A Cost-Consequence Analysis of Chimeric Antigen Receptor T-Cell Therapy in Patients with Relapsed or Refractory Large B-Cell Lymphoma across Gulf Cooperation Council Countries

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KEY LEARNINGS

Referring CAR T-cell therapy patients to Saudi Arabia (KSA) is a cost-effective alternative for Gulf Cooperation Council (GCC) countries compared to referrals to the United States (US) or Europe

BACKGROUND

- Relapsed or refractory large B-cell lymphoma (R/R LBCL) is a highly aggressive form of non-Hodgkin lymphoma with limited treatment options, particularly for patients who do not respond to traditional therapies.[1,2]
- The introduction of CD19 chimeric antigen receptor T-cell (CAR T) therapy offers a promising treatment option with substantial activity against R/R LBCL and a manageable safety profile.[2-5]
- However, access to CAR T therapy remains a challenge,[6,7] particularly in regions like the Gulf Cooperation Council (GCC), where there is limited availability of (CAR T) centers. Consequently, CAR T-eligible patients are referred abroad, typically to the United States (US) or Western Europe where more readily accessible treatment centers are available.

OBJECTIVE

- With the availability of CAR T referral centers in the Kingdom of Saudi Arabia (KSA), the aim of this study was to assess the projected economic consequences of adopting (CAR T) referral pathways to the KSA compared to referrals abroad to the US or Western Europe for CAR T-eligible R/R LBCL patients in the GCC.

CONCLUSIONS

- CAR T referral to KSA is a cost-efficient approach for GCC countries compared to referrals to the US or Western Europe.
- Adoption of KSA referrals could potentially enable more patients within the GCC to receive treatment with the same budget spending.

METHODS

- A cost-consequence analysis was conducted to compare the following referral scenarios for CAR T-eligible R/R LBCL patients in the GCC.

Model Scenarios

- Scenario 1: All identified CAR T-eligible patients from GCC countries referred abroad over a 1-year period to the US or Western Europe.
- Scenario 2: Simulation in which all CAR T-eligible patients were referred abroad to KSA instead of to the US or Western Europe. Out of these referrals 90% were to the US and the remaining 10% were to Western Europe.

Model Inputs

- The model incorporated annualized direct medical costs and direct non-medical costs.
- Number of patient referrals, resource utilization and treatment-related costs (reported in 2024 USD) were sourced from medical bills, public formularies, business centers, and local clinical experts.

Model Outputs

- Annualized per patient and overall costs were calculated to estimate the potential economic impact of the two referral scenarios.
- One-way sensitivity analyses were conducted to account for uncertainty in input parameters and were varied by ± 30%.

RESULTS

- Over a 1-year period, 14 R/R LBCL patients were identified from GCC countries as being referred abroad for CAR T therapy
- Average per patient costs for referrals abroad to the US or Western Europe were **$1,689,945** including ($519,572 for drug acquisition, $1,088,175 for direct medical care, and $82,198 for direct non-medical costs), resulting in total costs of **$23,659,230** for the 14 referred patients.
- Comparable average per patient costs for referral to KSA were estimated at **$636,751** (drug acquisition: $436,810; direct medical: $162,667; direct non-medical: $37,274), which would result in total costs of **$8,914,514** for 14 referred patients.
- With estimated per patient annual cost savings of **$1,053,194**, patient referral to the KSA was projected to result in total cost savings of **$8,914,514** representing a 62% reduction in budgetary spend.

Interpretation

- All else considered equal, and despite variations in referral costs across individual GCC countries (figure 2), utilizing healthcare abroad referral to KSA could help GCC health authorities realize substantially reduced expenditures for CAR T-eligible patients with R/R LBCL.
- Alternatively, pursuing referrals abroad to KSA instead of to the US and Western Europe could possibly lead to a **164% increase** in the number of GCC patients receiving CAR T therapy for the same budget spending.

Figure 1. Model Structure

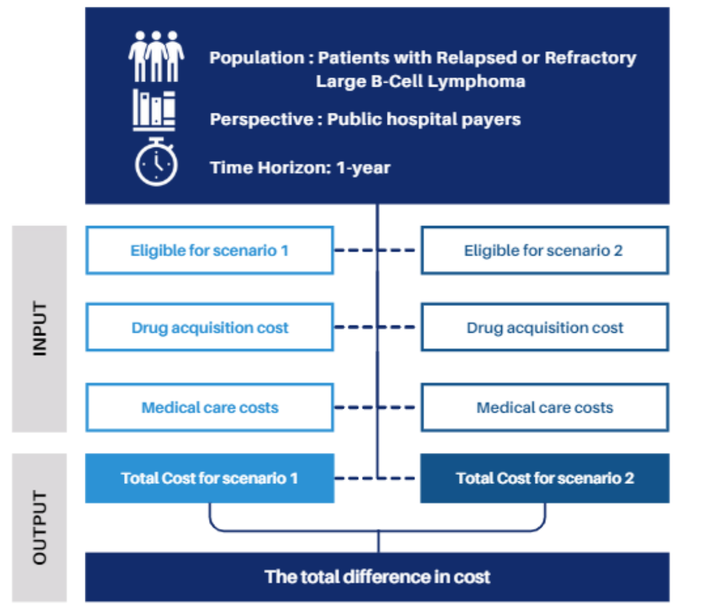


Table 1. Annualized per patient abroad referral costs.

