

One cost-information score combined unresolved and inapplicable states: a rule audit of 70 Beijing provider records

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ABSTRACT

Provider-information scores can conceal whether a service-specific fee assessment is applicable. We audited a project-developed scoring framework using 70 Beijing provider survey records and a catalogue of 56 services, focusing on the information retained by the historical cost category. The audit linked recorded service status, fee responses, cleaned fields and executable classification rules. All 39 historical reconstruction assertions passed. Nine records nevertheless shared a cost score of zero despite different denominator states. In eight, service-entry blanks, interpreted under the author-confirmed questionnaire convention, left no current or planned service in the historical denominator. The ninth contained one currently offered service, a combined fee-method response translated as “not offered / not priced”, and a fee-standard response of “none”. Its empty cleaned text and parsing label supplied no fee evidence recognised by the historical rule. Under the proposed audit mapping, the first group called for a recorded exclusion reason and the latter for source clarification. The category alone did not preserve this distinction. An applicability-first field-state specification separates source evidence, denominator eligibility, response states and proposed information tasks. The finding concerns this scoring implementation and its recorded service catalogue; full fee-field recoding, independent coding assessment and consultation evaluation remain outstanding.

Keywords: long-term care; provider-reported information; source tracing; applicability; rule audit; recorded-response coverage; decision support

1. Introduction

Preparing for long-term care consultation requires relating a person’s needs and preferences to what a provider reports about its services. Older people and informal caregivers value involvement and support that connects options with everyday circumstances [1]. Decision-aid research similarly examines understandable options and values-sensitive participation [2,3]. For a service-specific fee question, one preliminary task is concrete: determine whether the question applies before deciding what information to request.

A summary score can make provider records easier to scan. Its usefulness for that preliminary task depends on the distinctions it retains. An assessment with no eligible service has a different denominator and follow-up requirement from an eligible assessment whose fee answer remains unresolved. The same numerical category could describe both. If the underlying fields remain accessible and are reviewed, their difference may still be recovered; the category’s adequacy must therefore be assessed for a specified use rather than assumed from its compactness.

Public reporting of nursing-home summary ratings has been associated with changes in consumer demand [4], but a provider-information category is not itself a measure of care quality [5]. Content-validity research asks whether an indicator supports its intended interpretation [6], and data-quality frameworks distinguish completeness from conformance, plausibility and external validation [7]. Existing data standards also preserve reasons for absent values. HL7 FHIR R4’s DataAbsentReason distinguishes, among others, unknown, asked-unknown, not-asked and not-applicable [8]. The distinction between inapplicability and an unknown answer is therefore established; the empirical question is how a particular questionnaire-to-score implementation preserves or removes it.

We examined a framework developed for Eonbridge, a research prototype intended to prepare family and provider information before professional consultation. It assigned 0, 1 or 2 in nine domains using provider responses, service fields and record checks. The retained data, source responses and executable rules permit the cost category to be traced through successive representations. This setting supplies an inspectable case, rather than a population estimate of information problems in long-term care.

The primary question was whether the historical cost category, considered on its own, distinguished recorded states with different denominator eligibility and proposed information tasks. We reconstructed the classifications, traced the source and rule conditions behind the cost-zero group, and used the wider nine-domain audit as context. The contribution is an account of where information was compressed in this implementation and a specification for retaining its source, applicability and subsequent clarification requirements. Its intended role is to support information preparation while preserving professional judgement in social work [9–11].

2. Methods

2.1 Design, data provenance and responsibilities

This descriptive secondary analysis combined historical reconstruction with a rule-based construct audit. The audit examined whether a category retained information needed for a stated interpretive task. Reporting drew on STROBE principles for transparent observational research, adapted to the secondary-data and rule-audit design [12].

A faculty-led team designed and administered the Beijing provider survey, which participating organisations completed themselves. The project authorised secondary use of the supplied export and response documents for an undergraduate research prototype and methodological analysis. The author cleaned and harmonised the secondary data, decoded response codes, implemented and audited the rules, and prepared the manuscript. The analysis used an extract obtained on 29 June 2026 while the parent survey remained ongoing. Its 70 records had submission dates from 15 May to 26 June 2026; subsequent submissions were outside this frozen dataset.

The author confirmed that these records represented 70 different institutions, including records sharing an exact name. No name-based merging was applied. Institution recruitment procedures and individual respondents' organisational roles were not established by the retained analytical materials. Key-code decoding and rule interpretation involved one analyst, without an independent second coder.

2.2 Units, source meaning and historical eligibility

The provider record was the institution-level unit. Each record was represented against the same 56-service catalogue, producing 3,920 institution–service rows. Those rows describe a complete catalogue structure, not 3,920 independent providers or services actually delivered. The cost rule aggregated evidence from rows marked currently offered or planned; offered-service count, used only in supplementary diagnostics, excluded planned services. Supplementary Table S6 identifies the underlying tables and units.

The service-entry convention was retained through the author's clarification: a blank service entry meant non-provision, and the records under discussion had not skipped the question. This clarification was recorded in the project audit and applied only to the relevant service-status entries. The retained response exports did not reproduce the original blank-entry instruction or complete form configuration. We therefore distinguish the author-confirmed convention from the directly inspectable answer text. Its scope is the recorded service catalogue; it does not assign a meaning to blank fees, capacities or other questions.

For the cost-zero records, we traced the frozen service-status fields and linked response documents. The eight zero-denominator records had 56 blank service statuses each; their response documents did not display a populated Question 12 service block. The author-confirmed convention supplied the interpretation of those blanks. The remaining record had a populated Question 12 block with a currently offered service. The audit preserved the original responses, their translation and the cleaned and parsed outputs as separate stages. Absence of a displayed question block alone was not used to infer the questionnaire's skip logic.

2.3 Historical reconstruction and the cost-evidence rule

The audited version, dated 20 July 2026, was labelled `beijing-nine-domain-clarity-v1.0.0-analyst-provisional`. Its nine domains developed from an earlier project field vector; the exact thresholds and combination rules were analyst-provisional. Reconstruction retained the frozen inputs, category conditions and denominator conventions. The protocol's 39 assertions checked row counts, identifiers, joins, score ranges and totals, payment counts and exclusion of personal contact fields. These historical checks assessed computational consistency.

For cost-text clarity, a current or planned service supplied recognised fee evidence when at least one of three conditions held: its fee method belonged to the specific-method set; its cleaned fee text was non-empty; or its parsing label belonged to the accepted evidence set. The specific methods were per occasion, hourly, daily, monthly, free and multiple charging methods. Accepted labels were `numeric_extracted`, `explicit_free_or_zero`, `text_unparsed` and `not_priced_or_context_dependent`. Recognition therefore extended beyond a clear numeric or explicitly free answer.

The rule first assigned 0 when no eligible row supplied recognised evidence. Otherwise, it assigned 2 when at least one row had numeric or explicit free/zero evidence, such clear rows covered at least 50% of current or planned services, and no amount-range conflict was flagged; all other cases received 1. When the denominator was zero,

the historical implementation set the clear rate to 0.0. The source-to-category trace retained this behaviour without treating its numerical zero as a semantic definition of missingness. Full rules are in Supplementary Table S1.

