MRF Quality Report

s3://talon-storage-private/mrf-feed-uploads/2025-11/2025-11-24_encore-health_encore_in-network-rates.json

Size: 500.40 MB • MD5: ef2624c57d0a84e30abaec0f82803fc3

Payer: **The Healthcare Group dba Encore Health Network** • File Date: **2022-08-31** • Generated: **2026-04-24 22:58 EDT** • Tool Version: **1.0.0** • Elapsed: **143.20s**

65.0

Limited Reliability

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

Errors: 4 • Warnings: 9 • Info: 2

TOC Plan References

TOC: s3://talon-storage-private/mrf-feed-uploads/2025-11/2025-11_plan_ref_dbee9768b7ad2a5bedee24d3929168bf_index.json • Talon

Canonical: s3://talon-storage-private/mrf-feed-uploads/2025-11/2025-11-24_encore-health_encore_in-network-rates.json

Plan Name	Plan ID	Issuer / Sponsor	Market
Encore	Encore Health (custom)	—	—

CMS Official Schema Validation

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

Validator output:

```
error Data file does not contain version information. Please run again using the --schema-version option to specify a version.
```

Dimension Scores

Dimension	Score	Weight	Findings
Schema Integrity	70.0	30%	5
Provider Mapping	99.9	15%	3

Dimension	Score	Weight	Findings
Code Coverage	**90.0**	15%	2
Pricing Sanity	**68.5**	40%	5

Schema Integrity — Findings

Score: 70.0

ERROR `required_header_fields`

Missing required header fields: ['version']

WARNING `header_conditional`

plan_sponsor_name is required when plan_id_type == 'ein'

ERROR `file_freshness`

File is 1332 days old (last_updated_on exceeds the 90-day threshold)

WARNING `empty_negotiated_rates`

2 in_network items have empty negotiated_rates arrays (0.0%) — dead records

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: 99.9

WARNING `npi_validity`

0.07% of NPIs failed Luhn checksum validation (44 of 60036)

- 10027007
- 100267970
- 192971326
- 364797599
- 1033190625
- *… and 5 more*

WARNING `ein_validity`

0.34% of EINs failed IRS prefix validation (20 of 5804)

- 009466371
- 076587846
- 085425447
- 175426910
- 181347811
- *… and 5 more*

INFO `duplicate_npis`

8828 NPIs appear in more than one provider group

Code Coverage — Findings

Score: 90.0

WARNING `billing_code_format`

7874 CPT codes do not match expected format

WARNING `billing_code_format`

2600 HCPCS codes do not match expected format

Pricing Sanity — Findings

Score: 68.5

INFO `percentage_rates`

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

ERROR `zero_rates`

15438 zero-dollar rates (1.09%) — CMS schema requires negotiated_rate > 0 (exclusiveMinimum)

WARNING `high_frequency_rate_value`

2 rate value(s) appear with suspiciously high frequency (≥0.5% of dollar rates and ≥50 occurrences) — likely placeholder/sentinel values rather than real negotiated rates.

- {'rate': 80.0, 'count': 11631, 'pct': 0.82}
- {'rate': 85.0, 'count': 8180, 'pct': 0.58}

WARNING `rate_spread_by_class`

billing_class='professional' / negotiated_type='negotiated': P95/P50 spread is 10.7x (threshold: 5x, N=1,412,980 (1,000 sampled), high confidence)

WARNING `per_code_rate_spread`

2032 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
J1411	CPT	negotiated	professional	ffs	—	$60.00	$3570000.00	$3109362.58	$3570000.00	**59500.0×**	31
J3399	CPT	negotiated	professional	ffs	—	$60.00	$2299500.25	$2007945.21	$2299500.25	**38325.0×**	32
J7680	CPT	negotiated	professional	ffs	—	$0.01	$85.00	$75.77	$100.00	**10000.0×**	13
J7681	CPT	negotiated	professional	ffs	—	$0.01	$82.50	$73.75	$100.00	**10000.0×**	12
20697	CPT	negotiated	professional	ffs	—	$0.28	$0.32	$807.40	$2421.59	**8648.5×**	3
20697	CPT	negotiated	professional	ffs	—	$0.28	$0.32	$807.40	$2421.59	**8648.5×**	3
20697	CPT	negotiated	professional	ffs	—	$0.28	$0.32	$807.40	$2421.59	**8648.5×**	3
20697	CPT	negotiated	professional	ffs	—	$0.28	$0.32	$807.40	$2421.59	**8648.5×**	3
Q0171	CPT	negotiated	professional	ffs	—	$0.01	$0.91	$7.39	$85.00	**8500.0×**	36
J0665	CPT	negotiated	professional	ffs	—	$0.01	$0.02	$4.31	$60.00	**6000.0×**	56

