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Physician Dispensing of Oxycodone and Other Commonly Used Opioids, 2000–2015, United States

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Abstract

Objective—An average of 91 people in the United States die every day from an opioid-related overdose (including prescription opioids and heroin). The direct dispensing of opioids from health care practitioner offices has been linked to opioid-related harms. The objective of this study is to describe the changing nature of the volume of this type of prescribing at the state level.

Methods—This descriptive study examines the distribution of opioids by practitioners using 1999– 2015 Automation of Reports and Consolidated Orders System data. Analyses were restricted to opioids distributed to practitioners. Amount distributed (morphine milligram equivalents [MMEs]) and number of practitioners are presented.

Results—Patterns of distribution to practitioners and the number of practitioners varied markedly by state and changed dramatically over time. Comparing 1999 with 2015, the MME distributed to dispensing practitioners decreased in 16 states and increased in 35. Most notable was the change in Florida, which saw a peak of 8.94 MMEs per 100,000 persons in 2010 (the highest distribution in all states in all years) and a low of 0.08 in 2013.

Discussion—This study presents the first state estimates of office-based dispensing of opioids. Increases in direct dispensing in recent years may indicate a need to monitor this practice and consider whether changes are needed. Using controlled substances data to identify high prescribers and dispensers of opioids, as well as examining overall state trends, is a foundational activity to informing the response to potentially high-risk clinical practices.

Keywords

Opioids; Prescribing; Overdose; Direct Dispensing; Physician Dispensing

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Introduction

Between 2000 and 2015, more than half a million people in the United States died from drug overdoses, and the number of overdose deaths involving opioids (including prescription opioids and heroin) has quadrupled [1]. The majority of drug overdose deaths (more than six out of 10) involve an opioid, and an average of 91 people died every day in 2015 from an opioid-related overdose [2].

Increases in opioid prescribing have been strongly associated with the increase in opioid-related morbidity and mortality [3]. Since 1999, the amount of prescription opioids sold in the United States has nearly quadrupled, and yet there has not been concomitant change in the amount of pain reported [4,5]. In 2012, health care providers in the highest opioid prescribing state, Alabama, wrote almost three times as many prescriptions per person as those in the lowest prescribing state, Hawaii [6]. Studies suggest that regional variation in the use of prescription opioids cannot be explained by the underlying health status of the population [6].

There are different routes by which individuals can obtain opioid pain medications, such as having a prescription filled at a pharmacy, getting them directly from a practitioner, buying them on the street, stealing them, or borrowing them. The practice of providing medications directly to patients may be convenient, but it can raise issues of conflict of interest, quality of care, and the potential for misuse. The direct dispensing of opioids from practitioner offices has been linked to opioid-related harms. Previous work provides some evidence that the practice of direct dispensing leads to higher quantities and stronger drugs being dispensed, increased diversion of opioids, and higher medical costs [7–10]. As Thumula (2013) notes, the economics of physician dispensing, and potentially profiting, plausibly influences prescribing practices given that studies of other forms of physician self-referral show a direct effect (e.g., surgeons who own surgery centers do more surgeries). The practice of direct dispensing was particularly egregious in Florida, where unscrupulous providers were dispensing large quantities of prescription opioids from so-called “pill mills.” That is, drugs were given to patients in quantities that were outside the outside the course of professional practice.

Direct dispensing statutory or regulatory limits vary widely across the United States, with provisions that vary by practitioner type, drug schedule class, and drug amount [11]. Further, although 10 states have taken action to regulate pain clinics, to date little data have been available to state policy-makers and regulators with which to understand the extent of office-based opioid dispensing [12]. This study quantifies the amount of opioids directly dispensed to patients in each state as well as the number of practitioners that have dispensed oxycodone—the opioid most commonly associated with pain clinics—to patients. This previously unavailable information can inform decision-making and gives states a baseline and trend data to measure this method of medication delivery.

Methods

This descriptive study examines distribution of select opioids by practitioners using 1999–2015 Automation of Reports and Consolidated Orders System (ARCOS) data [13]. ARCOS is a mandatory reporting system that enables the Drug Enforcement Administration to monitor certain controlled substances from the point of manufacture to the point of sale. ARCOS tallies the amount (grams) of controlled substances legitimately distributed to pharmacies, hospitals, addiction treatment centers, and practitioners. Analyses were restricted to opioids distributed to practitioners (practitioners can be DDS, DMD, DO, DPM, DVM, MD, DOM, HMD, MP, ND, NP, OD, PA, or RPH [retail pharmacy distribution excluded]). Opioids included in this study are: codeine, fentanyl, hydrocodone, hydromorphone, methadone, morphine, and oxycodone.