2.4 Cost-source tracing and design synthesis

The core trace linked each historical cost-zero record to its service rows, retained answer document, recognised-evidence conditions and stored score. Record and service identifiers, Question 12 item positions and local source locations were retained in a controlled trace. For the eight zero-denominator records, this included all 448 service-status rows. The ninth record's fee-method and fee-standard text were compared directly with the cleaned text and parsing label. The comparison establishes the available input and output stages; it does not independently reconstruct an unavailable intermediate cleaning operation.

We separated three questions: whether a service entered the historical denominator, whether the rule recognised any fee evidence, and what the source response meant. The first two are recoverable from the recorded inputs and executable conditions. The third requires the question wording and relevant instructions. A combined fee-method label, a literal “none” and an empty cleaned cell were not assigned one common substantive state. Where a potential cross-field conflict could change eligibility, the proposed specification requires parent-condition clarification before final response coding.

The applicability-first field-state specification was developed after rule tracing. It preserves the original three applicability states and six applicable-response states, and associates them with proposed audit tasks (Figure 1; Supplementary Table S3). It was not applied as a new full-domain recoding of all fee questions. The cost-zero decomposition is retained separately from that prospective coding programme.

2.5 Supplementary diagnostics and data protection

The wider audit examined the nine domains' source signals, units, denominators, category conditions and overlap (Supplementary Tables S2a, S2b and S8). Historical score distributions, service-count associations, selected stricter upper-category rules and review scenarios provide supplementary context (Supplementary Methods; Tables S4 and S7–S11). These diagnostics neither selected an optimal threshold nor tested the proposed field-state coding.

The author had no direct respondent contact in this secondary analysis. Contact details and original network addresses were separated from analytical outputs; institution names and detailed addresses were excluded from the score file, and the controlled re-identification mapping remained separate. Institution-level derivatives stayed in a locally controlled environment. An institutional ethics approval or exemption determination for the parent survey or this secondary analysis was not available in the retained materials.

3. Results

3.1 Reconstruction preserved the historical outputs

All 39 historical reconstruction assertions passed. The dataset contained the expected 3,920 institution–service rows, with unique composite keys and complete coverage in required institution-level tables. Cost-text clarity was 0 for nine records, 1 for 23 and 2 for 38. The nine-domain distributions and their original diagnostics are retained in Supplementary Tables S7–S11.

The surrounding audit showed why equal category numbers could have different interpretations. Payment-method clarity counted selected payment routes, service reachability accepted both clear positive and clear negative responses, and care-capacity rules relied on populated service and capacity fields. These were different rule mechanics. Their coexistence does not establish that every possible aggregation is invalid, but it makes the intended use of an aggregate an explicit interpretive question.

3.2 The ninth cost-zero record retained text that the rule did not recognise

One cost-zero record contained a currently offered service. Its retained response, translated literally, marked the service as “currently offered”, the fee method as “not offered / not priced”, and the fee standard as “none” (Table 1). The frozen cleaned text was empty and the parsing label was `blank_or_not_stated`. None of the rule's recognised-evidence conditions was met.

Table 1: Source-to-score trace for the eligible service in the ninth cost-zero record

Stage	Retained evidence	Consequence for the historical rule	Interpretation retained by the audit
Source question	Question 12 asked respondents to complete service status, fee method, fee standard and current receiving capacity	Service status supplied the current/planned eligibility input	Interpret each answer against its own source question
Service status	“Currently offered”	One current service entered the fee denominator	Recorded current provision establishes historical eligibility
Fee method	Combined label: “not offered / not priced”	Outside the specific-method set	The combined label does not identify which alternative the respondent intended
Fee standard	“None”	The corresponding frozen cleaned fee text was empty	Retain the literal answer; do not infer free, unknown or absent solely from this word
Cleaned and parsed fields	Empty cleaned text; <code>blank_or_not_stated</code>	Neither text presence nor an accepted parsing label supplied recognised evidence	A processing output describes what the rule received, not the complete source meaning
Category assignment	One eligible service; zero rows with recognised fee evidence	Historical cost score 0	Clarify the fee response and any conflict that could affect the parent condition before new state coding

The retained text explains why “no recognised evidence” differs from “no source response”. It does not settle the meaning of the combined fee-method label. The label may concern pricing, but one of its alternatives also concerns service provision. The historical denominator follows the explicit service-status field; a new semantic coding pass must examine any conflict against the original question and option definitions. We therefore retain “unresolved” as an interpretive description, without forcing this case into a particular one of the six formal response states.

3.3 The shared zero category concealed a denominator distinction

The other eight cost-zero records had no current or planned service in the recorded catalogue. Their 448 service-status cells were blank. Applying the author-confirmed non-provision convention to those entries made the service-specific fee assessments structurally inapplicable within that catalogue. The historical implementation nevertheless assigned the same cost category as the eligible record in Table 1.

Table 2: Historical cost-zero decomposition and proposed audit tasks

Recorded service configuration	Institutions	Historical denominator and category	Audit interpretation and proposed task
All 56 service statuses blank under the author-confirmed non-provision convention	8	No current or planned service; denominator 0; cost score 0	Retain structural inapplicability and its source-supported exclusion reason within the recorded catalogue
One service explicitly recorded as currently offered, with the fee responses traced in Table 1	1	One eligible service; no recognised fee evidence; cost score 0	Retain historical eligibility and the unresolved source interpretation; clarify the fee answer and any parent-condition conflict

The score alone could not tell these records apart. Under the proposed audit mapping, the first group calls for a recorded exclusion reason; the second requires source clarification before a substantive fee state can be settled. These tasks were derived from the audit, rather than observed in professional consultations. The exclusion concerns the catalogue’s service-specific fee assessment and makes no claim that an institution provides no other services or charges no fees.

This decomposition does not estimate the overall prevalence of unresolved fee information. Historical score-1 records could contain unresolved rows, and score 2 required only 50% clear evidence among eligible services. A ratio of one remaining zero-score record to 62 denominator-eligible institutions would describe historical zero scores in that subset, not all unresolved fees or an improvement in information quality.

4. Discussion

4.1 The finding concerns what the cost category alone can show

The audited category combined a zero-denominator state with a non-zero-denominator state whose fee response required clarification. Its numerical reconstruction was consistent, but the category did not retain the reason for the zero. That reason mattered for the specified information task: recording an exclusion and clarifying an eligible assessment require different evidence and subsequent work.

The location of this loss is consequential. Source fields may preserve the distinction even when the displayed category does not. Where those fields remain accessible and are actually reviewed, applicability can potentially be recovered. The audit did not observe whether practitioners relied on the category alone, followed the proposed tasks or changed a family decision. It establishes a limitation of this representation for a defined interpretive use, rather than invalidating the score for every purpose.

Existing standards already distinguish several reasons for absent data [8]. The present contribution lies in tracing a concrete implementation across the source response, cleaning output, evidence predicate and denominator, then specifying which links must remain inspectable. This source-to-rule account complements data-quality assessment [7] and the requirement to justify an indicator's intended interpretation [6]. It does not establish novelty over every other coding or decision-support system.

