

# THE LANCET

## Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: Chen Z, Peto R, Zhou M, et al, for the China Kadoorie Biobank (CKB) collaborative group. Contrasting male and female trends in tobacco-attributed mortality in China: evidence from successive nationwide prospective cohort studies. *Lancet* 2015; **386**: 1447–56.

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**Webtable 1: ICD codes for specific causes of death** \_

Category	ICD-9	ICD-10
Lung cancer (including trachea)	162	C33-C34
Liver cancer	155	C22
Stomach cancer	151	C16
Oesophagus cancer	150	C15
Five minor sites (Lip/oral cavity, larynx, pharynx, pancreas and bladder)	140-149, 157, 161, 188	C00-C14, C25, C32, C67
Cancer, other or unknown	Rest of 140-208	Rest of C00-C97
<b>All cancer</b>	<b>140-208</b>	<b>C00-C97</b>
Ischaemic heart disease	410-414	I20-I25
Ischaemic stroke	433-435	I63
Haemorrhagic stroke	430-432	I61
Other or unknown type of stroke	436-438	Rest of I60-I69
Other cardiovascular	Rest of 410-438, exc. 415-417	Rest of I00-I99, exc. I26-I27
<b>All vascular</b>	<b>410-438, exc. 415-417</b>	<b>I00-I99 exc. I26-I27</b>
COPD	490-496, 415-417	J40-J44, I26-I27
Other respiratory	Rest of 460-519	Rest of J00-J99
<b>All respiratory</b>	<b>460-519, 415-417</b>	<b>J00-J99, I26-I27</b>
<b>All other medical</b>	<b>Rest of 001-799</b>	<b>Rest of A00-R99</b>
<b>All non-medical</b>	<b>800-999, E800-E999, V01-V82</b>	<b>V01-Y98</b>

**Webtable 2: Number of deaths at age 40-79, mortality RRs and proportion of deaths attributed to smoking among men in ~1995 (CPSS, 1991-99) and men and women in ~2010 (CKB, 2006-14)**

Cause of deaths	CPSS men only (First study, 1991-99)			CKB men (Second study, 2006-14)			CKB women (Second study, 2006-14)		
	No of deaths Smokers/Non-smokers*	RR <sup>†</sup> (95% CI)	PAF <sup>‡</sup> (%)	No of deaths Smokers/Non-smokers*	RR <sup>†</sup> (95% CI)	PAF <sup>‡</sup> (%)	No of deaths Smokers/Non-smokers*	RR <sup>†</sup> (95% CI)	PAF <sup>‡</sup> (%)
Lung cancer	1024/232	1.95 (1.68 - 2.26)	39	1073/161	2.58 (2.17 - 3.05)	51	101/618	2.56 (2.02 - 3.26)	9
Liver cancer	977/374	1.06 (0.93 - 1.20)	3	644/176	1.26 (1.06 - 1.50)	16	31/382	1.40 (0.93 - 2.12)	2
Stomach cancer	870/273	1.22 (1.06 - 1.41)	14	602/170	1.25 (1.05 - 1.49)	14	26/334	1.43 (0.92 - 2.23)	2
Oesophagus cancer	662/233	1.18 (1.01 - 1.38)	11	567/124	1.58 (1.30 - 1.93)	28	13/236	1.05 (0.55 - 2.01)	0
Five minor sites	215/78	1.18 (0.90 - 1.54)	11	282/62	1.53 (1.15 - 2.04)	27	14/210	0.98 (0.55 - 1.75)	-1
<b>All cancer</b>	<b>4201/1352</b>	<b>1.28 (1.20 - 1.36)</b>	<b>16</b>	<b>3811/913</b>	<b>1.51 (1.40 - 1.63)</b>	<b>26</b>	<b>272/3037</b>	<b>1.58 (1.37 - 1.81)</b>	<b>3</b>
IHD	1172/406	1.26 (1.12 - 1.42)	16	1261/426	1.38 (1.23 - 1.54)	19	130/1212	1.74 (1.42 - 2.12)	5
Ischaemic stroke	817/333	1.11 (0.97 - 1.27)	7	395/132	1.41 (1.15 - 1.73)	19	25/353	1.15 (0.74 - 1.78)	1
Haemorrhagic stroke	2437/816	1.06 (0.98 - 1.16)	5	1251/397	1.03 (0.92 - 1.16)	1	88/1262	1.09 (0.86 - 1.39)	1
<b>All cardiovascular</b>	<b>6277/2203</b>	<b>1.12 (1.07 - 1.18)</b>	<b>8</b>	<b>3578/1193</b>	<b>1.24 (1.16 - 1.33)</b>	<b>13</b>	<b>319/3530</b>	<b>1.44 (1.27 - 1.63)</b>	<b>3</b>
<b>All respiratory</b>	<b>5193/1504</b>	<b>1.27 (1.20 - 1.35)</b>	<b>16</b>	<b>1068/244</b>	<b>1.64 (1.42 - 1.90)</b>	<b>31</b>	<b>159/710</b>	<b>1.78 (1.46 - 2.17)</b>	<b>8</b>
<b>All other medical</b>	<b>2055/752</b>	<b>1.07 (0.98 - 1.17)</b>	<b>5</b>	<b>1062/360</b>	<b>1.20 (1.06 - 1.36)</b>	<b>12</b>	<b>110/1133</b>	<b>1.41 (1.13 - 1.76)</b>	<b>3</b>
<b>All causes</b>	<b>18875/6236</b>	<b>1.17 (1.14 - 1.21)</b>	<b>11</b>	<b>10326/2955</b>	<b>1.33 (1.28 - 1.39)</b>	<b>18</b>	<b>897/9037</b>	<b>1.51 (1.40 - 1.63)</b>	<b>3</b>

