

## Supporting Information

### Long-term exposure to ambient fine particulate matter and incidence of major cardiovascular diseases: a prospective study of 0.5 million adults in China

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**Contents for SI:** 10 pages, 3 tables and 3 figures.

**Table S1. Counts of incident cases for major cardiovascular diseases in 10 regions of CKB cohort.**

Region	CVD	IHD	AMI	Stroke	Hemorrhagic stroke	Ischemic stroke	MACE	MVE	MCE
Qingdao	8,595	4,455	691	2,062	249	1,788	2,590	2645	692
Harbin	27,859	13,528	836	14,958	1,015	14,240	15,320	15,391	836
Haikou	8,278	2,023	427	4,514	234	4,353	4,735	4,738	427
Suzhou	6,149	1,391	134	2,952	448	2,437	2,978	3,061	135
Liuzhou	12,670	4,909	291	5,014	636	4,393	5,162	5,230	292
Pengzhou	12,619	3,929	352	3,614	848	2,825	3,830	3,889	352
Maiji	12,480	3,793	328	4,450	760	3,772	4,627	4,700	329
Huixian	19,531	6,425	769	9,964	1,422	8,770	10,470	10,567	781
Tongxiang	19,943	3,509	274	3,501	771	2,707	3,681	3,727	275
Liuyang	19,906	6,361	502	6,193	1,301	4,889	6,412	6,578	503
Total	148,030	50,323	4,604	57,222	7,684	50,174	59,805	60,526	4,622

Abbreviations: CVD, cardiovascular disease; IHD, ischemic heart disease; AMI, acute myocardial infraction; MACE, major adverse cardiovascular events; MVE, major vascular events; MCE, major coronary events.

