

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments | |
|--|--|-----------------------------------|-----------------|-------------------------------------|---------------------|---|--|
| Olshan <i>et. al.</i> (2000) USA 1994-1997 | Squamous cell carcinoma of head and neck analyzed together (including oral cavity, pharynx, or larynx) | 11 | 74 | Never | 1.0 | Adjusted for age, race, sex, and average number of drinks of alcohol per week | |
| | | 171 | 128 | Ever | 4.1 (2.0-8.7) | | |
| | | 11 | 74 | <i>Average cigarettes per day</i> | | | |
| | | 46 | 44 | 0 | 1.0 | | |
| | | 112 | 69 | 1-19 | 3.3 (1.5-7.7) | | |
| | | | | 20+ | 4.6 (2.1-10.3) | | |
| | | | | <i>Average cigarettes per day</i> | | | |
| | | 11 | 74 | 0 | 1.0 | | |
| | | 46 | 44 | 1-19 | 3.3 (1.4-7.7) | | |
| | | 84 | 48 | 20-39 | 5.0 (2.2-11.2) | | |
| | | 28 | 21 | 40+ | 3.7 (1.4-10.0) | | |
| | | | | <i>Total years of cigarette use</i> | | | |
| | | 11 | 74 | 0 | 1.0 | | |
| | | 19 | 38 | 1-19 | 2.3 (0.9-5.9) | | |
| | | 75 | 52 | 20-39 | 4.2 (1.9-9.3) | | |
| | | 64 | 23 | 40+ | 7.2 (2.8-18.6) | | |
| | | | | <i>Pack-years of tobacco use</i> | | | |
| | | 11 | 74 | 0 | 1.0 | | |
| | | 36 | 50 | 1-19 | 2.7 (1.2-6.2) | | |
| | | 40 | 28 | 20-39 | 4.4 (1.8-10.7) | | |
| 83 | 37 | 40+ | 5.6 (2.4-13.0) | | | | |
| | | GSTT1 (present) | | | | | |
| 8 | 66 | Never | 1.0 | | | | |
| 136 | 103 | Ever | 4.9 (2.1-11.4) | | | | |
| | | <i>Average cigarettes per day</i> | | | | | |
| 8 | 66 | 0 | 1.0 | | | | |
| 37 | 38 | 1-19 | 3.9 (1.5-9.9) | | | | |
| 64 | 56 | 20+ | 5.1 (2.1-12.7) | | | | |
| | | <i>Pack-years of tobacco use</i> | | | | | |
| 8 | 66 | 0 | 1.0 | | | | |
| 28 | 41 | 1-19 | 3.3 (1.3-8.4) | | | | |
| 37 | 24 | 20-39 | 5.7 (2.1-15.3) | | | | |
| 60 | 30 | 40+ | 5.4 (2.0-14.2) | | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments |
|---|--|-----------------------------------|-----------------|-----------------------------------|---------------------|---|
| Olshan <i>et. al.</i> (2000) (contd) | Squamous cell carcinoma of head and neck analyzed together (including oral cavity, pharynx, or larynx) | 3 | 7 | GSTT1 (null) | | |
| | | 29 | 19 | Never | 2.7 (0.5-12.9) | Adjusted for age, race, sex, and average number of drinks of alcohol per week |
| | | | | Ever | 5.1 (1.9-14.1) | |
| | | 3 | 7 | <i>Average cigarettes per day</i> | | |
| | | 7 | 4 | 0 | 2.7 (0.5-12.9) | |
| | | 21 | 11 | 1-19 | 3.7 (0.7-19.4) | |
| | | | | 20+ | 7.0 (2.2-22.0) | |
| | | 3 | 7 | <i>Pack-years of tobacco use</i> | | |
| | | 6 | 7 | 0 | 2.8 (0.6-13.3) | |
| | | 3 | 4 | 1-19 | 2.3 (0.5-10.6) | |
| | | 19 | 5 | 20-39 | 2.1 (0.3-16.5) | |
| | | | | 40+ | 13.4 (3.6-50.4) | |
| | | 6 | 48 | GSTM1 (present) | | |
| | | 94 | 59 | Never | 1.0 | |
| | | | | Ever | 4.3 (1.6-11.6) | |
| | | 6 | 48 | <i>Average cigarettes per day</i> | | |
| | | 31 | 18 | 0 | 1.0 | |
| | | 56 | 34 | 1-19 | 4.5 (1.4-14.4) | |
| | | | | 20+ | 4.4 (1.5-12.7) | |
| | | 6 | 48 | <i>Pack-years of tobacco use</i> | | |
| | | 21 | 17 | 0 | 1.0 | |
| | | 25 | 17 | 1-19 | 4.0 (1.2-13.1) | |
| | | 42 | 19 | 20-39 | 4.1 (1.3-13.1) | |
| | | 40+ | 5.1 (1.6-15.8) | | | |
| 5 | 25 | GSTM1 (null) | | | | |
| 71 | 63 | Never | 1.3 (0.3-4.6) | | | |
| | | Ever | 4.7 (1.8-12.3) | | | |
| 5 | 25 | <i>Average cigarettes per day</i> | | | | |
| 13 | 24 | 0 | 1.2 (0.3-4.5) | | | |
| 52 | 33 | 1-19 | 2.8 (0.9-8.8) | | | |
| | | 20+ | 5.9 (2.1-17.0) | | | |
| 5 | 25 | <i>Pack-years of tobacco use</i> | | | | |
| 13 | 31 | 0 | 1.2 (0.3-4.5) | | | |
| 15 | 11 | 1-19 | 2.2 (0.7-6.7) | | | |
| 37 | 16 | 20-39 | 6.5 (1.9-22.5) | | | |
| | | 40+ | 7.4 (2.4-22.8) | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments |
|---|--|-----------------------------------|-----------------|-----------------------------------|---------------------|---|
| Olshan <i>et. al.</i> (2000) (contd) | Squamous cell carcinoma of head and neck analyzed together (including oral cavity, pharynx, or larynx) | 3 | 34 | GSTP1 (Ile/Ile) | | |
