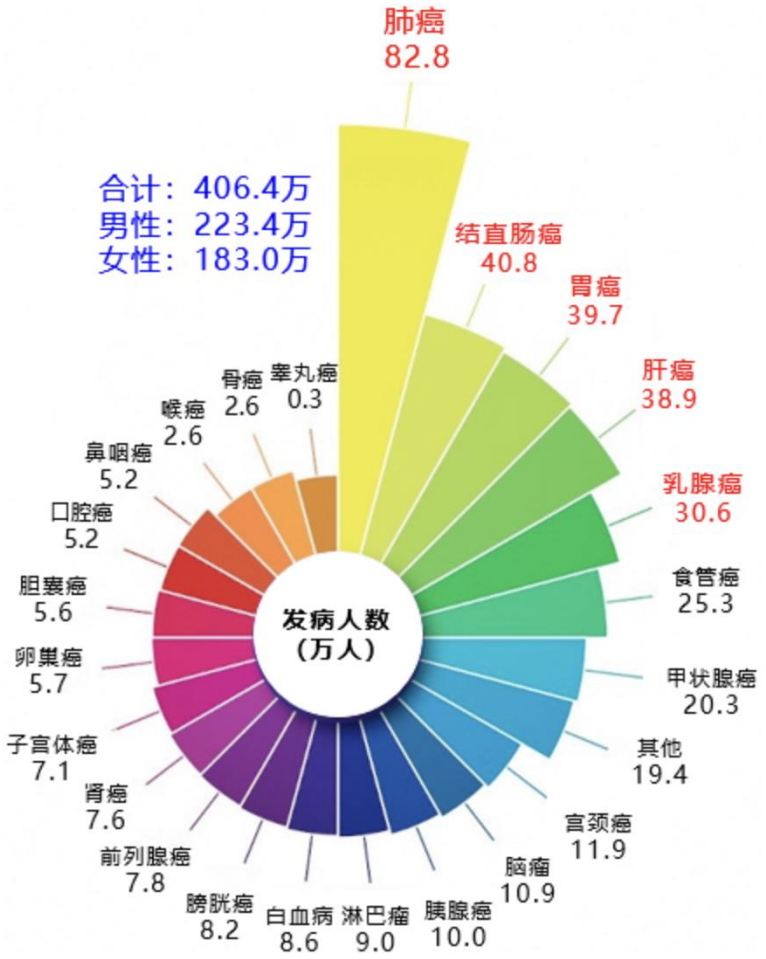
上升：
- 男性：前列腺癌、结直肠癌、白血病、脑癌、胰腺癌和膀胱癌
- 女性：甲状腺癌、宫颈癌、子宫癌、乳腺癌、脑瘤、肺癌、结直肠癌

下降：
- 男性和女性：食管癌、胃癌、肝癌

3.2 死亡趋势

上升：
- 男性：前列腺癌、结直肠癌、胰腺癌、白血病
- 女性：宫颈癌、甲状腺癌、乳腺癌

下降：
- 男性和女性：食管癌、胃癌、肝癌、肺癌



> CA Cancer J Clin. 2023 Jan;73(1):17-48. doi: 10.3322/caac.21763.

2023

Cancer statistics, 2023

Rebecca L Siegel [1], Kimberly D Miller [1], Nikita Sandeep Wagle [1], Ahmedin Jemal [1]

Affiliations + expand

PMID: 36633525 DOI: 10.3322/caac.21763

过去30年来，美国癌症死亡率下降了33%!
原因：治疗技术的进步、早期发现与吸烟人群的减少

Each year, the American Cancer Society estimates the numbers of new cancer cases and deaths in the United States and compiles the most recent data on population-based cancer occurrence and outcomes using incidence data collected by central cancer registries and mortality data collected by the National Center for Health Statistics.
In 2023, 1,958,310 new cancer cases and 609,820 cancer deaths are projected to occur in the United States. Cancer incidence increased for prostate cancer by 3% annually from 2014 through 2019 after two decades of decline, translating to an additional 99,000 new cases; otherwise, however, incidence trends were more favorable in men compared to women. For example, lung cancer in women decreased at one half the pace of men (1.1% vs. 2.6% annually) from 2015 through 2019, and breast and uterine corpus cancers continued to increase, as did liver cancer and melanoma, both of which stabilized in men aged 50 years and older and declined in younger men. However, a 65% drop in cervical cancer incidence during 2012 through 2019 among women in their early 20s, the first cohort to receive the human papillomavirus vaccine, foreshadows steep reductions in the burden of human papillomavirus-associated cancers, the majority of which occur in women. Despite the pandemic, and in contrast with other leading causes of death, the cancer death rate continued to decline from 2019 to 2020 (by 1.5%), contributing to a 33% overall reduction since 1991 and an estimated 3.8 million deaths averted.
This progress increasingly reflects advances in treatment, which are particularly evident in the rapid declines in mortality (approximately 2% annually during 2016 through 2020) for leukemia, melanoma, and kidney cancer, despite stable/increasing incidence, and accelerated declines for lung cancer. In summary, although cancer mortality rates continue to decline, future progress may be attenuated by rising incidence for breast, prostate, and uterine corpus cancers, which also happen to have the largest racial disparities in mortality.