**Table S2. Annual counts (%) of cardiovascular incident cases in 10 regions of CKB cohort.**

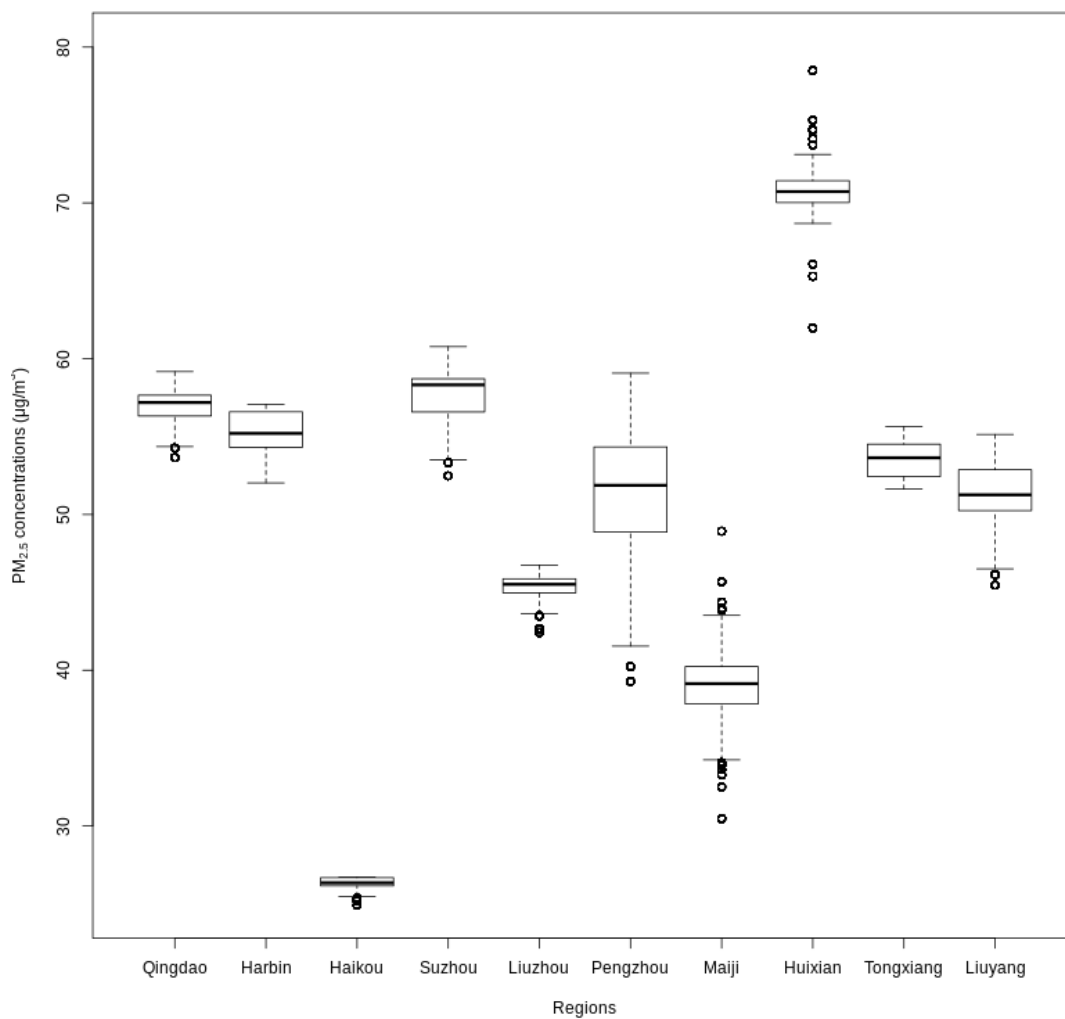
Region	Years of follow-up													Sum
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
Qingdao	69	235	443	642	663	650	642	790	867	951	958	881	804	8595
	(0.80%)	(2.73%)	(5.15%)	(7.47%)	(7.71%)	(7.56%)	(7.47%)	(9.19%)	(10.09%)	(11.06%)	(11.15%)	(10.25%)	(9.35%)	(100.00%)
Harbin	189	526	1712	2782	2569	2616	2823	2537	2612	2500	2338	2398	2257	27859
	(0.68%)	(1.89%)	(6.15%)	(9.99%)	(9.22%)	(9.39%)	(10.13%)	(9.11%)	(9.38%)	(8.97%)	(8.39%)	(8.61%)	(8.10%)	(100.00%)
Haikou	54	176	234	455	553	750	866	987	1052	820	796	863	672	8278
	(0.65%)	(2.13%)	(2.83%)	(5.50%)	(6.68%)	(9.06%)	(10.46%)	(11.92%)	(12.71%)	(9.91%)	(9.62%)	(10.43%)	(8.12%)	(100.00%)
Suzhou	8	21	106	207	353	410	543	582	670	783	838	824	804	6149
	(0.13%)	(0.34%)	(1.72%)	(3.37%)	(5.74%)	(6.67%)	(8.83%)	(9.46%)	(10.90%)	(12.73%)	(13.63%)	(13.40%)	(13.08%)	(100.00%)
Liuzhou	69	349	650	979	1106	1142	1119	876	1429	1354	1235	1257	1105	12670
	(0.54%)	(2.75%)	(5.13%)	(7.73%)	(8.73%)	(9.01%)	(8.83%)	(6.91%)	(11.28%)	(10.69%)	(9.75%)	(9.92%)	(8.72%)	(100.00%)
Pengzhou	34	129	262	437	812	550	751	1501	1373	1972	1006	3065	727	12619
	(0.27%)	(1.02%)	(2.08%)	(3.46%)	(6.43%)	(4.36%)	(5.95%)	(11.89%)	(10.88%)	(15.63%)	(7.97%)	(24.29%)	(5.76%)	(100.00%)
Maiji	24	93	205	402	611	474	3856	2120	750	665	825	1239	1216	12480
	(0.19%)	(0.75%)	(1.64%)	(3.22%)	(4.90%)	(3.80%)	(30.90%)	(16.99%)	(6.01%)	(5.33%)	(6.61%)	(9.93%)	(9.74%)	(100.00%)

Huixian	121	379	581	1116	1452	1585	1485	2365	2362	2362	2191	1847	1685	19531
	(0.62%)	(1.94%)	(2.97%)	(5.71%)	(7.43%)	(8.12%)	(7.60%)	(12.11%)	(12.09%)	(12.09%)	(11.22%)	(9.46%)	(8.63%)	(100.00%)
Tongxiang	32	87	6026	5244	4284	308	399	472	558	589	603	624	717	19943
	(0.16%)	(0.44%)	(30.22%)	(26.29%)	(21.48%)	(1.54%)	(2.00%)	(2.37%)	(2.80%)	(2.95%)	(3.02%)	(3.13%)	(3.60%)	(100.00%)
Liuyang	4	183	392	1761	1773	2080	1782	1819	2086	2043	1841	2423	1719	19906
	(0.02%)	(0.92%)	(1.97%)	(8.85%)	(8.91%)	(10.45%)	(8.95%)	(9.14%)	(10.48%)	(10.26%)	(9.25%)	(12.17%)	(8.64%)	(100.00%)
Total	604	2178	10611	14025	14176	10565	14266	14049	13759	14039	12631	15421	11706	148030
	(0.41%)	(1.47%)	(7.17%)	(9.47%)	(9.58%)	(7.14%)	(9.64%)	(9.49%)	(9.29%)	(9.48%)	(8.53%)	(10.42%)	(7.91%)	(100%)

**Table S3. Hazard ratios of cardiovascular diseases associated with per 10 µg/m<sup>3</sup> increase in PM<sub>2.5</sub> concentrations in different regions.**

