

Access to Antihypertensive Drugs in China

In China, 44% of deaths are attributable to cardiovascular diseases.¹ The primary risk factor associated with the high cardiovascular disease mortality is the high prevalence of hypertension in the population.¹ Approximately 37% of the Chinese population aged 35 to 75, or >250 million individuals, are estimated to have hypertension (systolic blood pressure ≥ 140 mmHg and diastolic blood pressure ≥ 90 mmHg).² Among Chinese hypertensive patients, only 23% are taking antihypertensive drugs (AHDs) and 5.7% have effective blood pressure control.²

The high price of AHDs is one major barrier to patient access and adherence to these medications in China.³ The demand for AHDs, similar to other preventive medications, is highly price elastic. Patients facing high out-of-pocket costs are more likely to defer taking AHDs or reduce adherence to them and, by extension, to have worse health outcomes. Indeed, low-income patients in China tend to receive less treatment for and achieve less effective control of their hypertension.²

We compared the price in China and the United States for frequently prescribed AHDs. We focused on 5 AHDs with >5% prescription frequency in primary health-care services in China (ie, Amlodipine, Nifedipine SA, Metoprolol, Valsartan, and Irbesartan). Together they accounted for 60% of all AHD prescriptions in primary health-care services in China.⁴ We obtained their price information in China through the Integrated Management Platform of Beijing Medicine Sunshine Purchase, a government-run website that publishes drug-related policy and drug retail prices in Beijing. We obtained the price information in the United States from the Federal Supply Schedule, which includes the price that eligible federal government agencies can use to purchase drugs. We took the lowest price available across retailers to measure the price of each drug in China, and the highest price available across vendors to measure the price of each drug in the United States to make the price comparison conservative.

We divided a drug's price in China (reported in Chinese Yuan) by 3.506, China's Purchasing Power Parity in 2017 as reported by the Organization for Economic Co-operation and Development, to obtain the Purchasing Power Parity–converted Chinese price in US dollars. We then compared the Purchasing Power Parity–converted Chinese price with the US price for each AHD. As shown in the Table, all the frequently prescribed AHDs had a higher price in China than in the United States, and, on average, the price in China was 3.3 times the price in the United States. Irbesartan had the lowest price differential (150%) and Nifedipine SA had the highest price differential (625%). The relatively high price of frequently prescribed AHDs in China most likely impacts access to AHDs, because patients' out-of-pocket costs are based on the drug price. Whereas these price differentials may have only modest financial impact on middle class patients, on a scale of billions of doses consumed per year, the implications are enormous. The implications are especially important for the rural population, whose financial resources are often

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Table. Price Comparison for Frequently Prescribed Antihypertensive Drugs in China

Drug Name	Prescription Frequency, %	Dosage,* mg/tablet	China Price (PPP converted)	US Price (Federal Supply Schedule)	China Price/US Price, %
Amlodipine†	24.5	5	\$0.07	\$0.03	233
Nifedipine SA‡	13.4	30	\$0.50	\$0.08	625
Metoprolol	8.0	25	\$0.09	\$0.02	450
Valsartan	7.4	80	\$0.18	\$0.10	180
Irbesartan	6.7	75	\$0.15	\$0.10	150
	Total: 60.0				Simple average: 328 Weighted average: 334

To make the price comparison conservative, the lowest price available across retailers is used to measure the price of each drug in China, and the highest price available across vendors is used to measure the price of each drug in the United States. A drug's price in Chinese yuan is divided by 3.506, China's PPP in 2017, to measure the PPP-converted Chinese price in US dollars. For reference purposes, the median per capita disposable income in China is \$5240 in 2015 (Federal Reserve Bank of St. Louis). PPP indicates purchasing power parity.

*A dosage is used when it has available price information in both the United States and China. If multiple dosages have available price information, then the dosage that is produced by the largest number of manufacturers in China is used in the analysis.

†Amlodipine and levamlodipine are combined.

‡FSS does not distinguish between Nifedipine extended release and Nifedipine controlled release, and refers to both as Nifedipine SA. The reported China price (\$0.50) is for Nifedipine extended release. The price in China for Nifedipine controlled release is \$1.30 per 30-mg tablet. To be conservative, we used only the price of \$0.50 in the analysis.

limited and whose insurance coverage usually does not include outpatient prescription drugs.³

There are 3 possible explanations for the relatively high price of AHDs in China. First, the registration process for drug production is lengthy and costly in China. To obtain permission from the regulatory authority to start making and selling a drug, manufacturers have to pay a substantial registration fee and face a long time lag between the application and the approval of the registration, which increases the cost of bringing the drug to market.

Second, subsequent to the approval of the registration, manufacturers have to overcome multiple barriers before their drugs can reach patients. Specifically, the drug needs to be placed on the National Essential Medicine List, which is updated only once every several years. Drugs that are not placed in a given year have to wait for multiple years until the next update to have the opportunity to be placed on the list. Once the drug is placed on the National Essential Medicine List, it then needs to be placed on the Provincial Essential Medicine List for every province where the manufacturer wishes to sell the drug. Moreover, each hospital maintains its own Essential Medicine List, and the placement on major hospitals' lists is indispensable for a drug to have a reasonable market share. Placing a drug on various Essential Medicine Lists takes considerable time and financial resources, which adds to the drug's cost. Instead of handling this cumbersome process themselves, many manufacturers hire a dealer company to market the drug, thereby incurring a middleman markup and adding more to the drug's cost.

Third, drug manufacturers often pay remunerations to physicians to encourage prescription, which can reach 40% of a drug's price and account for

75% of some physicians' overall income.⁵ These remunerations contribute to increasing the drug's price.

The Chinese government has identified the issue of high drug price and made various efforts to address it. Legislative and regulatory actions are currently being considered to shorten and simplify the process of registering manufacturers for drug production and the process of placing drugs on various Essential Drug Lists. In January 2017, the government adopted a 2-invoice policy that allows only 2 transactions between the manufacturer and the hospital: first, the manufacturer and the distributor; second, the distributor and the hospital. This policy prohibits dealer companies from handling sales for manufacturers so as to eliminate the middleman markup.

Recognizing the impact of price spread obtained by hospitals on drug prices, the government is reducing financial incentives for hospitals to sell medications. The compensation structure of clinicians also has been reformed to bring more transparency and accountability. It is more important that the Chinese government is expanding health insurance coverage to more citizens, with special focus on insurance benefits related to preventive medications such as AHDs.

Approximately 235 million Chinese adults are living with uncontrolled hypertension and, as a result, greater exposure to a high risk of cardiovascular disease morbidity and mortality.² The prospect of enhancing patient access to AHDs through lowering drug prices offers an opportunity for policy makers in China to dramatically improve the health of the population. Balancing patient access to AHDs and the financial viability of hospitals, physicians, and drug manufacturers should be a priority in China's ongoing healthcare reform.

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Disclosures

None.

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