

1 **Supplementary Material for “A comprehensive analysis of**
2 **the least-cost healthy diets across China from 2012 to 2023”**

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25 **Table S1 . Recommended energy intake (kcal) and item number for the four healthy**
 26 **recommended diets.**

CDG-2022	item		CDG-2016	item		ELD	item		HDB	item	
	kcal	s		kcal	s		kcal	s		kcal	s
Starchy staples ¹	982	2	Starchy staples ¹	114	2	Cereals	715	1	Starchy staples	116	2
				3		Starchy roots	49	1		0	
Dark-green leafy vegetables	44	1	Dark-green leafy or red/orange vegetables	39	1	Vegetables	92	3	Vegetables	110	3
Red/orange vegetables	44	1	vegetables								
Other vegetables	44	1	Other vegetables	78	2						
Fruits	188	2	Fruits	169	2	Fruits	141	2	Fruits	160	2
Legumes, nuts and seeds ²	145	1	Legumes, nuts and seeds ²	166	1	Legumes, nuts and seeds	536	1	Legumes, nuts and seeds	300	2
Meat, fish and eggs	249	1	Meat, fish and eggs	224	2	Red meat	44	1	Animal-source foods	300	1
						Fish	24	1			
						Poultry	58	1			
						Eggs	19	1			
Dairy	265	1	Dairy	179	1	Dairy	141	1			
Oils and fats	264	1	Oils and fats	237	1	Oils and fats	399	1		300	1
									Oils and fats		
Added-sugars	105	1	Added-sugars	95	1	Added-sugars	112	1			
	233			233			233			233	
Total	0	12		0	13		0	15		0	11

27 **Note:**

- 28 1. Due to limitations in food description detail and item coverage in the price dataset, whole grains cannot be
 29 distinguished from other starchy staple foods in estimating the cost of the Chinese Dietary Guideline diets.
 30 2. Under the Chinese Dietary Guidelines, only soy-based products are classified within the “legumes, nuts, and
 31 seeds” (plant-based protein) food group, while other beans are classified as starchy staple foods (whole grains). In
 32 the price dataset, however, tofu is the only item available that falls within the legumes, nuts, and seeds category.
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39 **Table S2. Mean and distribution of nominal and CPI-adjusted real costs of least-cost**
 40 **healthy diets by dietary guideline and year**

Dietary guidelines	Year	Obs	Nominal cost				Real cost			
			Mean	SD	25th pct	75th pct	Mean	SD	25th pct	75th pct
CDG-2022	2012	31	12.03	1.01	11.39	12.64	12.03	1.01	11.39	12.64
	2013	31	12.65	1.12	12.02	13.18	12.30	1.08	11.67	12.86
	2014	31	13.48	1.29	12.73	13.98	12.85	1.19	12.16	13.34
	2015	31	13.39	1.27	12.37	13.67	12.58	1.14	11.74	12.89
	2016	31	13.69	1.39	12.67	14.51	12.62	1.19	11.75	13.43
	2017	31	13.29	1.45	12.29	14.16	12.07	1.22	11.19	12.90
	2018	31	13.77	1.45	12.53	14.72	12.25	1.21	11.31	13.15
	2019	31	14.70	1.64	13.43	15.70	12.73	1.33	11.73	13.69
	2020	31	14.99	1.63	13.75	16.14	12.68	1.30	11.82	13.54
	2021	31	15.25	1.55	14.06	16.41	12.78	1.24	11.88	13.99
	2022	31	15.97	1.54	14.76	16.95	13.14	1.19	12.23	14.14
2023	31	15.81	1.52	14.74	16.61	12.98	1.18	12.07	13.81	
CDG-2016	2012	31	10.44	0.90	9.92	10.84	10.44	0.90	9.92	10.84
	2013	31	11.07	0.94	10.51	11.43	10.77	0.91	10.17	11.12
	2014	31	11.75	1.06	11.12	12.08	11.20	0.98	10.58	11.54
	2015	31	11.58	1.06	10.74	11.81	10.88	0.94	10.14	11.11
	2016	31	11.69	1.18	10.89	12.20	10.78	1.01	10.11	11.30
	2017	31	11.40	1.22	10.55	11.93	10.36	1.02	9.68	10.90
	2018	31	11.93	1.18	10.91	12.52	10.61	0.98	9.81	11.18
	2019	31	12.58	1.36	11.46	13.38	10.89	1.09	10.07	11.58
	2020	31	12.96	1.26	11.95	13.74	10.96	0.99	10.28	11.69
	2021	31	13.19	1.24	12.20	13.90	11.06	0.97	10.39	11.84
	2022	31	13.78	1.27	12.84	14.53	11.33	0.97	10.68	12.03
2023	31	13.67	1.29	12.74	14.16	11.22	0.98	10.54	11.75	
HDB	2012	31	8.84	0.84	8.45	9.18	8.84	0.84	8.45	9.18
	2013	31	9.39	0.84	8.95	9.72	9.13	0.81	8.69	9.49
	2014	31	9.82	0.93	9.30	10.10	9.36	0.86	8.92	9.65
	2015	31	9.72	0.90	9.24	9.96	9.13	0.80	8.71	9.35
	2016	31	9.85	1.01	9.24	10.34	9.09	0.87	8.58	9.53
	2017	31	9.57	1.06	8.90	10.13	8.69	0.89	8.08	9.15
	2018	31	10.09	1.05	9.40	10.66	8.98	0.87	8.40	9.44
	2019	31	10.81	1.21	9.94	11.49	9.35	0.98	8.69	10.01
	2020	31	11.22	1.14	10.50	11.79	9.49	0.91	8.97	10.03
	2021	31	11.36	1.09	10.58	11.99	9.53	0.86	8.89	10.04
	2022	31	11.91	1.13	11.12	12.68	9.80	0.87	9.19	10.42
2023	31	11.77	1.16	10.85	12.17	9.66	0.88	8.97	10.10	
EAT-LANCET	2012	31	11.73	1.02	11.13	12.05	11.73	1.02	11.13	12.05
	2013	31	12.40	1.09	11.83	12.64	12.06	1.05	11.48	12.28

