THE LANCET

Supplementary appendix

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The Tsinghua-*Lancet* Commission on Healthy Cities in China: unlocking the power of cities for a healthy china

Appendix 1 Targets included in the Healthy China 2030 plan

	Indicator	2015	2030
Health status	Life expectancy (years)	76·3	79·0
	Infant mortality (% per 1000 people)	8·1	5·0
	Under-5 mortality (% per 1000 people)	10·7	6·0
	Maternal mortality (per 100 000 people)	20·1	12·0
	People meeting the fitness standards defined in the National Physical Fitness standards (% of total population)	89·6	92·2
Healthy living	Health literacy (% of total population)	10	30
	Frequent physical exercises (100 million)	3·6	5·3
Health service and protection	Premature death rate from major chronic diseases (% of total population)	19·1	30% lower than in 2015
	Practicing or assistant physicians per 1000 people	2·2	3·0
	Out-of-pocket payment as a share of total health expenditure (% of total expenditure)	29·3	about 25
Healthy environment	Percentage of days with good air quality* in cities at prefecture level or above (%)	76·7	>80 by 2020, then continuous improvement
	Percentage of surface water scoring at least level 3† (%)	66	>70 by 2020, then continuous improvement
Health industry	Total size of industry	..	¥16 trillion (US$2·3 trillion in 2017)

*Good air quality means that the air quality index is less than 100. †Level 3 water quality refers to water that can be used for drinking, fishing, and swimming.

Source: Central Committee of Chinese Communist Party. State Council. The Plan for Healthy China 2030. Beijing: Government of the People's Republic of China, 2016.

Appendix 2 Urban population growth rates in prefecture-level cities and above in China between 1978 and 2015
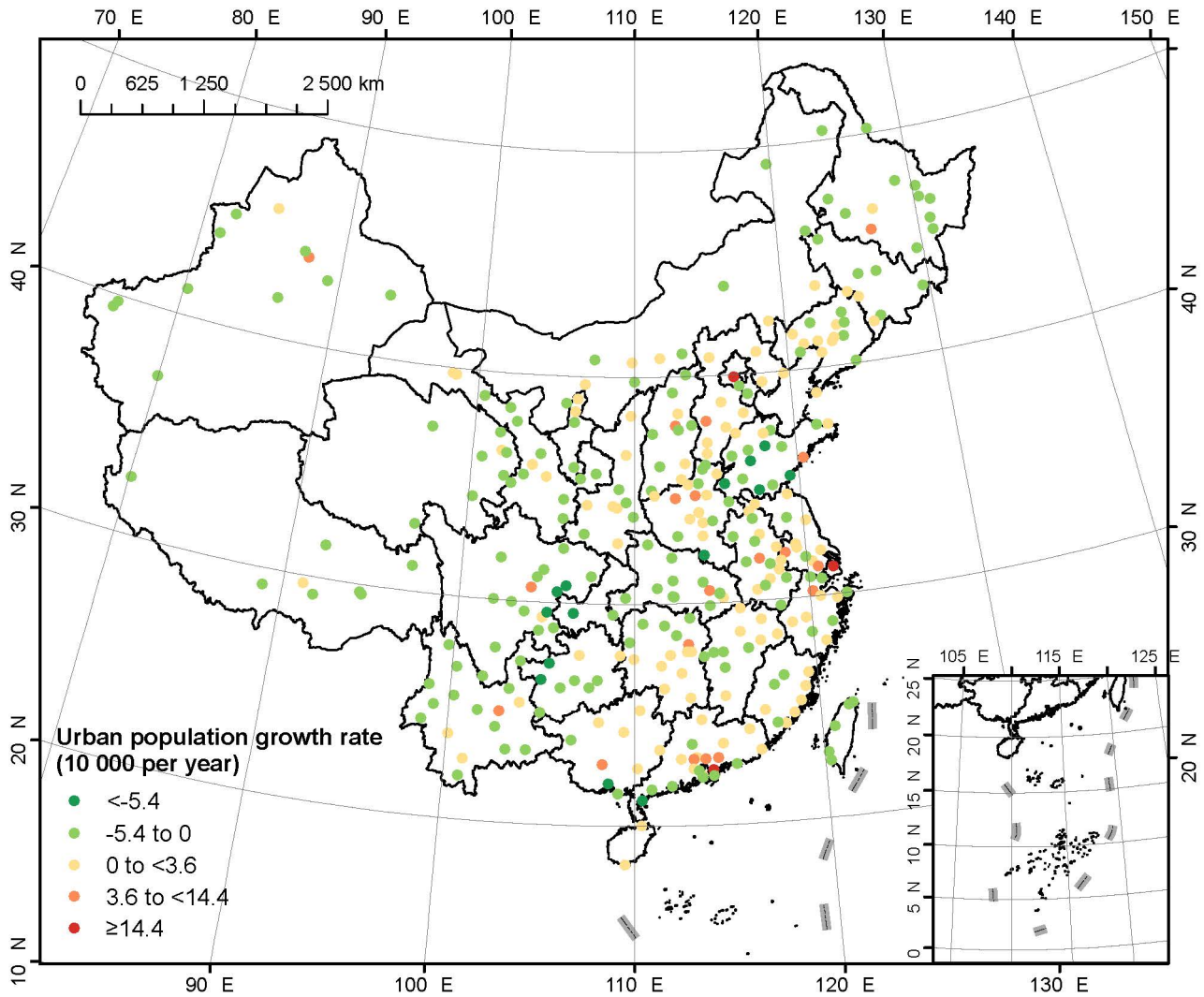
Figure A1 Urban population growth rates in prefecture-level cities and above in China between 1978 and 2015 (Data source: National Bureau of Statistics of China)