| | | 59 | 41 | Never | 1.0 | Adjusted for age, race, sex, and average number of drinks of alcohol per week |
| | | | | Ever | 7.4 (2.0-27.0) | |
| | | | | <i>Average cigarettes per day</i> | | |
| | | 3 | 34 | 0 | 1.0 | |
| | | 18 | 13 | 1-19 | 6.3 (1.5-27.2) | |
| | | 37 | 23 | 20+ | 8.4 (2.2-32.6) | |
| | | | | <i>Pack-years of tobacco use</i> | | |
| | | 3 | 34 | 0 | 1.0 | |
| | | 15 | 17 | 1-19 | 5.6 (1.4-23.4) | |
| | | 17 | 10 | 20-39 | 9.1 (2.0-40.3) | |
| | | 24 | 10 | 40+ | 9.0 (2.0-39.5) | |
| | | | | GSTP1 (Ile/Val or Val/Val) | | |
| | | 8 | 39 | Never | 2.3 (0.5-9.4) | |
| | | 106 | 81 | Ever | 6.6 (1.9-23.2) | |
| | | | | <i>Average cigarettes per day</i> | | |
| | | 8 | 39 | 0 | 2.3 (0.5-9.5) | |
| | | 26 | 29 | 1-19 | 5.1 (1.3-19.6) | |
| | | 71 | 44 | 20+ | 7.1 (1.9-26.4) | |
| | | | | <i>Pack-years of tobacco use</i> | | |
| 8 | 39 | 0 | 2.3 (0.6-9.6) | | | |
| 19 | 31 | 1-19 | 3.6 (0.9-14.4) | | | |
| 23 | 18 | 20-39 | 6.4 (1.6-26.0) | | | |
| 55 | 25 | 40+ | 9.2 (2.4-35.2) | | | |
| | | NAT1 (4 or 11/4 or 11) | | | | |
| 8 | 32 | Never | 1.0 | | | |
| 78 | 76 | Ever | 2.3 (0.9-5.6) | | | |
| | | <i>Average cigarettes per day</i> | | | | |
| 8 | 32 | 0 | 1.0 | | | |
| 18 | 25 | 1-19 | 1.9 (0.7-5.4) | | | |
| 54 | 42 | 20+ | 2.7 (1.0-7.1) | | | |
| | | <i>Pack-years of tobacco use</i> | | | | |
| 8 | 32 | 0 | 1.0 | | | |
| 18 | 27 | 1-19 | 2.0 (0.7-5.7) | | | |
| 18 | 19 | 20-39 | 2.3 (0.8-6.9) | | | |
| 37 | 22 | 40+ | 2.8 (0.9-7.8) | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments |
|---|--|-----------------------------------|-----------------|-----------------------------------|---------------------|---|
| Olshan <i>et. al.</i> (2000) (contd) | Squamous cell carcinoma of head and neck analyzed together (including oral cavity, pharynx, or larynx) | 3 | 41 | NAT1 (10/4 or 10/10) | | |
| | | 86 | 46 | Never | 0.3 (0.1-1.4) | Adjusted for age, race, sex, and average number of drinks of alcohol per week |
| | | | | Ever | 3.3 (1.3-8.4) | |
| | | 3 | 41 | <i>Average cigarettes per day</i> | | |
| | | 26 | 17 | 0 | 0.3 (0.1-1.4) | |
| | | 53 | 25 | 1-19 | 2.4 (0.8-7.4) | |
| | | | | 20+ | 3.5 (1.3-9.7) | |
| | | 3 | 41 | <i>Pack-years of tobacco use</i> | | |
| | | 16 | 21 | 0 | 0.3 (0.1-1.4) | |
| | | 22 | 9 | 1-19 | 1.4 (0.4-4.2) | |
| | | 41 | 13 | 20-39 | 3.8 (1.1-13.2) | |
| | | | | 40+ | 4.9 (1.6-14.9) | |
| | | 10 | 68 | CYP1A1 (Ile/Ile) | | |
| | | 152 | 111 | Never | 1.0 | |
| | | | | Ever | 4.2 (1.9-9.0) | |
| | | 10 | 68 | <i>Average cigarettes per day</i> | | |
| | | 40 | 39 | 0 | 1.0 | |
| | | 101 | 59 | 1-19 | 3.1 (1.3-7.4) | |
| | | | | 20+ | 5.0 (2.2-11.6) | |
| | | 10 | 68 | <i>Pack-years of tobacco use</i> | | |
| | | 31 | 43 | 0 | 1.0 | |
| | | 37 | 26 | 1-19 | 2.6 (1.1-6.4) | |
| | | 74 | 31 | 20-39 | 4.4 (1.8-11.2) | |
| | | 40+ | 5.7 (2.3-13.9) | | | |
| 1 | 4 | CYP1A1 (Ile/Val) | | | | |
| 12 | 8 | Never | 2.8 (0.3-28.9) | | | |
| | | Ever | 5.4 (1.6-17.9) | | | |
| 1 | 4 | <i>Average cigarettes per day</i> | | | | |
| 4 | 2 | 0 | 2.6 (0.2-26.2) | | | |
| 6 | 6 | 1-19 | 11.2 (1.7-76.0) | | | |
| | | 20+ | 2.3 (0.5-10.7) | | | |
| 1 | 4 | <i>Pack-years of tobacco use</i> | | | | |
| 3 | 3 | 0 | 2.4 (0.2-24.7) | | | |
| 2 | 2 | 1-19 | 5.2 (0.8-31.9) | | | |
| 5 | 3 | 20-39 | 2.8 (0.3-24.6) | | | |
| | | 40+ | 4.9 (0.8-29.8) | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments |
|---|--|------------------|------------------|----------------------------------|---------------------|--|
| Garrote <i>et al.</i> (2001) Cuba 1996-1999 | Oral cavity and oropharynx analyzed together | 16 | 81 | Never smokers | 1.0 | Estimates from unconditional logistic regression equations including terms for gender, age, area of residence, education and smoking and drinking habits |
| | | 42 | 39 | Former smokers | 6.31 (2.97-13.43) | |
| | | 25 | 25 | <i>Currents smokers</i> | | |
| | | 36 | 26 | <20 cigarettes/day | 6.31 (2.75-14.46) | |
| | | 63 | 18 | 20-29 cigarettes/day | 9.63 (4.28-21.64) | |
