

# Parkinson's Diagnoses Highest in Nebraska and Kansas

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Last updated 21 October 2025 • Check for updates at [EpicResearch.org](https://EpicResearch.org)

## Key Findings

- Nebraska and Kansas have the highest rates of Parkinson's disease among U.S. states studied, with 620 and 596 people diagnosed per 100,000 patients, respectively. Even after adjusting for other factors like age, sex, and comorbidities, Nebraska and Kansas continue to have the highest rates among U.S. states, suggesting the elevation is not solely due to demographics.

Parkinson's disease, a progressive neurodegenerative disorder, is considered a multi-factorial disease influenced by genetic factors, comorbidities, and environmental exposures such as air pollution and chemicals used in manufacturing and agriculture.<sup>1</sup> Understanding geographic patterns of Parkinson's diagnoses can offer important clues about potential environmental contributions and regional differences.

We studied more than 46 million adult patients across 49 U.S. states who had at least three outpatient visits between 2020 and 2025 to better understand patterns of Parkinson's diagnoses. Data for Alaska were too sparse to conduct a meaningful analysis. We first examined the unadjusted incidence rates for each state and then calculated an adjusted rate that accounted for age, sex, and comorbidities.

When looking at unadjusted incidence rates, we found that Nebraska (620 per 100,000 patients) and Kansas (596 per 100,000 patients) had the highest rates of newly diagnosed Parkinson's disease during the study period. States with the lowest observed rates were Montana (264 per 100,000 patients) and Nevada (275 per 100,000 patients).

After adjusting for patient age, time in the study, sex, race, ethnicity, and comorbidities, a relative rate was established for each state compared to Minnesota, the median for overall rates. Nebraska and Kansas remained the highest with 561 diagnoses per 100,000 patients and 517 diagnoses per 100,000 patients, respectively. Utah had the third highest rate at 493 diagnosed per 100,000 patients. States with the lowest relative rates were Montana (308 per 100,000 patients), Wisconsin (329 per 100,000 patients), and Washington (339 per 100,000 patients).



## Adjusted Parkinson's Diagnosis Rate by State

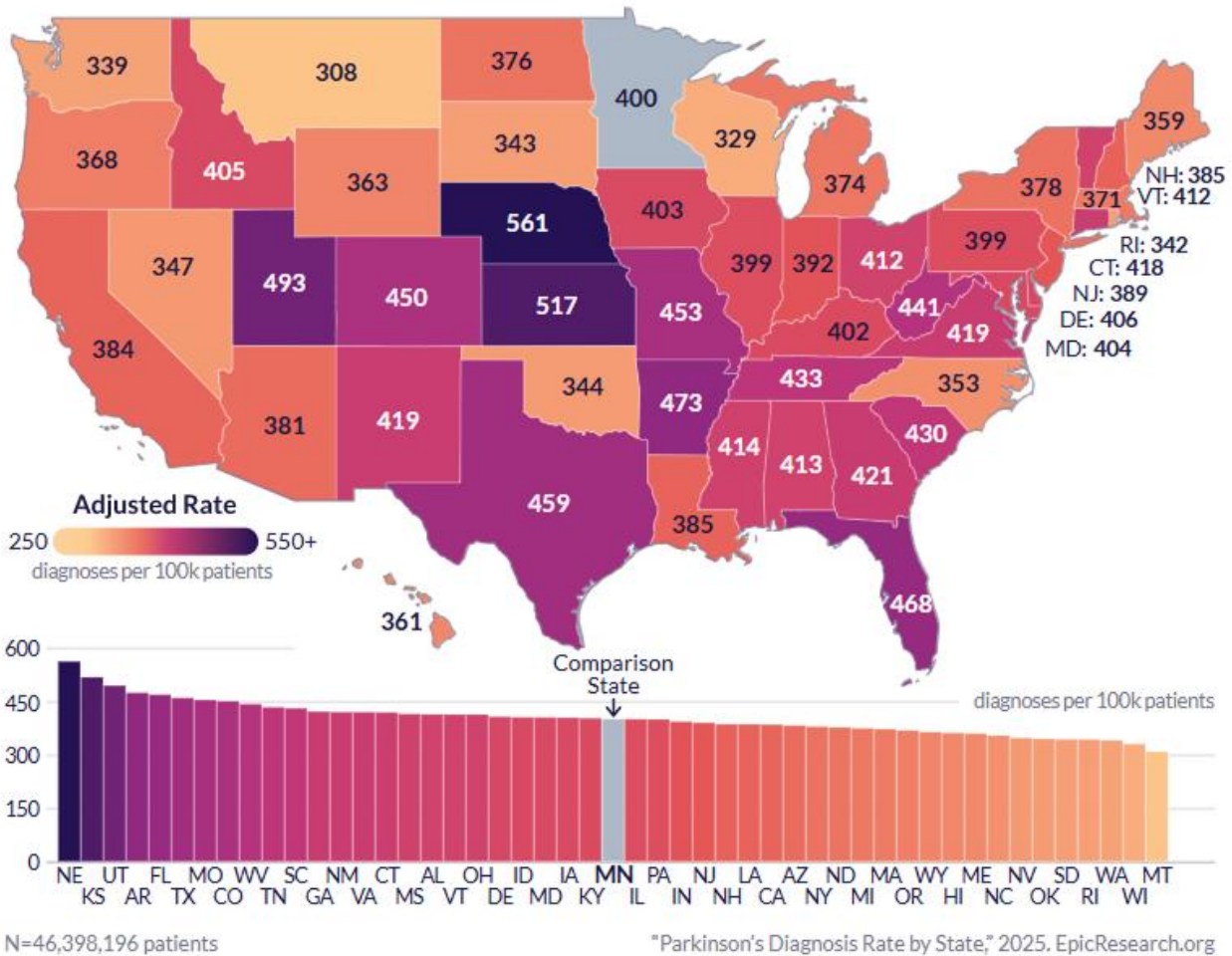


Figure 1b. The adjusted rate of Parkinson's diagnoses per 100,000 adults by state compared to Minnesota.