\* Excludes 4306 and 15,271 (14,080 male) ever regular smokers who stopped smoking by choice in CPSS and CKB respectively.

† Rate ratios (RRs) were all adjusted for area and age at risk (strata), education and alcohol. Additional adjustment for SBP ((1.18 [1.16-1.20], 1.35 [1.32-1.37], 1.56 [1.46-1.67] for, respectively CPSS men, CKB men and CKB women), for BMI ((1.15 [1.13-1.17], 1.30 [1.27-1.32], 1.48 [1.39-1.58] for, respectively CPSS men, CKB men and CKB women) and for SBP and BMI ((1.15 [1.13-1.17], 1.30 [1.27-1.33], 1.53 [1.43-1.63] for, respectively CPSS men, CKB men and CKB women) hardly changed the RRs for overall mortality.

‡ In estimating Population Attributable Fraction (PAF) for ever regular smoking, the RR used is for all ever regular smokers including those who stopped by choice.

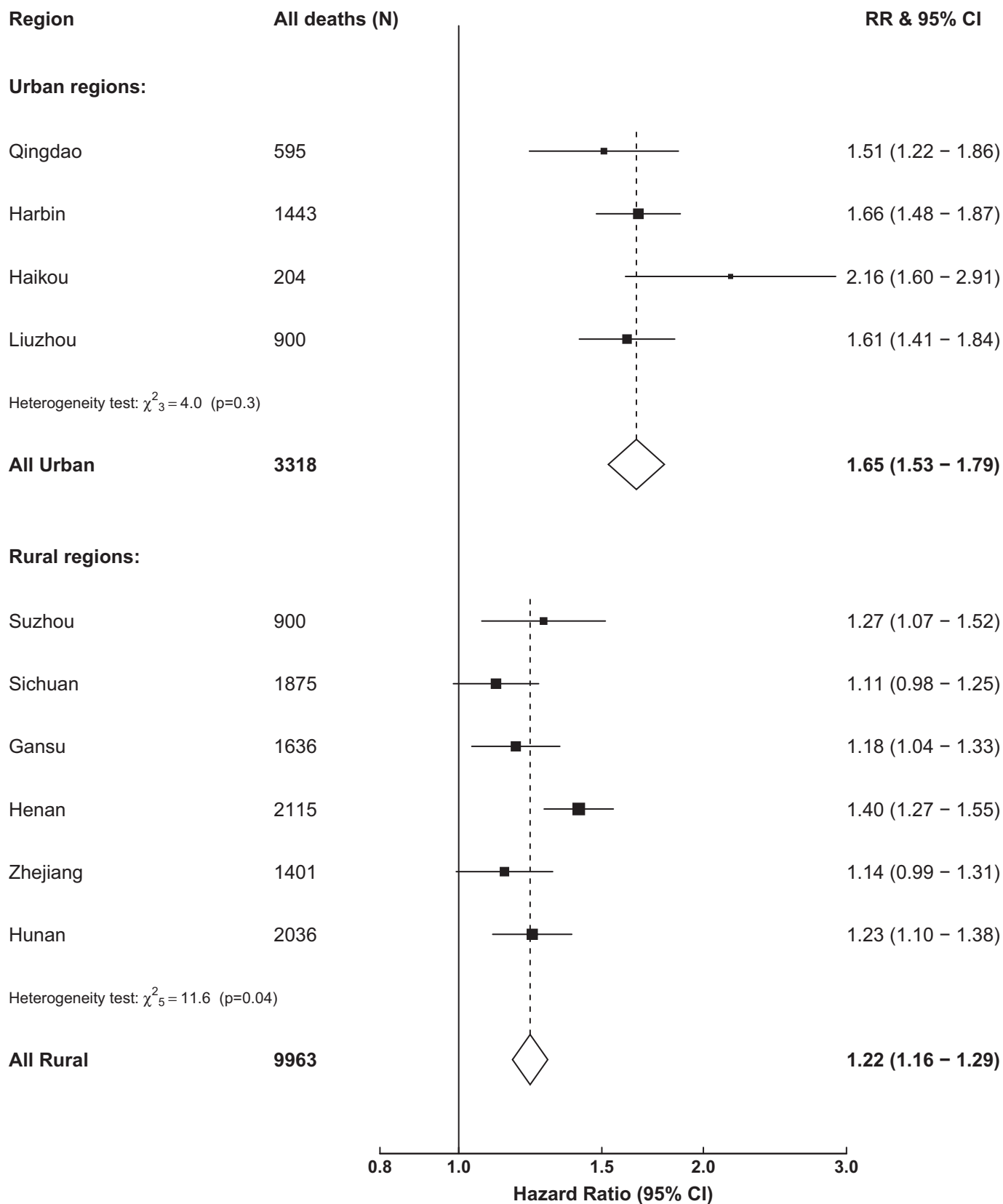
**Webtable 3: Baseline characteristics of men at age 40-79 in the first (CPSS, 1991) versus second study (CKB, 2004-08)**

Characteristics	CPSS (n=219,893)	CKB* (n=180,658)
% urban	27.1	43.7
Year of baseline survey (median)	1991	2006
