

# Opioid Painkiller Prescribing

## Where You Live Makes a Difference

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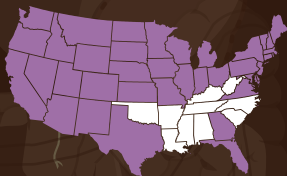
Each day, 46 people die from an overdose of prescription painkillers\* in the US.



259 M

Health care providers wrote 259 million prescriptions for painkillers in 2012, enough for every American adult to have a bottle of pills.

10



10 of highest prescribing states for painkillers are in the South.

Health issues that cause people pain don't vary much from place to place—not enough to explain why, in 2012, health care providers in the highest-prescribing state wrote almost 3 times as many opioid painkiller prescriptions per person as those in the lowest prescribing state in the US. Or why there are twice as many painkiller prescriptions per person in the US as in Canada. Data suggest that where health care providers practice influences how they prescribe.

Higher prescribing of painkillers is associated with more overdose deaths. More can be done at every level to prevent overprescribing while ensuring patients' access to safe, effective pain treatment. Changes at the state level show particular promise.

### States can

- ◇ Consider ways to increase use of prescription drug monitoring programs, which are state-run databases that track prescriptions for painkillers and can help find problems in overprescribing. Use of these programs is greater when they make data available in real-time, are universal (used by all prescribers for all controlled substances), and are actively managed (for example, send alerts to prescribers when problems are identified).
- ◇ Consider policy options (including laws and regulation) relating to pain clinics (facilities that specialize in pain treatment) to reduce prescribing practices that are risky to patients.

\* "Prescription painkillers" refers to opioid or narcotic pain relievers, including drugs such as Vicodin (hydrocodone+acetaminophen), OxyContin (oxycodone), Opana (oxymorphone), and methadone.

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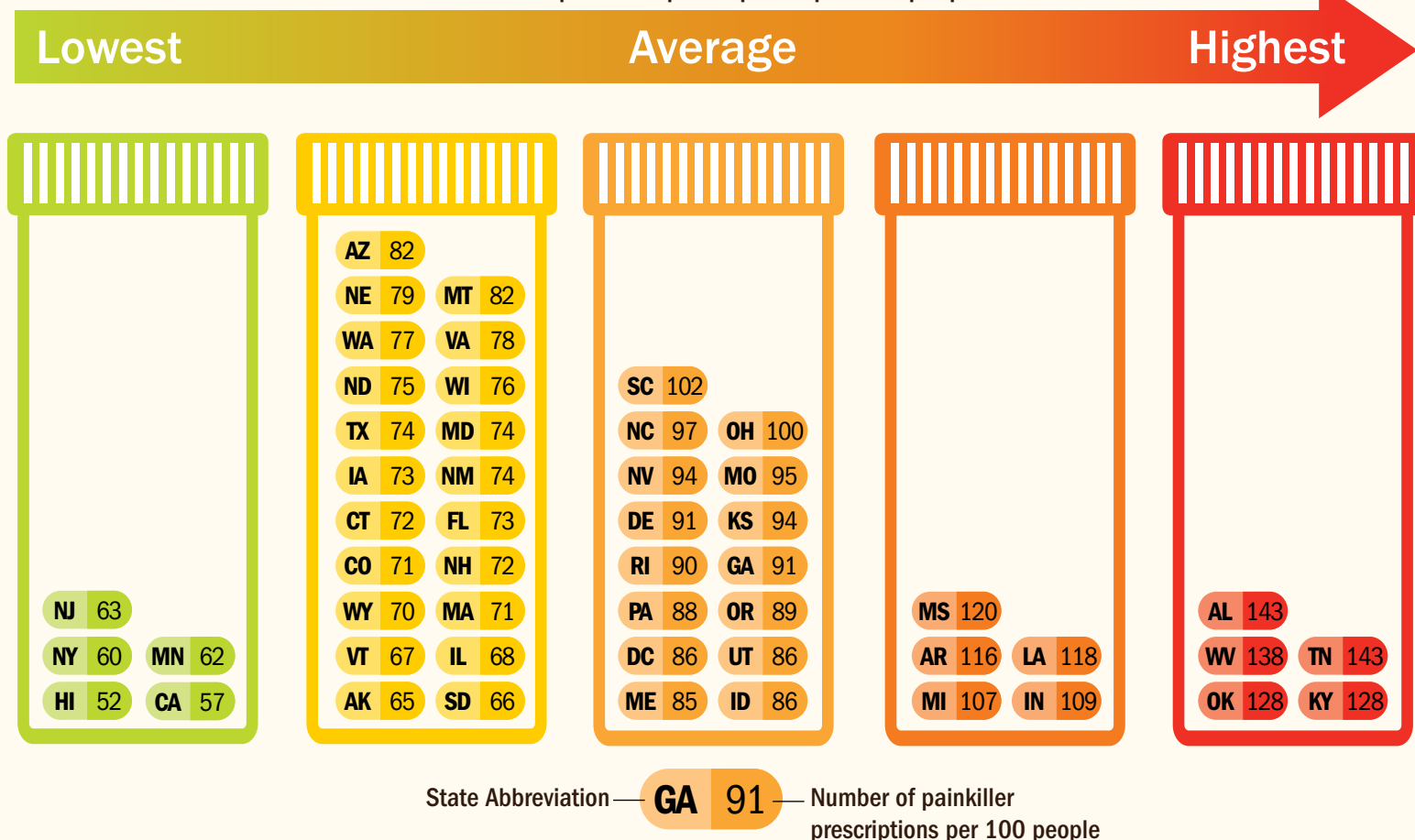
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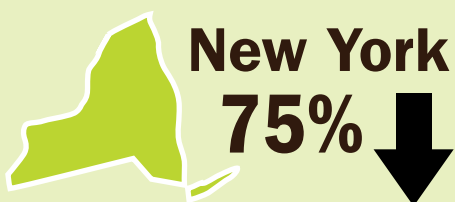


### Number of painkiller prescriptions per 100 people



SOURCE: IMS, National Prescription Audit (NPA™), 2012.

## Making a Difference: State Successes

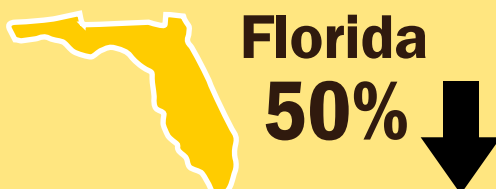


## 2012 Action:

New York required prescribers to check the state's prescription drug monitoring program before prescribing painkillers.

## 2013 Result:

Saw a 75% **drop in patients** who were seeing **multiple prescribers** to obtain the same drugs, which would put them at higher risk of overdose.

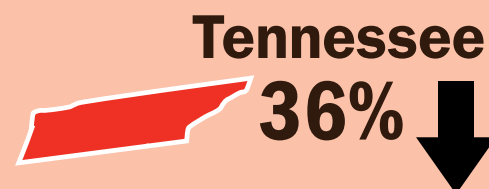


## 2010 Action:

Florida regulated pain clinics and stopped health care providers from dispensing prescription painkillers from their offices.

## 2012 Result:

Saw more than 50% **decrease in overdose deaths** from oxycodone.



## 2012 Action:

Tennessee required prescribers to check the state's prescription drug monitoring program before prescribing painkillers.

## 2013 Result:

Saw a 36% **drop in patients** who were seeing **multiple prescribers** to obtain the same drugs, which would put them at higher risk of overdose.

# What Can Be Done



## The Federal government is

- ◇ Supporting states that want to develop programs and policies to prevent prescription painkiller overdose, while ensuring patients' access to safe, effective pain treatment.
- ◇ Improving patient safety by supplying health care providers with data, tools, and guidance for decision making based on proven practices.
- ◇ Increasing access to mental health and substance abuse treatment through the Affordable Care Act.



## States can

- ◇ Consider ways to increase use of prescription drug monitoring programs, which are state-run databases that track prescriptions for painkillers and can help find problems in overprescribing. Use of these programs is greater when they make data available in real-time, are universal (used by all prescribers for all controlled substances), and are actively managed (for example, send alerts to prescribers when problems are identified).
- ◇ Consider policy options (including laws and regulation) relating to pain clinics to reduce prescribing practices that are risky to patients.
- ◇ Evaluate their own data and programs and consider ways to assess their Medicaid, workers' compensation programs, and state-run health plans to detect and address inappropriate prescribing of painkillers.
- ◇ Identify opportunities to increase access to substance abuse treatment and consider expanding first responder access to naloxone, a drug used when people overdose.



## Health care providers can

- ◇ Use prescription drug monitoring programs to identify patients who might be misusing their prescription drugs, putting them at risk for overdose.

