Integrating Real-World Evidence, Patient-Reported Outcomes, and Equity in Lifecycle HTA: Advancing Dynamic Value Assessment

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Introduction

Health technologies are increasingly introduced into clinical practice under conditions of significant clinical and economic uncertainty. Accelerated and conditional regulatory pathways particularly in areas such as oncology, rare diseases, and advanced therapies often rely on immature or limited evidence at the time of approval. While these pathways enable earlier patient access to innovative treatments, they also shift a substantial portion of evidence generation to the post-launch setting, requiring decision-makers to evaluate value in the context of evolving data.[1,2]

This changing evidentiary landscape has challenged traditional health technology assessment (HTA) approaches, which have historically relied on point-in-time evaluations conducted at market entry. In practice, the value of a health technology evolves as evidence matures, real-world utilization becomes clearer, and patient experience is better understood. As a result, there is growing recognition that HTA systems must move beyond single assessments toward approaches that can account for change and uncertainty over time.[2–4]

Lifecycle HTA has emerged as a structured response to this need. By connecting sequential activities including early evidence planning, initial appraisal, managed access, post-launch evidence generation, and reassessment lifecycle HTA enables value to be evaluated iteratively rather than at a single time point.[3,4] Within this framework, real-world evidence (RWE), patient-reported outcomes (PROs), and broader equity considerations play a critical role in reducing uncertainty and informing how value is refined across the lifecycle of a technology. [4–6]

However, despite increasing recognition of their importance, the integration of real-world evidence, patient-reported outcomes, and equity-driven evidence into HTA decision-making remains inconsistent and often fragmented.

This article examines how lifecycle HTA is evolving as a decision framework, and how the integration of real-world evidence, patient-reported outcomes, and equity considerations can enable more robust, adaptive, and patient-centered value assessment over time.

Lifecycle HTA as a Coordinated Decision Framework

Lifecycle HTA represents a shift from isolated assessments toward a coordinated and adaptive decision-making framework that explicitly addresses changes in evidence, technology, and clinical context over time.[2–4]

Rather than functioning as standalone evaluations, lifecycle HTA connects multiple stages of assessment into a prospectively designed sequence. A defining feature of this approach is the recognition that uncertainty at launch is not eliminated but actively managed through structured evidence generation and iterative reassessment.

This evolution fundamentally changes the role of evidence. Evidence is no longer required solely to support initial appraisal; it must be designed to inform decision points across the lifecycle, including continuation, restriction, or discontinuation decisions.

Operationalizing Lifecycle HTA: Early Access and Reassessment Pathways

Across jurisdictions, lifecycle HTA is emerging as a structured approach, with some systems actively operationalizing early or conditional access pathways linked to reassessment, while others are at earlier stages of implementation. [1,2]

Early access frameworks enable patient access to promising therapies based on preliminary evidence, while requiring prospective real-world data generation. These pathways are supported by structured evidence requirements and predefined reassessment conditions.

In France, Haute Autorité de santé (HAS's) early access programs enable therapies to be used based on preliminary evidence, while requiring structured real-world data collection to support subsequent health technology assessment and reassessment processes.[7,8]

In the United Kingdom, the National Institute for Health and Care Excellence (NICE) Early Value Assessment approach aligns evidence generation with future decision needs from early development stages, while managed access agreements, including schemes such as the Cancer Drugs Fund, enable conditional access alongside structured post-launch evidence generation to address uncertainty and inform subsequent reassessment.[9,10]

Across these models, a consistent paradigm is emerging:

- Initial decisions are provisional, not definitive
- Evidence generation is prospectively aligned with decision needs
- Reassessment is embedded as a core component of value assessment

