

**Sponsor**

Novartis Pharmaceuticals

**Generic Drug Name**

CAR-T cell therapy

**Trial Indication(s)**

Diffuse large B-cell lymphoma (DLBCL)

**Protocol Number**

CCTL019CUS08

**Protocol Title**

Real-world Resource Use and Costs of CAR-T Therapies in Diffuse Large B-cell Lymphoma (DLBCL): Inpatient and Outpatient Settings

**Clinical Trial Phase**

NA

**Phase of Drug Development**

NA

**Study Start/End Dates**

Study start date: 17/08/2020

Study Completion date: 10/05/2021

**Reason for Termination**

NA

**Study Design/Methodology**

A retrospective, non-interventional cohort study was used to address the study objectives. This study aimed to provide a better understanding of real-world HRU and healthcare reimbursement costs associated with CAR-T therapy among patients with r/r DLBCL.

Eligible adult patients with r/r DLBCL who were treated with CAR-T therapy or allo-HSCT between January 1, 2017 to September 31, 2019 were identified from the Centers for Medicare & Medicaid Services (CMS) 100% Medicare Database. The CAR-T cohort was further classified into CAR-T IP and CAR-T OP cohorts based on the infusion setting.

The index date was defined as the date of CAR-T therapy administration or allo-HSCT. Baseline period was defined as three months prior to the index date. Study period was defined from the index date to the end of health plan coverage based on insurance enrollment file or death, whichever occurred earlier.

Two sets of comparisons on HRU and healthcare reimbursement costs were conducted, one between IP vs. OP infusion of CAR-T, and the other between patients who received CAR-T therapy vs. allo-HSCT.

**Centers**

Novartis Investigative Site

**Objectives:****Primary objective(s)**

- To compare HRU and healthcare reimbursement costs between IP vs. OP infusion of CAR-T therapy among patients with r/r DLBCL

**Secondary objective(s)**

- To assess post-infusion IP admission/readmission and causes of IP admission/readmission among patients with r/r DLBCL who received CAR-T therapy
- To assess rate of adverse events (AEs) and cost per AE event among patients with r/r DLBCL who received CAR-T therapy
- To compare HRU and healthcare reimbursement costs of CAR-T therapy vs. allo-HSCT among patients with r/r DLBCL

**Test Product (s), Dose(s), and Mode(s) of Administration**

NA

**Statistical Methods**

Patient characteristics were described for patients in CAR-T IP, CART-T OP, CAR-T overall, and allo- HSCT cohorts. Comparisons were conducted between the CAR-T IP vs. CAR-T cohorts and between CAR-T overall vs. allo-HSCT cohorts. HRU by month during the study period was expressed as monthly incidence. Healthcare reimbursement costs by month during the study period were expressed on per patient-per-month (PPPM) basis to account for varying length of follow-up. Two sets of comparisons were conducted between the CAR-T IP vs. CAR-T OP cohorts: CAR-T IP overall (including Prospective Payment System [PPS]-exempt and non-PPS exempt) vs. CAR-T OP and CAR-T IP non-PPS exempt vs. CAR-T OP. HRU was compared between study cohorts using generalized linear models (GLMs) between patients.

**Study Population: Key Inclusion/Exclusion Criteria****Inclusion criteria**

CAR-T cohort:

- Patients had at least one International Classification of Diseases, Tenth Revision (ICD- 10) diagnosis code for DLBCL.
- Patients received CAR-T therapy following DLBCL diagnosis. The administration date of CAR-T therapy was defined as the index date. Patients who received both CAR-T therapy and allo-HSCT were classified based on the first treatment that the patient received
- Patients were at least 18 years of age as of the index date
- Patients had at least three months of continuous eligibility in the Medicare Part A and Part B data before the index date. Since 2019 Part D data is not available in the current data cut, eligibility requirement in the Part D data was not required

Patients were further classified into CAR-T IP and CAR-T OP cohorts depending on where the administration occurred.