- ◇ Use effective treatments such as methadone or buprenorphine for patients with substance abuse problems.
- ◇ Discuss with patients the risks and benefits of pain treatment options, including ones that do not involve prescription painkillers.
- ◇ Follow best practices for responsible painkiller prescribing, including:
  - Screening for substance abuse and mental health problems.
  - Avoiding combinations of prescription painkillers and sedatives unless there is a specific medical indication.
  - Prescribing the lowest effective dose and only the quantity needed depending on the expected length of pain.



## Everyone can

- ◇ Avoid taking prescription painkillers more often than prescribed.
- ◇ Dispose of medications properly, as soon as the course of treatment is done, and avoid keeping prescription painkillers or sedatives around "just in case."
- ◇ Help prevent misuse and abuse by not selling or sharing prescription drugs. Never use another person's prescription drugs.
- ◇ Get help for substance abuse problems  
1-800-662-HELP. Call Poison Help 1-800-222-1222 if you have questions about medicines.

For more information, please contact

**Telephone: 1-800-CDC-INFO (232-4636)**

**TTY: 1-888-232-6348**

Web: [www.cdc.gov](http://www.cdc.gov)

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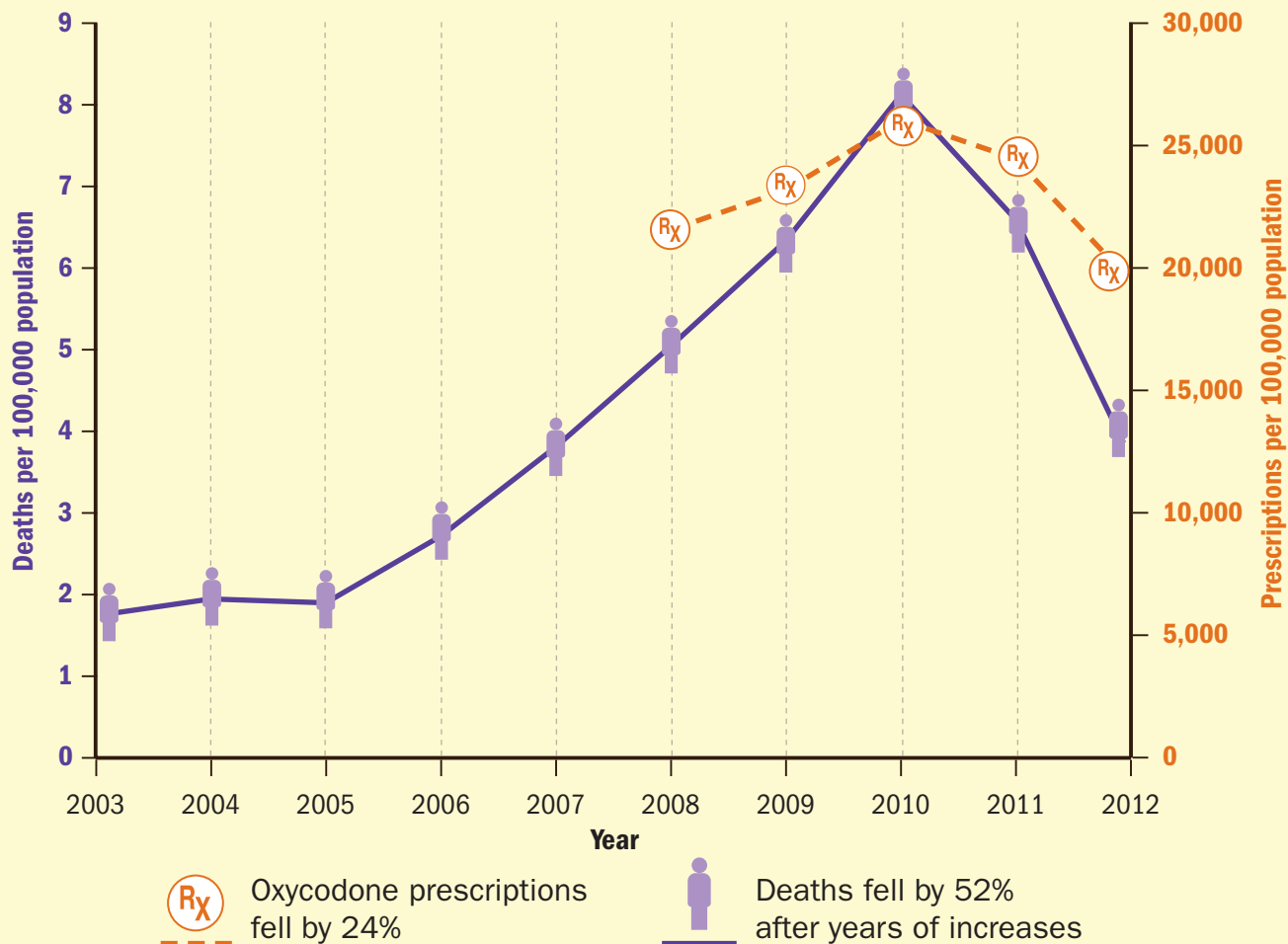
www

[www.cdc.gov/vitalsigns/opioid-prescribing](http://www.cdc.gov/vitalsigns/opioid-prescribing)

www

[www.cdc.gov/mmwr](http://www.cdc.gov/mmwr)

## New laws and enforcement reverse trends in oxycodone prescribing and related deaths in Florida





## Decline in Drug Overdose Deaths After State Policy Changes — Florida, 2010–2012

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During 2003–2009, the number of deaths caused by drug overdose in Florida increased 61.0%, from 1,804 to 2,905, with especially large increases in deaths caused by the opioid pain reliever oxycodone and the benzodiazepine alprazolam (1). In response, Florida implemented various laws and enforcement actions as part of a comprehensive effort to reverse the trend. This report describes changes in overdose deaths for prescription and illicit drugs and changes in the prescribing of drugs frequently associated with these deaths in Florida after these policy changes. During 2010–2012, the number of drug overdose deaths decreased 16.7%, from 3,201 to 2,666, and the deaths per 100,000 persons decreased 17.7%, from 17.0 to 14.0. Death rates for prescription drugs overall decreased 23.2%, from 14.5 to 11.1 per 100,000 persons. The decline in the overdose deaths from oxycodone (52.1%) exceeded the decline for other opioid pain relievers, and the decline in deaths for alprazolam (35.6%) exceeded the decline for other benzodiazepines. Similar declines occurred in prescribing rates for these drugs during this period. The temporal association between the legislative and enforcement actions and the substantial declines in prescribing and overdose deaths, especially for drugs favored by pain clinics, suggests that the initiatives in Florida reduced prescription drug overdose fatalities.

Florida gained notoriety after 2007 because of the proliferation of pain clinics in the state that were prescribing large quantities of drugs for pain with little medical justification and were being used primarily by persons abusing or diverting opioid analgesics, benzodiazepines, and muscle relaxants (2). In 2010, Florida was also home to 98 of the 100 U. S. physicians who dispensed the highest quantities of oxycodone directly from their offices. In response, Florida enacted several measures to address prescribing that was inconsistent with best practices. The Florida legislature required that pain clinics treating pain with controlled substances

register with the state by January 4, 2010. In February 2010, the Drug Enforcement Administration and various Florida law enforcement agencies began to work together in Operation Pill Nation (3). Pain clinic regulations were further expanded later in 2010. In February 2011, law enforcement conducted statewide raids, resulting in numerous arrests, seizures of assets, and pain clinic closures. In July of that year, coinciding with a public health emergency declaration by the Florida Surgeon General, the state legislature prohibited physician dispensing of schedule II or III drugs from their offices and activated regional strike forces to address the emergency. Mandatory dispenser reporting to the newly established prescription drug monitoring program began in September 2011. Finally, in 2012, the legislature expanded regulation of wholesale drug distributors and created the Statewide Task Force on Prescription Drug Abuse and Newborns.

Florida Medical Examiners Commission (FMEC) data from the period 2003–2012 were analyzed for this report. Florida has a regional system of 24 district medical examiners with jurisdiction over all drug-related deaths occurring in the state. Florida has established a unique system that requires each medical examiner to submit a report to the FMEC on every death in which a drug is detected in a decedent. The report includes information on the manner of death (unintentional, suicide, homicide, or undetermined) and which of 50 monitored drugs were detected in the decedent (including prescription drugs, illicit drugs, and alcohol). For each drug detected, the medical examiner determines whether it played a causal role in the death or was merely present (4). Only those deaths caused by one or more drugs (i.e., overdoses) were included in this analysis. Deaths were not restricted to Florida residents.

