

A Total Cost of Care Modeling Tool to Evaluate Second-Line Treatment Costs for Patients With Extensive-Stage Small Cell Lung Cancer

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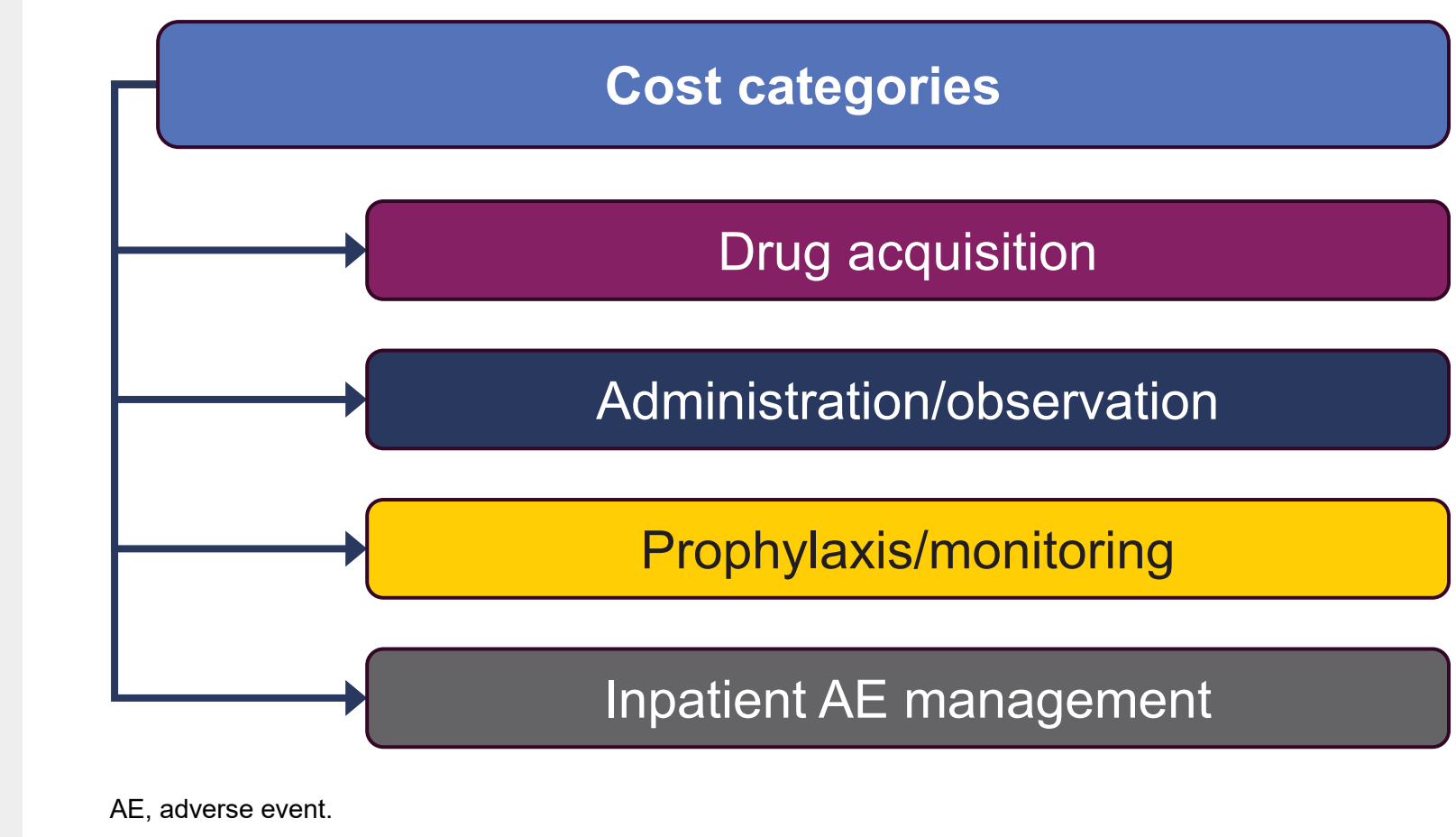
Background

