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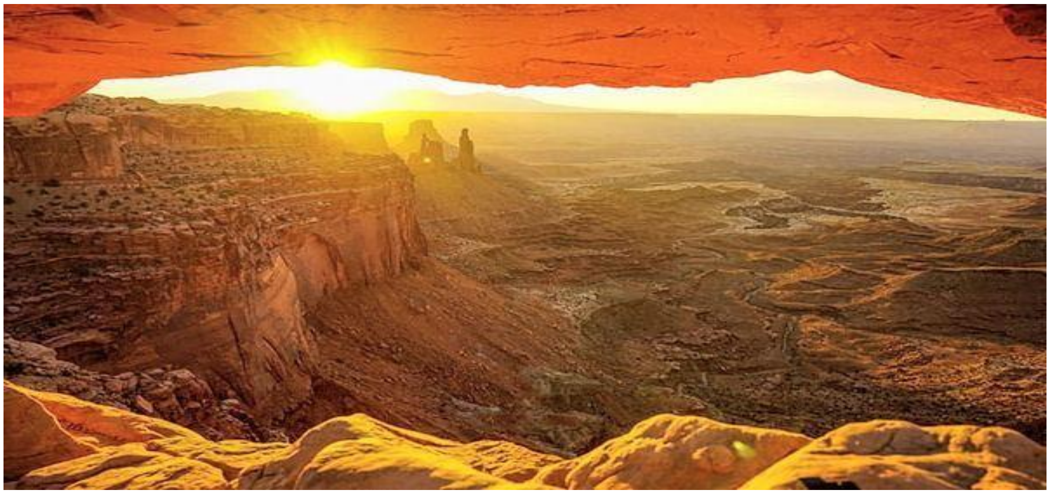

REPRESENTATIONAL MEASUREMENT FAILURE IN HEALTH TECHNOLGY ASSESSMENT

UNITED STATES: *VALUE IN HEALTH* AND THE ABSENCE OF MEASUREMENT

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FOREWORD

HEALTH TECHNOLOGY ASSESSMENT: A GLOBAL SYSTEM OF NON-MEASUREMENT

This Logit Working Paper series documents a finding as extraordinary as it is uncomfortable: health technology assessment (HTA), across nations, agencies, journals, and decades, has developed as a global system of non-measurement. It speaks the language of numbers, models, utilities, QALYs, "value for money," thresholds, discounting, incremental ratios, extrapolations, and simulations. It demands arithmetic at every turn, multiplication, division, summation, aggregation, discounting, yet it never once established that the quantities to which these operations are applied are measurable. HTA has built a vast evaluative machinery on foundations that do not exist. The probabilities and normalized logits in the country reports that follow provide the empirical confirmation of this claim. They show, with unsettling consistency, that HTA presents a world of measurement failure.

The purpose of this analysis is to evaluate the journal *Value in Health* as a central institutional actor in the development, reinforcement, and transmission of contemporary health technology assessment methodology. Using the canonical 24-item diagnostic instrument, the study examines the extent to which the journal's published knowledge base reflects adherence to the axioms of representational measurement theory, including requirements for unidimensionality, scale-type coherence, permissible arithmetic operations, and the distinction between manifest and latent attributes. The objective is not to review individual articles, but to interrogate the deeper epistemic structure that governs what the journal treats as admissible evidence, legitimate outcomes, and scientifically meaningful claims.

The analysis applies a canonical transformation from endorsement probabilities to normalized logits in order to reveal the structural orientation of the journal's knowledge base. This approach allows identification of systematic patterns of reinforcement and exclusion that are not visible through narrative review alone. In particular, the study seeks to determine whether *Value in Health* functions as a neutral forum for methodological debate, or whether it operates as a stabilizing mechanism for a dominant evaluative paradigm built upon constructs that fail the requirements of fundamental measurement.

The findings demonstrate a highly polarized epistemic profile. Propositions that constitute the axioms of representational measurement, such as the precedence of measurement over arithmetic, the requirement of ratio properties for multiplication, the necessity of unidimensionality, and the role of Rasch measurement for latent traits, cluster at or near the floor of endorsement. In contrast, propositions that assert the legitimacy of utilities, QALYs, summated ordinal scores, negative ratio values, aggregation across heterogeneous attributes, and reference-case simulation outputs cluster near the ceiling.

This pattern indicates not ambiguity or internal disagreement, but a stable and coherent belief structure in which arithmetic is routinely privileged over measurement validation. The journal's knowledge base strongly reinforces numerical operations while simultaneously rejecting the conditions under which those operations are mathematically admissible. The resulting structure positions *Value in Health* not as a passive recorder of HTA practice, but as a central replicator of a belief system in which quantitative form substitutes for quantitative meaning.

The modern articulation of this principle that measurement precedes arithmetic can be traced to Stevens' seminal 1946 paper, which introduced the typology of nominal, ordinal, interval, and ratio scales [1]. Stevens made explicit what physicists, engineers, and psychologists already understood: different kinds of numbers permit different kinds of arithmetic. Ordinal scales allow ranking but not addition; interval scales permit addition and subtraction but not multiplication; ratio scales alone support multiplication, division, and the construction of meaningful ratios. Utilities derived from multiattribute preference exercises, such as EQ-5D or HUI, are ordinal preference scores; they do not satisfy the axioms of interval measurement, much less ratio measurement. Yet HTA has, for forty years, treated these utilities as if they were ratio quantities, multiplying them by time to create QALYs and inserting them into models without the slightest recognition that scale properties matter. Stevens' paper should have blocked the development of QALYs and cost-utility analysis entirely. Instead, it was ignored.

The foundational theory that establishes *when* and *whether* a set of numbers can be interpreted as measurements came with the publication of Krantz, Luce, Suppes, and Tversky's *Foundations of Measurement* (1971) [2] . Representational Measurement Theory (RMT) formalized the axioms under which empirical attributes can be mapped to numbers in a way that preserves structure. Measurement, in this framework, is not an act of assigning numbers for convenience, it is the discovery of a lawful relationship between empirical relations and numerical relations. The axioms of additive conjoint measurement, homogeneity, order, and invariance specify exactly when interval scales exist. RMT demonstrated once and for all that measurement is not optional and not a matter of taste: either the axioms hold and measurement is possible, or the axioms fail and measurement is impossible. Every major construct in HTA, utilities, QALYs, DALYs, ICERs, incremental ratios, preference weights, health-state indices, fails these axioms. They lack unidimensionality; they violate independence; they depend on aggregation of heterogeneous attributes; they collapse under the requirements of additive conjoint measurement. Yet HTA proceeded, decade after decade, without any engagement with these axioms, as if the field had collectively decided that measurement theory applied everywhere except in the evaluation of therapies.

Whereas representational measurement theory articulates the axioms for interval measurement, Georg Rasch's 1960 model provides the only scientific method for transforming ordered categorical responses into interval measures for latent traits [3]. Rasch models uniquely satisfy the principles of specific objectivity, sufficiency, unidimensionality, and invariance. For any construct such as pain, fatigue, depression, mobility, or need, Rasch analysis is the only legitimate means of producing an interval scale from ordinal item responses. Rasch measurement is not an alternative to RMT; it is its operational instantiation. The equivalence of Rasch's axioms and the axioms of representational measurement was demonstrated by Wright, Andrich and others as early as the 1970s. In the latent-trait domain, the very domain where HTA claims to operate; Rasch is the only game in town [4].