Appendix 3 Names of cities in China and their populations by 2015

The list of cities was taken from *China City Statistical Yearbook* 2016[1]. Household registered population, i.e., people with *Hukou*, for each city was taken from the same book. Permanent resident population for province and the proportion of urban population was taken from *China Statistical Abstract 2016*[2]. Permanent resident population refers to people who stay in a city for more than half of the year, which include both people who registered with the city and people who registered in other cities. Beijing, Tianjin, Shanghai, and Chongqing are four municipalities directly under the central government. They are considered as province-level cities. We explained in panel 2 that cities in China include both urban and rural parts. Here populations for the entire city and for urban districts under the city were reported for each prefecture-level city. For county-level city, the total population was reported. The proportion of urban population in permanent resident population was only reported at the province level.

Reference

1. National Bureau of Statistics. China City Statistical Yearbook 2016. Beijing: China Statistics Press; 2016.
2. National Bureau of Statistics. China Statistical Abstract 2016. Beijing: China Statistics Press; 2016.

Table 1. Names of provinces and cities in China and their populations by 2015

Province	City at prefecture level and above	County-level city	Household registered population (10 000)		Permanent resident population (10 000)	% of urban population in permanent resident population
			All city	Districts under city		
Beijing			**1345**	**1345**	**2171**	**86.50**
Tianjin			**1027**	**1027**	**1547**	**82.64**
Shanghai			**1443**	**1376**	**2415**	**87.60**
Chongqing			**3372**	**2129**	**3017**	**60.94**
Hebei			**7651**	**1778**	**7425**	**51.33**
	Shijiazhuang		*1029*	*410*		
		Xinji	64			
		Jinzhou	57			
		Xinle	51			
	Tangshan		*755*	*334*		
		Zunhua	76			
		Qian'an	76			
	Qinhuangdao		*296*	*141*		
	Handan		*1050*	*176*		
		Wuan	84			
	Xingtai		*780*	*88*		
		Nangong	50			
		Shahe	45			
	Baoding		*1202*	*282*		
		Dingzhou	124			
		Zhuozhou	68			
		Anguo	42			
		Gaobeidian	58			
	Zhangjiakou		*469*	*91*		
	Chengde		*382*	*60*		
	Cangzhou		*774*	*55*		
		Renqiu	89			
		Botou	63			
		Huanghua	48			
		Hejian	88			

	Langfang		461	85		
		Bazhou	65			
		Sanhe	65			
	Hengshui		452	56		
		Jizhou	35			
		Shenzhou	58			
Shanxi			**3498**	**983**	**3664**	**55.03**
	Taiyuan		367	285		
		Gujiao	22			
	Datong		316	157		
	Yangquan		132	70		
	Changzhi		337	73		
		Lucheng	23			
	Jincheng		219	38		
		Gaoping	48			
	Shuozhou		162	67		
	Jinzhong		330	61		
		Jiexiu	43			
	Xinzhou		307	54		
		Yuanping	49			
	Linfen		431	81		
		Houma	24			
		Huozhou	31			
	Yuncheng		510	68		
		Yongji	44			
		Hejin	40			
	Lvliang		387	28		
		Xiaoyi	50			
		Fenyang	43			
Inner Mongolia			**2154**	**690**	**2511**	**60.30**
	Hohhot		239	130		
	Baotou		224	156		
	Wuhai		44	44		
	Chifeng		463	126		
	Tongliao		319	85		
	Hulunbuir		259	37		

