

OBJECTIVE

China has been implementing reimbursement-linked price negotiation for innovative drugs annually since 2016. Given the growing importance of value-based pricing, we aimed to assess the impact of price negotiation on the prices and their relationship with the clinical value of anticancer drugs in China.

RESULTS

Our final sample included 93 therapeutic indications for 65 anticancer drugs that were negotiated from 2016 to 2021, 71 indications of which were supported by double-arm clinical trials and 22 indications of which were supported by single-arm clinical trials.

Table 1. Characteristics of indications in the study sample from China

Indications supported by double-arm clinical trials (N=71)	Number	Percent
Cancer sites		
Blood	13	18
Lung	16	23
Breast	8	11
Colorectal	5	7
Renal	5	7
Other	24	34
Origin country		
Domestic	18	25
Imported	53	75
Priority review		
Yes	37	52
No	34	48
Administration route		
Intravenous	19	27
Oral	52	73
First-line therapy		
Yes	29	41
No	42	59
Comparator		
Placebo	24	34
Active	47	66
Indications supported by single-arm clinical trials (N=22)	Number	Percent
Cancer sites		
Hematological	12	55
Non-hematological	11	50
Origin country		
Domestic	16	73
Imported	6	27
Conditional approval		
Yes	16	73
No	6	27
Administration route		
Intravenous	11	50
Oral	11	50
First-line therapy		
Yes	2	9
No	20	91

METHODS

Therapeutic indications of anticancer drugs that were negotiated successfully between 2016 and 2021 were eligible for inclusion. We collected measures of clinical value on safety, survival, quality of life, and overall response rate from pivotal clinical trials and calculated treatment costs over expected treatment durations of included indications. The effect of price negotiation on the association between drug prices and clinical value was analyzed using multivariate regression. We also examined whether price negotiation led to a reduction in the variation of drug prices for a given value.