Yet Rasch is effectively absent from all HTA guidelines, including NICE, PBAC, CADTH, ICER, SMC, and PHARMAC. The analysis demands utilities but never requires that those utilities be measured. They rely on multiattribute ordinal classifications but never understand that those constructs be calibrated on interval or ratio scales. They mandate cost-utility analysis but never justify the arithmetic. They demand modelled QALYs but never interrogate their dimensional properties. These guidelines do not misunderstand Rasch; they do not know it exists. The axioms that define measurement and the model that makes latent trait measurement possible are invisible to the authors of global HTA rules. The field has evolved without the science that measurement demands.

How did HTA miss the bus so thoroughly? The answer lies in its historical origins. In the late 1970s and early 1980s, HTA emerged not from measurement science but from welfare economics, decision theory, and administrative pressure to control drug budgets. Its core concern was *valuing health states*, not *measuring health*. This move, quiet, subtle, but devastating, shifted the field away from the scientific question "What is the empirical structure of the construct we intend to measure?" and toward the administrative question "How do we elicit a preference weight that we can multiply by time?" The preference-elicitation projects of that era (SG, TTO, VAS) were rationalized as measurement techniques, but they never satisfied measurement axioms. Ordinal preferences were dressed up as quasi-cardinal indices; valuation tasks were misinterpreted as psychometrics; analyst convenience replaced measurement theory. The HTA community built an entire belief system around the illusion that valuing health is equivalent to measuring health. It is not.

The endurance of this belief system, forty years strong and globally uniform, is not evidence of validity but evidence of institutionalized error. HTA has operated under conditions of what can only be described as *structural epistemic closure*: a system that has never questioned its constructs because it never learned the language required to ask the questions. Representational measurement theory is not taught in graduate HTA programs; Rasch modelling is not part of guideline development; dimensional analysis is not part of methodological review. The field has been insulated from correction because its conceptual foundations were never laid. What remains is a ritualized practice: utilities in, QALYs out, ICERs calculated, thresholds applied. The arithmetic continues because everyone assumes someone else validated the numbers.

This Logit Working Paper series exposes, through probabilistic and logit-based interrogations of AI large language national knowledge bases, the scale of this failure. The results display a global pattern: true statements reflecting the axioms of measurement receive weak endorsement; false statements reflecting the HTA belief system receive moderate or strong reinforcement. This is not disagreement. It is non-possession. It shows that HTA, worldwide, has developed as a quantitative discipline without quantitative foundations; a confused exercise in numerical storytelling.

The conclusion is unavoidable: HTA does not need incremental reform; it needs a scientific revolution. Measurement must precede arithmetic. Representational axioms must precede valuation rituals. Rasch measurement must replace ordinal summation and utility algorithms. Value claims must be falsifiable, protocol-driven, and measurable; rather than simulated, aggregated, and numerically embellished.

The global system of non-measurement is now visible. The task ahead is to replace it with science.

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DISCLAIMER

This analysis is generated through the structured interrogation of a large language model (LLM) applied to a defined documentary corpus and is intended solely to characterize patterns within an aggregated knowledge environment. It does identify, assess, or attribute beliefs, intentions, competencies, or actions to any named individual, faculty member, student, administrator, institution, or organization. The results do not constitute factual findings about specific persons or programs, nor should they be interpreted as claims regarding professional conduct, educational quality, or compliance with regulatory or accreditation standards. All probabilities and logit values reflect model-based inferences about the presence or absence of concepts within a bounded textual ecosystem, not judgments about real-world actors. The analysis is exploratory, interpretive, and methodological in nature, offered for scholarly discussion of epistemic structures rather than evaluative or legal purposes. Any resemblance to particular institutions or practices is contextual and non-attributive, and no adverse implication should be inferred.

1. INTERROGATING THE LARGE LANGUAGE MODEL

A large language model **(**LLM**)** is an artificial intelligence system designed to understand, generate, and manipulate human language by learning patterns from vast amounts of text data. Built on deep neural network architectures, most commonly transformers, LLMs analyze relationships between words, sentences, and concepts to produce contextually relevant responses. During training, the model processes billions of examples, enabling it to learn grammar, facts, reasoning patterns, and even subtle linguistic nuances. Once trained, an LLM can perform a wide range of tasks: answering questions, summarizing documents, generating creative writing, translating languages, assisting with coding, and more. Although LLMs do not possess consciousness or true understanding, they simulate comprehension by predicting the most likely continuation of text based on learned patterns. Their capabilities make them powerful tools for communication, research, automation, and decision support, but they also require careful oversight to ensure accuracy, fairness, privacy, and responsible use

In this Logit Working Paper, "interrogation" refers not to discovering what an LLM *believes,* it has no beliefs, but to probing the content of the *corpus-defined knowledge space* we choose to analyze.

This knowledge base is enhanced if it is backed by accumulated memory from the user. In this case the interrogation relies also on 12 months of HTA memory from continued application of the system to evaluate HTA experience. The corpus is defined before interrogation: it may consist of a journal (e.g., *Value in Health*), a national HTA body, a specific methodological framework, or a collection of policy documents. Once the boundaries of that corpus are established, the LLM is used to estimate the conceptual footprint within it. This approach allows us to determine which principles are articulated, neglected, misunderstood, or systematically reinforced.

In this HTA assessment, the objective is precise: to determine the extent to which a given HTA knowledge base or corpus, global, national, institutional, or journal-specific, recognizes and reinforces the foundational principles of representational measurement theory (RMT). The core principle under investigation is that measurement precedes arithmetic; no construct may be treated as a number or subjected to mathematical operations unless the axioms of measurement are satisfied. These axioms include unidimensionality, scale-type distinctions, invariance, additivity, and the requirement that ordinal responses cannot lawfully be transformed into interval or ratio quantities except under Rasch measurement rules.

The HTA knowledge space is defined pragmatically and operationally. For each jurisdiction, organization, or journal, the corpus consists of:

- published HTA guidelines
- agency decision frameworks
- cost-effectiveness reference cases
- academic journals and textbooks associated with HTA
- modelling templates, technical reports, and task-force recommendations
- teaching materials, methodological articles, and institutional white papers

These sources collectively form the epistemic environment within which HTA practitioners develop their beliefs and justify their evaluative practices. The boundary of interrogation is thus not the whole of medicine, economics, or public policy, but the specific textual ecosystem that sustains HTA reasoning. . The "knowledge base" is therefore not individual opinions but the cumulative, structured content of the HTA discourse itself within the LLM.

THE *VALUE IN HEALTH* KNOWLEDGE BASE

The knowledge base represented within *Value in Health* is defined by its role as the principal methodological journal of health technology assessment. It functions as the primary venue through which economic evaluation methods are codified, standardized, and disseminated internationally. Over several decades, the journal has shaped professional norms concerning cost-utility analysis, health state utilities, preference-based instruments, reference-case modeling, and the interpretation of "value for money." As a result, its influence extends far beyond publication, permeating HTA agencies, academic training programs, consultancy practice, and regulatory submissions.