Year of birth (median)	1938	1952
<b>Age at baseline (%)</b>		
40-49	37.8	32.8
50-59	31.6	35.3
60-69	21.4	22.9
70-79	9.2	9.1
Mean age (years)	54.8	55.4
<b>Highest education (%)</b>		
None	22.7	10.0
Primary	44.2	35.5
Secondary	27.8	47.4
Tertiary	5.3	7.0
<b>Current alcohol drinking in most weeks (%)</b>	33.4	33.2
<b>Smoking category (%)</b>		
Never smoked regularly	26.8	24.7
Ex-smoker (stopped by choice)	2.0	7.2
<i>[Ex-smoker (stopped by choice) as % of ever-smoker]</i>	<i>[2.7]</i>	<i>[9.6]</i>
Smoker (current smoker or stopped because ill)	71.2	68.1
– Current smoker	67.4	60.8
– Stopped because ill	3.8	7.3
<b>Patterns among smokers #</b>		
<b>Age started (%)</b>		
<20	30.2	32.2
20-24	41.6	37.2
≥25	28.2	30.6
<b>First started on cigarettes, by birth year (%)</b>		
<1925	41.5	—
1925-1934	52.0	56.8
1935-1944	60.1	64.0
1945-1954	69.1	75.2
≥1955	—	89.2
<b>Last smoked cigarettes only, by age (%)</b>		
40-49	67.8	92.9
50-59	54.9	83.0
60-69	43.2	73.2
70-79	31.5	71.4
Any age	55.4	83.4
Mean cigarettes/day/pure cigarette smoker of any age	16.9	18.1

