

Risk of total mortality in relation to type of cigarette smoked

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This is an updated version of a review conducted in 2002.

Table 1 summarizes information on the relative risk of total mortality in relation to type of cigarette smoked for 8 studies, all from the USA, UK or Western Europe. Except that the Tang et al., 1995 results include some data considered separately by Hawthorne & Fry, 1978 the studies appear to provide independent data.

The table provides information on:

1. First author and location - see references for the full author list;
2. Study design and period of deaths (or cases) – all the studies were prospective studies of deaths = P(D);
3. Comparison and test group - the comparison group has always been taken as plain rather than filter or the group with the highest tar, nicotine or tar/nicotine (T/N) for which data are available; the test group has conversely always been taken as filter rather than plain or the lowest yield available;
4. Sex - some studies only provide results for one sex; one study provided results only for the sexes combined;
5. Numbers of deaths (or cases) - the number included in the specific comparison, on occasion estimated approximately;
6. RR (95% CI) - the relative risk and 95% CI comparing the last group (numerator) with the comparison group. Where a study provides estimates adjusted for various sets of adjustment factors, RRs and CIs are, if possible, presented (a) adjusted for as many factors as possible including cigarettes/day and (b) adjusted for as many factors as possible excluding cigarettes/day. RRs and CIs are sometimes given by age or other data subset, and have often had to be estimated (see notes);
7. Adjustment factors - see key at the end of the table; and
8. Notes - see key at the end of the table.

All the studies considered present estimates that are adjusted for age, cigs/day (or in one study pack-years) and possibly other factors also. Of these 16 relative risk estimates, 13 are below 1.00 (7 statistically significantly), and 3 are above 1.00 (none significantly). Omitting the tar estimate from the study by Tang et al., 1995, which is not comparable as it is expressed on a per mg tar reduction basis and would to some extent duplicate the filter/plain estimate, and also the nicotine estimate from the study by Kuller et al., 1991 to ensure all estimates are independent, fixed-effects meta-analysis gives a relative risk estimate of 0.86 (95% CI 0.83-0.89). There is some heterogeneity between these estimates, although this is not statistically significant ($\chi^2 = 23.2$ on 13 d.f., $p = 0.06$). The random-effects estimate is 0.86 (0.82-0.90).

Only three studies provide estimates that are unadjusted for cigs/day. In both these studies the unadjusted RRs are very similar to the adjusted RRs.

Relative risk of total mortality in relation to type of cigarette smoked

First author (year)/location	Study design/ Period of deaths (or cases)	Comparison group	Test group	Sex	Number of deaths (or cases)	RR (95% CI)	Adjustment factors	Notes
Hammond et al., 1976 and Lee & Garfinkel, 1981, USA	P(D) 1960-72	High T/N	Low T/N	M F	2895 1695 2308 1830	(1) 0.88(0.82-0.95) (2) 0.81(0.74-0.89) (1) 0.84(0.77-0.91) (2) 0.82(0.75-0.90)	age, cigs, race, ages, res, occ, educ, hlc, hhd	c, 1
Hawthorne & Fry, 1978, WC Scotland	P(D) 1968-77	Plain	Filter	M F	~510 72	1.02(0.84-1.24) 1.29(0.49-3.37)	age, cigs, stud	c
Lee & Garfinkel, 1981 Migrants, UK/USA	P(D) 1964-77	Plain	Filter	M F	650 292	0.90(0.77-1.05) 0.83(0.65-1.06)	age, cigs, ages, inh	c, 2
Borland et al., 1983, Whitehall, UK	P(D) 1967-77	CO >20 mg	CO ≤18 mg	M	635	1.11(0.82-1.52) 1.13(0.83-1.54)	age, cigs, occ, tar, age, occ age, occ	r, c r, c
Kuller et al., 1991 USA	P(D) 1973-85	Tar ≥20 mg Nic ≥1.5 mg	Tar ≤15 mg Nic ≤1.0 mg	M	323 323 313 313	0.83(0.67-1.02) 0.83(0.65-1.06) 0.74(0.60-0.90) 0.73(0.59-0.91)	age, chol, bp, cigs none age, chol, bp, cigs none	r, c r, c r, c r, c
Lange et al., 1992, Denmark	P(D) 1976-89	Plain	Filter	M F	682 682 465 465	0.90(0.80-1.10) 0.95(0.79-1.14) 0.70(0.60-0.90) 0.71(0.60-0.84)	age, pyr age age, pyr age	- r, c - r, c
Tang et al., 1995, 4 UK studies	P(D) 1967-90	Risk per 15 mg tar decrease Current plain	Current filter	M	2742 2742	0.80(0.70-0.92) 0.94(0.87-1.02)	age, cigs, stud age, cigs, stud	- -
Woodward, 2001, Scotland	P(D) 1984-99	Tar ≥15 mg	Tar <10 mg	M+F	331 331	0.67(0.50-0.89) 0.68(0.44-1.05)	age, sex age, sex, sc, cigs, dur, Bor, car, vitE, vitC, bmi, pot	r, c r, c

Key to adjustment factors

age = age
 ages = age started to smoke
 bmi = body mass index
 Bor = Bortner score
 bp = blood pressure
 car = beta-carotene
 chol = cholesterol
 cigs = number of cigarettes per day

dur = duration of smoking
 educ = education
 hhd = history of heart disease
 hlc = history of lung cancer
 inh = inhalation
 occ = occupation
 pot = urinary potassium
 pyr = pack-years

race = race
 rel = religion
 res = area of residence
 sc = social class
 sex = gender
 stud = study
 tar = tar yield
 vitC = vitamin C
 vitE = vitamin E

Key to notes

- c confidence limits estimated from data provided
 r relative risk estimated from data provided
 1 numbers of deaths are "adjusted deaths" as described by Hammond et al., 1976; numbers of deaths and RR (CI) given separately for two periods, (1) 1960-66 and (2) 1966-72
 2 combined analysis of British population random sample plus sample of siblings of UK migrants to USA

References

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