

**APPENDIX***Definition of new Arthroscopy by CPT code:*

Arthroscopic procedures with significant bony work or expected increased pain (i.e. total synovectomy) involved: 29876, 29885, 29886, 29887, 29888, 29889

Arthroscopic procedures that do not involve significant bony work:

29870, 29871, 29873, 29874, 29875, 29877, 29879, 29880, 29881, 29882, 29883, 29884

*Opioid classes identified in pharmacy claims and included:* Codeine, Dihydrocodeine, Fentanyl, Hydrocodone, Hydromorphone, Meperidine, Morphine, Oxycodone, Oxymorphone, Tapentadol, Tramadol

**Appendix Table 1 – Opioid Prescribing Information for filled Prescription within 3 days of Surgery Date (N=63,439)**

<b>Quantity</b>	<b>Mean</b>	<b>Min</b>	<b>10%</b>	<b>Median</b>	<b>90%</b>	<b>95%</b>	<b>Max</b>
Total	41.79	1	10	40 (IQR 30-50)	60	80	1298
Non-Invasive	42.96	1	10	40 (IQR 30-45)	60	60	1000
Invasive	52.16	1	12	40 (IQR 30-60)	70	90	1298
<b>MME</b>	<b>Mean</b>	<b>Min</b>	<b>10%</b>	<b>Median</b>	<b>90%</b>	<b>95%</b>	<b>Max</b>
Total	292.47	7.5	60	250 (IQR 150-375)	465	600	9734
Non-Invasive	264.47	7.5	50	225 (IQR 150-450)	450	600	7500
Invasive	363.88	7.5	75	300 (IQR 225-450)	600	750	9734
<b>Days Supply</b>	<b>Mean</b>	<b>Min</b>	<b>10%</b>	<b>Median</b>	<b>90%</b>	<b>95%</b>	<b>Max</b>
Total	6.03	1	2	5 (IQR 4-7)	10	12	120
Non-Invasive	5.74	1	2	5 (IQR 4-7)	10	10	120
Invasive	6.76	1	2	6 (IQR 5-8)	10	14	90

Notes: Mean opioid prescribing information for quantity, MME, and days supply are displayed for those members who filled an opioid within 3 days. Information on the minimum, medium, maximum, and the 10, 90, and 95 percentile are also reported.

