Abstract 116132

US Cost-Effectiveness of Chimeric Antigen Receptor T-Cell Therapy for Patients With Relapsed or Refractory Large B-Cell Lymphoma, Considering Infusion Setting and Payor Claims Data

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INTRODUCTION

- Chimeric antigen receptor (CAR) T-cell therapies have changed the treatment paradigm for patients with relapsed/refractory (R/R) large B-cell lymphoma (LBCL)
- Three anti-CD19 CAR T-cell therapies are approved by the United States Food and Drug Administration (FDA) for the treatment of adult patients with R/R LBCL after 2 or more lines of systemic therapy:
  - Axicabtagene ciloleucel (axi-cel; YESCARTA®)[1],
  - Lisocabtagene maraleucel (liso-cel; BREYANZI®)[2], and
  - Tisagenlecleucel (tisa-cel; KYMRIAH®)[3]

OBJECTIVE

- This payor-perspective model compared lifetime costs and benefits for patients with R/R LBCL treated with CAR T-cell therapy in the United States by therapy (axi-cel versus liso-cel and axi-cel versus tisa-cel) and considered impact of CAR T-cell site of care (inpatient versus outpatient)

DATA AND METHODS

Model Structure

- A decision-tree model compared lifetime direct healthcare costs and benefits between axi-cel and tisa-cel and between axi-cel and liso-cel

Cost Estimation

- Average per-patient lifetime costs (2020 United States dollars) include
  1. CAR T-cell–related and other relevant pre-infusion costs (t≤0 days; apheresis, bridging therapy, lymphodepletion chemotherapy, CAR T-cell acquisition/administration)
  2. Near-term post-infusion costs (0<t≤90 days; intensive care unit [ICU] and non-ICU inpatient hospitalization, emergency department visits, outpatient/other visits)
  3. Distant post-infusion costs (t>90 days; pre-/post-progression routine care applied to surviving patients)
  4. End-of-life costs (t>3 days; palliative/other end-of-life care for newly deceased patients)
  5. Other post-infusion costs (0<t≤365 days; post-infusion stem cell transplant [SCT] and first-year intravenous immune globulin use)

Quality-Adjusted Life-Year (QALY) Estimation

- Benefits were determined for each CAR T-cell therapy based on health utilities and partitioned survival models developed using matching-adjusted indirect comparison (MAIC) overall and progression-free survival curves[4,5]
- These matched survival curves were used to model long-term costs and QALYs

DATA AND METHODS *(Continued)*

Data

Table 1. Short-Term Resource Use Model Input Values

	Mean 90-day resource use per patient with…		
	CRS	NE	Neither
CAR T-cell site of care: Inpatient			
ICU, days	2.08	2.32	2.06
Non-ICU inpatient, days	17.16	16.83	16.97
ED, visits	0.06	0.12	0.05
Outpatient/other, visits	5.04	4.70	5.04
CAR T-cell site of care: Outpatient			
ICU, days	2.35	2.01	1.71
Non-ICU inpatient, days	7.81	4.76	11.71
ED, visits	0.01	0.02	0.00
Outpatient/other, visits	3.38	2.16	6.00

CAR, chimeric antigen receptor; CRS, cytokine release syndrome; ED, emergency department; ICU, intensive care unit; NE, neurologic event.

- Model input values related to short-term post-infusion healthcare resource use (**Table 1**) and CAR T-cell site of care were informed by analyses of insurance claims data (Anltiks All-Payer Claims) for 1,175 adult R/R LBCL patients with Commercial, Medicaid, Medicare Fee-for-Service, and Medicare Advantage coverage

Table 2. Select Treatment-Related Model Input Values

	Axi-cel vs…			
	Liso-cel	Tisa-cel	Liso-cel	Tisa-cel
CAR T-cell acquisition cost/patient, $	$399,000	$399,000	$410,300	$373,000
Receiving bridging therapy, %	0.0%	0.0%	59.1%	91.9%
Receiving post-infusion SCT, %	7.9%	7.9%	7.6%	5.4%
Grade ≥3 AE incidence, %*				
CRS	9.0%	9.3%	2.6%	17.1%
NE	28.8%	27.1%	14.4%	10.5%
Receiving IVIG, %	30.6%	30.6%	21.0%	30.0%

* matching-adjusted indirect comparison (axi-cel only)
AE, adverse event; axi-cel, axicabtagene ciloleucel; CAR, chimeric antigen receptor; CRS, cytokine release syndrome; IVIG, intravenous immune globulin; liso-cel, lisocabtagene maraleucel; NE, neurologic event; SCT, stem cell transplant; tisa-cel, tisagenlecleucel.