- Small cell lung cancer (SCLC) accounts for ~15% of all lung cancer cases, and it has the most aggressive clinical course of any type of pulmonary malignancy^{1,2}
 - ~70% of patients present with extensive-stage SCLC (ES-SCLC) at initial diagnosis¹
- Most patients with ES-SCLC progress within 6 months, long-term survival remains limited (historical median survival is 6–12 months), and only ~40% receive second-line (2L) therapy^{1,3,4}
- According to National Comprehensive Cancer Network® (NCCN®) Clinical Practice Guidelines in Oncology (NCCN Guidelines®), the preferred subsequent therapies for patients with ES-SCLC following progression on first-line therapies include tarlatamab, lurbinectedin, platinum-based doublet chemotherapy (if prolonged disease-free time), or topotecan⁵
- 2L treatments for ES-SCLC vary in evidence maturity, economic data availability, and real-world use, posing challenges for decision-makers comparing therapies⁵⁻¹²
- We developed a novel, customizable tool to estimate and compare total costs of care (TCOC) for 2L treatment of ES-SCLC in the US

Methods

- A customizable TCOC model was constructed to estimate costs from a US payer (Medicare/commercial health plan) or institutional perspective
- The model used economic data from Turquoise Health (aggregated commercial negotiated rates between payers and providers; **Table 1**) and noneconomic data from clinical trials or prescribing information (dosing, treatment duration, adverse event [AE] rates; **Tables 2 and 3**) due to a paucity of available real-world data for all treatments
- Costs, based on inputs to the model for each perspective, included drug acquisition, administration/observation, prophylaxis/monitoring, and inpatient AE management across a median number of treatment cycles (**Figure 1**)
- Assumptions:
 - All patients received only 1 treatment type, fully adhered to regimens, and experienced no dose reductions or delays
 - Due to limited information at the time of model creation, tarlatamab commercial acquisition costs were estimated based on a percentage markup over wholesale acquisition costs (WAC), consistent with commercial proportion increases for lurbinectedin; WAC +1.35% was estimated for Medicare perspective; and a unit cost of \$150 per 0.1 mg was assumed for institutional perspective
 - Carboplatin-etoposide was the only type of platinum-based chemotherapy used
 - Vial sharing was not considered in drug-acquisition costs
 - All treatments occurred in the outpatient setting, and oral treatments do not incur administration costs
 - Prophylaxis for emetic and febrile neutropenia (FN) risk was employed according to product dosing instructions, NCCN Guidelines®, or assumed risk based on available data^{5,6,8,13,14}
 - For high FN risk, pegfilgrastim was administered each cycle; for intermediate risk, pegfilgrastim was administered once each course; and for low risk, pegfilgrastim was not administered
 - All grade ≥3 AEs and grade ≥2 cytokine release syndrome AEs were independent, occurred in the first treatment cycle, and required inpatient stays

Figure 1. Costs of care



Model inputs

Table 1. Sourcing cost inputs

Data source ^a	Description	Data elements	Perspective
Turquoise Health	Aggregated commercial negotiated rates between payers and providers	MS-DRG, CPT, HCPCS, negotiated rates	Payer
		Chargemaster list/gross charges	Institution/provider
Medispan Price Rx	Aggregated drug pricing data	WAC	Institution/provider
CMS (Addendum B)	Medicare drug reimbursement data	HCPCS, MPL	Payer
Optum Rev Cycle Pro	Billing and reimbursement data references	MS-DRG, ICD-9-CM/ICD-9-PCS, ICD-10-CM/ICD-10-PCS	Payer and institution/provider

^aData were sourced in September 2024 by Turquoise Health, which has analyzed over 6000 hospitals and 270 payer contracts with a repository of over 1 billion negotiated rates. CM, clinical modification; CMS, Centers for Medicare and Medicaid Services; CPT, current procedural terminology; HCPCS, Healthcare Common Procedure Coding System; ICD, International Classification of Disease; MPL, Medicare payment limit; MS-DRG, Medicare Severity Diagnosis Related Groups; PCS, procedure coding system; WAC, wholesale acquisition cost.