**Allo-HSCT cohort:**

- Patients had at least one ICD-10 diagnosis code for DLBCL.
- Patients received allo-HSCT following DLBCL diagnosis. The date of allo-HSCT procedure was defined as the index date. Patients who received both CAR-T therapy and allo-HSCT were classified based on the first treatment the patient received
- Patients were at least 18 years of age as of the index date
- Patients had at least three months of continuous eligibility in the Medicare Part A and Part B data before the index date. Since 2019 Part D data is not available in the current data cut, eligibility requirement in the Part D data was not required

**Exclusion criteria**

Patients had a medical claim associated with a clinical trial (ICD-9 CM code V70.7; ICD-10 CM code Z00.6) during one month before and after the index date

**Participant Flow**

The CAR-T cohort included 430 patients, with 380 patients receiving CAR-T treatment in the IP setting and 50 patients receiving CAR-T treatment in the OP setting. The sample size for the allo-HSCT cohort was 265.

## Baseline Characteristics

### Key baseline characteristics among CAR-T IP and CAR-T OP cohorts

| Patient Characteristics   | CAR-T IP<br>N = 380 | CAR-T OP<br>N = 50 | P-value |
|---------------------------|---------------------|--------------------|---------|
| Patient Demographics      |                     |                    |         |
| Age (years)               |                     |                    |         |
| Mean ± SD                 | 70.8 ± 6.6          | 68.4 ± 8.5         | 0.052   |
| Median (Range)            | 71.0 (38.5 - 89.0)  | 69.1 (38.1 - 82.8) |         |
| Gender, n (%)             |                     |                    |         |
| Male                      | 237 (62.4)          | 35 (70.0)          | 0.293   |
| Female                    | 143 (37.6)          | 15 (30.0)          |         |
| Race and ethnicity, n (%) |                     |                    |         |
| White                     | 321 (84.5)          | 48 (96.0)          | 0.028*  |
| Black                     | 12 (3.2)            | 0 (0.0)            | 0.375   |
| Asian                     | 12 (3.2)            | 0 (0.0)            | 0.375   |
| Other                     | 22 (5.8)            | <11 (<22.0)        | 1.000   |

|  |               |               |        |
|--|---------------|---------------|--------|
| Unknown  | 15 (3.9)      | 0 (0.0)       | 0.235  |
| <b>Year of index date, n (%)</b>                               |               |               |        |
| 2015   | 0 (0.0)       | 0 (0.0)       |        |
| 2016   | 0 (0.0)       | 0 (0.0)       |        |
| 2017   | <11 (<2.9)    | 0 (0.0)       | 0.606  |
| 2018   | 126 (33.2)    | 13 (26.0)     |        |
| 2019   | 253 (66.6)    | 37 (74.0)     |        |
| <b>CAR-T agent identifiable, n (%)</b>                         | 0 (0.0)       | 41 (82.0)     | -      |
| Yescarta users among those identifiable                        | 0 (0.0)       | <11 (<22.0)   | -      |
| Kymriah users among those identifiable                         | 0 (0.0)       | 37 (74.0)     | -      |
| <b>DLBCL-related comorbidities, n (%)</b>                      |               |               |        |
| Hypertension   | 225 (59.2)    | 26 (52.0)     | 0.331  |
| Diabetes   | 78 (20.5)     | 14 (28.0)     | 0.226  |
| Depression   | 69 (18.2)     | <11 (<22.0)   | 0.708  |
| Chronic pulmonary disease                                      | 68 (17.9)     | <11 (<22.0)   | 0.495  |
| Renal disease  | 63 (16.6)     | <11 (<22.0)   | 0.231  |
| Liver disease  | 53 (13.9)     | <11 (<22.0)   | 0.116  |
| Cerebrovascular disease  | 36 (9.5)      | <11 (<22.0)   | 0.289  |
| <b>NCI Comorbidity Index (NCICI), mean <math>\pm</math> SD</b> | 2.1 $\pm$ 2.0 | 1.6 $\pm$ 1.9 | 0.036* |
| <b>NCI comorbidities, n (%)</b>                                |               |               |        |
| Diabetes   | 78 (20.5)     | 14 (28.0)     | 0.226  |
| Peripheral vascular disease                                    | 79 (20.8)     | <11 (<22.0)   | 0.646  |
| Chronic obstructive pulmonary disease                          | 78 (20.5)     | <11 (<22.0)   | 0.931  |
| Renal disease  | 63 (16.6)     | <11 (<22.0)   | 0.231  |
| Congestive heart failure                                       | 61 (16.1)     | <11 (<22.0)   | 0.708  |
| Mild liver disease   | 47 (12.4)     | 0 (0.0)       | 0.008* |
| Cerebrovascular disease  | 36 (9.5)      | <11 (<22.0)   | 0.289  |