		Horgos	8			
		Manzhouli	17			
		Zhalantun	41			
		Yakeshi	34			
		Genhe	14			
		Erguna	8			
	Erdos		*157*	*28*		
	Ulanqab		*274*	*32*		
		Fengzhen	32			
	Bayannur		*175*	*52*		
		Erlianhaote	3			
		Wulanhaote	32			
		Xilinhaote	18			
		Aershan	5			
Liaoning			**4230**	**1913**	**4382**	**67.35**
	Shenyang		*730*	*530*		
		Xinmin	68			
	Dalian		*594*	*305*		
		Wafangdian	100			
		Zhuanghe	90			
	Anshan		*346*	*150*		
		Haicheng	108			
	Fushun		*216*	*141*		
	Benxi		*151*	*93*		
	Dandong		*238*	*78*		
		Donggang	61			
		Fengcheng	57			
	Jinzhou		*303*	*97*		
		Linhai	52			
		Beizhen	52			
	Yingkou		*233*	*93*		
		Dashiqiao	70			
		Gaizhou	70			
	Fuxin		*189*	*76*		
	Liaoyang		*179*	*87*		
		Dengta	45			

	Panjin		130	65		
	Tieling		300	44		
		Diaobingshan	24			
		Kaiyuan	58			
	Chaoyang		341	61		
		Beipiao	58			
		Lingyuan	69			
	Huludao		280	94		
		Xingcheng	54			
Jilin			**2448**	**930**	**2753**	**55.31**
	Changchun		754	436		
		Yushu	126			
		Dehui	94			
	Jilin		426	182		
		Huadian	44			
		Jiaohe	44			
		Shulan	64			
	Siping		326	58		
		Gongzhuling	106			
		Shuangliao	37			
	Liaoyuan		121	47		
	Tonghua		221	44		
		Meihekou	61			
		Ji'an	22			
	Baishan		125	57		
		Linjiang				
	Baicheng		197	50		
		Taonan	43			
		Daan	41			
	Songyuan		278	57		
		Fuyu	72			
		Yanji	54			
		Tumen	12			
		Dunhua	47			
		Hunchun	27			
		Longjing	17			
		Helong	18			

Heilongjiang			3641	1385	3812	58.80
	Harbin		*961*	*549*		
		Shangzhi	58			
		Wuchang	92			
	Qiqihar		*549*	*137*		
		Nehe	71			
	Jixi		*182*	*83*		
		Mishan	35			
		Hulin	16			
	Hegang		*106*	*65*		
	Shuangyashan		*147*	*19*		
	Daqing		*275*	*136*		
	Yichun		*121*	*77*		
		Tieli	37			
	Jiamusi		*238*	*78*		
		Tongjiang	11			
		Fujin	38			
	Qitaihe		*83*	*50*		
	Mudanjiang		*262*	*88*		
		Suifenhe	7			
		Hailin	39			
		Ning'an	43			
		Muling	29			
		Dongning	21			
	Heihe		*168*	*20*		
		Beian	38			
		Wudalianchi	36			
	Suihua		*549*	*84*		
		Anda	47			
		Zhaodong	91			
		Hailun	78			
Jiangsu			**7718**	**3509**	**7976**	**66.52**
	Nanjing		*653*	*653*		
	Wuxi		*481*	*249*		
		Jiangyin	124			
		Yixing	108			
	Xuzhou		*1029*	*333*		

		Xinyi	113			
		Pizhou	188			
	Changzhou		*371*	*291*		
		Liyang	80			
	Suzhou		*667*	*341*		
		Changshu	107			
		Zhangjiagang	92			
		Kunshan	79			
		Taicang	48			
	Nantong		*767*	*213*		
		Qidong	112			
		Rugao	144			
		Haimen	100			
	Lianyungang		*531*	*221*		
	Huaian		*564*	*294*		
	Yancheng		*828*	*242*		
		Dongtai	113			
	Yangzhou		*461*	*232*		
		Yizheng	57			
		Gaoyou	82			
	Zhenjiang		*272*	*103*		
		Danyang	81			
		Yangzhong	28			
		Jurong	59			
	Taizhou		*508*	*164*		
		Xinghua	158			
		Taixing	120			
		Jingjiang	67			
	Suqian		*586*	*174*		
Zhejiang			**4873**	**1798**	**5508**	**65.80**
	Hangzhou		*724*	*533*		
		Jiande	51			
		Lin'an	53			
	Ningbo		*587*	*232*		
		Yuyao	84			
		Cixi	105			
		Fenghua	48			