1 Pre-negotiation prices and price changes after negotiation

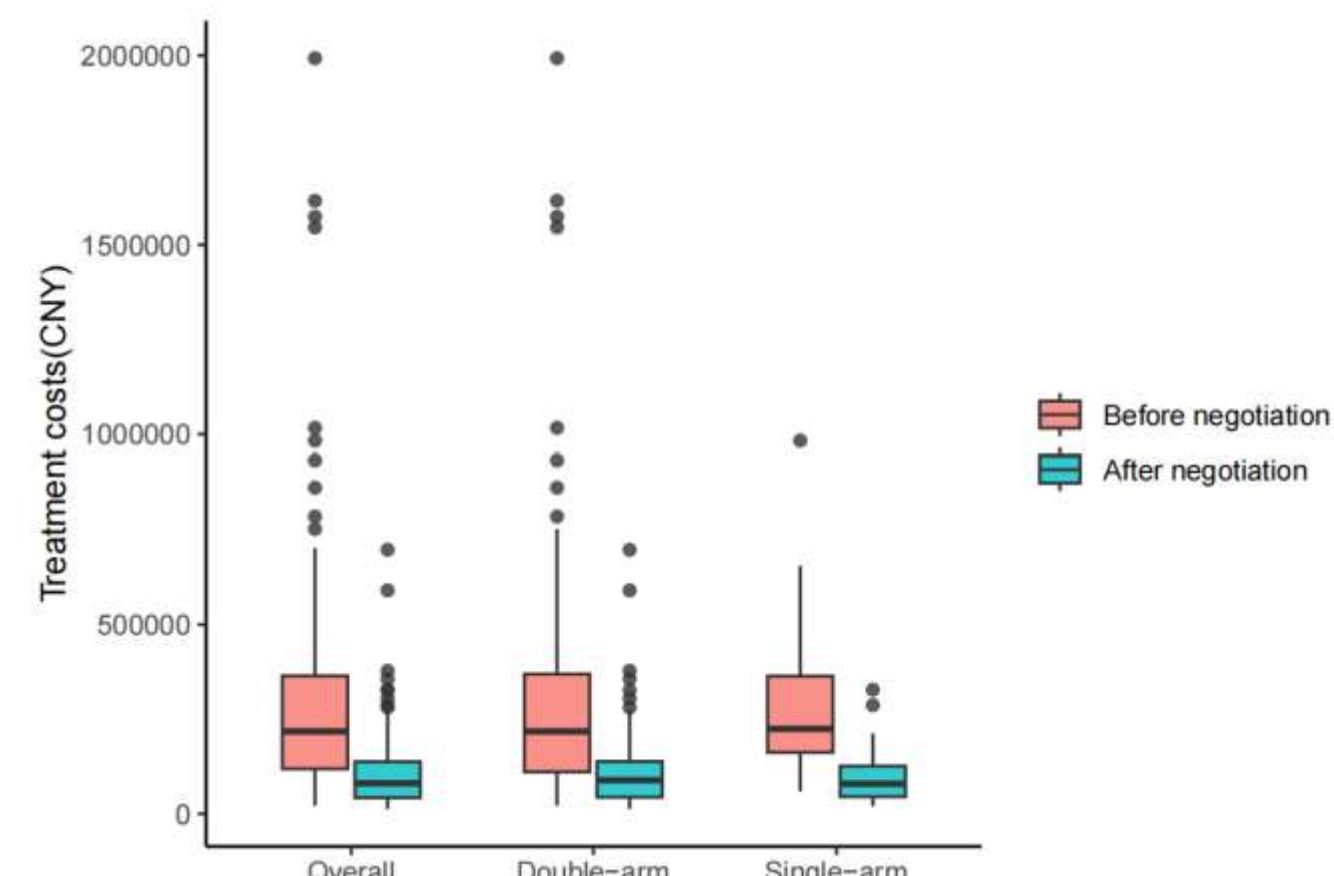


Figure 1. Treatment costs over expected durations

Before price negotiation, the median treatment costs over expected durations of therapeutic indications in the entire sample were CNY217,800 (IQR 115,980-375,039), which significantly decreased to CNY80,600 (IQR 42,283-138,357) after price negotiation went into effect ($p < 0.001$). The median treatment costs of therapeutic indications supported by double-arm clinical trials were not significantly different from those supported by single-arm clinical trials, neither before price negotiation nor after price negotiation.

2 Impact of price negotiation on the association of prices with clinical value _ indications supported by double-arm clinical trials

A positive association between treatment costs and added OS or PFS life-months gained was identified both before and after negotiation. Including measures of clinical value on survival, QoL, and safety in multiple regression analysis revealed that each added OS or PFS life-month gained was associated with an average increase in treatment costs of 3.6 percent before price negotiation and 3.2 percent after negotiation, respectively [table 2, column (1) and (2)]. By contrast, neither comparative safety nor QoL was associated with treatment costs before and after negotiation.

In the interaction model [table 2, column (3)], the estimates of the interaction terms between price negotiation and added survival, safety, and QoL on treatment costs were all negative and insignificant, suggesting that price negotiation may not have significantly changed the association of costs with clinical value.