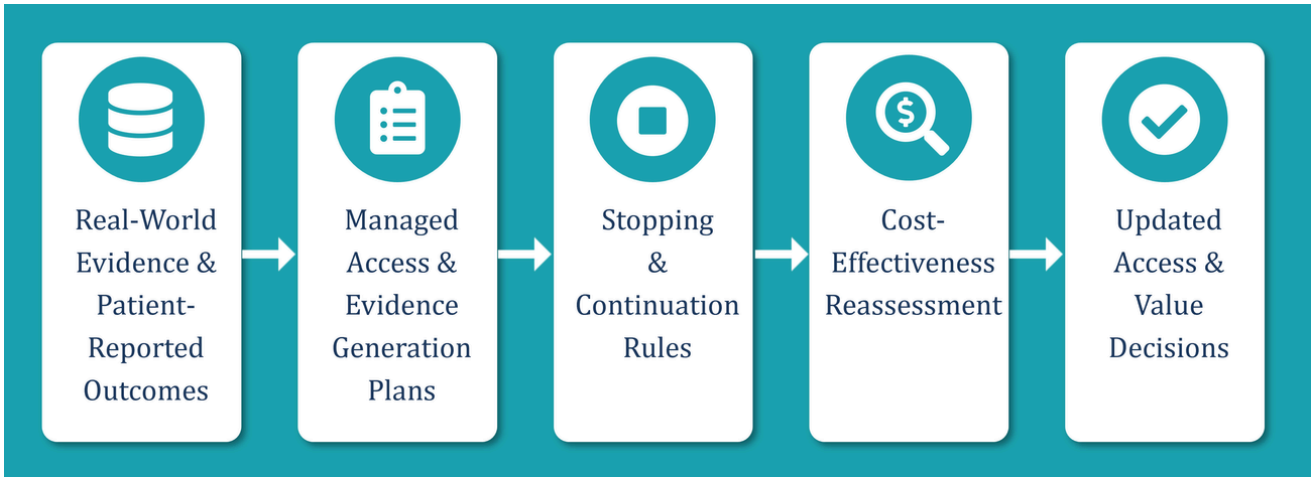
A key feature is the use of structured stopping and continuation rules, which establish criteria for determining whether a technology should remain reimbursed, be restricted, or be discontinued based on evolving evidence. These mechanisms ensure that evidence generation is directly linked to actionable decision-making.

Reassessment is typically triggered by the resolution of key uncertainties, including maturing clinical outcomes, evolving treatment pathways, and the availability of real-world and patient-reported evidence. Importantly, reassessment processes focus on updating value conclusions rather than conducting entirely new appraisals, reflecting the iterative nature of lifecycle HTA.

From Evidence Generation to Decision-Relevant Integration

Lifecycle HTA shifts the emphasis from generating evidence to ensuring that evidence is decision-relevant and operationalized.

In practice, this follows a structured pathway:



This progression highlights a core transformation: evidence is not merely collected, but systematically translated into inputs that guide reimbursement, pricing, and access decisions over time.

Real-World Evidence: Addressing Uncertainty Across the Lifecycle

RWE, derived from sources such as registries, administrative datasets, and electronic health records, plays a central role in lifecycle HTA.[11]

It supports:

- Evaluation of effectiveness and safety in broader populations
- Assessment of long-term outcomes and durability
- Understanding of real-world utilization patterns
- Inputs for economic evaluation

In practice, RWE is generated through layered strategies, combining registries, administrative datasets, and observational studies alongside clinical trial extensions. Its use is highly context dependent. Moreover, RWE use is context-specific, with oncology leveraging registries and administrative data, rare diseases relying on observational and registry-based evidence to supplement limited trials, and other therapeutic areas using more targeted epidemiological and utilization data.

Importantly, real-world evidence is frequently used to contextualize uncertainty, for example through treatment pattern variation, adherence differences, registry-based follow-up, or linkage to administrative datasets such as national treatment registries. Despite its growing importance, RWE is frequently used to contextualize uncertainty rather than replace trial evidence at initial appraisal. Within lifecycle HTA, its role is expanding toward informing reassessment decisions and updating value over time.

