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Trends in State-Level Pharmacy-Based Naloxone Dispensing Rates, 2012–2019

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Abstract

Introduction: Improving access to naloxone is an important public health strategy in the U.S. This study examines the state-level trends in naloxone dispensing from 2012 to 2019 for all 50 states and the District of Columbia.

Methods: Data from IQVIA Xponent were used to examine the trends and geographic inequality in annual naloxone dispensing rates and the number of naloxone prescriptions dispensed per high-dose opioid prescription from 2012 to 2019 and from 2016 to 2019 to correspond with the Centers for Disease Control and Prevention Guideline for Prescribing Opioids for Chronic Pain release. Annual percentage change was estimated using linear regression. Analyses were conducted in 2020.

Results: Naloxone dispensing rates and the number of naloxone prescriptions per 100 high-dose opioid prescriptions increased from 2012 to 2019 across all states and the District of Columbia. Average state-level naloxone dispensing rates increased from 0.55 per 100,000 population in 2012 to 45.60 in 2016 and 292.31 in 2019. Similarly, the average number of naloxone prescriptions per 100 high-dose opioid prescriptions increased from 0.002 in 2012 to 0.24 in 2016 and 3.04 in 2019. Across both measures of naloxone dispensing, the geographic inequality gap increased during the

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SUPPLEMENTAL MATERIAL

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study period. In 2019, the number of naloxone prescriptions dispensed per 100 high-dose opioid prescriptions ranged from 1.04 to 16.64 across states.

Conclusions: Despite increases in naloxone dispensing across all states, dispensing rates remain low, with substantial variation and increasing disparities over time at the state level. This information may be helpful in efforts to improve naloxone access and in designing state-specific intervention programs.

INTRODUCTION

In 2019, a total of 49,860 drug overdose deaths in the U.S. involved opioids.¹ Naloxone can reverse the effects of an opioid overdose, and its distribution is a key part of the public health response to the opioid overdose epidemic.² The Centers for Disease Control and Prevention (CDC) Guideline for Prescribing Opioids for Chronic Pain³ recommends considering offering naloxone when the risk factors for overdose (opioid dosages \geq 50 morphine milligram equivalents per day or concurrent opioid and benzodiazepine use) are present. In addition, the U.S. Food and Drug Administration recommends that clinicians discuss naloxone with patients when prescribing opioids.⁴

In response to the opioid overdose epidemic, states have implemented laws permitting pharmacy-based dispensing through standing orders, authorizing third-party prescriptions, and mandating coprescribing to patients at an increased risk for overdose.^{5,6} These laws have been associated with an increase in naloxone dispensing.^{6–10}

Although research has found substantial increases in naloxone dispensing in the U.S.,¹¹ knowledge of state-level trends is lacking. This study examines the state-level trends in community pharmacy naloxone dispensing from 2012 to 2019.

METHODS

Data from IQVIA Xponent were used to examine naloxone dispensing rates and naloxone prescriptions per 100 high-dose opioid prescriptions from community pharmacies from January 1, 2012 through December 31, 2019.¹² The data contain approximately 92% of all prescriptions dispensed from community pharmacies across all payers in the U.S.¹¹ Prescriptions were identified using National Drug Codes.

Annual naloxone dispensing rates were calculated by dividing the number of naloxone prescriptions per 100,000 population using U.S. Census data. The number of naloxone prescriptions per 100 high-dose opioid prescriptions was also computed. *High-dose opioid prescriptions* were defined as \geq 50 morphine milligram equivalents per day.³

State-level variation was measured by computing the relative geographic inequality, which was calculated as the ratio of the 90th percentile to the 10th percentile.¹³ All analyses were conducted using Stata, version 15.

Additional analyses examined naloxone dispensing from 2016 to 2019 to examine changes after the release of CDC Guideline for Prescribing Opioids for Chronic Pain.³ Annual percentage change (APC) was estimated by fitting a linear model; the logarithm of the

yearly rates first was regressed on time (year), and a slope transformation was used to calculate APC.¹⁴ Analyses were conducted in 2020.