ARCOS reports do not include unique practitioner identification; therefore we were not able to the examine number of practitioners for all drugs combined and could only examine drugs individually. While the most prescribed opioid medication varies by state, we chose to present the number of practitioners directly dispensing oxycodone because of its role in “pill mill” dispensing [7,9] and its availability as a high-dose single entity product.

Grams were converted to morphine milligram equivalents (MMEs) as derived from previous studies utilizing ARCOS or other data [14,15]. MMEs are presented in kg per population to standardize across states and are thus comparable with other publications [3]. The amount distributed and the number of practitioners are presented in five-year intervals (2000, 2005, 2010, 2015) in the interest of space, but percent change reflects comparison of 1999 to 2015 to capture change over the entire time period, as well as 2010–2015 to provide information on states that may be currently problematic (the full data table is available upon request to the corresponding author). Overall, less than 1% of the MME distribution in the United States in 2015 was dispensed by practitioners (overall breakdown: less than 1% dispensing practitioners, less than 1% teaching institutions, 6.8% hospitals, 15% addiction treatment programs, 78% pharmacies).

Results

The pattern of distribution to practitioners and the number of practitioners varied markedly by state and changed dramatically over time (Table 1). The top five states in MME direct dispensing are marked in bold in Table 1. Florida was the top dispensing state from 2002 to 2010. Nevada was among the top five in each of the MME columns in Table 1, although the state experienced a 17.8% decline from 2010 to 2015. The peak distribution amount for each state and the year of that distribution is also displayed in Table 1.

Comparing 1999 with 2015, the MME distributed in kg per 100,000 population decreased in 15 states and Washington, DC (AR, CA, DE, FL, IN, LA, NC, ND, OH, PA, TN, TX, UT, WV, VA, WY; range = −3.97 NC to −93.69 DC), and increased in 35 states (range = 5.22 NJ to 336.89 NV; marked in yellow). The largest percentage increase between 1999 and 2015 was in Nevada, where MME distribution increased from 0.16 to 0.68 MME per 100,000 persons. Most notable, however, was the increase and subsequent decrease in Florida, which

saw a peak of 8.94 MMEs per 100,000 persons in 2010 (the highest distribution in all states in all years), and a low of 0.08 in 2013. Eighteen states showed a percentage increase between 2010 and 2015 in MME kg per 100,000 population (MS: highest increase = 115.41%), and 33 showed a decrease (FL: greatest decrease = −99.04%).

The number of practitioners who directly dispensed oxycodone also varied by state and over time. In 1999 and 2015, California had the highest number (1999 = 119; 2015 = 224). Mississippi had the lowest number in 1999 (3), and West Virginia and Vermont were tied for lowest in 2015 (1). The peak was Florida in 2010, with 586 practitioners that directly dispensed oxycodone. Between 1999 and 2015, 18 states had a decrease in the number of dispensing practitioners and 33 increased (marked in yellow in Table 1). Between 2010 and 2015, 28 states decreased, 20 increased (marked in yellow in Table 1), and three remained level.

Florida was an outlier during the time period of this study because of the volume of opioids that were directly dispensed. As a case study, the MME kg per 100,000 population distribution and number of practitioners is displayed for Florida by year in Figure 1. The number of distributing practitioners in Florida tracked closely with the amount of oxycodone dispensed by practitioners, and Figure 1 indicates pre- and post-pain clinic statute distribution.

Discussion

This study found wide variation in health care practitioner dispensing across states and substantial changes over time. The state with the highest MME distribution was Florida in 2010 (8.94 MME kg per 100,000). Nevada also stands out as consistently being in the top five dispensing states, although showing some decline from 2010 to 2015. The 2011 ban of physician dispensing of Schedule II/III opioids under most circumstances in Florida corresponds with the dramatic decreases in opioid dispensing seen in our study, as well as the declines in opioid overdose deaths in Florida previously documented [7,16].

One limitation of ARCOS data is its overrepresentation of human drug consumption because unknown quantities are used for veterinary purposes. Another limitation is that it includes amounts re-ordered to replace drugs stolen from dispensers and amounts that were not consumed by patients in the same year.

