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Real-World Treatment Patterns and Clinical Outcomes Among Patients with Diffuse Large B-Cell Lymphoma in a US Healthcare Claims Database

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Key Takeaways

- R-CHOP-based regimens remain the most commonly prescribed in 1L. However, treatments in 2L and 3L have evolved substantially, with pola, tafa, CAR-T, and other targeted therapies accounting for over one-third of treatments by 2024
- 65.3% of CAR-T patients received bridging therapy, with the predominant drug classes for bridging therapy being corticosteroids (45.8%), monoclonal antibodies (39.6%), and chemotherapy (31.1%)
- Substantial unmet needs persist for patients with DLBCL, as treatment failure rates within 12 months after 1L R-CHOP (29.3%) and 2L SCT (18.2%) remain high
- OS and duration of treatment response (proxied by TTNT) declined rapidly for patients with relapsed or refractory DLBCL receiving 2L and 3L therapy, underscoring the need for more effective, durable frontline treatments to prevent further disease progression

Conclusions

- Despite the rapid uptake of novel agents in 2L and 3L, this study suggests that an unmet medical need persists for patients with DLBCL. The 1L failure rate within 12 months was 36.1%, with both OS and duration of treatment response (proxied by TTNT) declining rapidly in 2L and 3L therapies
- Persistently poor outcomes in later LOTs highlight the need for more effective and longer-lasting frontline and relapsed/refractory treatment options to prevent further disease progression

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Acknowledgments
This study was funded by Janssen Scientific Affairs, LLC. Medical writing and editorial support were provided by Cobbs Creek Healthcare, LLC and funded by Janssen Scientific Affairs, LLC. We thank Chang Xu, Pei Lin, Jianting Shi, and Sun Choi for contributions on the LOT algorithm. We thank Kalla Sun for programming support.

Disclosures
MS has received research funding and consultancy from Abbvie, Genentech, AstraZeneca, Genmab, Janssen, BeiGene, Bristol Myers Squibb, Morphosys/Incyte, Kite Phama, Eli Lilly, Fate Therapeutics, Nurix, Merck, Mustang Bio, Vincerx; holds stock options in Koi Biotherapeutics; and has a spouse employed by Bristol Myers Squibb. JSH, AB, GG, and XL are employees of Johnson & Johnson and/or equity holders in a publicly traded company. JSH also has a patent pending, which may result in an additional financial interest with Johnson & Johnson.

Introduction

- Novel agents, including chimeric antigen receptor T-cell (CAR-T) therapy and other targeted therapies, have drastically expanded treatment options available to patients with diffuse large B-cell lymphoma (DLBCL)[1-3]
- Limited real-world data exist on the evolution of treatment patterns and clinical outcomes by line of therapy (LOT) in patients with DLBCL

Objective

- To describe patient demographics, clinical characteristics, treatment patterns, and clinical outcomes in adult patients with DLBCL by lines of therapy and specific treatments

Methods

- We performed a retrospective cohort analysis of Optum's de-identified Clinformatics® Data Mart database, which contains administrative claims data for private and Medicare Advantage health plans in the US (**Figure 1**)

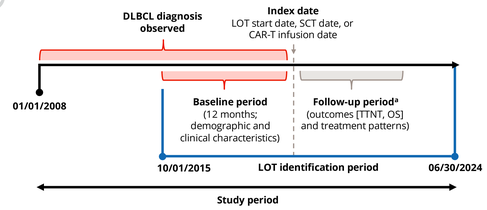
LOT Definitions

- 1L starts with the first drug after DLBCL diagnosis; combination regimen includes all drugs within 30 days of the initiation of 1L
- LOT advanced when the following occurred: 1) a new drug was observed >30 days after the LOT start date, 2) stem cell transplant (SCT) was observed, or 3) a regimen was discontinued and restarted after >90 days
- Maintenance therapies, salvage therapies (same LOT as SCT), and bridging therapies (same LOT as CAR-T) did not advance LOT

Study Population

- Adult patients diagnosed with DLBCL before or on the index date (LOT start date, SCT date, or CAR-T infusion date)
- Had ≥365 days continuous enrollment before the index date. For subgroup analyses by LOTs, patients were also required to have continuous enrollment starting ≥6 months before DLBCL diagnosis
- Received treatment for DLBCL between 10/1/2015 and 6/30/2024
- Excluded LOTs with clinical trial code within 6 months before index and selected cancer diagnoses within 12 months before index

Figure 1. Study Design



Abbreviations: CAR-T, chimeric antigen receptor T-cell; DLBCL, diffuse large B-cell lymphoma; LOT, line of therapy; OS, overall survival; SCT, stem cell transplant; TTNT, time to next treatment or death.
[a] Follow-up was defined as the time from the index date to death, end of continuous enrollment, or end of study period, whichever occurred first.

