

MRF Quality Report

s3://talon-storage-private/mrf-feed-uploads/2026-03/2026-03-05_QCP_in-network-rates.json.gz

Size: 53.68 MB • MD5: 74d8cf2212e50f3c7db2dceb5b03c3d0

Payer: **Quality Care Partners** • File Date: **3/4/2026** • Generated: **2026-04-23 23:41 EDT** • Tool Version: **1.0.0** • Elapsed: **292.20s**

65.0

Limited Reliability

score capped at 65.0 — CMS official schema validation failed (see meta for details)

Errors: 3 • Warnings: 9 • Info: 3

TOC Plan References

TOC: s3://talon-storage-private/mrf-feed-uploads/2026-03/2026-03_plan_ref_98d7022b7d7165738b14c89261e12b3b_index.json • Talon

Canonical: s3://talon-storage-private/mrf-feed-uploads/2026-03/2026-03-05_QCP_in-network-rates.json.gz

Plan Name	Plan ID	Issuer / Sponsor	Market
QCP	0123456789 (custom)	—	—

CMS Official Schema Validation

FAILED (exit code 1) — File does not conform to the CMS schema.

Validator output:

```
warn Schema version v2.0 was provided, but file indicates it conforms to schema version 2.0. v2.0 will be
used.
error Could not find a schema version named "v2.0". Available versions are:
v2.0.0
v0.1
v0.2
v0.3
v0.3.1
v0.3.2
v0.4.0
v0.4.1
v0.5.0
v0.5.3
v0.7.0
v0.8.0
v0.8.1
v0.9.0
v0.9.1
v0.10.0
v0.10.1
v0.11.0
v0.12.0
v0.13.0
v1.0.0
v0.10.3
v1.0.4
v1.0.6
v1.0.7
v1.1.0
v1.1.1
v1.1.2
v1.2.0
v1.3.0
v1.3.1
v1.3.2
v1.3.3
v1.4.0
v1.5.0
v1.6.0
v1.6.1
v1.6.2
v2.0.1
v2.1.0
v2.2.0
v2.2.1
```

Dimension Scores

Dimension	Score	Weight	Findings
Schema Integrity	70.0	30%	5
Provider Mapping	88.7	15%	3
Code Coverage	70.0	15%	2
Pricing Sanity	63.7	40%	5

Schema Integrity — Findings

Score: 70.0

WARNING header_conditional

last_updated_on '3/4/2026' is not a valid YYYY-MM-DD date

WARNING header_conditional

Partial plan fields present — missing: ['plan_market_type']

WARNING rates_without_providers

259882 negotiated_rate entries have neither provider_groups nor provider_references

INFO far_future_expiration

3253731 expiration_dates are more than 3 years in the future

ERROR cms_schema_validation

CMS official schema validator FAILED (exit code 1). File does not conform to the TIC in-network-rates schema.

Provider Mapping — Findings

Score: 88.7

ERROR `npi_validity`

5.70% of NPIs failed Luhn checksum validation (264 of 4635)

- 0
 - 1588679012
-

WARNING `ein_validity`

14 EINs failed IRS prefix validation

- 281723399
 - 282504837
 - 282884410
 - 287641240
 - 287743571
 - ... and 5 more
-

INFO `duplicate_npis`

284 NPIs appear in more than one provider group

Code Coverage — Findings

Score: 70.0

WARNING `billing_code_format`

122974 HCPCS codes do not match expected format

WARNING `duplicate_billing_codes`

14823 billing codes appear in more than one `in_network` item (99.2%)

Pricing Sanity — Findings

Score: 63.7

INFO `percentage_rates`

501 percentage rates (0.0%) — values represent % of a reference rate, not dollar amounts; excluded from spread analysis

ERROR `zero_rates`

62306 zero-dollar rates (1.92%) — CMS schema requires `negotiated_rate > 0` (exclusiveMinimum)

WARNING `rate_spread_by_class`

`billing_class='institutional' / negotiated_type='fee schedule'`: P95/P50 spread is 23.8x (threshold: 10x, N=1,094,207 (1,000 sampled), high confidence)

WARNING `rate_spread_by_class`

`billing_class='professional' / negotiated_type='fee schedule'`: P95/P50 spread is 13.4x (threshold: 5x, N=2,159,017 (1,000 sampled), high confidence)

WARNING `per_code_rate_spread`

1368 rate contexts have a max/min ratio exceeding the type-specific threshold (20x professional / 50x facility, min 3 occurrences required). Each context is a unique combination of all 10 rate-key dimensions. n= shows how many distinct provider rates exist for that exact context.