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 300 million patient records from 1,800 hospitals and more than 41,000 clinics from all 50 U.S. states, Canada, Lebanon, and Saudi Arabia. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Brian Olson.

## References

1. Tanner CM, Ostrem JL. Parkinson's disease. N Engl J Med. 2024;391(5):442-452. doi:10.1056/NEJMra2401857

## Data Definitions

Term	Definition
Study period	1/1/2022 to 6/1/2025
Study population: inclusion	Patients with: <ul style="list-style-type: none"> <li>An <b>outpatient face-to-face visit</b> within 2020 to 2021, 2022 to 2023, and 2024 to 2025</li> <li>An age of 20 or greater as of 1/1/2022</li> </ul>
Study population: exclusion	Any diagnoses of <b>Parkinson's</b> prior to 1/1/2022 Patients whose residence is outside of the United States
Outpatient face-to-face visit	An encounter of type Emergency, Office Visit, Well Child, Follow-Up, Telemedicine, Urgent Care, Walk-In, Routine Prenatal, Postpartum Visit, Fetal Care Consult, or Hospital Outpatient Visit
Exposures	Patient's state of residence as of their most recent healthcare encounter
Parkinson's	A diagnosis with ICD-10-CM code G20* or SNOMED code 49049000
Confounders	Reliable sex Age <ul style="list-style-type: none"> <li>&lt;=34</li> <li>35-49</li> <li>50-64</li> <li>65-74</li> <li>75-84</li> <li>85+</li> </ul> History of <b>TBI</b> History of <b>type 2 diabetes</b> History of <b>CVD</b> Race and ethnicity
TBI (traumatic brain injury)	A diagnosis with ICD-10-CM code S06* or SNOMED code 127295002
Type 2 diabetes	A diagnosis with ICD-10-CM code E11*
CVD (cardiovascular disease)	A diagnosis with ICD-10-CM code I20*-I26*, I30*-I39*, I40*-I49*, I51*, or I70*-I79*
Race and ethnicity	Patients were classified by self-reported race and ethnicity as Hispanic (any race), multiracial, non-Hispanic Black only (Black), non-Hispanic White only (White), non-Hispanic Asian only (Asian), other, or unknown
Model specifications	Rates per state Adjusted model: <ul style="list-style-type: none"> <li>Incidence density sampling matching patients 1:4 on age bucket and time in the study</li> <li>Survival analysis adjusting for <b>confounders</b> to get a hazard ratio per state</li> <li>Formula: MN unadjusted rate * the state of interest's hazard ratio</li> </ul>

**Table 1: Parkinson's Diagnosis Rate by State**

State	Dx Pts	Pts In State	Unadjusted Rate per 100k	Adjusted Rate per 100k
NE	1,882	303,330	620	561
KS	1,978	331,861	596	517
WV	1,839	378,898	485	441
FL	8,082	1,668,869	484	468
MO	1,674	346,399	483	453
VT	904	192,481	470	412
WY	225	50,721	444	363
AL	855	199,359	429	413
AR	1,608	375,834	428	473
DE	644	150,642	428	406
ID	1,426	333,670	427	405
TN	1,907	446,316	427	433
NM	325	76,188	427	419
CT	5,284	1,248,315	423	418
SC	4,888	1,164,092	420	430
ME	1,367	326,142	419	359
UT	885	211,543	418	493
NH	1,011	241,969	418	385
VA	8,090	1,982,070	408	419
TX	13,502	3,322,761	406	459
RI	183	45,219	405	342
OH	16,378	4,084,800	401	412
MN	4,394	1,099,715	400	400
MS	2,847	717,244	397	414
HI	1,048	268,586	390	361
PA	13,038	3,342,564	390	399
NJ	3,376	869,966	388	389
KY	3,836	1,000,335	383	402
CO	3,149	821,497	383	450
NY	9,653	2,527,575	382	378
AZ	1,364	360,283	379	381
LA	3,196	846,221	378	385
MD	2,728	729,126	374	404
IL	8,356	2,240,130	373	399
IA	2,691	724,293	372	403
GA	2,915	803,224	363	421
IN	4,247	1,176,761	361	392
OR	2,462	685,744	359	368

MI	7,516	2,140,197	351	374
OK	1,276	363,488	351	344
CA	7,053	2,066,061	341	384
ND	965	284,051	340	376
MA	3,635	1,081,463	336	371
NC	7,446	2,222,610	335	353
WA	1,682	527,419	319	339
SD	548	173,131	317	343
WI	4,502	1,471,780	306	329
NV	714	259,837	275	347
MT	207	78,518	264	308