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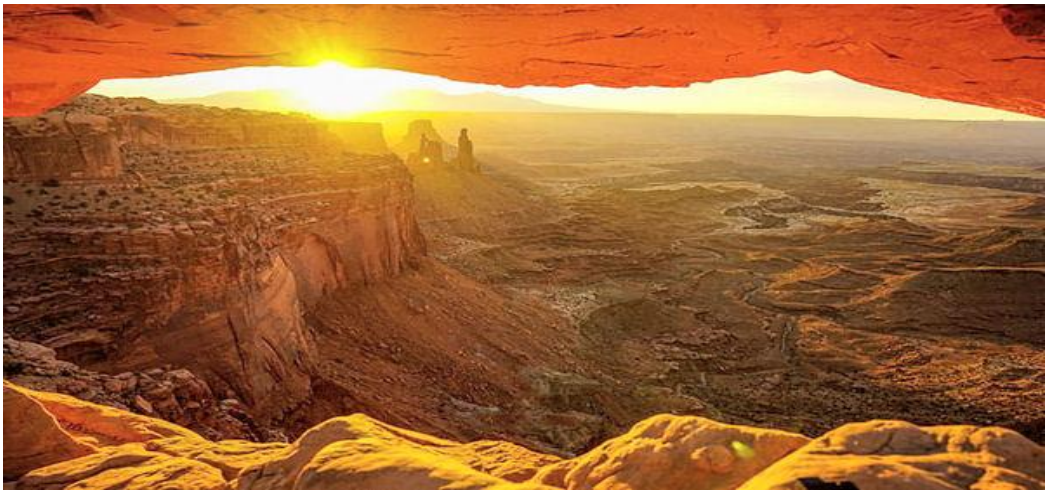

REPRESENTATIONAL MEASUREMENT FAILURE IN HEALTH TECHNOLGY ASSESSMENT

CANADA: DECONSTRUCTING THE EPISTEMIC KNOWLEDGE BASE OF THE *CANADIAN JOURNAL OF HEALTH TECHNOLOGIES*

Paul C Langley Ph.D Adjunct Professor, College of Pharmacy, University of Minnesota, Minneapolis, MN

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FOREWORD

HEALTH TECHNOLOGY ASSESSMENT: A GLOBAL SYSTEM OF NON-MEASUREMENT

The Canadian Journal of Health Technologies (CJHT) is the formal publication platform for Canada's Drug Agency (CDA), serving as a centralized outlet for the dissemination of evidence used to inform health system decision-making. The journal publishes a wide range of HTA outputs, including full health technology assessments, rapid reviews, reimbursement evaluations, horizon scans, and reports incorporating patient and stakeholder perspectives. These publications are designed to support decisions on the adoption, funding, and appropriate use of drugs, medical devices, and clinical interventions within publicly funded health systems.

The journal's focus is policy-facing rather than purely academic. Its content is structured to provide decision-makers with synthesized evidence on clinical effectiveness, safety, and economic impact, typically incorporating cost-effectiveness analyses and modeling frameworks. In doing so, it reflects and reinforces the methodological standards and assumptions that underpin Canadian HTA practice, including the use of multiattribute utility instruments, quality-adjusted life years, and simulation-based projections. As such, the journal functions not only as a repository of assessments, but as a codified expression of the Canadian HTA knowledge base, shaping how evidence is generated, interpreted, and applied in healthcare policy and reimbursement decisions.

The objective of this study is to undertake a systematic interrogation of the HTA knowledge base associated with the CJHT using a standardized 24-item canonical diagnostic instrument grounded in the axioms of representational measurement theory. The purpose is not to evaluate individual articles or specific assessments, but to determine whether the conceptual framework that underpins the journal's outputs meets the minimum requirements for scientific measurement. In particular, the study examines whether the knowledge base recognizes the conditions necessary for admissible arithmetic operations, including unidimensionality, invariance, the existence of a true zero, and the requirement that latent constructs be measured through Rasch-conformant instruments. By assigning categorical probabilities to each statement and transforming these into normalized logits, the study generates a structured profile of conceptual endorsement, allowing for an explicit assessment of whether the knowledge base supports evaluable, falsifiable value claims consistent with the standards of normal science.

