A BUDGET IMPACT ASSESSMENT OF TRILACICLIB FOR DECREASING THE INCIDENCE OF CHEMOTHERAPY-INDUCED MYELOSUPPRESSION IN ADULT PATIENTS WITH EXTENSIVE-STAGE SMALL CELL LUNG CANCER

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INTRODUCTION

- Lung cancer is the leading cause of cancer-related death in the US and around the world[1,2]
- Small cell lung cancer (SCLC) is distinguished from other forms of lung cancer by its aggressive clinical course and widespread metastases at diagnosis[3]
  - SCLC accounts for ~13–17% of lung cancer cases diagnosed annually in the US; of these, ~60–70% of patients will have extensive-stage disease (ES-SCLC) at diagnosis[1,4,5]
- Chemotherapy remains the cornerstone of treatment for ES-SCLC
  - Chemotherapy-induced damage of hematopoietic stem and progenitor cells (HSPCs) in the bone marrow often results in multilineage myelosuppression that may manifest as neutropenia, anemia, and/or thrombocytopenia[6]
- Trilaciclib (COSELA™, G1 Therapeutics, Inc.) is a transient intravenous kinase inhibitor that, when administered within 4 hours prior to the start of chemotherapy, helps to protect HSPCs from chemotherapy-induced damage (multilineage myeloprotection)[6,7]
- Data from 3 clinical trials (G1T28-05, -02, and -03) in adult patients with ES-SCLC showed that administering trilaciclib prior to chemotherapy reduced the incidence of chemotherapy-induced myelosuppression, and reduced the need for supportive care interventions and chemotherapy dose reductions/delays[8-10]

OBJECTIVE

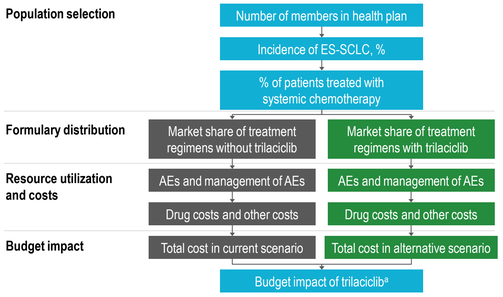
- To estimate the budget impact of trilaciclib when prescribed to decrease the incidence of myelosuppression in adult patients with ES-SCLC from a US third-party payer's perspective

METHODS

Model Overview

- The model creates 2 scenarios to assess the budget impact of trilaciclib from a third-party payer's perspective
  - A current scenario outlines the economics and outcomes associated with standard ES-SCLC treatments when unaccompanied by trilaciclib
  - An alternative scenario displays the economics and outcomes projected to evolve when those same standard treatments are combined with trilaciclib
- Differences in outcomes and their associated costs, as calculated for each scenario, represent the estimated budget impact of trilaciclib (**Figure 1**)

Figure 1. Model Structure



[a] Expressed as total annual costs, and costs per member per month.
AE, adverse event; ES-SCLC, extensive-stage small cell lung cancer.

Model Inputs

- The current scenario model uses a 1- to 5-year time horizon
  - Model users can configure and vary the time horizon, as well as other model input elements, to better align with individual health plan profiles and targeted interests
- The model considers a hypothetical plan with 1 million members in the US
  - Trilaciclib is eligible for adult patients aged ≥18 years with ES-SCLC treated with a platinum/etoposide-containing regimen in first or second line and a topotecan-containing regimen in second line (**Table 1**)

Table 1. Population Inputs

Metric	Value, %
Incidence of lung cancer[2]	0.07[a]
Patients with SCLC[4]	15.0
Patients with ES-SCLC within the SCLC population[1]	66.0
Patients treated with first-line therapy	90.0[b]
Patients receiving systemic chemotherapy in first line and eligible for trilaciclib	72.2[c]
First-line patients receiving second-line systemic chemotherapy within same year and eligible for trilaciclib	26.3[c]

[a] Calculated as the number of new lung cancer cases divided by the total US population.
[b] Decision Resources Group. Small Cell Lung Cancer - Landscape & Forecast - Disease Landscape & Forecast (November 2020).
[c] Based on market research and Kantar Health, CancerMPact® Treatment Architecture SCLC.
ES-SCLC, extensive-stage small cell lung cancer; SCLC, small cell lung cancer.

- The market share of trilaciclib was based on internal forecasting and business intelligence from the study sponsor (**Table 2**)

Table 2. Market Share of Trilaciclib Over Years 1–5

	Year 1	Year 2	Year 3	Year 4	Year 5
Uptake of trilaciclib, first-line chemotherapy, %	7	22	32	39	44
Uptake of trilaciclib, second-line chemotherapy, %	7	22	33	40	45

Values rounded to the nearest whole number.