2014	31	13.03	1.18	12.31	13.39	12.42	1.09	11.75	12.71
2015	31	12.97	1.14	12.24	13.27	12.18	1.01	11.53	12.52
2016	31	13.07	1.28	12.15	13.57	12.05	1.09	11.29	12.57
2017	31	12.98	1.35	12.10	13.42	11.79	1.14	11.09	12.14
2018	31	13.51	1.40	12.57	14.08	12.02	1.17	11.19	12.50
2019	31	14.14	1.57	12.94	14.77	12.24	1.27	11.33	12.77
2020	31	14.56	1.56	13.49	15.17	12.31	1.25	11.58	12.82
2021	31	14.95	1.54	13.82	15.63	12.54	1.23	11.66	13.06
2022	31	15.66	1.65	14.42	16.38	12.88	1.28	12.01	13.46
2023	31	15.75	1.62	14.50	16.59	12.92	1.25	11.89	13.76

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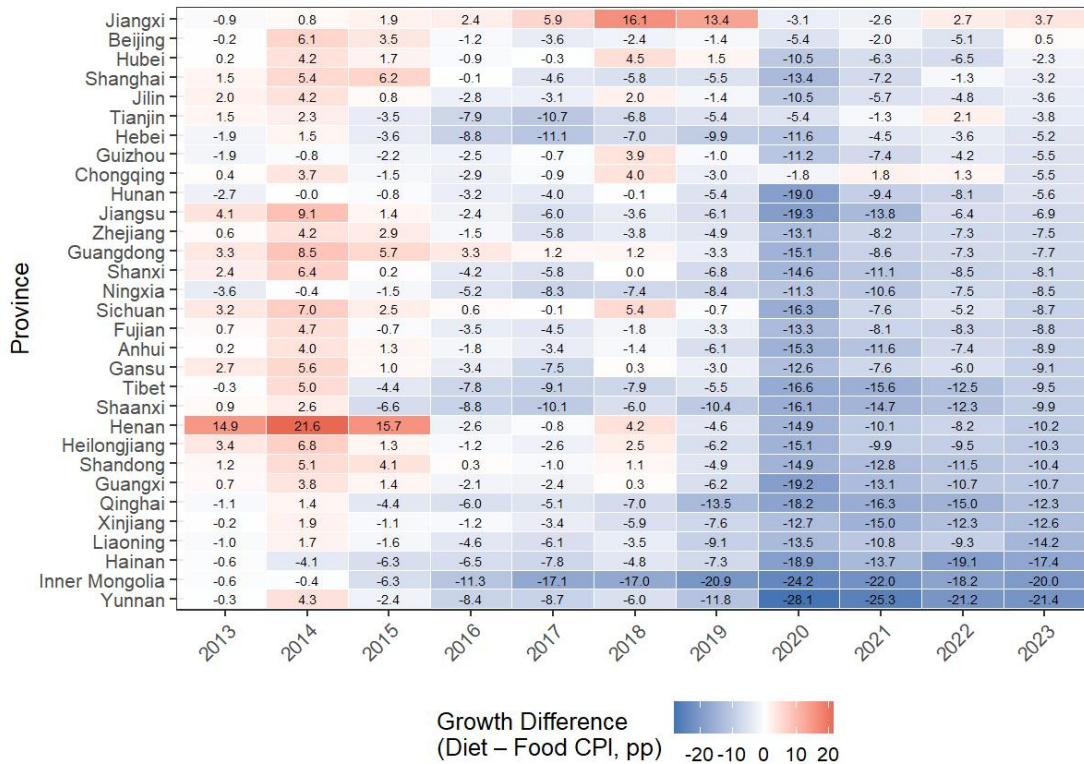
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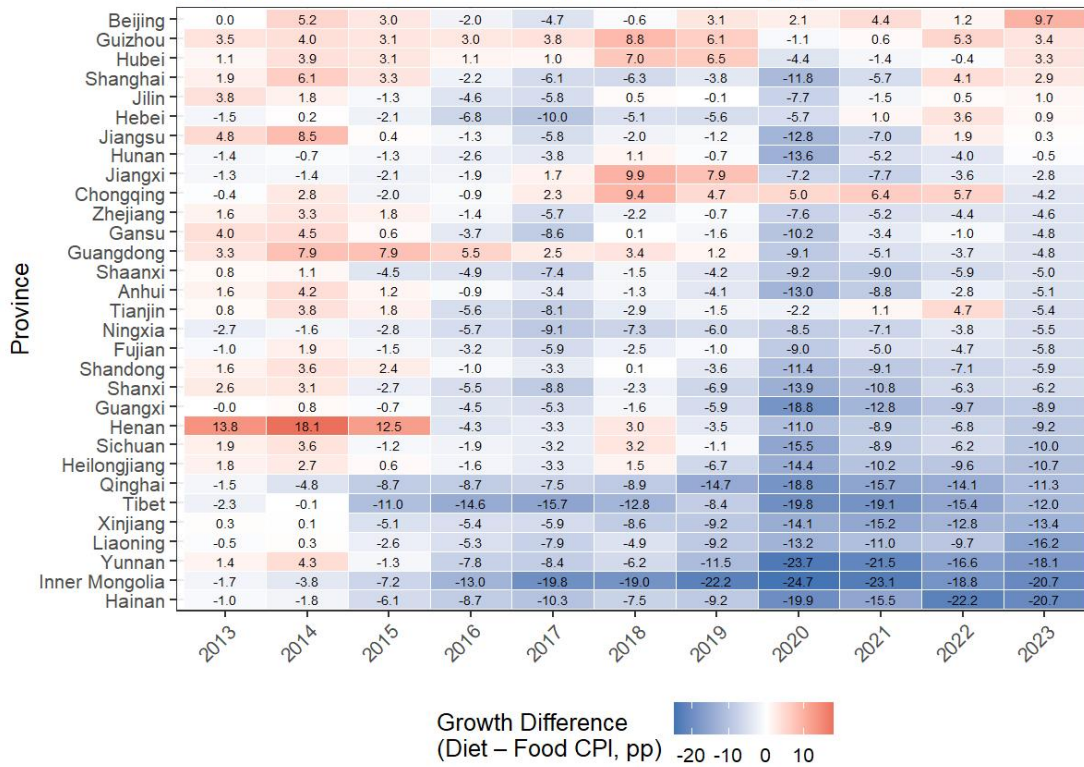
Difference Between Diet Growth and Food CPI (pp): CDG-2016



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 56 **Figure S1. Difference between cumulative growth in the least-cost CDG-2016 diet and the food CPI in China,**
 57 **by province and year (base year = 2012).** For each province, annual least-cost diet estimates for CDG-2016 are
 58 converted to a cumulative index with 2012 = 100 and compared with the corresponding provincial food consumer
 59 price index (CPI). Each cell represents a province–year observation. Blue shading indicates provinces where
 60 cumulative food CPI growth exceeds diet cost growth, while red shading indicates provinces where the least-cost
 61 CDG-2016 diet has increased faster than food prices overall.

