

# Orthopedic Surgeon Supply by State

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Public methodology surface -- <https://fonteum.com/methodology/orthopedic-supply>

Active U.S. orthopedic surgeons per 100,000 residents, by state.

## Source provenance

Source families: CMS NPPES NPI Registry (public API) + U.S. Census Bureau Population Estimates Program (PEP) V2025

Spatial resolution: State (50 + DC). NPPES does not publish a county-level field of practice in its public API.

Temporal coverage: 2026 snapshot (NPPES queried 2026-05-06; Census 2024 vintage).

Refresh cadence: Quarterly NPPES refresh; annual Census denominator update.

Snapshot: 30,447 orthopedic surgeons across 51 states + DC, dated 2026-05-06.

## Reproducibility

1. Query the NPPES API at <https://npiregistry.cms.hhs.gov/api/> with `taxonomy_description=<NUCC name>` and `enumeration_type=NPI-1` for each NUCC taxonomy in the parent specialty's scope (full list in the parent study's methodology).
2. Filter results to records with active license status.
3. Bucket by practice-address state (50 USPS codes + DC).
4. Pull U.S. Census Bureau PEP V2025 (2024 vintage) state population estimates from <https://www.census.gov/programs-surveys/popest.html>.
5. Compute  $\text{per\_100k} = \text{count} / \text{population} \times 100,000$  per state. Rank ascending and bucket into quartiles by rank.
6. Apply the parent study's transparent underserved threshold to flag the per-state row's underserved boolean.

The full ingest script is published at `scripts/research/nppes-write.ts` in the Fonteum engine repository (private). Customers under a pilot or Standard agreement can request the script for independent reconciliation.

## Limitations

- Counts NPI-1 individual providers only; the parent specialty taxonomy plus any subspecialty taxonomies the Sec.183 / Sec.188 ingest scoped to. PAs / NPs / CNMs working in the same care setting under different taxonomy codes are out of scope.
- Dataset measures density (per-capita supply), not access. Drive time, appointment availability, insurance acceptance, and wait times are not modeled.
- Underserved threshold is the parent study's transparent baseline cutoff, not a regulatory or clinical definition.
- Provider state is the practice-address state in NPPES. NPPES does not publish a county-level field of practice in its public API; county queries surface state-level density.
- NPPES `last_updated` reflects when CMS last touched the record -- providers may have moved, retired, or changed practice settings without updating their NPPES record. Roughly 5-15% of records have `last_updated > 5` years per CMS published quality reports.

- U.S. Census Bureau PEP V2025 (2024 vintage) state population. Annual estimates between decennial counts; Census itself documents a confidence band of ~0.5-2% depending on state.
- Estimates do not reflect mid-2025+ population movements. Major hurricane / wildfire displacements may distort per-capita ratios for several quarters until next vintage.

## Field schema

- > **npi** -- Individual provider NPI (10-digit).
  - Source: CMS NPPES NPI Registry (public API) (<https://npiregistry.cms.hhs.gov/api/>)
  - Refresh: Quarterly - Confidence: 1.0 (verbatim)
- > **taxonomy\_codes** -- All NUCC taxonomy codes attached to the record (primary + subspecialties).
  - Source: CMS NPPES NPI Registry (public API) (<https://npiregistry.cms.hhs.gov/api/>)
  - Refresh: Quarterly - Confidence: 1.0 (verbatim)
- > **taxonomy\_primary** -- The provider's primary NUCC taxonomy code.
  - Source: CMS NPPES NPI Registry (public API) (<https://npiregistry.cms.hhs.gov/api/>)
  - Refresh: Quarterly - Confidence: 1.0 (verbatim)
- > **state** -- Practice-address state (USPS code) at the time of NPPES record's last\_updated.
  - Source: CMS NPPES NPI Registry (public API) (<https://npiregistry.cms.hhs.gov/api/>)
  - Refresh: Quarterly - Confidence: 1.0 (verbatim)
- > **city** -- Practice-address city at the time of NPPES record's last\_updated.
  - Source: CMS NPPES NPI Registry (public API) (<https://npiregistry.cms.hhs.gov/api/>)
  - Refresh: Quarterly - Confidence: 1.0 (verbatim)
- > **last\_updated** -- When CMS last modified the NPPES record. Reflects record freshness, not Fonteum snapshot date.
  - Source: CMS NPPES NPI Registry (public API) (<https://npiregistry.cms.hhs.gov/api/>)
  - Refresh: Quarterly - Confidence: 1.0 (verbatim)
- > **population\_2024** -- PEP V2025 state population estimate for 2024 vintage.
  - Source: U.S. Census Bureau Population Estimates Program (PEP) V2025 (<https://www.census.gov/programs-surveys/popest.html>)
  - Refresh: Annual (V<year> vintage releases each March) - Confidence: 1.0 (verbatim)
- > **count** -- orthopedic surgeons active in NPPES as of snapshot date. The Sec.193 sub-specialty filter parameter (`?subspecialty=<NUCC code>`) on the public API recomputes counts and density against any registered subspecialty taxonomy.
  - Source: Fonteum Research (derived from CMS NPPES + U.S. Census Bureau)
  - Refresh: Recomputed on each NPPES + Census refresh cycle - Confidence: 0.95
- > **per\_100k** -- orthopedic surgeons per 100,000 residents (count / population x 100,000).
  - Source: Fonteum Research (derived from CMS NPPES + U.S. Census Bureau)
  - Refresh: Recomputed on each NPPES + Census refresh cycle - Confidence: 0.95
- > **rank\_density** -- 1..51 rank by per\_100k across U.S. states + DC.
  - Source: Fonteum Research (derived from CMS NPPES + U.S. Census Bureau)
  - Refresh: Recomputed on each NPPES + Census refresh cycle - Confidence: 0.95
- > **rank\_count** -- 1..51 rank by absolute count.
  - Source: Fonteum Research (derived from CMS NPPES + U.S. Census Bureau)
  - Refresh: Recomputed on each NPPES + Census refresh cycle - Confidence: 0.95
- > **quartile** -- Q1..Q4 from rank\_density.
  - Source: Fonteum Research (derived from CMS NPPES + U.S. Census Bureau)
  - Refresh: Recomputed on each NPPES + Census refresh cycle - Confidence: 0.95
- > **underserved** -- Boolean: per\_100k below the transparent threshold defined in the parent study.
  - Source: Fonteum Research (derived from CMS NPPES + U.S. Census Bureau)
  - Refresh: Recomputed on each NPPES + Census refresh cycle - Confidence: 0.9 - Caveat: Threshold is a baseline cutoff, not a regulatory or clinical definition.

## Version history

v2026.05.0 - released 2026-05-06

Initial Audit Pack release. Methodology, provenance map, reproducibility statement, and limitations stack baselined.

## Citation

APA:

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Plain text:

Fonteum -- Orthopedic Surgeon Supply by State (v2026.05.0). Snapshot 2026-05-06. <https://fonteum.com/methodology/orthopedic-supply>

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## Cross-references

Audit Pack: <https://fonteum.com/audit-pack/orthopedic-supply>

Research study: <https://fonteum.com/research/orthopedic-surgeon-supply-by-state-2026>

Limitations: <https://fonteum.com/methodology/orthopedic-supply#limitations>

Operator: [api@fonteum.com](mailto:api@fonteum.com) (B2B inquiries) / [corrections@fonteum.com](mailto:corrections@fonteum.com) (data issues)