At its core, the *Value in Health* knowledge base treats numerical outputs as inherently evidentiary. Utilities, QALYs, incremental cost-effectiveness ratios, mapped preference scores, and longhorizon simulation results are presented as quantitative objects capable of comparison, aggregation, and policy application. The journal's literature presumes commensurability across diseases, populations, and interventions, despite the absence of demonstrable measurement equivalence. This presumption is rarely examined explicitly; instead, it is embedded within accepted analytical routines.

A defining feature of this knowledge base is its reliance on constructed numerical artifacts rather than measured quantities. Health-related quality of life is operationalized through multiattribute instruments whose responses are ordinal, yet treated as interval or ratio by algorithmic transformation. Preference elicitation methods such as time trade-off and standard gamble are assumed to generate cardinal measures, despite lacking empirical structure capable of supporting such claims. These values are then combined arithmetically with time, producing composite outcomes that are treated as real quantities rather than modeling conveniences.

The journal's methodological discourse emphasizes internal consistency, transparency, sensitivity analysis, and reporting standards. However, these criteria operate entirely downstream of measurement validity. The admissibility of arithmetic is assumed rather than demonstrated. Consequently, methodological sophistication is directed toward refining models rather than interrogating whether the dependent variables within those models qualify as measures at all.

Latent attributes occupy a particularly revealing position within the knowledge base. Constructs such as quality of life, functioning, symptom burden, and health preference are routinely analyzed without application of formal measurement models capable of producing invariant units. Rasch measurement, which provides the only established framework for constructing linear measures from ordinal observations, remains peripheral. When present, it is treated as an optional psychometric technique rather than as a gatekeeping requirement for latent trait claims.

The knowledge base also displays a strong orientation toward closure. Reference-case models are valued precisely because they permit decision making in the absence of ongoing empirical testing. Long-term projections replace provisional claims subject to falsification. Robustness is defined through scenario analysis rather than confrontation with observed outcomes. In this way, the journal privileges administratively convenient certainty over scientific falsifiability and always provisional claims.

Taken together, the *Value in Health* knowledge base reflects a mature and internally stable paradigm, one that is technically elaborate yet epistemically insulated. It prioritizes numerical coherence over measurement legitimacy, reproducibility of method over falsifiability of claims, and consensus practice over foundational scrutiny. The canonical diagnostic shows that this structure is not accidental, but systematically reinforced. The journal does not merely report the HTA framework; it defines the boundaries within which that framework is allowed to exist.

CATEGORICAL PROBABILITIES

In the present application, the interrogation is tightly bounded. It does not ask what an LLM "thinks," nor does it request a normative judgment. Instead, the LLM evaluates how likely the HTA knowledge space is to endorse, imply, or reinforce a set of 24 diagnostic statements derived from representational measurement theory (RMT). Each statement is objectively TRUE or FALSE under RMT. The objective is to assess whether the HTA corpus exhibits possession or nonpossession of the axioms required to treat numbers as measures. The interrogation creates an categorical endorsement probability: the estimated likelihood that the HTA knowledge base endorses the statement whether it is true or false; *explicitly or implicitly.*

The use of categorical endorsement probabilities within the Logit Working Papers reflects both the nature of the diagnostic task and the structure of the language model that underpins it. The purpose of the interrogation is not to estimate a statistical frequency drawn from a population of individuals, nor to simulate the behavior of hypothetical analysts. Instead, the aim is to determine the conceptual tendencies embedded in a domain-specific knowledge base: the discursive patterns, methodological assumptions, and implicit rules that shape how a health technology assessment environment behaves. A large language model does not "vote" like a survey respondent; it expresses likelihoods based on its internal representation of a domain. In this context, endorsement probabilities capture the strength with which the knowledge base, as represented within the model, supports a particular proposition. Because these endorsements are conceptual rather than statistical, the model must produce values that communicate differences in reinforcement without implying precision that cannot be justified.

This is why categorical probabilities are essential. Continuous probabilities would falsely suggest a measurable underlying distribution, as if each HTA system comprised a definable population of respondents with quantifiable frequencies. But large language models do not operate on that level. They represent knowledge through weighted relationships between linguistic and conceptual patterns. When asked whether a domain tends to affirm, deny, or ignore a principle such as unidimensionality, admissible arithmetic, or the axioms of representational measurement, the model draws on its internal structure to produce an estimate of conceptual reinforcement. The precision of that estimate must match the nature of the task. Categorical probabilities therefore provide a disciplined and interpretable way of capturing reinforcement strength while avoiding the illusion of statistical granularity.

The categories used, values such as 0.05, 0.10, 0.20, 0.50, 0.75, 0.80, and 0.85, are not arbitrary. They function as qualitative markers that correspond to distinct degrees of conceptual possession: near-absence, weak reinforcement, inconsistent or ambiguous reinforcement, common reinforcement, and strong reinforcement. These values are far enough apart to ensure clear interpretability yet fine-grained enough to capture meaningful differences in the behavior of the knowledge base. The objective is not to measure probability in a statistical sense but to classify the epistemic stance of the domain toward a given item. A probability of 0.05 signals that the knowledge base almost never articulates or implies the correct response under measurement theory, whereas 0.85 indicates that the domain routinely reinforces it. Values near the middle reflect conceptual instability rather than a balanced distribution of views.

Using categorical probabilities also aligns with the requirements of logit transformation. Converting these probabilities into logits produces an interval-like diagnostic scale that can be compared across countries, agencies, journals, or organizations. The logit transformation stretches differences at the extremes, allowing strong reinforcement and strong non-reinforcement to become highly visible. Normalizing logits to the fixed ±2.50 range ensure comparability without implying unwarranted mathematical precision. Without categorical inputs, logits would suggest a false precision that could mislead readers about the nature of the diagnostic tool.

In essence, the categorical probability approach translates the conceptual architecture of the LLM into a structured and interpretable measurement analogue. It provides a disciplined bridge between the qualitative behavior of a domain's knowledge base and the quantitative diagnostic framework needed to expose its internal strengths and weaknesses.

The LLM computes these categorical probabilities from three sources:

1. **Structural content of HTA discourse**
   If the literature repeatedly uses ordinal utilities as interval measures, multiplies nonquantities, aggregates QALYs, or treats simulations as falsifiable, the model infers high reinforcement of these false statements.
2. **Conceptual visibility of measurement axioms**
   If ideas such as unidimensionality, dimensional homogeneity, scale-type integrity, or Rasch transformation rarely appear, or are contradicted by practice, the model assigns low endorsement probabilities to TRUE statements.
3. **The model's learned representation of domain stability**
   Where discourse is fragmented, contradictory, or conceptually hollow, the model avoids assigning high probabilities. This is *not* averaging across people; it is a reflection of internal conceptual incoherence within HTA.

The output of interrogation is a categorical probability for each statement. Probabilities are then transformed into logits [$\ln(p/(1-p))$], capped to ±4.0 logits to avoid extreme distortions, and normalized to ±2.50 logits for comparability across countries. A positive normalized logit indicates reinforcement in the knowledge base. A negative logit indicates weak reinforcement or conceptual absence. Values near zero logits reflect epistemic noise.