	Wenzhou		*811*	*166*		
		Ruian	123			
		Leqing	128			
	Jiaxing		*349*	*87*		
		Haining	68			
		Pinghu	49			
		Tongxiang	69			
	Huzhou		*264*	*111*		
	Shaoxing		*443*	*218*		
		Zhuji	108			
		Shengzhou	73			
	Jinhua		*478*	*96*		
		Lanxi	66			
		Yiwu	77			
		Dongyang	84			
		Yongkang	60			
	Quzhou		*256*	*85*		
		Jiangshan	61			
	Zhoushan		*97*	*71*		
	Taizhou		*597*	*159*		
		Linhai	120			
		Wenling	122			
	Lishui		*266*	*40*		
		Longquan	29			
Anhui			**6949**	**2017**	**6144**	**50.50**
	Hefei		*718*	*251*		
		Caohu	86			
	Wuhu		*385*	*146*		
	Bengbu		*376*	*114*		
	Huainan		*246*	*184*		
	Maanshan		*229*	*82*		
	Huaibei		*217*	*105*		
	Tongling		*74*	*45*		
	Anqing		*622*	*74*		
		Tongcheng	75			
	Huangshan		*148*	*45*		
	Fuyang		*1043*	*223*		

		Jieshou	80		
	Bozhou		635	163	
	Chuzhou		449	54	
		Tianchang	63		
		Mingguang	64		
	Lu'an		718	190	
	Chizhou		162	67	
	Xuancheng		280	87	
		Ningguo	39		
Fujian			**3721**	**1072**	**3839**	**62.60**
	Fuzhou		678	200	
		Fuqing	134		
		Changle	71		
	Xiamen		211	211	
	Putian		344	231	
	Sanming		284	28	
		Yong'an	33		
	Quanzhou		722	108	
		Shishi	33		
		Jinjiang	119		
		Nan'an	159		
	Zhangzhou		502	59	
		Longhai	86		
	Nanping		320	86	
		Shaowu	31		
		Wuyishan	24		
		Jian'ou	55		
	Longyan		309	102	
		Zhangping	30		
	Ningde		349	48	
		Fu'an	67		
		Fuding	59		
Jiangxi			**4914**	**1198**	**4566**	**51.62**
	Nanchang		520	301	
	Jingdezhen		167	46	
		Leping	93		
	Pingxiang		198	88	

	Jiujiang		517	67		
		Ruichang	46			
		Gongqingcheng	7			
	Xinyu		124	89		
	Yintan		127	24		
		Guixi	64			
	Ganzhou		961	154		
		Ruijin	70			
	Shangrao		774	139		
		Dexing	34			
	Fuzhou		399	118		
	Ji'an		530	58		
		Jinggangshan	17			
	Yichun		597	113		
		Zhangshu	61			
		Fengcheng	149			
		Gaoan	87			
Shandong			**9822**	**3231**	**9847**	**57.01**
	Jinan		626	366		
		Zhangqiu	103			
	Qingdao		783	373		
		Jiaozhou	83			
		Jimo	115			
		Pingdu	139			
		Laixi	74			
	Zibo		430	286		
	Zaozhuang		408	238		
		Tengzhou	170			
	Dongying		191	86		
	Yantai		653	185		
		Longkou	64			
		Laiyang	86			
		Laizhou	85			
		Penglai	45			
		Zhaoyuan	57			
		Qixia	61			
		Haiyang	66			

			894	187		
		Qingzhou	94			
		Zhucheng	110			
		Shouguang	107			
		Gaomi	96			
		Changyi	59			
		Anqiu	96			
	Jining		867	183		
		Qufu	64			
		Zoucheng	119			
	Tai'an		566	162		
		Xintai	141			
		Feicheng	99			
	Dezhou		587	122		
		Laoling	71			
		Yucheng	53			
	Weihai		255	132		
		Rongcheng	67			
		Rushan	56			
	Liaocheng		622	123		
		Linqing	80			
	Linyi		1124	262		
	Laiwu		128	128		
	Rizhao		296	134		
	Heze		1003	158		
	Binzhou		389	108		
Henan			**11103**	**2070**	**9480**	**46.85**
	Zhengzhou		810	344		
		Gongyi	84			
		Xinmi	89			
		Xingyang	68			
		Xinzheng	61			
		Dengfeng	72			
	Kaifeng		554	87		
	Luoyang		728	201		
		Yanshi	63			
	Pingdingshan		562	110		

		Ruzhou	115			
		Wugang	45			
	Anyang		617	116		
		Linzhou	113			
	Hebi		169	64		
	Xinxiang		637	105		
		Huixian	87			
		Weihui	54			
	Jiaozuo		372	98		
		Qinyang	49			
		Mengzhou	38			
	Puyang		429	71		
	Xuchang		505	42		
		Yuzhou	132			
		Changge	79			
	Luohe		268	135		
	Sanmenxia		228	29		
		Yima	16			
		Lingbao	75			
	Shangqiu		961	182		
		Yongcheng	158			
	Nanyang		1189	188		
		Dengzhou	177			
	Xinyang		898	153		
	Zhoukou		1244	60		
		Xiangcheng	124			
	Zhumadian		931	84		
	Jiyuan		71			
Hubei			**5308**	**1586**	**5852**	**56.85**
	Wuhan		829	516		
	Huangshi		268	85		
		Daye	97			
	Shiyan		346	118		
		Danjiangkou	46			
	Jingzhou		643	98		
		Shishou	63			
		Honghu	93			