This study presents the first state estimates of direct dispensing of opioids. While the overall amount dispensed in this manner represents a small proportion of the total distribution of opioids in the United States, this practice may have risks that are different than pharmacy-filled prescriptions. For example, while getting the exact same drug in the same quantity directly from a practitioner or from a pharmacy does not necessarily alter patient risk, when practitioners profit from direct dispensing, conflicts of interest may arise. As noted above, there is potential risk in direct dispensing if higher quantities or stronger drugs are dispensed than what would be filled at a pharmacy. Certainly patients in pain need appropriate care and pain management, and practitioners may find guidance for treating patients in the CDC Guideline for Prescribing Opioids for Chronic Pain [17].

Using controlled substances data to identify high pre-scribers and dispensers of opioids [17], as well as examining overall state trends, is a foundational activity to inform the response to potentially high-risk clinical practices. To find a balance between reducing misuse and overdose and safeguarding appropriate access to treatment, health care providers should use opioid pain medications carefully and combine them with nonpharmacological or nonopioid pharmacologic therapy, as appropriate, to provide greater benefits. States, as regulators of health care practice, play an important role in monitoring and addressing inappropriate and illegal prescribing practices that can help to reverse the current opioid epidemic.

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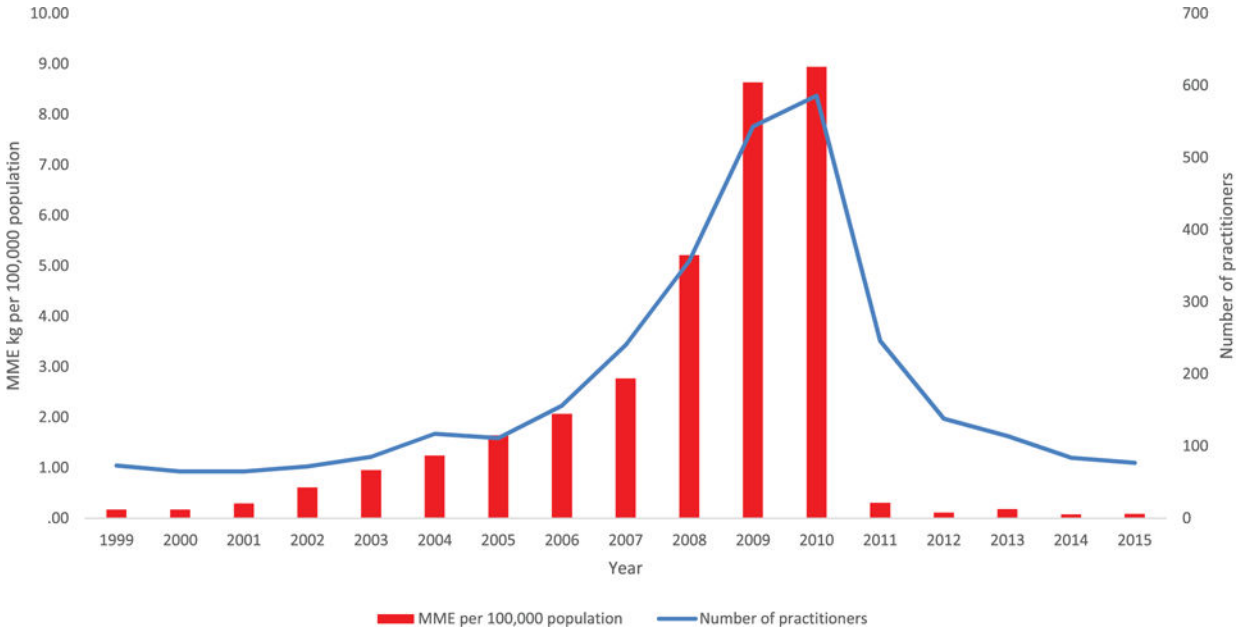

Figure 1.

Distribution of selected opioids to practitioners and number of practitioners receiving oxycodone, Florida, by year, Automation of Reports and Consolidated Orders System, US 1999–2015.

Table 1

Distribution of selected opioids to practitioners and number of practitioners receiving oxycodone, by state and year, Automation of Reports and Consolidated Orders System, US 1999–2015