Drug overdose death rates per 100,000 Florida residents were computed using population estimates compiled by



the Florida Department of Health in consultation with the Florida Legislature's Office of Economic and Demographic Research.\* Rates were calculated for deaths caused by all drugs, all prescription drugs, opioid analgesics (including oxycodone, methadone, hydrocodone, morphine, and hydromorphone), benzodiazepines (including alprazolam), carisoprodol (a muscle relaxant), illicit drugs (including heroin and cocaine), and alcohol. Most deaths included more than one drug, so rates (including those for alcohol) refer to deaths involving a drug type irrespective of whether they were single or multidrug overdoses. The statistical significance of changes in death rates from 2010 to 2012 was assessed using z-tests.

Rates of prescribing selected prescription drugs in Florida were calculated from statewide estimates of prescription counts from the IMS Health National Prescription Audit (NPA). NPA provides state level estimates of the numbers of prescriptions filled during 2008–2012. NPA estimates are based on a sample of approximately 57,000 pharmacies, which fill nearly 80% of the retail prescriptions in the United States. Confidence limits for the estimates are not available. All prescriptions, including refills, dispensed at retail pharmacies were included (5). Prescriptions were not restricted to those for Florida residents.

The rate of drug overdose deaths increased 58.9% during 2003–2010. The number of drug overdose deaths decreased 16.7%, from 3,201 to 2,666, and the rate decreased 17.7% during 2010 and 2012 (Table 1, Figure 1). This change was largely attributable to the decrease in prescription drug-related deaths, which peaked at 2,722 in 2010 and decreased to 2,116 in 2012. The prescription drug overdose death rate decreased 23.2% to 11.1 per 100,000 persons, the lowest rate since 2007. Opioid analgesic overdose deaths declined from 2,560 to 1,892, with a corresponding rate decrease of 27.0%. Oxycodone, methadone, and hydrocodone rates decreased, whereas morphine and hydromorphone rates increased. Benzodiazepine overdose death rates decreased 28.4%, with alprazolam rates down 35.6%. The rate of carisoprodol-related deaths also declined, but not significantly. Prescribing declined for drugs whose overdose rate declined and increased for drugs whose overdose rate increased. For example, oxycodone prescribing declined 24.0%, whereas morphine prescribing increased 37.6%. Overall illicit drug overdose death rates did not change significantly, although heroin overdose deaths increased from 48 to 108, a change from 0.3 to 0.6 per 100,000 persons. Alcohol overdose death rates were unchanged. The semiannual time trends in overdose rates for specific drugs indicate a steady decline beginning in 2011 rather than an abrupt decline following any one of the legislative and enforcement actions taken in Florida (Figure 2).

\*Data available at <http://www.floridacharts.com/flquery/population/populationrpt.aspx>.

#### What is already known on this topic?

From 2003 to 2009, the number of deaths caused by drug overdose in Florida increased 61.0%, from 1,804 to 2,905. In 2010, Florida's legislature implemented laws regulating pain clinics, and in 2011, prohibited prescribers from dispensing opioid analgesics from their offices.

#### What is added by this report?

After the implementation of legislation, overdose death rates for opioid analgesics declined 27.0%, from 13.6 to 9.9 per 100,000 persons, and overdose death rates for benzodiazepines declined 28.4%, from 6.9 to 5.0 per 100,000 persons. Heroin overdose death rates increased 122.4%, from 0.3 to 0.6 per 100,000, but the overall drug overdose death rate declined 17.7%, from 17.0 to 14.0 per 100,000.

#### What are the implications for public health practice?

State legislation that establishes oversight over pain management clinics or describes specific registration, licensure, or ownership requirements for such clinics, coupled with restrictions on dispensing controlled substances by prescribers, are promising interventions to limit prescription drug overdose deaths.

Although the oxycodone overdose death rate decreased across all demographic groups, the greatest declines were among males (57.0%) and non-Hispanic whites (52.6%) (Table 2). Decedents who were aged 0–24 years (67.0%) and 25–34 years (66.7%) showed larger decreases than older decedents. The rate of deaths ruled unintentional showed a larger decrease (53.9%) than those of suicide (37.8%) or undetermined intent (29.0%). Additionally, the rate of deaths in which oxycodone and alprazolam were both identified as causal declined 61.5%.

## Discussion

This analysis showed that policy changes in Florida were followed by declines in the prescribing of drugs, especially those favored by Florida prescribing dispensers and pain clinics, as well as by declines in overdose deaths involving those drugs. Florida has reported that approximately 250 pain clinics were closed by 2013, and the number of high-volume oxycodone dispensing prescribers declined from 98 in 2010 to 13 in 2012 and zero in 2013 (2). Law enforcement agencies in Florida also reported that rates of drug diversion (i.e., channeling of prescription drugs to illicit markets) declined during 2010–2012 (6). Preliminary data for the first half of 2013 from the FMEC indicate a continued decline in oxycodone and alprazolam overdose deaths (4). These changes might represent the first documented substantial decline in drug overdose mortality in any state during the past 10 years.

Although the combined state initiatives were followed by the desired effect, determining the extent of each policy's contribution to the decline in overdose deaths in Florida is not

**TABLE 1. Overdose death rates,\* number of overdose deaths, and prescribing (Rx) rates† for selected substances, by year — Florida, 2003–2012**

Substance	Year										% change 2010 to 2012
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
<b>Prescription drugs</b>	<b>7.3</b>	<b>8.2</b>	<b>8.6</b>	<b>9.5</b>	<b>10.9</b>	<b>11.8</b>	<b>13.3</b>	<b>14.5</b>	<b>13.5</b>	<b>11.1</b>	<b>-23.2<sup>§</sup></b>
	<b>1,239</b>	<b>1,436</b>	<b>1,534</b>	<b>1,730</b>	<b>2,012</b>	<b>2,195</b>	<b>2,496</b>	<b>2,722</b>	<b>2,560</b>	<b>2,116</b>	<b>-22.3</b>
Opioid analgesics	6.7	7.7	7.9	8.8	10.2	10.9	12.4	13.6	12.5	9.9	-27.0 <sup>§</sup>
	1,142	1,347	1,405	1,608	1,891	2,037	2,323	2,560	2,359	1,892	-26.1
Oxycodone	1.8	1.9	1.9	2.7	3.8	5.0	6.3	8.1	6.6	3.9	-52.1 <sup>§</sup>
	299	340	340	496	705	941	1,185	1,516	1,247	735	-51.5
Rx rate	—	—	—	—	—	21,571	23,195	26,049	24,456	19,790	-24.0
Methadone	2.1	3.2	3.5	3.9	4.2	3.7	3.8	3.7	3.6	2.7	-27.2 <sup>§</sup>
	367	556	620	716	785	693	720	694	691	511	-26.4
Rx rate	—	—	—	—	—	1,674	1,802	1,950	1,986	1,760	-9.8
Hydrocodone	1.1	1.3	1.2	1.3	1.4	1.4	1.4	1.7	1.6	1.3	-23.1 <sup>§</sup>
	180	228	221	236	264	270	265	315	307	245	-22.2
Rx rate	—	—	—	—	—	34,409	34,335	33,184	32,685	29,970	-9.7
Morphine	1.3	1.2	1.4	1.3	1.4	1.6	1.6	1.4	1.8	2.2	56.2 <sup>§</sup>
	217	216	247	229	255	300	302	262	345	414	58.0
Rx rate	—	—	—	—	—	2,222	2,564	2,693	3,028	3,706	37.6
Hydromorphone	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.5	0.9	189.9 <sup>§</sup>
	12	20	24	31	36	41	64	60	99	176	193.3
Rx rate	—	—	—	—	—	863	1,109	1,133	1,403	1,790	58.0
Other opioid analgesics	1.6	1.5	1.4	1.4	1.4	1.7	1.5	2.1	2.2	2.0	-4.5
	276	268	257	249	267	313	288	386	411	373	-3.4
Benzodiazepines	2.2	2.6	3.2	3.5	4.0	5.0	5.9	6.9	6.8	5.0	-28.4 <sup>§</sup>
	376	460	574	632	743	929	1,099	1,305	1,294	945	-27.6
Alprazolam	1.3	1.8	2.3	2.5	3.1	3.8	4.4	5.2	5.0	3.4	-35.6 <sup>§</sup>
	226	310	414	456	572	705	822	981	947	639	-34.9
Rx rate	—	—	—	—	—	21,319	22,503	23,681	23,114	21,041	-11.1
Other benzodiazepines	1.1	1.1	1.2	1.3	1.4	1.8	2.2	2.4	3.0	2.3	-5.0
	192	198	222	235	258	328	406	459	565	441	-3.9
Carisoprodol	0.3	0.5	0.5	0.4	0.5	0.5	0.5	0.6	0.8	0.5	-19.0
	45	81	96	74	88	84	98	111	153	91	-18.0
Rx rate	—	—	—	—	—	4,585	4,719	4,883	4,668	3,649	-25.3
<b>Illicit drugs</b>	<b>4.3</b>	<b>4.4</b>	<b>4.9</b>	<b>5.1</b>	<b>5.1</b>	<b>4.1</b>	<b>3.4</b>	<b>3.6</b>	<b>3.9</b>	<b>3.8</b>	<b>5.5</b>
	<b>737</b>	<b>771</b>	<b>882</b>	<b>936</b>	<b>935</b>	<b>768</b>	<b>635</b>	<b>678</b>	<b>739</b>	<b>724</b>	<b>6.8</b>
Heroin	1.3	0.9	0.6	0.4	0.5	0.6	0.5	0.3	0.3	0.6	122.4 <sup>§</sup>
	230	150	109	78	93	119	95	48	57	108	125.0
Cocaine	3.2	3.4	4.1	4.5	4.6	3.5	2.8	3.0	3.2	2.9	-3.1
	541	591	732	829	843	648	529	561	604	550	-2.0
Ethanol (alcohol)	1.6	1.7	1.9	2.1	2.5	2.6	3.0	3.0	3.1	3.0	-0.8
	279	293	343	378	466	489	559	572	590	574	0.3
<b>All substances¶</b>	<b>10.7</b>	<b>11.8</b>	<b>12.4</b>	<b>13.3</b>	<b>14.4</b>	<b>14.7</b>	<b>15.8</b>	<b>17.0</b>	<b>16.5</b>	<b>14.0</b>	<b>-17.7<sup>§</sup></b>
	<b>1,829</b>	<b>2,056</b>	<b>2,210</b>	<b>2,427</b>	<b>2,670</b>	<b>2,742</b>	<b>2,960</b>	<b>3,201</b>	<b>3,120</b>	<b>2,666</b>	<b>-16.7</b>