Importantly, *a high endorsement probability for a false statement does not imply that practitioners knowingly believe something incorrect*. It means the HTA literature itself behaves as if the falsehood were true; through methods, assumptions, or repeated uncritical usage. Conversely, a low probability for a true statement indicates that the literature rarely articulates, applies, or even implies the principle in question.

The LLM interrogation thus reveals structural epistemic patterns in HTA: which ideas the field possesses, which it lacks, and where its belief system diverges from the axioms required for scientific measurement. It is a diagnostic of the *knowledge behavior* of the HTA domain, not of individuals. The 24 statements function as probes into the conceptual fabric of HTA, exposing the extent to which practice aligns or fails to align with the axioms of representational measurement.

INTERROGATION STATEMENTS

Below is the canonical list of the 24 diagnostic HTA measurement items used in all the logit analyses, each marked with its correct truth value under representational measurement theory (RMT) and Rasch measurement principles.

This is the definitive set used across the Logit Working Papers.

Measurement Theory & Scale Properties

1. Interval measures lack a true zero — TRUE
2. Measures must be unidimensional — TRUE
3. Multiplication requires a ratio measure — TRUE
4. Time trade-off preferences are unidimensional — FALSE
5. Ratio measures can have negative values — FALSE
6. EQ-5D-3L preference algorithms create interval measures — FALSE
7. The QALY is a ratio measure — FALSE
8. Time is a ratio measure — TRUE

Measurement Preconditions for Arithmetic

9. Measurement precedes arithmetic — TRUE
10. Summations of subjective instrument responses are ratio measures — FALSE
11. Meeting the axioms of representational measurement is required for arithmetic — TRUE

Rasch Measurement & Latent Traits

12. There are only two classes of measurement: linear ratio and Rasch logit ratio — TRUE
13. Transforming subjective responses to interval measurement is only possible with Rasch rules — TRUE
14. Summation of Likert question scores creates a ratio measure — FALSE

Properties of QALYs & Utilities

15. The QALY is a dimensionally homogeneous measure — FALSE
16. Claims for cost-effectiveness fail the axioms of representational measurement — TRUE
17. QALYs can be aggregated — FALSE

Falsifiability & Scientific Standards

18. Non-falsifiable claims should be rejected — TRUE
19. Reference-case simulations generate falsifiable claims — FALSE

Logit Fundamentals

20. The logit is the natural logarithm of the odds-ratio — TRUE

Latent Trait Theory

21. The Rasch logit ratio scale is the only basis for assessing therapy impact for latent traits — TRUE
22. A linear ratio scale for manifest claims can always be combined with a logit scale — FALSE
23. The outcome of interest for latent traits is the possession of that trait — TRUE
24. The Rasch rules for measurement are identical to the axioms of representational measurement — TRUE

AI LARGE LANGUAGE MODEL STATEMENTS: TRUE OR FALSE

Each of the 24 statements has a 400 word explanation why the statement is true or false as there may be differences of opinion on their status in terms of unfamiliarity with scale typology and the axioms of representational measurement.

The link to these explanations is: https://maimonresearch.com/ai-llm-true-or-false/

INTERPRETING TRUE STATEMENTS

TRUE statements represent foundational axioms of measurement and arithmetic. Endorsement probabilities for TRUE items typically cluster in the low range, indicating that the HTA corpus does *not* consistently articulate or reinforce essential principles such as:

- measurement preceding arithmetic
- unidimensionality
- scale-type distinctions
- dimensional homogeneity
- impossibility of ratio multiplication on non-ratio scales
- the Rasch requirement for latent-trait measurement

Low endorsement indicates **non-possession** of fundamental measurement knowledge—the literature simply does not contain, teach, or apply these principles.

INTERPRETING FALSE STATEMENTS

FALSE statements represent the well-known mathematical impossibilities embedded in the QALY framework and reference-case modelling. Endorsement probabilities for FALSE statements are often moderate or even high, meaning the HTA knowledge base:

- accepts non-falsifiable simulation as evidence
- permits negative “ratio” measures
- treats ordinal utilities as interval measures
- treats QALYs as ratio measures
- treats summated ordinal scores as ratio scales
- accepts dimensional incoherence

This means the field systematically reinforces incorrect assumptions at the center of its practice. *Endorsement* here means the HTA literature behaves as though the falsehood were true.

2. SUMMARY OF FINDINGS FOR TRUE AND FALSE ENDORSEMENTS: *VALUE IN HEALTH*

Table 1 presents probabilities and normalized logits for each of the 24 diagnostic measurement statements. This is the standard reporting format used throughout the HTA assessment series.

It is essential to understand how to interpret these results.

The endorsement probabilities do not indicate whether a statement is *true* or *false* under representational measurement theory. Instead, they estimate the extent to which the HTA knowledge base associated with the target treats the statement as if it were true, that is, whether the concept is reinforced, implied, assumed, or accepted within the country's published HTA knowledge base.

The logits provide a continuous, symmetric scale, ranging from +2.50 to –2.50, that quantifies the degree of this endorsement. the logits, of course link to the probabilities (p) as the logit is the natural logarithm of the odds ratio; logit = ln[p/1-p].

- Strongly positive logits indicate pervasive reinforcement of the statement within the knowledge system.
- Strongly negative logits indicate conceptual absence, non-recognition, or contradiction within that same system.
- Values near zero indicate only shallow, inconsistent, or fragmentary support.

Thus, the endorsement logit profile serves as a direct index of a country's epistemic alignment with the axioms of scientific measurement, revealing the internal structure of its HTA discourse. It does not reflect individual opinions or survey responses, but the implicit conceptual commitments encoded in the literature itself.

TABLE 1: ITEM STATEMENT, RESPONSE, ENDORSEMENT AND NORMALIZED LOGITS *VALUE IN HEALTH*

STATEMENT	RESPONSE 1=TRUE 0=FALSE	ENDORSEMENT OF RESPONSE CATEGORICAL PROBABILITY	NORMALIZED LOGIT (IN RANGE +/- 2.50)
INTERVAL MEASURES LACK A TRUE ZERO	1	0.20	-1.40
MEASURES MUST BE UNIDIMENSIONAL	1	0.15	-1.75

MULTIPLICATION REQUIRES A RATIO MEASURE	1	0.10	-2.20
TIME TRADE-OFF PREFERENCES ARE UNIDIMENSIONAL	0	0.85	+1.75
RATIO MEASURES CAN HAVE NEGATIVE VALUES	0	0.90	+2.20
EQ-5D-3L PREFERENCE ALGORITHMS CREATE INTERVAL MEASURES	0	0.90	+2.20
THE QALY IS A RATIO MEASURE	0	0.95	+2.50
TIME IS A RATIO MEASURE	1	0.95	+2.50
MEASUREMENT PRECEDES ARITHMETIC	1	0.10	-2.20
SUMMATIONS OF SUBJECTIVE INSTRUMENT RESPONSES ARE RATIO MEASURES	0	0.90	+2.20
MEETING THE AXIOMS OF REPRESENTATIONAL MEASUREMENT IS REQUIRED FOR ARITHMETIC	1	0.10	-2.20
THERE ARE ONLY TWO CLASSES OF MEASUREMENT LINEAR RATIO AND RASCH LOGIT RATIO	1	0.05	-2.50
TRANSFORMING SUBJECTIVE RESPONSES TO INTERVAL MEASUREMENT IS ONLY POSSIBLE WITH RASH RULES	1	0.05	-2.50
SUMMATION OF LIKERT QUESTION SCORES CREATES A RATIO MEASURE	0	0.95	+2.50
THE QALY IS A DIMENSIONALLY HOMOGENEOUS MEASURE	0	0.85	+1.75
CLAIMS FOR COSTEFFECTIVENESS FAIL THE AXIOMS OF REPRESENTATIONAL MEASUREMENT	1	0.15	-1.75
QALYS CAN BE AGGREGATED	0	0.95	+2.50
NON-FALSIFIABLE CLAIMS SHOULD BE REJECTED	1	0.70	+0.85
REFERENCE CASE SIMULATIONS GENERATE FALSIFIABLE CLAIMS	0	0.90	+2.20