| | | 6 | 7 | ≥30 cigarettes/day | 20.77 (8.93-48.30) | |
| | | 11 | 3 | <4 cigars or equiv./day | 4.31 (1.13-16.38) | |
| | | | | ≥4 cigars or equiv./day | 20.45 (4.67-89.65) | |
| | | | | <i>Age started smoking (yrs)</i> | | |
| | | 45 | 29 | ≥17 | 1.0 | |
| | | 42 | 23 | 14-16 | 3.24 (1.69-6.20) | |
| | | 54 | 27 | <14 | 2.76 (1.55-4.89) | |
| | | | | <i>Duration of smoking (yrs)</i> | | |
| | | 26 | 29 | <38 | 1.0 | |
| | | 53 | 23 | 38-50 | 3.78 (2.05-6.99) | |
| 62 | 27 | ≥51 | 3.39 (1.82-6.32) | | | |
| Chen <i>et al.</i> (2001) USA 1985-1995 | Oral and oropharynx analyzed together | 51 | 192 | Never | 1.0 | Adjusted for age, race, and sex, alcohol consumption OR for pack-years cigarette smoking and acetylator status relative to baseline of persons who were never smokers and not slow acetylators. |
| | | 79 | 233 | Former | 1.1 (0.8-1.7) | |
| | | 211 | 127 | Current | 4.5 (3.0-6.8) | |
| | | 49 | 172 | <20 pack-years | 1.1 (0.7-1.7) | |
| | | 98 | 115 | 20-39 pack-years | 2.9 (1.9-4.5) | |
| | | 85 | 48 | 40-59 pack-years | 6.4 (3.8-10.7) | |
| | | 58 | 25 | 60+ pack-years | 7.5 (4.0-14.2) | |
| | | 20 | 21 | Smokeless tobacco use | 1.3 (0.6-2.6) | |
| | | | | <i>NAT2 (not slow)</i> | | |
| | | 24 | 91 | Never | 1.0 | |
| | | 18 | 77 | 1-19 pack-years | 1.0 (0.5-1.8) | |
| | | 43 | 53 | 20-39 pack-years | 2.2 (1.1-4.7) | |
| | | 58 | 29 | 40+ pack-years | 6.6 (2.4-18.7) | |
| | | | | <i>NAT2 (slow)</i> | | |
| | | 27 | 101 | Never | 1.0 (0.5-1.9) | |
| 31 | 95 | 1-19 pack-years | 1.2 (0.7-2.2) | | | |
| 55 | 62 | 20-39 pack-years | 3.5 (1.7-7.1) | | | |
| 85 | 44 | 40+ pack-years | 3.5 (1.5-8.5) | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments |
|--|--|-----------------------------|-----------------|--|---------------------|---|
| Chen <i>et al.</i> (2001) (contd) | Oral and oropharynx analyzed together | | | NAT2 acetylator status | | |
| | | | | <i>Not slow</i> | | |
| | | 24 | 91 | Never | 1.0 | OR for NAT2 acetylator status within strata of pack-years cigarette smoking are adjusted for age, race, sex and alcohol consumption |
| | | 18 | 77 | 1-19 pack-years | 1.0 | |
| | | 43 | 53 | 20-39 pack-years | 1.0 | |
| | | 58 | 29 | 40+ pack-years | 1.0 | |
| | | | | <i>Slow</i> | | |
| | | 27 | 101 | Never | 1.1 (0.6-2.1) | |
| | | 31 | 95 | 1-19 pack-years | 1.3 (0.7-2.6) | |
| | | 55 | 62 | 20-39 pack-years | 1.2 (0.7-2.1) | |
| 85 | 44 | 40+ pack-years | 0.9 (0.5-1.7) | | | |
| Gallus <i>et al.</i> (2003a) Italy and Switzerland 1992-1999 | Oral cavity, pharynx analyzed together | 60 | 692 | Never smokers | 1.0 | |
| | | 517 | 521 | Current smokers | 6.8 (4.9-9.4) | |
| | | | | <i>Cigarettes per day</i> | | |
| | | 108 | 205 | <15 | 4.6 (3.1-6.7) | |
| | | 244 | 225 | 15-24 | 7.7 (5.3-11.0) | |
| | | 157 | 82 | ≥25 | 12.3 (7.9-19.0) | |
| | | | | <i>Total duration of smoking (years)</i> | | |
| | | 126 | 214 | <30 | 5.1 (3.4-7.8) | |
| | | 391 | 307 | ≥30 | 7.7 (5.5-10.9) | |
| | | 172 | 557 | Ex-smokers | 2.1 (1.5-3.1) | |
| | | | | <i>Cigarettes per day</i> | | |
| | | 41 | 200 | <15 | 1.7 (1.0-2.7) | |
| | | 125 | 347 | ≥15 | 2.3 (1.6-3.4) | |
| | | | | <i>Total duration of smoking (years)</i> | | |
| | | 67 | 344 | <30 | 1.5 (1.0-2.3) | |
| | | 105 | 213 | ≥30 | 3.1 (2.1-4.6) | |
| | | | | <i>Tar yield</i> | | |
| | | 60 | 692 | Never smokers | 1.0 | |
| | | <i>Ever smokers (mg)</i> | | | | |
| 396 | 708 | <20 | 4.2 (3.0-5.8) | | | |
| 241 | 256 | ≥20 | 5.9 (4.1-8.5) | | | |
| | | <i>Current smokers (mg)</i> | | | | |
| 318 | 382 | <20 | 6.1 (4.4-8.6) | | | |
| 163 | 90 | ≥20 | 9.8 (6.5-14.8) | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments |
|---|---|------------------------|-------------------|--|--------------------------------|---|
| Gallus <i>et al.</i> (2003a) (contd) | Oral cavity, pharynx analyzed together | 31 | 63 | <i>Cigarettes smoked in the previous 6 months (mg)</i> | | |