RESULTS

Naloxone dispensing increased significantly from 2012 to 2019 across all states and the District of Columbia (Table 1 and Appendix Figure 1A, available online). The increase was highest in Arizona (APC=285.42) and lowest in Delaware (APC=84.69). From 2016 to 2019, increases were highest in Hawaii (APC=253.33) and lowest in Utah (APC=20.68) (Table 1 and Figure 1A).

Naloxone dispensing per 100 high-dose prescriptions also increased significantly from 2012 to 2019 across all states and the District of Columbia (Appendix Table 1, available online, and Appendix Figure 1B, available online), with the greatest increase in Arizona (APC=343.03) and lowest in Delaware (APC=123.11). From 2016 to 2019, increases were highest in Hawaii (APC=330.63) and lowest in Utah (APC=44.72) (Figure 1B and Appendix Table 1, available online).

A wide variation in naloxone dispensing rates was observed in 2019 (Table 1 and Figure 2A). In 2019, naloxone dispensing rates per 100,000 were highest in New Mexico (1,565.50) and lowest in Nebraska (95.39). A wide variation in naloxone dispensing per 100 high-dose opioid prescriptions was also observed (Figure 2B and Appendix Table 1, available online).

In 2012, state naloxone dispensing rates had a relative geographic inequality of 12.62 (approximately a 13-fold variation among states), increasing to 19.14 in 2016 but decreasing to 3.69 in 2019 (Table 2). From 2012 to 2019, the relative geographic inequality gap increased by 14% and by 10% between 2016 and 2019.

The number of naloxone prescriptions dispensed per 100 high-dose opioid prescriptions also varied widely by state. The relative geographic inequality increased marginally between 2012 and 2016 (14.23 and 14.86, respectively) before decreasing to 3.81 in 2019 (Table 2). Between 2012 and 2019, the relative geographic inequality gap increased by 17%. Similar patterns were observed between 2016 and 2019, with the relative geographic inequality increasing by 7%.

DISCUSSION

Naloxone dispensing increased substantially from 2012 to 2019 and from 2016 to 2019. However, overall dispensing rates remain low with substantial variation across states. In 2019, only 3 naloxone prescriptions were dispensed per 100 high-dose opioid prescriptions on average, ranging from 1.04 to 16.64 across states. Increases in naloxone dispensing may be due, in part, to the CDC Guideline for Prescribing Opioids for Chronic Pain³ and due to additional efforts such as the U.S. Surgeon General call for heightened awareness and availability of naloxone,¹⁵ U.S. Department of Health and Human Services guidance on naloxone prescribing,¹⁶ and provider outreach from the Centers for Medicare and Medicaid Services.¹⁷ State legislation may have also played a role in the increase. For example, during this period, there was a substantial increase in naloxone access laws granting

direct authority to pharmacists to dispense naloxone, and several states implemented laws requiring clinicians to coprescribe naloxone when the risk factors for overdose are present.^{5,18} Consistent with previous research,¹⁰ many of the higher state-level naloxone dispensing rates observed in this study were among states with a coprescribing requirement (e.g., Arizona, California, Ohio, Rhode Island, Vermont, Virginia, Washington).

State-level community pharmacy-based naloxone dispensing trends may help inform opioid overdose prevention efforts. Barriers to naloxone dispensing from community pharmacies such as lack of supply in pharmacies, limited knowledge among pharmacists about a standing order, limited knowledge among prescribers in counseling patients about overdose and naloxone, and increasing naloxone costs may be contributing to the low rates of naloxone dispensing.^{19–25} Pharmacists and healthcare providers can play an important role by ensuring that naloxone is readily available in pharmacies, by participating in naloxone training and education, and by understanding how to talk about naloxone with patients.¹⁰ States can support healthcare providers by expanding naloxone access and helping to reduce the stigma of prescribing, dispensing, and carrying naloxone. In addition, insurers can reduce out-of-pocket costs for patients and cover naloxone prescriptions without previous approval.¹¹ The substantial variation in naloxone dispensing suggests inconsistent practice patterns and demonstrates the need for better application of guidance and standards around naloxone dispensing practices.

