Cost-Effectiveness and Budget Impact of Lecanemab in Early Alzheimer's Disease in Saudi Arabia: A Single-Center Analysis at King Fahad Medical City

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KEY LEARNINGS

Lecanemab was projected to improve health outcomes and delay disease progression in patients with early Alzheimer's disease; however, its cost-effectiveness depended on the willingness-to-pay threshold applied.

BACKGROUND

- Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by pathological changes in the brain, including the accumulation of amyloid-β and neurofibrillary tangles composed of hyperphosphorylated tau. These changes may begin years before clinical symptoms emerge.(1,2)
- Conventional treatments, including cholinesterase inhibitors and memantine, primarily manage symptoms rather than the underlying disease pathology. Disease-modifying treatments offer an opportunity to intervene during early AD, before more advanced cognitive and functional impairment develops. (3,4)
- Lecanemab is an anti-amyloid monoclonal antibody that was associated with moderately less cognitive and functional decline than placebo over 18 months in the phase 3 Clarity AD trial (4) . Its economic value within the Saudi healthcare system remains uncertain and requires evaluation using locally relevant clinical, resource-use and cost inputs.

OBJECTIVE

- To evaluate the cost-effectiveness and five-year budget impact of lecanemab plus standard of care (SoC), compared with SoC alone, in adults with mild cognitive impairment or mild dementia due to AD with confirmed amyloid-β pathology. The analysis was conducted from Saudi public-payer and societal perspectives in the King Fahad Medical City setting.

CONCLUSIONS

- Lecanemab was associated with improved health outcomes and delayed disease progression in patients with early Alzheimer's disease, with an incremental cost-effectiveness ratio considered acceptable under the applied Saudi societal willingness-to-pay threshold. These findings support consideration of lecanemab for reimbursement and underscore the need for robust local data to strengthen the evidence base and inform decision-making.

References

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2. Scheltens P, Blennow K, Breteler MM, de Strooper B, Frisoni GB, Salloway S, et al. Alzheimer's disease. Lancet. 2016;388(10043):505-17.
3. National Institute on Aging. (2023, September 12). How is Alzheimer's disease treated? National Institutes of Health. https://www.nia.nih.gov/health/alzheimers-treatment/how-alzheimers-disease-treated
4. National Institute on Aging. (2023, July 7). FDA converts novel Alzheimer's disease treatment to traditional approval. https://www.nia.nih.gov/news/fda-converts-novel-alzheimers-disease-treatment-traditional-approval

METHODS

- A Markov cohort model with monthly cycles and half-cycle correction was developed to simulate progression across mild cognitive impairment, mild, moderate and severe AD, and death. Community and institutional care settings were modeled separately over a 30-year lifetime horizon.
- Clinical efficacy and disease-progression inputs were informed by the Clarity AD trial and validated by local clinical experts. Saudi-specific cost and healthcare resource-use data were obtained from the KFMC Business Center and electronic medical records.
- Inputs included lecanemab acquisition and administration, monitoring, disease management, informal care and productivity losses.
- A five-year budget impact analysis was conducted using an estimated eligible KFMC population of 132–139 patients annually and phased lecanemab uptake of 2–10 patients annually.
- Costs in the world without Lecanemab (SoC) include symptomatic treatment, direct medical care (community and institutional), and direct non-medical care costs. Lecanemab scenario costs additionally include drug acquisition, drug administration, monitoring, diagnostic and biomarker testing, and adverse event management.
- Probabilistic, one-way and scenario sensitivity analyses were performed to assess uncertainty.

RESULTS

- Lecanemab was associated with an incremental lifetime cost of SAR 306,429 per patient compared with SoC.
- Lecanemab generated 17.05 QALYs versus 14.63 QALYs with SoC, corresponding to an incremental gain of 2.42 QALYs (Figure 2).
- The base-case ICER was SAR 126,736/QALY, below the applied willingness-to-pay threshold in the model.
- Lecanemab increased the modeled time spent in community care by 1.35 years.
- The cumulative five-year net budget impact was SAR 1,968,538, increasing from SAR 205,309 in Year 1 to SAR 510,581 in Year 5.
- The budget impact was partially offset by reductions in AD disease-management costs.
- The annual cost per patient for lecanemab versus SoC over 5 years presented in (Figure 3), and (Figure 4) present the drug acquisition cost vs. other costs for lecanemab and SoC in year 2025 and 2029.
- The 5-Year Budget Impact Summary is presented in (Table 1).