		Songzi	84			
	Yichang		*398*	*128*		
		Yidu	40			
		Dangyang	47			
		Zhijiang	49			
	Xiangyang		*592*	*225*		
		Laohekou	52			
		Zaoyang	114			
		Yicheng	56			
	Ezhou		*110*	*110*		
	Jingmen		*299*	*60*		
		Zhongxiang	106			
	Xiaogan		*526*	*97*		
		Yingcheng	67			
		Anlu	62			
		Hanchuan	112			
	Huanggang		*744*	*35*		
		Macheng	117			
		Wuxue	82			
	Xianning		*300*	*61*		
		Chibi	53			
	Suizhou		*251*	*53*		
		Guangshui	93			
		Lichuan	92			
		Enshi	81			
		Xiantao	156			
		Tianmen	163			
		Qianjiang	102			
Hunan			**6947**	**1391**	**6783**	**50.89**
	Changsha		*680*	*319*		
		Liuyang	147			
	Zhuzhou		*403*	*96*		
		Liling	106			
	Xiangtan		*289*	*87*		
		Xiangxiang	92			
		Shaoshan	12			

	Hengyang		799	100	
		Leiyang	142		
		Changning	96		
	Shaoyang		821	70	
		Wugang	84		
	Yueyang		564	109	
		Miluo	75		
		Lingxiang	54		
	Yiyang		481	136	
		Yuanjiang	75		
	Changde		609	141	
		Jinshi	25		
	Chenzhou		528	77	
		Zixing	38		
	Yongzhou		635	116	
	Huaihua		518	38	
		Hongjiang	50		
	Zhangjiajie		170	52	
	Loudi		448	49	
		Lengshuijiang	37		
		Lianyuan	118		
		Jishou	31		
Guangdong			**8994**	**4419**	**10849**	**68.71**
	Guangzhou		854	854	
	Shaoguan		330	93	
		Lechang	53		
		Nanxiong	48		
	Shenzhen		355	355	
	Zhuhai		112	112	
	Shantou		550	543	
	Foshan		389	389	
	Jiangmen		391	140	
		Taishan	97		
		Heshan	37		
		Kaiping	68		
	Zhanjiang		823	163	

		Lianjiang	180			
		Leizhou	177			
		Wuchuan	119			
	Huizhou		357	*145*		
	Maoming		786	*290*		
		Gaozhou	178			
		Huazhou	173			
		Xinyi	145			
	Zhaoqing		438	*134*		
		Sihui	46			
	Chaozhou		273	*166*		
	Meizhou		544	*97*		
		Xinning	118			
	Zhongshan		159	*159*		
	Dongguan		195	*195*		
	Shanwei		359	*52*		
		Lufeng	187			
	Heyuan		366	*31*		
	Yangjiang		292	*120*		
		Yangchun	122			
	Qingyuan		419	*137*		
		Lianzhou	53			
		Yingde	110			
	Jieyang		702	*209*		
		Puning	246			
	Yunfu		299	*33*		
		Luoding	129			
Guangxi			**5518**	**1530**	**4796**	**47.06**
	Nanning		740	*290*		
	Liuzhou		382	*120*		
	Guilin		529	*128*		
	Wuzhou		344	*79*		
		Cenxi	95			
	Beihai		172	*65*		
	Fangchenggang		96	*57*		
		Dongxing	15			

	Qinzhou		*404*	*148*		
	Yulin		*711*	*109*		
		Beiliu	148			
	Guigang		*549*	*198*		
		Guiping	200			
	Baise		*413*	*36*		
		Jingxi	66			
	Laibin		*266*	*111*		
		Heshan	14			
	Chongzuo		*249*	*37*		
		Pingxiang	11			
	Hezhou		*240*	*118*		
	Hechi		*425*	*34*		
		Yizhou	66			
Hainan			**319**	**223**	**911**	**55.12**
	Haikou		*165*	*165*		
	Sanya		*58*	*58*		
	Sansha		*0.04*	*0.04*		
		Wuzhishan	11			
		Qionghai	51			
		Wenchang	57			
		Wanning	64			
		Dongfang	44			
Sichuan			**8397**	**2791**	**8204**	**47.69**
	Chengdu		*1228*	*698*		
		Dujiangyan	62			
		Pengzhou	81			
		Qionglai	66			
		Chongzhou	67			
	Zigong		*327*	*151*		
	Panzhihua		*111*	*68*		
	Luzhou		*506*	*150*		
	Deyang		*390*	*69*		
		Guanghan	61			
		Shifang	44			
		Mianzhu	51			