The findings are unequivocal. The HTA knowledge base associated with the journal exhibits a consistent and pronounced pattern of measurement inversion. Statements that are true within representational measurement theory are assigned low probabilities and negative logits, indicating weak endorsement or effective non-possession. In contrast, statements that are false are strongly endorsed, with high probabilities and large positive logits. The QALY is treated as a ratio measure, assumed to be aggregable, and regarded as dimensionally homogeneous, while the requirement that multiplication demands a ratio scale is rejected. At the same time, Rasch measurement is entirely absent across all relevant statements, indicating that the only scientifically defensible pathway for constructing measures of latent constructs is not recognized. The resulting profile

demonstrates that the knowledge base does not meet the axioms of representational measurement and therefore supports the generation of non-evaluable, non-falsifiable value claims.

The starting point is simple and inescapable: *measurement precedes arithmetic*. This principle is not a methodological preference but a logical necessity. One cannot multiply what one has not measured, cannot sum what has no dimensional homogeneity, cannot compare ratios when no ratio scale exists. When HTA multiplies time by utilities to generate QALYs, it is performing arithmetic with numbers that cannot support the operation. When HTA divides cost by QALYs, it is constructing a ratio from quantities that have no ratio properties. When HTA aggregates QALYs across individuals or conditions, it is combining values that do not share a common scale. These practices are not merely suboptimal; they are mathematically impossible.

The modern articulation of this principle 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.

Paul C Langley, Ph.D

Email: langleylapaloma@gmail.com

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.

KNOWLEDGE BASE OF THE *CANADIAN JOURNAL OF HEALTH TECHNOLOGIES*

The HTA knowledge base associated with the Canadian Journal of Health Technologies is best understood as a codified methodological framework that integrates evidence generation, economic evaluation, and policy translation within a single institutional platform. Unlike conventional academic journals, it does not function as a forum for competing methodological perspectives, but as a structured publication vehicle for a national HTA agency. As such, it reflects a standardized approach to evaluating health technologies, drawing upon established practices in pharmacoeconomics, outcomes research, and evidence synthesis. These practices include the use of multiattribute utility instruments such as the EQ-5D, the construction of quality-adjusted life years to represent treatment impact, and the application of simulation-based models to project long-term costs and outcomes. The journal's outputs are therefore not isolated analyses but components of a broader decision-support system, designed to inform reimbursement, formulary inclusion, and health system resource allocation.

What characterizes this knowledge base is the absence of any formal requirement to establish the measurement properties of the constructs it employs. Utilities derived from preference-based instruments are treated as if they possess interval or ratio scale characteristics, enabling their use in arithmetic operations such as multiplication by time and aggregation across patient populations. These operations underpin the construction of QALYs, which are then incorporated into cost-effectiveness models that generate estimates of value. The models themselves extend beyond observed data through simulation techniques, producing projections that are presented as evidence for decision-making. At no stage is there a requirement to demonstrate that the underlying constructs meet the axioms of representational measurement. There is no insistence on unidimensionality, invariance, or the existence of a true zero, nor is there systematic use of Rasch modeling to transform ordinal observations into valid measures of latent traits.

The result is a closed methodological system in which numerical outputs are assumed to constitute measurement, and where the appearance of quantitative rigor substitutes for validation of measurement properties. The journal reinforces this system by consistently publishing analyses that adopt these conventions, thereby normalizing their use and embedding them within policy-relevant evidence. Because the journal operates as an extension of a national HTA agency, its knowledge base carries direct implications for healthcare decision-making. The values generated through its methodologies are used to inform judgments about the adoption and funding of health technologies, yet these values are not grounded in measures that meet the requirements of representational measurement. This disconnect is not addressed within the framework itself. Instead, it is sustained by the internal consistency of the methods and their widespread acceptance within the HTA community. The knowledge base thus functions as an institutionalized expression of measurement inversion, where the conditions necessary for scientific measurement are neither recognized nor enforced, and where value claims are

constructed and disseminated without meeting the standards required for empirical evaluation, replication, or falsification.

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 non-possession 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 non-quantities, 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: *CANADIAN JOURNAL OF HEALTH TECHNOLOGIES*

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.