4.2 Retaining applicability, responses and recorded-response coverage

The proposed specification begins with the source question and its documented meaning (Figure 1). A decoded parent condition determines whether a dependent fee field is applicable, structurally inapplicable or undetermined. Only an applicable field proceeds to substantive response coding. If the parent condition conflicts or remains unresolved, known state counts are retained while the overall denominator and final coverage remain unsettled.

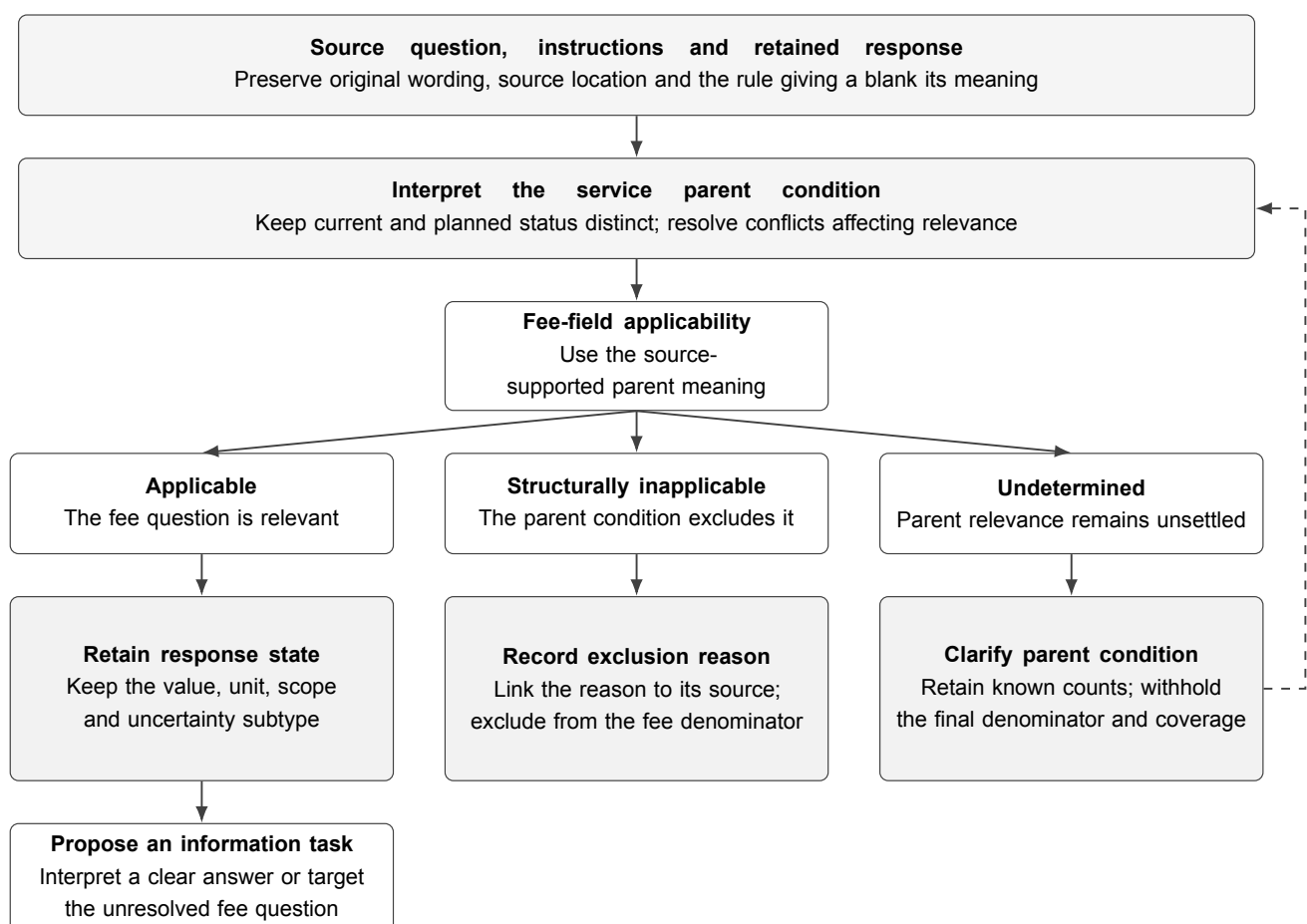


Figure 1: Proposed source-to-task specification for a dependent fee field. The service parent condition is resolved before fee-response coding. The applicable branch preserves the response state and relevant value, unit and conditions; the other branches retain an exclusion reason or a parent-clarification task. Arrows specify a proposed coding and audit sequence. They do not report a completed full-domain recoding or a tested consultation intervention.

The response vocabulary remains explicit yes, explicit no, clear value or category, conditional or ambiguous, unknown or undecided, and missing. A particular fee question need not use every category. A determinate price range can be a clear value when its scope and unit answer the source question; conditions that leave the required answer unresolved instead retain a conditional subtype. Explicitly free or zero-valued fees are interpretable values. An affirmative or negative service answer belongs to the parent question and cannot substitute for coding the dependent fee field.

Recorded-response coverage reports whether applicable questions contain an interpretable recorded answer under the source rules. Its numerator includes recorded uncertainty as well as clear answers; missing applicable answers

remain only in the denominator. Coverage must therefore accompany the response-state distribution and cannot stand for resolved fees. It also differs from the historical cost clear rate. A fully resolved set with no applicable questions is reported as not applicable, whereas 0% requires an applicable denominator with no recorded responses. Supplementary Table S3 gives the coding criteria and Supplementary Table S5 illustrates dependencies.

Service or channel breadth and record-quality status remain separate contextual outputs. They can retain current versus planned provision, source linkage, timeliness where available and record checks without compressing those properties into another overall quality score. Fee subfields also require separate denominators when they answer different questions. Additional requirements absent from the original survey cannot simply be introduced and then counted as missing responses.

4.3 Implications and the next coding assessment

The specification makes proposed information work explicit before provider comparison. For example, a fee answer tied to an unresolved eligibility condition would prompt clarification of that condition; an eligible question with no answer would prompt a targeted request. An exclusion would retain both its reason and its source. These are illustrative tasks compatible with decision-support approaches that preserve professional discretion [2,3,9–11]. Their relevance and burden must be assessed with practitioners and families.

The next empirical step is a bounded coding assessment of the fee domain. A manual should fix the parent-condition rules, response criteria and treatment of contradictions before independent coding begins. A coder uninformed in the original rules would use the same source materials while being shielded, where practicable, from the author's case labels and the cost-zero interpretation. Initial decisions, cross-classifications, disagreements and source-based adjudications should be retained separately. Responses cannot be compared only in conveniently concordant cases without reporting how applicability disagreements were handled.

If resources permit only a pilot, all nine core records could be checked alongside prespecified examples from historical categories 1 and 2. That design would test the reproducibility of selected interpretations, not establish reliable six-state coding throughout the fee domain. It would also be a post hoc extension of this audit. Consultation feasibility and effects would require subsequent stakeholder and workflow evaluation [13].