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Difference Between Diet Growth and Food CPI (pp): HDB



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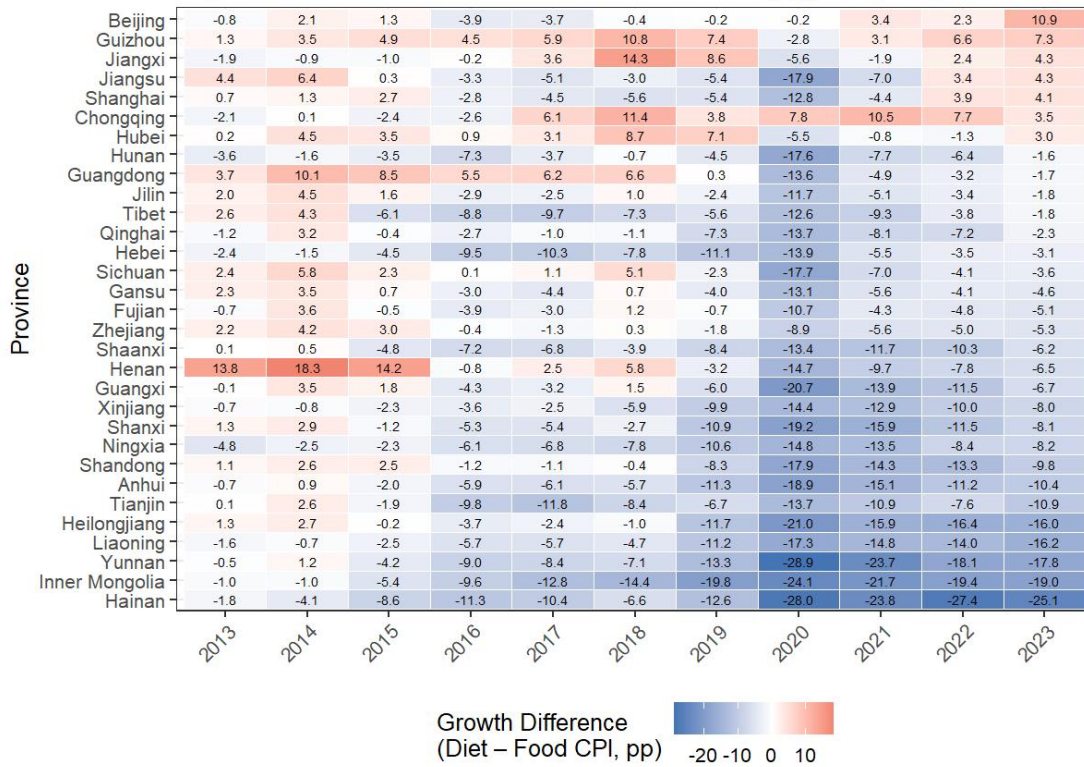
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Figure S2. Difference between cumulative growth in the least-cost HDB diet and the food CPI in China, by province and year (base year = 2012). For each province, annual least-cost diet estimates for HDB are converted to a cumulative index with 2012 = 100 and compared with the corresponding provincial food consumer price index (CPI). Each cell represents a province–year observation. Blue shading indicates provinces where cumulative food CPI growth exceeds diet cost growth, while red shading indicates provinces where the least-cost HDB diet has increased faster than food prices overall.

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Difference Between Diet Growth and Food CPI (pp): EAT-LANCET



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Figure S3. Difference between cumulative growth in the least-cost ELD diet and the food CPI in China, by province and year (base year = 2012). For each province, annual least-cost diet estimates for ELD are converted to a cumulative index with 2012 = 100 and compared with the corresponding provincial food consumer price index (CPI). Each cell represents a province–year observation. Blue shading indicates provinces where cumulative food CPI growth exceeds diet cost growth, while red shading indicates provinces where the least-cost ELD diet has increased faster than food prices overall.

