

VA	81.36	83.05	82.34	81.41	81.27	80.7	80.21	76.11	78.91	77.12	77.21	77.49	77.69	75.81	74.37	76.17
WV	63.87	63.76	63.53	62.36	60.88	61.11	61.37	62.18	63.33	61.24	60.58	61.27	61.92	60.67	59.83	59.54

Abbreviations: CA=California; DE=Delaware; FL=Florida; ID=Idaho; KY=Kentucky; LA=Louisiana; ME=Maine; OH=Ohio; TX=Texas; VA=Virginia; WV=Wes
*Mean daily opioid dosage is calculated for patients that have a Drug Enforcement Administration Schedule II-V opioid prescription in a given quarter and refers to l divided by the total number of prescription days accounting for overlapping prescription days).

SUPPLEMENTARY TABLE S3. Percent of patients with a high daily dosage of opioids* (≥ 90 MME per day), by state and quarter — Prescription Behavior

State	10Q1	10Q2	10Q3	10Q4	11Q1	11Q2	11Q3	11Q4	12Q1	12Q2	12Q3	12Q4	13Q1	13Q2	13Q3	13Q4
CA	14.89	14.61	14.72	13.40	11.39	11.41	11.48	11.70	11.44	11.56	11.46	11.59	11.79	11.22	10.93	10.97
DE									23.10	21.99	21.49	21.66	22.14	21.42	20.93	21.03
FL							18.48	17.03	16.72	15.91	15.39	15.06	14.64	14.32	14.42	
ID									15.75	15.80	16.55	16.32	15.86	15.16	15.52	
KY	13.14	12.93	13.06	11.76	9.27	10.27	9.34	9.82	9.71	9.34	10.00	9.68	9.37	9.09	8.77	8.57
LA			14.90	12.66	8.82	8.69	8.59	8.78	8.43	8.61	8.6	8.77	8.77	8.74	8.55	8.52
ME	20.74	21.2	20.82	19.27	16.69	16.45	16.47	16.25	16.21	15.96	15.93	16.24	16.46	16.49	15.67	15.81
OH	16.15	15.73	15.65	13.64	10.1	9.85	9.51	9.89	9.86	9.81	11.26	9.91	9.78	9.61	9.30	9.28
TX																
VA	16.79	16.71	16.72	15.26	12.58	12.61	12.62	13.32	14.64	11.52	11.38	11.70	11.83	12.62	12.88	11.06
WV	14.41	14.08	13.98	12.65	9.88	9.88	10.08	10.35	10.65	9.92	9.98	10.14	10.50	10.07	11.29	10.32

Abbreviations: CA=California; DE=Delaware; FL=Florida; ID=Idaho; KY=Kentucky; LA=Louisiana; ME=Maine; OH=Ohio; TX=Texas; VA=Virginia; WV=Wes
*Percent of patients with a high daily dosage of opioids is defined as the percentage of opioid-treated patients in the quarter with ≥ 90 MME per day prescribed for all drugs used by the patient, calculated using the average daily MME for CII-V opioid drugs over the three-month period.

SUPPLEMENTARY TABLE S4. Percent of opioid-treated days with overlapping opioid prescriptions,* by state and quarter — Prescription Behavior Sur

State	10Q1	10Q2	10Q3	10Q4	11Q1	11Q2	11Q3	11Q4	12Q1	12Q2	12Q3	12Q4	13Q1	13Q2	13Q3	13Q4
CA	20.54	20.48	20.51	20.54	20.29	20.44	19.72	19.98	20.39	20.39	20.04	20.25	20.42	19.67	19.39	19.4
DE									23.53	25.93	27.22	28.27	28.11	29.89	30.68	30.65
FL							23.44	23.05	22.91	22.91	22.74	22.34	21.71	21.44	21.17	

ID										20.52	21.92	22.4	22.5	22.04	21.77	21.4
KY	15.54	15.9	15.97	16.4	16.39	18.68	16.34	17.2	17.36	16.78	16.71	15.23	14.83	14.61	14.32	14.31
LA			14.58	16.13	16.32	15.92	15.86	16.3	16.27	15.99	16.03	16.35	16.49	16.11	15.99	16.08
ME	19.58	20.47	21.37	21.49	21.31	21.45	21.26	20.71	20.99	21.07	21.22	21.21	21.34	19.95	20.32	20.37
OH	18.94	20.00	19.97	20.21	20	19.49	19.39	19.31	18.98	18.65	17.57	18.34	18.11	17.97	17.75	17.69
TX																
VA	16.25	17.40	17.35	17.97	18.49	17.91	18.41	16.52	22.33	18.91	19.01	19.38	19.32	18.13	16.61	19.24
WV	14.66	15.38	15.52	16.04	16.15	15.97	15.98	16.29	16.31	15.99	15.97	16.41	16.51	15.41	14.45	14.36

