

Written Submission

The following report is based on the following paper:

Lam TH, Xu L, Schooling CM, Chan WM, Lee SY and Leung GM. Smoking and mortality in a prospective cohort study of elderly Chinese in Hong Kong. Addiction. 2015;110:502-10.

Title: Smoking kills more than 1 out of 2 smokers

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Summary

World Health Organization states “Tobacco kills up to one in every two users”.(1) This absolute risk of 1/2 was based on a relative risk (RR) of two for total mortality due to smoking (2, 3) and the attributable fraction (AF) in the exposed of 50%: $AF = (RR-1)/RR$.(4) Epidemiological risk estimates of smoking have been repeatedly under-estimated partly because few studies examined oldest old smokers separately. We followed up 65,510 older people and showed that (1) the adjusted RR of total mortality of smokers aged 65+ years is 2; (2) for 85+ years, the RR is 1.3 ($AF = 23\%$). Therefore the all-cause mortality risk due to smoking should be greater than 1/2.

Text

Our knowledge of the harms of tobacco on human has mostly come from epidemiological studies. The seminal paper from the large prospective study on British doctors with 40 years of follow up published in 1994 showed a relative risk (RR) of two for total or all-death due to smoking.(3) Risk perception and communication is essential for public health action. RRs are difficult to comprehend by the public and policy makers. Even for lung cancer which is an uncommon disease with a big RR (up to about 20-30),(5) most smokers do not get lung cancer during their lifetime. Unless the absolute or baseline risk of a disease in nonsmokers is known, the absolute risk of the disease in smokers cannot be calculated. The only exception is that for total or all-cause mortality. Peto was the first to translate an RR of two for total mortality due to smoking into the absolute risk that, “*about half of teenagers who keep smoking steadily will eventually be killed by tobacco (about a quarter in old age plus a quarter in middle age)*”.(3, 4) This is based on the attributable fraction (AF) in the exposed: $AF = (RR-1)/RR$. This absolute risk of 1/2 smokers will be killed by smoking is adopted by

World Health Organization which states “Tobacco kills up to one in every two users”.(1) Despite that such a large and striking absolute risk can be understood by all, public education campaigns on 1/2 mortality risk are rare. The first campaign on 1/2 risk was successfully conducted in Ireland in 2011,(6) followed by Hong Kong in 2013. A search of all the pictorial health warnings on cigarette packs in the world up to 27 November 2013 revealed that none shows this risk.(7)

However, the history of epidemiological risk estimates of smoking has repeatedly shown under-estimates, which have been revised upwards continuously by new findings and consensus after numerous systemic reviews. The British doctors cohort 50 year follow up paper published in 2004 showed that the RR of two reported 10 years ago was an under-estimate(2). The most striking result was that if smoking started at a young age, 2 out of 3 smokers will be killed by smoking, which was based on an RR of 3.(2) Note that the British doctors cohort results were confined to men. Under-estimates of RR can be due to the gap of several decades between the peak of tobacco consumption and the peak of tobacco-induced mortality, the different stages of the tobacco epidemic in different regions of the world at different stages of epidemiological transition with different pattern of smoking (age of initiation, daily consumption and duration, and quitting) in men and women,(8) and methodological issues (such as the baseline age of the subjects and the duration of follow up). Countries such as the US and UK where the tobacco epidemic has reached stage 4 (the most advanced stage) can provide more reliable evidence of the full extent of tobacco harm. But results from countries at stage 1 such as China are certainly under-estimates,(9, 10) which will need to be revised with the maturing of the epidemic, repeating the history of under-estimates in the West. Under-estimates may not be considered as errors, but they can adversely affect estimates of disease burden, public perception, political commitment, and tobacco control actions and quitting.

We took advantage of a large, prospective elderly cohort study of 65,510 older people (65+, years) with about 10 years of follow up (mean=10.9 years, standard deviation=3.1 and total person-years=710,385) in Hong Kong, a setting with the longest life expectancy in the world,(11) and at the mature stage of the tobacco epidemic to (1) examine the RR for age 65+ with a focus on 85+; and (2) based on the RR for 85+, and RR from younger cohorts and meta-analysis above, to estimate the absolute risk of total mortality attributable to smoking. After adjustment for age, sex (as appropriate), education, social security assistance, housing type, monthly expenditure, alcohol use and health status as in Table 1, consistent with Gellert’s meta-analysis on older people(12) and our first hypothesis, the RR of total mortality due to smoking was about 2 (RR=1.93 (95% CI: 1.84-2.03) overall (age 65+ years) with no evidence of sex differences (p for sex interaction: 0.74-0.89). For 85+ years, the adjusted RR was about 1.3 (1.29, 95% CI:1.05-1.58), which yielded an AF of 23%, meaning about 1 out of 4 oldest old smokers were killed by smoking. Most of the RRs for former smokers were between those of never and current smokers, suggesting that our results should be robust. In conclusion, our study has shown that smoking kills one out of four oldest old smokers, and together with existing evidence, we conclude that the all-cause mortality risk due to smoking should be greater than 1/2.

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