**Baseline characteristics among CAR-T and allo-HSCT patients**

|   | CAR-T (overall)<br>N = 430 | Allo-HSCT<br>N = 265 | P-value |
|---|----------------------------|----------------------|---------|
| <b>Patient Demographics</b>                     |                            |                      |         |
| <b>Age (years)</b>                              | -                          | -                    | -       |
| Mean ± SD                                       | 70.6 ± 6.9                 | 65.6 ± 9.8           | <0.001* |
| Median (Range)                                  | 70.8 (38.1 - 89.0)         | 67.9 (22.8 - 81.4)   |         |
| <b>Gender, n (%)</b>                            |                            |                      |         |
| Male  | 272 (63.3)                 | 163 (61.5)           | 0.644   |
| Female  | 158 (36.7)                 | 102 (38.5)           |         |
| <b>Race and ethnicity, n (%)</b>                |                            |                      |         |
| White   | 369 (85.8)                 | 221 (83.4)           | 0.387   |
| Black   | 12 (2.8)                   | 17 (6.4)             | 0.020*  |
| Asian   | 12 (2.8)                   | <11 (<4.2)           | 0.274   |
| Other   | 24 (5.6)                   | <11 (<4.2)           | 0.188   |
| Unknown   | 15 (3.5)                   | 15 (5.7)             | 0.171   |
| <b>Year of index date, n (%)</b>                |                            |                      |         |
| 2015  | 0 (0.0)                    | 23 (8.7)             | <0.001* |
| 2016  | 0 (0.0)                    | 62 (23.4)            |         |
| 2017  | <11 (<2.6)                 | 75 (28.3)            |         |
| 2018  | 139 (32.3)                 | 56 (21.1)            |         |
| 2019  | 290 (67.4)                 | 49 (18.5)            |         |
| <b>DLBCL-related comorbidities, n (%)</b>       |                            |                      |         |
| Hypertension                                    | 251 (58.4)                 | 155 (58.5)           | 0.975   |
| Diabetes  | 92 (21.4)                  | 62 (23.4)            | 0.537   |
| Depression                                      | 77 (17.9)                  | 55 (20.8)            | 0.353   |
| Chronic pulmonary disease                       | 75 (17.4)                  | 52 (19.6)            | 0.470   |
| Renal disease                                   | 68 (15.8)                  | 41 (15.5)            | 0.904   |
| Liver disease                                   | 56 (13.0)                  | 29 (10.9)            | 0.416   |
| Cerebrovascular disease                         | 38 (8.8)                   | <11 (<4.2)           | 0.006*  |
| <b>NCI Comorbidity Index (NCICI), mean ± SD</b> | 2.1 ± 2.0                  | 1.7 ± 1.9            | 0.024*  |

| NCI comorbidities, n (%)              |           |            |        |
|---------------------------------------|-----------|------------|--------|
| Diabetes                              | 92 (21.4) | 62 (23.4)  | 0.537  |
| Peripheral vascular disease           | 88 (20.5) | 30 (11.3)  | 0.002* |
| Chronic obstructive pulmonary disease | 88 (20.5) | 60 (22.6)  | 0.496  |
| Renal disease                         | 68 (15.8) | 41 (15.5)  | 0.904  |
| Congestive heart failure              | 68 (15.8) | 35 (13.2)  | 0.348  |
| Mild liver disease                    | 47 (10.9) | 22 (8.3)   | 0.260  |
| Cerebrovascular disease               | 38 (8.8)  | <11 (<4.2) | 0.006* |

## Primary Outcome Result(s)

### HRU by CAR-T cohort and by month during the study period

Mean length of follow-up for the CAR-T IP cohort and CAR-T OP cohort was 7.7 months and 6.9 months, respectively.

