

How Do Household Energy Transitions Work?

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Table 1: Table caption.

Sample	Overall			Indoor			
	Wave 1	Wave 2	Wave 4	Wave 1	Wave 2	Wave 3	Wave 4
New recruitment	977	196	68	0	300	0	52
Wave 1 households	-	866	780	-	0	0	0
Wave 2 households	-	-	162	-	-	246	248
Total recruitment	977	1062	1010	0	300	246	300

1 Introduction

China is deploying an ambitious policy to transition up to 70% of households in northern China from residential coal heating to electric or gas “clean” space heating, including a large-scale roll out across rural and peri-urban Beijing, referred to in this document as China’s Coal Ban and Heat Pump (CBHP) subsidy policy. To meet this target the Beijing municipal government announced a two-pronged program that designates coal-restricted areas and simultaneously offers subsidies to night-time electricity rates and for the purchase and installation of electric-powered heat pumps to replace traditional coal-heating stoves. The policy was piloted in 2015 and, starting in 2016, was rolled out on a village-by-village basis. The variability in when the policy was applied to each village allowed us to treat the roll-out of the program as a quasi-randomized intervention and evaluate its impacts on air quality and health. Household air pollution is a well-established risk factor for adverse health outcomes over the entire lifecourse, yet there is no consensus that clean energy interventions can improve these health outcomes based on evidence from randomized trials (Lai et al. 2024). Households may be differentially affected by the CBHP due to factors such as financial constraints and user preferences, and there is uncertainty about whether and how the policy may affect indoor and outdoor air pollution, as well as heating behaviors and health outcomes.

1.1 Subheading

First table (see Table 1)

Problem table:

Read in the data for Table 2:

And then make the table (Table 2:

Another one:

Table 2: Arithmetic and geometric means for air pollutant concentrations (micrograms per cubic meter) by wave.

			Wave 1		Wave 2		Wave 3		Wave 4	
			Est.	CI	Est.	CI	Est.	CI	Est.	CI
Personal measurements										
Filter-derived	24h PM2.5	Mean	117	[105, 129]	97	[87, 107]			84	[72, 97]
		GM	72	[65, 80]	59	[53, 65]			47	[42, 52]
	24h BC	Mean	4	[3.5, 4.4]	3.5	[2.7, 4.2]			3.7	[2.9, 4.5]
		GM	2.6	[2.4, 2.8]	1.9	[1.7, 2.1]			1.7	[1.5, 1.9]
Indoor measurements										
Sensor-derived	Seasonal PM2.5	Mean			94	[84, 104]	84	[75, 94]	67	[60, 75]
		GM			71	[65, 78]	63	[57, 70]	47	[42, 52]
Filter-derived	24h PM2.5	Mean			69	[59, 79]			59	[49, 69]
		GM			45	[39, 53]			33	[27, 40]
	24h BC	Mean			2.3	[1.8, 2.8]			2.8	[2.1, 3.4]
		GM			1.6	[1.3, 2.0]			1.6	[1.3, 1.9]
Outdoor measurements										
Sensor-derived	Seasonal PM2.5	Mean	47	[45, 48]	55	[54, 56]	33	[32, 34]	33	[32, 34]
		GM	36	[35, 37]	40	[39, 41]	23	[22, 23]	22	[22, 23]
Filter-derived	Seasonal PM2.5	Mean	38	[34, 42]	38	[34, 41]	25	[23, 28]	26	[24, 28]
		GM	33	[29, 36]	30	[28, 32]	21	[19, 23]	22	[21, 24]
	Seasonal BC	Mean	1.5	[1.3, 1.6]	1.4	[1.3, 1.5]			1.2	[1.1, 1.2]
		GM	1.3	[1.1, 1.4]	1.1	[1.0, 1.2]			1	[0.9, 1.1]

Note: Est. = Estimate, CI = 95 percent confidence interval, GM = Geometric Mean

Table 2 shows the distribution of selected demographic, health, and environmental characteristics from the baseline survey, prior to any villages being enrolled in the CBHP policy.

Lai PS, Lam NL, Gallery B, Lee AG, Adair-Rohani H, Alexander D, et al. 2024. Household Air Pollution Interventions to Improve Health in Low- and Middle-Income Countries: An Official American Thoracic Society Research Statement. *American Journal of Respiratory and Critical Care Medicine* 209:909–927; doi:[10.1164/rccm.202402-0398ST](https://doi.org/10.1164/rccm.202402-0398ST).