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Total Cost of Care Analysis of First-Line Immuno-Oncology Therapies for Unresectable Hepatocellular Carcinoma: A Colombian Payer Perspective

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Objective

- Tremelimumab + durvalumab (STRIDE) and atezolizumab + bevacizumab are among the NCCN and ESMO recommended first-line (1L) IO treatment options for Unresectable Hepatocellular Carcinoma (uHCC). This study aimed to estimate the total annual cost of care of treating newly diagnosed uHCC patients eligible for first-line systemic therapy with STRIDE compared to atezolizumab + bevacizumab, from the Colombian payer perspective.

Conclusions

- From a Colombian payer perspective, and under the inputs and parameters of this analysis, treatment with STRIDE was associated with an average cost savings of USD$10,767 per patient per year compared with atezolizumab + bevacizumab. The incremental cost offset to the health plan was USD$1,937,997 per year
- These findings suggest that STRIDE could offer cost savings for uHCC treatment in the Colombian healthcare system, although results may be sensitive to variations in the model inputs and assumptions. To our knowledge, this is the first study to comprehensively capture the cost of treating uHCC patients over one year in Colombia. Additional real-world evidence is warranted to capture long-term survival benefits and associated treatment costs

Plain language summary

Why did we perform this research?

- To understand the impact of two immunotherapy regimens, STRIDE (tremelimumab + durvalumab) and atezolizumab + bevacizumab, on the Colombian public payer's budget following the introduction of STRIDE as a first-line treatment option for uHCC patients

How did we perform this research?

- We adapted a total cost of care model that compared direct medical costs of treating newly diagnosed uHCC patients with STRIDE versus atezolizumab + bevacizumab over one year. Data from the HIMALAYA[3] and IMbrave150[4] clinical trials and unit costs from local databases were used for inputs. Because these trials differ in design and patient populations, results should be interpreted with caution.

What were the findings of this research and what are the implications?

- The model suggests STRIDE could offer cost savings for uHCC treatment in the Colombian healthcare system compared to atezolizumab + bevacizumab, largely because of lower drug acquisition costs.

Introduction

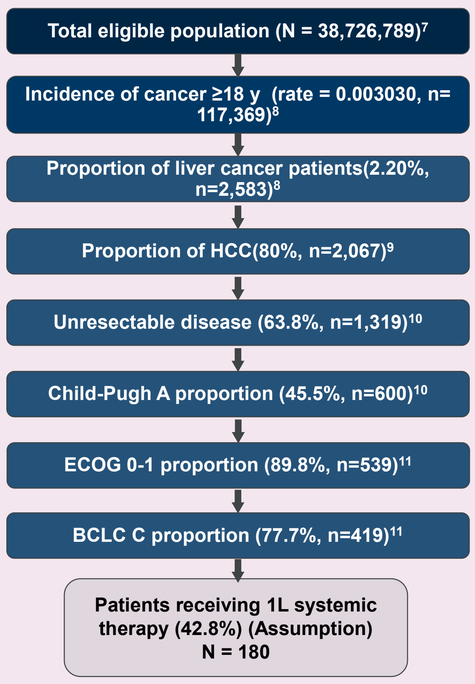
- Colombian real-world evidence highlights variability in HCC stage at diagnosis and access to potentially curative treatment. In a study, only 35% of patients were diagnosed at BCLC stages with curative treatment options, and 25% ultimately received curative therapies.[1,2]
- Two immunotherapy combinations, (1) single tremelimumab regular interval durvalumab (STRIDE), and (2) atezolizumab + bevacizumab, have demonstrated clinical benefit in their respective clinical trials, HIMALAYA and IMbrave150[3,4]
- Previous indirect treatment comparison analysis showed similar efficacy outcomes between treatments until two years, while STRIDE demonstrated favorable safety[5]. Comparison after two years was not feasible due to absence of data for IMbrave150 after 26.9 months (maximum length of follow-up for sorafenib).
- We consider relevant to compare the costs of STRIDE and atezolizumab + bevacizumab, considering the potential variability in the Colombian context.

Methods

A cost of care model was adapted from a previous publication[6], which followed uHCC patients eligible for first-line systemic therapy over the course of one year, considering direct medical costs. The model was used to estimate the total cost of care among eligible uHCC patients using STRIDE versus atezolizumab + bevacizumab from a Colombian payer perspective. Costs considered in the model included treatment acquisition and administration, endoscopy, healthcare resource use, and cost for treating grade **≥3** treatment-emergent adverse events (TEAEs).

