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Characteristics of Patients treated with CAR-T Therapies across Multiple Indications Utilizing the TriNetX Network

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BACKGROUND

- Chimeric antigen receptor (CAR)-T cell therapy, is a type of cancer immunotherapy that uses genetically altered T-cells to enable them in locating and destroying cancer cells more effectively.
- Six CAR T-cell therapies have been approved by the Food and Drug Administration (FDA) for the treatment of blood cancers (including lymphomas, some forms of leukemia, multiple myeloma) (**Table 1**).
- TriNetX, an Electronic Medical Record (EMR) database combines real time access from healthcare organizations (HCOs) across multiple countries to enable generation of real-world evidence.

Table 1. CAR-T FDA approval dates

CAR-T therapy	Indication	Date of FDA authorization
Tisagenlecleucel (Kymriah®)	B-ALL R/R (≥2L)* Adult LBCL~ R/R (≥2L) Adult FL R/R (≥2L)	Aug 30, 2017 May 01, 2018 May 27, 2022
Axicabtagene ciloleucel (Yescarta®)	Adult LBCL~ R/R (≥2L) Adult LBCL~ R/R (>1L)	Oct 18, 2017 Apr 01, 2022
Brexucabtagene autoleucel (Tecartus®)	Adult MCL R/R Adult B-ALL R/R¥	Jul 24, 2020 Oct 21, 2021
Idecabtagene vicleucel (Abecma®)	Adult MM R/R (≥4L)	Mar 26, 2021
Lisocabtagene maraleucel (Breyanzi®)	Adult LBCL# R/R (≥2L) Adult LBCL# R/R (>1L)	Feb 05, 2021 Jun 24, 2022
Ciltacabtagene autoleucel (Carvykti®)	Adult MM R/R (≥3L)	Feb 28, 2022

>1L, after first line systemic therapy, ≥2L, second line or later systemic therapy; ≥3L, third line or later systemic therapy; ≥4L, fourth line or later systemic therapy; B-ALL, b cell-acute lymphoblastic leukemia; HGBL, high-grade B-cell lymphoma; FL, follicular lymphoma; LBCL, large B-cell lymphoma; PMBCL, primary mediastinal large B-cell lymphoma; MCL, mantle cell lymphoma; MM, multiple myeloma.

* Pediatric and adults ≤ 25 years of age with B-ALL.
¥ Adults ≥ 26 years with R/R B-ALL.
~ LBCL includes diffuse large B-cell lymphoma (DLBCL) not otherwise specified, DLBCL arising from FL, HGBL and PMBCL.
# LBCL includes DLBCL not otherwise specified (including DLBCL arising from indolent lymphoma), HGBL, PMBCL, FL grade 3B.

OBJECTIVES

This study examined:

- Characteristics of patients on CAR-T therapies in HCOs covered by the TriNetX network in the United States (US).

METHODS

- Patients using CAR-T therapies were identified using RxNorm, ICD-10-PCS and HCPCS codes between Aug 31, 2017 (day after approval of first CAR-T therapy by the FDA) to Jan 13, 2023.
- Patient counts, demographics and co-medications were analyzed.

RESULTS

- Between August 31, 2017, and Jan 13, 2023, 1,630§ patients were administered with a CAR-T therapy (**Table 2**).

Table 2. Patients using CAR-T therapies (Aug 2017- Jan 2023)

CAR-T therapy	Number of patients using CAR-T therapy
Tisagenlecleucel	438
Axicabtagene ciloleucel	782
Brexucabtagene autoleucel	131
Idecabtagene vicleucel	169
Lisocabtagene maraleucel	88
Ciltacabtagene autoleucel	22

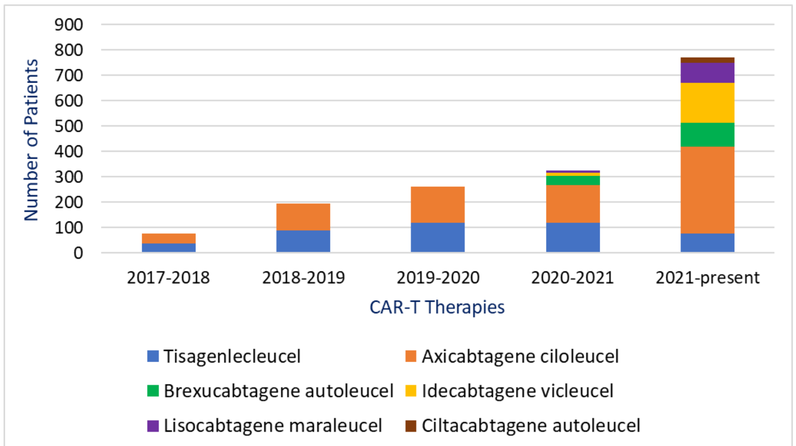
- Mean age of the cohort was 56 years, 66% of the cohort were males and 78% were white.
- In line with the CAR-T approved indications, 98% of the cohort were diagnosed with 'malignant neoplasms of lymphoid, hematopoietic and related tissue' (ICD-10-CM: C81 through C96).
- At any point during the therapy, 68% of the cohort used cyclophosphamide, 62% fludarabine, 34% rituximab and 28% doxorubicin.

§ Patient counts in the 'Results' section have been updated since the abstract submission as the TriNetX network updates numbers periodically for accuracy. Data sourced from TriNetX, LLC.

RESULTS

- Administration of Tisagenlecleucel and Axicabtagene ciloleucel (2 of the earliest CAR-T therapies approved), has increased over the years (**Figure 1**).
  - For Tisagenlecleucel, patient counts increased from 36 between Aug 2017-Aug 2018 to 196 between Sept 2020-Jan 2023.
  - Of the patients treated with Tisagenlecleucel, 54% were diagnosed with ALL (ICD-10-CM: C91.0) and 36% with diffuse large B-cell lymphoma (DLBCL) (ICD-10-CM: C83.3).
  - For Axicabtagene ciloleucel, patient counts increased from 40 between Sept 2017-Dec 2018 to 491 between Sept 2020-Jan 2023.
  - Almost all patients administered with Axicabtagene ciloleucel (94% of the cohort) were diagnosed with DLBCL (ICD-10-CM: C83.3).
- Administration of other CAR-Ts in Table 1 also increased from 2020 onwards.

Figure 1. Trend of CAR-T therapies administration in the US (2017- Jan 2023)



Data sourced from TriNetX, LLC

CONCLUSIONS

- Use of CAR-T therapies for multiple indications in the US has increased markedly since approval of the first therapies in 2017.
- Real-time EMR data has the potential to provide robust information on baseline characteristics and real-world use of innovative treatment including CAR-Ts.