- Other model input values were based on the ZUMA-1 (axi-cel), TRANSCEND (liso-cel), and JULIET (tisa-cel) clinical studies, and other published literature and publicly available data[6-8] (**Table 2**)

Scenario and Sensitivity Analyses

- Base-case inputs specific to axi-cel were based on ZUMA-1 Cohorts 1 and 2. Scenario analyses using data from ZUMA-1 Cohort 4[9] and ZUMA-1 Cohort 6[10] evaluated effects of alternative safety protocols
- In 2 additional scenario analyses, the share of patients who received CAR T-cell therapy in an outpatient site of care varied for all CAR T-cell therapies simultaneously (base: 17%; scenarios: 0% and 34%)
- Deterministic sensitivity analyses were performed to account for uncertainty in model parameters

Results Presentation

- Payor costs and health benefits (both discounted at 3% annually) were used to estimate incremental net monetary benefits (INMBs; QALYs valued at $150,000) and incremental cost-effectiveness ratios for axi-cel through direct comparisons with liso-cel and tisa-cel owing to use of MAIC-matched input values specific to pair-wise comparisons

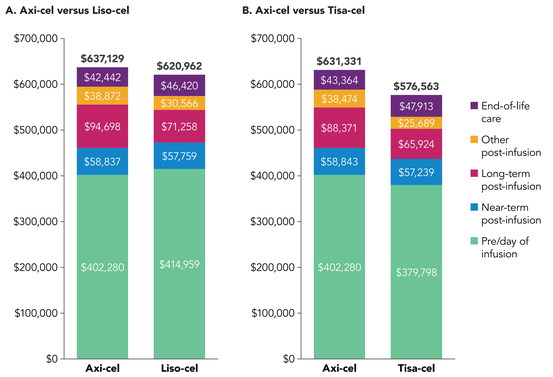
RESULTS

Table 3. Cost-Effectiveness Base Case Results

	Axi-cel versus Liso-cel			Axi-cel versus Tisa-cel		
	Axi-cel [A]	Liso-cel [B]	Δ [A]-[B]	Axi-cel [C]	Tisa-cel [D]	Δ [C]-[D]
Total direct medical costs	$637,129	$620,962	$16,167	$631,331	$576,563	$54,769
Total quality-adjusted life, years	7.705	5.898	1.807	7.240	5.005	2.235
On CAR T-cell therapy, t≤30 days	0.061	0.060	<0.001	0.061	0.060	<0.001
Off therapy, t>30 days	7.644	5.838	1.807	7.180	4.945	2.235
pre-progression	7.452	5.717	1.736	6.954	4.661	2.293
post-progression	0.192	0.121	0.071	0.226	0.284	-0.058
Net monetary benefit	$518,624	$263,711	$254,913	$454,719	$174,246	$280,472
ICER (axi-cel versus comparator)	-	-	$8,946	-	-	$24,506

Axi-cel, axicabtagene ciloleucel; CAR, chimeric antigen receptor; ICER, incremental cost-effectiveness ratio; liso-cel, lisocabtagene maraleucel; tisa-cel, tisagenlecleucel.

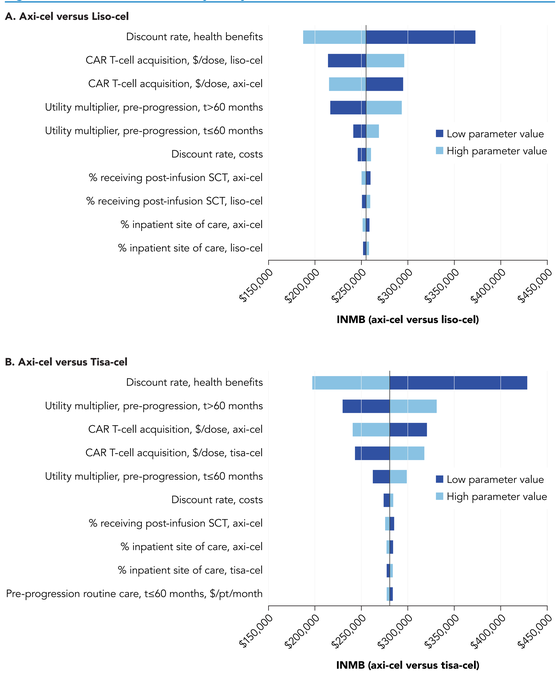
Figure 1. Base Case Costs



Axi-cel, axicabtagene ciloleucel; liso-cel, lisocabtagene maraleucel; tisa-cel, tisagenlecleucel.