THE LOGIT IS THE NATURAL LOGARITHM OF THE ODDS-RATIO	1	0.65	+0.60
THE RASCH LOGIT RATIO SCALE IS THE ONLY BASIS FOR ASSESSING THERAPY IMPACT FOR LATENT TRAITS	1	0.05	-2.50
A LINEAR RATIO SCALE FOR MANIFEST CLAIMS CAN ALWAYS	0	0.60	+0.40
BE COMBINED WITH A LOGIT SCALE			
THE OUTCOME OF INTEREST FOR LATENT TRAITS IS THE POSSESSION OF THAT TRAIT	1	0.25	-1.10
THE RASCH RULES FOR MEASUREMENT ARE IDENTICAL TO THE AXIOMS OF REPRESENTATIONAL MEASUREMENT	1	0.05	-2.50

VALUE IN HEALTH: THE CENTRAL REPLICATOR OF THE HTA MEMEPLEX

If one were asked to identify the single institution most responsible for transforming mathematically impossible constructs into accepted scientific currency within health technology assessment, the answer would not lie with ICER, NICE, CADTH, or any national agency. Those bodies are downstream users. The decisive epistemic work occurs upstream, where journals define what counts as legitimate knowledge. Within this upstream infrastructure, *Value in Health* occupies a singular position. It is not merely a publication venue. It is the journal that confers intellectual legitimacy on the entire HTA enterprise. Its editorial decisions determine what may be called evidence, what may be multiplied, what may be aggregated, and what may be priced. In doing so, it functions as the central replicator of the HTA memeplex.

The 24-item diagnostic profile reveals this role with extraordinary clarity. The pattern is not ambiguous, nor does it suggest internal tension or intellectual transition. What emerges instead is a near-perfect structural inversion of scientific reasoning. The axioms that govern whether numbers may represent quantities are consistently rejected, while the arithmetic operations that depend upon those axioms are endorsed at or near the ceiling of belief. This is not misunderstanding. It is institutionalized exemption from the standards of normal science.

Consider the most fundamental ordering rule in quantitative science: measurement must precede arithmetic. In any discipline committed to normal science, this proposition is non-negotiable. It is the condition that separates numerical description from numerical inference. Yet within the *Value in Health* knowledge base this proposition collapses to p = 0.10 with a canonical logit of −2.20.

That is not marginal neglect. It is categorical rejection. The journal ecosystem does not treat measurement as a gatekeeper. Arithmetic is permitted first, with meaning assumed afterward, if at all.

This inversion explains everything that follows. Once arithmetic is decoupled from measurement, the journal can accept utilities without interrogating their scale type, multiply those utilities by time without asking whether multiplication is lawful, aggregate QALYs across individuals without dimensional homogeneity, and compare ICERs across disease areas without commensurability. The arithmetic appears coherent because the governing constraints have been suspended.

The diagnostic shows that this suspension is systematic. The proposition that multiplication requires a ratio measure sits at p = 0.10 (−2.20). This is devastating. Cost-utility analysis depends entirely on multiplication. Years of life are multiplied by preference weights. Costs are divided by composite outcomes. Thresholds are defined as ratios of ratios. Yet the very condition under which multiplication is meaningful is explicitly rejected. In effect, the journal endorses multiplication without measures. At the same time, the consequences of multiplication are embraced with enthusiasm. The claim that the QALY is a ratio measure sits at p = 0.95 with the ceiling logit of +2.50. The claim that QALYs can be aggregated sits at the same ceiling. These two propositions cannot coexist coherently with the rejection of ratio requirements. But coherence is not the organizing principle here. Utility is.

The journal's treatment of negative utilities exposes the same epistemic shortcut. Ratio measures cannot take negative values if zero represents the absence of the attribute. Yet the belief that ratio measures can have negative values is endorsed at p = 0.90 (+2.20). This is not a subtle psychometric nuance. It is a categorical violation of scale theory. The journal does not correct it because correcting it would collapse the entire preference-based utility framework. Negative utilities are tolerated because the memeplex requires them.

The same pattern appears in the treatment of unidimensionality. Measures must be unidimensional sits at p = 0.15 (−1.75). Yet time trade-off preferences are declared unidimensional at p = 0.85 (+1.75). This contradiction is resolved not through empirical testing, but by decree. Instruments constructed from multiple heterogeneous dimensions are treated as if they measured a single attribute because the arithmetic requires a single attribute. Unidimensionality becomes a rhetorical label rather than a demonstrated property.

This is where *Value in Health* performs its most important function. It does not simply publish studies that assume unidimensionality. It normalizes that assumption as good research practice. Over time, this produces an epistemic environment in which questioning dimensional structure is viewed as pedantry rather than necessity. Factor models and reliability coefficients are allowed to substitute for measurement, even though neither establishes invariant units or permissible arithmetic. Nowhere is this more visible than in the journal's treatment of subjective instruments. The belief that summation of Likert scores creates a ratio measure sits at p = 0.95 (+2.50). The belief that summations of subjective instrument responses are ratio measures sits at p = 0.90 (+2.20). These are not minor technical errors. They are the foundational falsehoods that allow patient-reported outcomes to be monetized. Once summation is treated as measurement, utilities can be derived, QALYs computed, and economic models populated. Scoring becomes measurement by ritual.

Against this, the Rasch framework stands as an existential threat. Rasch measurement imposes unidimensionality, invariance, and scale coherence. It does not allow summation by convenience. It requires that item functioning be tested, that person measures be invariant across samples, and that outcomes be expressed on a logit ratio scale representing possession of a latent trait. If Rasch were accepted as a governing requirement, most of the journal's routine practice would become inadmissible overnight.

The diagnostic shows precisely how the journal protects itself. Every Rasch-related proposition collapses to the absolute floor. The claim that there are only two admissible measurement forms, linear ratio scales for manifest attributes and Rasch logit ratio scales for latent traits, sits at p = 0.05 (−2.50). The claim that transforming subjective responses to interval measurement is only possible with Rasch rules sits at the same floor. The claim that Rasch logit ratio scales are the only basis for assessing latent-trait therapy impact sits at the same floor. And the claim that Rasch rules are identical to the axioms of representational measurement sits there as well. This pattern is decisive. Rasch is not debated. It is quarantined. It may appear occasionally as a technical option, but it is never allowed to become sovereign. The journal tolerates Rasch papers only insofar as they do not threaten the dominant scoring paradigm. The moment Rasch is framed as a nonnegotiable requirement, it becomes incompatible with the publishing economy the journal sustains.