\* Excluded 29,564 men aged <40 at entry

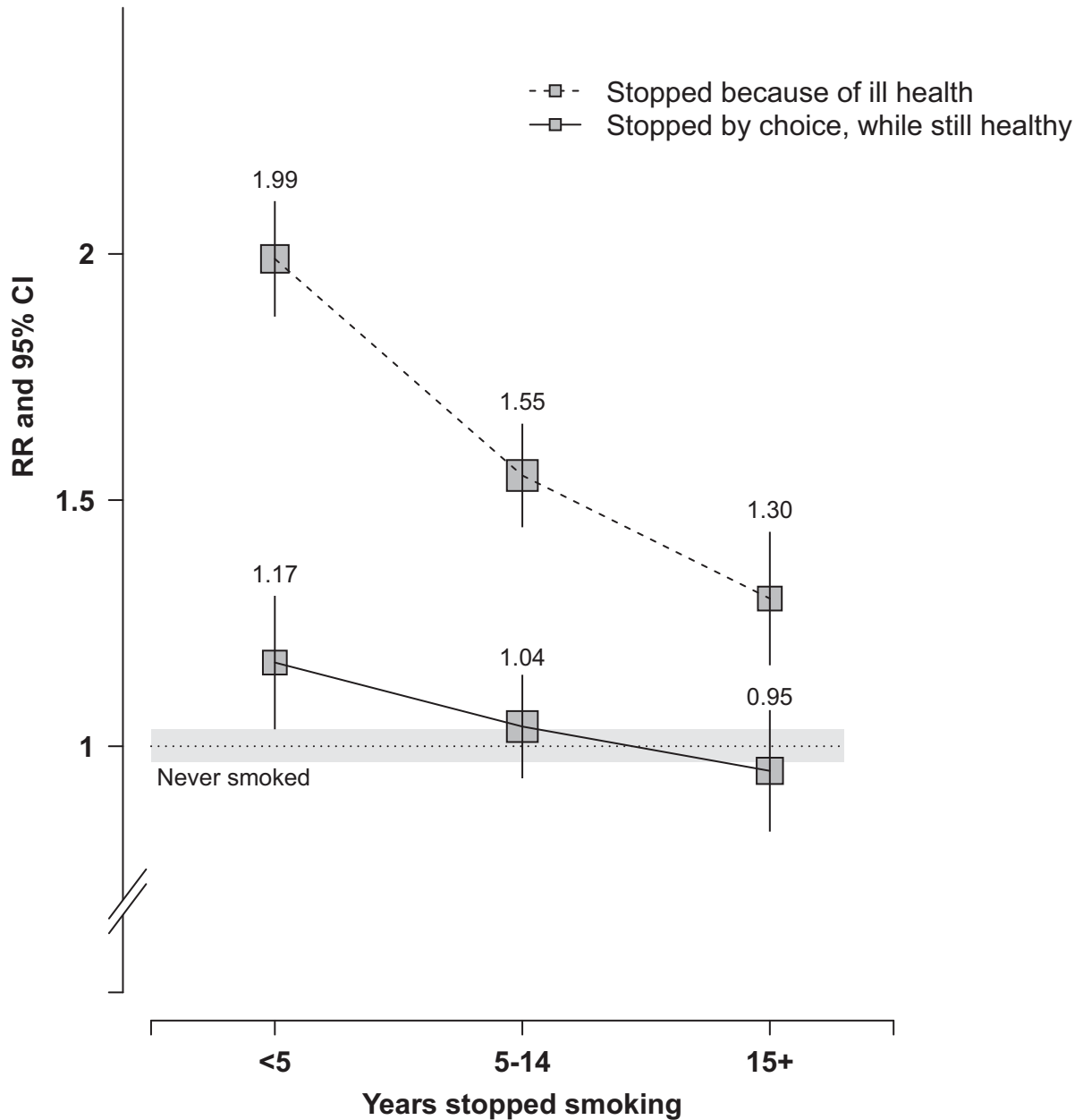
# Current smoker or stopped because ill

**Webfigure 1: Adjusted rate ratios for all-cause mortality in men, by area, in the second prospective study (CKB, 2006–14)**