CANADIAN JOURNAL OF HEALTH TECHNOLOGIES: ENDORSING o.2=MEASUREMENT INVERSION

The interrogation of the knowledge base associated with the CJHT reveals one of the most concentrated and unambiguous examples of measurement inversion within the contemporary HTA landscape (Table 1). This is not surprising. Unlike academic programs, which may contain residual variation in training and emphasis, this journal represents the formal publication vehicle of a national HTA authority. As such, it embodies not only accepted methodological practice but also institutional endorsement. The normalized logit profile therefore carries particular weight. It reflects not a diffuse academic environment, but a codified and policy-facing knowledge base that defines how evidence is constructed, interpreted, and applied in decision-making.

TABLE 1: ITEM STATEMENT, RESPONSE, ENDORSEMENT AND NORMALIZED LOGITS *CANADIAN JOURNAL OF HEALTH TECHNOLOGIES*

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	-1.80
MULTIPLICATION REQUIRES A RATIO MEASURE	1	0.10	-2.20
TIME TRADE-OFF PREFERENCES ARE UNIDIMENSIONAL	0	0.95	+2.50
RATIO MEASURES CAN HAVE NEGATIVE VALUES	0	0.95	+2.50
EQ-5D-3L PREFERENCE ALGORITHMS CREATE INTERVAL MEASURES	0	0.95	+2.50
THE QALY IS A RATIO MEASURE	0	0.95	+2.50
TIME IS A RATIO MEASURE	1	0.80	+1.40
MEASUREMENT PRECEDES ARITHMETIC	1	0.15	-1.80
SUMMATIONS OF SUBJECTIVE INSTRUMENT RESPONSES ARE RATIO MEASURES	0	0.95	+2.50
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	0.95	+2.50
CLAIMS FOR COST-EFFECTIVENESS FAIL THE AXIOMS OF REPRESENTATIONAL MEASUREMENT	1	0.10	-2.20
QALYS CAN BE AGGREGATED	0	0.95	+2.50

NON-FALSIFIABLE CLAIMS SHOULD BE REJECTED	1	0.40	-0.40
REFERENCE CASE SIMULATIONS GENERATE FALSIFIABLE CLAIMS	0	0.95	+2.50
THE LOGIT IS THE NATURAL LOGARITHM OF THE ODDS-RATIO	1	0.70	+0.85
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 BE COMBINED WITH A LOGIT SCALE	0	0.90	+2.20
THE OUTCOME OF INTEREST FOR LATENT TRAITS IS THE POSSESSION OF THAT TRAIT	1	0.90	+2.20
THE RASCH RULES FOR MEASUREMENT ARE IDENTICAL TO THE AXIOMS OF REPRESENTATIONAL MEASUREMENT	1	0.05	-2.50

The profile is striking in its uniformity. Statements that are true within representational measurement theory are assigned low probabilities and negative logits, while statements that are false receive near-maximal endorsement. The claim that the QALY is a ratio measure is assigned a probability of 0.95, yielding a normalized logit of +2.50. This is accompanied by identical or near-identical endorsements for the propositions that QALYs can be aggregated (+2.50) and that they are dimensionally homogeneous (+2.50). These three statements define the operational core of cost-utility analysis. Their joint endorsement indicates that within this knowledge base, the QALY is treated as a fully admissible quantity, capable of supporting multiplication, addition, and comparison across individuals and time.

This position is not merely incorrect; it is irreconcilable with the axioms of representational measurement. A ratio scale requires a true zero and a consistent unit that permits proportional comparisons. Utilities derived from ordinal preference data do not satisfy these conditions. They lack a true zero, and their transformations are not restricted to those that preserve ratios. The multiplication of such utilities by time to produce QALYs is therefore mathematically invalid. Yet within this knowledge base, this operation is not questioned. It is foundational. The strength of the endorsement, reflected in the maximal logits, indicates that the legitimacy of the QALY is not open to debate. It is assumed.

This assumption extends to the treatment of the instruments from which utilities are derived. The assertion that EQ-5D-3L preference algorithms create interval measures is rejected with a probability of 0.95 (+2.50), implying that the knowledge base accepts that such instruments yield interval-level outputs. Similarly, the summation of Likert-type responses is treated as producing

ratio measures (+2.50). These positions collectively demonstrate a willingness to treat ordinal data as if they possessed interval or ratio properties. This is a direct violation of measurement theory. Ordinal scales preserve order but not magnitude. Without a demonstrated interval or ratio structure, arithmetic operations are not admissible. Yet the knowledge base proceeds as though these operations are legitimate, effectively bypassing the measurement problem.