\* Per 100,000 population, based on Florida Department of Health resident population estimates, available at <http://www.floridacharts.com/flquery/population/populationrpt.aspx>. The source of overdose death data is the Florida Medical Examiners Commission.

† Per 100,000 population, based on Florida Department of Health resident population estimates. The source of prescribing data is IMS Health's National Prescription Audit.

§ Change in rate is statistically significant at  $p < 0.001$ . Changes in prescribing rates were not tested.

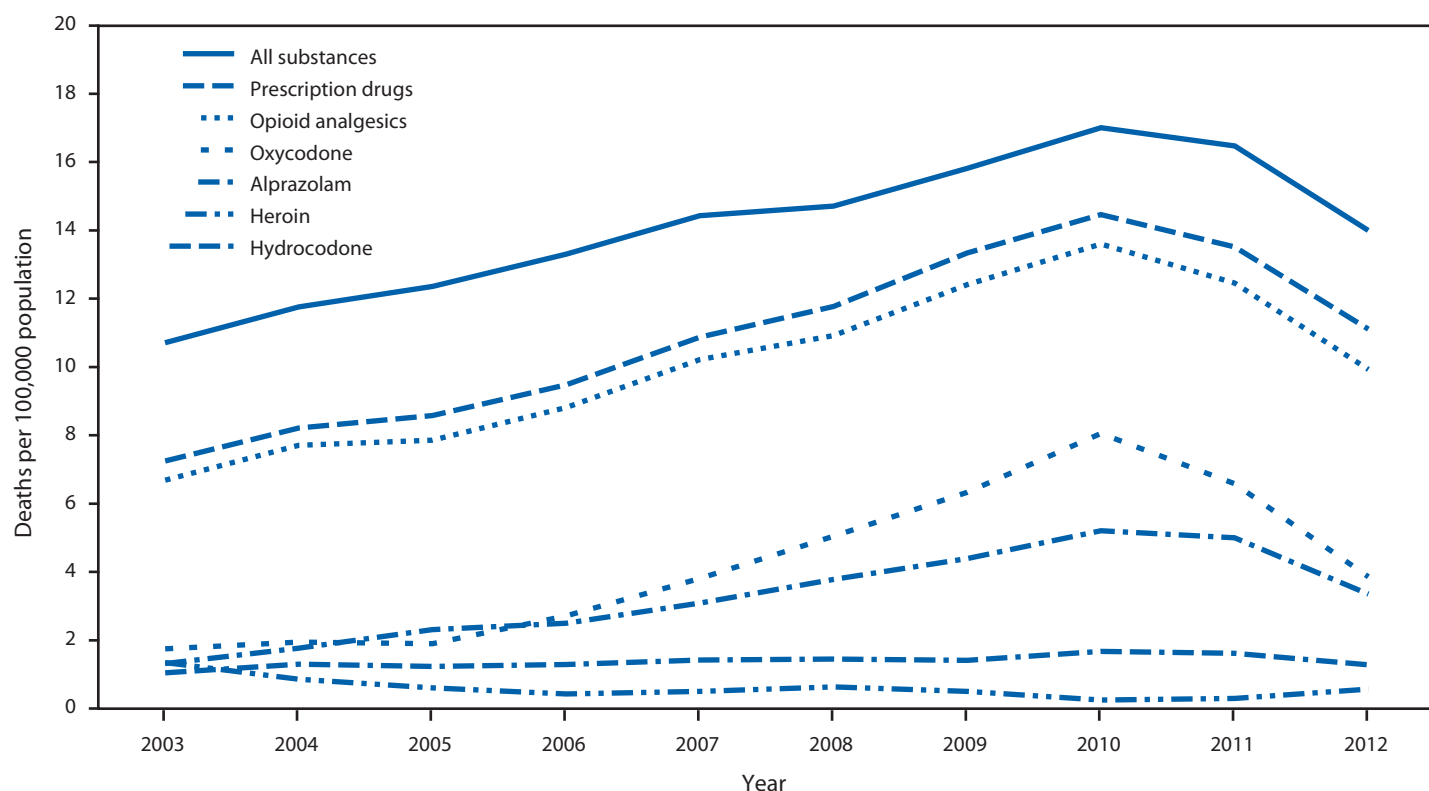
¶ Many deaths had more than one drug contributing to the death; thus, the sum of the rates in each column exceeds the total death rate.

possible. Declines in overdoses of oxycodone might also have been related to the transition in late 2010 to a formulation of extended-release oxycodone designed to be abuse-resistant (7), but most of the decline in oxycodone prescribing and overdoses occurred after 2011. The increase in deaths associated with heroin and hydromorphone and morphine after 2010 might be a sign of a switch to use of alternative opioids. However, the effect of such a switch was limited: 668 fewer opioid analgesic overdose deaths occurred in 2012, compared with 60 more heroin deaths. Heroin deaths fluctuated widely during 2003–2012, so other factors might be involved. Moreover,

other states that did not experience declines in prescription opioid deaths have reported increases in heroin overdose deaths during 2010–2012 (8). National data indicate a substantial increase in heroin overdose deaths during 2010–2011 (CDC WONDER, unpublished data, 2014).

The findings in this report are subject to at least five limitations. First, rates might be overestimated by the inclusion of nonstate residents, but the impact of this factor on trends is likely to be small (Florida Medical Examiners Commission, unpublished data, 2005–2008). Second, deaths from heroin might be underestimated because only the



**FIGURE 1. Overdose death rates\* for selected substances, by year — Florida, 2003–2012†**

\* Per 100,000 population. Based on Florida Department of Health resident population estimates, available at <http://www.floridacharts.com/flquery/population/populationrpt.aspx>.

† The source of overdose death data is the Florida Medical Examiners Commission.