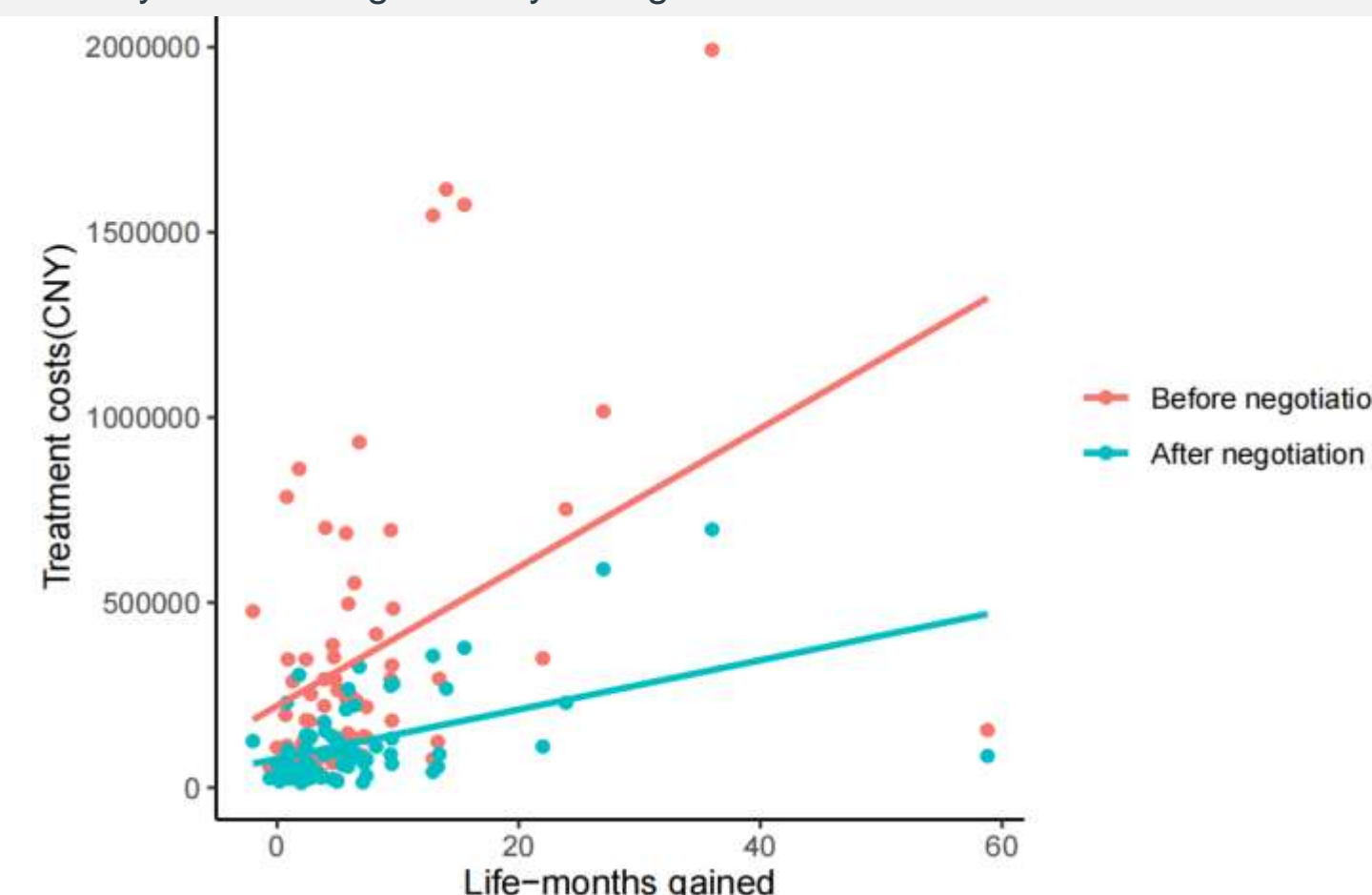


Figure 2. The association between costs and added OS or PFS life-months gained of indications supported by double-arm clinical trials

Table 2. Regression analysis for indications supported by double-arm clinical trials

Variable	Model		
	(1)	(2)	(3)
Dependent variables	log (costs before negotiation)	log (costs after negotiation)	log (costs before and negotiation)
Life-months gained	0.036*** (0.007)	0.032*** (0.006)	0.036*** (0.007)
Safety_ improvement or no difference	0.086 (0.120)	0.031 (0.109)	0.086 (0.114)
QoL_improvement	0.060 (0.119)	-0.086 (0.108)	-0.060 (0.114)
QoL_NA or reduction	-0.094 (0.110)	-0.108 (0.100)	-0.094 (0.105)
Negotiation			-0.366** (0.122)
Safety_ improvement or no difference # negotiation			-0.055 (0.162)
Life-months gained # negotiation			-0.004 (0.010)
QoL_improvement # negotiation			-0.026 (0.161)
QoL_NA or reduction # negotiation			-0.015 (0.149)
Constant	5.141*** (0.090)	4.774*** (0.082)	5.141*** (0.086)
Observations	70	70	140
R²	0.293	0.294	0.430
Adj R²	0.249	0.250	0.391

3 Impact of price negotiation on the association of prices with clinical value _ indications supported by single-arm clinical trials

Regression analyses showed that with an average 10 percent increase in ORR, treatment costs increased by 6.4 and 7.3 percent before and after price negotiation, respectively [figure 4 and column (1) and column (2) in table 3]. In the interaction model adding interaction terms of price negotiation with ORR, the estimate was positive but insignificant, implying the relationship between treatment costs and ORR may not be mediated by price negotiation [table 3, column (3)].

