

eAppendix Table. Definition of Variables Used in the Study

Variables	Definition	Codes (if applicable)
Opioid fill	Filled prescription for all opioids, including tramadol and buprenorphine, between October 1, 2013, and December 31, 2015	Generic Cross Reference (GCR) Codes for all opioids: 930981, 930133, 930052, 930049, 930041, 929758, 929645, 929451, 929414, 929410, 929182, 929026, 928771, 928553, 928363, 928354, 928318, 927685, 927600, 927029, 926797, 926762, 926665, 926663, 926662, 926660, 926658, 926654, 926652, 926650, 926649, 926647, 926646, 926525, 926524, 926119, 926108, 926105, 926104, 926103, 925351, 924365, 923958, 923776, 923770, 923767, 923563, 923420, 923042, 921976, 921975, 921974, 629767, 596370, 492885, 492829, 492826, 487682, 487595, 464966, 464956, 464832, 453380, 453360, 432417, 432185, 432180, 423500, 423470, 382310, 371260, 368265, 368240, 337990, 302774, 292100, 291500, 291490, 291485, 291478, 291473, 291455, 265100, 226300, 226295, 208775, 180129, 130984, 130970, 130964, 130959, 108155, 095670, 092577, 004050, 004046, 923288, 931161, 931282
High-dose opioid therapy	Average daily morphine milligram equivalents higher than 50	
Concurrent use of opioid/benzodiazepine	Benzodiazepine prescriptions concurrently filled with any opioid during any month between October 1, 2013, and December 31, 2015	GCR codes for benzodiazepines: 119270, 119185, 213000, 927904, 431685, 214420, 930123, 236575, 375025, 594000, 923630, 176990, 347844, 929700, 624620, 127780, 931138, 930120, 924008, 498000
Rural residence	Rural status of the town of patients' latest residence	
Rural status of the pharmacy	Rural status of the town of last pharmacy where patient filled the opioid prescription	
Homelessness	A binary variable based on ever mention of homelessness <i>ICD-9-CM</i> or <i>ICD-10</i> codes in the All Payers Claims Database (APCD) (defined by MDPH)	<i>ICD-9:</i> V600 <i>ICD-10:</i> Z590
Elixhauser physical comorbidities	Count of Elixhauser physical comorbidities ever diagnosed between January 1, 2011, and December 31, 2015; based on diagnosis codes in APCD; range 0-27	HIV, liver disease, chronic pulmonary disease, CHF, arrhythmia, valvular heart, pulmonary circulatory, peripheral vascular, hypertension (uncomplicated and complicated), paralysis, other neurologic, diabetes (uncomplicated and complicated), acid peptic disease, renal failure, non-metastatic cancer, metastatic cancer, rheumatoid arthritis/autoimmune diseases, coagulopathy, obesity, weight loss, anemia (blood loss and deficiency), fluid and electrolyte imbalance
Elixhauser mental comorbidities	Count of Elixhauser physical comorbidities ever diagnosed between January 1, 2011, and December 31, 2015; based on diagnosis codes in APCD; range 0-4	Alcohol dependence, substance use, depression, psychosis
Opioid use disorder	A binary variable based on any mention of opioid use <i>ICD-9-CM</i> or <i>ICD-10</i> codes in APCD (defined by MDPH)	<i>ICD-9-CM:</i> 30400, 30401, 30402, 30403, 30470, 30471, 30472, 30473, 30550, 30551, 30552, 30553 <i>ICD-10:</i> F1120, F1121, F1110, F11120, F11121, F11122, F11129, F1114, F11150, F11151, F11159, F11181,

		F11182, F11188, F1119, F11220, F11221, F11222, F11229, F1123, F1124, F11250, F11251, F11259, F11281, F11282, F11288, F1129, F1190, F11920, F11921, F11922, F11929, F11913, F11914, F11950, F11951, F11959, F11981, F11982, F11989, F1199
Nonfatal opioid overdose	A binary variable based on ambulance encounters, emergency department visits, outpatient observation, or inpatient hospital discharge.	ICD-9-CM: 965.00-965.02, 965.09, E85.00-E85.02
Fatal opioid overdose	A binary variable based on identification of diagnoses codes for mortality and opioid-related poisoning	ICD-10-CM: X40-X49, Y10-Y19 T40.0, T40.1, T40.2, T40.3, T40.4, and T40.6