肥胖增加癌症发生率?

Does obesity increase cancer rates?

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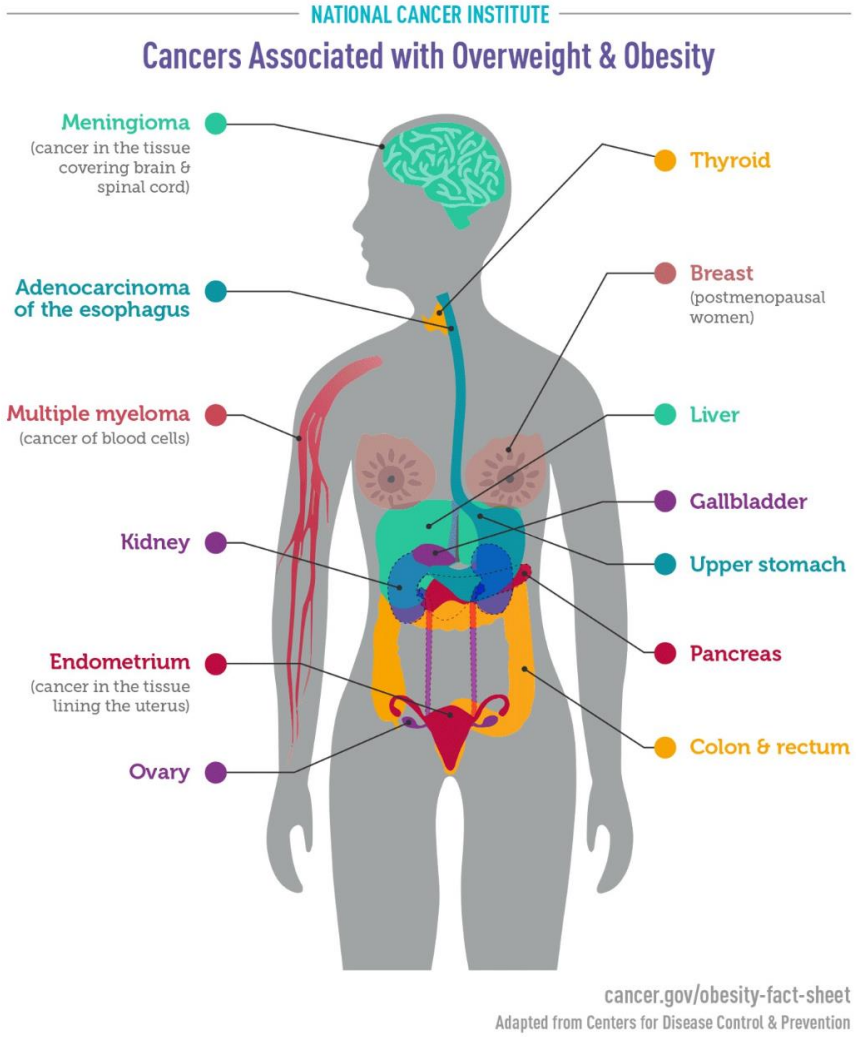
Obesity and Cancer Risk



- About 3.6% of all cancer cases attributable to high BMI[1]
- Obesity, weight gain, and central adiposity in adulthood associated with increased post-menopausal breast cancer risk[2]
- Racial/Ethnic variation mayexist[2]
  - Among blacks, central adiposity may have a stronger impact than BMI
  - Among Hispanic women, associations with body size are similar to white women
  - Among Asian women, associations with body size are stronger than white women
- Cancer tumor subtype[2]

1. (Arnold, Pandeya et al. 2015); 2. (Bandera, Maskarinec et al. 2015)