	Mianyang		*545*	*128*		
		Jiangyou	89			
	Guangyuan		*305*	*93*		
	Suining		*379*	*152*		
	Neijiang		*420*	*141*		
	Ziyang		*504*	*110*		
		Jianyang	149			
	Leshan		*354*	*116*		
		Emeishan	43			
	Yibin		*552*	*127*		
	Nanchong		*742*	*194*		
		Langzhong	86			
	Dazhou		*683*	*180*		
		Wanyuan	59			
	Guang'an		*467*	*127*		
		Huaying	36			
	Yaan		*155*	*62*		
	Meishan		*349*	*88*		
	Bazhong		*380*	*136*		
		Kangding	11			
		Maerkang	6			
		Xichang	65			
Guizhou			**3156**	**715**	**3530**	**42.01**
	Guiyang		*392*	*236*		
		Qingzhen	52			
	Liupanshui		*333*	*47*		
	Zunyi		*793*	*91*		
		Chishui	31			
		Renhuai	70			
	Anshun		*296*	*131*		
	Tongren		*437*	*47*		
	Bijie		*904*	*162*		
		Kaili	57			
		Xingyi	85			
		Fuquan	33			

		Duyun	49			
Yunnan			**2884**	**648**	**4742**	**43.33**
	Kunming		*556*	*279*		
		Anning	27			
	Yuxi		*216*	*44*		
	Qujing		*648*	*73*		
		Xuanwei	153			
	Zhaotong		*599*	*89*		
	Lijiang		*121*	*15*		
	Baoshan		*259*	*92*		
		Tengchong	67			
	Puer		*250*	*23*		
	Lincang		*235*	*32*		
		Dali	62			
		Chuxiong	52			
		Mangshi	39			
		Ruili	13			
		Kaiyuan	28			
		Gejiu	39			
		Jinghong	42			
		Wenshan	49			
		Mengzi	40			
		Mile	54			
		Shangri-La	15			
Xizang			**324**	**90**	**324**	**27.74**
	Lhasa		*53*	*21*		
	Xigaze		*75*	*16*		
	Qamdo		*73*	*11*		
Shaanxi			**3922**	**1346**	**3793**	**53.92**
	Xi'an		*816*	*621*		
	Tongchuan		*84*	*74*		
	Baoji		*385*	*142*		
	Xianyang		*528*	*92*		
		Xingping	62			
	Yan'an		*236*	*47*		

	Hanzhong		*385*	*58*		
	Weinan		*557*	*97*		
		Hancheng	40			
		Huayin	26			
	Yulin		*377*	*57*		
	Shangluo		*251*	*56*		
	Ankang		*305*	*101*		
Gansu			**2454**	**813**	**2600**	**43.19**
	Lanzhou		*322*	*205*		
	Jiayuguan		*20*	*20*		
	Jinchang		*46*	*21*		
	Baiyin		*181*	*49*		
	Tianshui		*367*	*131*		
	Wuwei		*190*	*103*		
	Zhangye		*130*	*51*		
	Pingliang		*233*	*51*		
	Jiuquan		*112*	*42*		
		Yumen	16			
		Dunhuang	14			
	Qingyang		*267*	*38*		
	Dingxi		*301*	*46*		
	Longnan		*286*	*56*		
		Linxia	25			
		Hezuo	9			
Qinghai			**371**	**136**	**588**	**50.30**
	Xining		*201*	*94*		
	Haidong		*170*	*41*		
		Golmud	14			
		Delingha	8			
		Yushu	11			
Ningxia			**664**	**279**	**668**	**55.23**
	Yinchuan		*179*	*109*		
	Shizuishan		*75*	*43*		
	Wuzhong		*140*	*40*		
		Qingtongxia	28			

	Guyuan			*150*	*46*		
	Zhongwei			*120*	*41*		
Xinjiang				**297**	**291**	**2360**	**47.23**
	Urumqi			*267*	*261*		
	Karamay			*30*	*30*		
		Sihezi	39				
		Cocodala	8				
		Hami	43				
		Changji	37				
		Kuitun	16				
		Yining	55				
		Tacheng	15				
		Aletai	20				
		Bole	26				
		Korla	49				
		Akesu	51				
		Atus	27				
		Kashi	63				
		Hetian	35				
		Fukang	17				
		Wusu	23				
		Alar	22				
		Tumushuke	17				
		Beitun	5				
		Alashankou	1				
		Tiemenguan	5				
		Horgos	7				
		Wujiaqu	9				
		Shuanghe	5				
Total				**137462**	**77116**	**137462**	**56.10**