4.4 Scope and remaining evidence limits

This is a single-implementation audit of a local provider-reported sample. The rule developer also performed its interpretive audit, and no independent coding assessment was completed. The retained materials do not establish a sampling frame, respondent-level expertise or the prevalence of these representation problems among Beijing providers. Self-reported service status also does not verify actual provision, current capacity or fees.

The core interpretation combines directly inspectable responses and processing outputs with an author-confirmed service-entry convention. The original form's complete option definitions and skip configuration, and the intermediate cleaning operation responsible for the "none"-to-empty transition, were not independently recovered in this trace. These source gaps matter for resolving contradictory labels and for extending the convention beyond its recorded scope. They do not justify silently converting every blank or parser label into a new substantive state.

Full fee-field recoding, independent agreement, review time and consultation outcomes were not measured. Supplementary correlations and stricter-rule scenarios describe the historical implementation; they do not validate the new specification or identify preferred cut-offs. Transfer to another questionnaire requires its own source definitions, parent conditions and audit trail. The immediate reusable contribution is the traceable distinction among source meaning, rule recognition and denominator eligibility.

5. Conclusion

In this implementation, a historical cost score of zero did not distinguish catalogue-bound structural inapplicability from an eligible assessment with unresolved fee-source interpretation. Source tracing made the difference visible: service status determined the historical denominator, while a separate evidence predicate determined the shared category. Retaining those stages alongside proposed exclusions and clarification tasks provides an auditable basis for subsequent independent coding and consultation studies.

Data availability

The manuscript reports aggregate findings and scoring definitions. Institution-level survey derivatives, source-document locations and the controlled re-identification mapping remain in a locally controlled environment and are not publicly released.

Code availability

The local reconstruction package retains the historical rules, checks and diagnostic outputs. Separate retained scripts implement the cost-threshold comparison, fee-evidence trace, bootstrap intervals and metadata scenario. Their institution-level inputs remain controlled. The local data-free rule package contains explicitly synthetic cases and recorded implementation checks; those checks are distinct from the historical 39 assertions and from independent coding assessment. The current source trace records the locations and field stages behind the two main tables. These materials have not been publicly released.

Author contributions

Man Tek Liao: conceptualisation, methodology, secondary-data cleaning and key-code decoding, field harmonisation, software, formal analysis, computational validation, construct audit, visualisation, manuscript drafting and revision, and version curation. Faculty-led project team: survey design, survey administration and original data collection.

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Competing interests

The author declares no competing interests.

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Supplementary Methods | Sampling descriptors and historical diagnostics

Submission metadata recorded 67 WeChat submissions, two link submissions and one mobile submission. Institution type was a multi-select item, producing 76 labels across the 70 records. These comprised 38 community-based ageing-service labels; eight tertiary general hospital labels; seven each for primary general hospitals, nursing institutions and other organisations; four home-based ageing-service labels; two each for specialist hospitals and rehabilitation institutions; and one social or non-profit organisation label.

SM1. Service-count associations and stricter-rule comparisons

Counts, percentages, means, medians and ranges described the records and historical scores. Offered-service count was the number of the 56 service rows coded as currently offered in `Simulation_Input.offered_service_count`, excluding planned services. Spearman correlation, calculated as Pearson correlation of average ranks, assessed whether records with more offered services tended to have higher domain scores.

Paired non-parametric bootstrap resampling used the institution-identifier record as the resampling unit, with 10,000 resamples and seed 20260808. Percentile 95% confidence intervals used the 2.5th and 97.5th percentiles. Zero-variance resamples were omitted for the affected domain: 14 for service reachability and none for the other domains. These intervals describe diagnostic resampling within the frozen record-based sample; they do not establish population representativeness or statistical independence.

For each domain, a selected stricter specification changed only the requirements for score 2 and retained the historical score-0 definition. Changes could involve completion proportions, evidence types or combinations of supporting conditions, rather than a numeric cut-off alone. We compared the historical and alternative means and counted reclassified records, using the definitions in Supplementary Tables S1 and S4. The alternatives were analyst-provisional and were not evaluated as preferred scoring rules. An additional cost-only scenario raised the clear-rate threshold from 50% to 75%, retaining the historical denominator, score-0 definition, numeric or explicit free/zero evidence eligibility and amount-conflict rule. Distributions, means and transitions were calculated separately from the original joint stricter alternative.

SM2. Historical review scenarios

Historical-score review strata grouped records according to the type of clarification or verification indicated by the audited rules. Under precedence $A > B > C$, stratum A captured fields that could change a content-domain classification, stratum B captured entity or metadata issues when A was absent, and stratum C retained conditional or general text without changing the historical category. Records without these triggers were routine, and multiple reasons could be retained alongside the primary stratum. The retained content-clarification and metadata-flag resolution scenarios estimated mechanical changes in historical outputs, with definitions in Supplementary Table S4. The metadata scenario used the specified flags and data-completeness eligibility conditions across records, irrespective of primary review stratum; it did not select only stratum B.

The original summed output is retained as a historical version diagnostic, with a median of 16 and range of 6–18. Domain means ranged from 1.414 to 1.914. None of these summaries is a new measure of service quality.

Supplementary Table S1

Historical and selected stricter scoring rules

The table specifies `beijing-nine-domain-clarity-v1.0.0-analyst-provisional` dated 20 July 2026, retaining all historical thresholds and selected alternatives. Unless the `score=0` or `score=2` condition is met, the score is 1. “Known” and “missing” in the historical service-field conditions mean non-empty and empty after cleaning, respectively; these are storage tests, distinct from the questionnaire-defined meaning of a blank service entry. The questionnaire convention that blank service entries mean non-provision is applied when interpreting applicability, without rewriting these historical tests.

The explicit response sets were q9 {“accept”, “do not accept”} and q19 {“can”, “cannot”}. The precise sets were q16 {“within 24 hours”, “2–3 days”, “3–7 days”, “more than 1 week”} and q23 {“can, within 24 hours”, “can, within 48 hours”, “currently cannot”}. Every non-empty q22 enumerated label, including “home service not provided”, was treated as precise. Historical information frames sometimes used response presence as an inclusion condition and did not separately encode all applicability states.

