

## Abstract

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No disclosures

## Background

Well-established disparities are limiting the surgical treatment of Carpal tunnel syndrome (CTS). Prior studies have not identified areas in greatest need, nor have they evaluated the differences in open and endoscopic CTS surgery.

## Methods

A cross-sectional study was conducted using data from the Centers for Medicare & Medicaid Services (CMS). Current procedural terminology codes for open and endoscopic carpal tunnel release were searched from 2013 through 2022. Moran's I statistic was calculated using geospatial analysis to determine hot (high rates) and cold (low rates) spots. Logistic regression determined the factors associated with hotspots (OR>1).

## Results

The majority of the 1,411,972 patients underwent open surgery (73.9%). For total procedures, the percentage living in a rural population (OR=0.96, [95% CI: 0.94, 0.99];  $p=0.0018$ ) was a predictor of cold spots. For open procedures, a greater percentage living in a rural environment (OR=0.97, [95% CI: 0.94, 0.99];  $p=0.018$ ) and a greater percentage of the county that is uninsured (OR=0.80, [95% CI: 0.67, 0.96];  $p=0.018$ ) were associated with coldspots. For endoscopic procedures, only the percentage of adults with obesity (OR=0.85, [95% CI: 0.75, 0.96];  $p=0.0072$ ) was a significant predictor of hot and cold spots.

## Conclusions

Significant disparities in access to both open and endoscopic CTS surgery exist in the United States. Living in a rural environment was the main determinant of decreased access to care, indicating a need for more hand surgeons in these areas.

Region	Division	Total Procedures		Open Procedures		Endoscopic Procedures	
		Hotspot (n=39)	Coldspot (n=65)	Hotspot (n=29)	Coldspot (n=65)	Hotspot (n=59)	Coldspot (n=52)
Northeast	New England	0	2	0	2	3	1
	Middle Atlantic	1	1	1	1	3	2
Midwest	East North Central	7	5	5	6	8	4
	West North Central	16	19	10	18	11	16
South	South Atlantic	6	15	4	12	14	12
	East South Central	3	11	3	13	6	5
	West South Central	3	8	1	7	3	5
West	Mountain	3	3	5	5	9	7
	Pacific	0	1	0	1	2	0

Table 1. Geospatial Analysis Results Categorized Geographically

Hot and cold denote hotspots (counties with increased carpal tunnel surgery rates compared to average) and coldspots (counties with decreased carpal tunnel surgery rates compared to average)