- Total lifetime direct healthcare costs and QALYs for axi-cel exceeded those for liso-cel and tisa-cel largely due to longer patient lifespans (**Table 3** and **Figure 1**)
- Base case INMB for axi-cel was $255,000 compared to liso-cel and $280,000 compared to tisa-cel
- For axi-cel, incremental costs per QALY gained were $9,000 versus liso-cel and $25,000 versus tisa-cel
- Results were not sensitive to alternative outpatient proportions applied to all CAR T-cell therapies or to changes in Grade ≥3 cytokine release syndrome/neurologic event rates and other input values for axi-cel consistent with different ZUMA-1 cohorts

Figure 2. Deterministic Sensitivity Analyses



Axi-cel, axicabtagene ciloleucel; CAR, chimeric antigen receptor; INMB, incremental net monetary benefits; liso-cel, lisocabtagene maraleucel; pt, patient; SCT, stem cell transplant; tisa-cel, tisagenlecleucel.

- Results were most sensitive to changes in the discount rate applied to health benefits, CAR T-cell acquisition costs, and pre-progression utility multipliers (**Figure 2**)
- However, in all scenarios and sensitivities, axi-cel was cost-effective versus both comparator therapies at a maximum willingness-to-pay of under $33,000/QALY

CONCLUSIONS

- Axi-cel is a cost-effective CAR T-cell option for patients with R/R LBCL compared to tisa-cel and liso-cel
- Treatment site of care does not impact the cost-effectiveness of CAR T-cell treatment

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DISCLOSURES

AKCJ: employment with Medicus Economics; consulting or advisory role, through Medicus Economics (a health care consulting firm), for AbbVie, Acadia, Agios, Albireo, Alexion, Apellis, Argenx, Astellas, BeyondSpring, Boehringer-Ingelheim, Biohaven, Celgene, Deciphera, Drexel, F2G, Genentech, Include Health, Kite, Madrigal, Oncopeptides, Penn, Pfizer, PharmaEssentia, Rallybio, Reata, Regeneron, Sage, Sanofi, Sarepta, Spark, Sunovion, and Vertex; and research funding from Medicus Economics LLC, which was paid fees by Kite to conduct the research for this analysis. **JTS:** employment with Kite, and stock or other ownership in Gilead. **SWW:** consulting or advisory role for Kite Pharma, Amgen, Allergan/Abbvie, and Johnson & Johnson. **STW:** employment with Medicus Economics; consulting or advisory role, through Medicus Economics (a health care consulting firm), for AbbVie, Acadia, Agios, Albireo, Alexion, Apellis, Argenx, Astellas, BeyondSpring, Boehringer-Ingelheim, Biohaven, Celgene, Deciphera, Drexel, F2G, Genentech, Include Health, Kite, Madrigal, Oncopeptides, Penn, Pfizer, PharmaEssentia, Rallybio, Reata, Regeneron, Sage, Sanofi, Sarepta, Spark, Sunovion, and Vertex; and research funding from Medicus Economics LLC, which was paid fees by Kite to conduct the research for this analysis. **MGB:** employment with Medicus Economics; consulting or advisory role, through Medicus Economics (a health care consulting firm), for AbbVie, Acadia, Agios, Albireo, Alexion, Apellis, Argenx, Astellas, BeyondSpring, Boehringer-Ingelheim, Biohaven, Celgene, Deciphera, Drexel, F2G, Genentech, Include Health, Kite, Madrigal, Oncopeptides, Penn, Pfizer, PharmaEssentia, Rallybio, Reata, Regeneron, Sage, Sanofi, Sarepta, Spark, Sunovion, and Vertex; and research funding from Medicus Economics LLC, which was paid fees by Kite to conduct the research for this analysis. **SJ:** consulting or advisory role, through Medicus Economics (a health care consulting firm), for AbbVie, Acadia, Agios, Albireo, Alexion, Apellis, Argenx, Astellas, BeyondSpring, Boehringer-Ingelheim, Biohaven, Celgene, Deciphera, Drexel, F2G, Genentech, Include Health, Kite, Madrigal, Oncopeptides, Penn, Pfizer, PharmaEssentia, Rallybio, Reata, Regeneron, Sage, Sanofi, Sarepta, Spark, Sunovion, and Vertex; and research funding from Medicus Economics LLC, which was paid fees by Kite to conduct the research for this analysis. **UG:** employment with Thomas Jefferson University; stock or other ownership in Iovance, Pfizer, Moderna, and Gamida; consulting or advisory role for Jazz, Gamida, Mesoblast, and Incyte; and speakers' bureau participation for Jazz, Astellas, Incyte, Kite.

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