

ECONOMIC EVALUATION OF ISAVUCONAZOLE VERSUS VORICONAZOLE FOR THE TREATMENT OF PATIENTS WITH POSSIBLE INVASIVE ASPERGILLOSIS IN
BRAZILIAN PRIVATE HEALTHCARE SYSTEM

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INTRODUCTION

Patients with invasive mold infections (IMI) commonly require hospital admissions and may present a large variety of clinical manifestations that represents diagnostic and therapeutic challenges for the Brazilian's Health System.¹ In 2019, isavuconazole was approved in Brazil, by Brazilian Health Regulatory Agency (Anvisa) for the treatment of invasive aspergillosis (IA) and invasive mucormycosis (IM). No economic evaluation of isavuconazole was performed from the perspective of the Brazilian health system since then. Therefore, the primary objective of this study was to assess the cost-effectiveness of isavuconazole compared to reference voriconazole for suspected IA in the Brazilian private healthcare system (PHS). The secondary objective was to assess the price acquisition of drugs impact in an economic evaluation of generic voriconazole versus isavuconazole without discount on list price, and generic and reference voriconazole with a 60% discount on price list.

METHODOLOGY

A 5-year decision-tree was developed from the PHS perspective. The model simulated the disease course and included the possibility of an IMI caused by IA versus IM, the possibility of receiving a second-line treatment (treatment with L-anfotericin B) as well as the probability of dying following an IA or IM infection (Figure 1). The model assumed that 5.75%² of the patients with possible IA have IM. It was also assumed that pathogen information would become available during the treatment course, in 6 days, for only 61%³ of patients, with differential diagnosis unavailable for the remainder. Efficacy parameters were extracted from SECURE/VITAL^{4,5} trials. Costs included treatment acquisition, hospitalization, and adverse events¹² (Table 1). Alternatives scenarios included 3- and 10-year time horizon and discount price of voriconazole. Deterministic and probabilistic sensitivity analyses were conducted. A willingness-to-pay of R\$ 40,688/QALY was considered.

RESULTS AND DISCUSSION

The base case analysis showed that isavuconazole was associated with a total cost saving of R\$ 95,204 per patient, when compared to reference voriconazole (Table 2). Considering generic voriconazole, isavuconazole was associated with a saving of R\$ 66,685 (Table 3). The discount simulation scenario showed that isavuconazole compared to reference or generic voriconazole with 60% discount on price list resulted in a saving of R\$ 46,333 and R\$ 34,926, respectively. (Table 2 and 3). Results were robust in sensitivity analyses (Figure 2). 3- and 10-year ICURs were also dominant (Table 4), relative to a willingness-to-pay threshold of R\$ 40,688/QALY. All scenarios showed that isavuconazole dominated voriconazole, probably because isavuconazole providing fewer monitoring exams, adverse events and reduction in length of hospital stay compared to voriconazole. Futhermore, isavuconazole has spectrum of action to IA and IM while voriconazole has only IA indication.

Figure 1: Decision-free model



Figure 2: Probabilistic Sensitivity Analysis (PSA) scartter plot – Base Case

100% of simulations on the probabilistic sensitivity analysis are in the Southeast of the PSA scatter plot