Limitations

This study is subject to several limitations. The analysis was limited to prescriptions dispensed by community pharmacies and does not capture naloxone received from other sources such as harm reduction programs. Available data do not permit the assessment of patient factors that could indicate overdose risk and naloxone need. The number of high-dose opioid prescriptions per naloxone prescription is an approximation. Finally, the analyses did not examine the impact of state policies aimed at increasing naloxone availability.

CONCLUSIONS

This study provides states with information about naloxone dispensing rates and highlights the geographic inequalities and changes in disparities over time. Addressing the opioid overdose epidemic will require comprehensive efforts to improve naloxone access and distribution. Such efforts are of increased urgency given the worsening and expanding drug overdose epidemic and the increased use of potent synthetic drugs such as illicitly manufactured fentanyl and fentanyl analogs.¹

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

ACKNOWLEDGMENTS

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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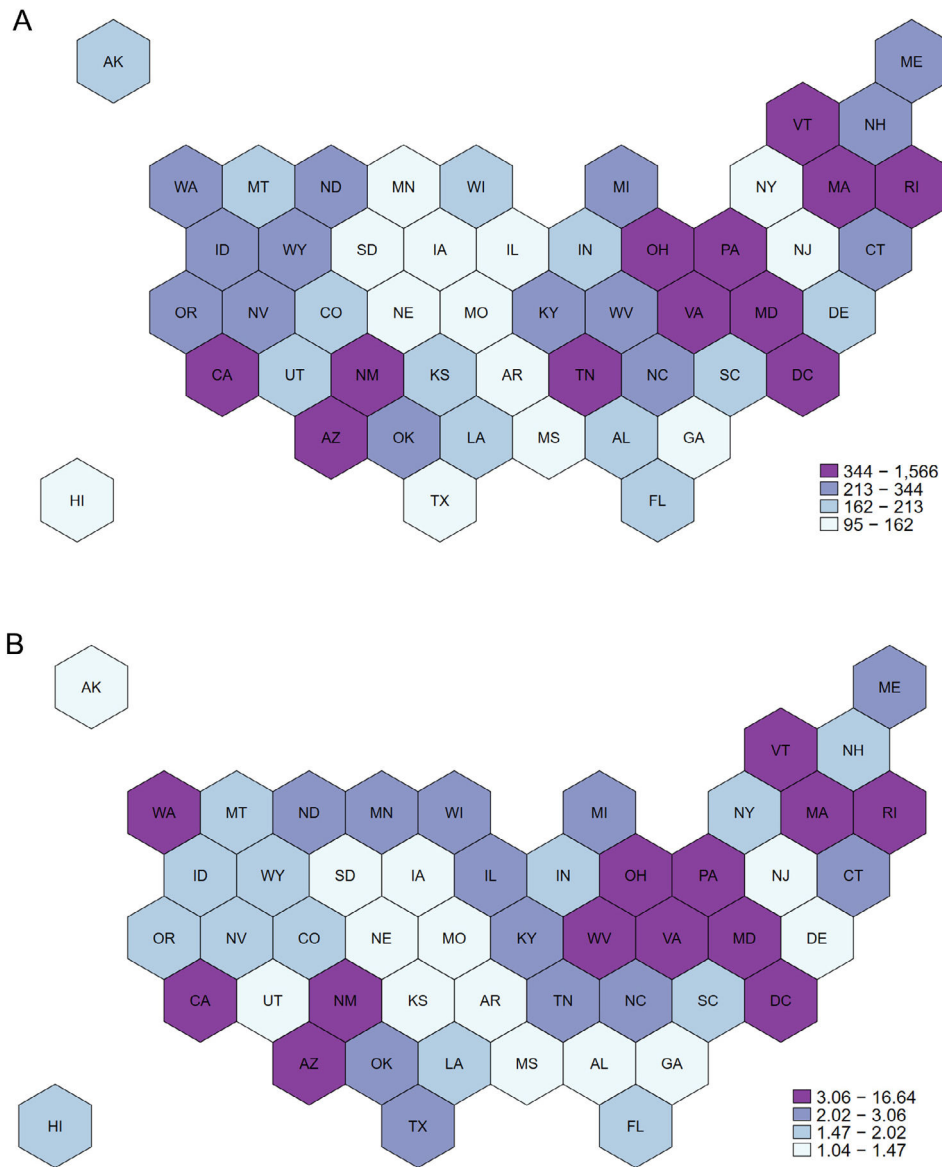