Code	Code Type	Neg. Type	Billing Class	Arrangement	Setting	Min	Median	Mean	Max	Ratio	n
A4459	HCPCS	fee schedule	professional	ffs	—	\$0.05	\$184.48	\$179.08	\$240.63	4812.6×	109
Q0249	HCPCS	fee schedule	institutional	ffs	—	\$7.57	\$6572.00	\$4513.49	\$14129.80	1866.8×	107
92953	CPT	fee schedule	institutional	ffs	—	\$0.83	\$1.70	\$549.68	\$1446.07	1742.3×	91
Q0249	HCPCS	fee schedule	professional	ffs	—	\$7.57	\$6243.40	\$3568.92	\$11829.60	1562.9×	231
95004	CPT	fee schedule	institutional	ffs	—	\$3.48	\$7.13	\$716.77	\$1878.84	539.9×	91
95044	CPT	fee schedule	institutional	ffs	—	\$4.80	\$9.84	\$718.19	\$1878.84	391.4×	91
33289	CPT	fee schedule	institutional	ffs	—	\$264.12	\$541.45	\$24100.15	\$62756.18	237.6×	91
63685	CPT	fee schedule	institutional	ffs	—	\$300.17	\$615.35	\$25944.29	\$67513.42	224.9×	91
33287	CPT	fee schedule	institutional	ffs	—	\$317.92	\$651.74	\$25963.37	\$67513.42	212.4×	91
33231	CPT	fee schedule	institutional	ffs	—	\$330.12	\$676.75	\$26417.52	\$68675.56	208.0×	91

Recommended Actions

1. `schema` `cms_schema_validation`

P1

CMS official schema validator FAILED (exit code 1). File does not conform to the TIC in-network-rates schema.

2. **provider_mapping** `mpi_validation`

P1

5.70% of NPIs failed Luhn checksum validation (264 of 4635)

3. **pricing** `zero_rates`

P1

62306 zero-dollar rates (1.92%) — CMS schema requires `negotiated_rate > 0` (`exclusiveMinimum`)

4. **provider_mapping** `ein_validation`

P2

14 EINs failed IRS prefix validation

5. **pricing** `rate_spread_by_class`

P2

`billing_class='institutional' / negotiated_type='fee schedule':` P95/P50 spread is 23.8x (threshold: 10x, N=1,094,207 (1,000 sampled), high confidence)

6. **pricing** `rate_spread_by_class`

P2

`billing_class='professional' / negotiated_type='fee schedule':` P95/P50 spread is 13.4x (threshold: 5x, N=2,159,017 (1,000 sampled), high confidence)

7. **pricing** `per_code_rate_spread`

P2

1368 rate contexts have a max/min ratio exceeding the type-specific threshold (20x professional / 50x facility, min 3 occurrences required). Each context is a unique combination of all 10 rate-key dimensions. n= shows how many distinct provider rates exist for that exact context.

8. **schema** `header_conditional`

P2

`last_updated_on '3/4/2026'` is not a valid YYYY-MM-DD date

9. **schema** `header_conditional`

P2

Partial plan fields present — missing: [`plan_market_type`]

10. **schema** rates_without_providers

P2

259882 negotiated_rate entries have neither provider_groups nor provider_references