- The population eligible to receive first-line systemic therapy in Colombia was estimated as shown in Figure 1. Given the differences in the data sources available in Colombia, the population model was built differently from the one used in the original publication

Figure 1. Newly incident patient flow diagram



Methods

Model Inputs

Clinical Data

- Data from the HIMALAYA[3] and IMbrave150[4] trials were used to extract the rate of TEAEs (Table 2) and treatment regimens (Table 4) of STRIDE and atezolizumab + bevacizumab.
- **Weekly resource use** rates for atezolizumab + bevacizumab was taken from NICE TA666[12], based on IMbrave150 progression-free data. STRIDE was assumed equal, given the lack of real-world data

Costs

- Weekly healthcare resource use costs were calculated by multiplying rate with unit costs (Table 1). The annual cost-of-care per patient was calculated by multiplying weekly resource use by 52 (weeks).
- The cost of treating grade ≥3 TEAEs were calculated by multiplying the cost of treatments with the mean frequency of TEAEs associated with STRIDE and atezolizumab + bevacizumab (Table 2).
- An **endoscopy** is required before initiating atezolizumab + bevacizumab to assess bleeding risk and manage gastric varices[4] but not before STRIDE, which carries no increased bleeding risk.[3] The one-time pre-treatment monitoring cost of **$155.54** for endoscopy is applied only to patients receiving atezolizumab + bevacizumab.
- **Drug administration** costs were estimated based on IV frequency (Table 3).
- **Drug acquisition costs** were estimated based on the cost of each drug. The base case assumed the cost of one year of treatment (Table 4) while the alternative scenario used the mean treatment frequency and duration observed in the HIMALAYA and IMbrave150 clinical trials [3,4] (Table 5)
- Unit costs for procedures, diagnostic imaging, consultations, and hospitalizations were obtained from the Sufficiency Database[13] inflated to 2025 prices using CPI adjustments and the 2025 SOAT Tariff Manual.[14] For medicines, weighted prices were calculated using 2025 data available from SISMED.[15] Healthcare resource use was estimated through consultation with a treating clinical expert. The total annual burden from the plan perspective was calculated by multiplying the annual cost-of-care per patient with the number of eligible patients (n = 180) (Figure 1).
- All results are presented in U.S. dollars using the average 2025 exchange rate of USD 1 = COP 4,052.71

Table 1. Weekly healthcare resource use rates and costs

Resource Use		Unit Cost (2025 USD)	Frequency per week	Cost per year (2025 USD)	
				STRIDE	Atezolizumab + bevacizumab
Physician visits	Appointment with oncologist	$13.11	0.248	$169.30	$169.30
	Appointment with hepatologist	$22.53	0.002	$2.81	$2.81
	Appointment with gastroenterologist	$16.48	0.000	$0.00	$0.00
	Appointment with radiologist	$13.02	0.013	$8.47	$8.47
	Appointment within clinician nurse specialist	$3.32	0.315	$54.31	$54.31
	Appointment with palliative care physician/nurse	$14.09	0.035	$25.80	$25.80
Laboratory tests	AFP test	$12.97	0.230	$155.15	$155.15
	Liver function test	$20.91	0.240	$260.91	$260.91
	INR	$3.61	0.240	$45.11	$45.11
	Complete blood count	$3.95	0.230	$47.20	$47.20
	Biochemistry*		0.240	$0.00	$0.00
Radiological tests	Abdominal CT	$67.00	0.126	$438.96	$438.96
	Abdominal MRI	$126.17	0.059	$385.77	$385.77
Hospitalization	Hospitalisation	$37.16	0.014	$26.28	$26.28
	Hospital follow-up: Specialist	$20.09	0.023	$24.45	$24.45
	Hospital follow-up: General Practitioner	$6.40	0.021	$6.95	$6.95
	Hospital follow-up: Nurse	$5.30	0.031	$8.49	$8.49

Table 2. Frequency and cost of grade ≥3 TEAEs

Grade ≥3 TEAEs	Cost (2025 USD)	Frequency		Total costs per year	
		STRIDE	Atezolizumab + Bevacizumab	STRIDE	Atezolizumab + Bevacizumab
ALT increased	$294.68	2.6%	3.6%	$7.66	$10.61
AST increased	$294.68	5.2%	7.0%	$15.32	$20.63
Blood bilirubin increased	$294.68	0.8%	2.4%	$2.36	$7.07
Diarrhea	$1,248.26	4.4%	1.8%	$54.92	$22.47
Fatigue	$597.37	2.1%	0.0%	$12.54	$0.00
Hypertension	$83.62	0.0%	15.2%	$0.00	$12.71
Hyperthyroid events	$2,635.06	1.8%	2.4%	$47.43	$63.24
Proteinuria	$316.96	0.0%	3.0%	$0.00	$9.51
Rash, pruritis	$80.37	1.5%	0.0%	$1.21	$0.00
Upper GI bleeding	$2,669.48	0.0%	6.4%	$0.00	$170.85

Table 3. Treatment administration frequency and costs

Treatment	Infusion time	Number of administrations	Cost of IV infusion (2025 USD)	Annual cost of administration (2025 USD)
			For session	
Atezolizumab	60 min; 30 min for subsequent infusions	17	$132.31	$2,249.21
Bevacizumab	(a) First: 90 min (b) second: 60 min (c) subsequent: 30 min	17	$132.31	$2,249.21
Durvalumab	60 min	13	$132.31	$1,719.98
Tremelimumab	60 min	1	$132.31	$132.31