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Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Early Release / Vol. 66
October 3, 2017

Vital Signs: Trends in Incidence of Cancers Associated with Overweight and Obesity — United States, 2005–2014

C. Brooke Steele, DO[1]; Cheryll C. Thomas, MSPH[1]; S. Jane Henley, MSPH[1]; Greta M. Massetti, PhD[1]; Deborah A. Galuska, PhD[2]; Tanya Agurs-Collins, PhD[3]; Mary Puckett, PhD[1]; Lisa C. Richardson, MD[1]

Overweight and obesity were linked to:

UP Cancer 40% (55% Women; 24% Men)

***42%: Endometrial, Ovarian and Breast**

***Twice as likely: Esophagus, gastric cardia, liver, and kidney cancers**

***30% more likely: Colorectal cancer**

肥胖与癌症的相关性具体研究

Studies on the association between obesity and cancer

肥胖引起的癌症中，男性以肝癌、结直肠癌和肾癌最多，女性以乳腺癌、子宫内膜癌和结直肠癌最多。

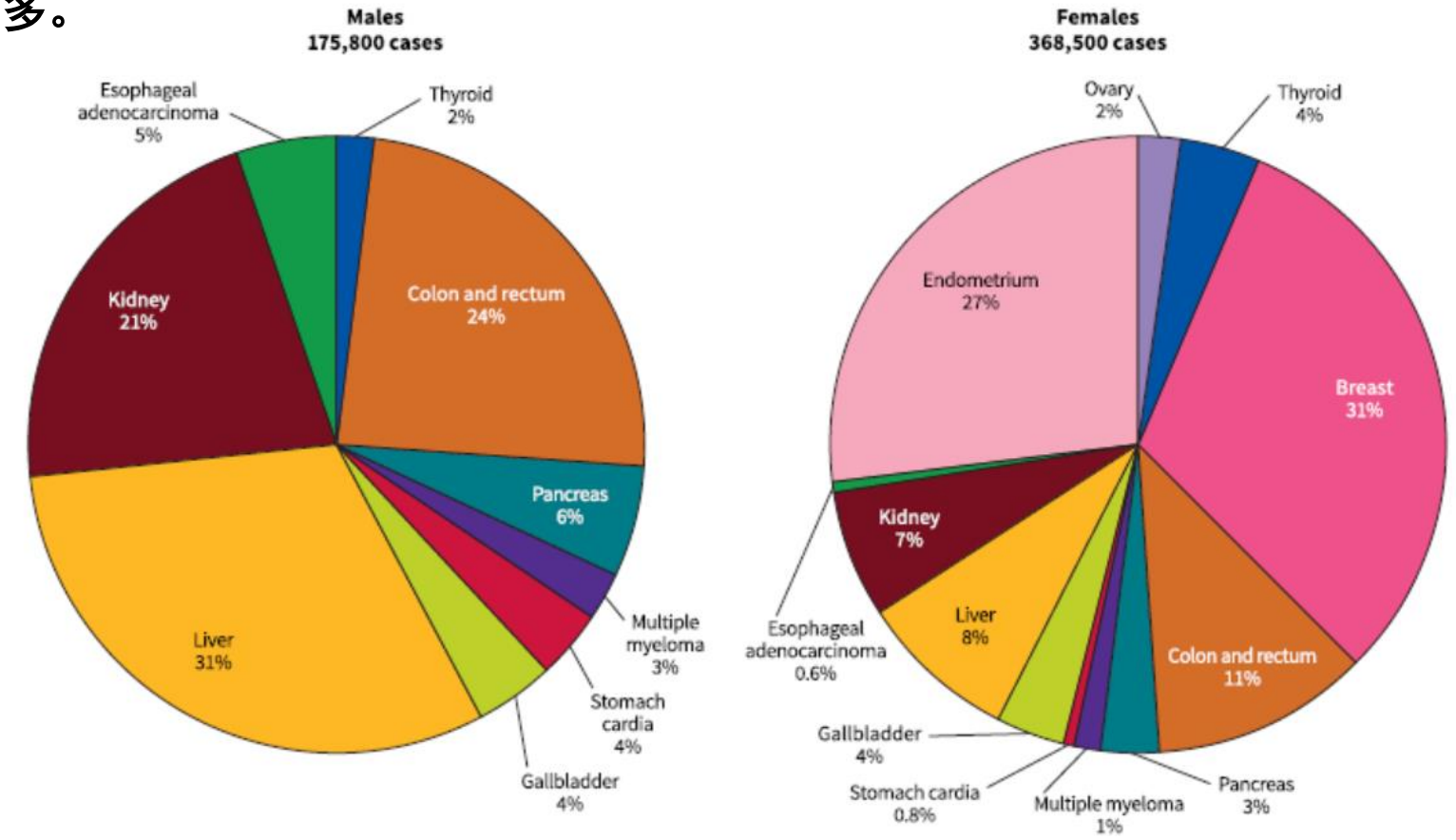

FIGURE 7. Contribution of Each Cancer to Total Cancer Burden Attributable to Excess Body Weight (Body Mass Index ≥ 25 kg/m2) by Sex in 2012. Data source: Pearson-Stuttard J, Zhou B, Kontis V, Bentham J, Gunter MJ, Ezzati M. Worldwide burden of cancer attributable to diabetes and high body-mass index: a comparative risk assessment. *Lancet Diabetes Endocrinol.* 2018;6:e6-e15.8 Adapted with permission from the authors

Obesity and Cancer

Plausible Mediators

- Insulin 胰岛素
- Estrogens 雌激素
- Adipokines 脂肪因子
- Inflammation 炎症

CANCER

Cancer risk as compared to someone with BMI <25

Cancer type	Comparative risk
Endometrial	2-4 x BMI≥25, 7x with BMI≥40
Esophageal	4.8 x BMI≥40, 2.4-2.7 x BMI 30-39.9, 1.5 x BMI 25-29.9
Gastric cardia	2 x BMI≥30