| | | 462 | 434 | <10 ≥10 | 3.8 (2.2-6.8) 7.1 (5.1-9.9) | Estimates from unconditional multiple logistic regression models, including terms for age, sex, study centre, education and alcohol consumption |
| Lissowska <i>et al.</i> (2003) Poland 1997-2000 | Oral cavity and pharynx analyzed together | 22 | 43 | Never smokers | 1.0 | |
| | | 22 | 37 | Former smokers | 1.37 (0.58-3.25) | |
| | | 78 | 44 | Current smokers | 3.42 (1.46-8.03) | |
| | | | | <i>No./day</i> | | |
| | | 26 | 16 | <15 | 4.07 (1.40-11.85) | |
| | | 21 | 13 | 15-20 | 4.72 (1.49-14.99) | |
| | | 31 | 15 | >20 | 6.69 (2.15-20.77) | |
| | | | | <i>Age started smoking (yrs)</i> | | |
| | | 17 | 13 | >20 | 1.0 | |
| | | 39 | 19 | 18-20 | 1.96 (0.63-6.05) | |
| | | 22 | 12 | ≤17 | 2.56 (0.66-9.90) | |
| | | | | <i>Years of smoking (yrs)</i> | | |
| | | 12 | 16 | ≤26 | 1.0 | |
| | | 21 | 15 | 27-35 | 1.96 (0.39-9.98) | |
| | | 45 | 13 | >36 | 4.30 (0.72-25.82) | |
| | | | | <i>Years since ceasing smoking</i> | | |
| | | 72 | 43 | Current | 1.0 | |
| 14 | 16 | ≤10 | 0.50 (0.20-1.25) | | | |
| 12 | 33 | >10 | 0.31 (0.12-0.83) | | | |
| | | <i>Cigarettes type</i> | | | | |
| | | Never smoker | 1.0 | | | |
| 34 | 44 | Filtered | 1.64 (0.73-3.65) | | | |
| 47 | 25 | Mixed | 4.24 (1.65-10.91) | | | |
| 15 | 5 | Plain | 6.46 (1.74-24.74) | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments | |
|---|--|---|--------------------|--|---------------------|---|--|
| Castellsagué <i>et al.</i> (2004) Spain 1996-1999 | Oral cavity and oropharynx analyzed together | 55 | 113 | Never smoker | 1.0 | OR adjusted for center, gender, age group, years of schooling and average daily consumption of pure ethanol | |
| | | 320 | 262 | Ever smoker | 4.10 (2.19-7.69) | | |
| | | 82 | 133 | Ex-smoker | 2.36 (1.21-4.60) | | |
| | | 238 | 129 | Current smoker | 6.41 (3.32-12.37) | | |
| | | | | <i>Smoking amount (average no. of cigs./day)</i> | | | |
| | | 28 | 50 | 1-10 | 2.60 (1.23-5.49) | | |
| | | 97 | 80 | 11-20 | 4.94 (2.48-9.85) | | |
| | | 87 | 61 | 21-30 | 5.23 (2.55-10.74) | | |
| | | 64 | 40 | 31-40 | 4.54 (2.11-9.79) | | |
| | | 44 | 30 | ≥41 | 4.35 (1.92-9.82) | | |
| | | | | <i>Smoking amount by smoking status</i> | | | |
| | | 40 | 72 | Ex-smoker of 1 to 20 cigs./day | 2.68 (1.31-5.50) | | |
| | | 42 | 61 | Ex-smoker of ≥21 cigs./day | 2.10 (0.99-4.45) | | |
| | | 15 | 21 | Current smoker of 1 to 10 cigs./day | 3.66 (1.42-9.43) | | |
| | | 70 | 37 | Current smoker of 11 to 20 cigs./day | 8.48 (3.71-19.37) | | |
| | | 76 | 40 | Current smoker of 21 to 30 cigs./day | 8.81 (3.82-20.35) | | |
| | | 43 | 21 | Current smoker of 31 to 40 cigs./day | 7.30 (2.84-18.79) | | |
| | | 34 | 9 | Current smoker of ≥41 cigs./day | 12.21 (4.08-36.54) | | |
| | | | | <i>Years of tobacco smoking</i> | | | |
| | | 10 | 14 | 1-10 | 2.23 (0.81-6.16) | | |
| | | 14 | 21 | 11-20 | 2.84 (1.09-7.40) | | |
| | | 58 | 57 | 21-30 | 3.37 (1.55-7.32) | | |
| | | 73 | 75 | 31-40 | 3.79 (1.79-8.03) | | |
| 89 | 62 | 41-50 | 6.34 (2.95-13.60) | | | | |
| 76 | 33 | ≥51 | 10.19 (4.49-23.13) | | | | |
| | | <i>Smoking duration by smoking status</i> | | | | | |
| 49 | 91 | Ex-smoker of 1 to 40 years | 2.43 (1.21-4.89) | | | | |
| 33 | 42 | Ex-smoker of ≥41 years | 2.81 (1.25-6.32) | | | | |
| 106 | 76 | Current smoker of 1 to 40 years | 4.40 (2.16-8.95) | | | | |
| 132 | 53 | Current smoker of ≥41 years | 9.56 (4.62-19.77) | | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments |
|--|---|---------------------------------------|-----------------|---|---------------------|--|
| Rodriguez <i>et al.</i> (2004) Italy and Switzerland 1984-1997 | Oral and pharynx analyzed together | 14 | 125 | Never smokers | 1.0 | Estimates from logistic regression models conditioned on sex, age and study centre, and adjusted for education, marital status, body mass index, tobacco, alcohol and coffee consumption |
| | | 17 | 66 | Ex-smokers | 2.30 (0.90-5.86) | |
| | | 20 | 39 | <i>Current smokers (cigarettes/day)</i> | | |
| | | 48 | 47 | <15 | 4.37 (1.70-11.23) | |