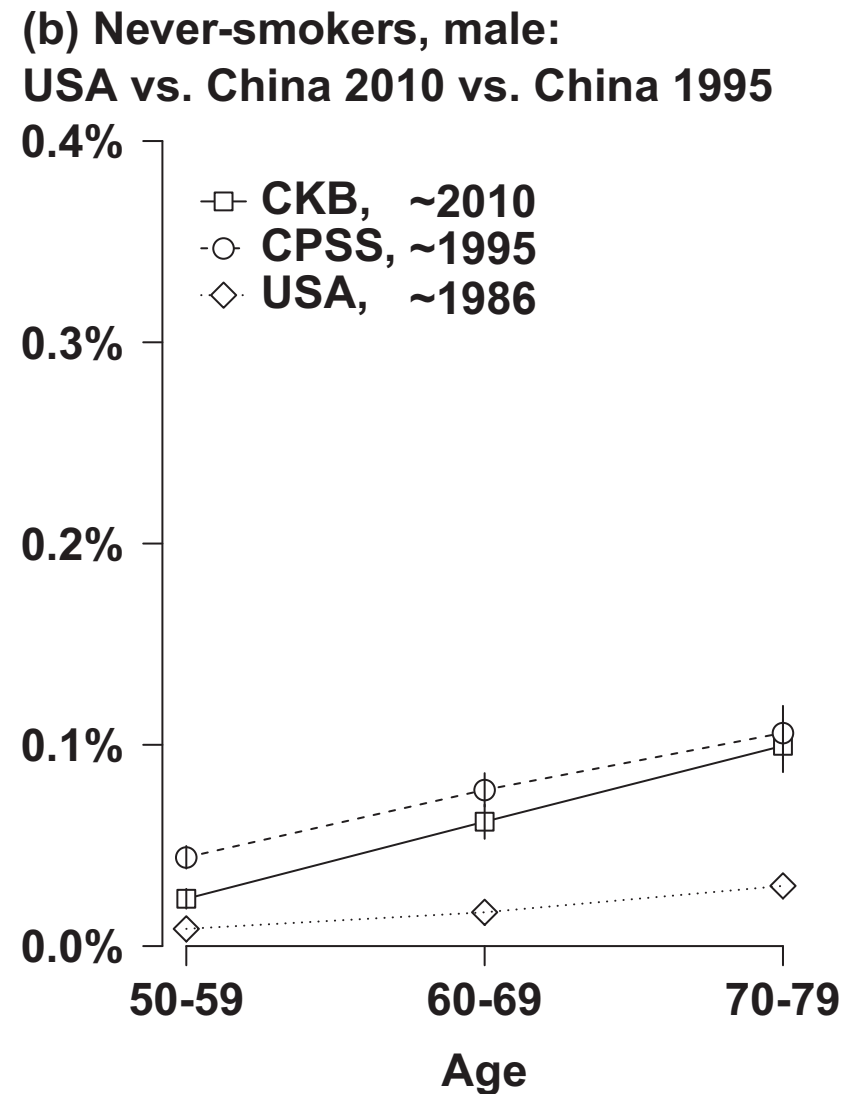
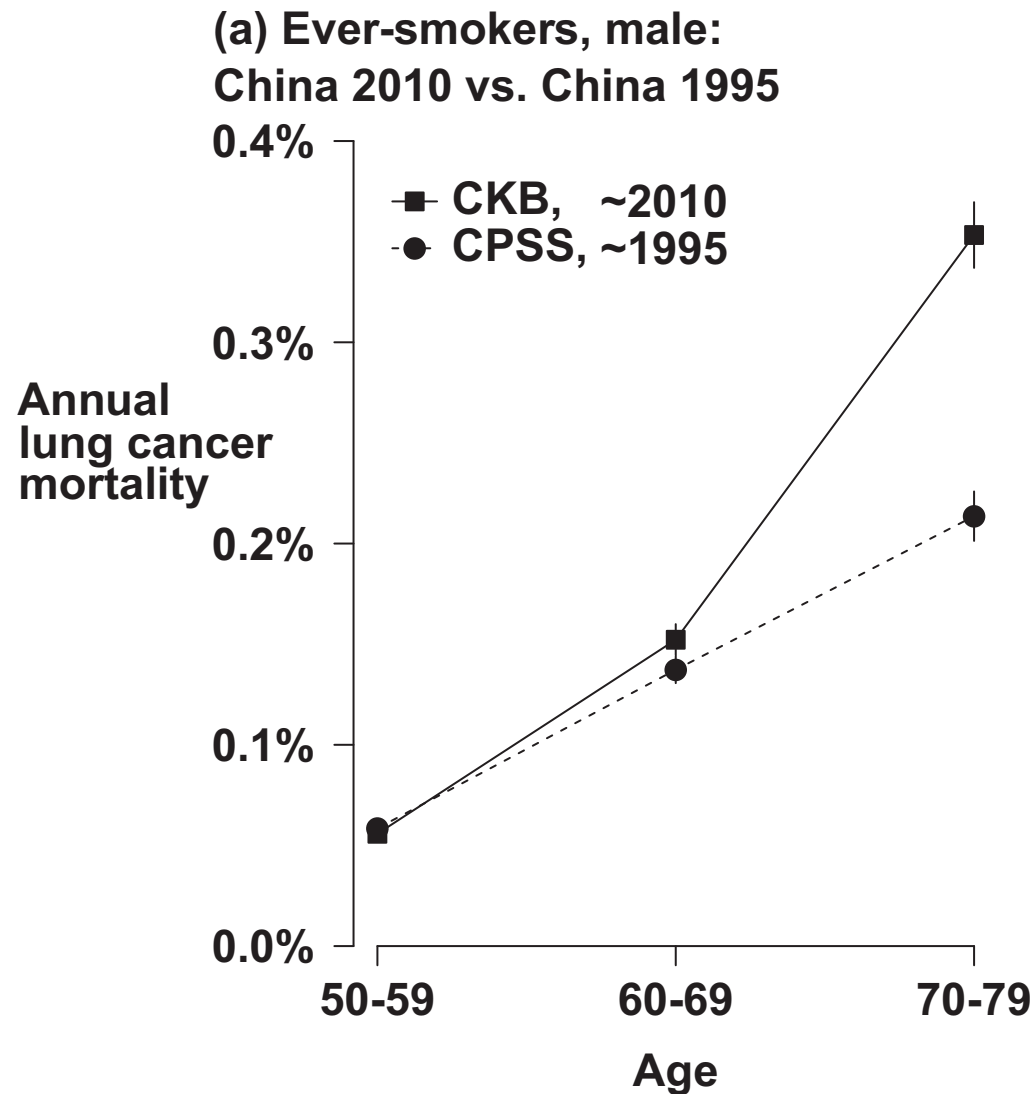
## Webfigure 2: Ex- versus never-smoker all-cause mortality rate ratio, by years stopped smoking and reason stopped; men in both studies

Each group-specific CI (including that for never-smokers, given by the width of the shaded strip) reflects the variance of the log risk in that 1 group, so comparisons use variances from >1 group.