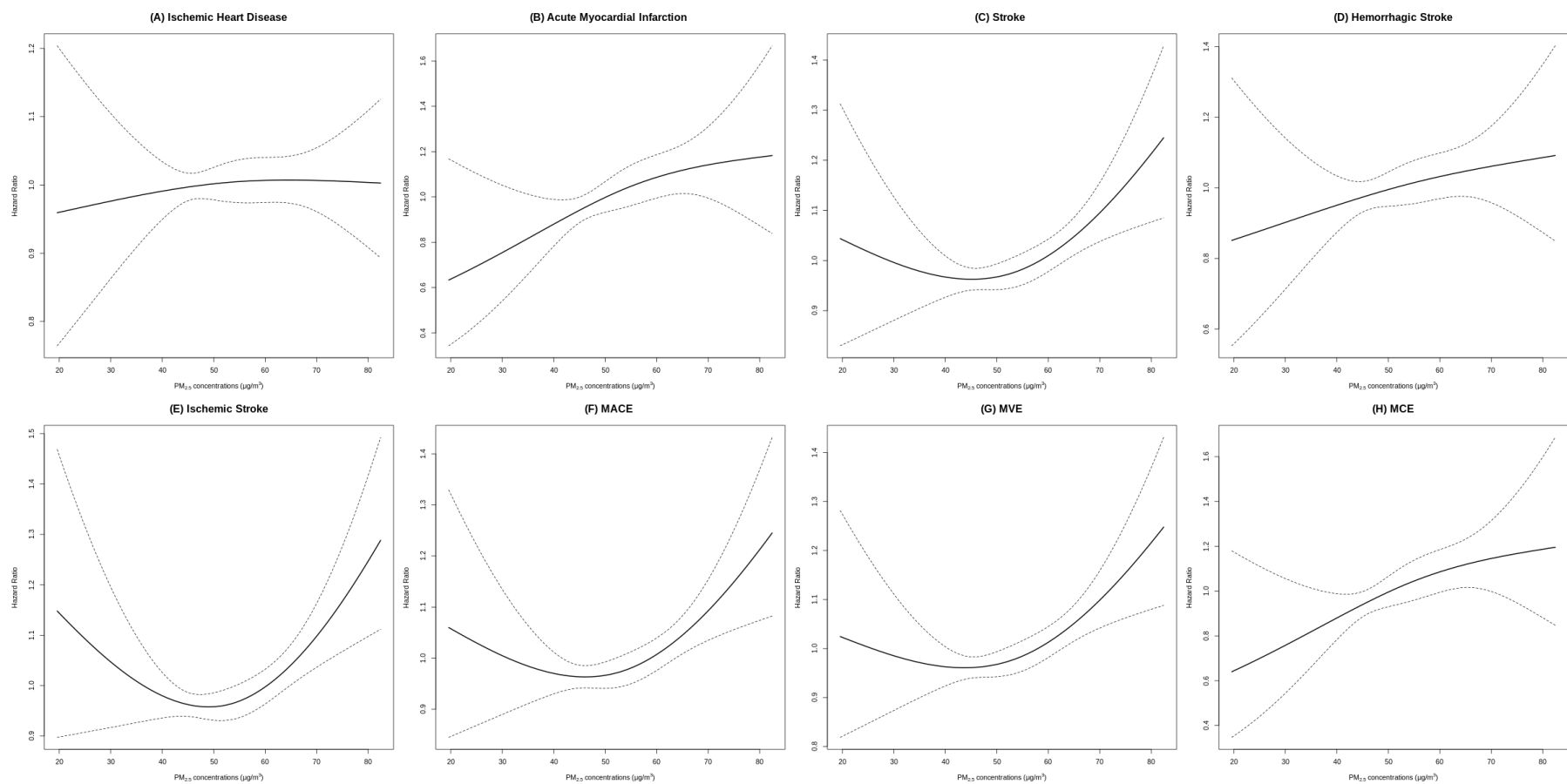
<b>Regions</b>	<b>Unadjusted model</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>
Qingdao	1.22 (1.07, 1.39)	1.20 (1.05, 1.38)	1.23 (1.07, 1.40)	1.21 (1.05, 1.38)
Liuzhou	0.98 (0.95, 1.02)	0.98 (0.95, 1.02)	0.98 (0.95, 1.02)	1.00 (0.97, 1.05)
Haikou	0.95 (0.78, 1.15)	0.95 (0.78, 1.15)	0.94 (0.78, 1.14)	1.06 (0.79, 1.44)
Suzhou	1.05 (0.98, 1.12)	1.05 (0.98, 1.12)	1.05 (0.98, 1.13)	0.99 (0.92, 1.07)
Harbin	1.04 (1.01, 1.08)	1.04 (1.01, 1.08)	1.04 (1.01, 1.07)	1.04 (1.01, 1.08)
Pengzhou	0.98 (0.94, 1.02)	0.97 (0.93, 1.02)	0.98 (0.93, 1.03)	0.98 (0.94, 1.02)
Maiji	1.39 (1.20, 1.61)	1.40 (1.21, 1.63)	1.46 (1.26, 1.71)	1.39 (1.19, 1.64)
Liuyang	1.04 (0.94, 1.15)	1.04 (0.94, 1.15)	1.03 (0.93, 1.13)	0.99 (0.87, 1.12)
Tongxiang	1.64 (1.34, 2.01)	1.64 (1.34, 2.01)	1.69 (1.39, 2.06)	1.28 (1.06, 1.55)
Huixian	1.51 (1.30, 1.74)	1.50 (1.30, 1.73)	1.42 (1.24, 1.62)	1.34 (1.16, 1.54)