| | | 37 | 22 | 15-24 | 11.26 (4.48-28.30) | |
| | | | | ≥25 | 20.66 (6.91-61.77) | |
| | | | | <i>Duration of smoking (years)</i> | | |
| | | 24 | 78 | < 20 | 2.50 (1.06-5.89) | |
| | | 41 | 49 | 20-24 | 8.67 (3.43-21.92) | |
| | | 55 | 39 | ≥25 | 17.55 (6.54-46.77) | |
| Menvielle <i>et al.</i> (2004a) France 1989-1991 | Hypopharynx and larynx analyzed together | 386 | 75 | Current smoker | 1.0 | OR adjusted for age, alcohol consumption, duration of smoking and amount of tobacco smoked |
| | | 103 | 93 | Ex-smoker | 0.3 (0.2-0.5) | |
| | | | | <i>Duration since quitting</i> | | |
| | | 386 | 75 | Current smoker | 1.0 | |
| | | 68 | 36 | 10 years and less | 0.4 (0.2-0.6) | |
| | | 29 | 36 | 11-20 years | 0.2 (0.1-0.5) | |
| | | 6 | 21 | 21 years and more | 0.1 (0.03-0.4) | |
| | | | | <i>Age at starting</i> | | |
| | | 248 | 65 | 17 years and less | 1.0 | |
| | | 187 | 71 | 18-20 years | 1.0 (0.7-1.6) | |
| | | 54 | 32 | 21 years and more | 1.5 (0.8-2.8) | |
| | | | | <i>Type of tobacco</i> | | |
| | | 89 | 27 | Hand-rolled cigarette ≥ commercial | 1.2 (0.97-1.4) | |
| | | 445 | 132 | Black tobacco ≥ blond | 1.2 (0.96-1.5) | |
| | | 125 | 45 | Use of filter ≥ no filter | 1.0 (0.9-1.2) | |
| | | | | Current smoker | | |
| 15 | 74 | Never smoker | 1.0 | | | |
| | | <i>Duration 1-30 years Amount (g)</i> | | | | |
| 1 | 8 | 1-9 | 3.0 (1.1-8.0) | | | |
| 11 | 3 | 10-19 | 4.0 (1.6-9.9) | | | |
| 33 | 5 | 20-39 | 10.6 (4.4-25.5) | | | |
| 14 | 2 | >40 | 15.2 (5.7-40.8) | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments | | | | | | |
|--|--|--------------|-----------------|---|---------------------|--|---|------------------|------------------|--|----------------|--|
| Menvielle <i>et al.</i> (2004a) (contd) | Hypopharynx and larynx analyzed together | 5 | 2 | <i>Duration 31-40 years Amount (g)</i> | | OR adjusted for age, alcohol consumption, duration of smoking and amount of tobacco smoked | | | | | | |
| | | | | 1-9 | 8.7 (3.6-21.1) | | | | | | | |
| | | | | 13 | 5 | | 10-19 | 11.5 (5.1-26.2) | | | | |
| | | | | 94 | 7 | | 20-39 | 30.6 (14.2-65.9) | | | | |
| | | 32 | 5 | >40 | 43.8 (17.9-107) | | | | | | | |
| | | 16 | 6 | <i>Duration >40 years Amount (g)</i> | | | | | | | | |
| | | | | 1-9 | 8.0 (3.5-18.3) | | | | | | | |
| | | | | 34 | 16 | | | 10-19 | 10.6 (5.0-22.2) | | | |
| | | | | 92 | 13 | | | 20-39 | 28.1 (13.8-56.9) | | | |
| | | 41 | 3 | >40 | 40.2 (17.5-92.3) | | | | | | | |
| | | 15 | 74 | Ex-smoker | | | | | | | | |
| | | | | Never smoker | | | | | 1.0 | | | |
| | | | | <i>Duration 1-30 years Amount (g)</i> | | | | | | | | |
| | | | | 1 | 7 | | | | | 1-9 | 0.8 (0.3-2.1) | |
| | | | | 5 | 12 | | | | | 10-19 | 1.1 (0.5-2.5) | |
| | | | | 6 | 19 | | | | | 20-39 | 2.9 (1.3-6.4) | |
| | | | | 9 | 4 | | | | | >40 | 4.2 (1.7-10.2) | |
| | | | | 5 | 6 | | | | | <i>Duration 31-40 years Amount (g)</i> | | |
| | | | | | | | | | | 1-9 | 2.4 (1.0-5.8) | |
| | | | | | | | | | | 7 | 7 | |
| 23 | 13 | | | | | 20-39 | | | | 8.5 (4.1-17.6) | | |
| 17 | 5 | | | >40 | 12.1 (5.2-28.0) | | | | | | | |
| 2 | 3 | | | <i>Duration >40 years Amount (g)</i> | | | | | | | | |
| | | | | 1-9 | 2.2 (0.8-5.71) | | | | | | | |
| | | | | 5 | 8 | | | | | 10-19 | 2.9 (1.2-6.9) | |
| | | 15 | 8 | 20-39 | 7.8 (3.4-17.6) | | | | | | | |
| | | 8 | 1 | >40 | 11.1 (4.2-29.3) | | | | | | | |
| Rosenquist <i>et al.</i> (2005) Sweden 2000-2004 | Oral and pharynx analyzed together | 41 | 154 | <i>Cigarette consumption (cigarettes/day)</i> | | | Adjusted for total consumption of alcohol | | | | | |
| | | | | Never smoked | | | | | 1.0 | | | |
| | | | | 21 | 74 | | | | 1-10 | 1.1 (0.6-2.1) | | |
| | | | | 49 | 71 | | | 11-20 | 2.4 (1.3-4.1) | | | |
| | | 20 | 21 | >20 | 2.8 (1.3-6.1) | | | | | | | |
| | | 34 | 141 | <i>Total tobacco consumption (kg)</i> | | | | | | | | |
| | | | | Never smoked | | | | | 1.0 | | | |
| | | | | 23 | 92 | | | | <125 | 1.1 (0.6-2.0) | | |
| | | | | 24 | 51 | | | | 125-250 | 1.8 (1.0-3.5) | | |
