ECONOMIC IMPACT OF TRILACICLIB FOR CHEMOTHERAPY-INDUCED MYELOSUPPRESSION IN EXTENSIVE-STAGE SMALL CELL LUNG CANCER: ECONOMIC EVALUATION FROM THE PROVIDER AND PATIENT-CAREGIVER PERSPECTIVES IN THE UNITED STATES

Ivo Abraham[1]; Weiguang Xue[2]; Xin Chen[2]; Zheng-Yi Zhou[2]; Huan Huang[3]

[1]University of Arizona, Tucson, AZ, USA; [2]Analysis Group, Inc., Boston, MA, USA; [3]G1 Therapeutics, Inc., Research Triangle Park, NC, USA

INTRODUCTION

- Chemotherapy induced myelosuppression (CIM), commonly manifested as neutropenia, anemia, and/or thrombocytopenia, is a major complication of systemic chemotherapy for extensive-stage small cell lung cancer (ES-SCLC)[1]
- Management of CIM typically requires single lineage supportive care interventions such as granulocyte colony-stimulating factors (G-CSFs), erythropoiesis-stimulating agents (ESAs), red blood cell (RBC) transfusion, and platelet transfusion.[2-4] Additional medical resources such as outpatient visits, hospitalizations, and emergency room (ER) visits may also be required, which pose an economic burden to providers, patients, and caregivers
- Trilaciclib is a first-in-class breakthrough therapy that protects multiple hematopoietic lineages simultaneously against CIM in adult patients with ES-SCLC[5]
- Clinical trials showed that administering trilaciclib prior to chemotherapy reduced the incidence of CIM and the need for supportive care interventions[6-8]

OBJECTIVE

- To evaluate the economic impact of trilaciclib for CIM in adult patients with ES-SCLC receiving platinum/etoposide- or topotecan-containing chemotherapy from both provider and patient-caregiver perspectives in the United States (US)

METHODS

Model Overview

- An economic model (**Figure 1**) was developed to estimate the economic impact of administering trilaciclib prior to first-line (1L) or second-/third-line (2/3L) chemotherapy in patients with ES-SCLC over a 3-year time horizon, comparing "with" and "without" trilaciclib scenarios
- The provider perspective included the cost of prophylactic treatments and the cost of managing Grade 3/4 adverse events (AEs) such as outpatient visits, outpatient rescue medications, outpatient rescue transfusions, ER visits, and hospitalizations
- The patient-caregiver perspective included indirect costs associated with productivity loss and out-of-pocket payment (OOP) for prophylactic treatments and management of Grade 3/4 AEs
- The cost of chemotherapies was assumed the same between the "with" and "without" trilaciclib scenarios and therefore was not included in the model
- All cost inputs were adjusted to 2021 US dollars based on the consumer price index

Figure 1 Model Schema

Model Inputs

Target population, market share, and clinical inputs

- The model considered a hypothetical cohort of patients with ES-SCLC who are eligible to receive trilaciclib prior to 1L or 2/3L chemotherapy
- The proportion for patients receiving 1L and 2/3L chemotherapies was 99% and 1%, respectively[9]
- Market share of chemotherapy regimens were based on literature[10]
- Market share of prophylactic treatments were assumed the same between the 1L and 2/3L settings (**Table 1**)[9,11]
- Dosing schedules were based on the prescribing information from the US package inserts, NCCN guidelines for SCLC[12], and published data[13]
- Incidences of Grade 3/4 AEs in the "with" and "without" trilaciclib scenarios were based on literature[10]

Table 1 Market Share of Prophylactic Treatments in Scenarios Without and With Trilaciclib

Prophylactic treatment mix	Scenario without trilaciclib[a]			Scenario with trilaciclib[b]		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Trilaciclib	0%	0%	0%	7%	22%	32%
Prophylactic G-CSF	44%	44%	44%	38%	26%	18%
No prophylaxis	56%	56%	56%	55%	52%	50%

