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INTRODUCTION

Helicobacter pylori (Hp) infection is a key risk factor for gastric cancer, making eradication a public health priority. In China, increasing antibiotic resistance has lowered the effectiveness of traditional proton pump inhibitor (PPI)-based therapies, resulting in lower eradication rates and a growing clinical burden^[1]. Vonoprazan (VPZ), a novel potassium-competitive acid blocker (P-CAB) with superior efficacy, has demonstrated higher eradication rates and may provide a clinically and economically valuable alternative.

OBJECTIVE

To evaluate the economic and antibiotic stewardship impact of VPZ-based regimens (bismuth quadruple [VPZ-BQT] and dual therapy [VPZ with high dose amoxicillin, VPZ-HDT]) versus PPI-bismuth quadruple (PPI-BQT) for first-line *H. pylori* eradication in China from a healthcare system perspective.

METHOD

A decision-tree model, based on an epidemiological estimation of the Chinese *H. pylori* patient population, was used to project the economic and antibiotic stewardship consequences of different first-line treatment strategies.

- Model Structure:** The model simulated outcomes for a cohort of *H. pylori*-infected patients undergoing up to two 14-day courses of therapy (first- and second-line).
- Key Inputs:** Treatment regimens and their distribution patterns were informed by Chinese clinical guidelines^[2] and real-world data. Efficacy data were derived from network meta-analyses of eradication rates. Costs were based on 2024 national drug prices and healthcare service fees (in Chinese yuan [¥]).
- Outcomes:** Per-patient and national-level projections (2025–2027) were calculated for direct medical costs (DMC), antibiotic costs (AC), antibiotic consumption (DDDs)^[3], and antibiotic exposure days.
- Scenario Analysis:** The impact of increasing first-line VPZ-HDT adoption was modeled to identify the cost-saving threshold.

RESULTS

Economic comparison

- VPZ-HDT achieved net savings of ¥142.90 in DMC and ¥119.08 in AC per patient vs. PPI-BQT. This economic benefit was driven by its high efficacy, which minimized the need for costly second-line treatments and offset its higher initial drug cost.
- Although the VPZ-BQT regimen increased DMC by ¥139.00 per patient, it still delivered AC savings of ¥17.29, highlighting its specific value in reducing antibiotic.
- Projected nationally (2025–2027), full VPZ-HDT adoption could save approximately ¥6.99 billion in DMC and ¥5.82 billion in AC. In contrast, a full shift to VPZ-BQT, while increasing overall DMC, could still generate ¥0.85 billion in AC savings.