Domain	Source fields and observational unit	Historical information frame / applicability logic	Historical score 0	Historical score 1	Historical score 2	Selected stricter score 0/1/2	Construct rationale	Version/source
Care capacity	<code>Service_Capacity_Long.service_status,</code> <code>capacity_raw;</code> institution–service across 56 services	All 56 catalogue services form the coverage frame	Both known counts are 0	Any pattern not meeting 0 or 2	Status known $\geq 54/56$ (95% target; integer cut-off 96.4%) and capacity known $\geq 45/56$ (80% target; integer cut-off 80.4%)	0 unchanged; 2 requires status 56/56 and capacity 56/56; otherwise 1	Counts populated fields; inactive status can be complete	v1.0.0; cleaned workbook and executable rulebook, 20 Jul 2026
Medical coordination	<code>Institution_Profiles</code> q9/q19; <code>Referral_Channels;</code> <code>Collaboration_Info.</code> <code>needed_handoff_information;</code> medical-category service status/current/planned fields; institution plus option tables	A record enters the information frame when q9 or q19 is present, a medical channel or clinical handoff is reported, or any medical service status is known	No signal in the information frame	Any pattern not meeting 0 or 2	q9 or q19 is explicit, and ≥ 2 of 3 support families are present: ≥ 1 medical referral channel; ≥ 1 clinical-handoff item; ≥ 1 current/planned medical service	0 unchanged; 2 requires q9 and q19 explicit plus ≥ 2 of the same 3 support families; otherwise 1	Combines directional response status with collaboration/service breadth	v1.0.0; q9/q19 profile fields and linked long tables
Admission or short-stay process	Five admission/residential/day-care service rows (<code>service_status,</code> <code>capacity_raw</code>); q16 first response; q17 reassessment	Five predefined service groups and q16/q17 form the process-information frame	All five service statuses missing and q16 and q17 missing	Any pattern not meeting 0 or 2	Status known 5/5, capacity known $\geq 3/5$, q16 non-empty and q17 non-empty	0 unchanged; 2 requires status 5/5, capacity 5/5, q16 precise and q17 non-empty; otherwise 1	Measures coverage of related service and process fields; offered-service status is not required	v1.0.0; five-service set defined in rulebook
Service reachability	<code>Institution_Profiles</code> q16 first response, q22 home-service radius, q23 urgent response; institution	All three questions form the reachability-information frame	q16, q22 and q23 all missing	Any pattern not meeting 0 or 2	At least 2 of 3 labels precise; every non-empty q22 enum is precise	0 unchanged; 2 requires all 3 labels precise; otherwise 1	Preserves clarity of reachability-related responses; explicit non-provision remains a precise answer	v1.0.0; decoded profile labels
Family support	Family-caregiver support service status/capacity; family handoff; “no family support” barrier; family-caregiver target signal; institution plus linked option tables	Applicable information exists when the family-support service status is known or ≥ 1 support-signal family is present	Family-support service status missing and no support-signal family present	Any pattern not meeting 0 or 2	(Service status and capacity known and ≥ 1 of 3 support families) or ≥ 2 of 3 support families; families are handoff, barrier and target	0 unchanged; 2 requires service status and capacity known and ≥ 2 support families; otherwise 1	Measures multi-source family-related information coverage, not visit access or support outcomes	v1.0.0; service, collaboration, barrier and target tables

Domain	Source fields and observational unit	Historical information frame / applicability logic	Historical score 0	Historical score 1	Historical score 2	Selected stricter score 0/1/2	Construct rationale	Version/source
Payment-method clarity	Selected rows in Payment_Methods; Simulation_Input.payment_method_count; institution–route aggregated to institution	Payment routes are counted when selected is true	0 selected routes	1 selected route	≥2 selected routes	0 selected =0; 1–2 selected =1; ≥3 selected under the selected stricter alternative =2	Direct channel-count threshold; audit-aligned label is payment-channel breadth	v1.0.0; payment tables
Cost-text clarity	Current or planned service rows; fee method/text, parse status, extracted amount and min–max conflict; institution–service aggregated to institution	Historical denominator: all services marked current or planned; clear rate is the number of clear rows divided by this denominator. When the denominator is zero, the historical implementation sets the clear rate to 0.0	No service rows supply fee evidence recognised by the historical rule; this includes zero-denominator records in the historical implementation	Fee evidence recognised by the historical rule is present, but the score-2 condition is not met	≥1 row is numeric_extracted or explicit_free_or_zero, clear rate ≥50%, and no amount conflict	0 unchanged; 2 requires ≥1 numeric amount, clear rate ≥75%, zero unparsed rows and no amount conflict; otherwise 1	Combines fee-evidence status, clear-rate coverage and conflict checking within the current-or-planned-service denominator	v1.0.0; service-level fee fields
Adaptation support	Thirteen rehabilitation, cognitive, psychological and environmental-adaptation service rows; adaptation handoff and barrier signals; institution plus linked long tables	Applicable information exists when ≥1 related service status, handoff item or barrier is present	No related service status, handoff or barrier signal	Any pattern not meeting 0 or 2	Status known 13/13, capacity known ≥11/13 (80% target; integer cut-off 84.6%), and ≥1 handoff or barrier signal	0 unchanged; 2 requires status 13/13, capacity 13/13, ≥1 handoff and ≥1 barrier; otherwise 1	Combines field coverage with collaboration/risk-signal status	v1.0.0; 13-service set and linked collaboration/barrier tables
Data completeness	Institution name, Beijing district, institution type; q9/q16/q17/q19/q22/q23; duplicate-name, address and response-time flags; institution	All provider survey records enter the record-quality frame	Any base field missing or fewer than 3/6 key labels present	Any pattern not meeting 0 or 2	All 3 base fields present, ≥5/6 key labels present and zero quality issues	0 unchanged; 2 requires all 3 base fields, 6/6 labels and zero quality issues; otherwise 1	Records metadata and field presence; six labels overlap with content domains	v1.0.0; profiles and quality flags

For cost-text clarity, recognised evidence is the logical OR of a specific fee method, non-empty cleaned fee text, and any of the four accepted parse states specified in Section 2.3. Counts include only current/planned services. The retained fee method for the ninth cost-zero record was “not provided / not priced”, outside the specific-method set; its fee-standard response was “none”, its frozen cleaned text was empty, and its parse state was blank_or_not_stated. It therefore supplied no recognised evidence despite retained source text. The two clear parse states required for score 2 are a narrower subset, not the entire evidence predicate.

Supplementary Table S2a

Construct claim, provenance and dependency audit

Tables S2a and S2b report the 13-dimensional audit for the same nine domains. Here, historical coverage dependence refers to the executable rule’s populated-field tests; it does not override the questionnaire meaning of service-entry blanks.

Domain	Construct claim and primary finding	Provenance and unit	Historical inclusion / applicability logic	Field-state preservation	Coverage dependence	Breadth dependence	Record-quality dependence
Care capacity	Claim: care capacity; finding: field coverage	Service-capacity table; institution–service	Fixed 56–service frame	Written inactive labels and empty cells are handled differently; the blank-meaning convention is not a separate legacy state	High	No mechanical service-count increment	None
Medical coordination	Claim: coordination; finding: response/collaboration hybrid	Profiles and linked option tables; institution	Any medical-response/status signal; no proportion denominator	Explicit yes/no both satisfy the explicitness test; one non-explicit q9/q19 response can coexist with score 2 if the other is explicit and at least two support families are present	Moderate	Support-family count includes channels, handoff and service presence	None
Admission or short-stay	Claim: process; finding: process-field coverage	Five service rows plus profiles; mixed unit aggregated to institution	Five-service frame plus q16/q17	Written inactive labels count as populated; instruction-defined blanks do not; conditional q16 is non-empty	High	Offered-service count absent	None
Service reachability	Claim: reachability proxy; finding: response clarity	Three profile labels; institution	Three-question frame	Explicit negative is precise; conditional q16/q23 is not precise; missing retained	Low	None	None
Family support	Claim: family/visit support; finding: signal coverage hybrid	Service, handoff, barrier and target tables; mixed unit	Any family service status or signal family	Service non-provision can be known; unselected option cannot distinguish missing/inapplicable	Moderate	Counts signal families, not total services	None
Payment-method clarity	Claim: clarity; finding: channel breadth	Payment-route table; institution–route	Selected routes form count	Zero conflates no selection states in source representation	None	Direct mechanical count	None
Cost-text clarity	Claim: clarity; finding: applicable-text status/coverage hybrid	Service fee fields; institution–service	Current/planned services; clear-rate denominator	Free/zero differs from blank; unparsed and context-dependent remain partial; no-service inapplicability historically merged with 0	Moderate	Denominator grows with applicable portfolio	Conflict flag is a record check within the domain
Adaptation support	Claim: support; finding: information/collaboration hybrid	Thirteen service rows plus handoff/barrier; mixed unit	Any related service-status or collaboration/risk signal	Written inactive labels count as populated; instruction-defined blanks do not; option absence retains limited state information	High	Signal-family presence; no direct threshold based on the number of currently offered services	None
Data completeness	Claim: completeness; finding: mixed record-quality-oriented historical indicator	Profiles and quality flags; institution	All records	Checks presence, not direction or certainty	High for selected fields	None	Direct