[a] In the scenario "without" trilaciclib, the market share of prophylactic G-CSFs was assumed to be the proportion of G-CSF usage within 1-3 days after chemotherapy based on Goldschmidt 2021[11]
[b] In the scenario "with" trilaciclib, the uptake of trilaciclib was based on Deriz 2021[11] and 80% of trilaciclib's market share was assumed taken from prophylactic G-CSFs

Cost inputs from provider perspective

- **Table 2** presents the health resource use required for the management of each Grade 3/4 AE episode[14]
- Unit drug costs were obtained from IBM Micromedex RedBook[15]
- Costs of blood products[16], ER visits[14,17,18], and hospitalizations[18-21] were estimated based on published literature
- Chair time and facility fees (such as equipment, space, and staff members) were assumed to be covered by the provider's operating costs. Therefore, costs of drug administration, blood transfusion procedure, and outpatient visit were assumed zero from the provider perspective
- **Table 3** summarizes key cost inputs

Table 2 Healthcare Resource Use Required for the Management of Each Grade 3/4 AE Episode[a]

	Neutropenia	Febrile neutropenia	Anemia	Thrombocytopenia
% Requiring outpatient visit	85.5%	85.5%	79.1%	80.2%
% Requiring therapeutic G-CSF[b]	65.0%	100.0%	0.0%	0.0%
% Requiring ESA	0.0%	0.0%	4.0%	0.0%
% Requiring RBC transfusion	0.0%	0.0%	82.5%	0.0%
% Requiring platelet transfusion	0.0%	0.0%	0.0%	39.5%
% Requiring hospitalization	75.7%	100.0%	82.8%	83.7%
% Requiring ER visit	50.0%	50.0%	50.4%	55.8%

[a] The healthcare resource use required for the management of each Grade 3/4 AE episode was estimated based on Epstein 2021[14]
[b] Therapeutic G-CSF refers to G-CSF support initiated after a patient develops neutropenia

Table 3 Summary of Key Cost Inputs

Cost element	Provider perspective[a]	OOP from the patient-caregiver perspective[b]
Trilaciclib cost per dose	$2,834[c]	$613[c]
G-CSF cost per chemotherapy cycle	$5,654[d]	$445[d]
Cost per RBC transfusion	$630[16]	$245[16]
Cost per platelet transfusion	$1,595[16]	$452[16]
Cost per outpatient visit (any AE)	$0	$45[23]
Cost per ER visit for neutropenia	$419[14,17]	$190[24]
Cost per ER visit for febrile neutropenia	$577[17,18]	$262[24]
Cost per ER visit for anemia	$342[14,17]	$155[24]
Cost per ER visit for thrombocytopenia	$395[14,17]	$179[24]
Cost per hospitalization for neutropenia	$14,264[19,20]	$3,205[25,26]
Cost per hospitalization for febrile neutropenia	$18,653[18,19]	$3,647[27-30]
Cost per hospitalization for anemia	$8,229[19,20]	$4,384[26]
Cost per hospitalization for thrombocytopenia	$22,219[19,21]	$6,754[21,26]
Productivity loss per visit for prophylactic treatment	NA	$256[30-34]
Indirect cost per episode of neutropenia	NA	$4,148[31]
Indirect cost per episode of febrile neutropenia	NA	$4,566[31]
Indirect cost per episode of anemia	NA	$4,148[31]

[a] Costs of drug administration, transfusion procedure, and outpatient visit were assumed to be covered by the provider's operating costs and therefore were assumed to be zero in the model
[b] Drug cost and blood product cost were estimated based on 20% co-insurance and $40 copayment. Costs of medical services (drug administration, transfusion procedure, outpatient visit, ER visit, and hospitalization) were estimated based on 20% co-insurance
[c] Trilaciclib costs per dose from provider and patient-caregiver perspective were estimated using WAC price (2 units per dose), and OOP based on CMS Medicare Part B reimbursement limit[22]
[d] G-CSF cost per chemotherapy cycle from provider perspective was estimated using WAC price weighted by the distribution of G-CSF[5] and dose per chemotherapy cycle (pegfilgrastim: 1 dose; filgrastim: 5 doses); G-CSF cost per chemotherapy cycle from patient-caregiver perspective was estimated using OOP based on CMS Medicare Part B reimbursement limit,[22] weighted by the distribution of G-CSF[5] and dose per chemotherapy cycle (pegfilgrastim: 1 dose; filgrastim: 5 doses)