| | | 47 | 35 | >250 | 4.7 (2.4-9.1) | | | | | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments |
|---|---|---------------------------------|------------------|---|---------------------|---|
| Andreotti <i>et al.</i> (2006) Brazil 1999-2002 | Oral cavity and pharynx analyzed together | 16 | 134 | Never smoked | 1.0 | OR adjusted |
| | | 56 | 160 | Ex-smoker | 2.9 (1.6-5.3) | |
| | | 252 | 173 | Current smoker | 12.1 (7.0-21.0) | |
| | | | | <i>Smoking amount (pack-years)</i> | | |
| | | 18 | 135 | Never smoked | 1.0 | |
| | | 64 | 108 | ≤20 | 4.4 (2.5-7.9) | |
| Bosetti <i>et al.</i> (2008) Italy 1984-2000 | Upper aerodigestive tract (oral cavity, pharynx, oesophagus and larynx) analyzed; Oral cavity and pharynx analyzed together | 87 | 943 | All upper aerodigestive tract Never smokers | 0.12 (0.09-0.15) | Estimated from unconditional logistic regression with adjustment for age, study center, education, and alcohol drinking |
| | | 1514 | 1476 | Current smokers | 1.0 | |
| | | | | <i>Ex-smokers Time since cessation (years)</i> | | |
| | | 338 | 478 | <10 | 0.70 (0.56-0.88) | |
| | | 155 | 489 | 10-19 | 0.58 (0.47-0.73) | |
| | | 95 | 391 | ≥20 | 0.27 (0.22-0.34) | |
| | | | | <i>Age at cessation (years)</i> | | |
| | | 40 | 248 | <35 | 0.19 (0.13-0.27) | |
| | | 105 | 391 | 35-44 | 0.26 (0.21-0.34) | |
| | | 215 | 426 | 45-54 | 0.44 (0.36-0.53) | |
| | | 228 | 293 | 55-64 | 0.69 (0.56-0.86) | |
| | | | | Oral cavity and pharynx | | |
| | | 24 | 701 | Never smokers | 0.07 (0.05-0.11) | |
| | | 712 | 1176 | Current smokers | 1.0 | |
| | | | | <i>Ex-smokers Time since cessation (years)</i> | | |
| | | 144 | 383 | <10 | 0.51 (0.40-0.65) | |
| | | 56 | 330 | 10-19 | 0.20 (0.14-0.28) | |
| | | 23 | 232 | ≥20 | 0.12 (0.08-0.20) | |
| | | <i>Age at cessation (years)</i> | | | | |
| 13 | 162 | <35 | 0.14 (0.08-0.26) | | | |
| 45 | 279 | 35-44 | 0.20 (0.14-0.29) | | | |
| 90 | 301 | 45-54 | 0.36 (0.27-0.48) | | | |
| 75 | 203 | 55-64 | 0.48 (0.34-0.66) | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments | | | | | | | | | | | | | | |
|---|--|--------------|-----------------|---------------------------------|---------------------|--|-------|----------------|------------|-----------------|--|---------------------------------|----------------|--|-------------------|----------------|--|-------------------|----------------|--|
| Soya <i>et al.</i> (2007) India 2003-2006 | Squamous cell carcinoma of upper aerodigestive tract | 150 | 141 | <i>Smoking, pack-years (PY)</i> | | OR adjusted for age, gender, tobacco chewing and alcohol consumption | | | | | | | | | | | | | | |
| | | | | 0 | 1.0 | | | | | | | | | | | | | | | |
| | | | | 66 | 34 | | 1-10 | 2.1 (1.1-4.0) | | | | | | | | | | | | |
| | | | | 59 | 23 | | 11-20 | 2.6 (1.3-5.4) | | | | | | | | | | | | |
| | | | | 61 | 14 | | 20-40 | 3.7 (1.7-8.0) | | | | | | | | | | | | |
| | | | | 72 | 8 | | >40 | 7.9 (3.1-20.2) | | | | | | | | | | | | |
| | | | | <i>Tobacco chewers</i> | | | 134 | 160 | Never | 1.0 | OR adjusted for age, gender, smoking and alcohol consumption | | | | | | | | | |
| | | | | 84 | 34 | | | | Occasional | 2.5 (1.5-4.2) | | | | | | | | | | |
| | | | | 190 | 26 | | | | Regular | 10.5 (6.3-17.3) | | | | | | | | | | |
| | | | | GSTM1 present | | | | | 112 | 107 | | <i>Smoking, pack-years (PY)</i> | | OR adjusted for age, gender, tobacco chewing and alcohol consumption | | | | | | |
| | | | | Non-smokers | | | | | | | | 1.0 | | | | | | | | |
| | | | | 49 | 30 | | | | | | | 1-10 PY | 1.6 (0.8-3.2) | | | | | | | |
| | | | | 45 | 17 | | | | | | | 11-20 PY | 3.2 (1.4-7.4) | | | | | | | |
| | | | | 40 | 12 | | | | | | | 21-40 PY | 2.8 (1.2-6.5) | | | | | | | |
| | | | | 53 | 6 | | | | | | | >40 PY | 7.4 (2.6-21.4) | | | | | | | |
| | | | | <i>Tobacco chewing</i> | | | | | | | | 111 | 125 | | GSTM1 null | | OR adjusted for age, gender, smoking and alcohol consumption | | | |
| | | | | Non-chewers | | | | | | | | | | | 1.0 | | | | | |
| | | | | 56 | 27 | | | | | | | | | | Occasional | 2.1 (1.2-3.8) | | | | |