Figure 1. (A) Annual percentage change in naloxone dispensing rate per 100,000 population, by state, 2016–2019. (B) Annual percentage change in naloxone prescriptions dispensed per 100 high-dose opioid prescriptions, by state, 2016–2019.

Note: High-dose opioid prescriptions are defined as 50 morphine milligram equivalents per day.

AK, Alaska; AL, Alabama; AR, Arkansas; AZ, Arizona; CA, California; CO, Colorado; CT, Connecticut; DC, District of Columbia; DE, Delaware; FL, Florida; GA, Georgia; HI, Hawaii; IA, Iowa; ID, Idaho; IL, Illinois; IN, Indiana; KS, Kansas; KY, Kentucky; LA, Louisiana; MA, Massachusetts; MD, Maryland; ME, Maine; MI, Michigan; MN, Minnesota; MO, Missouri; MS, Mississippi; MT, Montana; NC, North Carolina; ND, North Dakota; NE, Nebraska; NH, New Hampshire; NJ, New Jersey; NM, New Mexico; NV, Nevada; NY, New York; OH, Ohio; OK, Oklahoma; OR, Oregon; PA, Pennsylvania; RI, Rhode Island; SC,

South Carolina; SD, South Dakota; TN, Tennessee; TX, Texas; UT, Utah; VA, Virginia; VT, Vermont; WA, Washington; WI, Wisconsin; WV, West Virginia; WY, Wyoming.

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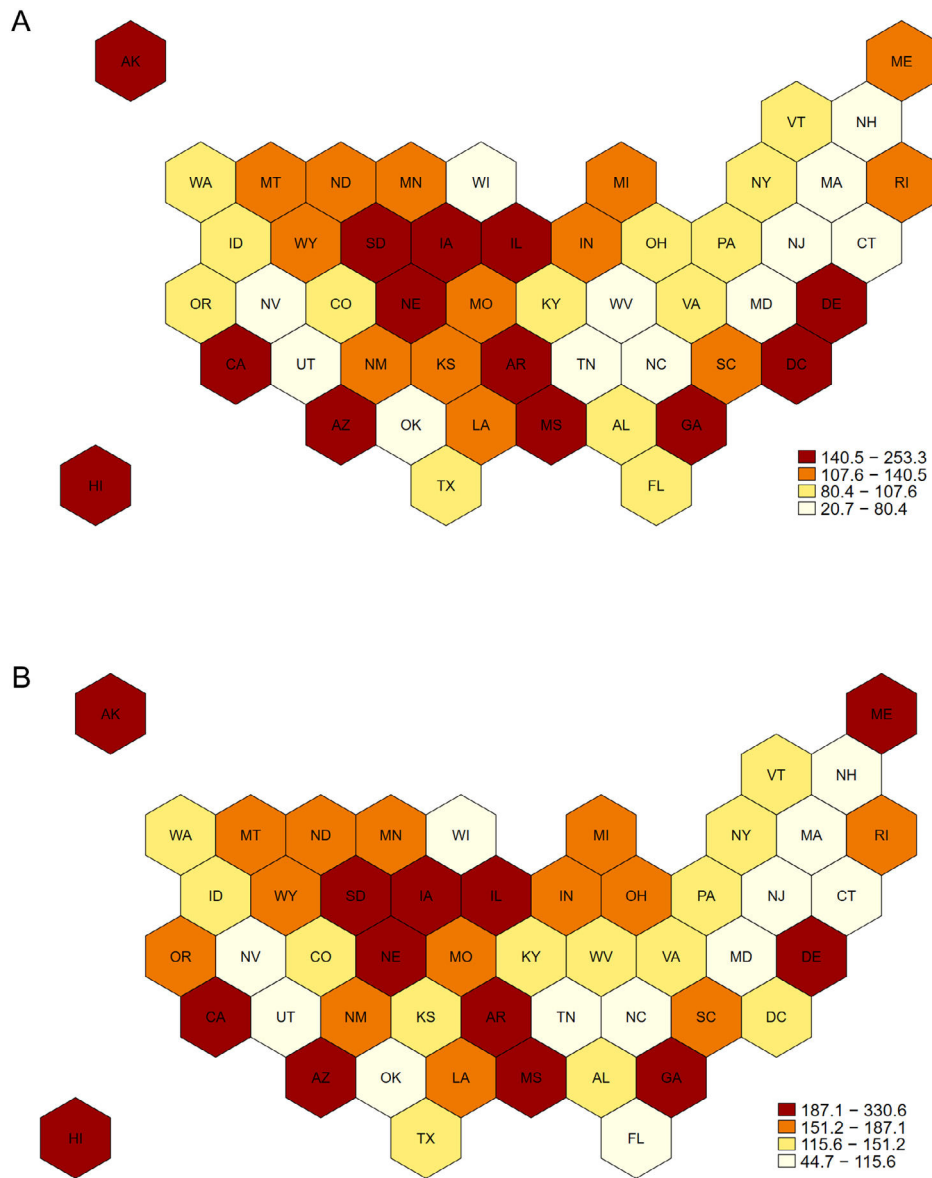