Cost Parameters	CAR T Healthcare Abroad Referral to the US or Western Europe	CAR T Healthcare Abroad Referral to the KSA	Difference (Cost Saving)
Drug Acquisition	$519,572	$436,810	$(82,762)
Medical Care	$1,088,175	$162,667	$(925,508)
Non medical Cost	$82,198	$37,274	$(44,924)
Total Costs	**$1,689,945**	**$636,751**	**$(1,053,194)**

Figure 2. Average total costs per country for abroad referrals to the US or Western Europe

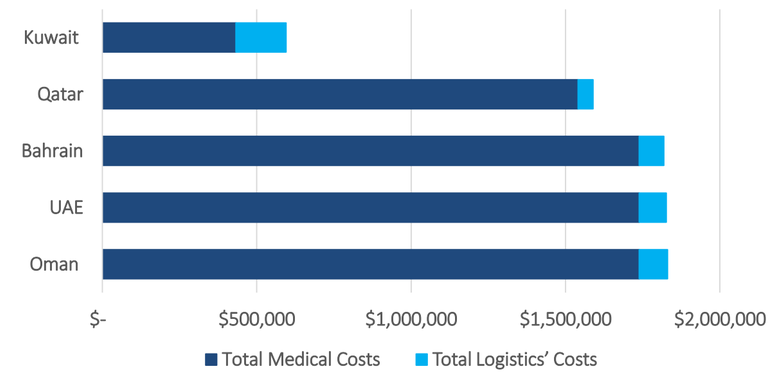


Figure 3. Per patient and overall cost comparison of CAR T Healthcare Abroad Referral

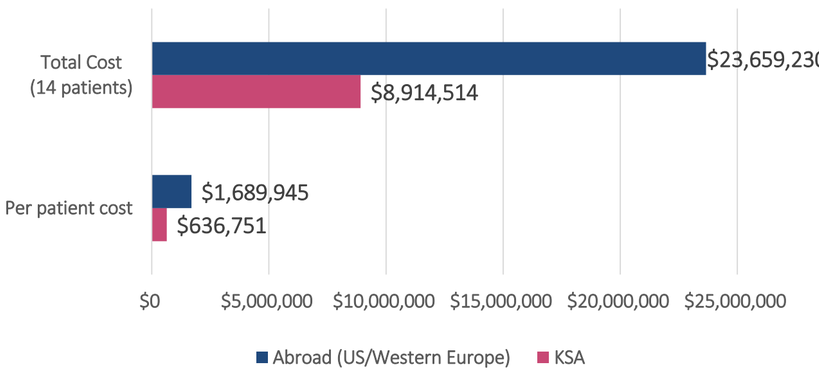


Figure 4. Annual cost breakdown per patient

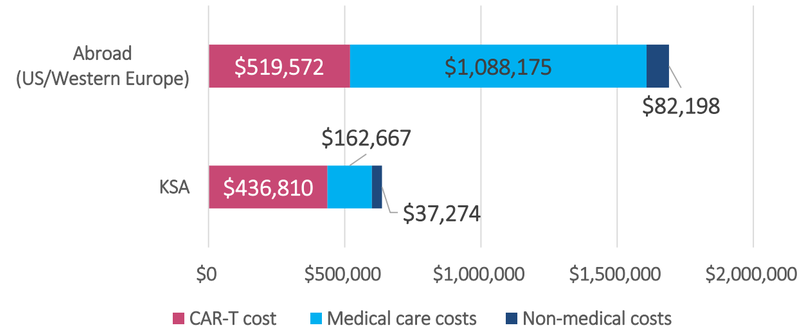
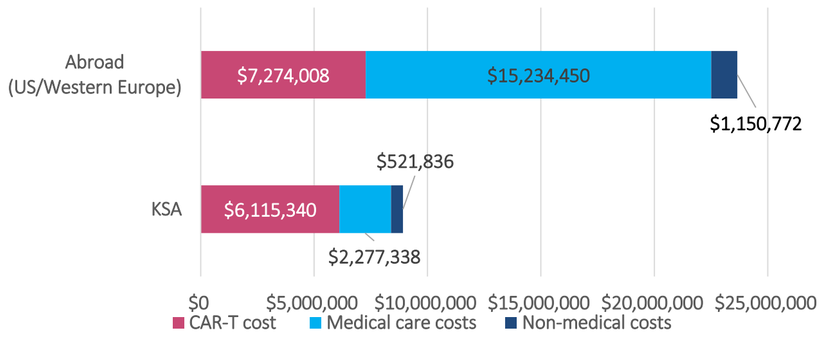


Figure 5. Annual cost breakdown for (14) patients



Abbreviations: CART: chimeric antigen receptor T-cell, GCC: Gulf cooperation council, KSA: the Kingdom of Saudi Arabia, R/R LBCL: relapsed or refractory large B-cell lymphoma, UAE: United Arab Emirates, US: the United States

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