| | | | | 132 | 20 | | | | | | | | | | Regular | 9.4 (5.3-16.6) | | | | |
| | | | | <i>Smoking, pack-years (PY)</i> | | | | | | | | | | | 38 | 31 | | GSTM1 null | | OR adjusted for age, gender, tobacco chewing and alcohol consumption |
| | | | | Non-smokers | | | | | | | | | | | | | | 1.1 (0.6-2.1) | | |
| | | | | 16 | 6 | | | | | | | | | | | | | 1-10 PY | 3.3 (1.1-10.4) | |
| | | | | 15 | 6 | | | | | | | | | | | | | 11-20 PY | 1.3 (0.4-4.0) | |
| 21 | 3 | 21-40 PY | 5.9 (1.5-23.1) | | | | | | | | | | | | | | | | | |
| 19 | 2 | >40 PY | 7.8 (1.5-40.3) | | | | | | | | | | | | | | | | | |
| <i>Tobacco chewing</i> | | 22 | 35 | GSTM1 null | | OR adjusted for age, gender, smoking and alcohol consumption | | | | | | | | | | | | | | |
| Non-chewers | | | | 0.84 (0.5-1.6) | | | | | | | | | | | | | | | | |
| 29 | 8 | | | Occasional | 3.6 (1.5-8.7) | | | | | | | | | | | | | | | |
| 58 | 5 | | | Regular | 15.4 (5.8-41.0) | | | | | | | | | | | | | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments | | | |
|---------------------------------------|--|--------------|------------------|--|--|----------------|--|--|--|
| Soya <i>et al.</i> (2007) (contd) | Squamous cell carcinoma of upper aerodigestive tract | 123 | 131 | GSTT1 present | | | | | |
| | | | | <i>Smoking, pack-years (PY)</i> | | | | | |
| | | | | Non-smokers | | 1.0 | OR adjusted for age, gender, tobacco chewing and alcohol consumption | | |
| | | | | 1-10 PY | | 1.9 (1.0-3.5) | | | |
| | | | | 11-20 PY | | 2.3 (1.0-5.0) | | | |
| | | | | 21-40 PY | | 3.7 (1.7-8.2) | | | |
| | | | | >40 PY | | 7.4 (2.7-19.7) | | | |
| | | | | <i>Tobacco chewing</i> | | | OR adjusted for age, gender, smoking and alcohol consumption | | |
| | | | | Non-chewers | 124 | 147 | | 1.0 | |
| | | | | Occasional | 59 | 32 | | 1.8 (1.0-3.0) | |
| | | | | Regular | 148 | 25 | 8.3 (4.9-13.9) | | |
| | | | | GSTM1 null | | | | | OR adjusted for age, gender, tobacco chewing and alcohol consumption |
| | | | | <i>Smoking, pack-years (PY)</i> | | | | | |
| | | | | Non-smokers | 28 | 7 | 3.9 (1.5-10.0) | | |
| | | | | 1-10 PY | 8 | 3 | 2.7 (0.6-11.8) | | |
| | | | | 11-20 PY | 17 | 3 | 5.5 (1.4-21.6) | | |
| | | | | 21-40 PY | 12 | 2 | 2.6 (0.5-13.7) | | |
| | | | | >40 PY | 12 | 2 | 9.9 (1.1-87.6) | | |
| | | | | <i>Tobacco chewing</i> | | | | OR adjusted for age, gender, smoking and alcohol consumption | |
| | | | | Non-chewers | 14 | 12 | 1.1 (0.5-2.8) | | |
| Occasional | 25 | 3 | 9.5 (2.7-33.7) | | | | | | |
| Regular | 38 | 1 | 52.0 (7.0-393.3) | | | | | | |
| GSTP1 ile/ile | | | | | OR adjusted for age, gender, tobacco chewing and alcohol consumption | | | | |
| <i>Smoking, pack-years (PY)</i> | | | | | | | | | |
| Non-smokers | 79 | 74 | 1.0 | | | | | | |
| 1-10 PY | 39 | 22 | 1.4 (0.7-3.0) | | | | | | |
| 11-20 PY | 31 | 11 | 2.9 (1.1-7.4) | | | | | | |
| 21-40 PY | 36 | 8 | 3.7 (1.4-9.8) | | | | | | |
| >40 PY | 34 | 5 | 5.6 (1.7-17.9) | | | | | | |
| <i>Tobacco chewing</i> | | | | OR adjusted for age, gender, smoking and alcohol consumption | | | | | |
| Non-chewers | 82 | 87 | 1.0 | | | | | | |
| Occasional | 44 | 19 | 1.9 (1.0-3.8) | | | | | | |
| Regular | 95 | 14 | 7.6 (3.9-14.8) | | | | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments | | | | |
|--|--|--------------|-----------------|---------------------------------|---------------------|--|--|------------------------|----------------------------------|--|
| Soya <i>et al.</i> (2007) (contd) | Squamous cell carcinoma of upper aerodigestive tract | 72 | 64 | GSTP1 ile/val or val/val | | | | | | |
| | | | | <i>Smoking, pack-years (PY)</i> | | | | | | |
| | | | | Non-smokers | 0.78 (0.5-1.3) | OR adjusted for age, gender, tobacco chewing and alcohol consumption | | | | |
| | | | | 1-10 PY | 1.9 (0.8-4.8) | | | | | |
| | | | | 11-20 PY | 1.7 (0.7-4.4) | | | | | |
| | | | | 21-40 PY | 2.1 (0.7-5.9) | | | | | |
| | | | | >40 PY | 7.8 (2.0-30.7) | | | | | |
| | | | | | | | | Tobacco chewing | | |