Patient-Reported Outcomes: Capturing Patient-Centered Value

PROs provide direct insight into the patient experience, capturing dimensions of value not fully reflected in clinical endpoints, including quality of life, symptom burden, and treatment impact.[5,11]

These outcomes are particularly relevant in chronic conditions, rare diseases, and settings with limited clinical endpoints. While widely recognized, they are often incorporated in a qualitative or supportive capacity, for example through descriptive quality-of-life outcomes, caregiver burden assessments, or utility inputs used within economic models, rather than as formal components of decision-making frameworks.

Within lifecycle HTA, patient-reported outcomes have the potential to play a more central role by:

- Informing value judgments when clinical outcomes are uncertain
- Supporting continuation or discontinuation decisions
- Providing evidence of patient benefit beyond traditional endpoints

Realizing this potential requires systematic integration into clinical, economic, and RWE frameworks, ensuring that patient experience is meaningfully reflected in value assessment.

Equity as a Core Dimension of Lifecycle Value

Equity considerations are increasingly recognized as a critical component of value assessment within lifecycle HTA.[11]

These considerations include:

- Patient and caregiver burden
- Real-world access and treatment complexity
- Population-level disparities in access and outcomes

RWE and PROs provide the foundation for assessing these dimensions, with RWE identifying disparities in access and outcomes (e.g., subgroup-specific differences in uptake across socioeconomic or geographic groups), and PROs capturing variation in treatment burden and lived experience (e.g., differences in quality of life or tolerability across patient populations). However, equity considerations remain largely qualitative. Advancing lifecycle HTA will require their systematic and data-driven integration into decision-making frameworks.

The Integration Imperative

The effectiveness of lifecycle HTA ultimately depends on the integration of evidence within decision-making processes.

Currently RWE informs effectiveness and utilization, PROs inform patient experience and equity considerations provide contextual insights. However, these elements are often assessed in parallel rather than within a unified framework.

Lifecycle HTA requires a shift toward integrated evidence systems, where:

- Data generation is aligned with clearly defined decision questions
- Clinical, economic, and patient-centered outcomes are connected
- Evidence evolves alongside technologies and their real-world use

Without this integration, lifecycle HTA risks being structurally robust but analytically constrained.

Implications for Market Access and Health Economics

The transition to lifecycle HTA is reshaping how evidence is generated and used in market access decisions. Market access is no longer a discrete event at launch; it is an ongoing, lifecycle process requiring early alignment between clinical development, evidence strategy, and payer expectations.

This is reflected in recent appraisals where therapies such as pembrolizumab-based combinations in metastatic lung cancer have progressed through Cancer Drugs Fund exit review, with updated survival evidence from KEYNOTE-407 and real-world data sources (e.g., Systemic Anti-Cancer Therapy and National Health Service datasets) informing decisions on routine commissioning,[12] while treatments such as atezolizumab in the adjuvant setting have undergone managed access review, with evidence generated under managed access agreements supporting guidance updates and long-term reimbursement decisions.[13]

Evidence planning must extend beyond initial appraisal to anticipate the uncertainties that drive reassessment. This includes generating long-term clinical data, real-world effectiveness evidence, and patient-reported measures that support future continuation, restriction, or pricing decisions.

At the same time, payer decision-making is evolving. Static reimbursement models are giving way to adaptive frameworks, where access and pricing are conditionally linked to evidence maturation. This places greater emphasis on the timeliness, relevance, and interpretability of post-launch evidence, as well as on clearly defined decision rules.

Health economic evaluation is undergoing a parallel shift. Traditional models based on extrapolated trial data are being complemented by iterative reassessment approaches that incorporate evolving evidence.

In practice, this involves:

- Updating survival estimates and durability as long-term data mature
- Refining assumptions on treatment duration, adherence, and real-world use
- Incorporating comparative effectiveness evidence from real-world data
- Integrating patient-reported outcomes to reflect quality-of-life impacts
- Accounting for changes in comparators, treatment pathways, and market dynamics

Rather than full re-appraisal, these approaches focus on targeted parameter updates, resulting in more robust and mature estimates of cost-effectiveness. Taken together, these developments signal a shift toward a dynamic and evidence-responsive health economic paradigm, where value is continuously refined as evidence evolves.