**Webfigure 3: Changing Chinese male lung cancer mortality, 1995-2010, among ever-smokers and never-smokers in two nationally representative prospective studies about 15 years apart**

NB: Rates in later middle age are increasing in Chinese smokers, decreasing in Chinese never-smokers, and roughly constant in US never-smokers. CKB, Chinese Kadoorie Biobank, follow-up ~2006-2014; CPSS, Chinese Prospective Smoking Study, follow-up ~1991-1999; USA, ACS CPS-II, follow-up 1984-1988 [3]. Non-smoker rates: webtables 4-5.





**Webtable 4: Chinese never-smoker lung cancer death rates by age and sex in two successive prospective studies 15 years apart (1991-99 and 2006-14)**

Age at risk (in years)	Male, 1991-99 (mid-year 1995)			Male, 2006-14 (mid-year 2010)			Female, 2006-14 (mid-year 2010)		
	Person years	Lung ca deaths	Rate / 100000	Person years	Lung ca deaths	Rate / 100000	Person years	Lung ca deaths	Rate / 100000
<b>40-44</b>	32391	5	<b>18</b>	56656	6	<b>10</b>	321656	10	<b>8</b>
<b>45-49</b>	76630	16		52234	5		341274	45	
<b>50-54</b>	71812	31	<b>44</b>	46190	7	<b>26</b>	328126	51	<b>21</b>
<b>55-59</b>	68713	31		51852	19		350710	91	
<b>60-64</b>	62924	46	<b>78</b>	46243	22	<b>66</b>	259817	99	<b>54</b>
<b>65-69</b>	49204	41		39430	33		176555	123	
<b>70-74</b>	35752	34	<b>109</b>	36527	37	<b>125</b>	131322	116	<b>107</b>
<b>75-79</b>	22810	28		21490	32		65702	83	
<b>Total, by summation</b>	420235	232		350621	161		1975162	618	

Never-smokers include those who reported at baseline having smoked occasionally, but never regularly.

The crude rate in each age group is  $100,000 \times$  the number of lung cancer deaths / person-years.

The rate in each 10-year age group is the mean of the two crude rates in the component 5-year age groups.

**Webtable 5: US never-smoker lung cancer mortality rates by age and sex in the American Cancer Society's Second Cancer Prevention Study, CPS-II, during years 3-6 of the prospective follow-up (approximately 1984-88)**

Age at risk (in years)	Male, 1984-88 (mid-year 1986)			Female, 1984-88 (mid-year 1986)		
	Person years	Annual lung cancer mortality / 100,000		Person years	Annual lung cancer mortality / 100,000	
		Crude rate	Smoothed		Crude rate	Smoothed
<b>35-39</b>	14560	7	<b>2</b>	30810	3	<b>2</b>
<b>40-44</b>	13930	0	<b>3</b>	45760	0	<b>3</b>
<b>45-49</b>	32110	9	<b>5</b>	116870	4	<b>4</b>
<b>50-54</b>	81410	5	<b>7</b>	196520	5	<b>7</b>
<b>55-59</b>	87920	3	<b>10</b>	224110	8	<b>10</b>
<b>60-64</b>	80570	11	<b>14</b>	227400	14	<b>14</b>
<b>65-69</b>	69670	24	<b>20</b>	192560	18	<b>19</b>
<b>70-74</b>	50530	36	<b>27</b>	143280	28	<b>26</b>
<b>75-79</b>	28880	38	<b>35</b>	95900	42	<b>34</b>

Source: Appendix to Reference (3). Never-smoker means replied "never smoked regularly" at baseline survey.

The crude rate in each age group is  $100,000 \times$  the number of lung cancer deaths / person-years.

Smoothing the lung cancer mortality rates in the 5-year age groups with lower limits 35, 40, ... , 75 involved obtaining the best-fitting line of slope 4 on a logarithmic graph of the crude rates vs these lower age limits; then, in Webfigure 3, the US rates at ages 50-59, 60-69 and 70-79 are each the mean of two smoothed rates.