Figure 1. | Budget Impact Model structure

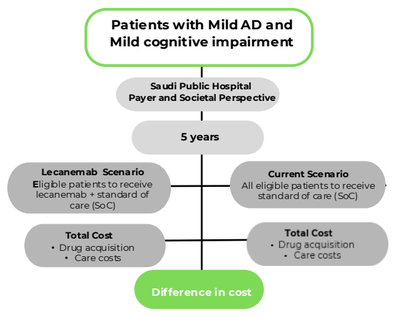

Figure 2. | Base case cost-effectiveness results

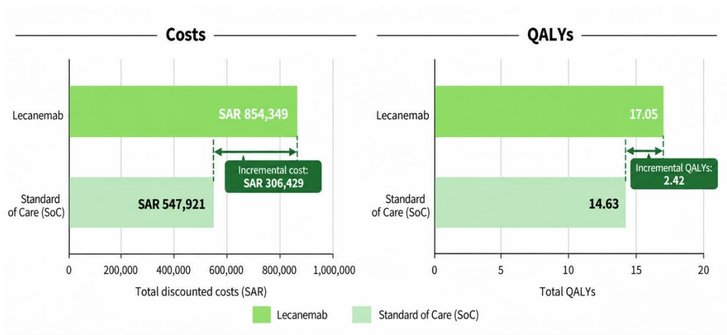

Figure 3. | Annual cost per patient - Lecanemab vs. SoC (2025-2029).

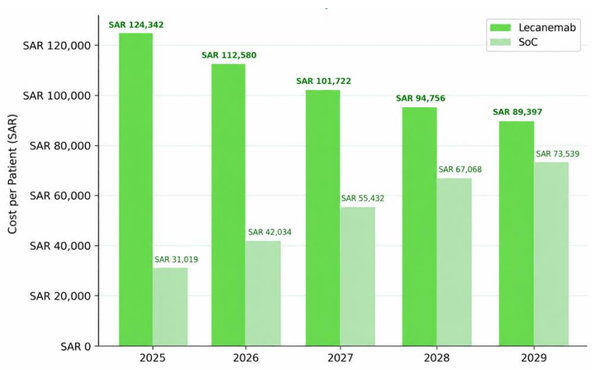

Figure 4. | Costs per patient for Lecanemab vs. SoC in year 2025 and 2029

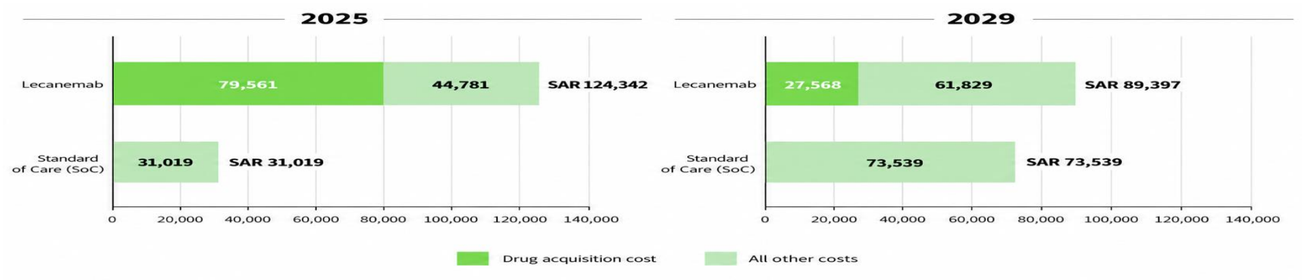

Table 1. | 5-Year Budget Impact Summary

	Year 1 2025	Year 2 2026	Year 3 2027	Year 4 2028	Year 5 2029	Total 5 Years
Patients on Lecanemab	2	4	6	8	10	30
World with Lecanemab (SAR)	887,737	1,328,629	1,795,193	2,213,690	2,519,541	8,744,790
World without Lecanemab / SoC (SAR)	682,429	986,784	1,365,619	1,732,460	2,008,960	6,776,252
Net Budget Impact (SAR)	**205,309**	**341,845**	**429,574**	**481,230**	**510,581**	**1,968,538**
Cost per Patient - Lecanemab	124,342	112,580	101,722	94,756	89,397	-
Cost per Patient - SoC	31,019	42,034	55,432	67,068	73,539	-

Author contributions All authors provided substantial contributions to study conception/design, or acquisition/analysis of data; drafting of the publication or reviewing it critically for important intellectual content; and gave their final approval of the publication.
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