

Table 2.2.6a Cohort studies of measures of body fatness and cancers of the biliary tract

| Reference Location Follow-up period | Total number of subjects Sex Incidence/mortality | Organ site (ICD code) | Exposure categories | Exposed cases | Relative risk (95% CI) | Covariates | |
|---|--|--|---------------------|---------------|---------------------------|---|--|
| Oh et al. (2005) Republic of Korea 1992–2001 | 781 283 Men Incidence | Intra- and extrahepatic bile ducts | BMI | | | Age, smoking status, alcohol consumption, physical activity, family history of cancer, residence area | |
| | | | < 18.5 | 9 | 0.90 (0.45–1.83) | | |
| | | | 18.5–22.9 | 192 | 1.00 | | |
| | | | 23.0–24.9 | 164 | 1.22 (0.99–1.50) | | |
| | | | 25.0–26.9 | 108 | 1.40 (1.11–1.78) | | |
| 27.0–29.9 | 38 | 1.24 (0.87–1.75) | | | | | |
| > 30.0 | 6 | 1.64 (0.73–3.70) | | | | | |
| Ishiguro et al. (2008) Japan Public Health Center 1990–2004 | 53 187 Women Incidence | Extrahepatic bile ducts (ICD-O-3: C23.9, C24.0) | BMI | | | Age, study area, cholelithiasis, diabetes, smoking, alcohol consumption | |
| | | | < 23 | 12 | 1.00 | | |
| | | | 23.0–24.9 | 14 | 2.09 (0.97–4.53) | | |
| | | | 25.0–26.9 | 9 | 2.04 (0.85–4.85) | | |
| | | | ≥ 27.0 | 8 | 1.89 (0.76–4.67) | | |
| | [<i>P</i> _{trend}] | | [0.12] | | | | |
| | 48 681 Men Incidence | | | BMI | | | |
| | | | | < 23 | 40 | 1.00 | |
| | | | | 23.0–24.9 | 31 | 1.33 (0.83–2.13) | |
| | | | | 25.0–26.9 | 14 | 1.08 (0.58–1.98) | |
| | ≥ 27.0 | 14 | 1.83 (0.98–3.39) | | | | |
| | [<i>P</i> _{trend}] | | [0.12] | | | | |
| | 101 868 Women and men Incidence | | | BMI | | | |
| < 23 | | | | 52 | 1.00 | | |
| 23.0–24.9 | | | | 45 | 1.50 (1.00–2.24) | | |
| 25.0–26.9 | | | | 23 | 1.29 (0.79–2.11) | | |
| ≥ 27.0 | 22 | 1.78 (1.07–2.95) | | | | | |
| [<i>P</i> _{trend}] | | [0.03] | | | | | |
| 53 187 Women Incidence | | Gall bladder and biliary tract (ICD-O-3: C23.9, C24.0) | BMI | | | Age, study area, cholelithiasis, diabetes, smoking, alcohol consumption | |
| | | | < 23 | 47 | 1.00 | | |
| | | | 23.0–24.9 | 23 | 0.85 (0.51–1.41) | | |
| | | | 25.0–26.9 | 17 | 0.98 (0.56–1.71) | | |
| ≥ 27.0 | 19 | 1.19 (0.69–2.04) | | | | | |

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|--|--|---|-------------------------------|---------------|---------------------------|--|------------------|
| Ishiguro et al. (2008) (cont.) | 48 681 Men Incidence | | BMI | | | | |
| | | | < 23 | 54 | 1.00 | | |
| | | | 23.0–24.9 | 37 | 1.09 (0.71–1.68) | | |
| | | | 25.0–26.9 | 20 | 1.14 (0.68–1.92) | | |
| | | | ≥ 27.0 | 18 | 1.62 (0.93–2.84) | | |
| | 101 868 Men and women Incidence | | BMI | | | | |
| | | | < 23 | 101 | 1.00 | | |
| | | | 23.0–24.9 | 60 | 0.98 (0.70–1.36) | | |
| 25.0–26.9 | | 37 | 1.06 (0.72–1.55) | | | | |
| | ≥ 27.0 | 37 | 1.38 (0.94–2.03) | | | | |
| Schlesinger et al. (2013) EPIC cohort 1992–2010 | 359 290 Men and women (191 934 men and women for weight change) Incidence | Biliary tract (ICD-O): gall bladder (C23.9), extrahepatic bile ducts (C24.0), ampulla of Vater (C24.1), and C24.8, C24.9 | BMI, tertiles (sex-specific) | | | Age, sex, study centre, education, smoking, alcohol consumption, height Weight change per year further adjusted for weight at age 20 yr Analyses by hip circumference, waist-to-hip ratio, waist-to-height ratio gave similar results | |
| | | | Men: | Women: | | | |
| | | | < 24.93 | < 23.04 | 50 | | 1.00 |
| | | | 24.93–27.80 | 23.04–26.64 | 74 | | 1.21 (0.84–1.74) |
| | | | ≥ 27.81 | ≥ 26.65 | 86 | | 1.26 (0.87–1.83) |
| | | | [<i>P</i> _{trend}] | | | | 1.11 (0.93–1.31) |
| | | | per 5 kg/m ² | | | | |
| | | | Weight change, tertiles | | | | |
| | | | T1 | | 38 | | 1.00 |
| | | | T2 | | 48 | | 1.33 (0.85–2.08) |
| T3 | | 29 | 0.98 (0.59–1.65) | | | | |
| [<i>P</i> _{trend}] | | | [0.89] | | | | |
| per 1 kg/yr | | | 0.98 (0.51–1.89) | | | | |
| Intrahepatic bile ducts ICD-10: C22.1 | BMI, per 5 kg/m ² | | 1.10 (0.80–1.52) | | | | |
| | Weight, per 5 kg | | 1.05 (0.93–1.18) | | | | |
| | Weight change (kg/yr) [sic] | | 1.17 (0.36–3.79) | | | | |