**Appendix Table 2 – Average Observed Prescribing Rates, Quantity, and MME by State**

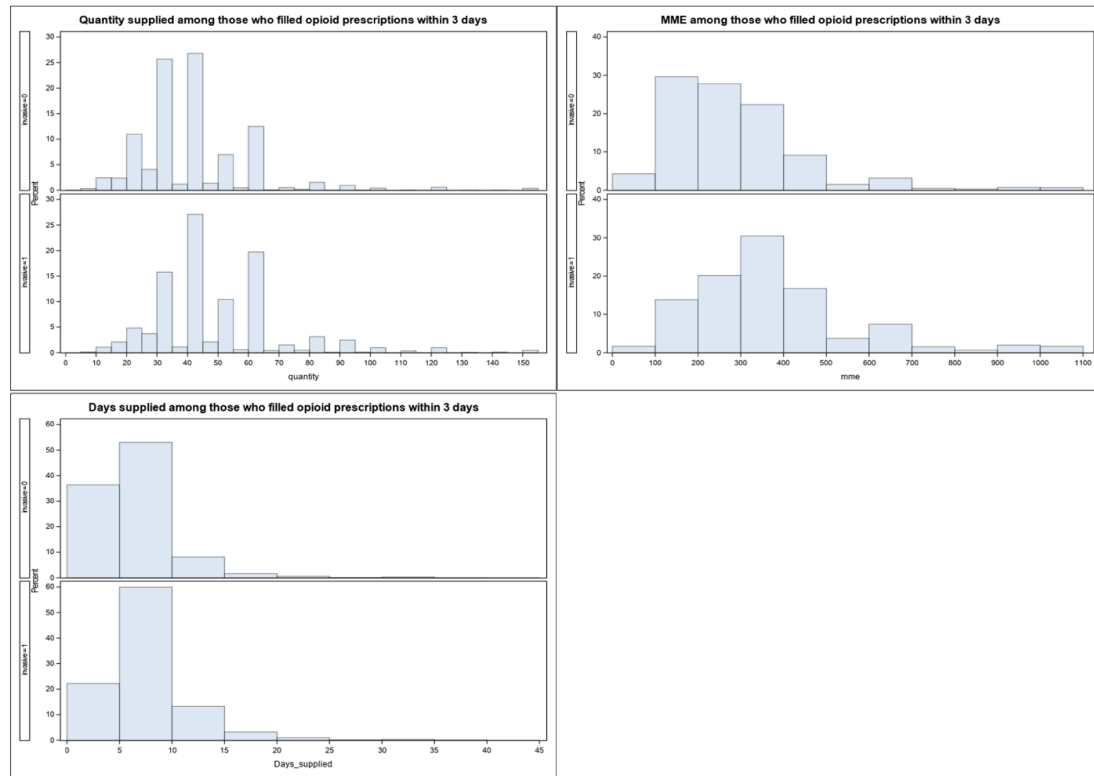
State	Prescribing		
	Rate	Tablets	MME
Alaska	0.42	49.09	447.73
Alabama	0.79	37.00	298.37
Arkansas	0.77	39.48	316.19
Arizona	0.75	38.49	265.74
California	0.65	40.34	302.36
Colorado	0.78	38.10	263.56
Connecticut	0.61	28.71	200.65
D.C.	0.77	44.54	335.89
Delaware	0.64	37.64	241.81
Florida	0.71	39.19	275.07
Georgia	0.71	39.03	293.63
Hawaii	0.62	33.85	216.76
Iowa	0.79	42.20	289.02
Idaho	0.77	43.32	360.37
Illinois	0.78	41.56	273.43
Indiana	0.76	43.38	288.30
Kansas	0.77	43.18	301.81
Kentucky	0.53	42.50	334.85
Louisiana	0.72	39.45	333.97
Massachusetts	0.72	35.10	243.07
Maryland	0.72	36.45	251.97
Maine	0.70	34.04	239.30
Michigan	0.76	42.97	290.01
Minnesota	0.65	35.51	225.56
Missouri	0.77	43.45	282.13
Mississippi	0.68	36.94	297.58
Montana	0.72	40.17	277.99
North Carolina	0.74	40.83	286.43
North Dakota	0.56	34.22	243.85
Nebraska	0.85	41.62	274.06
New Hampshire	0.59	28.68	189.35
New Jersey	0.63	33.54	244.84
New Mexico	0.70	35.70	236.55
Nevada	0.58	41.53	328.32
New York	0.71	36.88	256.48
Ohio	0.79	41.66	274.22
Oklahoma	0.75	44.87	370.50
Oregon	0.72	39.47	271.92
Pennsylvania	0.68	35.69	234.77
Rhode Island	0.79	29.59	201.37

South Carolina	0.73	41.60	310.22
South Dakota	0.40	40.96	247.53
Tennessee	0.79	36.32	282.58
Texas	0.64	44.66	322.67
Utah	0.81	37.10	291.04
Virginia	0.74	41.53	292.94
Vermont	0.73	24.13	156.88
Washington	0.79	39.77	277.17
Wisconsin	0.79	39.08	245.44
West Virginia	0.58	38.28	242.95
Wyoming	0.75	41.12	280.34