	Morphine milligram equivalents kg per 100,000 population (select opioids*)							Number of practitioners (oxycodone)						
	Year				Percent change 1999–2015	Percent change 2010–2015	Max distribution (year)	Year				Percent change 1999–2015	Percent change 2010–2015	Max practitioners (year)
State	2000	2005	2010	2015				2000	2005	2010	2015			
Alabama	**0.14**	0.22	0.23	**0.37**	47.57	65.07	0.63 (2012)	12	21	35	37	76.19	5.71	49 (2012/13)
Alaska	0.11	**0.37**	0.60	0.22	6.13	−63.33	0.80 (2011)	12	8	15	11	−15.38	−26.67	15 (2010)
Arizona	0.08	0.14	0.17	0.17	10.96	1.02	0.53 (2012)	47	47	64	76	40.74	18.75	77 (2013)
Arkansas	0.07	0.26	0.14	0.09	−15.75	−36.63	.91 (2008)	8	5	10	7	−22.22	−30.00	18 (2007)
California	0.11	**0.49**	0.58	0.16	−19.33	−72.78	0.63 (2006)	108	141	172	224	88.24	30.23	232 (2013)
Colorado	0.07	0.37	0.25	0.21	24.77	−14.56	0.50 (2006)	47	73	97	121	168.89	24.74	121 (2015)
Connecticut	0.04	0.09	0.23	0.27	224.05	16.88	0.38 (2011)	34	28	36	42	61.54	16.67	60 (2011)
Delaware	0.03	0.11	0.28	0.06	−7.19	−79.84	1.28 (2011)	4	1	7	3	−25.00	−57.14	11 (2012)
District of Columbia	0.08	0.13	0.04	0.01	−93.69	−70.64	0.19 (1999)	4	6	2	2	−50.00	0.00	7 (2006)
Florida	**0.17**	**1.64**	**8.94**	0.09	−50.38	−99.04	8.94 (2010)	65	111	586	77	5.48	−86.86	586 (2010)
Georgia	0.09	0.31	**0.74**	**0.27**	99.76	−63.71	0.80 (2011)	37	52	142	111	158.14	−21.83	142 (2010)
Hawaii	0.07	**0.47**	0.20	**0.30**	323.66	46.38	1.03 (2001)	4	4	8	19	375.00	137.50	19 (2015)
Idaho	0.09	0.17	0.15	0.17	28.99	14.28	0.30 (2006)	7	14	22	12	200.00	−45.45	22 (2010)
Illinois	0.05	0.10	0.17	0.17	19.79	−1.47	0.23 (2006)	24	15	35	52	100.00	48.57	52 (2015)
Indiana	0.11	0.17	0.15	0.08	−57.05	−46.77	0.23 (2004)	14	8	18	17	30.77	−5.56	22 (2011/12)
Iowa	0.03	0.11	0.07	0.11	177.31	62.91	0.15 (2006)	10	3	8	11	22.22	37.50	11 (2015)

	Morphine milligram equivalents kg per 100,000 population (select opioids*)							Number of practitioners (oxycodone)						
	Year				Percent change 1999–2015	Percent change 2010–2015	Max distribution (year)	Year				Percent change 1999–2015	Percent change 2010–2015	Max practitioners (year)
State	2000	2005	2010	2015				2000	2005	2010	2015			
Kansas	0.01	0.11	0.10	0.08	92.40	−16.64	0.14 (2006)	14	3	4	11	37.50	175.00	14 (2000)
Kentucky	0.02	0.06	**0.74**	0.11	273.63	−85.34	0.83 (2011)	5	10	29	12	140.00	−58.62	32 (2011)
Louisiana	**0.14**	0.16	0.08	0.11	−42.85	33.80	0.40 (2007)	16	19	23	18	38.46	−21.74	26 (2012)
Maine	0.06	0.14	0.16	0.23	225.78	50.29	0.29 (2008)	11	3	5	4	−63.64	−20.00	11 (2000/1)
Maryland	0.06	0.14	**0.67**	**0.28**	121.21	−58.40	13.05 (2011)	35	36	84	72	84.62	−14.29	95 (2011)
Massachusetts	0.02	0.10	0.10	0.06	24.89	−38.52	0.15 (2007)	29	25	29	22	37.50	−24.14	40 (2001)
Michigan	0.05	0.10	0.15	0.17	32.93	12.73	0.41 (2013)	12	14	24	34	41.67	41.67	37 (2013)
Minnesota	0.02	0.07	0.10	0.11	245.67	12.88	0.11 (2014)	30	15	27	45	25.00	66.67	46 (2014)
Mississippi	0.07	0.08	0.09	0.19	130.07	115.41	0.19 (2015)	1	10	8	8	166.67	0.00	13 (2011)
Missouri	0.03	0.07	0.07	0.11	79.66	68.01	0.16 (2011)	15	21	21	17	6.25	−19.05	23 (2012)
Montana	0.04	0.07	0.11	0.10	27.73	−6.89	0.11 (2007)	4	5	4	4	−50.00	0.00	9 (2003)
Nebraska	0.03	0.10	0.11	0.07	7.73	−32.86	0.12 (2011)	12	10	13	6	−25.00	−53.85	15 (2001)
Nevada	**0.13**	**0.41**	**0.83**	**0.68**	336.89	−17.81	1.16 (2011)	10	14	31	38	216.67	22.58	40 (2012)
New Hampshire	0.01	0.16	0.20	0.10	219.55	−50.23	0.21 (2007)	10	4	8	4	−33.33	−50.00	11 (2001)
New Jersey	0.04	0.09	0.12	0.10	5.22	−14.47	0.15 (2012)	56	86	128	117	98.31	−8.59	128 (2010)
New Mexico	0.06	0.16	0.15	0.12	77.13	−21.04	0.23 (2006)	4	1	4	3	−50.00	−25.00	7 (2006/7/11/12)
New York	0.01	0.08	0.09	0.08	81.77	−11.37	0.13 (2013)	87	106	129	153	42.99	18.60	153 (2015)
North Carolina	0.05	0.08	0.13	0.08	−3.97	−33.97	0.16 (2007)	27	24	32	15	−28.57	−53.13	37 (2011)