- The model evaluates the acquisition costs of currently used first- and second-line systemic chemotherapy regimens, trilaciclib, and the prophylactic use of granulocyte-colony stimulating factors (G-CSFs; **Table 3**)
  - All costs were reported in 2019 $US
- The wholesale acquisition cost for trilaciclib is $1417 per 300-mg vial or $2834 per dose
  - The total cost of trilaciclib per course of chemotherapy is calculated by multiplying the cost per dose of trilaciclib by the number of cycles in each chemotherapy regimen, then multiplying by the number of doses required per cycle
- Based on market research, the model estimates that 26% of patients in the placebo group receive prophylactic G-CSFs
  - Administering trilaciclib is assumed to reduce the prophylactic use of G-CSFs by 50%[11]
- The average cost associated with the prophylactic use of G-CSFs per cycle, including administration costs, was calculated to be $5455 based on published literature[12]
  - The number of cycles of G-CSF per cycle of chemotherapy (3.41) was inferred from a weighted average of the mean number of cycles of filgrastim (2.3) and pegfilgrastim (3.5)[13]
    - The average cost multiplied by the average number of cycles equated to a total cost of $18,602
- Adverse event (AE) profiles of the chemotherapy-based regimens were derived from the G1T28-05, -02, and -03 studies, and published literature (**Tables 4** and **5**)[8-10,14,15]
  - Patients may have experienced ≥1 AE
- Management costs for AEs were sourced through published literature, and determined as $19,519 per neutropenia event, $23,017 per anemia event, $25,786 per thrombocytopenia event, and $21,474 total cost for febrile neutropenia[16,17]

Table 3. Current Treatment Acquisition Costs

	Market Share Inputs, %[a]	Number of Cycles, n	Chemotherapy Regimen and Associated Costs, $US	Trilaciclib Doses per Cycle, n	Total Cost of Trilaciclib per Chemotherapy Regimen, $US[b]
First-line chemotherapy					
E/P/A	68	4	44,907	3	34,008
E/P	20	5	9034	3	42,510
Etoposide and cisplatin	12	5	8239	3	42,510
Second-line chemotherapy					
Topotecan	73	5	15,131	5	70,850
E/P	19	5	9034	3	42,510
Etoposide and cisplatin	8	5	8239	3	42,510

[a] Based on market research.
[b] Trilaciclib costs were added to the respective chemotherapy regimens in the alternative scenario.
E/P, etoposide and carboplatin; E/P/A, etoposide, carboplatin, and atezolizumab.

Table 4. Incidence of Hematologic AEs Related to Myelosuppression in the Current Scenario Without Trilaciclib

	Neutropenia	Febrile Neutropenia	Anemia	Thrombocytopenia
Incidence of AEs with first-line chemotherapy, %				
E/P/A[8]	60	6	30	38
E/P[9]	68	8	19	8
Etoposide and cisplatin[14]	68	10	12	15
Average number of AEs per patient,[a] n	2.5	1.3	1.6	1.7
Incidence of AEs with second-line chemotherapy, %				
Topotecan[10]	86	18	61	57
E/P[15]	20	6	21	31
Etoposide and cisplatin[14]	68	10	12	15
Average number of AEs per patient,[a] n	3.3	1.2	1.8	4.1

For first line, data were pooled from G1T28-05 and G1T28-02.
[a] Metric calculated as the total number of grade 3/4 AEs during the trial duration divided by the number of patients having ≥1 grade 3/4 AE.
AE, adverse event; E/P, etoposide and carboplatin; E/P/A, etoposide, carboplatin, and atezolizumab.

Table 5. Incidence of Hematologic AEs Related to Myelosuppression in the Alternative Scenario With Trilaciclib

	Neutropenia	Febrile Neutropenia	Anemia	Thrombocytopenia
Incidence of AEs with first-line chemotherapy, %				
E/P/A[8]	21	2	17	2
E/P[9]	11	3	5	8
Etoposide and cisplatin[a,14]	18	3	6	3
Average number of AEs per patient,[b] n	1.3	1.0	1.6	1.5
Incidence of AEs with second-line chemotherapy, %				
Topotecan[10]	75	6	28	56
E/P[a,15]	17	2	10	30
Etoposide and cisplatin[a,14]	59	3	6	15
Average number of AEs per patient,[b] n	2.5	1.0	1.7	2.5

For first line, data were pooled from G1T28-05 and G1T28-02.
[a] Relative risk reduction with trilaciclib calculated using data pooled from G1T28-05 and G1T28-02, and data from G1T28-03, and applied to AE rates without trilaciclib.
[b] Metric calculated as the total number of grade 3/4 AEs during the trial duration divided by the number of patients having ≥1 grade 3/4 AE.
AE, adverse event; E/P, etoposide and carboplatin; E/P/A, etoposide, carboplatin, and atezolizumab.