Table 4. Treatment regimen and acquisition costs (Base Case)

Drug acquisition	Atezolizumab	Bevacizumab	Durvalumab	Tremelimumab
Dose per vial (mg)	1200	100	500	300
Drug dose (mg)	1200	1063.5	1500	300
Dose frequency (per week)	0.33	0.33	0.25	N/A
Mean treatment duration (days)	365	365	365	N/A
Number of vials used per administration	1	11	3	1
Total number of administrations per patient per year	17	17	13	1
Total number of drug vials used per patient per year	17	187	39	1
Cost per vial (2025 USD) – SISMED prices considered	$3,988.86	$180.99	$2,255.18	$5,961.94

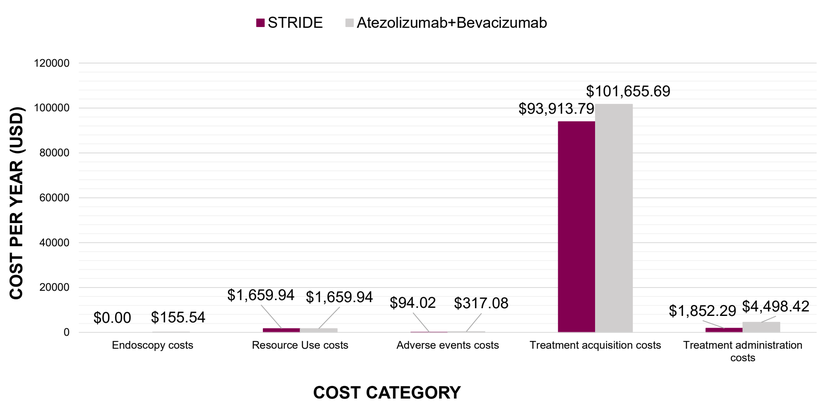
Table 5. Trial Based parameters (Alternative scenario: trial-based treatment duration))

Drug acquisition	Atezolizumab	Bevacizumab	Durvalumab	Tremelimumab
Mean treatment duration (days)	225.24	210.02	167.41	N/A
Number of vials used per administration	1	11	3	1
Total number of administrations per patient per year	10	10	5	1
Total number of drug vials used per patient per year	10	110	15	1
Annual cost of administration (2025 USD)	$1,323.07	$1,323.07	$661.53	$132.31

*Assume biochemistry costs are included in liver function tests

Results and interpretation

Figure 2. Annual drug and non-drug costs per patient



- The total annual cost of care for STRIDE and atezolizumab + bevacizumab was estimated at USD$97,520 and USD$108,287 per patients, respectively.
- There was an **average cost savings** of USD**$10,767 per patient per year** when **patients were treated with STRIDE** compared to atezolizumab + bevacizumab.
- The main driver of cost savings was treatment acquisition (-USD$7,742, -8%), though lower costs were also associated with treatment administration (-USD$2646, -58%), TEAE management (-USD$223, -70%) and endoscopy (-USD$156, -100%)

Table 6. Annual burden to the plan (USD)

Cost Category	STRIDE	Atezolizumab+ Bevacizumab	Incremental
Endoscopy	$0.00	$27,997.92	$27,997.92
Resource use	$298,790.00	$298,790.00	$0.00
Grade ≥3 TEAEs	$16,922.91	$57,075.07	$40,152.17
Treatment acquisition	$16,904,481.81	$18,298,024.71	$1,393,542.91
Treatment administration	$333,412.46	$809,715.97	$476,303.51
TOTAL	**$17,553,607.16**	**$19,491,603.67**	**$1,937,996.51**

- The total burden to the health plan was estimated at $17,553,607 when all patients were treated with STRIDE, and $19,491,604 when treated with atezolizumab + bevacizumab (Table 6).
- The incremental cost offset to the health plan was USD$1,937,997 per year when treated with STRIDE, with treatment acquisition accounting for 71% of cost savings (-USD$1,393,542).
- In the alternative scenario using trial-based treatment duration, the incremental cost offset to the health plan was USD$4,002,984, with treatment acquisition accounting for 90% of the cost savings.

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Abbreviations

NCCN: National Comprehensive Cancer Network. **ESMO:** European Society for Medical Oncology. **uHCC:** Unresectable Hepatocellular Carcinoma. **AFP**: alpha-fetoprotein; **ALT:** alanine aminotransferase; **AST**: aspartate aminotransferase; USD: American Dollars; CT: computerized tomography; ; **GI:** gastrointestinal; **INR:** international normalized ratio; **IV:** intravenous; **MRI:** magnetic resonance imaging; **STRIDE:** single tremelimumab regular interval durvalumab

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