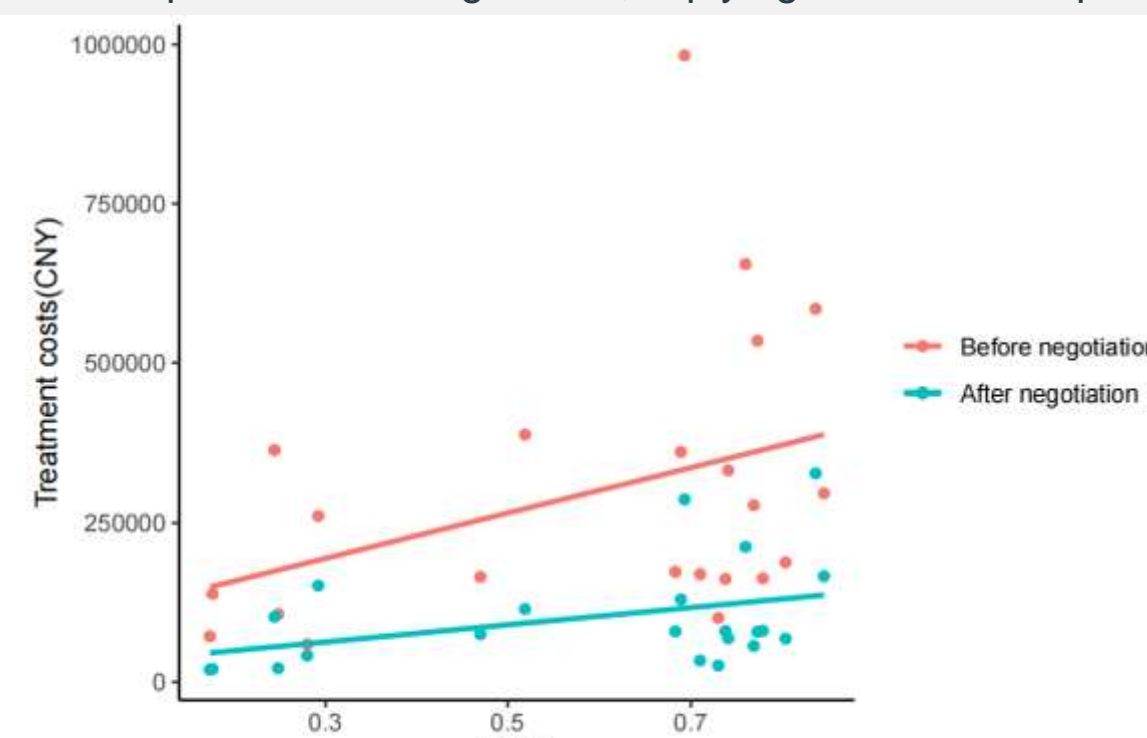


Figure 3. The association between treatment costs and overall response rates of indications supported by single-arm clinical trials

Table 3. Regression analysis for indications supported by single-arm clinical trials

Variable	Model		
	(1)	(2)	(3)
Dependent variables	log (costs before negotiation)	log (costs after negotiation)	log (costs before and negotiation)
ORR	0.637* (0.258)	0.726* (0.289)	0.637* (0.274)
Negotiation			-0.541* (0.245)
ORR # Negotiation			0.089 (0.388)
Constant	4.991*** (0.163)	4.450*** (0.183)	4.991*** (0.174)
Observations	22	22	44
R²	0.234	0.239	0.510
Adj R²	0.196	0.201	0.473

4 Impact of price negotiation on the prices for a given value

For indications supported by double-arm and single-arm clinical trials, the implementation of price negotiation has resulted in a reduction in the variation of drug prices for a given value, with greater reductions observed for higher value.