In the first month following the index date (including the index encounter), 52% patients in the CAR-T OP cohort had at least one IP visit. By definition, 100% patients in the CAR-T IP cohort had at least one IP visit. Number of IP admissions was significantly lower among the CAR-T OP cohort compared to the CAR-T IP cohort during the first month following the index date (IRR [95% CI]: 0.51 [0.41, 0.63]). Number of IP admissions were nominally lower in the CAR-T OP cohort during second, third, and fourth month following the index date and comparable between the two cohorts in subsequent months.

In the first month following the index date, number of IP days were significantly lower among the CAR-T OP cohort compared to the CAR-T IP cohort (5.2 vs. 20.4 days; IRR [95% CI]: 0.26 [0.21, 0.32]). In the second month following the index date, 34.6% of the CAR-T IP cohort and <23.9% of the CAR-T OP cohort had at least one IP visit. IP days remained significantly lower among the CAR-T OP cohort compared to the CAR-T IP cohort (1.6 vs. 4.6 days; IRR [95% CI]: 0.35 [0.13, 0.92]). IP days were nominally lower in the CAR-T OP cohort in subsequent months.

Number of ICU stays was also significant lower among the CAR-T OP cohort compared to the CAR-T IP cohort in the first month following the index date (0.1 vs. 0.3; IRR [95% CI]: 0.32 [0.14, 0.74]). Number of ICU stays were generally comparable between the two cohorts in subsequent months.

Similarly, ICU days were significantly lower among the CAR-T OP cohort compared to the CAR-T IP cohort in the first month following the index date (0.26 vs. 0.06 days; IRR [95% CI]: 0.21 [0.06, 0.70]). ICU days were generally comparable between the two cohorts in subsequent months.

In the first month following the index date, 72.1% patients in the CAR-T IP cohort had at least one OP visit and number of OP visits was significantly higher among the CAR-T OP cohort (5.2 vs. 2.1; IRR [95% CI]: 2.51 [2.08, 3.04]). Number of OP visits were generally comparable between the two cohorts in subsequent months.

Number of ER visits was significantly higher in the CAR-T OP cohort during the first month following the index date (0.32 vs. 0.03; IRR [95% CI]: 10.44 [4.23, 25.75]) and generally comparable between the two cohorts in subsequent months.

### **Healthcare reimbursement costs by CAR-T cohort and by month during the study period**

Results below mainly focus on the comparison between the non-PPS exempt CAR-T IP cohort (N = 252) vs. the CAR-T OP cohort since healthcare reimbursement costs for inpatient admissions in the PPS-exempt hospitals were much lower compared to non PPS-exempt hospitals.

Pre-infusion costs that occurred in the OP setting during the baseline period were estimated for the CAR-T IP (including both PPS-exempt and non PPS-exempt hospitals) and OP cohorts. Leukapheresis-related costs were \$2,067 for the CAR-T IP cohort and \$1,967 for the CAR-T OP cohort. Lymphodepleting regimen-related costs were \$3,781 for the CAR-T IP cohort and \$3,427 for the CAR-T OP cohort. Additionally, CAR-T infusion-related costs for the non-PPS exempt CAR-T IP cohort and CAR-T OP cohort were \$338,623 and \$353,377 respectively. There were no significant differences in the pre-infusion costs between the CAR-T IP and OP cohorts and the CAR-T infusion-related costs between the non-PPS exempt CAR-T IP cohort and CAR-T OP cohort.

During the first month following the index date (including the index encounter), total healthcare reimbursement cost was nominally higher in the CAR-T OP cohort compared to the CAR-T IP cohort by \$13,421. Cost of IP admissions was significantly higher in the CAR-T IP cohort compared to the CAR-T OP cohort by \$334,308 ( $p < 0.001$ ) and cost of OP visits was significantly higher in the CAR-T OP cohort compared to the CAR-T IP cohort by \$363,607 ( $p < 0.001$ ). This is mainly driven by where the cost of CAR-T was accounted for. Costs from the second month following the index date up to the end of follow-up were largely comparable between the CAR-T IP and OP cohorts.