Liver	2 x BMI≥25
Pancreatic	1.5 x BMI≥25
Colorectal	1.3 x BMI≥30
Gallbladder	1.6 x BMI≥30
Post-menopausal breast cancer	1.2-1.4 x BMI≥25 1.2x as likely for every 5-unit increase in BMI
Ovarian	1.1x as likely for every 5-unit increase in BMI

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减重手术可减少癌症的发生？

Can bariatric surgery reduce the occurrence of cancer?

Bariatric Surgery: A Pathway to Cancer Prevention？

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Development of cancer after bariatric surgery

Stella T.T. et al. SOARD;2020;16(10):1586

Methods

The New York Statewide Planning and Research Cooperative System database(SPARCS) 2006 ~ 2012 underwent bariatric procedures . Subsequent cancer diagnoses were captured up to 2016.

Results

71,000 patients who underwent bariatric surgery and 323,197 patients without a bariatric intervention.

Conclusions

Patients undergoing bariatric surgery were less likely to develop both obesity-related cancer and other cancers.

RYGB had a lower risk of developing cancers that are considered nonobesity related compared with SG

减重手术后发生肥胖相关癌症与肥胖不相关癌症的机会都减少
RYGB比SG术后更少发生癌症

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减重手术能否减少癌症的发生率？

Can bariatric surgery reduce the incidence of cancer?

Obesity Surgery
https://doi.org/10.1007/s11695-019-04368-4

ORIGINAL CONTRIBUTIONS

Effects of Bariatric Surgery on Cancer Risk: Evidence from Meta-analysis

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Our meta-analysis indicated that bariatric surgery for severe obesity was associated with decreased cancer risk, both for cancer incidence and mortality