RESULTS

Current and Alternative Scenario Results

- In a hypothetical plan with 1 million members, 239 and 62 patients in first- and second-line settings, respectively, were estimated to be eligible for trilaciclib over a 5-year period
- Chemotherapy-induced AEs were estimated to be fewer over 5 years in the alternative scenario where trilaciclib is available (**Table 6**), resulting in cost savings due to reduced management costs
- The introduction of trilaciclib is associated with a total cost decrease of $20,246–$475,774 over 1–5 years, translating into savings of $0.002–$0.008 per member per month over the corresponding period (**Table 7**)
- The total budget impact associated with trilaciclib over 5 years is presented in **Table 8**

Table 6. Fewer Hematologic AEs Related to Myelosuppression in Alternative Scenario Over 5 Years

AE	Current Scenario (Without Trilaciclib), n	Alternative Scenario (With Trilaciclib), n	Events Avoided With Trilaciclib
Neutropenia	526	418	108
Febrile neutropenia	32	25	7
Anemia	153	130	23
Thrombocytopenia	244	198	46

AE, adverse event.

Table 7. Cost Savings With Trilaciclib Over Years 1–5

Costs, $US	Difference in Year 1	Difference Over 2 Years	Difference Over 3 Years	Difference Over 4 Years	Difference Over 5 Years
Total	–20,246	–92,325	–199,428	–329,882	–475,774
PMPM	–0.002	–0.004	–0.006	–0.007	–0.008

PMPM, per member per month.

Table 8. Total Budget Impact Over 5 Years Associated With Introduction of Trilaciclib

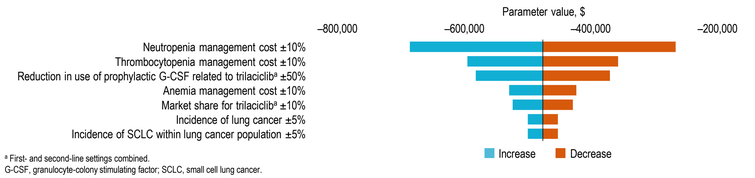
Costs, $US	Current Scenario (Without Trilaciclib)	Alternative Scenario (With Trilaciclib)	Difference
Trilaciclib	0	3,704,199	3,704,199
Chemotherapy	8,851,823	8,851,823	0
AE management			
Neutropenia	10,266,538	8,167,575	–2,098,963
Febrile neutropenia	696,326	546,790	–149,537
Anemia	3,518,813	2,988,600	–530,213
Thrombocytopenia	6,303,203	5,113,873	–1,189,330
Total AE management	20,784,880	16,816,839	–3,968,042
Prophylactic use of G-CSFs	1,458,460	1,246,529	–211,932
Total	31,095,164	30,619,390	–475,774
PMPM	0.52	0.51	–0.008

Red, cost adding; orange, cost neutral; green, cost saving.
AE, adverse event; G-CSF, granulocyte-colony stimulating factor; PMPM, per member per month.

Scenario and Sensitivity Analyses

- Deterministic sensitivity analysis suggests that the spectrum of expected financial impact associated with trilaciclib could vary from cost savings of $265,878 to $685,671 overall, or from cost savings of $0.004 to $0.011 per member per month over 5 years
- Varying the percentage reduction in the prophylactic use of G-CSFs from 0–100% gave similar results; total cost savings ranged from $263,843 (0% reduction) to $687,706 (100% reduction), corresponding to $0.004 to $0.011 per member per month
- The iterative combination of model variables illustrates that managing costs of neutropenia and thrombocytopenia specifically will have the greatest budget impact over time (**Figure 2**)

Figure 2. Sensitivity Analysis Results (Key Variables and Budget Effects)



[a] First- and second-line settings combined.
G-CSF, granulocyte-colony stimulating factor; SCLC, small cell lung cancer.

CONCLUSIONS

- Trilaciclib represents a new pharmacy expenditure when added to standard chemotherapy treatment regimens for ES-SCLC
- The incremental cost of trilaciclib to a third-party payer is projected to be offset by a reduction in the costs of managing AEs related to myelosuppression, which are fewer when trilaciclib is used for its approved indication
- The net financial impact of trilaciclib is estimated to be a budgetary cost saving
- The magnitude and rapidity of financial benefit will be affected by market uptake of trilaciclib and the incidence of myelosuppression unique to each payer's patient population

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