Supplementary Table S2b

Rule conditions, overlap and audit-aligned interpretation

This table links each historical domain to its rule conditions, shared inputs, interpretive alignment, sensitivity result and audit-aligned interpretation. Audit-aligned labels describe the historical mechanics and do not replace the separately proposed semantic field-coverage measure.

Domain	Rule conditions	Cross-domain overlap	Interpretive alignment	Sensitivity finding	Audit-aligned interpretation
Care capacity	Completion cut-offs	Service fields also support other domains	Label overstates rule content	No institutions were reclassified under the selected 56/56 stricter rule	Service–capacity field coverage
Medical coordination	Explicit response plus 2/3 support families	Medical service records and q fields connect to completeness	Partly aligned; actual coordination performance remains separate	16 reclassified	Medical-response status plus coordination breadth
Admission or short-stay	Complete status, $\geq 60\%$ capacity, two response fields	q16/q17 reused in reachability/completeness	Aligned after narrowing the name	19 reclassified	Admission-process information coverage
Service reachability	$\geq 2/3$ precise	q16/q22/q23 reused in completeness; q16 in admission	Strongest label–rule alignment	28 reclassified	Reachability response status
Family support	Service evidence plus support families, or 2/3 families	Shares service/collaboration structures	“Visit” is unsupported; “support information” is aligned	15 reclassified	Family-support information status and signal breadth
Payment-method clarity	≥ 2 routes historically; ≥ 3 under the selected stricter alternative	Payment count checked against simulation input	Label–rule mismatch	30 reclassified	Payment-channel breadth
Cost-text clarity	Evidence, rate and conflict criteria	Uses service applicability/status	Aligned after applicability is explicit	18 reclassified	Applicable-service cost-text status plus field coverage
Adaptation support	13/13 status, capacity threshold, handoff/barrier	Shares service and collaboration structures	Label overstates service capability	18 reclassified	Adaptation-information coverage plus collaboration/risk-signal status
Data completeness	Base fields, label count, zero flags	Reuses q9/q16/q17/q19/q22/q23	Mixed record-quality-oriented historical indicator with substantive source-field overlap	5 reclassified	Separately reported mixed record-quality-oriented historical indicator

Supplementary Table S3

Proposed field-state coding and audit-task mapping

Every coded field retains its source value, source field, applicable questionnaire instruction or coding rule, decoded meaning and rule version. A blank with a documented meaning retains the blank source value together with the instruction that justifies its interpretation. These attributes are part of the proposed specification, not a claim that every historical source field has already been recoded.

Applicable response states comprise explicit yes, explicit no, clear value or category, conditional or ambiguous, unknown or undecided, and missing. Clear non-binary answers retain value type, unit and relevant conditions; grouped uncertainty states retain their subtypes. An unresolved parent condition prevents final coverage reporting, while a resolved all-inapplicable set is reported as not applicable.

Use clear value or category for a determinate answer, including a stated range; conditions specifying its scope or unit do not by themselves make it conditional. Use conditional or ambiguous when a dependency leaves the answer required by the field unresolved, retaining any reported value, range and conditions.

Stage	Field state	Minimum coding evidence	Additional stored attributes	Analytical treatment	Review or consultation action
Applicability	Applicable	Decoded parent condition confirms relevance	<code>applicability=applicable</code> ; parent field and decoded value	Denominator-eligible; proceed to response coding	Interpret the answer
Applicability	Structurally inapplicable	Source-supported parent meaning makes the condition false	<code>applicability=structurally_inapplicable</code> ; parent evidence; exclusion reason	Exclude; retain the reason separately	Record exclusion; suppress redundant follow-up
Applicability	Undetermined	Parent meaning is unresolved, conflicting or insufficiently coded	<code>applicability=undetermined</code> ; parent evidence; unresolved reason	Do not finalise denominator or coverage	Resolve the parent condition first
Response, if applicable	Explicit yes	Source meaning clearly affirms availability, acceptance or presence	<code>response_state=explicit_yes</code> ; parent applicability evidence	Clear and recorded; include in numerator	Check conditions, timing and scope
Response, if applicable	Explicit no	Source meaning clearly denies provision or acceptance, including an instruction-defined blank	<code>response_state=explicit_no</code> ; parent applicability evidence; blank-meaning rule when used	Clear and recorded; include in numerator	Relate the boundary to family requirements
Response, if applicable	Clear value or category	An interpretable non-binary answer	<code>response_state=clear_value</code> ; value; value type; unit; relevant conditions; parent applicability evidence	Clear and recorded; include in numerator	Preserve the amount, capacity, radius or other answer without forcing yes/no coding
Response, if applicable	Conditional or ambiguous	A dependency or multiple plausible readings	<code>response_state=conditional_or_ambiguous</code> ; subtype <code>conditional_dependency</code> or <code>ambiguous_text</code> ; parent applicability evidence	Recorded; include in numerator; report state	Clarify the dependency or ambiguity
Response, if applicable	Unknown or undecided	The provider explicitly reports uncertainty or an unsettled position	<code>response_state=unknown_or_undecided</code> ; subtype <code>unknown</code> or <code>undecided</code> ; parent applicability evidence	Recorded; include in numerator; report state	Request current position and review time
Response, if applicable	Missing	No interpretable applicable answer after source decoding and linkage	<code>response_state=missing</code> ; parent applicability evidence	Include in denominator only	Generate a targeted completion request

For fee coding, distinguish the parent service response from the dependent fee answer. Explicitly free or zero-valued fees can be clear values. An explicit statement of uncertainty is recorded; an absent interpretable answer is missing. A combined source label must retain its alternatives until the question and coding evidence resolve them. Parser categories describe processing and cannot alone select a semantic response state. If conflicting source values could change parent eligibility, code applicability as undetermined before interpreting the dependent response. Current and planned services retain their separate status and any stated price timing.

