Hospital Capacity Use in Diffuse Large B-Cell Lymphoma Care: A Population-Based Treatment-Pathway Model

EE695

Michiel Zietse[1], Roelof W.F. van Leeuwen[2], Roy Bleumink[3], Hedwig M. Blommestein[4,5], Marcel Nijland[6], Frederick W. Thielen[4,5,*], Aart Beeker[7,*]

1 Dept. of Hospital Pharmacy, Erasmus MC, Rotterdam · 2 Healthbridgers B.V., The Hague · 3 Delta4Health, Arnhem · 4 Dept. of Health Technology Assessment, Erasmus School of Health Policy & Management, Erasmus University Rotterdam · 5 Erasmus Centre for Health Economics Rotterdam (EsCHER), Erasmus University Rotterdam · 6 Dept. of Hematology, UMC Groningen · 7 Dept. of Internal Medicine, Spaarne Gasthuis, Haarlem/Hoofddorp. All in the Netherlands. * Equal contributions.

INTRODUCTION

- Diffuse large B-cell lymphoma (DLBCL) is the most common aggressive non-Hodgkin lymphoma. First-line (1L) R-CHOP is potentially curative, but 20-40% of patients develop relapsed or refractory (r/r) disease.
- Later lines rely on resource-intensive strategies such as CAR T-cell therapy, salvage chemotherapy and stem-cell transplantation (SCT), placing demands on inpatient beds and specialised nursing staff at a time of workforce constraints.
- Few models translate treatment sequencing into hospital capacity requirements such as chair time, bed days and nursing time.

OBJECTIVE

To quantify hospital capacity use across 1L, second-line (2L) and third-line (3L) DLBCL treatment in the Netherlands with a validated population-based treatment-pathway model, and to identify where capacity pressure concentrates.

METHODS

Model — Deterministic, cohort-based treatment-pathway model simulating the 2025 incident cohort of adult DLBCL patients in the Netherlands (n = 1,605, NKR/IKNL data), of whom 79% receive 1L treatment.

Pathways — Guideline-consistent (NVvH) 1L, 2L and 3L pathways with fixed transition proportions from Dutch population-based studies, trials and ZIN HTA reports, reviewed by haematologists and a hospital finance specialist.

Capacity — Outpatient chair time and inpatient bed days per cycle from treatment protocols. Nursing time from nurse-to-patient ratios (0.25, 0.5 or 1.0 FTE per patient per unit of treatment time), expressed in hours, bed days and nursing FTE.

Validation — Face validity (clinical and financial expert review) and external technical validation by an independent health-economic consultancy using the AdVISHE framework, including flow-logic, extreme-value and unit testing.

Scope — Healthcare costs were modelled alongside capacity (healthcare perspective, 2025 euros) but are not the focus of this poster. 4L treatment was not included.

Key model inputs

Patient flow

- Incident patients 2025: 1,605 (NKR/IKNL, +2.67% per year), 79% receive 1L treatment
- 1L stage: 43% limited, 57% advanced, cure rate 63.6% (HemoBase registry)
- 2L allocation: 50% non-fit, 15% fit, 35% CAR-T screening (58% infused)
- 3L allocation: 50% non-fit, 20% fit, 20% CAR-T screening, 10% clinical trial
- No further active treatment: 10% / 20% / 30% of r/r patients after 1L / 2L / 3L

Capacity per cycle

- R-CHOP: outpatient, 6 h chair time in cycle 1 and 3.5 h in later cycles, low to moderate nursing intensity
- R-DHAP / R-ICE: inpatient, 4 / 3 bed days per cycle
- Autologous SCT: 24 bed days, allogeneic SCT: 35 bed days
- CAR T-cell therapy: 14 bed days per treatment, highest nursing intensity
- Nursing intensity low / moderate / high = 0.25 / 0.5 / 1.0 FTE per patient per unit of treatment time

Model logic

Branching cohort flow with fixed outcome proportions per line. After each line patients are cured, achieve remission with possible relapse, or are refractory. R/r patients proceed to the next line or receive no further active treatment. Capacity use is assigned to the treatments received (cycles x per-cycle chair time, bed days and nursing intensity).