Table 2. Inputs for key treatment assumptions

Treatment	Doses per cycle	Doses per admin	Admin amount	Cycle length (weeks)	Median cycles per course ^a	Observation requirement (hours)	Monitoring level	Emetic/FN risk ^b
Lurbinectedin ^{5,15}	1	1	3.2 mg/m ²	3	4	NR	Low	Mod/int
Tarlatamab ^{8,13}	Cycle 1	3	1 or 10 mg ^c	4	5	2 to 24 ^d	Low	Low/low ^e
	Cycle 2+	2	10 mg					
Platinum rechallenge ^{3,9,10}	Carboplatin	1	5 mg/mL/min	3	4	NR	Moderate	Mod/int
	Etoposide	3	100 mg/m ²	3	4	NR	Moderate	Low/int
Topotecan (oral) ^{7,16}	5	5	2.3 mg/m ²	3	4	NR	Moderate	Low/high

^aMedian cycles per course were based on the median time on treatment from the clinical trials. ^bRisk was used to estimate prophylaxis use. ^cPatients receive 1 mg on cycle 1, day 1 and 10 mg for all subsequent doses. ^dDuring cycle 1, administrations 1 and 2 require 22–24 hours of observation, and administration 3 requires 6–8 hours; during cycle 2, they require 6–8 hours of observation, during cycles 3 and 4, they require 3–4 hours; and during cycle 5, they require 2 hours. ^eIn addition to emetic/FN prophylaxis, during cycle 1 of tarlatamab treatment, 1 liter of normal saline is infused over 2–4 hours immediately after completion of tarlatamab infusion.

Table 3. Inputs for inpatient management of AEs

Grade ≥3 AE	Lurbinectedin ^a	Tarlatamab ^b	Platinum rechallenge ^c	Topotecan (oral) ^d
Anemia	8.6%	7.5%	12.2%	22.6%
Anorexia	-	-	-	5.2%
Asthenia	-	5.3%	-	4.6%
Colitis	-	-	-	-
CRS	-	21.1%	-	-
Diarrhea	1.0%	-	0.5%	7.9%
Dyspnea	-	-	-	7.9%
Fatigue	6.7%	5.3%	0.5%	6.5%
Febrile neutropenia	4.8%	-	6.1%	5.0%
Fever	-	-	-	4.0%
Hypertension	-	3.0%	-	-
Hypokalemia	-	2.3%	-	-
Hyponatremia	-	6.0%	-	-
ICANS	-	0.0%	-	-
Leukopenia	28.6%	-	4.1%	65.4%
Lymphopenia	0.0%	13.5%	-	-
Neutropenia	45.7%	6.0%	24.5%	73.2%
Pneumonia	1.9%	4.5%	-	-
Respiratory tract infection	-	2.3%	-	-
Thrombocytopenia	6.7%	-	7.7%	48.7%

For therapies, except tarlatamab, grade 3 and 4 AEs occurring at a frequency of ≥5% and ≥1% of patients are included, respectively. For tarlatamab, grade 3 and 4 AEs occurring at a frequency of ≥2% were included. The incidence of grade ≥2 CRS is included, as patients require hospitalization. AEs for which hospitalization is not required (eg, decreased appetite, musculoskeletal pain, vomiting, and fatigue) were excluded.

- AE management data in this model are limited by reliance on clinical trial data rather than real-world data
- In real-world clinical practice with lurbinectedin, with primary prophylaxis allowed, grade ≥3 neutropenia (1% vs 46%) and leukopenia (0% vs 29%) were reported less frequently than in the pivotal phase 2 basket trial^{13,18}
- Available real-world studies of tarlatamab report higher incidences of grade ≥2 cytokine release syndrome (32% vs 21%) and grade ≥3 immune effector cell–associated neurotoxicity syndrome (5%–14% vs 0%) than in DeLLphi-301^{17,19,20}

Results

Figure 2. Total cost of care per treated patient based on the median number of cycles: commercial payer