Abbreviations: CA=California; DE=Delaware; FL=Florida; ID=Idaho; KY=Kentucky; LA=Louisiana; ME=Maine; OH=Ohio; TX=Texas; VA=Virginia; WV=Wes
*Percent of opioid-treated days with overlapping opioid prescriptions is defined as the percent of total opioid-treated days for all patients in the quarter with at least t opioid prescriptions.

SUPPLEMENTARY TABLE S5. Percent of opioid-treated days with overlapping benzodiazepine prescriptions,* by state and quarter — Prescription Beh:

State	10Q1	10Q2	10Q3	10Q4	11Q1	11Q2	11Q3	11Q4	12Q1	12Q2	12Q3	12Q4	13Q1	13Q2	13Q3	13Q4
CA	12.97	13	13.1	13.11	12.92	13.09	12.82	12.98	13.29	13.36	13.31	13.4	13.36	13.43	13.45	13.52
DE									12.7	12.81	13.06	12.96	12.71	12.78	12.7	12.76
FL								16.59	15.76	15.44	15.23	14.9	14.58	13.8	13.51	13.22
ID										11.23	11.81	11.94	12.1	12.29	12.35	12.17
KY	21.50	22.47	22.66	22.92	22.81	23	23.14	23.09	22.93	23.21	22.97	22.24	22.04	21.75	21.54	21.41
LA			15.27	15.91	15.71	15.69	15.62	15.78	15.86	15.88	16.1	16.24	16.2	16.38	16.44	16.31
ME	11.35	11.3	12.01	12.06	11.75	11.96	11.88	11.56	11.83	11.79	11.69	11.55	11.59	10.78	11.4	11.52
OH	15.11	15.76	15.74	15.91	15.6	15.43	15.28	15.27	15.17	15.04	14.35	14.92	14.89	14.96	14.76	14.76
TX																
VA	11.35	11.82	11.81	11.97	11.8	11.81	11.74	10.4	11.64	12.99	12.98	13.1	13.08	12.54	11.46	13.17
WV	22.05	22.58	22.77	22.84	22.58	22.42	22.53	22.2	22.03	21.93	21.83	21.8	21.58	21.34	18.73	19.51

Abbreviations: CA=California; DE=Delaware; FL=Florida; ID=Idaho; KY=Kentucky; LA=Louisiana; ME=Maine; OH=Ohio; TX=Texas; VA=Virginia; WV=Wes
*Percent of opioid-treated days with overlapping benzodiazepine prescriptions is defined as the percent of total opioid- and benzodiazepine-treated days for all patier Administration Schedule II-V opioid prescriptions and benzodiazepine prescriptions.

SUPPLEMENTARY TABLE S6. Multiple-provider episode rate* per 100,000 state residents, by state and quarter — Prescription Behavior Surveillance S

State	10Q1	10Q2	10Q3	10Q4	11Q1	11Q2	11Q3	11Q4	12Q1	12Q2	12Q3	12Q4	13Q1	13Q2	13Q3	13Q4
CA	13.84	14.24	14.40	13.17	12.15	12.99	11.90	10.96	12.03	11.96	13.08	11.66	10.26	10.44	10.18	8.80
DE									13.41	10.47	10.03	8.61	6.29	9.11	6.62	5.97
FL								13.94	10.24	9.67	9.13	8.20	7.59	7.99	7.05	6.10
ID																
KY	19.57	19.47	20.07	17.63	16.14	17.19	18.97	15.59	14.20	15.43	7.28	4.50	4.18	3.86	4.32	3.54
LA																
ME	4.29	5.04	5.12	3.99	3.99	5.27	4.22	4.07	3.91	3.16	3.54	2.71	2.56	3.24	2.86	2.64
OH	23.98	25.31	24.74	22.46	19.58	20.09	21.32	20.03	18.21	16.87	10.98	12.46	11.41	12.31	13.29	11.50
TX																
VA	0.97	0.86	1.09	1.07	0.88	1.21	1.10	1.61	7.88	9.02	9.48	9.31	8.75	6.20	4.60	7.23
WV	9.39	9.93	11.33	10.96	7.44	8.89	9.22	8.57	8.03	9.11	7.98	5.44	4.43	4.86	2.10	2.05

Abbreviations: CA=California; DE=Delaware; FL=Florida; ID=Idaho; KY=Kentucky; LA=Louisiana; ME=Maine; OH=Ohio; TX=Texas; VA=Virginia; WV=Wes

*Multiple-provider episode (MPE) rate is defined as the number of instances in which a patient fills Drug Enforcement Administration Schedule II-IV opioid prescrip in the previous three months per 100,000 state residents. MPE data was not available for Idaho, Louisiana, Texas, and Virginia because of their change in PDMP data; MPE rates across some calendar quarters impossible.