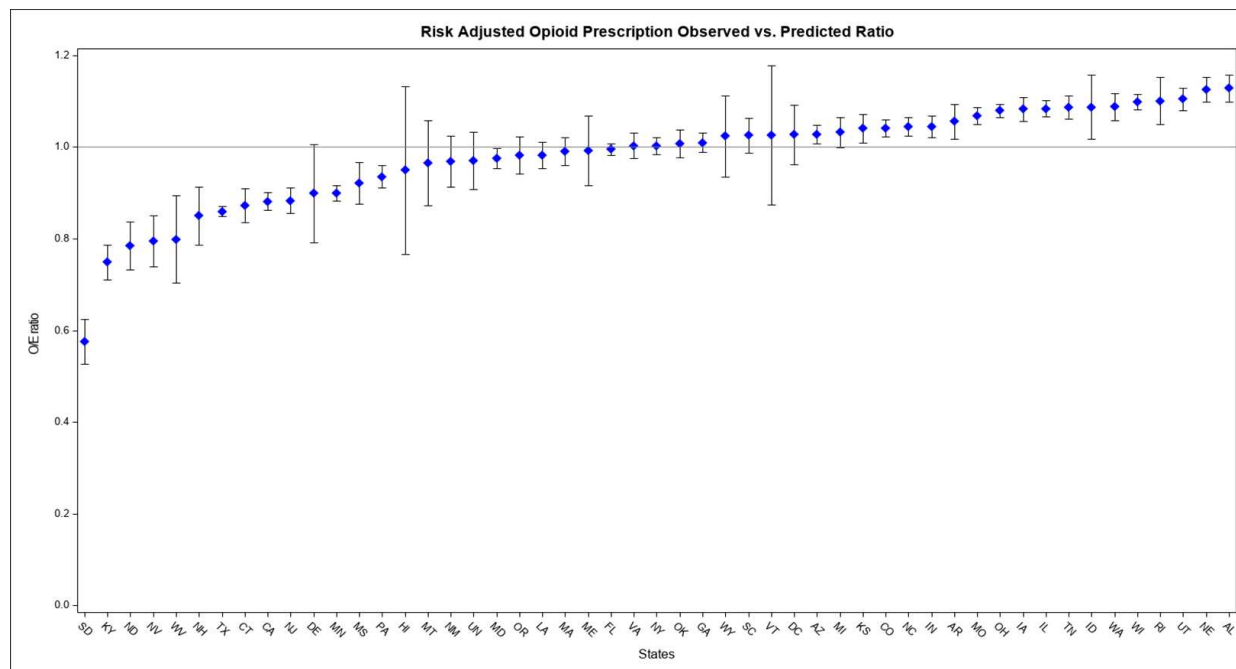
**Appendix Table 3 –Total MME Saved if Dosage Would not Have Exceeded the Median Total MME Level**

Year	Median MME	Patients	Total MME Saved
2015	300	5,572	1,303,848
2016	300	5,713	1,319,703
2017	300	5,474	1,187,858
2018	210	7,950	993,750
2019 (first two quarters)	180	3,886	423,574
All	250	28,595	5,230,577

**Appendix Figure 1 – Distribution on the Filled Prescriptions within 3 Days of the Index Date by Invasive vs. Non-invasive Procedure**