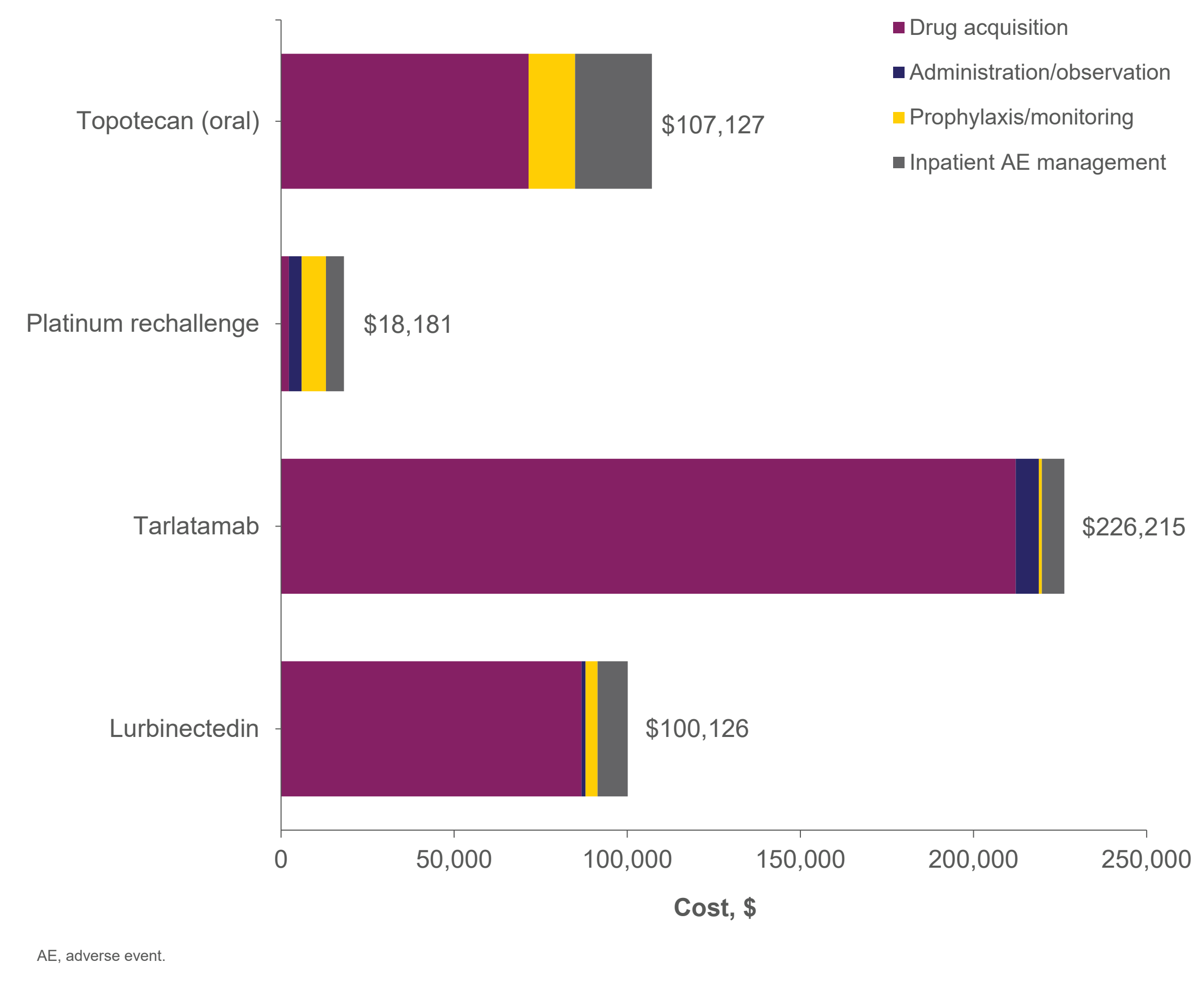


Figure 4. Total cost of care per treated patient based on the median number of cycles: institutional