**TABLE 2. Oxycodone overdose death rate\* and number of deaths, by selected characteristics — Florida, 2010 and 2012†**

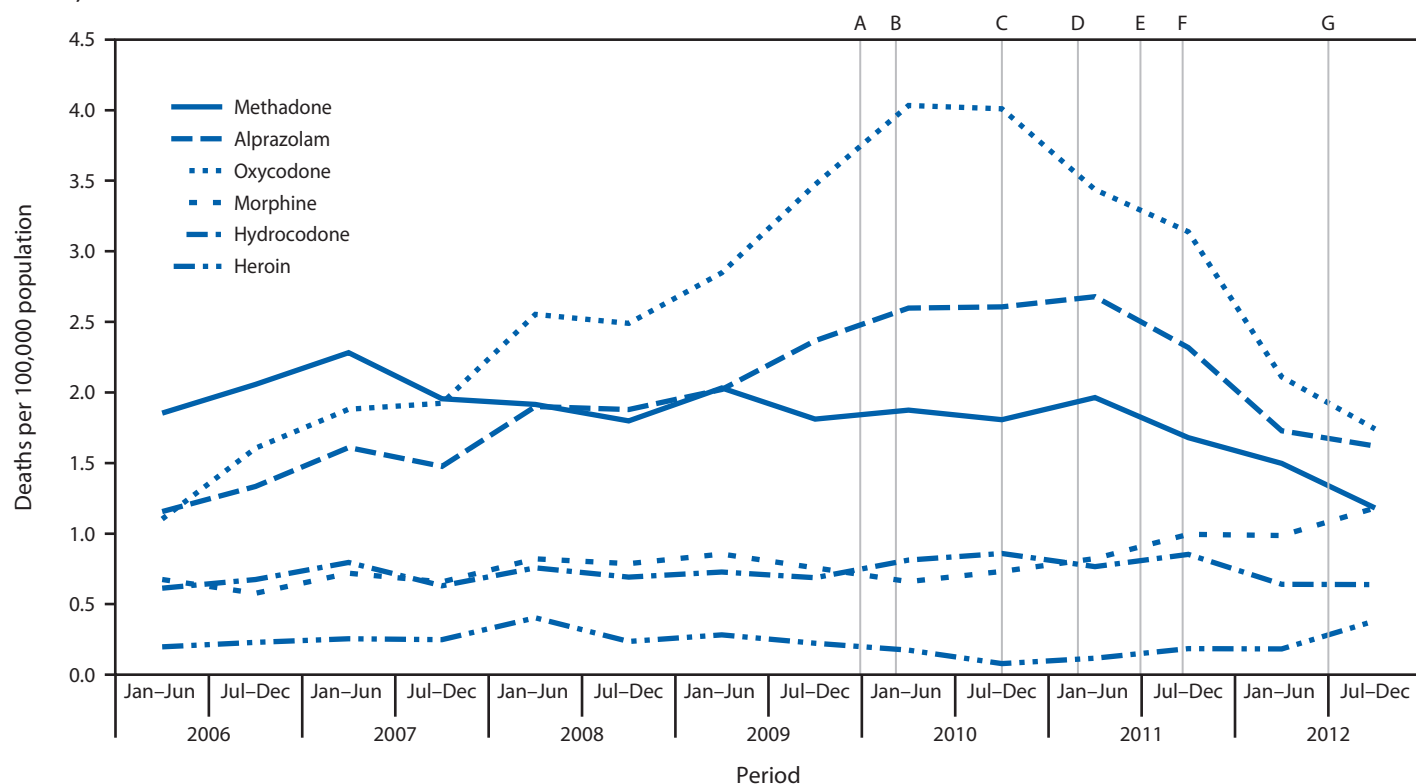
Characteristic	2010		2012		% change in rate
	Rate	No.	Rate	No.	
<b>Sex</b>					
Female	5.1	487	2.9	287	-41.8
Male	11.2	1029	4.8	448	-57.0
<b>Age group (yrs)</b>					
0–24	2.7	156	0.9	52	-67.0
25–34	17.3	394	5.8	136	-66.7
35–44	14.4	349	6.4	151	-55.7
45–54	15.0	412	8.4	225	-44.3
≥55	3.6	205	2.9	171	-19.2
<b>Race/Ethnicity</b>					
White, non-Hispanic	13.2	1446	6.3	683	-52.6
Black/Other, non-Hispanic	1.3	46	1.0	37	-21.4
Hispanic	0.6	24	0.3	15	-39.8
<b>Manner of death</b>					
Unintentional	7.2	1347	3.3	628	-53.9
Suicide	0.7	124	0.4	78	-37.8
Undetermined	0.2	39	0.1	28	-29.0
<b>Oxycodone and alprazolam</b>	3.3	627	1.3	244	-61.5
<b>Total</b>	<b>8.1</b>	<b>1516</b>	<b>3.9</b>	<b>735</b>	<b>-52.1</b>

\* Per 100,000 population. Based on Florida Department of Health resident population estimates, available at <http://www.floridacharts.com/flquery/population/populationrpt.aspx>.

† The source of overdose death data is the Florida Medical Examiners Commission.

metabolites of heroin, such as morphine, are usually present in postmortem toxicology specimens. For prescription drug overdose deaths, however, the FMEC data provide a more complete accounting than death certificates (9). Third, prescription counts are estimated by a proprietary method and therefore include an undisclosed amount of error. Fourth, the role of other factors that might have affected prescribing and/or overdose death rates during this period (e.g., greater awareness of the problem) could not be evaluated. The absence of similar recent drug-specific overdose mortality data from other states precluded a comparison with other jurisdictions not making policy changes. Finally, the data sources available for this investigation did not permit any assessment of potential unintended consequences of these policy changes, such as reduction of access to pain medication for legitimate prescribing indications.

**FIGURE 2. Semiannual drug overdose death rates\* for selected drugs, and selected prescription drug diversion and misuse actions taken — Florida, 2006–2012†**



\* Per 100,000 population. Based on Florida Department of Health resident population estimates, available at <http://www.floridacharts.com/flquery/population/populationrpt.aspx>.

† The source of overdose death data is the Florida Medical Examiners Commission.

- A. January 4, 2010. Pain clinics must register.  
 B. February, 2010. Operation Pill Nation: U.S. Drug Enforcement Agency and state and local law enforcement begin investigation of pain clinics.  
 C. October 1, 2010. Pain clinic regulation expanded.  
 D. February 23, 2011. Operation Pill Nation: joint law enforcement raids begin.  
 E. July 1, 2011. Physician dispensing prohibited and statewide regional strike forces activated.  
 F. September 1, 2011. Mandatory reporting to prescription drug monitoring program begins.  
 G. July 1, 2012. Wholesale distributor regulations expanded.

Some of the measures introduced in Florida have been adopted by other states. For example, the number of states with pain clinic laws increased from three in 2010 to 11 in 2013 (10). However, more rigorous evaluations of such interventions using comparison populations are necessary. At present, state legislation that establishes oversight over pain management clinics or describes specific registration, licensure, or ownership requirements for such clinics, coupled with restrictions on dispensing controlled substances by prescribers, can be considered promising interventions to reduce prescription drug overdose deaths.

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## Vital Signs: Variation Among States in Prescribing of Opioid Pain Relievers and Benzodiazepines — United States, 2012

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### Abstract

**Background:** Overprescribing of opioid pain relievers (OPR) can result in multiple adverse health outcomes, including fatal overdoses. Interstate variation in rates of prescribing OPR and other prescription drugs prone to abuse, such as benzodiazepines, might indicate areas where prescribing patterns need further evaluation.

**Methods:** CDC analyzed a commercial database (IMS Health) to assess the potential for improved prescribing of OPR and other drugs. CDC calculated state rates and measures of variation for OPR, long-acting/extended-release (LA/ER) OPR, high-dose OPR, and benzodiazepines.

**Results:** In 2012, prescribers wrote 82.5 OPR and 37.6 benzodiazepine prescriptions per 100 persons in the United States. State rates varied 2.7-fold for OPR and 3.7-fold for benzodiazepines. For both OPR and benzodiazepines, rates were higher in the South census region, and three Southern states were two or more standard deviations above the mean. Rates for LA/ER and high-dose OPR were highest in the Northeast. Rates varied 22-fold for one type of OPR, oxymorphone.

**Conclusions:** Factors accounting for the regional variation are unknown. Such wide variations are unlikely to be attributable to underlying differences in the health status of the population. High rates indicate the need to identify prescribing practices that might not appropriately balance pain relief and patient safety.

**Implications for Public Health:** State policy makers might reduce the harms associated with abuse of prescription drugs by implementing changes that will make the prescribing of these drugs more cautious and more consistent with clinical recommendations.

### Introduction

Persons in the United States consume opioid pain relievers (OPR) at a greater rate than any other nation. They consume twice as much per capita as the second ranking nation, Canada (1). Overprescribing of opioid pain relievers can result in multiple adverse health outcomes, including fatal overdoses (2). Opioid pain relievers were involved in 16,917 overdose deaths in 2011; in 31% of these deaths, benzodiazepine sedatives were also cited as contributing causes (CDC WONDER, unpublished data, 2014). High rates of prescribing these controlled substances are important determinants of rates of fatal overdose and drug abuse (3,4). Overall state prescribing

rates of OPR vary widely (5). Variation in prescribing rates for higher-risk opioid prescriptions (e.g., those for long-acting or extended-release [LA/ER] formulations) or those for high daily dosage have not been examined. LA/ER OPR are more prone to abuse, and high-dose formulations are more likely to result in overdoses, so they deserve special attention. Benzodiazepines are commonly prescribed in combination with OPR, even though this combination increases the risk for overdose (6). Interstate variation in prescribing rates for benzodiazepines has not been measured.

Information on local prescribing rates can alert authorities to atypical use and can prompt action. Such authorities include



**U.S. Department of Health and Human Services**  
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state and local health departments, law enforcement agencies, health-care systems, and licensure boards. States have the authority to track prescribing and dispensing and regulate medical practice within their borders. They can influence the rate of prescribing of controlled prescription drugs by various measures. These include passing regulations related to use of state prescription drug monitoring programs and the operation of pain clinics.