In contrast, the propositions that define the conditions for valid measurement are systematically rejected. The requirement that multiplication demands a ratio scale is assigned a probability of 0.10 (−2.20), indicating effective non-possession. The principle that measurement precedes arithmetic is similarly rejected (0.15; −1.80), as is the requirement that arithmetic operations be grounded in the axioms of representational measurement (0.10; −2.20). These are not peripheral considerations. They are the conditions that determine whether numerical operations are meaningful. Their rejection explains why the knowledge base is able to sustain a framework in which arithmetic is applied to quantities that do not meet the necessary criteria.

The absence of Rasch measurement is complete. All statements relating to the role of Rasch modeling in constructing valid measures of latent constructs are assigned probabilities of 0.05, corresponding to the extreme negative logit of −2.50. This includes the recognition that Rasch transformation is required to convert ordinal responses into interval measures, that the Rasch logit scale provides invariant measurement, and that latent traits are defined by the possession of a construct. The uniformity of these values indicates that Rasch measurement is not merely underutilized but absent as a conceptual framework within this knowledge base.

This absence is decisive. Without Rasch modeling, there is no scientifically defensible method for transforming subjective health status data into measures. The use of preference weights does not alter the ordinal nature of the data. It produces a new set of ordinal relations, not a measure. The subsequent use of these values in arithmetic operations is therefore unjustified. Yet the knowledge base proceeds as though these operations are legitimate, because the measurement problem has been excluded from consideration. This exclusion is not incidental. It is a structural feature of the framework.

The treatment of falsifiability further illustrates the epistemological limitations of the knowledge base. The proposition that non-falsifiable claims should be rejected receives only moderate support (0.40; −0.40), indicating a weak commitment to the principles of empirical science. At the same time, the claim that reference-case simulations generate falsifiable claims is strongly rejected (+2.50), implying that such simulations are accepted despite their non-falsifiable nature. This combination reflects a departure from the norms of scientific inquiry. In a framework governed by representational measurement and falsifiability, claims must be constructed in a manner that allows for empirical testing and potential refutation. Simulation models that produce long-term projections without the possibility of empirical validation do not meet this standard.

The CJHT knowledge base thus represents a closed methodological system. It incorporates a set of assumptions and practices that are internally coherent but externally invalid when assessed against the axioms of measurement. As a publication vehicle for a national HTA authority, it does not merely reflect these practices; it codifies them. The journal publishes assessments, economic evaluations, and modeling studies that apply the same framework, thereby reinforcing its

legitimacy. The repetition of these methods across publications creates an appearance of validation, but this is circular. The framework is validated by its own outputs, not by adherence to external standards of measurement.

This is where the institutional significance of the findings becomes critical. The journal is not an independent academic outlet. It is the formal expression of a national HTA agency's methodology. Its knowledge base therefore has direct implications for policy and decision-making. The endorsement of false measurement principles within this context means that decisions regarding resource allocation, reimbursement, and patient access are being informed by quantities that do not meet the conditions required for measurement. This is not a technical issue. It is a fundamental problem of scientific validity.

The implications extend beyond Canada. The CJHT is part of a broader international network of HTA practice, sharing methodological assumptions with agencies such as NICE and PBAC, and with academic and professional organizations that define the standards of the field. The logit profile observed here is consistent with those observed in other contexts, indicating that the problem is not localized but systemic. The journal does not deviate from the global HTA memeplex; it exemplifies it.

Addressing this problem requires more than incremental methodological refinement. It requires a fundamental reorientation of the knowledge base. Measurement must be recognized as a prerequisite for arithmetic, not as an optional consideration. For manifest variables, this implies the use of linear ratio scales. For latent constructs, it necessitates the adoption of Rasch measurement to establish invariant, unidimensional scales. Instruments that do not meet these criteria cannot be used to generate evaluable value claims. This is not a refinement of existing methods. It is a replacement of the underlying framework.

For the CJHT, this would entail a comprehensive reassessment of the methods it publishes and endorses. It would require the rejection of cost-utility analysis based on QALYs, the revision of guidelines that assume the validity of utility measures, and the incorporation of measurement theory into the evaluation of instruments and models. It would also necessitate a shift toward claims that are empirically evaluable, replicable, and grounded in valid measures. This is a substantial undertaking, but it is the only path to restoring scientific legitimacy.

