

# The economic and commercial case for ALS treatment innovation

## GRANT RESEARCH

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## Background

Amyotrophic lateral sclerosis (ALS) is a rapidly progressive neurodegenerative disease leading to paralysis and death, typically within 2–5 years of symptom onset.<sup>1,2</sup> Despite its relatively low prevalence, ALS imposes a disproportionate burden on patients, caregivers, and healthcare systems due to its complex diagnostic pathway, limited treatment options, and high resource utilisation.

Nevertheless, factors including increased funding, large-scale collaborative initiatives, and a growing at-risk population position ALS as a priority for scientific innovation and strategic investment, with the potential to accelerate the development of diagnostics, therapies and preventive strategies.

## Aim

Our aim was to quantify the socioeconomic burden of ALS and estimate the potential commercial and societal value of effective ALS therapies across seven countries (UK, US, Canada, France, Germany, Italy, and Australia), while examining implications for health policy and HTA decision-making.

## Methods

We applied three complementary approaches:

- 1) We monetised the annual socioeconomic cost by combining QALY losses and direct healthcare costs.
- 2) We used proxy pricing based on tofersen, a novel disease-modifying ALS therapy, scaled to the full ALS population over a 10-year horizon.
- 3) We adapted a published Markov model to evaluate hypothetical treatment scenarios with variable effectiveness.

Estimates were generated from healthcare system and payer perspectives.

## Burden of illness in ALS

A literature review of the burden of illness for ALS indicated that QALY shortfalls for each patient can range, on average, from 9.27 in Italy to 15.55 in Germany. Expressed as a monetary burden — that is, by applying the monetary value that each country assigns to a QALY — this ranges from \$358,000 per patient in Italy to \$1.2 million in the United States.

Our literature review also highlighted that healthcare resource utilisation per person per year ranges from \$23,000 in Canada to \$77,000 in the United States. Still, ALS imposes a wide range of additional costs that stress the need to consider its broader societal value. Indeed, evidence from a recent German study indicates that direct medical costs account for approximately a third of total costs associated with ALS.<sup>2</sup> Thus, while ALS' cost on the healthcare system is significant, the true economic and societal burden of ALS is borne largely outside the formal healthcare system.

## Estimating the commercial value of a treatment

### Approach 1: Using the total country-specific burden of ALS

Quantifying the total burden of ALS, by combining the monetary value of healthcare resource utilisation and QALY losses, generates an estimate of the societal value of eradicating ALS. This approach assumes a fundamental shift in our understanding of ALS, as we are effectively representing the value of a pathway that includes predictive screening tools and a curative therapy that reverses disease progression.

#### Total monetised burden of ALS per year (USD millions)

	UK	USA	CAN	AUS	FRA	ITA	GER
Population-wide healthcare costs	178.2	2,500	64.6	139.3	171.4	201.4	251.9
Monetised health losses due to ALS population	5,900	31,700	1,500	1,100	3,000	1,900	4,100
Total monetised burden	6,078	34,200	1,565	1,239	3,171	2,101	4,352

### Approach 2: Using a current treatment price

Our second approach estimates the commercial value of a potential ALS treatment using the existing price of tofersen, a recently approved innovative ALS therapy that is authorised for 2% of the ALS population. This approach assumes that the price of tofersen could be achieved by a new hypothetical ALS treatment (or treatments) that could serve a wider population.

#### Estimated commercial value of treatment at years 1, 5, and 10 (USD millions)

	UK	USA	CAN	AUS	FRA	ITA	GER
Year 1	209.0	4,799.6	139.0	143.4	250.9	242.4	347.2
Year 5	943.8	21,670.4	627.4	647.7	1,132.6	1,094.5	1,567.5
Year 10	1,738.5	39,916.2	1,155.7	1,193.0	2,086.3	2,016.0	2,887.3

## Estimating the commercial value of a treatment

### Approach 3: Using conventional HTA methods

Finally, we used conventional HTA methods to approximate the value of hypothetical ALS treatments, using an adapted Markov model originally developed by Tappenden et al.<sup>3</sup> We estimated the value of three hypothetical treatment profiles with the aim of representing a range of possibilities for potential outcomes. We modelled the relative effects of these treatments through two mechanisms: slowing the rate of disease progression by applying a relative risk reduction (RRR), and/or including beneficial health-related quality of life (HRQoL) effects in each stage by applying a utility gain for patients. Below we describe the profiles of each hypothetical medicine we evaluated:

- **Medicine 1:** RRR = 0.39 and utility gain = 0.14
- **Medicine 2:** RRR = 0.5 and utility gain = 0.14
- **Medicine 3:** RRR = 1 and utility gain = 0.14

#### Yearly commercial values of treatments (in USD millions)

	UK	USA	CAN	AUS	FRA	ITA	GER
Medicine 1	-10.4	163.5	11.4	-0.9	26.0	-3.9	-15.5
Medicine 2	-22.9	147.1	9.6	-5.9	20.1	-19.4	-44.0
Medicine 3	202.5	3,141.1	217.7	136.8	462.7	281.6	492.6

While each of these three medicine profiles improve health and extend life, some of the scenarios in some of the HTA contexts demonstrate negative treatment values, even before the cost of the medicine is accounted for. That is, these interventions would not be cost-effective even at price zero. This result highlights well-known methodological challenges that exists when evaluating treatments for severe and life-limiting therapies.

## Discussion and Conclusion

- **Several factors could position ALS at the forefront of innovation.**
- **This analysis demonstrates how traditional HTA frameworks may systematically undervalue treatments for progressive and severe diseases, thereby creating inadequate commercial incentives for pharmaceutical innovation in these areas.**
- **Considering alternative or broader value frameworks may be necessary to appropriately reflect the value of medicines in these disease areas.**
- **Our research provides a comprehensive understanding of the environment for ALS therapies, demonstrating that advances in ALS treatment research represent a substantial opportunity, despite it being a rare disease.**

## References

1. Saini, A. and Chawla, P.A., 2024. Breaking barriers with tofersen: Enhancing therapeutic opportunities in amyotrophic lateral sclerosis. *European Journal of Neurology*, 31(2), p.e16140. DOI: 10.1016/j.eurj.2024.01.019

2. Bradford, D. and Rodgers, K.E., 2024. Advancements and challenges in amyotrophic lateral sclerosis. *Frontiers in Neuroscience*, [online] 18. DOI: 10.3389/fnins.2024.1407704

3. Schönfelder, E., Osmanovic, A., Mischen, L.H., Petri, S. and Schreiber-Katz, O., 2020.

Costs of illness in amyotrophic lateral sclerosis (ALS): a cross-sectional survey in Germany. *Orphanet Journal of Rare Diseases*, 15(1), p.149. DOI: 10.1186/s13023-020-01818-4

4. Tappenden, P., Hardiman, O., Kwon, S.-H., Mon-Yes, M., Galvin, M., McDermott, C., and the ALS-Care Study Group, 2024. A Model-Based Economic Evaluation of Hypothetical Treatments for Amyotrophic Lateral Sclerosis in the UK: Implications for Pricing of New and Emerging Health Technologies. *PharmacoEconomics*, 42(9), pp.1003–1016. DOI: 10.1007/s40273-024-01938-7

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