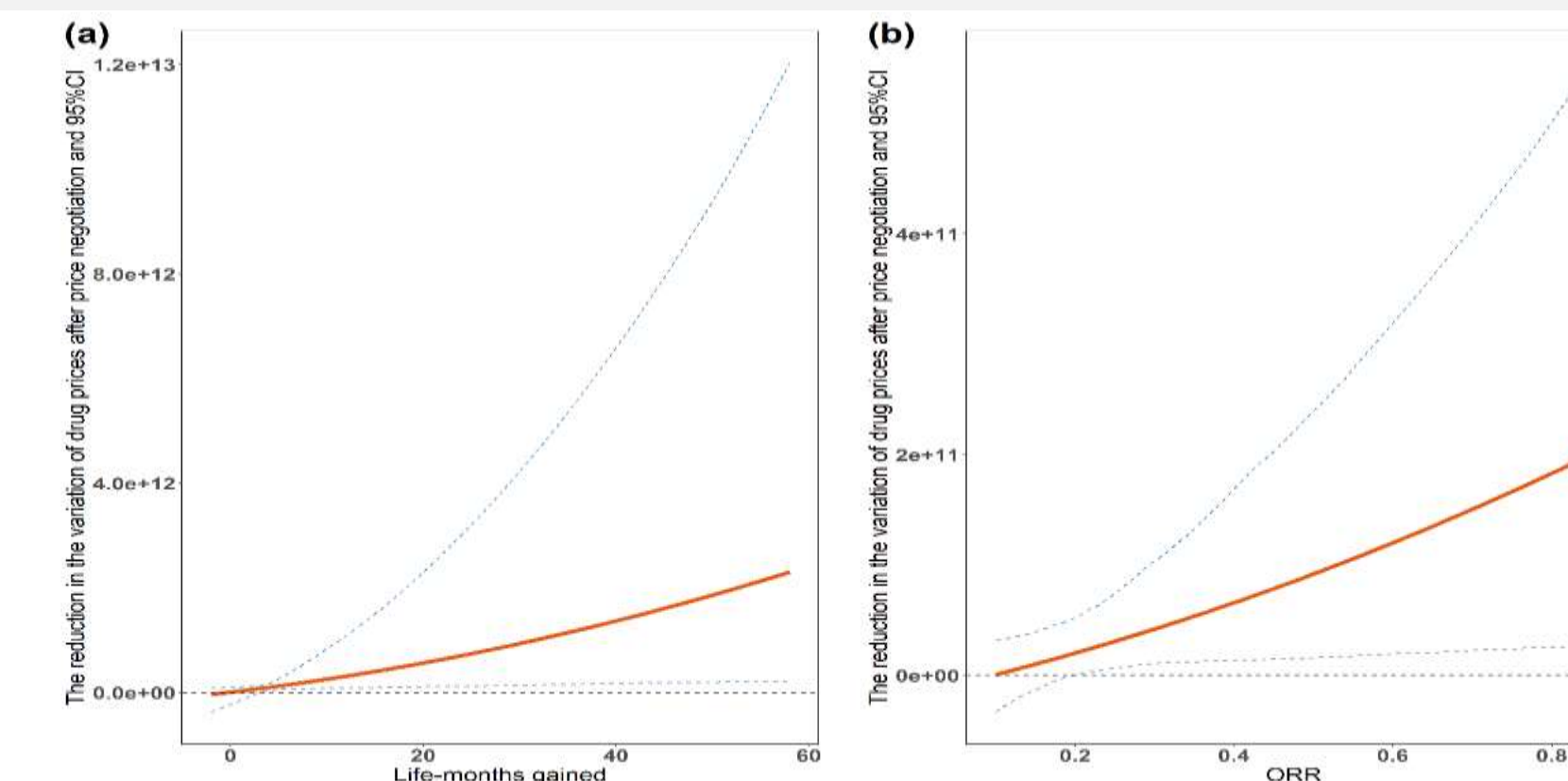


Figure 4. Clinical value and the reduction in the variation of drug prices after price negotiation.

Contact information

Jing Zhou, Ph.D., jingzhou556@163.com. HEOA Group, West China School of Public Health and West China Fourth Hospital, Sichuan University, Chengdu, Sichuan, 610041, China.

CONCLUSIONS

The price negotiation implemented in China in recent years has significantly reduced the prices of anticancer drugs, while the value increases can still be reflected in the magnitude of costs after price negotiation. Moreover, price negotiation has led to drug pricing being more aligned with clinical value. China's achievements have great implications for price regulation in other countries, especially LMICs, facing rising drug expenditures and constrained resources.