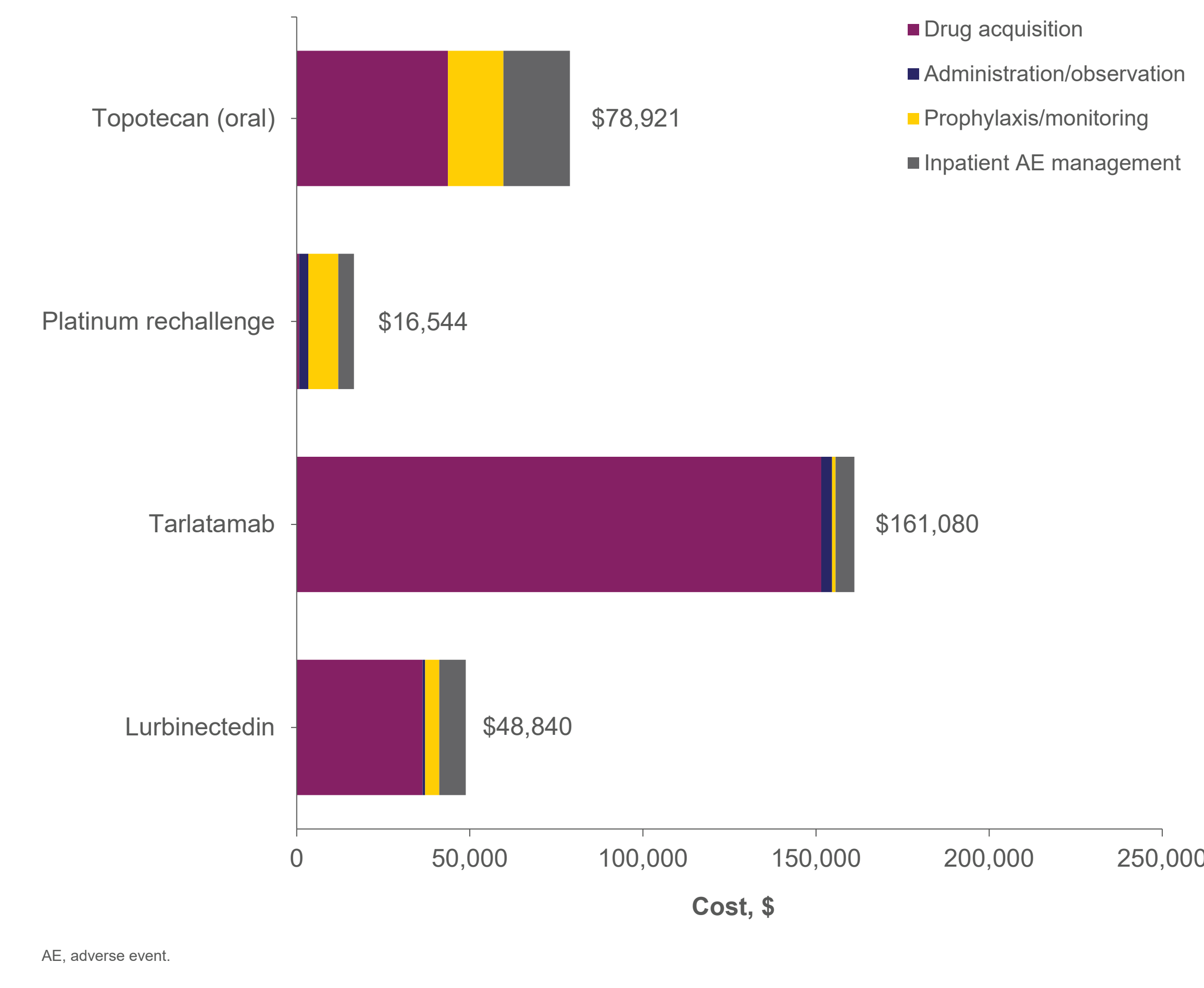


Figure 3. Total cost of care per treated patient based on the median number of cycles: Medicare payer