11. **code_coverage** billing_code_format

P3

122974 HCPCS codes do not match expected format

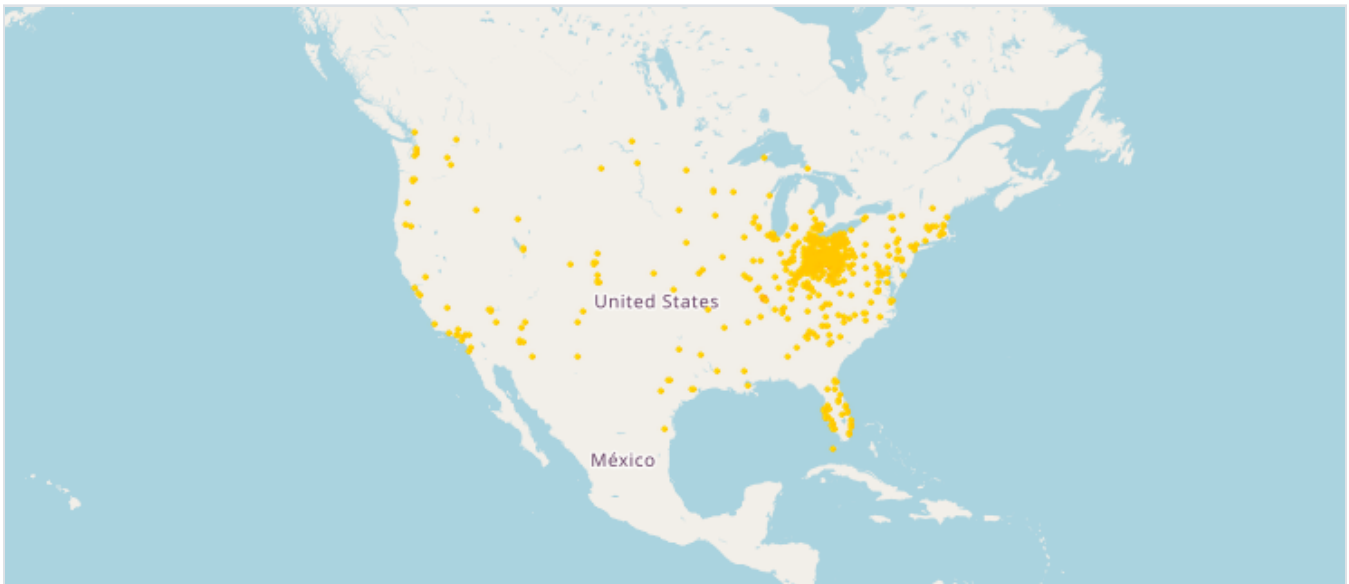
12. **code_coverage** duplicate_billing_codes

P3

14823 billing codes appear in more than one in_network item (99.2%)

Provider Geographic Coverage

4069 unique NPIs found — 4063 geocoded (100%) — 763 zip codes represented.



Schema Integrity — Metrics

header_missing_fields	
header_conditional_issues	last_updated_on '3/4/2026' is not a valid YYYY-MM-DD date, Partial plan fields present — missing: [plan_market_type]
file_age_days	None
items_total	3251469

items_missing_required_pct	0.0	
items_empty_rates	0	
prices_total	3253731	
prices_missing_required_pct	0.0	
prices_missing_field_breakdown		
prices_missing_service_code	0	
prices_invalid_billing_class	0	
rates_without_providers	259882	
negotiation_arrangements	ffs	3251469
billing_code_types	HCPCS	985090
	CPT	2266002
	CSTM-ALL	111
	RC	266
expired_prices	0	
invalid_expiration_format	0	

Provider Mapping — Metrics

provider_references_in_file	4635
provider_group_ids_referenced	4635
unresolved_references	0
resolution_rate_pct	100.0
npis_validated	4635
invalid_npi_count	264
invalid_npi_examples	0, 0, 0, 0, 0, 0, 0, 0, 0, 0
eins_validated	4635
invalid_ein_count	14
invalid_ein_examples	281723399, 282504837, 282884410, 287641240, 287743571, 287841552, 287924612, 290823786, 292667201, 293649265
empty_npi_groups	0
groups_without_tin	0

npis_in_multiple_groups	284
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Code Coverage — Metrics