The logit diagnostic provides a clear and quantitative basis for this reassessment. By identifying the degree to which the knowledge base endorses or rejects the axioms of measurement, it highlights the specific areas where reform is needed. In the case of the CJHT, the diagnosis is unequivocal. The knowledge base does not possess the conditions required for scientific measurement. Until this is addressed, the outputs of its HTA activities, however sophisticated in appearance will remain disconnected from the standards that define valid scientific inquiry.

In conclusion, the interrogation of the CJHT knowledge base confirms that measurement inversion is not an incidental feature of HTA, but a defining characteristic. The strong endorsement of false propositions and the systematic rejection of true axioms demonstrate that the framework operates independently of the principles that govern measurement. This is not a sustainable position. The evolution of objective knowledge requires that claims be constructed on a foundation that supports

empirical evaluation and logical consistency. Without such a foundation, HTA remains an exercise in numerical storytelling, regardless of its institutional authority or methodological sophistication.

CANADA'S DRUG AGENCY: LEGACY AND FALSE MEASUREMENT

Of all the LLM interrogations undertaken to date, now exceeding one hundred across agencies, journals, academic programs, and national frameworks the knowledge base associated with Canada's Drug Agency stands out for the strength and asymmetry of its results. The pattern observed is not simply one of measurement inversion; it represents an extreme case. Of the ten canonical statements that are demonstrably false within the axioms of representational measurement, nine are endorsed at the maximum positive logit level (+2.50). This is not a marginal drift away from measurement standards. It is a categorical commitment to propositions that cannot be sustained within any coherent theory of measurement. It is, quite literally, measurement inversion plus.

This pattern is reinforced by the corresponding absence of endorsement for statements that are true. Of the fourteen statements that define the conditions required for valid measurement, only four are endorsed at the lowest logit level. The remainder are either weakly endorsed or rejected outright. The asymmetry is critical. It demonstrates not merely a lack of understanding of measurement principles, but a systematic replacement of those principles with an alternative set of assumptions in which numerical representation is treated as sufficient for measurement. The result is a knowledge base in which arithmetic operations are applied without regard to admissible scale properties, and where constructs such as the QALY are treated as if they possessed ratio characteristics despite lacking the necessary foundations.

This has direct implications for the legacy of Canada's Drug Agency (and CADTH its predecessor). The agency, through its reports, guidelines, and publication platform, has played a central role in shaping the evaluation of health technologies within Canada and influencing international practice. Its outputs are not abstract academic exercises; they inform decisions regarding reimbursement, access, and the allocation of healthcare resources. If the quantities that underpin these decisions do not meet the axioms of representational measurement, then the resulting claims cannot be considered scientifically valid. They may be consistent, they may be widely accepted, and they may be operationally convenient, but they do not satisfy the conditions required for evidence.

The caution that follows from this is unavoidable. The issue is not one of incremental methodological refinement or the need for improved data inputs. It is structural. The knowledge base itself does not possess the properties required to support measurement, yet it continues to generate and endorse claims that depend on those properties. This creates a disconnect between the appearance of quantitative rigor and the reality of measurement validity. Over time, this disconnect becomes institutionalized, forming a legacy that is resistant to challenge precisely because it is embedded in established practice.

That legacy must now be questioned. Not in the sense of revisiting individual studies or refining existing models, but at the level of first principles. The interrogation results demonstrate that the foundational assumptions of the framework are incompatible with the axioms of measurement that

have been accepted in the social sciences for more than half a century. This is not a new problem. The requirements for admissible measurement were clearly articulated in the mid-twentieth century and formalized in the early 1970s. The continued reliance on constructs that fail these requirements cannot be attributed to a lack of available knowledge. It reflects an institutional choice to proceed without resolving the measurement problem.

For a national agency, this carries a particular responsibility. The authority of its recommendations rest on the assumption that they are grounded in scientifically valid evidence. If that assumption is undermined, then the credibility of the framework is called into question. The appropriate response is not defensive, nor is it to appeal to consensus or precedent. It is to confront the measurement issue directly. Until that occurs, the legacy of Canada's Drug Agency will remain tied not to the advancement of evaluable knowledge, but to the sustained application of numerical constructs that fail the basic tests of measurement.

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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 distance education training programs specifically to support this transition. 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.

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 evidence-based 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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