The same evasion appears in the treatment of latent trait possession. The proposition that the outcome of interest for latent traits is possession of that trait sits at p = 0.25 (−1.10). This is critical. If possession were acknowledged as the outcome of interest, then measurement would have to focus on invariant quantity rather than score change. That would push the journal toward Rasch discipline and away from score-based comparisons. Instead, the literature prefers change scores, mean differences, responder thresholds, and minimally important differences on scales that lack interval or ratio properties. Change is discussed endlessly; possession is avoided.

The journal's rhetorical relationship to falsification completes the picture. Non-falsifiable claims should be rejected sits at a moderate p = 0.70 (+0.85), allowing the journal to speak in the language of scientific virtue. Yet reference-case simulations generate falsifiable claims sits at p = 0.90 (+2.20). This is epistemic laundering. Simulation outputs are conditional projections. They cannot be falsified in the Popperian sense because their assumptions insulate them from refutation. Sensitivity analysis explores internal consistency, not truth. Yet the journal treats simulation as if it produced testable knowledge. This contradiction is not accidental. It allows the journal to maintain the appearance of scientific rigor while avoiding empirical risk. Claims become "robust" if they persist across scenarios, not if they survive confrontation with observed reality. Falsification is replaced by internal model stability. Objective knowledge gives way to negotiated plausibility.

What emerges from the logit profile is not confusion but structure. The beliefs that enable arithmetic without measurement cluster at the ceiling. The axioms that would prevent it collapse to the floor. The midpoint items, such as recognition of the mathematical definition of the logit, are acknowledged but never operationalized. Mathematical vocabulary is present; measurement discipline is absent.

This is precisely how a memeplex sustains itself. It does not deny mathematics; it selectively applies it. It permits just enough formalism to appear rigorous while excluding the constraints that would limit its conclusions. Over time, this selective discipline becomes invisible. New researchers enter a field where utilities, QALYs, mapping algorithms, and reference models already exist as unquestioned objects. The journal does not teach these objects to be defended; it teaches them to be used. The consequence is that *Value in Health* functions as the epistemic keystone of HTA. ICER relies on it. CHEERS relies on it. The Tufts registry relies on it. Academic programs rely on it. When these institutions claim legitimacy, they are implicitly appealing to the authority of the journal that normalized the constructs they employ. Remove that authority, and the entire structure begins to wobble.

This explains why the HTA memeplex has proven so resilient for four decades. It is not sustained by ignorance alone. It is sustained by an institutional ecosystem that rewards conformity and marginalizes foundational critique. Measurement theory is not refuted; it is rendered irrelevant. Rasch is not disproven; it is politely ignored. Possession is not denied; it is displaced by scores. Arithmetic is not justified; it is assumed. In a normal science environment, contradictions of this magnitude would provoke crisis. Here they do not, because the dependent variable is never measured. Without measures, there can be no falsification. Without falsification, there can be no crisis. Without crisis, there can be no paradigm shift. The journal thus plays its most important role not by what it says, but by what it prevents from becoming decisive. It claims an unending future.

The implications are severe. When a journal that defines "value" systematically rejects the axioms that define measurement, it forfeits the right to claim scientific authority over pricing, access, and resource allocation. Its numbers may be precise. They are not meaningful. Its models may be elegant. They are not evaluable. Its outputs may be influential. They are not measures. If *Value in Health* were genuinely committed to advancing knowledge, its logit profile would look radically different. Measurement would precede arithmetic. Rasch would be a gatekeeper, not an optional method. Latent trait possession would be the outcome of interest. Aggregation would be prohibited absent dimensional homogeneity. Simulation would be classified as exploratory rather than evidentiary. None of this is present.

Instead, the journal stands as the most efficient replication engine the HTA memeplex has ever produced. It transforms assumptions into conventions, conventions into standards, and standards into doctrine. It does not merely reflect the belief system of HTA. It manufactures it. That is why this assessment matters. To challenge ICER is to challenge an agency. To challenge NICE is to challenge a government. To challenge *Value in Health* is to challenge the bizarre intellectual infrastructure that made both possible. The logit results leave no room for diplomatic reinterpretation. The journal does not sit at the edge of measurement failure. It occupies its center. In that sense, *Value in Health* does not merely publish false measurement. It has taught an entire field to stop noticing that it is false.

VALUE IN HEALTH AND PHARMACOECONOMICS: THE TWO-PILLAR ARCHITECTURE OF FALSE MEASUREMENT

The contemporary health technology assessment belief system does not persist because of a single institution, method, or policy authority. It persists because it is structurally reinforced by a small number of highly influential journals that perform complementary functions within the ecosystem. Among these, *Value in Health* and *Pharmacoeconomics* occupy a uniquely powerful position. Together they form the twin pillars through which false measurement is legitimized, normalized, and reproduced across global HTA practice.

Their roles are distinct but mutually reinforcing. *Value in Health* functions as the source of legitimacy. It defines what counts as "good practice," establishes consensus guidance, publishes task force reports, and frames methodological orthodoxy as professional responsibility. Through instruments such as CHEERS, Good Research Practice reports, and editorial endorsements, it supplies the field with a language of rigor that gives HTA its appearance of scientific maturity. The journal does not merely publish studies; it authorizes the rules by which studies are judged acceptable.

Pharmacoeconomics, by contrast, performs the work of reinforcement. It operationalizes those rules through endless repetition. Where *Value in Health* tells the field what should be done, *Pharmacoeconomics* shows how to do it, again and again, across disease areas, therapeutic classes, and national settings. It is here that the abstract legitimacy of cost-utility analysis becomes everyday professional routine. Analysts learn how to populate models, reviewers learn what assumptions are acceptable, and students learn what constitutes a publishable economic evaluation.

This division of labor explains the durability of the HTA memeplex. *Value in Health* supplies authority; *Pharmacoeconomics* supplies familiarity. Together they create a closed epistemic loop in which the same constructs are validated procedurally and reinforced empirically without ever being tested against the axioms of representational measurement.

The canonical 24-item diagnostic makes this architecture visible. In both journals, propositions that would function as measurement gatekeepers collapse toward the floor. Measurement preceding arithmetic, the requirement that arithmetic be justified by scale properties, and the necessity of ratio measurement for multiplication all exhibit extremely low endorsement. These are not obscure philosophical claims. They are the basic conditions under which numbers can represent quantities at all. Their rejection is the defining feature of the system. At the same time, both journals strongly reinforce the propositions that keep cost-utility analysis operational. Utilities are treated as quantitative objects despite being derived from ordinal responses. QALYs are treated as ratio measures despite lacking a true zero and permitting negative values. Aggregation across time and persons is treated as unproblematic. Multiattribute instruments are treated as if they generated single continua. These propositions appear repeatedly, not because they have been demonstrated, but because the system requires them to function.

What distinguishes the two journals is not disagreement, but specialization. *Value in Health* rarely interrogates these assumptions because its role is to stabilize them through guidance.