Recommended Actions

1. **schema** `required_header_fields` — **P1**

Missing required header fields: ['version']

2. **schema** `file_freshness` — **P1**

File is 1332 days old (last_updated_on exceeds the 90-day threshold)

3. **schema** `cms_schema_validation` — **P1**

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

4. **pricing** `zero_rates` — **P1**

15438 zero-dollar rates (1.09%) — CMS schema requires negotiated_rate > 0 (exclusiveMinimum)

5. **provider_mapping** `npi_validity` — **P2**

0.07% of NPIs failed Luhn checksum validation (44 of 60036)

6. **provider_mapping** `ein_validity` — **P2**

0.34% of EINs failed IRS prefix validation (20 of 5804)

7. **pricing** `high_frequency_rate_value` — **P2**

2 rate value(s) appear with suspiciously high frequency (≥0.5% of dollar rates and ≥50 occurrences) — likely placeholder/sentinel values rather than real negotiated rates.

8. **pricing** `rate_spread_by_class` — **P2**

billing_class='professional' / negotiated_type='negotiated': P95/P50 spread is 10.7x (threshold: 5x, N=1,412,980 (1,000 sampled), high confidence)

9. **pricing** `per_code_rate_spread` **P2**

2032 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.

10. **schema** `header_conditional` **P2**

plan_sponsor_name is required when plan_id_type == 'ein'

11. **schema** `empty_negotiated_rates` **P2**

2 in_network items have empty negotiated_rates arrays (0.0%) — dead records

12. **code_coverage** `billing_code_format` **P3**

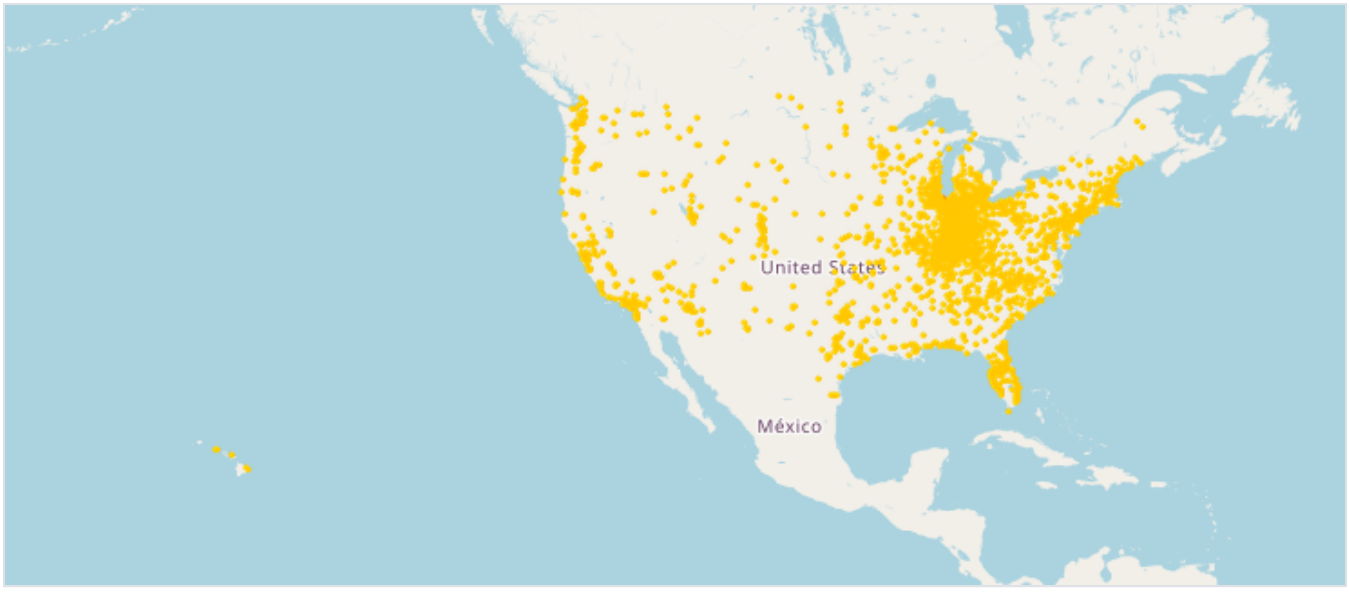
7874 CPT codes do not match expected format

13. **code_coverage** `billing_code_format` **P3**

2600 HCPCS codes do not match expected format

Provider Geographic Coverage

47259 unique NPIs found — 46546 geocoded (98%) — 3526 zip codes represented.