## Secondary Outcome Result(s)

### IP re-admission/admission among CAR-T IP and OP cohorts

53.7% patients in the CAR-T OP cohort were admitted to the hospital during the first month after CAR-T infusion. The trend was generally comparable when stratified by index year. Mean Length of Stay (LOS) of first IP admission was 6.8 days among the overall CAR-T OP cohort (5.1 days among patients with index year of 2018 and 7.4 days among patients with index year of 2019).

Over the entire month, the proportion of patients hospitalized at any given day was higher in CAR-T IP cohort than CAR-T OP cohort. Proportion of patients hospitalized decreased over time during first month post-infusion in the CAR-T IP cohort. 25.0% of the CAR-T IP cohort was hospitalized at Day 30 post-infusion. In the CAR-T OP cohort, proportion hospitalized was the highest at Day 7 (38%) and decreased over time starting Day 8. 14.0% of the CAR-T OP cohort was hospitalized at Day 30 post-infusion.

In the CAR-T IP cohort, the most frequent re-admitting diagnoses (i.e., IP visits after the index encounter) during 1-15 days post-infusion included encounter for antineoplastic chemotherapy and immunotherapy (36.8%), DLBCL (31.6%), and fever (6.3%). Most frequent re-admitting diagnoses during 16-30 days post-infusion also included encounter for antineoplastic chemotherapy and immunotherapy (29.4%), DLBCL (17.6%), and fever (11.8%). Most frequent re-admitting diagnoses during 31-60 days post-infusion included fever (16.7%), followed by DLBCL, dyspnea, hypercalcemia, and hypotension (11.1% each).

In the CAR-T OP cohort, the most frequent admitting diagnoses during 1-15 days post-infusion included DLBCL (55.6%), neutropenia (22.2%), and fever and pain (11.1% each). Most frequent admitting diagnosis during 16-30 days post-infusion was DLBCL (66.7%).

Main cause of readmission/admission was not presented during 61-90 days post-infusion among CAR-T IP cohort and during 31-90 days post-infusion among CAR-T OP cohort due to very limited sample size.

**AE rate during the study period among CAR-T cohorts**

| <b>AEs</b>                                    | <b>CAR-T IP</b> | <b>CAR-T OP</b> |
|---|-----------------|-----------------|
|   | <b>N = 380</b>  | <b>N = 50</b>   |
| Anemia  | 352 (92.6)      | 35 (70.0)       |
| CRS   | 93 (24.5)       | <11 (<22.0)     |
| Fatigue                                       | 227 (59.7)      | 33 (66.0)       |
| Febrile neutropenia                           | 22 (5.8)        | <11 (<22.0)     |
| Hypogammaglobulinemia and B-cell aplasia      | 118 (31.1)      | 11 (22.0)       |
| Hypokalemia                                   | 138 (36.3)      | 13 (26.0)       |
| Hypophosphatemia                              | 58 (15.3)       | <11 (<22.0)     |
| Hypotension                                   | 182 (47.9)      | 21 (42.0)       |
| Neutropenia and neutrophil count decreased    | 290 (76.3)      | 28 (56.0)       |
| Neurologic toxicity                           |                 |                 |
| Encephalopathy                                | 162 (42.6)      | 11 (22.0)       |
| Mental status changes/disorientation          | 175 (46.1)      | 13 (26.0)       |
| Disturbance in attention                      | 0 (0.0)         | 0 (0.0)         |
| Somnolence                                    | <11 (<2.9)      | 0 (0.0)         |
| Delirium                                      | 35 (9.2)        | <11 (<22.0)     |
| Abnormal motor activity                       | <11 (<2.9)      | 0 (0.0)         |
| Aphasia                                       | 54 (14.2)       | <11 (<22.0)     |
| Speech disorder                               | 19 (5.0)        | 0 (0.0)         |
| Agitation/restlessness                        | <11 (<2.9)      | <11 (<22.0)     |
| Cerebral edema                                | 12 (3.2)        | 0 (0.0)         |
| Seizure                                       | 15 (3.9)        | <11 (<22.0)     |
| Thrombocytopenia and platelet count decreased | 209 (55.0)      | 21 (42.0)       |
| Pyrexia                                       | 303 (79.7)      | 30 (60.0)       |
| White blood cell count decreased              | 274 (72.1)      | 20 (40.0)       |