Results

- LOTs from 9,545 patients met study criteria. Demographics and clinical characteristics for 1L, 2L, and 3L subgroups are shown in **Table 1**

Table 1. Demographics and Clinical Characteristics of Patients with DLBCL, by LOT

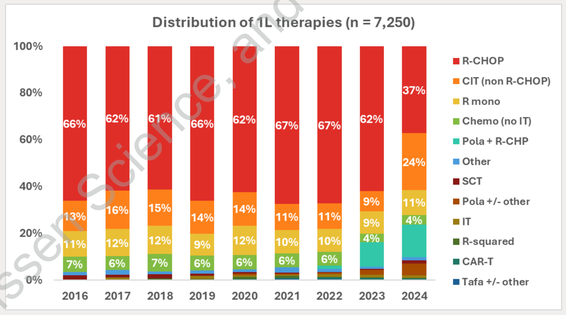
	1L n = 7,250	2L n = 2,544	3L n = 859
Demographics			
Age at index, years			
Mean (SD)	71.5 (11.9)	71.4 (11.4)	71.3 (11.5)
Sex, n (%)			
Male	3,914 (54.0)	1,429 (56.2)	478 (55.6)
Female	3,336 (46.0)	1,115 (43.8)	381 (44.4)
Race, n (%)			
White	5,205 (71.8)	1,848 (72.6)	621 (72.3)
Black	447 (6.2)	133 (5.2)	47 (5.5)
Asian	200 (2.8)	65 (2.6)	23 (2.7)
Other/unknown	1,398 (19.3)	498 (19.6)	168 (19.6)
Payer type, n (%)			
Commercial	1,571 (21.7)	615 (24.2)	224 (26.1)
Medicare Advantage	5,677 (78.3)	1,929 (75.8)	635 (73.9)
US region, n (%)			
South	2,868 (39.6)	998 (39.2)	338 (39.3)
Northeast	1,057 (14.6)	356 (14.0)	130 (15.1)
Midwest	1,850 (25.5)	682 (26.8)	218 (25.4)
West	1,454 (20.1)	505 (19.9)	170 (19.8)
Unknown	21 (<1)	3 (<1)	3 (<1)
Clinical characteristics			
QCCI			
Mean (SD)	4.9 (2.8)	5.2 (2.8)	5.2 (2.8)
Median	4.0	5.0	5.0
Time from first observed DLBCL diagnosis to index date, months			
Mean (SD)	3.4 (8.4)	13.6 (15.0)	22.4 (17.5)
Median	1.3	7.9	16.7
Follow-up time, months			
Mean (SD)	24.0 (22.6)	19.3 (19.7)	15.8 (16.9)
Median	16.2	11.8	9.6

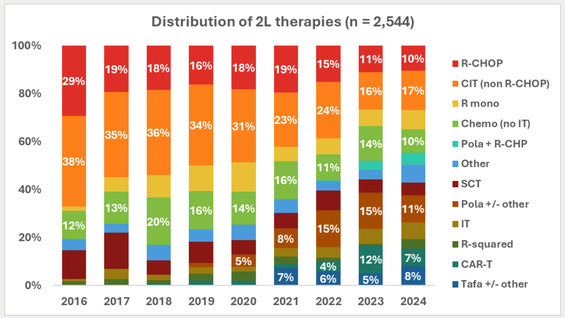
Abbreviations: QCCI, Quan-Charlson Comorbidity Index; SD, standard deviation

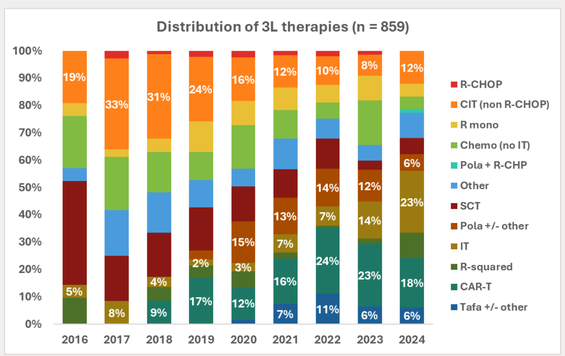
Distribution of Treatment Regimens

- Distributions of treatment regimens by LOTs during the study period are shown in **Figure 2**
- R-CHOP was the most common 1L therapy throughout the study period, with 66% of patients receiving an R-CHOP-based regimen and another 13% receiving non-R-CHOP chemoimmunotherapy (CIT) regimens in 1L in 2016. 1L distribution is similar until 2023-24, when use of polatuzumab vedotin (pola) + R-CHP based regimens increased
- Treatment patterns in 2L evolved substantially; use of conventional CIT and chemotherapy (without immunotherapy) changed from 81% in 2016 to 45% in 2024, while use of pola-, tafasitamab (tafa)-, and CAR-T-based regimens increased steadily, with 32% of 2L patients treated with one of these therapies in the first half of 2024
- In 3L, the use of conventional CIT declined from 43% in 2016 to 21% in 2024, with 55% treated in the first half of 2024 with CAR-T, pola-based, tafa-based, and other novel immunotherapy regimens