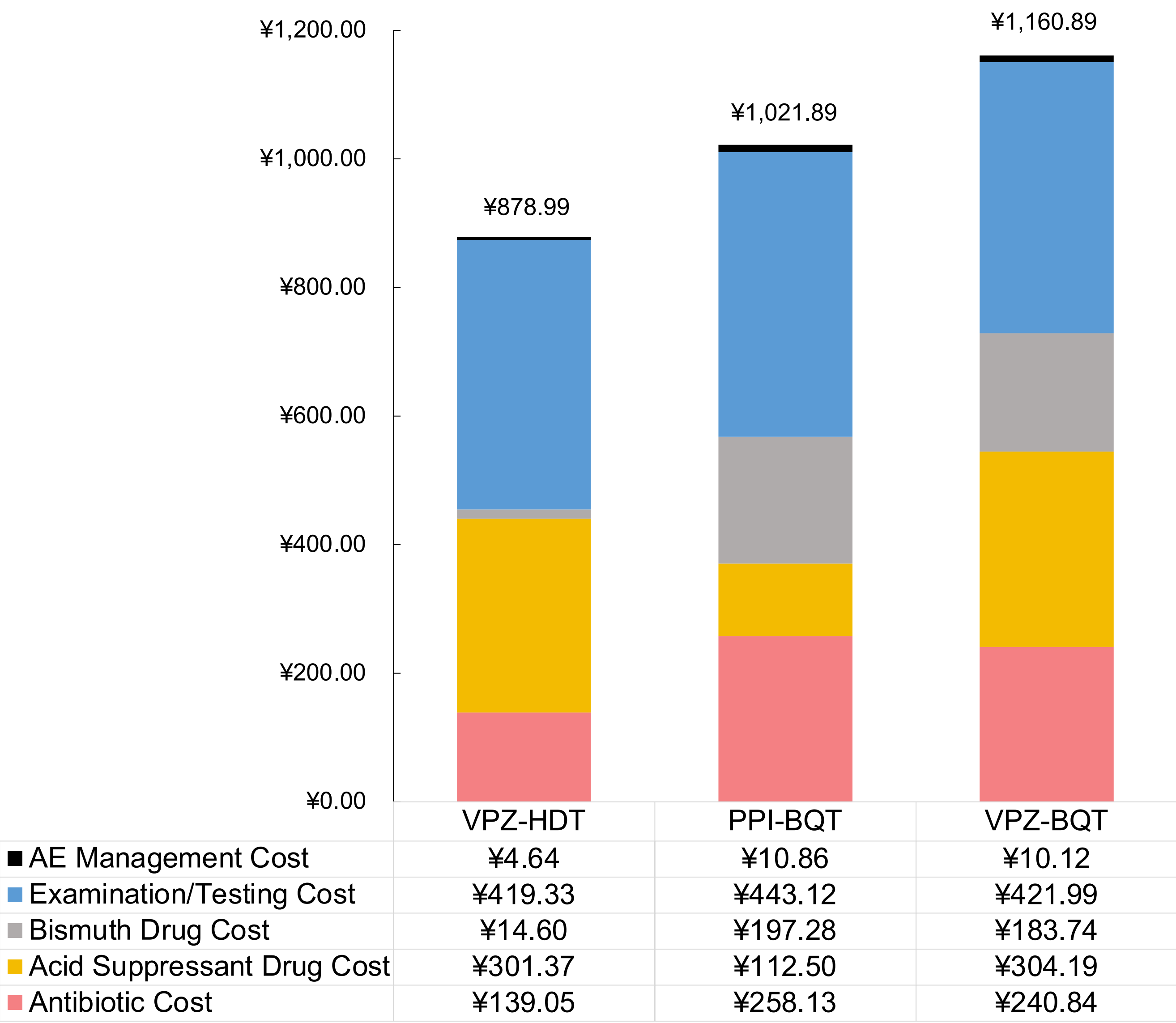


Figure 1. Cost Breakdown per Patient for Each *H. pylori* Eradication Regimen

Table 1. Total Antibiotic Costs and Direct Medical Costs in Different Treatment Regimens

	VPZ-HDT	VPZ-BQT	PPI-BQT
Cumulative Cost for the Target <i>H. pylori</i> Patient Population in China (2025-2027) (in billions)			
Total antibiotic costs	¥6.80	¥11.78	¥12.62
Total direct medical costs	¥42.98	¥56.76	¥49.96

Antibiotic stewardship impact

- Per patient, VPZ-HDT and VPZ-BQT reduced total antibiotic consumption (DDDs) by 37.84% and 6.91% respectively, compared to PPI-BQT.
- Nationally, this projects to a reduction of 0.95 billion DDDs (with VPZ-HDT) and 0.17 billion DDDs (with VPZ-BQT) over three years.
- Both VPZ-based regimens reduced consumption of high-resistance antibiotics (e.g., clarithromycin, levofloxacin), with VPZ-HDT enabling a strategic shift towards amoxicillin-only therapy.
- Both VPZ-based regimens also lowered total antibiotic exposure days by minimizing the need for second-line therapy.

Table 2. Antibiotic Usage in Different Treatment Regimens

	VPZ-HDT	VPZ-BQT	PPI-BQT
Total DDDs per <i>H. pylori</i> Patient	31.82	47.64	51.18
Total DDDs for the Target <i>H. pylori</i> Patient Population in China (2025-2027) (in billions)	1.56	2.33	2.50
Cumulative Antibiotic Consumption for the Target <i>H. pylori</i> Patient Population in China (2025-2027) (in tons)			
Amoxicillin	2,172.28	1,498.53	1,608.66
Clarithromycin	49.14	603.23	648.78
Levofloxacin	2.39	38.53	40.75
Tetracycline	0.89	5.08	5.91
Metronidazole	0.45	8.40	8.82
Furazolidone	0.96	11.27	12.16

Table 3. Days of Antibiotic Exposure for Different Treatment Regimens

	VPZ-HDT	VPZ-BQT	PPI-BQT
Days of Antibiotic Exposure per <i>H. pylori</i> Patient			
Amoxicillin	15.22	15.32	16.45
Clarithromycin	1.01	12.34	13.27
Levofloxacin	0.11	1.75	1.85
Tetracycline	0.01	0.05	0.06
Metronidazole	0.01	0.11	0.11
Furazolidone	0.10	1.15	1.24
Cumulative Days of Antibiotic Exposure for the Target <i>H. pylori</i> Patient Population in China (2025-2027)			
Amoxicillin	743,896,538.36	749,264,742.70	804,330,013.73
Clarithromycin	49,138,770.06	603,231,884.83	648,780,020.03
Levofloxacin	5,314,555.54	85,625,264.53	90,551,478.48
Tetracycline	445,198.37	2,542,264.83	2,954,931.96
Metronidazole	278,248.98	5,253,028.45	5,510,945.41
Furazolidone	4,785,882.48	56,369,572.20	60,805,743.92

Scenario analyses

- The economic advantage of a VPZ-based strategy grew as the proportion of first-line VPZ-HDT utilization increased.
- The VPZ strategy begins to achieve net cost savings compared to the PPI-BQT strategy when the use of the VPZ-HDT regimen reaches or exceeds 49.35%.

CONCLUSIONS

VPZ-based regimens, particularly VPZ-HDT, offer notable antibiotic stewardship and economic advantages for *H. pylori* eradication in China, with VPZ's superior efficacy driving these positive outcomes. Strategic adoption of effective VPZ-based therapies may optimize antibiotic stewardship and support national resistance control efforts.

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