Appendix 4 The development of Hygienic Cities in China between 1990 and 2015
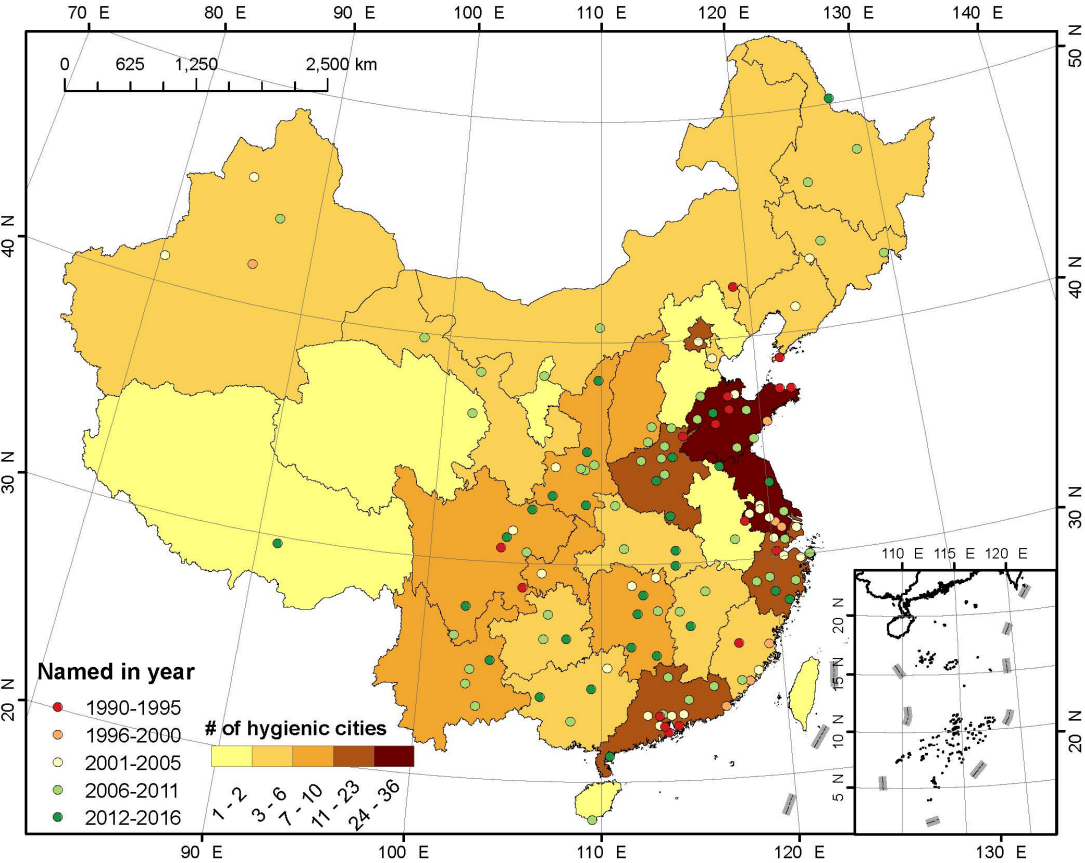
Figure A2 The development of Hygienic Cities in China between 1990 and 2015

Appendix 5 Comparison of health city indicators used in China and in Europe

Here we compared the indicator system of healthy cities (total 39 indicators) used by NPHCC to the Healthy Cities project indicators (total 32 indicators) used by WHO European Office[1] to give an example on the similarity and dissimilarity between China's indicator system and others (Table 1). There are other indicator systems such as WHO's Urban HEART and European Urban Health Indicators System, more can be found from Rothenberg et al. (2015)[2].

Reference

1. Webster P, Sanderson D. Healthy cities indicators-a suitable instrument to measure health? *J Urban Health* 2013; **90**(SUPPL 1): 52-61.
2. Rothenberg R, Stauber C, Weaver S, Dai D, Prasad A, Kano M. Urban health indicators and indices--current status. *BMC Public Health* 2015; **15**: 494.

Table 1 Comparison of indicator systems for healthy cities used in China and Europe (Words in bold fonts are categories used in the European system).

Category	China	Europe
Healthy Population /**Health**	(1) Life expectancy (2) Infant mortality rate (3) Maternal mortality rate (4) Prevalence of hypertension in adults (5) Total incidence rate of infectious diseases (6) Incidence rate of HIV/AIDS and the percentage of patients under management (7) Incidence rate of tuberculosis (8) Smoking rate of persons> 15 years (9) Percentage of frequent exercisers (10) Residents' health literacy	(1) Mortality (2) Main causes of death (3) Low birth weight
Heath services	(1) Percentage of patients with diabetes whose blood sugar levels are under control (2) Percentage of patients with severe mental disorder who are under management (3) Percentage of Children who are under management (4) Percentage of women who have received care before giving birth (5) Number of doctor/assistant doctor per 1 000 (6) Number of public health worker per 10 000 (7) Percentage of health expenditure to total government expenditure	(1) City health education programs (2) Immunization rates (3) Inhabitants per primary health care practitioner (4) Inhabitants per nurse (5) Percentage of population covered by health insurance (6) Availability of services in foreign languages (7) Health debates in civil council