Cost inputs from patient-caregiver perspective

- The OOP for the cost of drugs and blood products was estimated based on 20% co-insurance and $40 copayment
  - Unit drug costs were obtained from the Centers for Medicare and Medicaid Services (CMS) Medicare Part B Reimbursement Limit (2Q 2021 ASP)[22]
- The OOP for medical services was estimated based on 20% co-insurance
  - Unit costs of drug administration, transfusion procedure, and outpatient visit were based on the CMS Physician Fee Schedule[23]
  - Costs of blood products[16,23], ER visits[24], and hospitalizations[25-30] were obtained from the literature
- Productivity loss due to additional visit for receiving prophylactic treatment was estimated
  - Trilaciclib is administered on the same day as chemotherapy and therefore no separate visit for prophylactic treatment is required
  - For G-CSFs, one additional separate visit was assumed during each cycle of chemotherapy
- Indirect costs associated with each AE episode were obtained from the literature, which included patient and caregiver work loss and paid caregiver costs[31]

Model Outcomes

- Estimated clinical and economic outcomes per trilaciclib-eligible patient were compared between "with" and "without" trilaciclib scenarios
  - Number of Grade 3/4 AEs and health resource use
  - Total cost and cost breakdowns (prophylactic treatment, hospitalization, outpatient, ER visit, and indirect cost)

RESULTS

- The "with" trilaciclib scenario was estimated to reduce Grade 3/4 AEs over a 3-year period (0.65 events avoided per patient in Year 3) and was associated with less healthcare resource use compared with the "without" scenario (**Figure 2** and **Figure 3**)
  - Number of Grade 3/4 AEs avoided per patient in Year 3: 0.42 for neutropenia, 0.02 for febrile neutropenia, 0.06 for anemia, and 0.14 for thrombocytopenia
  - Number of health resource use avoided per patient in Year 3: 0.28 for outpatient visit, 0.04 for RBC transfusion, 0.05 for platelet transfusion, 0.51 for hospitalization, and 0.28 for ER visit
- From the provider perspective, the projected total costs saving associated with the introduction of trilaciclib were $953, $3,116, and $4,599 per patient in years 1-3, respectively (**Figure 4**)
  - These cost savings were mainly driven by the reduction in hospitalization costs
- From the patient-caregiver perspective, the projected cost savings were $792, $2,589, and $3,821 per patient in years 1-3, respectively (**Figure 5**)
  - These cost savings were mainly driven by the reduction in hospitalization costs and indirect costs

Figure 2 Projected Number of Grade 3/4 AEs per Patient in Year 3

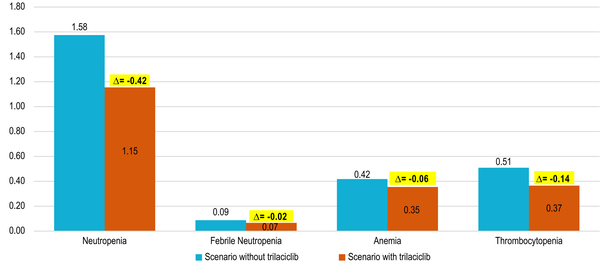

Figure 3 Projected Number of Healthcare Resource Use per Patient in Year 3

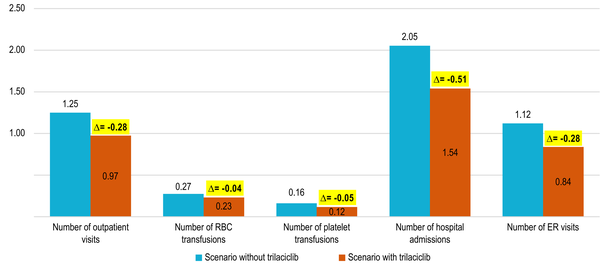

Figure 4 Projected Costs per Patient from the Provider Perspective (Year 1-3)