Recorded-response coverage counts answered applicable questions, including explicitly recorded uncertainty; it is reported with the state distribution. Subfields such as method and amount require separately defined questions and denominators. A completed method field does not imply a completed amount field. These are prospective manual rules, not results of a completed full-domain recoding or independent agreement study.

Supplementary Table S4

Sensitivity and version-diagnostic analysis definitions

Analysis	Main setting	Alternative setting	Comparison statistic	Result
Upper-category rule sensitivity	Historical rules in Table S1	Selected one-directional stricter rules in Table S1	Mean difference and institution-level reclassification count	Mean differences ranged from −0.429 to 0.000; 0–30 institutions reclassified by domain
Cost-state decomposition	Historical cost score 0 combines two states: a zero current/planned-service denominator and a non-zero denominator with no historically recognised fee evidence	Separate zero-denominator structural inapplicability from applicable services with unresolved fee information	Counts within historical score 0	8 structurally inapplicable; 1 applicable unresolved
Historical-score review strata	Primary precedence A>B>C; otherwise routine	A: content-domain change; B: entity or metadata check; C: conditional or general text	Institution count and share	A 26 (37.1%); B 17 (24.3%); C 19 (27.1%); routine 8 (11.4%)
Stratum-A scoring-impact scenario	Observed historical nine-domain mean 1.708	Specified hypothetical content clarification for stratum-A records	Mechanical difference in the historical composite version diagnostic	1.746; +0.038
Metadata-flag resolution scenario	Observed historical nine-domain mean 1.708	Hypothetical resolution of specified metadata flags across eligible records, irrespective of primary review stratum	Mechanical difference in the historical composite version diagnostic	1.741; +0.033; 21 records changed (A: 4; B: 17)
Association uncertainty	Observed Spearman ρ between each domain and offered-service count	10,000 paired institution-level bootstrap resamples; seed 20260808	Percentile 95% confidence interval	Reported in Supplementary Table S9; 14 zero-variance service-reachability resamples omitted

Additional cost-rule comparison (70 institutions)

Scenario	Score 0	Score 1	Score 2	Mean	Reclassified from historical
Historical rule: clear rate $\geq 50\%$	9	23	38	1.414	0
Threshold only: $\geq 75\%$, all other historical conditions retained	9	30	31	1.314	7
Original joint stricter rule in Table S1	9	41	20	1.157	18

Relative to the historical rule, the threshold-only scenario moved seven records from score 2 to score 1; nine remained at 0, 23 at 1 and 31 at 2. The joint stricter scenario moved 18 records from 2 to 1; nine remained at 0, 23 at 1 and 20 at 2. No other transitions occurred. The threshold-only scenario retained eligibility for numeric or explicit free/zero evidence and did not impose the joint rule’s numeric-only or zero-unparsed-row requirements. Historical inputs and denominator conventions were unchanged across scenarios.

The duplicate-name condition used in Table S1 and in the stratum-B rule below remains a frozen name-collision flag. The author has confirmed that the records represent different institutions. Historical scores, strata and hypothetical metadata-scenario outputs are retained as versioned computations, not current unresolved-entity counts or completed verification effects. This confirmation does not resolve other address or completion-time issues.

The metadata scenario identified 25 records with at least one historical name, address or completion-time flag (A: 8; B: 17). Of these, 21 had all three base fields and at least five of the six decoded key labels recorded, so their data-completeness score changed from 1 to 2 (A: 4; B: 17); the other four remained unchanged. The nine-domain total rose from 1,076 to 1,097 with denominator 630, giving 1.7412698 and a change of 0.0333333 before rounding. The scenario substituted the counterfactual completeness score; stored flags, content-domain scores and primary strata were retained. These hypothetical changes do not represent completed metadata verification.

The following historical rules assign one primary review stratum while allowing multiple recorded reasons.

Rule	Trigger or treatment
Precedence	Assign one primary stratum under $A > B > C$.
A1 Medical	Assign stratum A when the medical score is below 2, at least two support families are present and q9 or q19 is non-explicit.
A2 Reachability	Assign stratum A when the reachability score is below 2 and clarification of an unresolved q16, q22 or q23 response could meet the historical two-of-three explicit-response rule.
A3 Cost	Assign stratum A for a cost score of 0 with at least one current or planned service; a cost score of 1 whose unresolved rows could reach 50% clear coverage; or an amount conflict.
A4 General	Assign stratum A for any score-0 domain requiring a missingness or decoding check.
B	When stratum A is absent, assign stratum B for a duplicate-name, address-quality or completion-time trigger.
C	Assign stratum C to remaining review records with conditional text or general notes that do not cross a historical threshold.
Routine	Assign routine status when no trigger is present.
Stratum-A scenario	Change only the specified medical, reachability and cost fields capable of reaching score 2; do not automatically revise all score-0 fields.
Metadata-flag resolution scenario	Apply hypothetical resolution of the specified metadata flags across eligible records, irrespective of primary stratum; replace only the data-completeness score with its metadata-resolved value, retaining content-domain scores, primary strata and stored historical flags.
Interpretation	Treat the strata as audit consequences under the historical scoring implementation.

Supplementary Table S5

Proposed fee-field and other parent–child examples

These proposed examples specify parent–child dependencies for capacity, home-service radius and reimbursement conditions. A parent value is interpreted using its own source instructions before any applicability decision is made. The service-entry blank convention in this survey does not establish a blank-coding rule for other fields or other surveys.

Child field	Parent condition	Applicable when	Structurally inapplicable when	Applicability undetermined when	Response coding if applicable
Service-specific fee question	Recorded service-provision status and the meaning of the actual fee question	Current or planned provision is source-supported and the fee question is relevant	The source-supported parent condition excludes the service-specific fee question	Service status or a fee/service conflict leaves parent relevance unsettled	Preserve free/zero, determinate values or ranges as clear values when they answer the question; otherwise retain the applicable response state and subtype. Do not infer a state from a parser label alone.
Capacity detail	Service-provision status	The service is explicitly recorded as currently offered or planned and a capacity detail is meaningful	The service is explicitly neither currently offered nor planned, and capacity is not defined	Service status is missing, conflicting or insufficiently coded, or the relevance of capacity detail to this service is undetermined	Use clear value or category for interpretable values or ranges; otherwise apply conditional or ambiguous, unknown or undecided, or missing under Table S3. Retain value, unit and conditions.

Child field	Parent condition	Applicable when	Structurally inapplicable when	Applicability undetermined when	Response coding if applicable
Home-service radius	Home-service provision state	Home service is explicitly recorded as currently offered or planned	Home service is explicitly neither currently offered nor planned	Home-service provision status is missing, conflicting or unresolved	Use clear value or category for interpretable distances, areas or ranges; otherwise apply conditional or ambiguous, unknown or undecided, or missing under Table S3. Retain value, unit and conditions.
Reimbursement conditions	Payment-route availability or selection	The relevant route is selected or otherwise confirmed as available	The route is explicitly unavailable within a complete route record	The route-selection record is incomplete, ambiguous or conflicting	Use the six response states in Table S3 according to the actual answer type. Preserve conditions and distinguish conditional or ambiguous, unknown or undecided, and missing.