**Cost of AEs among CAR-T cohort during the study period**

| AE  | Overall<br>N = 430        | Stratified by CAR-T Infusion Setting |                           |
|---|---------------------------|--------------------------------------|---------------------------|
|   |                           | CAR-T IP<br>N = 380                  | CAR-T OP<br>N = 50        |
| Anemia, n (%)                                     | 387 (90.0)                | 352 (92.6)                           | 35 (70.0)                 |
| Cost per event, mean ± SD [median]                | \$8,123 ± 30,915 [283]    | \$8,534 ± 32,520 [278]               | \$5,020 ± 13,277 [287]    |
| CRS, n (%)  | 100 (23.3)                | 93 (24.5)                            | <11 (<22.0)               |
| Fatigue, n (%)                                    | 260 (60.5)                | 227 (59.7)                           | 33 (66.0)                 |
| Cost per event, mean ± SD [median]                | \$6,191 ± 24,382 [161]    | \$5,468 ± 22,089 [146]               | \$12,770 ± 39,095 [392]   |
| Febrile neutropenia, n (%)                        | 24 (5.6)                  | 22 (5.8)                             | <11 (<22.0)               |
| Cost per event, mean ± SD [median]                | \$21,756 ± 31,727 [3,843] | \$28,187 ± 34,053 [17,156]           | \$1,747 ± 4,566 [133]     |
| Hypogammaglobulinemia and B-cell aplasia, n (%)   | 129 (30.0)                | 118 (31.1)                           | 11 (22.0)                 |
| Cost per event, mean ± SD [median]                | \$3,257 ± 8,431 [658]     | \$3,202 ± 8,434 [725]                | \$4,029 ± 8,431 [312]     |
| Hypokalemia, n (%)                                | 151 (35.1)                | 138 (36.3)                           | 13 (26.0)                 |
| Cost per event, mean ± SD [median]                | \$10,235 ± 25,190 [705]   | \$11,003 ± 26,719 [843]              | \$5,139 ± 9,091 [104]     |
| Hypophosphatemia, n (%)                           | 62 (14.4)                 | 58 (15.3)                            | <11 (<22.0)               |
| Cost per event, mean ± SD [median]                | \$9,142 ± 15,072 [1,163]  | \$9,046 ± 15,337 [1,098]             | \$10,034 ± 13,347 [3,550] |
| Hypotension, n (%)                                | 203 (47.2)                | 182 (47.9)                           | 21 (42.0)                 |
| Cost per event, mean ± SD [median]                | \$10,197 ± 39,733 [285]   | \$10,328 ± 41,197 [271]              | \$8,679 ± 14,826 [395]    |
| Neutropenia and neutrophil count decreased, n (%) | 318 (74.0)                | 290 (76.3)                           | 28 (56.0)                 |
| Cost per event, mean ± SD [median]                | \$4,759 ± 20,947 [163]    | \$4,430 ± 20,754 [162]               | \$7,082 ± 22,173 [221]    |
| Neurologic toxicity                               |                           |                                      |                           |
| Encephalopathy, n (%)                             | 173 (40.2)                | 162 (42.6)                           | 11 (22.0)                 |
| Cost per event, mean ± SD [median]                | \$9,599 ± 36,847 [90]     | \$9,405 ± 37,468 [90]                | \$13,177 ± 22,519 [254]   |
| Mental status changes/disorientation, n (%)       | 188 (43.7)                | 175 (46.1)                           | 13 (26.0)                 |
| Cost per event, mean ± SD [median]                | \$1,971 ± 18,484 [83]     | \$1,852 ± 18,624 [83]                | \$5,739 ± 12,993 [142]    |
| Disturbance in attention, n (%)                   | 0 (0.0)                   | 0 (0.0)                              | 0 (0.0)                   |
| Cost per event, mean ± SD [median]                | -                         | -                                    | -                         |
| Somnolence, n (%)                                 | <11 (<2.6)                | <11 (<2.9)                           | 0 (0.0)                   |
| Cost per event, mean ± SD [median]                | \$3,301 ± 10,774 [90]     | \$3,301 ± 10,774 [90]                | -                         |
| Delirium, n (%)                                   | 36 (8.4)                  | 35 (9.2)                             | <11 (<22.0)               |
| Cost per event, mean ± SD [median]                | \$24,743 ± 33,822 [803]   | \$23,931 ± 33,712 [344]              | \$62,893 ± . [62,893]     |
| Abnormal motor activity, n (%)                    | <11 (<2.6)                | <11 (<2.9)                           | 0 (0.0)                   |
| Cost per event, mean ± SD [median]                | \$1,435 ± 2,117 [404]     | \$1,435 ± 2,117 [404]                | -                         |