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|--|--|--------------------------------|---|---------------|--------------------------------------|------------|
| Park et al. (2014) Meta-analysis 2005–2013 | Men: 5 studies Women: 6 studies Incidence and mortality | Gall bladder and biliary tract | BMI, highest vs lowest category Men Women | NR | 1.37 (0.83–1.91) 1.44 (1.12–1.76) | |

BMI, body mass index (in kg/m²); CI, confidence interval; EPIC, European Prospective Investigation into Cancer and Nutrition; ICD, International Classification of Diseases; NR, not reported; yr, year or years

Table 2.2.6b Case–control studies of measures of body fatness and cancers of the biliary tract

| Reference Study location Period | Number of cases Number of controls Source of controls | Organ site (ICD code) | Exposure categories | Exposed cases | Relative risk (95% CI) | Adjustment for confounding |
|---|--|--|---|--|---|-------------------------------------|
| Kato et al. (1989) Japan 1982–1986 | 73 73 Population | Bile ducts | Broca index (obesity) > 1.0 | 73 | 0.23 (0.11–0.49) | Age, sex |
| Ahrens et al. (2007) Europe 1995–1997 | 104 1401 (men only) Population | Biliary tract (ICD-O): gall bladder (C23.9), extrahepatic bile ducts (C24.0), ampulla of Vater (C24.1), and C24.8, C24.9 | BMI 1–5 yr ago < 18.5 18.5– < 25 25– < 27 27– < 30 ≥ 30 BMI at age 35 yr < 18.5 18.5– < 25 25– < 27 27– < 30 ≥ 30 Lowest adult BMI < 18.5 18.5– < 25 25– < 27 27– < 30 ≥ 30 Maximum adult BMI 18.5– < 25 25– < 27 27– < 30 ≥ 30 | 0 39 27 23 13 1 57 21 13 7 4 65 10 7 5 23 24 23 25 | – 1.00 1.30 (0.77–2.21) 1.00 (0.57–1.74) 1.39 (0.70–2.77) 1.27 (0.14–11.4) 1.00 1.53 (0.89–2.64) 1.63 (0.84–3.15) 2.58 (1.07–6.23) 0.79 (0.27–2.30) 1.00 2.02 (0.95–4.32) 4.15 (1.60–10.7) 4.68 (1.13–19.4) 1.00 1.33 (0.72–2.45) 0.97 (0.52–1.80) 1.34 (0.73–2.47) | Age, country, history of gallstones |

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|--|--|--|--|-----------------------|--|---|
| Ahrens et al. (2007) (cont.) | | Extrahepatic bile ducts (<i>n</i> = 74) | ≤ 25 ≥ 25 | | 1.00 3.34 (1.08–10.35) | |
| Hsing et al. (2008) China 1997–2001 | 627 959 Population | Biliary tract (ICD-9: 156) | Usual adult BMI < 18.5 18.5–22.9 23.0–24.9 ≥ 25 [<i>P</i> _{trend}] | 17 30 73 145 | 0.62 (0.35–1.09) 1.00 1.2 (0.85–1.68) 1.56 (1.17–2.10) [< 0.001] | Age (continuous), sex (male, female), education (none/primary, junior middle, senior, some college) |
| | | | Maximum adult BMI < 18.5 18.5–22.9 23.0–24.9 ≥ 25 [<i>P</i> _{trend}] | 6 74 83 185 | 1.24 (0.47–3.29) 1.00 1.35 (0.94–1.95) 1.48 (1.08–2.03) [0.02] | |
| | | | BMI change in adulthood ≤ 0.74 0.75–2.77 2.78–5.21 > 5.21 [<i>P</i> _{trend}] | 74 62 86 93 | 1.00 0.93 (0.62–1.39) 1.45 (0.98–2.14) 1.47 (1.00–2.16) [0.01] | |
| | | Extrahepatic bile ducts (<i>n</i> = 191) | Usual adult BMI < 18.5 18.5–22.9 ≥ 23 [<i>P</i> _{trend}] | 8 86 95 | 0.52 (0.24–1.13) 1.00 0.99 (0.71–1.37) [0.29] | No effect of maximum adult BMI, or BMI change in adulthood |
| Grainje et al. (2009) United Kingdom 1987–2002 | 86 3007 Population | Bile ducts (cholangiocarcinoma) | BMI < 25 25–29.9 ≥ 30 | 36 31 19 | 1.00 1.03 (0.62–1.72) 1.51 (0.83–2.75) | Smoking, alcohol, NSAID use |

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|---|--|--------------------------|--|------------------|---------------------------|----------------------------|
| Shebl et al. (2011) China 1997–2001 | 627 959 Population | Extrahepatic bile ducts | WC (cm) Low High (men: ≥ 90 ; women: ≥ 80) | 61 31 | 1.00 0.64 (0.37–1.13) | Age, sex, BMI |

BMI, body mass index (in kg/m^2); CI, confidence interval; ICD, International Classification of Diseases; NSAID, non-steroidal anti-inflammatory drug; WC, waist circumference; yr, year or years

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