In this table, recorded describes response presence rather than an additional response category. Unresolved has no single automatic coding equivalent: the source meaning determines the formal state in Table S3. An explicit negative service response and the inapplicability of a dependent field belong to different levels.

For capacity detail, meaningful and defined refer to the relevance of the capacity field to the service, not to whether a capacity value has been recorded. If capacity detail is applicable but no response is recorded under the source coding rules, code the response as missing; if relevance itself remains unresolved, code applicability as undetermined.

Supplementary Table S6

Data tables, observational units and analytical roles

Data table	Records	Observational unit	Analytical role
Institution_Profiles	70	Provider record	Institution type, district and decoded key-response labels
Simulation_Input	70	Provider record	Offered-service count used in the association analysis
Service_Catalog	56	Service	Service names, categories and field dictionary
Service_Capacity_Long	3,920	Provider record–service	Service status, capacity, cost text and applicability
Service_Targets_Long	10,056	Provider record–service–target	Target populations and service-fit signals
Service_Delivery_Long	4,970	Provider record–service–delivery mode	Modes of service delivery
Referral_Channels	455	Provider record–referral channel	Referral sources and channel breadth
Payment_Methods	490	Provider record–payment route	Selected payment routes
Barriers	387	Provider record–barrier	Intake and collaboration signals
Collaboration_Info	716	Provider record–collaboration item	Handover fields and collaboration structure
Open_Text	89	Provider record–text item	Cleaned supplementary descriptions
Quality_Flags	70	Provider record	Name, address, completion-time and record-quality flags

Supplementary Table S7

Distribution of the historical nine-domain scores

Domain	Score 0, n (%)	Score 1, n (%)	Score 2, n (%)	Mean
Care capacity	8 (11.4%)	2 (2.9%)	60 (85.7%)	1.743
Medical coordination	0 (0.0%)	26 (37.1%)	44 (62.9%)	1.629
Admission or short-stay process	0 (0.0%)	10 (14.3%)	60 (85.7%)	1.857
Service reachability	0 (0.0%)	6 (8.6%)	64 (91.4%)	1.914
Family support	3 (4.3%)	11 (15.7%)	56 (80.0%)	1.757
Payment-method clarity	0 (0.0%)	22 (31.4%)	48 (68.6%)	1.686
Cost-text clarity	9 (12.9%)	23 (32.9%)	38 (54.3%)	1.414
Adaptation support	1 (1.4%)	13 (18.6%)	56 (80.0%)	1.786
Data completeness	0 (0.0%)	29 (41.4%)	41 (58.6%)	1.586

Supplementary Table S8

Nine-domain source signals, rule mechanics and interpretations

Historical domain	Principal source signals	Dominant rule mechanics	Construct finding	Audit-aligned interpretation
Care capacity	Status and capacity fields across 56 services	Coverage-dominant	Completion thresholds dominate the score	Service–capacity field coverage
Medical coordination	q9, q19, referral channels, handoff and medical-service signals	Hybrid	Response status is combined with collaboration/service breadth	Medical-response status plus coordination breadth
Admission or short-stay process	Five service groups, q16 and q17	Coverage-dominant	Complete process fields can score highly without an offered related service	Admission-process information coverage
Service reachability	q16, q22 and q23	Response-status oriented	Explicit response coding dominates; service count is absent	Reachability response status
Family support	Caregiver-support service fields, handoff, barriers and targets	Hybrid	Multi-source presence combines coverage and breadth	Family-support information status and signal breadth
Payment-method clarity	Count of selected payment routes	Breadth-dominant	The rule counts channels; explanatory clarity is outside the rule	Payment-channel breadth
Cost-text clarity	Parseable cost text among current or planned services	Hybrid, conditional on applicability	Response status, clear-rate coverage and conflict checks jointly determine the score	Applicable-service cost-text status plus field coverage
Adaptation support	Thirteen related services, handoff and barriers	Hybrid	Field coverage and collaboration/risk signals dominate	Adaptation-information coverage plus collaboration/risk-signal status
Data completeness	Three base fields, six reused labels and three quality flags	Record-quality oriented	Content labels are reused inside a metadata-oriented score	Separately reported mixed record-quality-oriented historical indicator

High historical categories occurred without a current or planned service in the corresponding group: 10 of 60 records scoring 2 for admission or short stay, 1 of 44 for medical coordination, 33 of 56 for family support and 10 of 56 for adaptation support. These patterns are consistent with rules using populated fields or supporting signals without requiring provision in every category condition. The heterogeneous mechanics do not, by themselves, establish that all aggregations are invalid.

Supplementary Table S9

Diagnostic Spearman associations with offered-service count

Domain	Spearman ρ	Bootstrap 95% CI
Care capacity	0.547	0.369 to 0.681
Medical coordination	0.483	0.276 to 0.657
Admission or short-stay process	0.541	0.363 to 0.674
Service reachability	0.218	−0.037 to 0.421
Family support	0.364	0.101 to 0.576
Payment-method clarity	0.058	−0.191 to 0.296
Cost-text clarity	0.520	0.288 to 0.702
Adaptation support	0.463	0.218 to 0.652
Data completeness	0.162	−0.096 to 0.408

The associations may reflect service portfolios, opportunities to populate fields or shared rule inputs. The diagnostic analysis does not separate those mechanisms or establish a common scale. Institution-level bootstrap resampling used 10,000 resamples and seed 20260808; 14 zero-variance resamples were omitted for service reachability and none for the other domains. The intervals do not establish population representativeness.

Supplementary Table S10

Sensitivity to selected stricter upper-category rules

Domain	Historical mean	Selected stricter mean	Mean difference	Records reclassified
Care capacity	1.743	1.743	0.000	0
Medical coordination	1.629	1.400	−0.229	16
Admission or short-stay process	1.857	1.586	−0.271	19
Service reachability	1.914	1.514	−0.400	28
Family support	1.757	1.543	−0.214	15
Payment-method clarity	1.686	1.257	−0.429	30
Cost-text clarity	1.414	1.157	−0.257	18
Adaptation support	1.786	1.529	−0.257	18
Data completeness	1.586	1.514	−0.071	5

All reclassifications moved from 2 to 1. The joint cost alternative simultaneously tightened the clear-rate threshold, required numeric evidence and excluded unparsed rows. The separate threshold-only scenario reclassified seven records, compared with 18 under that joint alternative (Supplementary Table S4). Neither comparison identifies a preferred rule.

Supplementary Table S11

Primary historical-score review strata

Primary stratum	Records	Share	Historical-implementation audit function
A	26	37.1%	Fields whose clarification could alter at least one reconstructed historical content-domain classification
B	17	24.3%	Entity, address, completion-time or related record-verification issues when no stratum-A trigger is present
C	19	27.1%	Conditional or general-text issues retained for interpretive review without changing the historical classification
Routine	8	11.4%	No specified historical-score or record-review trigger

These are historical audit consequences, not current counts of unresolved entity identities or observed effects of professional review. Primary precedence was A > B > C; multiple reasons could also be retained. Supplementary Table S4 preserves the trigger rules and hypothetical scenario definitions.