	(8) Number of beds per 1 000 elderlies	
Healthy environment /**Environmental indicators**	(1) Percentage of days with good air quality (2) Percentage of waste water subject to centralized processing (3) Percentage of tap water that meet quality standards (urban and rural) (4) Percentage of safety disposal of garbage (5) Prevalence rate of harmless toilets (rural) (6) Public green space per capita (7) Percentage of toilets meet and over the grade three	(1) Air pollution (2) Water quality (3) Sewage collection (4) Household waste treatment (5) Green space (6) Derelict industrial sites (7) Sport and leisure facilities (8) Pedestrianization (9) Cycle routes (10) Public transport access (11) Public transport range (12) Living space
Healthy society /**Socioeconomic indicators**	(1) Percentage of out-of-pocket expense to total health expenditure (2) Prevalence rate of basic endowment insurance (3) Unemployment rate in urban areas (4) Substitution rate of basic living allowance to consumption (5) Share of public transport in all journeys (6) Average gross floor area of living space for urban dwellers (7) Area of urban sportsgrounds per capita (8) Kilometers of healthy walking trails per 10 000 (9) Mortality rate due to accidents per 100 million GDP (10) Percentage of food that meet the quality standards in investigation (11) Gross enrollment rate in high schools	(1) Percentage of population in inadequate housing (2) Homelessness (3) Unemployment (4) Poverty (5) Availability of child care (6) Age of mothers at time of birth (7) Abortion rate (8) Employment of disable people
Governance	(1) Health in all policies (2) Healthy City planning (3) Annual assessment report	

Appendix 6 Methodological notes for the survey of actions adopted by cities in China in building healthy cities

In order to learn what have been done by cities in China in building healthy cities, we worked with the National Patriotic Health Campaign Committee (NPHCC) Office in National Health and Family Planning Commission to conduct a mail-in survey between February and March in 2017. NPHCC Office helped us to invite any cities that are working to become healthy cities to participate in the survey voluntarily. We developed a questionnaire with open questions to ask cities to report their actions in five aspects and any innovations in building healthy cities.

- Environmental management

- Health services

- Prevention and control of diseases

- Social services

- Actions to increase public participation

In total, we received responses from 36 cities, including 14 cities that have been included in the first batch of 38 cities in the national pilot program (Table 1).

Table 1 Names of cities that participated in the survey

Types	Names
Cites included in the national pilot-program	Baoji, Changchun, Chengdu, Hangzhou, Karamay, Luzhou, Nanning, Ningbo, Suzhou, Weihai, Wuxi, Xicheng District (Beijing), Yichang, Zhengzhou
Other cities	Changzhou, Dongtai, Gaoyou, Gongyi, Guilin, Jiangyin, Jiyuan, Linzhou, Luoyang, Pingdingshan, Taicang, Tongling, Zhenjiang, Zhangjiagang, Xinxiang, Xinzheng, Xinyang, Xucang, Wugang, Yangzhong, Yizheng, Yongcheng

Appendix 7 Methodological notes on the calculation of the Baidu indices for hand-foot-mouth diseases

Here we show an example of using search inquiries to track the occurrence of HFMD disease because data from search engines respond quicker than passive disease surveillance systems and can reflect the current trend of the epidemic.

Baidu Index (https://index.baidu.com/) is an open-access platform which reflects trends of Baidu users' daily searching behaviors on both PCs and mobile terminals. We collected daily index data on HFMD related keywords (in Chinese) in Chengdu from May 1, 2013 to December 31, 2016. Thirty-eight keywords involving symptoms, transmission and treatments were collected. Daily aggregated counts of HFMD cases from 2013 to 2016 in Chengdu, China were obtained from CDC-Sichuan. No personal information was revealed. Both health data and index data were aggregated by week in this study.

In this study, we built a composite index.

$$index_j = \sum_{i=1}^{j} w_i x_i \qquad （1）$$

where $index_j$ represents the composite index of the first j keywords, x_i is a single keyword, w_i is the weight of x_i, that is determined by its cross-correlation with counts of HFMD cases,

$$HFMD = \alpha + \beta index_j + \varepsilon \qquad （2）$$

where HFMD is weekly counts of HFMD cases, ε denotes residual term.

HFMD related keywords were sorted according to their cross-correlation with the counts of HFMD cases. Then the keywords were entered into equation 1 to form different composite indices. The process continued until R^2 of the regression model (equation 2) did not increase.