23个研究

严重肥胖的减肥手术与降低癌症风险有关，包括降低癌症发病率和死亡率

Table 1 Characteristics of literatures included in the meta-analysis

Reference	Year	Region	Outcome	Follow-up time (year)	Cancer type	Sex	No. of cases	No. of controls
Christou NV [34]	2004	Canada	Incidence	5.00	Cancer	Both	1035	5746
Pontiroli AE [19]	2018	Italy	Incidence	23.00	Cancer	Both	385	681
Ward KK [28]	2014	America	Incidence	4.50	Uterine malignancy	Female	103,797	7,328,061
Christou NV [31]	2008	Canada	Incidence	5.00	Breast cancer, colorectal cancer, endometrial cancer, melanoma, non-Hodgkin's lymphoma, pancreatic cancer	Both	1035	5746
Schauer DP [15]	2019	America	Incidence	3.50	Breast cancer, colorectal cancer, endometrial cancer, pancreatic cancer	Both	22,198	66,427
Douglas IJ [27]	2015	United Kingdom	Incidence	15.00	Cancer	Both	3882	3882
Feigelson HS [18]	2019	America	Incidence	10.00	Breast cancer	Female	17,998	53,889
Adams TD [30]	2009	America	Incidence	24.00	Breast cancer, colorectal cancer, melanoma, non-Hodgkin's lymphoma, pancreatic cancer	Both	6596	9442
Maret-Ouda J [23]	2017	Sweden	Incidence	10	Esophageal adenocarcinoma	Both	34,437	239,775
Anveden A [25]	2017	Sweden	Incidence	18.10	Breast cancer, endometrial cancer	Female	1420	1447
Schauer DP [22]	2017	America	Incidence	10.00	Cancer	Both	18,355	40,524
Mackenzie H [20]	2018	Sweden	Incidence	4.60	Breast cancer, colorectal cancer, endometrial cancer, esophageal adenocarcinoma	Both	4978	4978
Hassinger TE [17]	2019	America	Incidence	5.70	Breast cancer	Female	2430	2430
Sjostrom L [32]	2007	Sweden	Mortality	10.9	Cancer	Both	2010	2037
Pontiroli AE [19]	2018	Italy	Mortality	23.00	Cancer	Both	385	681
Kauppila JH [16]	2019	Nordic countries	Mortality	≥15	Cancer	Both	49,977	455,281
Liakopoulos V [35]	2019	Sweden	Mortality	9	Cancer	Both	5321	5321
Adams TD [33]	2007	America	Mortality	7.1	Cancer	Both	9949	9628
Ceriani V [21]	2018	Italy	Mortality	15	Cancer	Both	472	1405
Davidson LE [26]	2016	America	Mortality	7.2	Cancer	Both	7925	7925
Adams TD [30]	2009	America	Mortality	24.00	Cancer	Both	6596	9442
Gribsholt SB [24]	2017	Denmark	Mortality	4.2	Cancer	Both	9895	247,366
Buchwald H [29]	2010	America	Mortality	25	Cancer	Both	421	417

Zhang, K., Luo, Y., Dai, H. *et al.* Effects of Bariatric Surgery on Cancer Risk: Evidence from Meta-analysis. *OBES SURG* (2019).

减重手术与癌症手术：谁先谁后？

Bariatric Surgery vs. Cancer Surgery: Who's First?

1.安全第一
2.不影响/尽量少影响癌症生存时间
3.注意：肥胖程度、合并疾病、器官功能衰竭期？
4.癌症：肿瘤种类、分期、肿瘤部位、恶性程度
5.需要多学科（MDT）讨论？

1. Safety first
2. Does not affect/minimize the impact on cancer survival time
3. Note: What is the degree of obesity, comorbidities, and organ failure?
4. Cancer: tumor type, stage, tumor location, and degree of malignancy
5. Need a multidisciplinary (MDT) discussion?

减重手术与癌症手术：谁先谁后？

Bariatric Surgery vs. Cancer Surgery: Who's First?

1.同时进行：胃癌等

2.先减重后癌症手术：早期甲状腺乳头状癌等

3.先癌症手术后减重手术：乳腺癌进展期等

1. Concurrently: gastric cancer, etc
2. Bariatric Surgery first and then cancer surgery: early papillary thyroid cancer, etc
3. Cancer surgery followed by bariatric surgery: advanced breast cancer, etc

Voting questions:

1. Should bariatric surgery be considered as part of the standard treatment in cancer patients?
Yes
No
2. Should bariatric surgery be prioritized in cancer therapy?
Yes
No
3. Does bariatric surgery have a positive impact on the long-term survival rates of cancer patients?
Yes
No
4. Can bariatric surgery affect the efficacy of chemotherapy or radiotherapy in cancer patients?
Yes
No
5. Do cancer patients require special nutritional support after bariatric surgery?
Yes
No
6. Is bariatric surgery applicable to all cancer patients?
Yes
No

Voting questions:

7. Does bariatric surgery have a positive effect on the quality of life of cancer patients?
Yes
No
8. Can bariatric surgery affect the immune system of cancer patients?
Yes
No
9. Do cancer patients need special psychological support when undergoing bariatric surgery?
Yes
No
10. Does bariatric surgery have a positive impact on the endocrine system of cancer patients?
Yes
No
11. Is interdisciplinary team collaboration required for cancer patients undergoing bariatric surgery?
Yes
No

Voting questions:

12. Can bariatric surgery affect the fertility of cancer patients?
Yes
No
13. Is bariatric surgery suitable for pediatric or adolescent cancer patients?
Yes
No