89 **Table S3. Nutrient adequacy ratio (NAR) and mean adequacy ratio (MAR) across four**
 90 **least-cost healthy recommended diets in China.**

Dietary guidelines	Item	Obs	Mean	Median	SD	25th pct	75th pct
CDG-2022	MAR	14,133	0.96	0.96	0.02	0.94	0.97
	protein	14,133	1.00	1.00	0.00	1.00	1.00
	Ca	14,133	1.00	1.00	0.00	1.00	1.00
	P	14,133	1.00	1.00	0.00	1.00	1.00
	Mg	14,133	1.00	1.00	0.00	1.00	1.00
	Fe	14,133	0.97	1.00	0.04	0.96	1.00
	Zn	14,133	0.99	1.00	0.02	1.00	1.00
	Se	14,133	0.68	0.67	0.14	0.58	0.70
	Cu	14,133	1.00	1.00	0.00	1.00	1.00
	Vitamin A	14,133	1.00	1.00	0.00	1.00	1.00
	thiamin	14,133	0.94	0.97	0.07	0.86	1.00
	riboflavin	14,133	0.98	0.98	0.03	0.96	1.00
	niacin	14,133	0.94	0.97	0.07	0.90	1.00
	Vitamin C	14,133	0.96	1.00	0.11	1.00	1.00
CDG-2016	MAR	14,133	0.96	0.96	0.02	0.94	0.98
	protein	14,133	1.00	1.00	0.00	1.00	1.00
	Ca	14,133	1.00	1.00	0.00	1.00	1.00
	P	14,133	1.00	1.00	0.00	1.00	1.00
	Mg	14,133	1.00	1.00	0.00	1.00	1.00
	Fe	14,133	0.98	1.00	0.03	0.98	1.00
	Zn	14,133	0.99	1.00	0.03	0.98	1.00
	Se	14,133	0.81	0.78	0.09	0.75	0.89
	Cu	14,133	1.00	1.00	0.00	1.00	1.00
	Vitamin A	14,133	1.00	1.00	0.00	1.00	1.00
	thiamin	14,133	0.93	0.98	0.08	0.86	1.00
	riboflavin	14,133	0.92	0.92	0.05	0.89	0.95
	niacin	14,133	0.88	0.89	0.09	0.83	0.97
	Vitamin C	14,133	1.00	1.00	0.03	1.00	1.00
HDB	MAR	14,253	0.95	0.95	0.02	0.93	0.96
	protein	14,253	1.00	1.00	0.00	1.00	1.00
	Ca	14,253	0.95	0.97	0.05	0.92	1.00
	P	14,253	1.00	1.00	0.00	1.00	1.00
	Mg	14,253	1.00	1.00	0.00	1.00	1.00
	Fe	14,253	1.00	1.00	0.01	1.00	1.00
	Zn	14,253	1.00	1.00	0.00	1.00	1.00
	Se	14,253	0.86	0.84	0.10	0.81	0.95
	Cu	14,253	1.00	1.00	0.00	1.00	1.00
	Vitamin A	14,253	0.98	1.00	0.07	1.00	1.00
	thiamin	14,253	0.94	1.00	0.08	0.88	1.00
	riboflavin	14,253	0.67	0.67	0.06	0.64	0.69

	niacin	14,253	0.90	0.91	0.09	0.85	1.00
	Vitamin C	14,253	0.99	1.00	0.05	1.00	1.00
EAT-LANCET	MAR	14,101	0.96	0.97	0.01	0.96	0.97
	protein	14,101	1.00	1.00	0.00	1.00	1.00
	Ca	14,101	1.00	1.00	0.00	1.00	1.00
	P	14,101	1.00	1.00	0.00	1.00	1.00
	Mg	14,101	1.00	1.00	0.00	1.00	1.00
	Fe	14,101	1.00	1.00	0.00	1.00	1.00
	Zn	14,101	1.00	1.00	0.00	1.00	1.00
	Se	14,101	0.78	0.80	0.07	0.76	0.81
	Cu	14,101	1.00	1.00	0.00	1.00	1.00
	Vitamin A	14,101	0.98	1.00	0.09	1.00	1.00
	thiamin	14,101	0.98	1.00	0.05	1.00	1.00
	riboflavin	14,101	0.77	0.76	0.04	0.75	0.80
	niacin	14,101	1.00	1.00	0.01	1.00	1.00
	Vitamin C	14,101	0.99	1.00	0.05	1.00	1.00