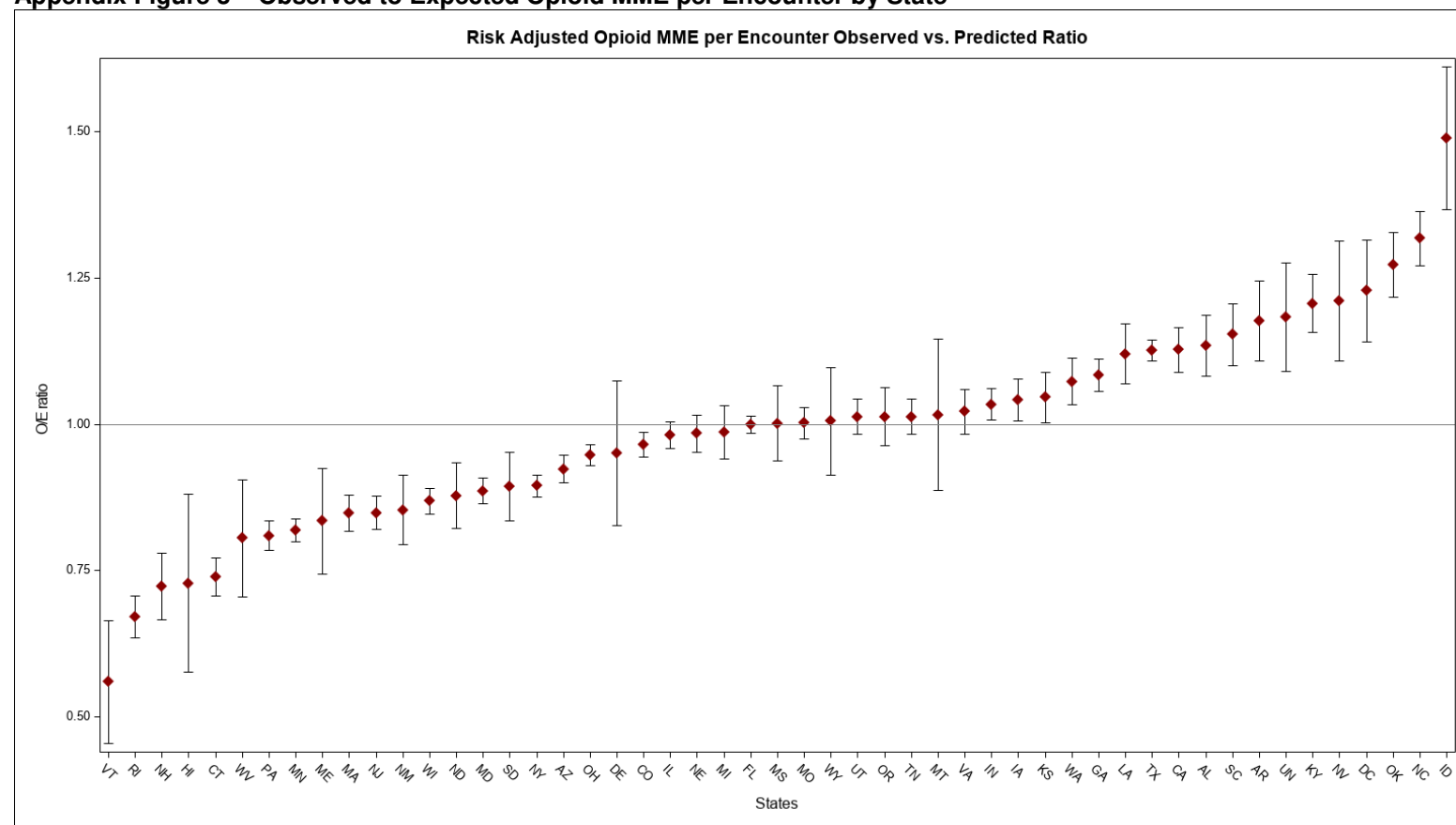


Appendix Figure 2 – Observed to Expected Opioid Prescribing Rate by State



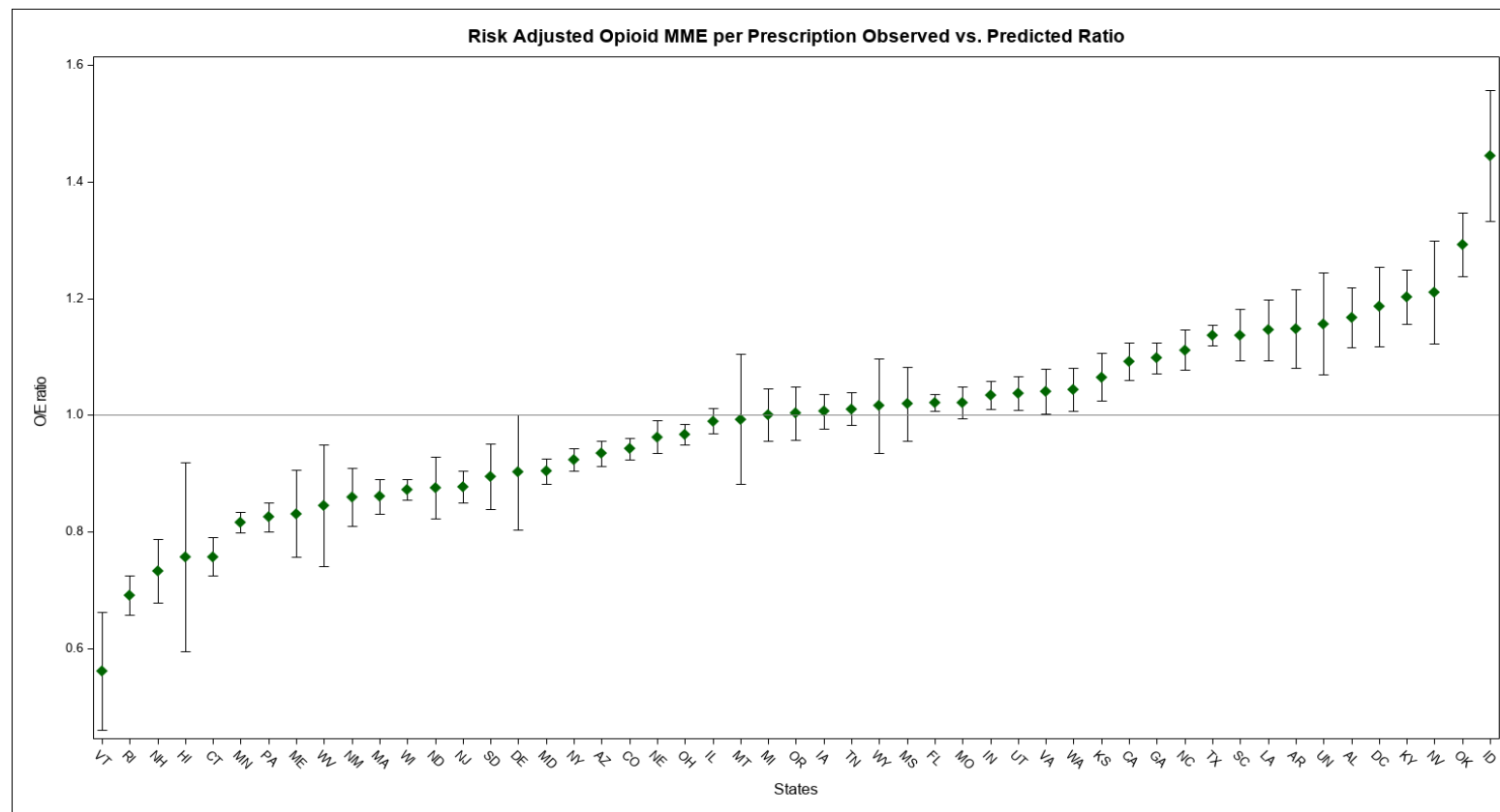
Notes: State-level variation in the opioid prescribing rate for knee arthroscopies among patients who were opioid naive. The median state-level prescribing rate during these years was 73%. The observed to expected prescribed rate is displayed for each state with a 95% confidence interval. States with higher-than-expected prescribing rates are displayed with an O/E rate larger than 1. Expected prescribing rate was adjusted for case mix with age, sex, procedure type, race, ethnicity, education, household income, comorbidities, and year, using multivariate logistic regression.

Appendix Figure 3 – Observed to Expected Opioid MME per Encounter by State



Notes: State-level variation in the opioid prescribing rate for knee arthroscopies among patients who were opioid naive. The observed to expected prescribed rate is displayed for each state with a 95% confidence interval. States with higher-than-expected prescribing rates are displayed with an O/E rate larger than 1. Expected prescribing rate was adjusted for case mix with age, sex, procedure type, race, ethnicity, education, household income, comorbidities, and year, using multivariate linear regression.

Appendix Figure 4 – Observed to Expected Opioid MME per Prescription by State



Notes: State-level variation in the opioid prescribing rate for knee arthroscopies among patients who were opioid naive. The observed to expected prescribed rate is displayed for each state with a 95% confidence interval. States with higher-than-expected prescribing rates are displayed with an O/E rate larger than 1. Expected prescribing rate was adjusted for case mix with age, sex, procedure type, race, ethnicity, education, household income, comorbidities, and year, using multivariate linear regression.