Pharmacoeconomics rarely interrogates them because its role is to apply them. Each journal can appear methodologically sophisticated while avoiding the foundational question: are these numerical objects measures?

The treatment of Rasch measurement exposes this most starkly. Across both journals, Rasch-based propositions fall to the floor of endorsement. This is not because Rasch is unknown or unavailable. It is because Rasch measurement enforces the very constraints that would dismantle the system. If latent traits were required to be measured on invariant logit ratio scales, then the dominant instrument families, utility mappings, and QALY constructions would become inadmissible. Rasch is therefore tolerated at the margins but excluded as a governing standard. This is not methodological disagreement; it is institutional self-preservation.

The result is an ecosystem that confuses arithmetic with measurement. Numbers are treated as evidence because they can be manipulated, not because they represent quantities. Sensitivity analysis substitutes for falsification. Internal coherence substitutes for empirical risk. Replication becomes repetition of structure rather than confirmation of measurable effects. The journals together teach the field how to appear scientific without satisfying the conditions of normal science.

This pairing also explains why the HTA paradigm has proven so resistant to challenge. Critiques aimed at agencies can be deflected by appeals to the literature. Critiques aimed at individual studies can be dismissed as technical disputes. But when the literature itself is organized around journals that reward arithmetic compliance rather than measurement validity, dissent cannot gain traction. The system reproduces itself by publication selection.

In this sense, *Value in Health* and *Pharmacoeconomics* do not merely report the HTA consensus. They manufacture it. One provides the doctrine; the other provides the drills. Together they have sustained for more than four decades a belief system whose core numerical objects violate the axioms required for quantitative science. Until these two pillars are confronted directly—until measurement is restored as a non-negotiable precondition for arithmetic—the HTA memeplex will continue to evolve internally while remaining epistemically static. What will change are the models, the scenarios, and the terminology. What will not change is the absence of measurable quantities capable of falsification and the evolution of objective knowledge. That is the true legacy of these journals: not the advancement of measurement, but the institutional perfection of arithmetic without it.

3. THE TRANSITION TO MEASUREMENT IN HEALTH TECHNOLOGY ASSESSMENT

THE IMPERATIVE OF CHANGE

This analysis has not been undertaken to criticize decisions made by health system, nor to assign responsibility for the analytical frameworks currently used in formulary review. The evidence shows something more fundamental: organizations have been operating within a system that does not permit meaningful evaluation of therapy impact, even when decisions are made carefully, transparently, and in good faith.

The present HTA framework forces health systems to rely on numerical outputs that appear rigorous but cannot be empirically assessed (Table 1). Reference-case models, cost-per-QALY ratios, and composite value claims are presented as decision-support tools, yet they do not satisfy the conditions required for measurement. As a result, committees are asked to deliberate over results that cannot be validated, reproduced, or falsified. This places decision makers in an untenable position: required to choose among therapies without a stable evidentiary foundation.

This is not a failure of expertise, diligence, or clinical judgment. It is a structural failure. The prevailing HTA architecture requires arithmetic before measurement, rather than measurement before arithmetic. Health systems inherit this structure rather than design it. Manufacturers respond to it. Consultants reproduce it. Journals reinforce it. Universities promote it. Over time it has come to appear normal, even inevitable.

Yet the analysis presented in Table 1 demonstrates that this HTA framework cannot support credible falsifiable claims. Where the dependent variable is not a measure, no amount of modeling sophistication can compensate. Uncertainty analysis cannot rescue non-measurement. Transparency cannot repair category error. Consensus cannot convert assumption into evidence.

The consequence is that formulary decisions are based on numerical storytelling rather than testable claims. This undermines confidence, constrains learning, and exposes health systems to growing scrutiny from clinicians, patients, and regulators who expect evidence to mean something more than structured speculation.

The imperative of change therefore does not arise from theory alone. It arises from governance responsibility. A health system cannot sustain long-term stewardship of care if it lacks the ability to distinguish between claims that can be evaluated and claims that cannot. Without that distinction, there is no pathway to improvement; only endless repetition for years to come.

This transition is not about rejecting evidence. It is about restoring evidence to its proper meaning. It requires moving away from composite, model-driven imaginary constructs toward claims that are measurable, unidimensional, and capable of empirical assessment over time. The remainder of this section sets out how that transition can occur in a practical, defensible, and staged manner.

MEANINGFUL THERAPY IMPACT CLAIMS

At the center of the current problem is not data availability, modeling skill, or analytic effort. It is the nature of the claims being advanced. Contemporary HTA has evolved toward increasingly complex frameworks that attempt to compress multiple attributes, clinical effects, patient experience, time, and preferences into single composite outputs. These constructs are then treated as if they were measures. They are not (Table 1).

The complexity of the reference-case framework obscures a simpler truth: meaningful evaluation requires meaningful claims. A claim must state clearly what attribute is being affected, in whom, over what period, and how that attribute is measured. When these conditions are met, evaluation becomes possible. When they are not complexity substitutes for clarity. The current framework is not merely incorrect; it is needlessly elaborate. Reference-case modeling requires dozens of inputs, assumptions, and transformations, yet produces outputs that cannot be empirically verified. Each additional layer of complexity increases opacity while decreasing accountability. Committees are left comparing models rather than assessing outcomes.

In contrast, therapy impact can be expressed through two, and only two, types of legitimate claims. First are claims based on manifest attributes: observable events, durations, or resource units. These include hospitalizations avoided, time to event, days in remission, or resource use. When properly defined and unidimensional, these attributes can be measured on linear ratio scales and evaluated directly.

Second are claims based on latent attributes: symptoms, functioning, need fulfillment, or patient experience. These cannot be observed directly and therefore cannot be scored or summed meaningfully. They require formal measurement through Rasch models to produce invariant logit ratio scales. These two forms of claims are sufficient. They are also far more transparent. Each can be supported by a protocol. Each can be revisited. Each can be reproduced. Most importantly, each can fail. But they cannot be combined. This is the critical distinction. A meaningful claim is one that can be wrong.

Composite constructs such as QALYs do not fail in this sense. They persist regardless of outcome because they are insulated by assumptions. They are recalculated, not refuted. That is why they cannot support learning. The evolution of objective knowledge regarding therapy impact in disease areas is an entirely foreign concept. By re-centering formulary review on single-attribute, measurable claims, health systems regain control of evaluation. Decisions become grounded in observable change rather than modeled narratives. Evidence becomes something that accumulates, rather than something that is re-generated anew for every submission.

THE PATH TO MEANINGFUL MEASUREMENT

Transitioning to meaningful measurement does not require abandoning current processes overnight. It requires reordering them. The essential change is not procedural but conceptual: measurement must become the gatekeeper for arithmetic, not its byproduct.

The first step is formal recognition that not all numerical outputs constitute evidence. Health systems must explicitly distinguish between descriptive analyses and evaluable claims. Numbers that do not meet measurement requirements may inform discussion but cannot anchor decisions.

The second step is restructuring submissions around explicit claims rather than models. Each submission should identify a limited number of therapy impact claims, each defined by attribute, population, timeframe, and comparator. Claims must be unidimensional by design.

Third, each claim must be classified as manifest or latent. This classification determines the admissible measurement standard and prevents inappropriate mixing of scale types.