## Methods

Data on prescribing in 2012 come from IMS Health's National Prescription Audit (NPA). NPA provides estimates of the numbers of prescriptions dispensed in each state based on a sample of approximately 57,000 pharmacies, which dispense nearly 80% of the retail prescriptions in the United States. Prescriptions, including refills, dispensed at retail pharmacies and paid for by commercial insurance, Medicaid, Medicare, or cash were included.\*

CDC used the numbers of prescriptions and census denominators to calculate prescribing rates for OPR, subtypes of OPR, and benzodiazepines. The OPR category included semisynthetic opioids, such as oxycodone and hydrocodone, and synthetic opioids, such as tramadol. It did not include buprenorphine products used primarily for substance abuse treatment rather than pain, methadone distributed through substance abuse treatment programs, or cough and cold formulations containing opioids. LA/ER OPR were defined as those that should be taken only 2 to 3 times a day, such as methadone, OxyContin, and Opana ER. High-dose OPR were defined as the largest formulations available for each type of OPR that resulted in a total daily dosage of  $\geq 100$  morphine milligram equivalents when taken at the usual frequency, for example, every 4–6 hours. Benzodiazepines included alprazolam, clonazepam, clorazepate, diazepam, estazolam, flurazepam, lorazepam, oxazepam, quazepam, temazepam, and triazolam.

CDC calculated prescribing rates per 100 persons for the United States, each census region, and each state. CDC described the distribution of state rates using mean, standard deviation (SD), coefficient of variation (CV) (SD divided by the mean), the interquartile ratio (IQ) (75th percentile rate divided by the 25th percentile rate), and the ratio of the highest/lowest rates. Rates were transformed into multiples of the SD above or below the mean state rate of each drug.

## Results

Prescribers wrote 82.5 OPR prescriptions and 37.6 benzodiazepine prescriptions per 100 persons in the

United States in 2012 (Table). LA/ER OPR accounted for 12.5%, and high-dose OPR accounted for 5.1% of the estimated 258.9 million OPR prescriptions written nationwide. Prescribing rates varied widely by state for all drug types. For all OPR combined, the prescribing rate in Alabama was 2.7 times the rate in Hawaii. The high/low ratio was greater for LA/ER OPR and high-dose OPR compared with all OPR together: for high-dose OPR, state rates ranged 4.6-fold (Delaware versus Texas), and for LA/ER OPR, state rates ranged 5.3-fold (Maine versus Texas). State rates ranged 3.7-fold (West Virginia versus Hawaii) for benzodiazepines. For both OPR and benzodiazepines, Alabama, Tennessee, and West Virginia were the three highest-prescribing states. Among the OPR drugs, interstate variation was greatest for oxymorphone (CV = 0.72, IQ = 2.50, high/low = 21.9). OPR prescribing rates correlated with benzodiazepine prescribing rates ( $r = 0.80$ ;  $p < 0.01$ ).

The distribution of state prescribing rates was skewed toward higher rates (Figure 1). For both OPR and benzodiazepine rates, Alabama, Tennessee, and West Virginia were  $\geq 2$  SDs above the mean. For LA/ER opioids, Maine and Delaware were  $\geq 2$  SDs above the mean. For high-dose OPR, Delaware, Tennessee, and Nevada were  $\geq 2$  SDs above the mean. Texas's rate for LA/ER OPR was the only rate  $\geq 2$  SDs below the mean for any category.

The South region had the highest rate of prescribing OPR and benzodiazepines (Figure 2). The Northeast had the highest rate for high-dose OPR and LA/ER OPR, although high rates also were observed in individual states in the South and West. In the Northeast, 17.8% of OPR prescribed were LA/ER OPR. States in the South ranked highest for all individual opioids except for hydromorphone, fentanyl, and methadone, for which the highest rates were in Vermont, North Dakota, and Oregon, respectively.

## Conclusions and Comment

The rates of use of pain relievers and benzodiazepine sedatives showed about three- to five-fold variation from the highest to lowest states. Variation was greater for the LA/ER and high-dose formulations of OPR. Higher OPR and benzodiazepine prescribing rates in the South presented in this report are similar to the findings of higher prescribing rates for other drugs in the South, including antibiotics (7), stimulants in children (8), and medications that are high-risk for the elderly (9). Previous studies have found that regional prescribing variation cannot be explained by variation in the prevalence of the conditions treated by these drugs (5,7). Other research indicates that wide variation in rates of surgery and hospitalization also cannot be explained by the underlying

\*Additional information available at [http://www.imshealth.com/deployedfiles/ims/global/content/insights/researchers/npa\\_data\\_brief.pdf](http://www.imshealth.com/deployedfiles/ims/global/content/insights/researchers/npa_data_brief.pdf).



TABLE. Prescribing rates per 100 persons, by state and drug type — IMS Health, United States, 2012

State	Opioid pain relievers	Rank	Long-acting/ extended-release opioid pain relievers	Rank	High-dose opioid pain relievers	Rank	Benzodiazepines	Rank
Alabama	142.9	1	12.4	22	6.8	4	61.9	2
Alaska	65.1	46	10.7	31	4.2	26	24.0	50
Arizona	82.4	26	14.5	12	5.5	12	34.3	33
Arkansas	115.8	8	9.6	37	4.1	29	50.8	8
California	57.0	50	5.8	49	3.0	42	25.4	47
Colorado	71.2	40	11.8	24	4.1	31	28.0	44
Connecticut	72.4	38	14.1	13	5.4	13	46.2	11
Delaware	90.8	17	21.7	2	8.8	1	41.5	19
District of Columbia	85.7	23	13.7	17	5.7	10	38.4	24
Florida	72.7	37	11.3	26	6.6	5	46.9	10
Georgia	90.7	18	8.6	43	4.1	30	37.0	27
Hawaii	52.0	51	8.8	42	3.9	36	19.3	51
Idaho	85.6	24	10.3	33	3.9	34	29.1	42
Illinois	67.9	43	5.2	50	2.0	50	34.2	34
Indiana	109.1	9	10.7	30	4.9	20	42.9	17
Iowa	72.8	36	7.3	47	2.2	48	37.3	26
Kansas	93.8	16	10.3	34	4.0	32	38.9	23
Kentucky	128.4	4	11.6	25	5.0	19	57.4	5
Louisiana	118.0	7	7.8	46	3.6	39	51.5	7
Maine	85.1	25	21.8	1	5.6	11	40.7	22
Maryland	74.3	33	16.0	6	5.0	18	29.9	40
Massachusetts	70.8	41	14.9	8	3.5	41	48.8	9
Michigan	107.0	10	9.1	40	4.5	22	45.5	14
Minnesota	61.6	48	10.2	35	2.2	49	24.9	48
Mississippi	120.3	6	7.2	48	2.9	43	46.2	12
Missouri	94.8	14	9.5	38	3.5	40	42.6	18
Montana	82.0	27	14.0	15	4.4	23	33.7	35
Nebraska	79.4	28	7.8	45	2.3	46	35.0	32
Nevada	94.1	15	14.8	10	8.2	3	37.5	25
New Hampshire	71.7	39	19.6	3	6.1	7	41.2	21
New Jersey	62.9	47	11.3	27	5.8	9	36.5	28
New Mexico	73.8	35	12.7	21	3.8	38	31.5	37
New York	59.5	49	9.5	39	4.3	24	27.3	45
North Carolina	96.6	13	13.7	18	4.3	25	45.3	15
North Dakota	74.7	32	10.5	32	2.3	47	31.1	39
Ohio	100.1	12	11.2	28	4.2	27	41.3	20
Oklahoma	127.8	5	12.8	20	6.0	8	44.5	16
Oregon	89.2	20	18.8	4	5.2	16	31.4	38

health status of the population (9,10). Wide variation in the use of medical technology, including pharmacotherapy, usually indicates a lack of consensus on the appropriateness of its use (9). Therefore, one possible explanation for the results of this study is the lack of consensus among health-care providers on whether and how to use OPR for chronic, noncancer pain (2).

Research on small-area variation in health care indicates that high rates of use of prescription drugs and medical procedures do not necessarily translate into better outcomes or greater patient satisfaction. In fact, high rates of use might produce worse outcomes (11,12). In this case, greater use of opioids and benzodiazepines might expose populations to greater risks for overdose and falls (2,3,13,14). Greater use is also associated with abuse (4), although such use might both cause and be caused by abuse. The wide variation in rates of use for LA/ER opioids, in particular, might reflect the demand for these drugs

in the drug-using community and their selective prescribing, often in combination with sedatives and muscle relaxants, by unscrupulous pain clinics (14). Factors that might explain why some states have consistently lower rates of prescribing also need to be identified in future research.