|  |                         |                         |                        |
|--|-------------------------|-------------------------|------------------------|
| Aphasia, n (%)                                       | 55 (12.8)               | 54 (14.2)               | <11 (<22.0)            |
| Cost per event, mean ± SD [median]                   | \$15,701 ± 25,889 [813] | \$14,505 ± 25,277 [599] | \$56,379 ± . [56,379]  |
| Speech disorder, n (%)                               | 19 (4.4)                | 19 (5.0)                | 0 (0.0)                |
| Cost per event, mean ± SD [median]                   | \$6,116 ± 8,466 [755]   | \$6,116 ± 8,466 [755]   | -                      |
| Agitation/restlessness, n (%)                        | 12 (2.8)                | <11 (<2.9)              | <11 (<22.0)            |
| Cost per event, mean ± SD [median]                   | \$954 ± 2,399 [84]      | \$1,079 ± 2,715 [73]    | \$517 ± 572 [278]      |
| Cerebral edema, n (%)                                | 12 (2.8)                | 12 (3.2)                | 0 (0.0)                |
| Cost per event, mean ± SD [median]                   | \$5,060 ± 14,815 [91]   | \$5,060 ± 14,815 [91]   | -                      |
| Seizure, n (%)                                       | 16 (3.7)                | 15 (3.9)                | <11 (<22.0)            |
| Cost per event, mean ± SD [median]                   | \$6,362 ± 16,353 [283]  | \$1,815 ± 4,610 [283]   | \$56,379 ± . [56,379]  |
| Thrombocytopenia and platelet count decreased, n (%) | 230 (53.5)              | 209 (55.0)              | 21 (42.0)              |
| Cost per event, mean ± SD [median]                   | \$5,230 ± 21,970 [386]  | \$5,452 ± 22,969 [416]  | \$3,378 ± 10,289 [286] |
| Pyrexia, n (%)                                       | 333 (77.4)              | 303 (79.7)              | 30 (60.0)              |
| Cost per event, mean ± SD [median]                   | \$6,540 ± 25,945 [90]   | \$6,480 ± 27,108 [90]   | \$6,972 ± 15,136 [99]  |
| White blood cell count decreased, n (%)              | 294 (68.4)              | 274 (72.1)              | 20 (40.0)              |
| Cost per event, mean ± SD [median]                   | \$5,242 ± 23,238 [106]  | \$5,211 ± 23,761 [106]  | \$5,482 ± 18,795 [90]  |