Schema Integrity — Metrics

header_missing_fields	version	
header_conditional_issues	plan_sponsor_name is required when plan_id_type == 'ein'	
file_age_days	1332	
items_total	22380	
items_missing_required_pct	0.0	
items_empty_rates	2	
prices_total	1418205	
prices_missing_required_pct	0.0	
prices_missing_field_breakdown		
prices_missing_service_code	0	
prices_invalid_billing_class	0	
rates_without_providers	0	
negotiation_arrangements	**ffs**	22380
billing_code_types	**CPT**	18762
	HCPCS	2668
	RC	161
	AP-DRG	788
	CSTM-ALL	1

expired_prices	0
invalid_expiration_format	0

Provider Mapping — Metrics

provider_references_in_file	5946
provider_group_ids_referenced	5804
unresolved_references	0
resolution_rate_pct	100.0
npis_validated	60036
invalid_npi_count	44
npi_validity_rate_pct	99.93
invalid_npi_examples	10027007, 100267970, 192971326, 364797599, 1033190625, 1033190625, 1033190625, 1033190625, 1053548570, 1053561252
eins_validated	5804
invalid_ein_count	20
ein_validity_rate_pct	99.66
invalid_ein_examples	009466371, 076587846, 085425447, 175426910, 181347811, 184366929, 189663275, 196446983, 284500476, 287447787
empty_npi_groups	0
groups_without_tin	0
npis_in_multiple_groups	8828

Code Coverage — Metrics

unique_codes_total	22380
duplicate_codes	0
duplicate_pct	0.0
by_code_type	CPT: 18762 HCPCS: 2668 RC: 161 AP-DRG: 788 CSTM-ALL: 1

unknown_code_types		
format_invalid_by_type	CPT	7874
	HCPCS	2600
codes_not_in_reference	reference_not_loaded	

most_frequent_codes

Type	Code	Occurrences
CPT	0001A	1
CPT	0001M	1
CPT	0001U	1
CPT	0002A	1
CPT	0002M	1
CPT	0002U	1
CPT	0003A	1
CPT	0003M	1
CPT	0003T	1
CPT	0003U	1
CPT	0004A	1
CPT	0004M	1
CPT	0005U	1
CPT	0006M	1
CPT	0006U	1
CPT	0007M	1
CPT	0007U	1
CPT	0008M	1
CPT	0008T	1
CPT	0008U	1

Pricing Sanity — Metrics

total_prices_checked	1418205
total_rates	1418156
per_diem_rates	0
percentage_rates	49
negative_rates	0
zero_rates	15438
extreme_high_rates	1369
extreme_low_rates	0

rate_distribution

sample_n	1418156
sample_k	5000
confidence	high
p5	7.77
p25	62.6075
p50	245.04500000000002
p75	831.5825
p95	2772.3735
p99	7221.784300000022

by_billing_class

Class / Type	Count	Median	p25	p75	p95	Confidence
professional/negotiated	1,412,980	243.4	57.2	802.8	2596.8	high
institutional/negotiated	5,176	8310.0	3848.0	26499.5	79232.6	high

negotiated_types

negotiated	1418156

unique_rate_contexts

145058

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%)	`resolution_rate% × 0.60`
npi_validity (30%)	`(100 − invalid_npi_pct × 5) × 0.30`
ein_validity (10%)	`10 − (invalid_ein_pct × 0.1) [0% invalid → 10 pts, 100% invalid → 0 pts, linear]`

Code Coverage

Tracks every (billing_code_type, billing_code) pair and flags unrecognized CMS TIC code types, format violations for CPT/HCPCS/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	`× 0.5 (cap 10)`
duplicate_code_pct	`× 2 (cap 20)`
codes_not_in_reference_pct	`× 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	`× 5 (cap 20)`
zero_rate_pct	`× 3 (cap 15)`
extreme_rate_pct	`× 5 (cap 25) — ffs only`
class_spread_excess	`(spread − threshold) × 2, max across (billing_class, negotiated_type) buckets (cap 15)`
per_code_high_spread_count	`× 0.1 (cap 15)`
invalid_negotiated_type_pct	`× 3 (cap 10) — rates silently dropped`
invalid_setting_pct	`× 1 (cap 5) — silently defaults to wildcard`
invalid_severity_pct	`× 1 (cap 5) — silently normalised to ''`
institutional_with_service_codes_pct	`× 1 (cap 5) — extra key variation`
invalid_service_code_pct	`× 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 `reporting_entity_name` and `plan_id` are present. Key input: `plan|<entity>|<plan_id_type>|<plan_id>`. Stable across monthly re-exports.
Tier 2 — URL hash	Fallback when `plan_id` 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 `plan_id` 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 = `55ee3ec3f939ada1` · entity = The Healthcare Group dba Encore Health Network · plan_id = `352067676` (EIN) · 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 ∝ 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.