Figure 2. (A) Naloxone dispensing rate per 100,000 population, by state, 2019. (B) Naloxone prescriptions dispensed per 100 high-dose opioid prescriptions, by state, 2019. *Note: High-dose opioid prescriptions* are defined as 50 morphine milligram equivalents per day.

AK, Alaska; AL, Alabama; AR, Arkansas; AZ, Arizona; CA, California; CO, Colorado; CT, Connecticut; DC, District of Columbia; DE, Delaware; FL, Florida; GA, Georgia; HI, Hawaii; IA, Iowa; ID, Idaho; IL, Illinois; IN, Indiana; KS, Kansas; KY, Kentucky; LA, Louisiana; MA, Massachusetts; MD, Maryland; ME, Maryland; MI, Michigan; MN, Minnesota; MO, Missouri; MS, Mississippi; MT, Montana; NC, North Carolina; ND, North Dakota; NE, Nebraska; NH, New Hampshire; NJ, New Jersey; NM, New Mexico; NV, Nevada; NY, New York; OH, Ohio; OK, Oklahoma; OR, Oregon; PA, Pennsylvania; RI, Rhode Island; SC, South Carolina; SD, South Dakota; TN, Tennessee; TX, Texas; UT, Utah;

VA, Virginia; VT, Vermont; WA, Washington; WI, Wisconsin; WV, West Virginia; WY, Wyoming.

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Table 1.
Trends in Annual Naloxone Dispensing Rates Per 100,000 Population, by State, 2012–2019