Conclusion

Lifecycle HTA represents a fundamental shift in how healthcare systems evaluate, manage, and refine value over time. It moves beyond static, one-time assessments toward an adaptive and evidence-responsive model in which decisions are continuously revisited as new evidence emerges.

Within this framework, structured reassessment and ongoing evidence generation are integral to decision-making. Early access, managed evidence generation, and iterative evaluation enable healthcare systems to accommodate uncertainty while maintaining accountability in value determination.

RWE, PROs, and equity considerations are therefore not supplementary inputs, but core components of lifecycle HTA. Their effective integration into decision frameworks will determine how successfully this approach supports adaptive, patient-centered, and sustainable healthcare systems.

References

1. Eichler HG, Bedlington N, Boudes M, et al. Medicines Adaptive Pathways to Patients: why, when, and how to engage? Clin Pharmacol Ther. 2019;105(5):1148–1155.
2. Trowman R, Migliore A, Ollendorf DA. Health technology assessment 2025 and beyond: lifecycle approaches to promote engagement and efficiency in health technology assessment. Int J Technol Assess Health Care. 2023;39(1):e15.
3. Pichler FB, et al. Lifecycle HTA: promising applications and a framework for implementation. Int J Technol Assess Health Care. 2024;40(1):e50.
4. Pichler FB, et al. An operationalization framework for lifecycle health technology assessment. Int J Technol Assess Health Care. 2024;40(1):e45.
5. Basch E. Patient-reported outcomes harnessing patients' voices to improve clinical care. N Engl J Med. 2017;376(2):105–108.
6. Kirwin E, et al. A conceptual framework for lifecycle health technology assessment. Value Health. 2022;25(7):1116–1123.
7. Haute Autorité de Santé. Early access to medicinal products. Paris: HAS; 2021 [updated 2026]. Available from: https://www.has-sante.fr/jcms/r_1500918/en/early-access-to-medicinal-products
8. Thomassin C, Fernandez J, Galbraith M, Babin C, Bardin M, Diatta T, Desbiolles A, Beaufils A, Pelon F, Cochat P. OP36 Real-World Data From Early Access Programs In France: A Two-Year Review. Int J Technol Assess Health Care. 2025 Jan 7;40(Suppl 1):S17.
9. Johnson EE, Orozco-Leal G, Still M, O'Connor N, Jayachandran L, Robinson T, Meader N, Kenny RPW, Wallace SA, Gonzalez-Moral SG, Vale L, Parker R, Rice S, Sagoo GS, Pearson F. Methods used in early value assessments for NICE: a scoping review. Int J Technol Assess Health Care. 2025 Sep 8;41(1):e64
10. National Institute for Health and Care Excellence (NICE). Managed access. London: NICE; 2026. Available from: https://www.nice.org.uk/what-nice-does/patient-access-schemes-and-pricing-agreements/managed-access
11. Pushkarna D, Kaur R, del Aguila M, Collet JP, Fazeli MS. Role of integrated real-world evidence and patient-reported outcomes in lifecycle health technology assessment. Value Health. 2026;29(Suppl 6). Presented at: ISPOR 2026; Philadelphia, PA, USA. Available from: https://www.ispor.org/heor-resources/presentations-database/presentation-cti/ispor-2026/bridging-evidence-and-affordability/role-of-integrated-real-world-evidence-and-patient-reported-outcomes-in-lifecycle-hta
12. National Institute for Health and Care Excellence (NICE). Technology Appraisal guidance TA770. Pembrolizumab with carboplatin and paclitaxel for untreated metastatic squamous non-small-cell lung cancer. 2022, Available from: https://www.nice.org.uk/guidance/ta770
13. National Institute for Health and Care Excellence (NICE). Technology Appraisal guidance TA770. Atezolizumab for adjuvant treatment of resected non-small-cell lung cancer. 2025, Available from: https://www.nice.org.uk/guidance/ta1071