unique_codes_total	14938																																																															
duplicate_codes	14823																																																															
duplicate_pct	99.23																																																															
by_code_type	<table border="1"> <tr> <td>HCPCS</td> <td>5380</td> </tr> <tr> <td>CPT</td> <td>9512</td> </tr> <tr> <td>CSTM-ALL</td> <td>1</td> </tr> <tr> <td>RC</td> <td>45</td> </tr> </table>	HCPCS	5380	CPT	9512	CSTM-ALL	1	RC	45																																																							
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unknown_code_types																																																																
format_invalid_by_type	<table border="1"> <tr> <td>HCPCS</td> <td>122974</td> </tr> </table>	HCPCS	122974																																																													
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codes_not_in_reference	reference_not_loaded																																																															
most_frequent_codes	<table border="1"> <thead> <tr> <th>Type</th> <th>Code</th> <th>Occurrences</th> </tr> </thead> <tbody> <tr><td>HCPCS</td><td>E0950</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0951</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0952</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0953</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0954</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0956</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0957</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0960</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0973</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0978</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0981</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0982</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0990</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E0995</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E1016</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E2208</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E2209</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E2210</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E2323</td><td>1,323</td></tr> <tr><td>HCPCS</td><td>E2324</td><td>1,323</td></tr> </tbody> </table>	Type	Code	Occurrences	HCPCS	E0950	1,323	HCPCS	E0951	1,323	HCPCS	E0952	1,323	HCPCS	E0953	1,323	HCPCS	E0954	1,323	HCPCS	E0956	1,323	HCPCS	E0957	1,323	HCPCS	E0960	1,323	HCPCS	E0973	1,323	HCPCS	E0978	1,323	HCPCS	E0981	1,323	HCPCS	E0982	1,323	HCPCS	E0990	1,323	HCPCS	E0995	1,323	HCPCS	E1016	1,323	HCPCS	E2208	1,323	HCPCS	E2209	1,323	HCPCS	E2210	1,323	HCPCS	E2323	1,323	HCPCS	E2324	1,323
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Pricing Sanity — Metrics

total_prices_checked	3253731																																			
total_rates	3253230																																			
per_diem_rates	0																																			
percentage_rates	501																																			
negative_rates	0																																			
zero_rates	62306																																			
extreme_high_rates	2967																																			
extreme_low_rates	764																																			
rate_distribution	<table border="1"> <tr> <td>sample_n</td> <td>3253230</td> </tr> <tr> <td>sample_k</td> <td>5000</td> </tr> <tr> <td>confidence</td> <td>high</td> </tr> <tr> <td>p5</td> <td>4.14747</td> </tr> <tr> <td>p25</td> <td>59.4909750000000006</td> </tr> <tr> <td>p50</td> <td>247.7</td> </tr> <tr> <td>p75</td> <td>911.151</td> </tr> <tr> <td>p95</td> <td>4486.7819250000001</td> </tr> <tr> <td>p99</td> <td>15875.8365</td> </tr> </table>	sample_n	3253230	sample_k	5000	confidence	high	p5	4.14747	p25	59.4909750000000006	p50	247.7	p75	911.151	p95	4486.7819250000001	p99	15875.8365																	
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by_billing_class	<table border="1"> <thead> <tr> <th>Class / Type</th> <th>Count</th> <th>Median</th> <th>p25</th> <th>p75</th> <th>p95</th> <th>Confidence</th> </tr> </thead> <tbody> <tr> <td>institutional/ fee schedule</td> <td>1,094,207</td> <td>471.3</td> <td>114.3</td> <td>1680.2</td> <td>11195.1</td> <td>high</td> </tr> <tr> <td>professional/ fee schedule</td> <td>2,159,017</td> <td>166.2</td> <td>40.4</td> <td>662.0</td> <td>2234.5</td> <td>high</td> </tr> <tr> <td>institutional/ derived</td> <td>3</td> <td>1.0</td> <td>1.0</td> <td>1.0</td> <td>1.0</td> <td>low</td> </tr> <tr> <td>professional/ derived</td> <td>3</td> <td>1.0</td> <td>1.0</td> <td>1.0</td> <td>1.0</td> <td>low</td> </tr> </tbody> </table>	Class / Type	Count	Median	p25	p75	p95	Confidence	institutional/ fee schedule	1,094,207	471.3	114.3	1680.2	11195.1	high	professional/ fee schedule	2,159,017	166.2	40.4	662.0	2234.5	high	institutional/ derived	3	1.0	1.0	1.0	1.0	low	professional/ derived	3	1.0	1.0	1.0	1.0	low
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institutional/ derived	3	1.0	1.0	1.0	1.0	low																														
professional/ derived	3	1.0	1.0	1.0	1.0	low																														
negotiated_types	<table border="1"> <tr> <td>fee schedule</td> <td>3253224</td> </tr> <tr> <td>derived</td> <td>6</td> </tr> </table>	fee schedule	3253224	derived	6																															
fee schedule	3253224																																			
derived	6																																			
unique_rate_contexts	34762																																			

rate_key_dimension_validity

invalid_negotiated_type	0
invalid_negotiated_types_seen	{}
invalid_setting	0
invalid_settings_seen	{}
invalid_severity_of_illness	0
severity_on_non_apr_drg	0
institutional_with_service_codes	0
invalid_service_code_format	0
billing_code_modifier_too_long	0

Scoring Methodology

Embedded in this report at generation time.