States	2012	2013	2014	2015	2016	2017	2018	2019	APC 2012–2019	APC 2016–2019
AK	0.16	0.41	0.14	2.32	10.38	83.69	143.63	162.05	223.89	140.74
AL	0.36	0.08	2.46	10.45	27.55	51.50	119.63	185.15	194.25	92.67
AR	0.31	0.55	0.71	0.6	6.24	28.53	191.39	141.83	177.39	208.85
AZ	0.13	0.17	0.61	1.88	28.08	116.35	369.80	409.11	285.42	150.76
CA	0.28	0.91	2.45	6.73	24.3	33.57	91.83	453.24	171.21	166.04
CO	0.61	0.29	1.43	10.92	35.39	65.52	168.98	198.22	174.87	84.34
CT	0.45	2.88	4.58	11.05	153.16	157.42	271.55	321.28	165.28	31.89
DC	0	0.32	1.07	1.62	46.29	56.09	119.13	827.25	269.30	156.07
DE	0	0	19.06	10	14.74	59.80	166.39	195.36	84.69	140.49
FL	0.11	0.06	1.31	6.74	47.73	56.27	250.13	207.60	260.67	80.44
GA	1.02	0.53	1.92	3.92	9.33	23.64	91.56	125.61	124.24	149.79
HI	0	0.10	0.29	0.72	2.84	19.20	83.08	117.26	259.22	253.33
IA	0.31	0.23	0.65	0.33	6.43	14.70	60.72	99.78	161.51	162.30
ID	0.74	0.93	0.77	3.05	46.16	43.51	165.32	215.59	160.65	81.46
IL	0.37	0.16	0.20	3.67	9.52	47.89	155.15	161.58	207.61	162.99
IN	0.20	0.24	0.54	1.66	17.19	63.58	172.80	201.87	220.67	131.39
KS	1.00	0.29	8.14	13.1	24.86	41.70	116.73	209.90	138.47	110.21
KY	0.49	0.60	1.40	2.49	45.96	117.38	196.73	298.10	192.01	84.51
LA	0.11	0.14	1.50	2.23	21.33	31.99	123.48	175.63	217.86	115.47
MA	0.16	0.69	5.77	47.62	151.04	200.01	294.76	357.15	214.40	34.58
MD	0.21	0.28	10.93	44.99	128.41	227.12	348.08	613.91	234.97	66.88
ME	0	0	1.63	2.69	22.48	55.26	119.63	312.01	200.88	137.82
MI	1.00	1.03	0.68	1.84	19.35	80.26	158.01	213.39	157.26	119.86
MN	0.73	0.67	1.49	1.81	17.39	38.64	117.74	137.00	142.94	107.63
MO	0.34	0.40	2.07	2.11	14.18	57.95	171.88	155.93	175.31	128.88
MS	0.50	0.86	6.28	4.49	6.18	32.87	72.60	119.69	118.77	163.32
MT	3.11	2.99	2.42	1.64	16.14	45.72	132.45	177.80	100.34	128.45
NC	0.37	0.57	1.78	29.95	123.84	155.40	240.26	332.40	201.41	40.46

States	2012	2013	2014	2015	2016	2017	2018	2019	APC 2012–2019	APC 2016–2019
ND	1.05	2.41	0.71	0.9	13.37	38.05	40.21	217.12	119.47	132.05
NE	0.21	0.21	0.35	0.34	4.84	18.05	52.91	95.39	175.01	172.38
NH	0.24	0.08	1.40	22.2	61.17	49.16	88.61	243.03	211.11	60.44
NJ	0.40	0.42	1.20	10.25	31.43	66.51	77.76	105.11	153.90	45.90
NM	0.82	0.78	7.18	17.71	148.02	225.89	506.38	1,565.50	220.07	119.97
NV	0.22	0.50	0.65	1.88	97.12	87.57	154.42	262.64	217.07	42.64
NY	0.07	0.14	0.61	1.54	19.62	31.80	66.55	127.28	221.62	88.66
OH	0.66	0.96	4.03	12.73	47.34	69.70	155.09	391.47	159.22	104.17
OK	1.37	0.48	0.62	34.6	119.33	162.86	312.51	313.78	186.24	42.65
OR	0.14	0.42	1.48	5.59	33.12	67.82	169.19	241.58	211.03	98.88
PA	0.61	0.32	0.97	9.11	54.21	133.38	275.51	417.52	213.45	98.38
RI	0.69	1.73	56.69	65.5	123.09	104.74	667.55	889.47	166.67	117.83
SC	0.12	0.07	0.54	6.25	19.15	45.16	182.05	181.43	248.50	125.68
SD	0.97	0.53	0.93	0.93	5.25	24.78	45.32	101.21	120.23	158.14
TN	0.78	0.39	1.29	5.94	77.26	182.39	300.91	416.24	208.40	74.24
TX	0.20	0.26	0.39	1.51	21.31	34.99	91.12	118.99	192.80	84.36
UT	1.87	2.69	2.46	8.38	110.4	160.24	179.73	198.81	126.82	20.68
VA	0.21	0.23	2.04	3.31	49.17	456.25	363.13	438.77	267.44	88.48
VT	0.17	0.17	3.87	3.16	40.7	354.42	279.70	344.65	256.02	85.38
WA	0.27	0.71	1.91	6.99	48.25	89.74	177.22	344.03	195.45	92.97
WI	0.08	0.14	0.35	1.14	38.15	89.88	106.87	194.96	259.84	65.98
WV	2.16	0.48	2.28	11.18	63.64	152.42	272.45	328.99	162.93	73.48
WY	1.58	0.45	0.56	1.38	23.26	79.16	179.15	244.05	168.25	119.66