10-2016

14Q1	14Q2	14Q3	14Q4	15Q1	15Q2	15Q3	15Q4	16Q1	16Q2	16Q3	16Q4
146.18	149.28	149.15	136.14	133.51	136.36	133.52	136.46	133.67	128.65	129.17	125.23
186.07	192.11	190.30	184.43	173.39	181.77	180.67	179.33	174.09	170.83	168.49	164.65
161.46	163.88	164.46	155.24	152.12	157.59	159.71	160.69	159.95	157.21	155.29	152.9
178.39	197.61	199.43	189.03	180.53	184.65	185.91	193.43	188.01	183.46	181.28	178.47
243.60	266.34	249.78	237.99	227.56	234.99	238.31	236.42	228.55	225.84	224.87	219.11
229.55	246.06	237.8	215.24	208.78	214.63	216.04	216.61	211.49	208.51	211.79	209.19
186.61	188.89	189.97	182.64	177.34	179.73	178.96	176.63	167.28	161.03	157.85	
200.04	206.35	207.88	196.86	186.97	189.68	188.70	188.02	178.35	171.31	158.74	149.38
				97.65	108.60	110.43	112.28	106.16	106.42	103.87	108.70
162.66	165.76	165.92	157.50	151.63	154.97	156.11	154.33	149.05	144.15		
214.26	223.65	224.33	204.74	193.32	198.13	191.95	192.09	182.41	177.18	171.91	164.53

t Virginia.

er 1,000 state residents.

Behavior Surveillance System, 2010-2016

14Q1	14Q2	14Q3	14Q4	15Q1	15Q2	15Q3	15Q4	16Q1	16Q2	16Q3	16Q4
76.05	74.84	73.84	74.74	73.83	73.46	72.30	70.08	70.00	68.53	67.43	66.38
105.34	104.06	104.17	103.37	101.03	97.83	97.29	97.11	96.33	94.78	94.46	93.32
86.16	84.83	83.92	89.77	84.87	83.04	82.09	79.87	81.35	81.26	81.12	80.39
79.74	80.24	79.37	80.30	79.71	79.58	79.73	78.32	77.77	76.54	75.43	74.97
53.82	55.4	52.42	52.7	52.91	52.24	52.19	52.11	51.93	51.31	50.76	50.36
61.2	60.84	60.21	60.58	60.47	59.9	60.18	60.55	60.27	59.93	59.27	58.12
92.56	91.73	91.37	99.85	91.34	90.69	90.29	90.22	90.78	89.75	86.33	
62.85	61.52	61.21	61.36	61.31	60.37	59.72	59.40	59.22	58.21	58.64	58.86
				61.02	60.78	61.16	61.39	61.26	61.01	59.58	59.24

76.25	74.28	73.41	74.13	73.12	72.83	73.28	73.12	73.03	71.45		
59.95	59.32	59.87	61.71	62.67	62.12	60.53	59.11	58.47	57.51	56.85	56.06

t Virginia; MMEs=morphine milligram equivalents.

MME per day prescribed (total number of MME preprescribed)

or Surveillance System, 2010-2016

14Q1	14Q2	14Q3	14Q4	15Q1	15Q2	15Q3	15Q4	16Q1	16Q2	16Q3
10.83	10.57	10.28	10.63	11.33	10.59	10.44	11.94	10.18	10.21	9.63
20.76	21.17	20.86	21.39	19.77	18.34	17.95	17.95	17.84	17.27	16.84
14.08	13.61	13.40	14.82	13.89	13.43	13.43	13.12	13.38	13.70	13.35
15.75	15.05	14.84	15.73	15.53	15.18	14.90	15.45	15.26	15.09	14.54
8.4	9.45	8.1	8.31	8.47	8.24	8.01	8.09	8.04	7.91	7.84
8.81	9.46	8.59	8.93	8.84	9.14	8.79	8.67	8.78	8.83	8.48
16.10	16.03	16.14	19.23	17.42	17.08	17.06	17.77	17.32	17.09	16.28
9.14	8.78	8.59	8.77	8.87	8.61	8.44	8.75	8.66	8.55	8.76
				9.61	8.98	8.82	8.87	8.95	9.14	8.68
11.18	12.28	11.48	11.87	12.56	11.68	10.90	10.77	10.66	12.50	
10.45	10.07	9.94	10.56	10.92	10.65	10.17	9.79	9.72	9.22	9.08

t Virginia; MME=morphine milligram equivalent.