	Morphine milligram equivalents kg per 100,000 population (select opioids*)							Number of practitioners (oxycodone)						
	Year				Percent change 1999–2015	Percent change 2010–2015	Max distribution (year)	Year				Percent change 1999–2015	Percent change 2010–2015	Max practitioners (year)
State	2000	2005	2010	2015				2000	2005	2010	2015			
North Dakota	0.04	0.08	0.16	0.17	−17.66	6.40	0.35 (2007)	4	5	4	8	−11.11	100.00	9 (1999)
Ohio	0.04	0.14	0.42	0.07	−23.96	−82.26	0.42 (2010)	22	19	30	24	4.35	−20.00	32 (2009)
Oklahoma	0.11	0.12	0.14	0.17	47.46	15.59	0.23 (2011)	13	10	14	6	−50.00	−57.14	17 (2011)
Oregon	0.04	0.14	0.17	0.14	80.57	−18.93	0.20 (2006)	19	25	44	49	104.17	11.36	54 (2011)
Pennsylvania	0.06	0.10	0.21	0.10	−35.06	−52.95	0.36 (2012)	68	71	113	72	−6.49	−36.28	159 (2013)
Rhode Island	0.02	0.12	0.12	0.09	125.31	−28.91	0.16 (2014)	5	7	6	3	−50.00	−50.00	7 (2001/5/6)
South Carolina	0.05	0.05	0.64	0.06	18.52	−90.58	0.64 (2010)	5	11	39	6	20.00	−84.62	39 (2010)
South Dakota	0.05	0.10	0.17	0.15	138.34	−7.94	0.29 (2012)	1	3	5	4	33.33	−20.00	6 (2011)
Tennessee	**0.15**	0.18	0.54	0.15	−39.36	−73.03	0.71 (2011)	35	55	104	68	106.06	−34.62	105 (2012)
Texas	0.06	0.08	0.06	0.06	−19.88	14.63	0.12 (2007)	16	38	33	22	−38.89	−33.33	48 (2012)
Utah	0.05	0.12	0.06	0.07	−27.89	22.53	0.28 (2006)	8	12	7	9	28.57	28.57	15 (2011/12)
Vermont	0.02	0.08	0.08	0.08	36.03	−0.25	1.35 (2013)	4	3	2	1	−85.71	−50.00	7 (1999)
Virginia	0.07	0.13	0.13	0.14	18.16	5.23	0.65 (2013)	22	25	28	39	44.44	39.29	44 (2013)
Washington	0.05	0.17	0.15	0.11	25.99	−23.92	0.23 (2006)	40	41	34	37	15.63	8.82	46 (2004)
West Virginia	0.09	0.07	0.06	0.06	−34.58	4.99	0.17 (2002)	7	2	5	1	−66.67	−80.00	7 (2000)
Wisconsin	0.02	0.09	0.20	0.16	201.98	−19.55	0.62 (2009)	46	40	59	69	43.75	16.95	79 (2011)
Wyoming	0.06	0.10	0.12	0.08	−9.89	−28.88	0.41 (2012)	7	7	2	3	−25.00	50.00	7 (2000/5)

*Opioids included: codeine, fentanyl, hydrocodone, hydromorphone, methadone, morphine, and oxycodone. States with the highest MME dispensing in **bold** font. States with increases in the percent change column highlighted in yellow.