The findings in this report are subject to at least four limitations. First, IMS estimates have not been validated, and they do not include prescriptions dispensed by prescribers, hospital/clinic pharmacies, or health maintenance organization pharmacies, potentially biasing rates downward. Second, prescriptions might be dispensed to nonstate residents, as commonly occurred in Florida during the previous decade (14). Third, prescribing rates cannot be correlated with rates of outcomes, such as overdoses with these drugs, because drug-specific overdose data are not available for most jurisdictions. Finally, the prescribing rates shown for a state might conceal large differences in rates within the state (15).

TABLE. (Continued) Prescribing rates per 100 persons, by state and drug type — IMS Health, United States, 2012

State	Opioid pain relievers	Rank	Long-acting/ extended-release opioid pain relievers	Rank	High-dose opioid pain relievers	Rank	Benzodiazepines	Rank
Pennsylvania	88.2	21	14.9	9	5.4	14	46.1	13
Rhode Island	89.6	19	14.0	14	5.2	17	60.2	4
South Carolina	101.8	11	11.0	29	3.9	33	52.6	6
South Dakota	66.5	45	9.0	41	2.5	45	28.0	43
Tennessee	142.8	2	18.2	5	8.7	2	61.4	3
Texas	74.3	34	4.2	51	1.9	51	29.8	41
Utah	85.8	22	12.1	23	5.3	15	35.9	30
Vermont	67.4	44	13.9	16	4.7	21	35.5	31
Virginia	77.5	29	9.9	36	3.8	37	36.4	29
Washington	77.3	30	14.6	11	4.1	28	27.1	46
West Virginia	137.6	3	15.7	7	6.2	6	71.9	1
Wisconsin	76.1	31	13.1	19	3.9	35	33.4	36
Wyoming	69.6	42	8.0	44	2.7	44	24.1	49
Mean	87.3	—	12.0	—	4.5	—	39.2	—
Standard deviation	22.4	—	3.9	—	1.6	—	11.1	—
Coefficient of variation	0.26	—	0.32	—	0.36	—	0.28	—
Median	82.4	—	11.3	—	4.2	—	37.3	—
25th percentile	71.7	—	9.5	—	3.7	—	31.1	—
75th percentile	96.6	—	14.1	—	5.4	—	46.1	—
Interquartile ratio	1.3	—	1.5	—	1.4	—	1.5	—
Ratio of highest to lowest	2.7	—	5.3	—	4.6	—	3.7	—
Northeast	70.8		12.6		4.8		38.2	
South	93.7		10.2		4.6		43.1	
Midwest	88.4		9.3		3.4		38.1	
West	68.0		9.6		3.9		27.9	
U.S. rate	82.5	—	10.3	—	4.2	—	37.6	—

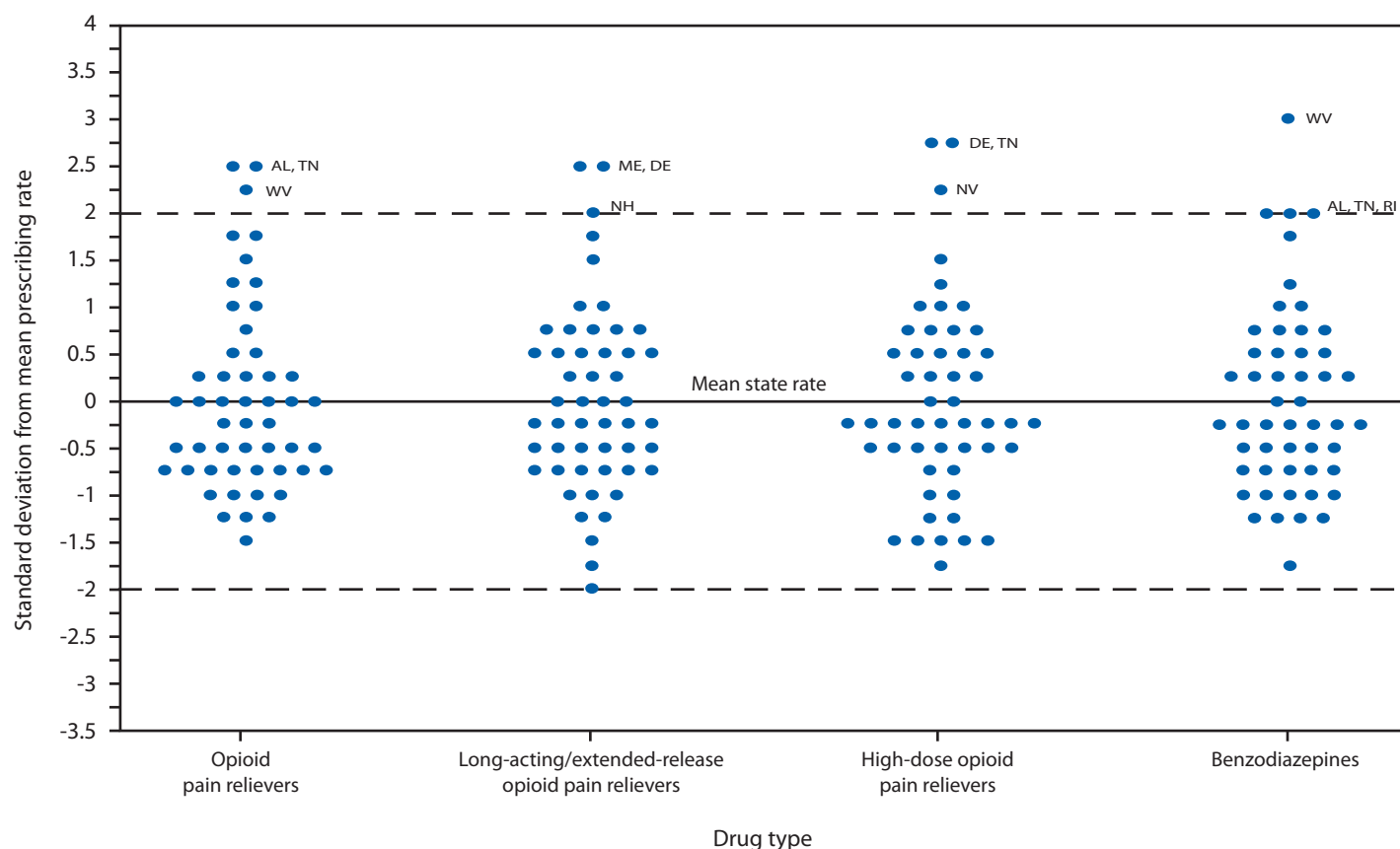
### Key Points

- Opioid pain relievers and benzodiazepine sedatives are commonly prescribed in the United States. They are frequently prescribed to the same patient.
- Overprescribing of opioid pain relievers can result in multiple adverse health outcomes, including fatal overdoses.
- Wide variation exists from one state to another in prescribing rates for these drugs. For states that prescribe well above the national rate, the need for a change in prescribing practices is urgent.
- CDC recommends that states make active use of their prescription drug monitoring programs to calculate current rates of prescribing, examine variations within the state, and track the impact of safer prescribing initiatives.
- Additional information is available at <http://www.cdc.gov/vitalsigns>.

Evaluating and modifying state prescribing patterns is particularly important in states with the highest prescribing rates for drugs prone to abuse. States can determine the factors driving their high prescribing rates by using data from their prescription drug monitoring programs (PDMPs), systems that record all prescriptions for drugs prone to abuse. They can also use PDMPs to evaluate the impacts of policy changes. Recently, a few states have been able to change prescribing patterns by increasing prescriber use of their PDMPs. New York and Tennessee, for example, mandated prescriber use of the state PDMP in 2012. They subsequently used their PDMPs to document declines of 75% and 36%, respectively, in the inappropriate use of multiple prescribers by patients (16).

States can take other actions that will affect prescribers. Developing or adopting existing guidelines for prescribing OPR and other controlled substances can establish local standards of care that might help bring prescribing rates more in line with current best practices. State Medicaid programs can manage pharmacy benefits so as to promote cautious, consistent use of OPR and benzodiazepines. In addition, a number of states have passed laws designed to address the most egregious prescribing excesses. Florida, for example, enacted pain clinic legislation in 2010 and prohibited dispensing by prescribers in 2011. It subsequently experienced a decline in rates of drug diversion (17) and a 52% decline in its oxycodone

FIGURE 1. Distribution of state prescribing rates,\* by drug type — IMS Health, United States, 2012



\* State rates are rounded to the nearest 0.25 standard deviation for purposes of presentation.

overdose death rate (18). Guidelines, insurance strategies, and laws are promising interventions that need further evaluation. Patients in all states deserve access to safe and effective evidence-based medical care, and prescribers should carefully consider the balance between risks and benefits in any pharmacotherapy.

