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Use of Cost per Responder Models for CAR-T Therapies in Relapsed or Refractory Multiple Myeloma

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INTRODUCTION

- Despite many advances in therapy with improved responses and survival, multiple myeloma remains an incurable malignancy and most patients ultimately experience relapse.
  - To address this unmet need, new classes of therapies have emerged for treating Relapsed or Refractory Multiple Myeloma (RRMM) patients, including chimeric antigen receptor T-cell (CAR-T) therapies targeting the B-cell maturation antigen.
- CAR-T therapies have been shown to have a high overall response rate (ORR) and improved progression-free survival (PFS).[1,2]
- As newer, more innovative RRMM therapies are developed and brought to market, payers will need to balance their higher efficacy and total treatment costs when assessing potential value.
- Cost per responder models can be used to compare treatments based on their efficacy and costs.
- We have developed a cost per responder (CPR) model to evaluate the potential value of CAR-T therapies with respect to ORR, complete response or better (≥CR), and months of PFS.

OBJECTIVES

- To assess the value of RRMM CAR-T therapies (ciltacabtagene autoleucel [cilta-cel] and idecabtagene vicleucel [ide-cel]), using a novel CPR model that incorporates efficacy and total cost of treatment in the United States.

METHODS

Comparative efficacy of cilta-cel versus ide-cel

- A matching-adjusted indirect comparison (MAIC) was used to compare cilta-cel (CARTITUDE-1)[1] and ide-cel (KarMMa)[2] using the methodology previously published by Martin et al. 2021.[3]
  - A MAIC matches and adjusts individual patient data from one clinical trial based on the summary-level characteristics in a comparator trial.
- ORR, CR and PFS were the key efficacy outcomes considered in the model.
  - Cilta-cel response rate and PFS were modeled using observed data. PFS was extrapolated using a log-normal extrapolation based on consideration of statistical fit and clinical plausibility.
  - Ide-cel response rates were estimated by applying the adjusted RRs from MAIC to the observed cilta-cel response rates.
  - Ide-cel PFS was extrapolated using a log-normal extrapolation of the observed data, then adjusted by applying an adjustment HR. The adjustment HR was calculated by dividing the unadjusted cilta-cel vs. ide-cel HR by the adjusted HR obtained from the MAIC.
  - Median PFS for cilta-cel has not been reached after 21.7 months of follow-up;[1] median (95% CI) PFS for ide-cel is 8.6 (5.6-11.6) months.[2]

METHODS (CONTINUED)

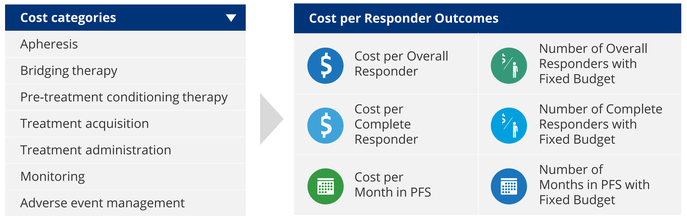
Cost sources and model assumptions

- We estimated the total cost of each CAR-T treatment based on the cost categories presented in **Figure 1**.
- Apheresis: costed using the Centers for Medicare & Medicaid Services (CMS) Physician Fee Schedule 2021.[4]
- Bridging therapy: assumed three-week duration based on a clinician Delphi Panel and costs were obtained from Pricentric One.[5]
- Pre-treatment conditioning therapy: cost of lymphodepletion with fludarabine and cyclophosphamide was obtained from Pricentric One.[5]
- CAR-T infusion was assumed to have a one-time cost, based on treatment acquisition ($465,000 for cilta-cel and $419,500 for ide-cel) and treatment administration.
- Treatment administration: included hospital visits, with costs informed by public sources, [4,6,7,8] and frequencies informed by expert clinical opinion and KarMMa.[9]
- Zero ICU stays were assumed to be associated with CAR-T infusion to avoid double counting with cytokine release syndrome (CRS) events.
- Post-infusion monitoring: costs incurred over time as long as patients were in PFS.
- Frequency of post-infusion monitoring was informed by a clinician Delphi Panel and costed using the CMS Physician Fee Schedule 2021.[4]
- Adverse events (AE) were informed by FDA prescribing information[10,11] and were one-time upfront costs, costed from a commercial perspective. [8,12,13]
- Grade 3-4 AE costs were included, as were Grade 1-2 CRS and neurologic toxicity events.
- Costs were inflated to 2021 US dollars.

Calculating cost per responder

- Model outputs are summarized in **Figure 1** and were calculated over a two-year time horizon.
- Cost per responder (ORR and ≥CR): Equal to the total cost of treatment divided by the ORR or ≥CR.
- Cost per month in PFS: Equal to the total cost of treatment divided by the restricted mean PFS.
- Fixed budget outputs
  - The number of responders (ORR and ≥CR) and number of months in PFS achievable within a fixed budget were calculated by dividing the cost per responder or cost per month in PFS by the fixed budget.

FIGURE 1: Summary of model outputs.



RESULTS

- Cost per responder and fixed budget results are presented in **Figure 2** and **Figure 3**, respectively.

FIGURE 2: Value comparison between cilta-cel and ide-cel at 2 years post-infusion.

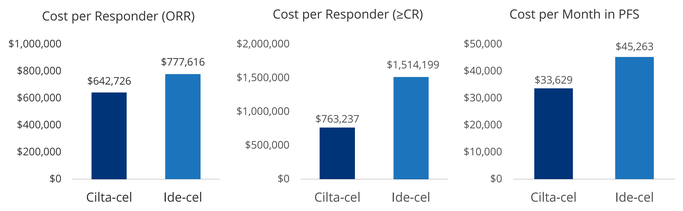
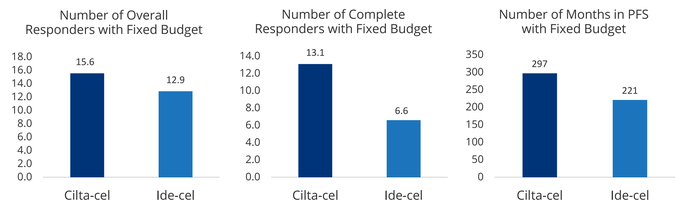


FIGURE 3: Fixed budget analysis comparison between cilta-cel and ide-cel at 2 years post-infusion, assuming a fixed budget of $10 million.



Limitations

- Lack of head-to-head CAR-T trial data necessitated use of MAIC to estimate comparative efficacy.
- Real-world evidence may better capture the experiences and outcomes of patients receiving CAR-T treatments; however this data is not yet available.

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KEY TAKEAWAYS

- Overall, cilta-cel offers substantial clinical benefit for patients with RRMM compared to ide-cel.
- The CPR analysis estimated a lower cost per responder using either ORR or ≥CR for cilta-cel compared to ide-cel. The CPR analysis also estimated a lower cost per month in PFS for cilta-cel compared to ide-cel.
- With a fixed budget, more treated patients would experience a response, and more total months of PFS would be achieved with cilta-cel than with ide-cel.

CONCLUSIONS

- CPR models have significant potential to assist payers in evaluating the value of newer, more innovative RRMM therapies by integrating information on both total costs and efficacy.

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DISCLOSURES

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