| | | | | | | | | Non-chewers | 0.63 (0.4-1.1) | OR adjusted for age, gender, smoking and alcohol consumption |
| | | | | | | | | Occasional | 2.1 (1.1-4.3) | |
| | | | | Regular | 10.5 (5.1-21.6) | | | | | |
| Hashibe <i>et al.</i> (2007c) INHANCE consortium Europe, North America, South/Central America, International 1984-2006 | Head and neck ICD-O-2/ICD-9/ICD-10 | 854 | 2577 | Never drinkers | | Random-effects model used. Study-specific odds ratios were adjusted for age, sex, race/ethnicity, education level, study center, years of cigar smoking, and years of pipe smoking | | | | |
| | | | | <i>Cigarette smoking</i> | | | | | | |
| | | | | Never | 1.0 | | | | | |
| | | | | Ever | 2.13 (1.52-2.98) | | | | | |
| | | | | | | | | | Frequency, cigarettes/day | |
| | | | | Never smokers | 1.0 | | | | | |
| | | | | 1-10 | 1.82 (1.28-2.59) | | | | | |
| | | | | 11-20 | 2.36 (1.60-3.47) | | | | | |
| | | | | 21-30 | 3.58 (2.09-6.16) | | | | | |
| | | | | 31-40 | 4.46 (2.54-7.83) | | | | | |
| | | | | >40 | 2.69 (1.21-5.98) | | | | | |
| | | | | | | | | | Duration, y | |
| | | | | Never smokers | 1.0 | | | | | |
| | | | | 1-10 | 1.45 (1.04-2.03) | | | | | |
| | | | | 11-20 | 1.10 (0.75-1.61) | | | | | |
| | | | | 21-30 | 1.79 (1.20-2.67) | | | | | |
| | | | | 31-40 | 3.61 (2.26-5.75) | | | | | |
| | | | | >40 | 4.83 (3.18-7.33) | | | | | |
| | | | | | | | | | Cumulative smoking, py | |
| | | | | Never smokers | 1.0 | | | | | |
| 1-10 | 1.58 (1.13-2.22) | | | | | | | | | |
| 11-20 | 1.85 (1.08-3.16) | | | | | | | | | |
| 21-30 | 2.75 (1.71-4.43) | | | | | | | | | |
| 31-40 | 4.06 (2.33-7.09) | | | | | | | | | |
| 41-50 | 3.46 (1.97-6.09) | | | | | | | | | |
| >50 | 5.40 (3.06-9.53) | | | | | | | | | |

Table 2.33. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract combined

| Reference, Country and years of study | Cancer subsite | No. of cases | No. of controls | Smoking categories | Odds ratio (95% CI) | Comments |
|--|---|--------------|------------------|----------------------------------|---------------------|--|
| Hashibe <i>et al.</i> (2007c) (contd) | Head and neck ICD-O-2/ICD-9/ICD-10 | 115 | 2268 | Oral cavity/pharynx | | |
| | | 57 | 1240 | <i>Cigarette smoking</i> | 1.0 | Random-effects model used. Study-specific odds ratios were adjusted for age, sex, race/ethnicity, education level, study center, years of cigar smoking, and years of pipe smoking |
| | Oral cavity: C00.3-C00.9, C02.0-C02.3, C03.0, C03.1, C03-9, C04.0, C04.1, C04.8, C04.9, C05.0, C06.0-C06.2, C06.8 and C06.9 | 115 | 2268 | <i>Frequency, cigarettes/day</i> | 1.07 (0.50-2.28) | |
| | | 21 | 424 | Never smokers | 1.0 | |
| | | 17 | 500 | 1-10 | 1.55 (0.86-2.79) | |
| | | 11 | 148 | 11-20 | 1.08 (0.39-2.99) | |
| | | 4 | 94 | 21-30 | 2.68 (1.25-5.78) | |
| | | 4 | 59 | 31-40 | 5.46 (0.92-33.47) | |
| | Oropharynx: C01.9, C02.4, C05.1, C05.1, C05.2, C09.0, C09.1, C09.8, C09.9, C10.0-C10.4, C10.8, C10.9 analyzed together | 4 | 59 | >40 | 6.00 (1.48-24.29) | |
| | | 115 | 2268 | <i>Duration, y</i> | 1.0 | |
| | | 5 | 192 | Never smokers | 1.0 | |
| | | 7 | 228 | 1-10 | 1.71 (0.62-4.74) | |
| | | 12 | 295 | 11-20 | 2.35 (0.69-7.96) | |
| | | 13 | 278 | 21-30 | 2.14 (0.94-4.86) | |
| 20 | 226 | 31-40 | 2.07 (0.88-4.84) | | | |
| 20 | 226 | >40 | 2.56 (1.29-5.07) | | | |
| Applebaum <i>et al.</i> (2007) USA 1999-2003 | Head and neck ICD-9 141, 143, 144, 145, 146, 148, 149 and 161 | 90 | 182 | Without HPV16 serology | | Models also controlled for sex, age, race, and education |
| | | 92 | 152 | <i>Smoking, pack-years</i> | 1.0 | |
| | | 126 | 123 | None | 1.2 (0.8-1.7) | |
| | | 177 | 92 | >0 to <20 | 1.7 (1.2-2.6) | |
| | | | | 20 to <45 | 1.7 (1.2-2.6) | |
| | | | | ≥45 | 3.0 (2.0-4.6) | |
| | | 90 | 182 | With HPV16 serology | | |
| | | 92 | 152 | <i>Smoking, pack-years</i> | 1.0 | |
| | | 126 | 123 | None | 1.1 (0.7-1.7) | |
| | | 177 | 92 | >0 to <20 | 1.8 (1.2-2.7) | |
| | | 20 to <45 | 1.8 (1.2-2.7) | | | |
| | | ≥45 | 3.4 (2.2-5.3) | | | |