Note: Boldface indicates statistical significance ($p < 0.05$).

AK, Alaska; AL, Alabama; APC, annual percentage change; AR, Arkansas; AZ, Arizona; CA, California; CO, Colorado; CT, Connecticut; DC, District of Columbia; DE, Delaware; FL, Florida; GA, Georgia; HI, Hawaii; IA, Iowa; ID, Idaho; IL, Illinois; IN, Indiana; KS, Kansas; KY, Kentucky; LA, Louisiana; MA, Massachusetts; MD, Maryland; ME, Maryland; MI, Michigan; MN, Minnesota; MO, Missouri; MS, Mississippi; MT, Montana; NC, North Carolina; ND, North Dakota; NE, Nebraska; NH, New Hampshire; NJ, New Jersey; NM, New Mexico; NV, Nevada; NY, New York; OH, Ohio; OK, Oklahoma; OR, Oregon; PA, Pennsylvania; RI, Rhode Island; SC, South Carolina; SD, South Dakota; TN, Tennessee; TX, Texas; UT, Utah; VA, Virginia; VT, Vermont; WA, Washington; WI, Wisconsin; WY, West Virginia; WY, Wyoming.

Table 2. Summary of Naloxone Dispensing Rates and High-Dose Opioid Prescriptions, by State, 2012–2019

Variables	Mean	SD	Median	10th Percentile	90th Percentile	Relative geographic inequality ^a
Naloxone dispensing rate per 100,000 population						
2012	0.55	0.60	0.34	0.08	1.05	12.62
2016	45.60	42.78	28.08	6.43	123.09	19.14
2019	292.31	245.39	213.39	118.99	438.77	3.69
% Change (2012–2019)	93,074.41	81,126.44	60,056.43	15,144.28	208,504.50	13.77
% Change (2016–2019)	910.24	701.83	726.98	170.42	1,765.50	10.36
Naloxone prescriptions dispensed per 100 high-dose opioid prescriptions ^b						
2012	0.002	0.002	0.001	0.001	0.01	14.23
2016	0.24	0.25	0.17	0.04	0.64	14.86
2019	3.04	3.03	2.02	1.33	5.07	3.81
% Change (2012–2019)	234,600.40	209,001.30	157,763.10	33,376.46	567,186.80	16.99
% Change (2016–2019)	1,797.78	1,361.52	1,511.73	450.44	3,343.99	7.42
High-dose opioid prescriptions per 100 population						
2012	26.10	73.94	26.70	16.77	34.55	2.06
2016	19.75	55.72	19.86	12.51	26.37	2.11
2019	10.52	2.77	10.76	6.95	13.74	1.98
% Change (2012–2019)	-58.38	10.54	-59.12	-66.82	-49.64	0.74
% Change (2016–2019)	-45.06	14.00	-46.87	-53.24	-38.86	0.73

^aMeasure of relative geographic inequality was calculated as the ratio of the 90th percentile to the 10th percentile.

^bHigh-dose opioid prescriptions are defined as 50 morphine milligram equivalents per day.