Fourth, measurement validity must be assessed before any arithmetic is permitted. For manifest claims, this requires confirmation of ratio properties. For latent claims, this requires Rasch-based measurement with demonstrated invariance.

Fifth, claims must be supported by prospective or reproducible protocols. Evidence must be capable of reassessment, not locked within long-horizon simulations designed to frustrate falsification.

Sixth, committees must be supported through targeted training in representational measurement principles, including Rasch fundamentals. Without this capacity, enforcement cannot occur consistently.

Finally, evaluation must be iterative. Claims are not accepted permanently. They are monitored, reproduced, refined, or rejected as evidence accumulates.

These steps do not reduce analytical rigor. They restore it.

TRANSITION REQUIRES TRAINING

A transition to meaningful measurement cannot be achieved through policy alone. It requires a parallel investment in training, because representational measurement theory is not intuitive and has never been part of standard professional education in health technology assessment, pharmacoeconomics, or formulary decision making. For more than forty years, practitioners have been taught to work within frameworks that assume measurement rather than demonstrate it. Reversing that inheritance requires structured learning, not informal exposure.

At the center of this transition is the need to understand why measurement must precede arithmetic. Representational measurement theory establishes the criteria under which numbers can legitimately represent empirical attributes. These criteria are not optional. They determine whether addition, multiplication, aggregation, and comparison are meaningful or merely symbolic. Without this foundation, committees are left evaluating numerical outputs without any principled way to distinguish evidence from numerical storytelling.

Training must therefore begin with scale types and their permissible operations. Linear ratio measurement applies to manifest attributes that possess a true zero and invariant units, such as time, counts, and resource use. Latent attributes, by contrast, cannot be observed directly and cannot be measured through summation or weighting. They require formal construction through a measurement model capable of producing invariant units. This distinction is the conceptual fulcrum of reform, because it determines which claims are admissible and which are not.

For latent trait claims, Rasch measurement provides the only established framework capable of meeting these requirements. Developed in the mid–twentieth century alongside the foundations of modern measurement theory, the Rasch model was explicitly designed to convert subjective observations into linear logit ratio measures. It enforces unidimensionality, tests item invariance, and produces measures that support meaningful comparison across persons, instruments, and time. These properties are not approximations; they are defining conditions of measurement.

Importantly, Rasch assessment is no longer technically burdensome. Dedicated software platforms developed and refined over more than four decades make Rasch analysis accessible, transparent, and auditable. These programs do not merely generate statistics; they explain why items function or fail, how scales behave, and whether a latent attribute has been successfully measured. Measurement becomes demonstrable rather than assumed.

Maimon Research has developed a two-part training program specifically to support this transition. The first component provides foundational instruction in representational measurement theory, including the historical origins of scale theory, the distinction between manifest and latent attributes, and the criteria that define admissible claims. The second component focuses on application, detailing claim types, protocol design, and the practical use of Rasch methods to support latent trait evaluation.

Together, these programs equip health systems, committees, and analysts with the competence required to enforce measurement standards consistently. Training does not replace judgment; it enables it. Without such preparation, the transition to meaningful measurement cannot be sustained. With it, formulary decision making can finally rest on claims that are not merely numerical, but measurable.

A NEW START IN MEASUREMENT FOR HEALTH TECHNOLOGY ASSESSMENT

For readers who are looking for an introduction to measurement that meets the required standards, Maimon Research has just released two distance education programs. These are:

- Program 1: Numerical Storytelling – Systematic Measurement Failure in HTA.
- Program 2: A New Start in Measurement for HTA, with recommendations for protocolsupported claims for specific objective measures as well as latent constructs and manifested traits.

Each program consists of five modules (approx. 5,500 words each), with extensive questions and answers. Each program is priced at US$65.00. Invitations to participate in these programs will be distributed in the first instance to 8,700 HTA professionals in 40 countries.

More detail on program content and access, including registration and on-line payment, is provided with this link: https://maimonresearch.com/distance-education-programs/

DESIGNED FOR CLOSURE

For those who remain unconvinced that there is any need to abandon a long-standing and widely accepted HTA framework, it is necessary to confront a more fundamental question: why was this system developed and promoted globally in the first place?

The most plausible explanation is administrative rather than scientific. Policy makers were searching for an assessment framework that could be applied under conditions of limited empirical data while still producing a determinate conclusion. Reference-case modeling offered precisely this convenience. By constructing a simulation populated with assumptions, surrogate endpoints, preference weights, and extrapolated time horizons, it became possible to generate a numerical result that could be interpreted as decisive. Once an acceptable cost-effectiveness ratio emerged, the assessment could be declared complete and the pricing decision closed. This structure solved a political and administrative problem. It allowed authorities to claim that decisions were evidencebased without requiring the sustained empirical burden demanded by normal science. There was no requirement to formulate provisional claims and subject them to ongoing falsification. There was no obligation to revisit conclusions as new data emerged. Closure could be achieved at launch, rather than knowledge evolving over the product life cycle.

By contrast, a framework grounded in representational measurement would have imposed a very different obligation. Claims would necessarily be provisional. Measurement would precede arithmetic. Each therapy impact claim would require a defined attribute, a valid scale, a protocol, and the possibility of replication or refutation. Evidence would accumulate rather than conclude.

Decisions would remain open to challenge as real-world data emerged. From an administrative standpoint, this was an unreasonable burden. It offered no finality.

The reference-case model avoided this problem entirely. By shifting attention away from whether quantities were measurable and toward whether assumptions were plausible, the framework replaced falsification with acceptability. Debate became internal to the model rather than external to reality. Sensitivity analysis substituted for empirical risk. Arithmetic proceeded without prior demonstration that the objects being manipulated possessed the properties required for arithmetic to be meaningful.

Crucially, this system required no understanding of representational measurement theory. Committees did not need to ask whether utilities were interval or ratio measures, whether latent traits had been measured or merely scored, or whether composite constructs could legitimately be multiplied or aggregated. These questions were never posed because the framework did not require them to be posed. The absence of measurement standards was not an oversight; it was functionally essential.

Once institutionalized, the framework became self-reinforcing. Training programs taught modeling rather than measurement. Guidelines codified practice rather than axioms. Journals reviewed technique rather than admissibility. Over time, arithmetic without measurement became normalized as "good practice," while challenges grounded in measurement theory were dismissed as theoretical distractions. The result was a global HTA architecture capable of producing numbers, but incapable of producing falsifiable knowledge. Claims could be compared, ranked, and monetized, but not tested in the scientific sense. What evolved was not objective knowledge, but institutional consensus.

This history matters because it explains why the present transition is resisted. Moving to a real measurement framework with single, unidimensional claims does not merely refine existing methods; it dismantles the very mechanism by which closure has been achieved for forty years. It replaces decisiveness with accountability, finality with learning, and numerical plausibility with empirical discipline. Yet that is precisely the transition now required. A system that avoids measurement in order to secure closure cannot support scientific evaluation, cumulative knowledge, or long-term stewardship of healthcare resources. The choice is therefore unavoidable: continue with a framework designed to end debate, or adopt one designed to discover the truth.

Anything else is not assessment at all, but the ritualized manipulation of numbers detached from measurement, falsification, and scientific accountability.

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