SAEM 2026 · EMS · NATIONAL DESCRIPTIVE ANALYSIS

Do NEMSIS Urbanicity Categories Represent Homogeneous EMS Operating Environments?

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21.8 min

URBAN 90TH–10TH PERCENTILE SPREAD OF RESPONSE TIMES

Within-category heterogeneity exceeds inter-category gradient

53.3M

911 ACTIVATIONS · NEMSIS 2024 PUBLIC-RELEASE

86.7% Urban · 6.0% Suburban · 6.2% Rural · 1.1% Frontier

CV 1.13

WITHIN-CATEGORY VARIABILITY — HIGHEST IN URBAN

Lowest in Frontier (CV 1.06) · paradoxical pattern

2.8 min

SPREAD OF URBAN MEDIANS ACROSS CENSUS DIVISIONS

East North Central 6.5 → East South Central 9.3 min

BACKGROUND

Urbanicity is geography of labor markets, not of operating environments.

Urbanicity is among the most widely used stratification variables in EMS research, yet these categories (Urban, Suburban, Rural, Frontier) may not capture what researchers assume.

In NEMSIS, urbanicity categories do not directly reflect built environment conditions, as their names might imply. Instead, urbanicity is derived from Metropolitan Statistical Area (MSA) county membership — a classification used to define regional labor markets.

> **Urban = any county in a large metro area (city & suburbs)**

> **Suburban = micropolitan counties (10k–50k)**

> **Rural / Frontier = remaining areas**

No prior work has systematically examined whether these administrative categories correspond to homogeneous EMS operating environments.

METHODS

National descriptive analysis of NEMSIS 2024 911 activations.

Source. NEMSIS 2024 public-release 911 activations.

Within-category metrics. Median · IQR · 90th–10th percentile range · coefficient of variation (CV).

Overlap analysis. Proportion of Urban/Suburban responses exceeding the Rural median.

Geographic stratification. Urban responses stratified by Census Division.

RESULTS

Within-category variation overwhelms between-category gradient.

53,339,824	Total activations analyzed
86.7%	Urban share of activations
6.0% / 6.2% / 1.1%	Suburban / Rural / Frontier shares
CV 1.13	Urban (highest within-category variability)
CV 1.06	Frontier (lowest variability — paradoxical)
21.8 min	Urban 90th–10th percentile range
7.7 / 8.5	Urban / Suburban median response time (min)
9.0 / 10.7	Rural / Frontier median response time (min)
40% / 46%	Urban / Suburban responses exceeding the Rural median
35%	Urban responses exceeding 10 minutes
6.5 → 9.3	Urban medians across Census Divisions *(East North Central → East South Central)*

CONCLUSION

MSA-based classification captures labor-market geography, not operational EMS contexts.

NEMSIS urbanicity categories exhibit substantial within-category heterogeneity that challenges their use as proxies for homogeneous EMS operating environments. Variability was paradoxically highest in Urban and lowest in Frontier; nearly half of Suburban responses exceeded the Rural median; and Urban medians ranged 2.8 min across Census Divisions. This suggests MSA-based classification captures labor market geography rather than operational EMS contexts. Supplementary built environment measures (e.g., land use, road network) may be warranted.

ASK ME ABOUT

- MSA vs operational geography
- NEMSIS data structure
- Built-environment supplements
- Census Division spread