RESULTS

First line (1L) — 1,268 patients
5 FTE nursing time
26,817 outpatient hours · no inpatient days · 6,704 nursing hours

Second line (2L) — 415 patients
39 FTE nursing time
5,322 outpatient hours · 3,041 inpatient days · 51,593 nursing hours

Third line (3L) — 276 patients
24 FTE nursing time
3,216 outpatient hours · 1,750 inpatient days · 31,955 nursing hours

Per r/r patient (n = 461) — 2L and 3L combined
0.14 FTE nursing time
18.5 outpatient hours · 10.4 inpatient days · 181.2 nursing hours

Patient flow through the model: 2025 incident cohort, the Netherlands (model n per line, percentages are model inputs)

Newly diagnosed DLBCL n = 1,605
Adult incident cohort 2025 (NKR/IKNL), adjusted for 2.67% annual incidence growth

79% →

1L n = 1,268

- **Limited stage 43% (n = 545)** — R-CHOP x3 (70%), R-CHOP x6 (30%)
- **Advanced stage 57% (n = 723)** — R-CHOP x8 (45%), R-CHOP x6 (40%), R-mini-CHOP (10%), R-CHOP + lenalidomide (5%)
- **Outcome after 1L** — Cure 63.6%. Relapsed or refractory disease: n = 461, of whom 10% receive no further active treatment

r/r: 461 →

2L n = 415

- **Non-fit, transplant-ineligible 50% (n = 207)** — R-GemOx (43%), R-PECC (45%), RB (10%), Pola-BR (2%)
- **Fit, transplant-eligible 15% (n = 62)** — R-DHAP (60%), R-GDP (30%), R-ICE (10%), plus 61 patients reallocated here after CAR-T screening. Auto-SCT in responders (n = 44)
- **CAR-T screening 35% (n = 145)** — CAR-T infusion in 58%: n = 84 (axicabtagene ciloleucel, lisocabtagene maraleucel)

After 2L: 20% of r/r patients receive no further active treatment

r/r →

3L n = 276

- **Non-fit, transplant-ineligible 50% (n = 138)** — R-GemOx, R-PECC, RB, Pola-BR
- **Fit, transplant-eligible 20% (n = 55)** — R-DHAP, R-GDP, R-ICE, plus 23 patients reallocated here after CAR-T screening. Auto- or allo-SCT (n = 28)
- **CAR-T screening 20% (n = 55)** — CAR-T infusion: n = 32 (axicabtagene ciloleucel, lisocabtagene maraleucel, tisagenlecleucel)
- **Clinical trial 10% (n = 28)**

After 3L: 30% of r/r patients receive no further active treatment

r/r →

4L n = 154
Not included in the model (no reliable data on later-line treatment mix)

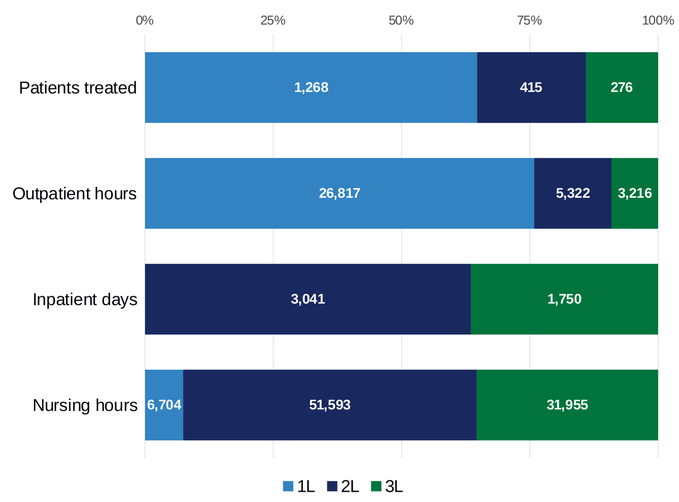
Hospital capacity use by line of therapy and pathway (2025 cohort)