Notes: Unadjusted model, adjusting for age and sex only. Model 1, adjusting for age, sex, active smoking status, passive smoking status. Model 2, adjusting for age, sex, active/passive smoking status, education, BMI, self-rated health, alcohol consumption, physical activity, household income, solid fuel used for cooking/heating. Model 3, adjusting for age, sex, active/passive smoking status, education, BMI, self-rated health, alcohol consumption, physical activity, household income, solid fuel used for cooking/heating, ozone and temperature.

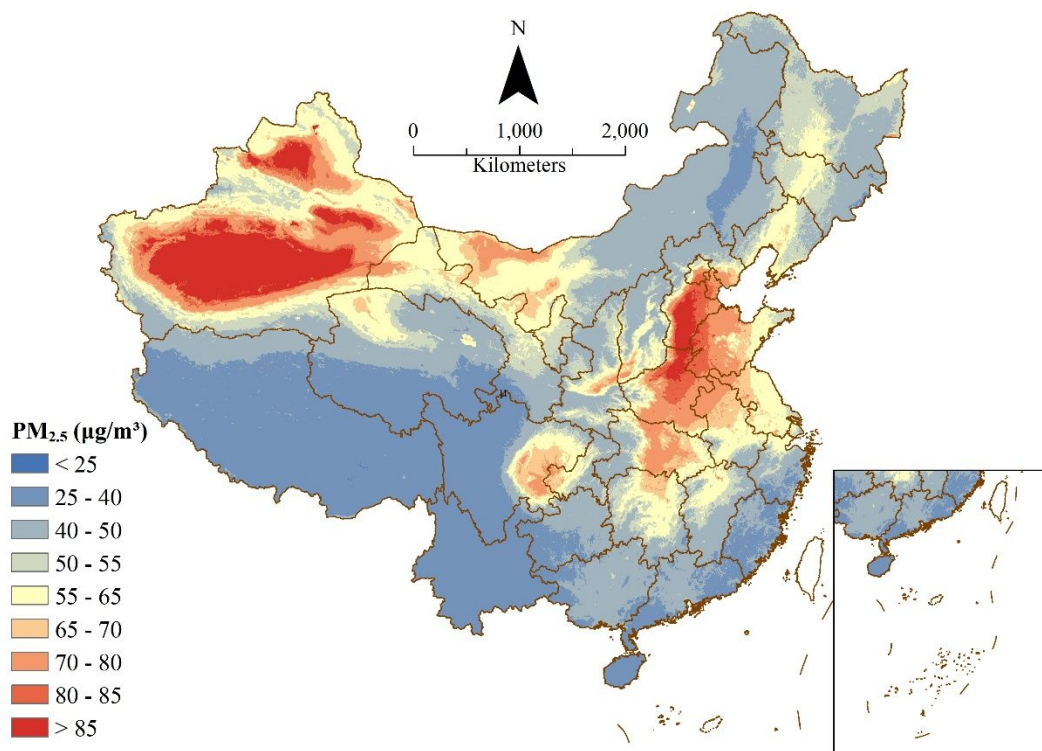


**Figure S1. Boxplots for average annual mean concentrations of long-term exposure to PM<sub>2.5</sub> in 10 regions of CKB.**





**Figure S2. Concentration-response curves for long-term exposure to PM<sub>2.5</sub> and incident risk of specific cardiovascular diseases. (A) Ischemic heart disease, (B) Acute myocardial infarction, (C) Stroke, (D) Hemorrhagic stroke, (E) Ischemic stroke, (F) Major adverse cardiovascular events, (G) Major vascular events, (H) Major coronary events.**



**Figure S3. Predicted PM<sub>2.5</sub> concentration from the satellite-based exposure assessment model from 2005 to 2017.**