

FROM QUALITY-ADJUSTED LIFE YEARS (QALY) TO EQUAL VALUE OF LIFE YEARS (evLY): A STUDY ON NON-**ALCOHOLIC STEATOHEPATITIS (NASH) SUBPOPULATIONS**

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BACKGROUND

In health economics, the traditional measure of Quality-Adjusted Life Years

Title	Not obese	Obese	Absolute difference	Percent change
ICER using QALY	115,449	139,219	23,770	21%
ICER using evLY – SoC as comparator	101,804	100,924	881	-1%

The QALY-based ICER of the curative therapy vs SoC was **21%** higher for super obese patients compared to those without obesity. However, using evLY significantly

(QALYs) has been widely used to medical interventions evaluate by combining both life expectancy and quality of life.

However, QALYs are sometimes viewed as discriminatory, as they discount years of life based on health quality, potentially undervaluing the lives of those with chronic conditions or disabilities. To address this concern, the alternative method of Equal Value of Life Years (evLYs) offers a more equitable approach. Unlike QALYs, which adjust life years based on the quality of health, evLYs focus on the value of added life years, treating each additional year of life as having the same utility as a general population.

OBJECTIVE

The evLY, a measure developed by Institute for Clinical and Economic Review (ICER) US, offers a potential

Nonalcoholic Two distinct (NASH) Steatohepatitis subpopulations were evaluated: one comprising super-obese patients, and the other consisting of non-obese patients. Apart from baseline utility levels, all other input parameters were identical across both subpopulations.

Table 1. Comparison of curative therapy's ICER using QALY and evLY,

In the non-obese cohort, a background utility value of 0.88 was used, whereas for the super-obese cohort, the background utility was set at 0.72. A utility decrement was applied for NASH to derive utility values corresponding to each health state.

Baseline utility was determined to be 0.79 for non-obese patients with as super-obese with NASH.

(QoL) The quality of life was computed by dividing total LYs by total QALYs (10.14 and 11.49 for SoC and curative therapy respectively).

reduced this difference to less than 1%. Those results are presented in Table 1, and Figure 2.

Considering super obese subpopulations, the curative therapy generated **1.87** incremental evLY with SoC as the comparator, but only **1.44** with biological therapy as the comparator. Those results can be seen in the Table 2.

Comparison of ICER obtained via different methods



NASH, and **0.63** for patients classified Figure 2. ICER calculated with QALY and evLYs



QALY alternative to in costeffectiveness analyses (CEA). This study aimed to calculate both evLY and QALY in internally developed costeffectiveness model (CEM).

- For investigation this recently developed model for Nonalcoholic (NASH) Steatohepatitis and Nonalcoholic fatty liver disease (NAFL) was selected. The model compares the effects of lifestyle intervention (body weight reduction), also referred to as standard of care (SoC), curative therapy and a biologic therapy.
- different subpopulations Two were considered and the impact of using evLY instead of QALY on the results was evaluated.

METHODS

The cohort Markov model estimated the cost-effectiveness of a hypothetical

Table 2. Comparison of QALY and evLY, using two subpopulations

Title	Not obese	Obese	Absolute difference
Incremental QALY	1.64	1.36	0.28
Incremental evLY using SoC comparator as comparator	1.85	1.87	0.02
Incremental evLY using biologic therapy as comparator	1.42	1.44	0.01

- Figure 1 illustrates the method used to calculate evLYs, representing the area in the blue region.
- formula, as The evLY per the methodology outlined by the ICER US, was employed in this model. Specifically, the standard QALY approach was applied to Life Years (LYs) common to both the intervention and the comparator (Area 1 in Figure 1). For LYs gained exclusively by the intervention, a utility value equivalent
- Mean QoL were determined as 0.57 and 0.59, for patients using SoC and curative therapy, respectively.
- Figure 3 provides visual a representation of how these results contribute to the calculation of evLYs within the NASH example, specifically for the super-obese population, with SoC selected as the comparator.



The difference in QoL between SoC and curative therapy is minimal, as all patients start in a healthy state and the therapy is most effective for severely ill individuals. Consequently, the primary impact is on life years gained.

Using the standard approach, treating super-obese individuals is less cost-effective than treating non-obese patients. This could challenge when present a comparing two treatments, especially if one population has a lower baseline utility. However, this demonstrates how evLY can disparities reduce across subpopulations.

Unlike QALYs, the quantity of evLYs varies with the chosen comparator, allowing ICER values to shift based on the comparator used and potentially altering the cost-effectiveness. perceived Thus, implementing evLY requires careful consideration.

curative therapy for NASH, compared separately to SoC and a biologic therapy.



Figure 1. Methods of calculating evLYs (general example) – plots reproduced based on Ref 1.

to that of a healthy life year (assumed to be 0.851 by ref [1], derived from the utility of a general US population) was considered (Area 2 in Figure 1).

Additionally, the evLYs for curative therapy were also computed using biologic therapy as a comparator and utilizing the same methodology as before.

RESULTS

Length of life was determined as total discounted LYs - 17.64 and 19.59 for SoC and curative therapy respectively



Length of life

Figure 3. Methods of calculating evLYs (NASH example)

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