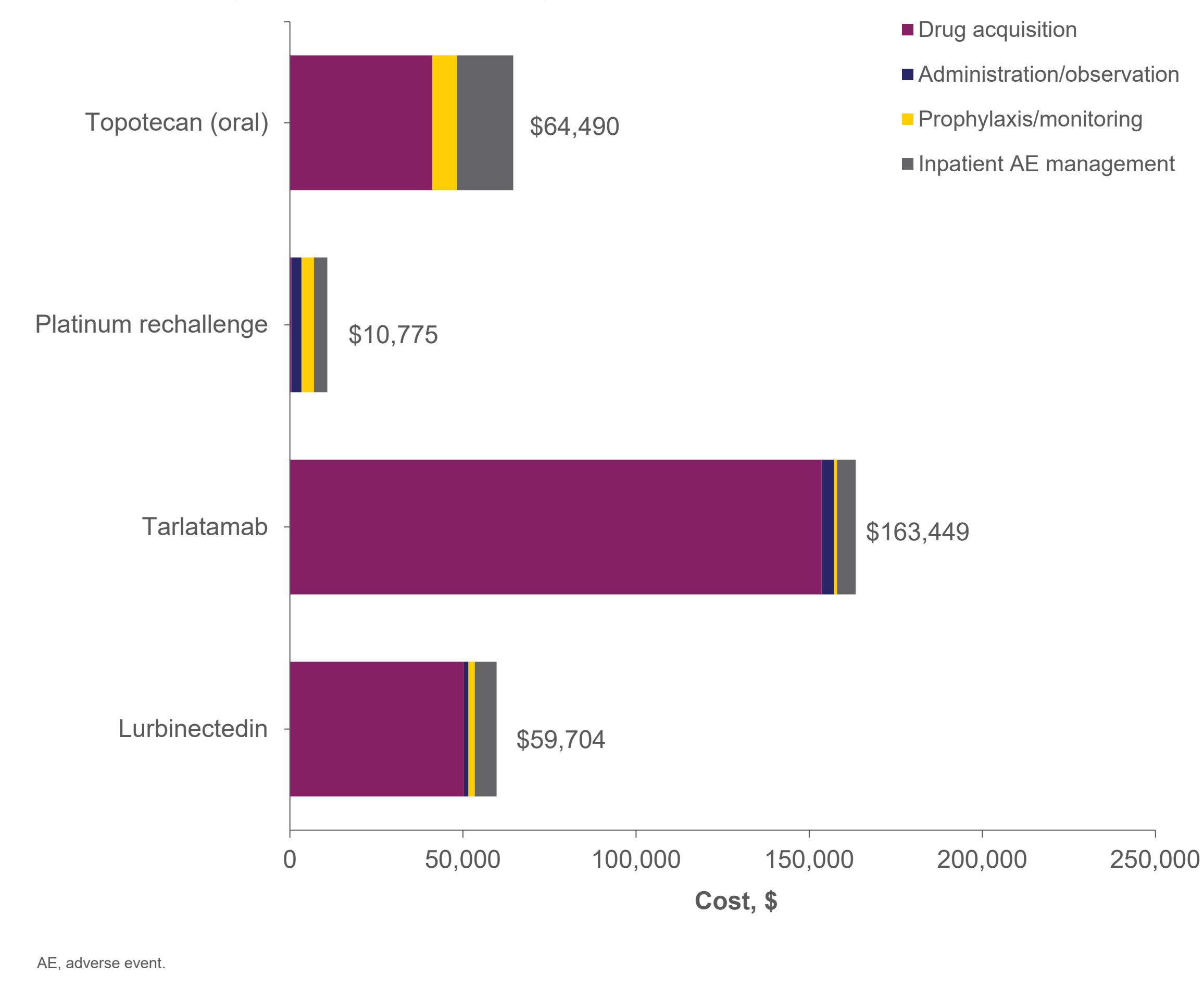


Table 4. Total cost of care per treated patient based on the median number of cycles: all perspectives

Estimated costs, \$	Lurbinectedin	Tarlatamab	Platinum rechallenge	Topotecan (oral)
Commercial payer	100,126	226,215	18,181	107,127
Drug acquisition	86,805	212,171	2,299	71,500
Administration/observation	1,160	6,673	3,656	0
Prophylaxis/monitoring	3,450	865	7,036	13,442
Inpatient AE management	8,711	6,507	5,191	22,185
Medicare payer	59,704	163,449	10,775	64,490
Drug acquisition	50,284	153,550	435	41,152
Administration/observation	1,291	3,549	2,902	0
Prophylaxis/monitoring	1,822	916	3,617	7,157
Inpatient AE management	6,308	5,433	3,822	16,181
Institutional	48,840	161,080	16,544	78,921
Drug acquisition	36,344	151,500	698	43,693
Administration/observation	728	3,103	2,669	0
Prophylaxis/monitoring	4,098	1,011	8,658	15,992
Inpatient AE management	7,671	5,466	4,518	19,235

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