Evaluating Six Month Mortality in Medicare and Medicaid CAR-T Patients

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Background

- Chimeric antigen receptor T cell (CAR-T) therapy now spans seven products and multiple indications.
- Further expansion into the outpatient setting is expected in the coming years.
- Current published work on mortality and treatment success consists of meta-analyses and single-system retrospective studies.
- Research has not fully evaluated mortality across multiple payers and patient demographics.

Methods

- Sources:
    - 100% Medicare Research Identifiable Files (2017-2022)
    - 100% Medicare Advantage Encounters claims (2017-2020)
    - 100% Medicaid T-MSIS (2017-2020)
    - 100% Medicare Beneficiary Summary File (MBSF)
    - 100% TAF Demographic and Eligibility File
- CAR-T procedures on same day represented in different systems assigned by hierarchy of:
    - Inpatient > outpatient
    - FFS > Medicare Advantage > Medicaid

Results

Table 1 – Unique CAR-T Claims By Source

Claim Source	Inpatient	Outpatient	Total
Medicare FFS	4,564	294	4,858
Medicare Advantage	356	34	390
Medicaid	617	113	730
Grand Total	**5,537**	**441**	**5,978**

Table 3 – Mortality by Year of CAR-T Procedure

Year of CAR-T	Case Count	% Died Within 6 Months
2017	42	31%
2018	573	21%
2019	913	24%
2020	1,092	24%
2021	1,155	20%
2022**	424	17%
Across Years	**4,199**	**22%**

Decreasing Rate of Mortality

**Through April

Figure 1 – Survival Curve By Payer for Beneficiaries who Died In Post-Period

FFS
Medicare Advantage
Medicaid

Survival Probability
Days Post CAR-T Procedure
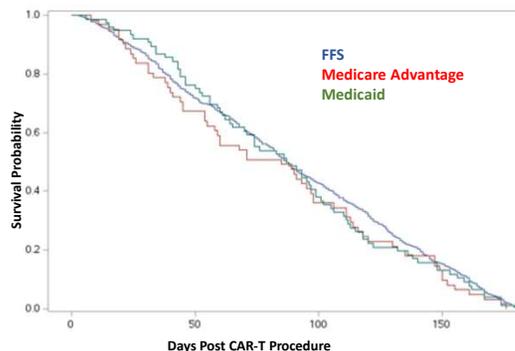
Table 2 – Claims Selection Waterfall

Data Cleaning Step	Potential Claims For Analysis	Percent of Total Claims (n=5,978)
Unique Claim Dates	5,769	97%
With Demographic Info	5,268	88%
First CAR-T Procedure	5,034	84%
With 6-Month Follow-up	4,366	73%
>18 years old	**4,199**	**70%**

Table 4 – Mortality by Gender, Race

Variables	Case Count	% Died Within 6 Months	Mean Age	Mean Days To Death
Gender*				
Female	1,641	19%	65.9	86.2
Male	2,556	24%	66.6	90.7
Race				
White	3,301	22%	68.7	87.8
Black	239	24%	60.9	98.1
Hispanic	183	16%	47.0	92.9
Unknown	154	20%	63.4	95.3
Other	114	23%	67.8	83.8
Missing	110	22%	42.7	93.4
Asian	98	23%	65.3	101.5

***Does not total to 100% due to few patients without gender information

Table 5 – Mortality by Payer + Setting

Payer	Site of Service	Case Count	% Died Within 6 Months	Mean Age	Mean Days To Death
FFS	IP	3,311	23%	68.8	89.0
FFS	OP	217	18%	68.9	103.3
MA	IP	255	24%	68.9	84.0
MA	OP	20	*	66.2	19.0
Medicaid	IP	360	20%	43.7	86.4
Medicaid	OP	36	*	37.3	122.5

*Counts of less than 11 are blinding due to data use agreement with CMS

Notable Findings

- CAR-T mortality rate has decreased since 2019
- Inpatient CAR-T procedures have a higher rate of 6-month mortality, likely due to outpatient patient selection
- Male mortality is statistically significantly higher (p<0.001)
- Differential mortality seen across race may be to small patient volumes

Future Directions

- While CAR-T therapy is a relatively new therapy, the volume of patients now available for analysis has the statistical power for more complex predictive analyses.
- Predictors of treatment success can now be identified which can aid in CAR-T being utilized across a wider patient population and in multiple settings of care.

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