Overall Score

Weighted sum of four structural dimensions, normalized to a 0–100 scale.

Normalized Weights		
	Schema Integrity	30%
	Provider Mapping	15%
	Code Coverage	15%
	Pricing Sanity	40%

Confidence Bands		
	High	≥90
	Usable With Caution	≥75
	Limited Reliability	≥60
	Not Usable	<60

Score Caps		
	Raw Json Errors Only → 74.0	Native JSON syntax errors in the unpatched source file. File must be re-exported by the payer; scoring reflects auto-patched data only.
	Cms Validation Failure Only → 65.0	CMS official schema validator reports the file does not conform to the TIC spec.
	Both Raw Json Errors And Cms Failure → 59.0	Both native JSON syntax errors and CMS schema validation failure present.

Rate Context Key — 14-Tuple Field Coverage

Every rate in a CMS TIC MRF file is described by a 14-field tuple. Fields 1–10 form the rate-context key used to group and compare rates across the system. Fields 11–12 (provider, expiration date) are validated separately and excluded from the grouping key for analytical reasons. Each of the four scoring dimensions validates a distinct slice of this tuple — together they cover all 14 fields.

Field	Validated by
1 billing_code_type	Schema (required field) + Code Coverage (enum + format validation)
2 billing_code_type_version	Schema (required field)
3 billing_code	Schema (required field) + Code Coverage (format, duplicates, reference lookup)
4 billing_code_modifier	Pricing (modifier length, key normalization)
5 service_code	Pricing (POS format, normalization, institutional-class check)
6 negotiated_type	Pricing (CMS TIC enum validation)
7 billing_class	Schema (CMS TIC enum validation) + Pricing (spread thresholds)
8 negotiation_arrangement	Schema (CMS TIC enum validation) + Pricing (FFS vs bundle/capitation gating)
9 severity_of_illness	Pricing (APR-DRG only, valid values 1–4)

Field	Validated by
10 setting	Pricing (CMS TIC enum validation)
11 provider (NPI/EIN)	Provider Mapping (Luhn checksum, IRS prefix, group resolution) — excluded from grouping key
12 expiration_date	Schema (date validity, far-future sanity) — excluded from grouping key
13 additional_generic_notes	not validated (free-text)
14 negotiated_rate	Pricing (negative/zero/extreme-value checks, spread analysis)

- Fields 1–10 are the grouping key. Each unique combination is a distinct rate context — rates with different modifiers, POS codes, or arrangements land in separate buckets and are never compared against each other.
- Provider (field 11) is excluded from the key: the spread check is cross-provider by design. Partitioning by provider produces singleton buckets and eliminates the spread signal.
- Expiration date (field 12) is excluded because it is a contract lifecycle attribute, not a clinical context. Rates for the same service should be comparable regardless of when they expire.
- service_code (field 5) arrays are flattened and normalized before keying: '1' → '01', and a rate with ['11','22'] contributes to both the '11' and '22' buckets so rates are compared apples-to-apples by place of service.

Schema Integrity

Validates required fields, enum values, conditional requirements, and date validity per the CMS TIC in-network-rates schema. Also checks file freshness and expiration date sanity.

Method: Penalty-based deductions from 100, capped per category.

per_missing_required_header_field	5
per_header_conditional_issue	2
freshness_warn	5
freshness_error	10
item_missing_fields_pct	×5 (cap 30)
empty_rates_pct	×0.5 (cap 5)
price_missing_fields_pct	×10 (cap 30)
rates_without_providers_rate	×200 (cap 20)
expired_prices_pct	×0.5 (cap 5)
file freshness warn days	45
file freshness error days	90
expiry far future years	3

Provider Mapping

Verifies that all provider_group_id references in in_network items resolve to an entry in the provider_references array. Validates NPI integrity via Luhn checksum and EIN integrity via IRS-issued 2-digit prefix.

Method: Weighted component sum (not purely penalty-based).

provider_resolution (60%)	$\text{resolution_rate\%} \times 0.60$
npi_validity (30%)	$(100 - \text{invalid_npi_pct} \times 5) \times 0.30$
ein_validity (10%)	$10 - \min(\text{invalid_ein_count} \times 0.2, 10)$

Code Coverage

Tracks every (billing_code_type, billing_code) pair and flags unrecognized CMS TIC code types, format violations for CPT/HCCPS/NDC, and duplicates (same code appearing in multiple in_network items).