l Drug Enforcement Administration Schedule II-V (CII-V) opioid

veillance System, 2010-2016

14Q1	14Q2	14Q3	14Q4	15Q1	15Q2	15Q3	15Q4	16Q1	16Q2
19.38	19.03	18.72	18.57	18.12	18.52	18.13	17.11	18.00	17.34
30.94	31.20	31.22	31.34	30.78	30.00	29.72	29.58	29.45	29.58
22.08	22.14	21.92	22.48	21.70	21.73	21.63	20.45	21.66	21.92

21.11	21.94	22.01	22.16	22.04	22.16	22.15	22.13	22.04	21.96
14.69	18.18	14.01	13.64	13.38	13.04	13.06	13.23	12.97	12.67
15.75	16.5	15.73	14.7	14.47	14.2	15.01	15.5	15.18	14.96
21.47	21.24	21.02	21.37	20.87	20.64	20.52	20.84	21.12	21.24
17.68	17.33	17.40	16.79	16.56	16.17	15.87	15.84	15.70	15.34
				13.54	14.31	14.54	15.00	14.73	14.50
19.24	17.82	17.22	17.38	16.69	17.41	18.38	18.80	18.78	17.30
14.24	14.12	13.99	14.05	14.14	14.10	13.99	14.04	13.72	13.62

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wo overlapping Drug Enforcement Administration Schedule II-V

avior Surveillance System, 2010-2016

14Q1	14Q2	14Q3	14Q4	15Q1	15Q2	15Q3	15Q4	16Q1	16Q2	16Q3	16Q4
13.50	13.48	13.41	12.98	12.61	12.81	12.55	11.80	12.52	12.18	12.08	11.74
12.70	12.66	12.55	12.32	11.97	11.94	11.63	11.45	11.15	10.99	10.54	10.25
14.19	14.44	14.42	13.07	13.28	13.32	13.34	13.18	13.07	12.94	13.08	12.94
12.05	12.41	12.38	12.05	11.93	12.02	11.82	11.85	11.69	11.32	11.16	10.91
21.14	20.83	20.45	20.01	19.66	19.41	19.27	19.15	18.94	18.69	18.23	17.64
15.58	15.27	14.77	13.65	13.34	13.18	14.1	14.39	14.11	13.73	13.23	12.86
11.83	11.72	11.61	10.59	11.35	11.34	11.08	11.15	11.30	11.00	10.72	
14.67	14.52	14.37	14.11	13.84	13.66	13.56	13.49	13.25	12.93	12.50	11.84
				10.29	10.65	10.74	10.90	10.64	10.22	9.63	10.05
13.15	12.32	11.62	11.23	10.43	11.19	12.13	12.33	12.22	10.88		
19.34	19.67	19.51	18.78	18.18	17.90	17.13	16.71	16.07	15.53	14.86	14.16

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its in the quarter with overlapping Drug Enforcement

ystem, 2010-2016

14Q1	14Q2	14Q3	14Q4	15Q1	15Q2	15Q3	15Q4	16Q1	16Q2	16Q3	16Q4
8.17	8.27	8.17	8.06	7.65	6.14	5.19	4.79	4.04	3.7	3.41	2.85
3.86	7.62	5.15	6.22	3.93	5.73	5.31	3.08	3.71	3.71	2.87	3.29
6.11	5.88	5.43	5.01	3.9	3.72	3.7	3.4	3.01	2.98	3.31	3.26
4.92	5.42	5.1	5.1	5.26	5.36	5.85	5.61	4.27	4.54	3.99	3.59
2.63	2.18	3.09	2.94	2.18	1.43	1.73	2.48	2.33	1.58	1.58	
10.41	11.68	12.3	11.33	9.36	9.7	9.69	7.9	6.25	4.89	4.14	3.14
6.47	4.08	1.44	1.34	4.85	5.15	6.24	5.4	4.93	1.27		
2.38	2.65	2.49	1.78	1.68	2.22	2.06	1.03	0.81	0.49	0.65	0.49

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ptions from five or more prescribers at five or more pharmacies
a vendors during the study interval, which made calculation of