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108 **Table S4. Top 15 food items by total energy contribution in least-cost diets, by**
 109 **benchmark guideline**

Diet guidelines	Food item (English)	Energy share
CDG-2022	Wheat flour (standard grade)	16.1%
	Wheat flour (premium grade)	10.8%
	Soybean oil (bulk, Grade I, solvent-extracted)	10.0%
	Fresh pork (rib cut)	9.2%
	Milk (UHT, 240 ml pillow pack)	8.3%
	Tofu (unpackaged)	6.2%
	Late indica rice (Grade II)	5.6%
	Corn flour (degermed maize)	5.6%
	Japonica rice (Grade II)	4.0%
	Banana (domestic, Grade I)	4.0%
	White sugar (bagged)	3.8%
	Milk (UHT, 250 ml carton)	3.0%
	Pear (Ya pear, Grade I)	2.4%
	Carrot (fresh, Grade I)	1.9%
	Chinese chives (fresh, Grade I)	1.6%
CDG-2016	Wheat flour (standard grade)	18.7%
	Wheat flour (premium grade)	12.6%
	Soybean oil (bulk, Grade I, solvent-extracted)	9.0%
	Tofu (unpackaged)	7.1%
	Late indica rice (Grade II)	6.5%
	Corn flour (degermed maize)	6.5%
	Milk (UHT, 240 ml pillow pack)	5.6%
	Fresh pork (rib cut)	4.8%
	Japonica rice (Grade II)	4.7%
	Eggs (fresh, whole)	4.4%
	Banana (domestic, Grade I)	3.6%
	White sugar (bagged)	3.5%
	Pear (Ya pear, Grade I)	2.1%
	Milk (UHT, 250 ml carton)	2.0%
	Carrot (fresh, Grade I)	1.6%
HDB	Wheat flour (standard grade)	19.0%
	Tofu (unpackaged)	12.9%
	Wheat flour (premium grade)	12.8%
	Soybean oil (bulk, Grade I, solvent-extracted)	11.4%
	Late indica rice (Grade II)	6.7%
	Corn flour (degermed maize)	6.6%
	Fresh pork (rib cut)	6.4%
	Eggs (fresh, whole)	6.0%
	Japonica rice (Grade II)	4.8%

	Banana (domestic, Grade I)	3.4%
	Pear (Ya pear, Grade I)	2.0%
	Carrot (fresh, Grade I)	1.5%
	Cabbage (fresh, Grade I)	1.5%
	Blended soybean oil (Grade I)	1.3%
	Radish (fresh, Grade I)	1.0%
EAT-LANCET	Tofu (unpackaged)	23.0%
	Wheat flour (standard grade)	19.5%
	Soybean oil (bulk, Grade I, solvent-extracted)	15.1%
	Milk (UHT, 240 ml pillow pack)	4.4%
	White sugar (bagged)	4.1%
	Wheat flour (premium grade)	3.8%
	Late indica rice (Grade II)	3.1%
	Banana (domestic, Grade I)	3.0%
	Chicken (whole, eviscerated, premium)	2.5%
	Corn flour (degermed maize)	2.3%
	Potato (fresh, Grade I)	2.1%
	Japonica rice (Grade II)	2.0%
	Fresh pork (rib cut)	1.9%
	Pear (Ya pear, Grade I)	1.8%
	Blended soybean oil (Grade I)	1.7%

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Table S5. List of food items in the China Price Information Network