Figure 2. Distribution of Therapies Among Patients with DLBCL, by LOT and Year







Abbreviations: CAR-T, chimeric antigen receptor T-cell; CIT, chemoimmunotherapy; DLBCL, diffuse large B-cell lymphoma; IT: immunotherapy; Pola, polatuzumab vedotin; R-CHOP, rituximab, cyclophosphamide, doxorubicin, and vincristine (with or without corticosteroids) ; R-CHP, rituximab, cyclophosphamide, and doxorubicin (with or without corticosteroids); R-squared, rituximab and lenalidomide; SCT, stem cell transplant; Tafa, tafasitamab

CAR-T Subgroup

- 403 patients received CAR-T therapies, including axi-cel (33.9%), lisocel (23.3%), tisa-cel (6.4%), and unspecified brand (claim codes that may be used for any CAR-T brand; 36.4%)
- 65.3% of CAR-T patients received bridging therapy. Top bridging therapies are summarized in **Table 2a**
- Among the 225 (55.8%) CAR-T patients who had an apheresis claim, the median time from apheresis to CAR-T infusion was 33 days
- After CAR-T therapy, 92 patients received 1 of 36 regimens as the next LOT (**Table 2b**), indicating no standard of care after CAR-T

Table 2. Treatments before and after CAR-T

a. Bridging therapy before CAR-T**

Top drug classes	%
Corticosteroid	45.8
Monoclonal antibody	39.6
Chemotherapy	31.1
Antibody-drug conjugate	25.8
Top 6 individual drugs* (before identifying combination regimens)	
Rituximab	39.1
Pola	25.3
Cyclophosphamide	8.4
Bendamustine	8.4
Gemcitabine	8.0
Oxaliplatin	8.0
Top 3 bridging regimens*	
Pola + rituximab	12.9
Pola + BR	7.6
Rituximab monotherapy	6.2

b. Next LOT after CAR-T

Top 10 regimens after CAR-T*	%
Loncastuximab tesirine	12.0
Epcoritamab	10.9
Rituximab monotherapy	8.7
Pola + BR	7.6
Pola + rituximab	6.5
CAR-T	5.4
Lenalidomide	4.3
Pembrolizumab	4.3
Lenalidomide + rituximab	3.3
Nivolumab	3.3
Top 3 drug classes after CAR-T*	
Monoclonal antibody	54.4
Antibody-drug conjugate	31.5
Chemotherapy	22.8

Abbreviations: BR, bendamustine + rituximab; CAR-T, chimeric antigen receptor T-cell; LOT, line of therapy; Pola, polatuzumab vedotin
*excluding corticosteroids
** treatment from apheresis to 7 days before CAR-T infusion, among the 225 patients with a claim for apheresis

Clinical Outcomes

- TTNT, OS, and treatment failure rate (next treatment or death within 12 or 24 months) were evaluated using Kaplan Meier analyses by LOT and selected treatments (**Table 3**)

Table 3. Clinical Outcomes by LOT and Treatment

	Patient Count	TTNT, months	OS, months	Failure Rate within 12 months, %	Failure Rate within 24 months, %
	n	Median (95% CI)	Median (95% CI)	Median (95% CI)	Median (95% CI)
LOT					
1L	7,250	36.1 (32.4-38.9)	58.1 (54.2-60.7)	36.1 (34.9-37.2)	44.8 (43.5-46.1)
2L	2,544	10.6 (9.6-12.5)	30.0 (27.2-33.0)	51.7 (49.6-53.8)	64.2 (61.9-66.4)
3L	859	7.9 (7.0-9.6)	18.4 (15.4-21.0)	57.9 (54.1-61.4)	71.2 (67.2-74.7)
Treatment					
1L R-CHOP	4,074	58.2 (50.5-65.2)	67.8 (63.0-71.6)	29.3 (27.8-30.7)	37.5 (35.8-39.2)
2L SCT	192	67.8 (50.3-NR)	NR (48.8-NR)	18.2 (11.9-24.0)	33.5 (24.7-41.3)
CAR-T	403	18.3 (13.7-22.6)	26.4 (21.8-29.0)	42.4 (36.6-47.7)	60.4 (52.7-66.8)

Abbreviations: CI: confidence interval; NR, not reached; OS, overall survival; R-CHOP, rituximab, cyclophosphamide, doxorubicin, and vincristine (with or without corticosteroids); SCT, stem cell transplant; TTNT, time to next treatment or death

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B-cell Malignancies