

ABSENCE OF EXCESS BODY FATNESS

VOLUME 16

This publication represents the views and expert opinions of an IARC Working Group on the Evaluation of Cancer-Preventive Interventions, which met in Lyon, 5–12 April 2016

LYON, FRANCE - 2018

IARC HANDBOOKS OF
CANCER PREVENTION

2.2.15 Cancer of the testis

Cancer of the testis is a rare malignancy, accounting for 1% of incident cases of cancer in men, but the testis is the most common cancer site for men aged 15–44 years in developed countries. To date, the most important identified risk factor for testicular cancer is an undescended testicle. Increased risk has also been associated with family history of testicular cancer, various genetic factors, and several perinatal risk factors.

In 2001, the Working Group of the *IARC Handbook* on weight control and physical activity ([IARC, 2002](#)) concluded that the evidence of an association between avoidance of weight gain and testicular cancer was *inadequate*.

(a) Cohort studies

Since 2000, only one cohort study of excess body weight in relation to risk of testicular cancer has been published: a Norwegian cohort of approximately 600 000 men aged 14–44 years ([Björge et al., 2006](#)). For overweight and obesity compared with normal BMI, the relative risks were 0.89 (95% CI, 0.77–1.03) and 0.83 (95% CI, 0.58–1.17), respectively, and the relative risk per 1 kg/m² increase in BMI was 0.97 (95% CI, 0.95–1.00). There was no statistically significant heterogeneity of results between histological subtypes of testicular cancer.

(b) Case–control studies

A total of seven population- or hospital-based case–control studies published after 2000 focused on the association between BMI and weight and testicular cancer (Table 2.2.15; web only; available at: <http://publications.iarc.fr/570>). In four studies, there was no overall significant association with BMI for all testicular cancer cases ([Dieckmann & Pichlmeier, 2002](#); [Richiardi et al., 2003](#); [Pan et al., 2004](#); [McGlynn et al., 2007](#)). [Giannandrea et al. \(2012\)](#) found an inverse association with all testicular cancer cases for

men with BMI > 27.4 kg/m² ($n = 26$) compared with men with BMI ≤ 23.15 kg/m² (OR, 0.42; 95% CI, 0.24–0.75). One study showed that high BMI in men aged 18–29 years was significantly more frequent in testicular cancer cases than in controls ([Dieckmann et al., 2009](#)). In one study, analysis by subtype yielded an odds ratio of 3.66 (95% CI, 1.87–7.15) for obese men (BMI > 31 kg/m²) with non-seminoma testicular cancer ($n = 11$) ([Garner et al., 2003](#)).

A meta-analysis of the earlier cohort study and 10 case–control studies showed an inverse association between overweight and testicular cancer (OR, 0.92; 95% CI, 0.86–0.98), which was not significant for obesity (OR, 0.93; 95% CI, 0.75–1.15) ([Lerro et al., 2010](#)).

References

- Bjørge T, Tretli S, Lie AK, Engeland A (2006). The impact of height and body mass index on the risk of testicular cancer in 600,000 Norwegian men. *Cancer Causes Control*, 17(7):983–7. doi:[10.1007/s10552-006-0032-8](https://doi.org/10.1007/s10552-006-0032-8) PMID:[16841265](https://pubmed.ncbi.nlm.nih.gov/16841265/)
- Dieckmann KP, Hartmann JT, Classen J, Diederichs M, Pichlmeier U (2009). Is increased body mass index associated with the incidence of testicular germ cell cancer? *J Cancer Res Clin Oncol*, 135(5):731–8. doi:[10.1007/s00432-008-0504-1](https://doi.org/10.1007/s00432-008-0504-1) PMID:[19002497](https://pubmed.ncbi.nlm.nih.gov/19002497/)
- Dieckmann KP, Pichlmeier U (2002). Is risk of testicular cancer related to body size? *Eur Urol*, 42(6):564–9. doi:[10.1016/S0302-2838\(02\)00467-0](https://doi.org/10.1016/S0302-2838(02)00467-0) PMID:[12477651](https://pubmed.ncbi.nlm.nih.gov/12477651/)
- Garner MJ, Birkett NJ, Johnson KC, Shatenstein B, Ghadirian P, Krewski D; Canadian Cancer Registries Epidemiology Research Group (2003). Dietary risk factors for testicular carcinoma. *Int J Cancer*, 106(6):934–41. doi:[10.1002/ijc.11327](https://doi.org/10.1002/ijc.11327) PMID:[12918073](https://pubmed.ncbi.nlm.nih.gov/12918073/)
- Giannandrea F, Paoli D, Lombardo F, Lenzi A, Gandini L (2012). Case-control study of anthropometric measures and testicular cancer risk. *Front Endocrinol (Lausanne)*, 3:144. doi:[10.3389/fendo.2012.00144](https://doi.org/10.3389/fendo.2012.00144) PMID:[23189072](https://pubmed.ncbi.nlm.nih.gov/23189072/)
- IARC (2002). Weight control and physical activity. Lyon, France: IARC Press (IARC Handbooks of Cancer Prevention, Vol. 6). Available from: <http://publications.iarc.fr/376>.
- Lerro CC, McGlynn KA, Cook MB (2010). A systematic review and meta-analysis of the relationship between body size and testicular cancer. *Br J Cancer*, 103(9):1467–74. doi:[10.1038/sj.bjc.6605934](https://doi.org/10.1038/sj.bjc.6605934) PMID:[20978513](https://pubmed.ncbi.nlm.nih.gov/20978513/)
- McGlynn KA, Sakoda LC, Rubertone MV, Sesterhenn IA, Lyu C, Graubard BI, et al. (2007). Body size, dairy consumption, puberty, and risk of testicular germ cell tumors. *Am J Epidemiol*, 165(4):355–63. doi:[10.1093/aje/kwk019](https://doi.org/10.1093/aje/kwk019) PMID:[17110638](https://pubmed.ncbi.nlm.nih.gov/17110638/)
- Pan SY, Johnson KC, Ugnat AM, Wen SW, Mao Y; Canadian Cancer Registries Epidemiology Research Group (2004). Association of obesity and cancer risk in Canada. *Am J Epidemiol*, 159(3):259–68. doi:[10.1093/aje/kwh041](https://doi.org/10.1093/aje/kwh041) PMID:[14742286](https://pubmed.ncbi.nlm.nih.gov/14742286/)
- Richiardi L, Askling J, Granath F, Akre O (2003). Body size at birth and adulthood and the risk for germ-cell testicular cancer. *Cancer Epidemiol Biomarkers Prev*, 12(7):669–73. PMID:[12869410](https://pubmed.ncbi.nlm.nih.gov/12869410/)