Method: Penalty-based deductions from 100.

per_unknown_code_type	3 pts each (cap 20)
format_invalid_pct	$\times 0.5$ (cap 10)
duplicate_code_pct	$\times 2$ (cap 20)
codes_not_in_reference_pct	$\times 0.5$ (cap 30) — only when reference set is loaded

Pricing Sanity

Detects invalid rates (negative, zero, extreme-value) and distribution anomalies (per-class P95/P50 spread, per-code max/min ratio, flat-rate distributions). Exact counts are used for all validity checks (negative, zero, extreme, dimension validity). Percentile-based checks (spread, IQR) use reservoir sampling — $k=5\,000$ global, $k=1\,000$ per (billing_class, negotiated_type) bucket — so memory stays bounded on large files. Per-code max/min spread is exact (all rates seen, no sampling).

Method: Penalty-based deductions from 100.

negative_rate_pct	$\times 5$ (cap 20)
zero_rate_pct	$\times 3$ (cap 15)
extreme_rate_pct	$\times 5$ (cap 25) — ffs only
class_spread_excess	$(\text{spread} - \text{threshold}) \times 2$, max across (billing_class, negotiated_type) buckets (cap 15)
per_code_high_spread_count	$\times 0.1$ (cap 15)
invalid_negotiated_type_pct	$\times 3$ (cap 10) — rates silently dropped
invalid_setting_pct	$\times 1$ (cap 5) — silently defaults to wildcard
invalid_severity_pct	$\times 1$ (cap 5) — silently normalised to ''
institutional_with_service_codes_pct	$\times 1$ (cap 5) — extra key variation
invalid_service_code_pct	$\times 2$ (cap 5) — encode raises ValueError
extreme high by billing class	professional: 25000.0, institutional: 2000000.0, both: 2000000.0, default: 500000.0

extreme low	0.01
spread warn p95 over p50 by class	professional: 5, institutional: 10, both: 10, default: 5
per rate context max min ratio	professional_codes: 20, facility_drg_codes: 50
flat rate iqr p75 threshold pct	5.0
flat rate min rates to check	100
spread min n to flag	50
per code min n to flag	3

Dashboard: MRF Identity Key

(ingest-time — not stored in report JSON)

The dashboard assigns a persistent `mrf_key` to each MRF so that all validation runs of the same file are grouped together in the score-history view, even if the payer re-exports the file at a new URL.

Tier 1 — entity + plan_id	Used when both <code>reporting_entity_name</code> and <code>plan_id</code> are present. Key input: <code>plan <entity> <plan_id_type> <plan_id></code> . Stable across monthly re-exports.
Tier 2 — URL hash	Fallback when <code>plan_id</code> is absent. Key input: the raw file location URL/path. Entity name alone is not used — a payer publishes multiple distinct plans under the same entity name and without <code>plan_id</code> they cannot be safely distinguished. A URL change produces a different key.

The key is a 16-character MD5 hex digest of the input string (case-insensitive, whitespace-stripped). **This run:** `mrf_key = c254098866036231 · entity = Quality Care Partners · plan_id = 311435470 (hios) · tier = 1 (entity + plan_id)`

Provider Geographic Coverage

(supplemental — does not affect score)

Geographic analysis is a supplemental feature computed on demand after scoring completes. It does not affect any scoring dimension — it is an observational overlay to assess the breadth and distribution of in-network providers.

NPPES	CMS National Plan and Provider Enumeration System — monthly full-replacement CSV. Maps each NPI to its primary registered ZIP code.
ZCTA centroids	GeoNames US postal code file. Maps each 5-digit ZIP to a (latitude, longitude) centroid for map placement.

Process: Extract all NPIs from the MRF file → resolve each NPI to its primary practice ZIP via NPPES → aggregate provider count per ZIP → map each ZIP to a lat/lon centroid via ZCTA → render as a weighted heatmap (intensity \propto provider count per ZIP).

Limitations: NPIs absent from NPPES (recently issued, test NPIs, EINs) are excluded and reduce the geocoding match rate. Location reflects the provider's NPPES-registered primary address, not necessarily where they accept this specific plan. Map viewport covers the bounding box of ZIP codes representing 90% of total provider count, dropping sparse geographic outliers.