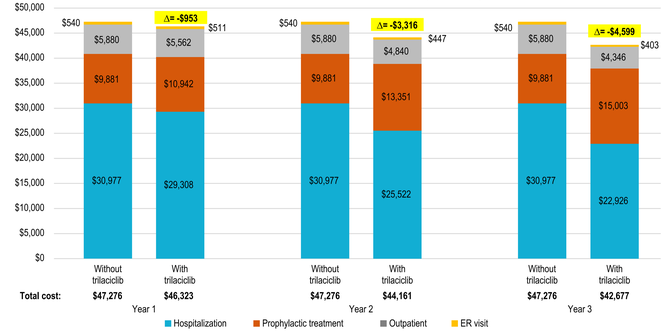

Figure 5 Projected Costs per Patient from the Patient-Caregiver Perspective (Year 1-3)

CONCLUSIONS

- From both the US provider and patient-caregiver perspectives, the use of trilaciclib prior to chemotherapy in patients with ES-SCLC is associated with fewer myelosuppressive AEs and less healthcare resource use, translating into lower total cost of care

International Society for Pharmacoeconomics and Outcomes Research Annual Meeting | May 15–18, 2022 | Washington, DC. and Virtual

REFERENCES

1. Ferrarotto R, et al. *Cancer Med.* 2021;10(17):5748-5756.
2. Kuter DJ. Oncology (Williston Park, NY). 2015;29(4):282-294.
3. Aapro M, et al. *Ann Oncol.* 2018;29(Suppl 4):iv96-iv110.
4. Klastersky J, et al. *Ann Oncol.* 2016;27(suppl 5):v111-v118.
5. COSELA™ (trilaciclib). Prescribing Information. https://www.g1therapeutics.com/cosela/pi/.
6. Daniel D, et al. *Int J Cancer.* 2020;148(10):2557-2570.
7. Weiss JM, et al. *Ann Oncol.* 2019;30(10):1613-1621.
8. Hart LL, et al. *Adv Ther.* 2021;38(1):350-365.
9. Goldschmidt J, et al. AMCP Nexus poster presentation. 2021.
10. Abraham I, et al. *J Manag Care Spec Pharm.* 2022:1-14.
11. Deriz B, et al. AMCP poster presentation. 2021.
12. NCCN Guideline for SCLC. Version 1.2022.
13. Gascón P, et al. *Support Care Cancer.* 2016;24(2):911-925.
14. Epstein RS, et al. *J Med Econ.* 2022;25(1):108-118.
15. IBM Micromedex REDBOOK.
16. Toner RW, et al. *Appl Health Econ Health Policy.* 2011; 9(1):29-37.
17. Williams RM, et al. *N Engl J Med.* 1996;334(10):642-646.
18. Kawatkar AA, et al. *Support Care Cancer.* 2017; 25(9):2787-2795.
19. 1999 - 2019 AHA Annual Survey data analyzed by KFF
20. HCUPnet 2015.
21. Weycker D, et al. *BMC Cancer.* 2019;19(1):151.
22. October 2021 CMS Medicare Part B Reimbursement Limit.
23. 2021 CMS Physician Fee Schedule.
24. Medical Expenditure Panel Survey.
25. Weycker D, et al. *Ann Oncol.* 2008;19(3):454-460.
26. Wong W, et al. *PLoS One.* 2018;13(4):e0196007.
27. Weycker D, et al. *J Oncol Pract.* 2015. Jan;11(1):47-54.
28. Dulisse B, et al. *J Med Econ.* 2013;16(6):720-35.
29. Li S, et al. *Support Care Cancer.* 2020 Jan;28(1):113-122.
30. Tai E, et al. *J Oncol Pract.* 2017 Jun;13(6):e552-e561.
31. Calhoun EA, et al. *Oncologist.* 2001;6(5):441-445.
32. Henry DH, et al. *Support Care Cancer.* 2008 Jul 16(7):791-801.
33. de Moor JS et al. *J Cancer Surviv.* 2017;11(1):48-57.
34. US Bureau of Labor Statistics.