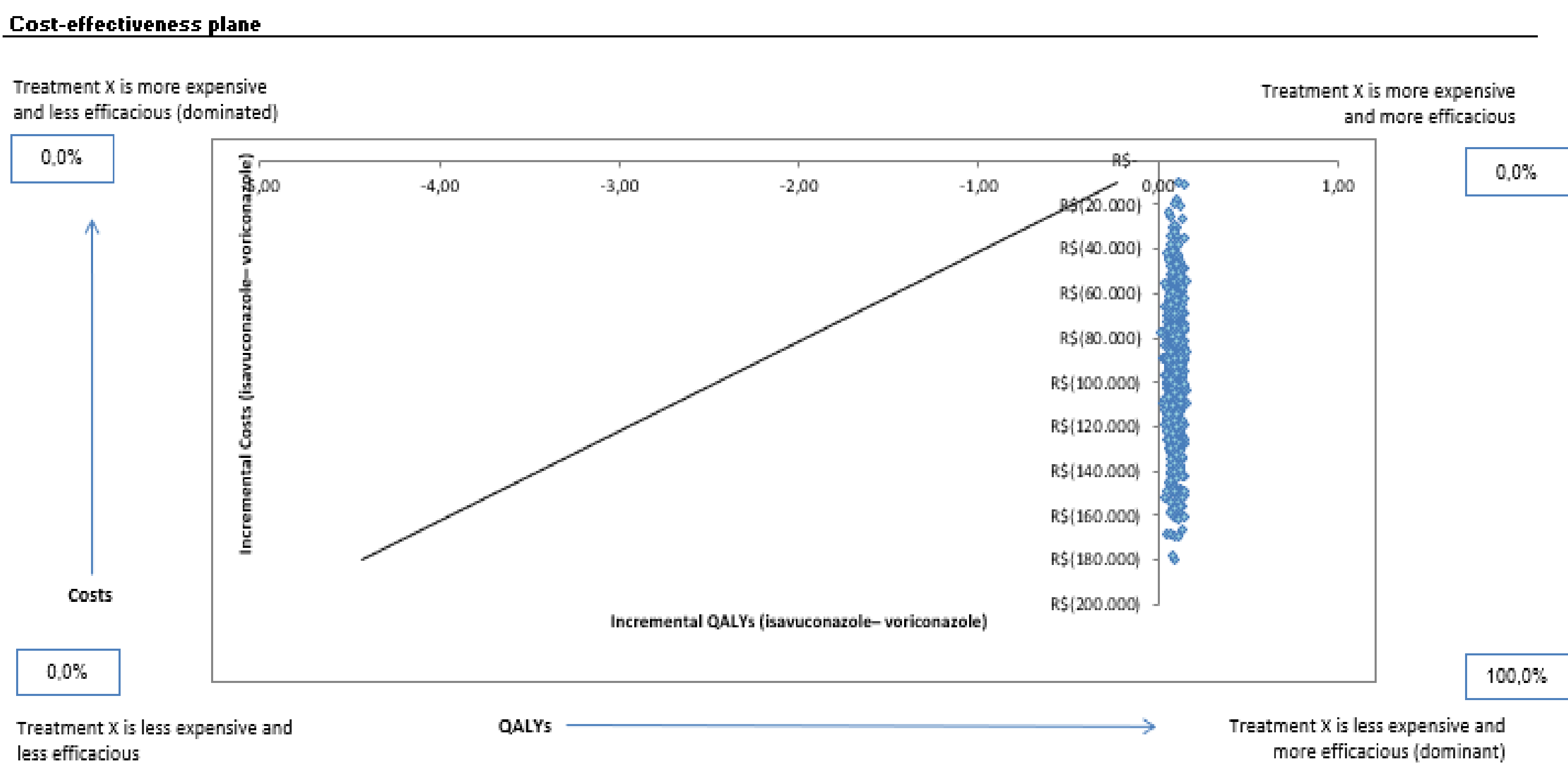


Table 1: Costs ^{10,11,12}

	Unit Cost	Reference
Isavuconazole IV	R\$ 1,735	CMED, 2022
Isavuconazole Oral	R\$ 327	CMED, 2022
Voriconazole REF IV	R\$ 1,688	CMED, 2022
Voriconazole REF Oral	R\$ 497	CMED, 2022
Voriconazole REF 60% discount IV	R\$ 675	CMED, 2022 calculated
Voriconazole REF 60% discount Oral	R\$ 199	CMED, 2022 calculated
Voriconazole GEN IV	R\$ 1,097	CMED, 2022
Voriconazole GEN Oral	R\$ 323	CMED, 2022
Voriconazole GEN 60% discount IV	R\$ 439	CMED, 2022 calculated
Voriconazole GEN 60% discount oral	R\$ 129	CMED, 2022 calculated
L – Anfotericin B IV	R\$ 2,401	CMED, 2022
Serum creatinine	R\$ 17.72	CBHPM, 2022
Urinalysis	R\$ 20.71	CBHOM, 2022
Liver function test	R\$90.18	CBHPM, 2022
Hospitalisation	R\$ 3,779.24	UNIDAS 2017/2018
AE: Cardiac disorders	R\$ 1,120.24	CBHPM, 2022
AE: Hepatobiliary disorders	R\$ 827.10	CBHPM, 2022
AE: Nephrotoxicity L – Anfotericin B	R\$ 3,924.60	Walsh et al, 2004; UNIDAS 2017/2018; Brunesteyn et al, 2007

AE: adverses events; IV: intravenous; REF: reference; GEN: generic; R\$: Brazilian currency

Table 2: Base case and scenario of voriconazole reference with a 60% discount results

	Voriconazole Reference	Isavuconazole
Total QALYs	2,52	2,61
Incremental QALYs		0,10
Total Costs	R\$ 519,577	R\$ 424,373
Incremental Costs		- R\$ 95,204
ICUR		DOMINANT
Scenario with a 60% discount		
Total QALYs	2,52	2,61
Incremental QALYs		0,10
Total Costs	R\$ 457,942	R\$ 411,610
Incremental Costs		- R\$ 46,333
ICUR		DOMINANT

Table 3: Scenarios of voriconazole generic and voriconazole generic with a 60% discount results

	Voriconazole Generic	Isavuconazole
Total QALYs	2,52	2,61
Incremental QALYs		0,10
Total Costs	R\$ 483,611	R\$ 416,926
Incremental Costs		- R\$ 66, 685
ICUR		DOMINANT
Scenario with a 60% discount		
Total QALYs	2,52	2,61
Incremental QALYs		0,10
Total Costs	R\$ 443,556	R\$ 408,630
Incremental Costs		- R\$ 34,926
ICUR		DOMINANT

Table 4: Scenarios of 3- and 10- year time horizon

	Voriconazole Reference	Isavuconazole
3 year		
Total QALYs	1,58	1,64
Incremental QALYs		0,06
Total Costs	R\$ 519,577	R\$ 424,373
Incremental Costs		- R\$ 95,204
ICUR		DOMINANT
10 year		
Total QALYs	4,49	4,66
Incremental QALYs		0,17
Total Costs	R\$ 519,577	R\$ 424,373
Incremental Costs		- R\$ 95,204
ICUR		DOMINANT

CONCLUSION

In comparison to voriconazole, isavuconazole is a cost-saving strategy for suspected IA treatment, regardless of it being the reference or generic voriconazole. When a 60% discount was applied in the price list of voriconazole, for simulation the Brazilian market practices, isavuconazole maintained the result of the cost-saving strategy as well.

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