**HRU by CAR-T vs allo-HSCT cohort during the six-month follow-up period**

|   | Monthly incidence rate |                     | Adjusted IRR                                    |             |
|---|------------------------|---------------------|---|-------------|
|   | CAR-T IP<br>N = 265    | CAR-T OP<br>N = 430 | CAR-T vs.<br>Allo-HSCT (ref)<br>IRR (95%<br>CI) | P-<br>value |
| <b>HRU during the six-month follow-up period</b>                                |                        |                     |   |             |
| Length of follow-up in months, mean $\pm$ SD [median]                           | 5.0 $\pm$ 1.8 [6.0]    | 4.5 $\pm$ 1.9 [6.0] | -   |             |
| <b>HRU during the six-month follow-up period, including the index encounter</b> |                        |                     |   |             |
| <b>IP</b>   |                        |                     |   |             |
| Number of patients with IP visit, n (%)   | 251 (94.7)             | 416 (96.7)          | -   |             |
| Number of IP admissions   | 0.51                   | 0.47                | 0.90 (0.77, 1.04)                               | 0.149       |
| IP days   | 8.61                   | 6.04                | 0.68 (0.59, 0.79)                               | <0.001*     |
| ICU stay  | 0.09                   | 0.08                | 0.94 (0.67, 1.31)                               | 0.709       |
| ICU days  | 1.02                   | 0.58                | 0.59 (0.39, 0.91)                               | 0.018*      |
| <b>OP</b>   |                        |                     |   |             |
| Number of patients with OP visit, n (%)   | 239 (90.2)             | 394 (91.6)          | -   |             |
| Number of OP visits   | 2.99                   | 2.90                | 0.98 (0.90, 1.07)                               | 0.653       |
| <b>ER</b>   |                        |                     |   |             |
| Number of patients with ER visit, n (%)   | 71 (26.8)              | 128 (29.8)          | -   |             |
| Number of ER visits   | 0.10                   | 0.11                | 1.05 (0.77, 1.44)                               | 0.747       |

**Healthcare reimbursement costs comparing CAR-T vs. allo-HSCT cohort**

Index procedure-related costs were higher in the CAR-T cohort (\$266,555) compared to the allo- HSCT cohort (\$89,693) by \$182,337 (p<0.001).

During the first month following the index date (including the index encounter), total cost was higher in the CAR-T cohort compared to the allo-HSCT cohort by \$178,895 (p<0.001). Cost of IP admissions was significantly higher in the CAR-T cohort compared to the allo-HSCT

cohort by \$135,509 ( $p<0.001$ ). Cost of OP visits was also significantly higher in the CAR-T cohort compared to the allo-HSCT cohort by \$37,885 ( $p<0.001$ ).

Total costs from the second month following the index date up to the end of follow-up were significantly higher for the allo-HSCT cohort compared to the CAR-T cohort. Difference in total cost between the two cohorts (CAR-T vs. allo-HSCT) was -\$7,184 in month 2 ( $p<0.001$ ), -\$5,845 in month 3 ( $p<0.001$ ), -\$3,789 in month 4 ( $p<0.001$ ), -\$2,909 in month 5 ( $p=0.020$ ), - \$3,518 in month 6 ( $p<0.001$ ), and -\$2,431 in month 7 up to the end of follow-up ( $p=0.035$ ). The cost differences in total healthcare reimbursement costs between cohorts were mainly contributed by healthcare reimbursement costs of IP admissions. Difference in healthcare reimbursement cost of IP admissions between the two cohorts (CAR-T vs. allo-HSCT) was - \$5,145 in month 2 ( $p<0.001$ ), -\$3,939 in month 3 ( $p=0.003$ ), -\$2,296 in month 4 ( $p=0.091$ ), - \$2,654 in month 5 ( $p=0.069$ ), -\$3,105 in month 6 ( $p=0.012$ ), and -\$2,778 in month 7 up to the end of follow-up ( $p=0.005$ ).

Healthcare reimbursement costs of OP visits in the second and third month following the index date were significantly higher among the allo-HSCT cohort and comparable between cohorts in subsequent months.

### **Safety Results**

NA

### **Other Relevant Findings**

None

### **Conclusion**

In the six-month follow up period (including the index encounter), IP days and ICU days were significantly lower among the CAR-T cohort compared to the allo-HSCT cohort. Resource use of OP and ER were comparable between the two cohorts.

### **Date of Clinical Study Report**

21 May 2021