No	Food Group	Food Item (English)	Food Item (Chinese)	Unit Used in Price Data
1	Grain	Rice (late indica)	晚籼米	yuan / 500 g
2	Grain	Rice (japonica)	粳米	yuan / 500 g
3	Grain	Wheat flour (premium)	面粉一	yuan / 500 g
4	Grain	Wheat flour (standard)	面粉二	yuan / 500 g
5	Grain	Corn flour	玉米粉	yuan / 500 g
6	Tubers	Potato	土豆	yuan / 500 g
7	Vegetables	Chinese cabbage	大白菜	yuan / 500 g
8	Vegetables	Cabbage	圆白菜	yuan / 500 g
9	Vegetables	Rape green	油菜	yuan / 500 g
10	Vegetables	Chinese chives	韭菜	yuan / 500 g
11	Vegetables	Celery	芹菜	yuan / 500 g
12	Vegetables	Eggplant	茄子	yuan / 500 g
13	Vegetables	Tomato	西红柿	yuan / 500 g
14	Vegetables	Cucumber	黄瓜	yuan / 500 g
15	Vegetables	Radish	萝卜	yuan / 500 g
16	Vegetables	Carrot	胡萝卜	yuan / 500 g
17	Vegetables	Green pepper	青椒	yuan / 500 g
18	Vegetables	Chili pepper	尖椒	yuan / 500 g
19	Vegetables	Garlic scapes	蒜苔	yuan / 500 g
20	Vegetables	Green beans	豆角	yuan / 500 g
21	Fruits	Apple	苹果	yuan / 500 g
22	Fruits	Pear	梨	yuan / 500 g
23	Fruits	Orange	橙子	yuan / 500 g
24	Fruits	Banana	香蕉	yuan / 500 g
25	Fruits	Watermelon	西瓜	yuan / 500 g
26	Legumes	Tofu	豆腐	yuan / 500 g
27	Dairy	Milk (240 ml pack)	牛奶	yuan / pack
28	Dairy	Milk (250 ml carton)	牛奶	yuan / carton
29	Dairy	Domestic infant formula	国产奶粉	yuan / 400 g
30	Dairy	Imported infant formula	进口奶粉	yuan / 400 g
31	Eggs	Eggs	鸡蛋	yuan / 500 g
32	Poultry	Chicken	鸡肉	yuan / 500 g
33	Red meat	Pork (lean)	猪肉 (瘦)	yuan / 500 g
34	Red meat	Pork ribs	猪小排	yuan / 500 g
35	Red meat	Pork belly	猪肉 (肋条肉)	yuan / 500 g
36	Red meat	Pork (leg, without bone, with skin)	带皮后腿肉	yuan / 500 g
37	Red meat	Beef (brisket)	牛肉 (腹部肉)	yuan / 500 g
38	Red meat	Beef (shank)	牛肉 (后腱)	yuan / 500 g
39	Red meat	Lamb (without bone)	羊肉 (新鲜去骨)	yuan / 500 g
40	Red meat	Lamb (leg with bone)	羊肉 (后腿, 带骨)	yuan / 500 g

41	Fish and shellfish	Hairtail	带鱼	yuan / 500 g
42	Fish and shellfish	Prawns	海虾	yuan / 500 g
43	Fish and shellfish	Grass carp	草鱼	yuan / 500 g
44	Fish and shellfish	Silver carp	鲢鱼	yuan / 500 g
45	Fish and shellfish	Common carp	鲤鱼	yuan / 500 g
46	Fish and shellfish	Crucian carp	鲫鱼	yuan / 500 g
47	Fish and shellfish	Bighead carp	鳊鱼	yuan / 500 g
48	Fish and shellfish	Yellow croaker	黄鱼	yuan / 500 g
49	Oils & fats	Soybean oil	大豆油	yuan / 5 L
50	Oils & fats	Blended vegetable oil	大豆调和油	yuan / 5 L
51	Oils & fats	Peanut oil	花生油	yuan / 5 L
52	Oils & fats	Rapeseed oil	菜籽油	yuan / 5 L
53	Condiments	Sugar	白砂糖	yuan / 500 g
54	Condiments	Brown sugar	红糖	yuan / 500 g
55	Condiments	Salt	食用盐	yuan / 500 g
56	Condiments	Soy sauce	酱油	yuan / bottle
57	Condiments	Vinegar	醋	yuan / bottle
58	Condiments	MSG	味精	yuan / 500 g
59	Processed foods	Instant noodles	方便面	yuan / pack
60	Processed foods	Biscuits	饼干	yuan / pack
61	Beverages	Mineral water	矿泉水	yuan / bottle
62	Beverages	Carbonated drink	碳酸饮料	yuan / bottle

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127 **Note:** The retail price database includes 62 food items monitored in the national food price system. For
128 the least-cost diet analysis in this study, 52 items were used. The following items were excluded
129 because they are not part of the dietary reference frameworks for healthy adults or do not contribute
130 meaningfully to energy intakes in the diet modelling: MSG (味精), infant formula products (奶粉),
131 instant noodles (方便面), mineral water (矿泉水), carbonated beverages (碳酸饮料), soy sauce (酱油),
132 vinegar (醋), table salt (食用盐), and biscuits (饼干).

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