### Acknowledgments

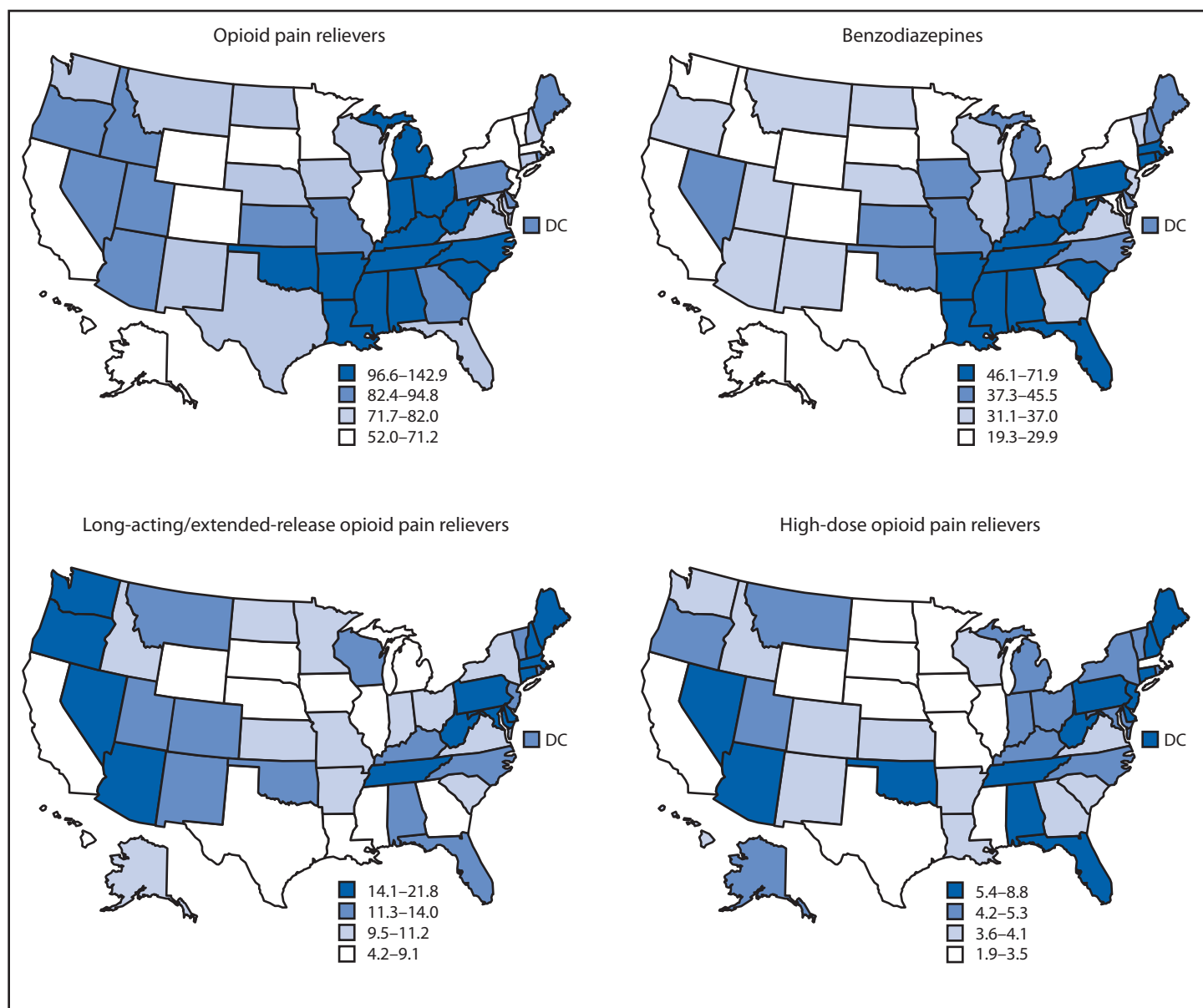
Rose Rudd, MSPH, National Center for Injury Prevention and Control, CDC. Caitlin Koris, Rollins School of Public Health, Emory University.

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FIGURE 2. Prescribing rates per 100 persons (in quartiles), by state and drug type — IMS Health, United States, 2012



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## Press Release

**Embargoed until 1:00 pm ET**

Tuesday, July 1, 2014

Contact: [CDC Media Relations](#)

404-639-3286

### **Opioid painkiller prescribing varies widely among states**

*Where you live makes a difference*

Health care providers wrote 259 million prescriptions for opioid painkillers in 2012 – many more in some states than in others – according to a [Vital Signs](#) report released today by the Centers for Disease Control and Prevention that highlights the danger of overdose. The report also has an example of a state that reversed its overdose trend.

Health care providers in the highest prescribing state, Alabama, wrote almost three times as many of these prescriptions per person as those in the lowest prescribing state, Hawaii. Most of the highest prescribing states were in the South. Previous research has shown that regional variation in use of prescriptions cannot be explained by the underlying health status of the population.

The Vital Signs report also contains a study highlighting the success of Florida in reversing prescription drug overdose trends. Results showed that after statewide legislative and enforcement actions in 2010 and 2011, the death rate from prescription drug overdose decreased 23 percent between 2010 and 2012. Florida officials had taken these actions in response to a 28 percent increase in the drug overdose death rate over the preceding years (2006-2010).

Declines in death rates in Florida for specific prescription painkillers (oxycodone, methadone, and hydrocodone) and sedatives paralleled declines in prescribing rates for those drugs. This report was based on Florida Medical Examiners Commission data from 2006 to 2012 and IMS Health National Prescription Audit data from 2008 to 2012.

“Prescription drug overdose is epidemic in the United States. All too often, and in far too many communities, the treatment is becoming the problem,” said CDC Director Tom Frieden, M.D., M.P.H. “Overdose rates are higher where these drugs are prescribed more frequently. States and practices where prescribing rates are highest need to take a particularly hard look at ways to reduce the inappropriate prescription of these dangerous drugs.”



**DEPARTMENT OF HEALTH AND HUMAN SERVICES  
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For this Vital Signs report, CDC analyzed 2012 prescribing data collected from retail pharmacies in the United States by a commercial vendor. CDC calculated prescribing rates by state for various types of opioid painkillers.

Key findings include:

- Southern states – Alabama, Tennessee, and West Virginia in particular – had the most painkiller prescriptions per person.
- The Northeast, especially Maine and New Hampshire, had the most prescriptions per person for long-acting/extended-release painkillers and for high-dose painkillers.
- State variation was the greatest for oxycodone (a specific type of painkiller), among all prescription painkillers. Nearly 22 times as many prescriptions were written for oxycodone in Tennessee as were written in Minnesota.

“We know we can do better. State variation in prescribing shows us that the overprescribing of opioids can be reduced safely and feasibly,” said Daniel M. Sosin, M.D., M.P.H., F.A.C.P., acting director of CDC’s National Center for Injury Prevention and Control. “Improving how opioids are prescribed will help us prevent the 46 prescription painkiller overdose deaths that occur each day in the United States.”

Previous research has shown that state variation does not necessarily translate to better health outcomes or patient satisfaction. In fact, high rates of use might produce worse outcomes.

Steps that states can take to address the overprescribing of painkillers include:

- Considering ways to increase use of prescription drug monitoring programs, which are state-run databases that track prescriptions for painkillers and can help find problems in overprescribing. Impact of these programs is greater when they make data available in real time, are universal (used by all prescribers for all prescriptions for all controlled substances), and are actively managed (for example, send alerts to prescribers when problems are identified).
- Considering policy options, including laws and regulation, relating to pain clinics to reduce prescribing practices that are risky to patients.
- Evaluating their own data and programs and considering ways to assess their Medicaid, workers’ compensation programs, and other state-run health plans to detect and address inappropriate prescribing of painkillers.
- Identifying opportunities to increase access to substance abuse treatment and considering expanding first responder access to naloxone, a drug used when people overdose.



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CDC's Injury Center works to protect the safety of everyone, every day. For more information about prescription drug overdoses, please visit [www.cdc.gov/homeandrecreationalsafety/overdose](http://www.cdc.gov/homeandrecreationalsafety/overdose).

[Vital Signs](#) is a CDC report that appears on the first Tuesday of the month as part of the CDC journal [Morbidity and Mortality Weekly Report, or MMWR](#). The report provides the latest data and information on key health indicators. These are cancer prevention, obesity, tobacco use, motor vehicle passenger safety, prescription drug overdose, HIV/AIDS, alcohol use, health care–associated infections, cardiovascular health, teen pregnancy, food safety and viral hepatitis.

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