Line / pathway	Outpatient hours	Inpatient days	Nursing hours	Nursing FTE
1L treatments (n = 1,268)	**26,817**	**-**	**6,704**	**5**
Limited stage	8,432	-	2,108	2
Advanced stage	18,385	-	4,596	3
2L treatments (n = 415)	**5,322**	**3,041**	**51,593**	**39**
Fit (salvage chemotherapy, SCT)	585	1,863	22,125	17
Non-fit	4,738	-	1,178	1
CAR-T (n = 84)	-	1,179	28,290	21
3L treatments (n = 276)	**3,216**	**1,750**	**31,955**	**24**
Fit (salvage chemotherapy, SCT)	372	1,302	20,502	15
Non-fit	2,844	-	711	1
CAR-T (n = 32)	-	448	10,741	8

Fit = transplant-eligible (intensive salvage chemotherapy and stem-cell transplantation), non-fit = transplant-ineligible, CAR-T = patients receiving CAR T-cell infusion. FTE = full-time equivalents. Across the r/r population (n = 461), 2L and 3L together account for 4,791 inpatient days and 83,548 nursing hours.

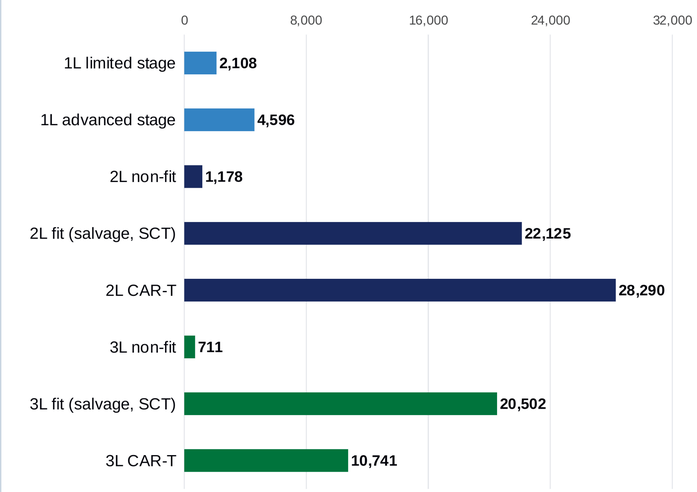
Where capacity use concentrates: share by treatment line

Labels show absolute numbers (patients, hours, days)



Nursing hours by line of therapy and pathway

CAR-T and intensive salvage pathways dominate nursing time



KEY FINDINGS

- Capacity use concentrates in r/r disease: 2L and 3L treatment require 4,791 inpatient days and 63 nursing FTE, versus no inpatient days and 5 FTE for 1,268 patients in 1L.
- CAR T-cell therapy accounts for 47% of later-line nursing hours (39,031 of 83,548), with intensive salvage and SCT accounting for most of the remainder.
- Each r/r patient requires on average 10.4 inpatient days and 181 nursing hours in 2L and 3L.

IMPLICATIONS & PERSPECTIVES

- Capacity planning for DLBCL should focus on inpatient beds and specialised nursing for a small group of r/r patients.
- Scenario analyses can quantify the capacity impact of new therapies (e.g. Pola-R-CHP in 1L, glofitamab-GemOx in later lines), outpatient delivery, de-escalation and point-of-care CAR-T.
- Additional capacity outcomes can be added to the model, such as physician time, pharmacy preparation, diagnostics and radiotherapy.
- Capacity inputs are protocol-based and later-line allocations are most uncertain. Calibration with real-world data is the next step.



Contact: Michiel Zietse | m.zietse@erasmusmc.nl
Funding: Roche Nederland B.V.

ISPOR Europe 2026 | Poster abstract 4022