Prescription Drug Monitoring Program Mandates and Opioids Dispensed Following Emergency Department Encounters for Patients With Sickle Cell Disease or Cancer With Bone Metastasis

Patients with sickle cell disease (SCD) or cancer with bone metastasis often present to the emergency department (ED) for treatment of severe pain,1,2 and opioid analgesics remain first-line therapies for acute pain in the ED or after discharge.3 Policies aimed at improving the safety of opioid prescribing, such as state legislative mandates that prescribers register with or use prescription drug monitoring programs (PDMPs),4 may inadvertently limit access to opioids for these patients.5 We examined the association between implementation of PDMP mandates and changes in opioids dispensed to these patients following ED encounters.

Methods | We used the 2011-2017 Health Care Cost Institute (HCCI) claims data, covering 27% of commercially insured individuals across the US in 2017. Study samples included patients aged 18 through 64 years who had at least 1 diagnosis of SCD or cancer with bone metastasis and at least 1 ED encounter (without hospital admission) in a calendar quarter, and who resided in 1 of 29 states with active prescriber online access to a PDMP by January 1, 2011. The first nonrefill opioid prescription filled within 3 days of an ED encounter (if any) was identified.

Study outcomes included the probability of opioid dispensing following an ED encounter, and morphine milligram equivalents (MMEs) of the opioid dispensed. PDMP mandates were classified as “comprehensive” (requiring PDMP use for all prescribers in all clinical circumstances) or “noncomprehensive” (registration or use mandates that fall short of being comprehensive), with legislation status and effective dates determined based on original legal research (Supplement).

We examined changes in study outcomes before and after mandate implementation, using states that had not yet implemented a mandate as controls. The design is akin to a stepped-wedge trial design in which interventions are “switched on” at different time points for different clusters of participants in a study. We estimated difference-in-differences models that included state and quarter fixed effects and indicators of exposure to PDMP mandates, defined as 1 (0 otherwise) if the ED encounter occurred on or after the effective date of a state’s mandate (Supplement). Models controlled for additional state legislations and practices and patient age, sex, chronic pain unrelated to cancer or SCD, and behavioral health conditions. Robust standard errors were derived to account for clustering of ED encounters within patients. Parallel trends assumptions before mandate implementation were met (Supplement). We estimated differences in outcomes conditional on exposure to no mandate, noncomprehensive, and comprehensive mandates. Two-tailed \( P < .05 \) indicated statistical significance, using STATA 16.0 MP. This study was approved by the Weill Cornell Medicine Institutional Review Board with a waiver of informed consent.

Results | Of the 29 states included, 17 implemented a noncomprehensive mandate by the end of 2017, of which 7 transitioned from noncomprehensive to comprehensive. Five states implemented a comprehensive mandate without having a prior mandate. Study samples included 18 345 ED encounters by 6239 patients with SCD and 26 427 ED encounters by 14 389 patients with cancer with bone metastasis.

Opioids were dispensed to patients with SCD and cancer with bone metastasis following 15.0% and 14.1% of ED encounters.

Figure 1. Opioid Dispensing Following an ED Encounter, by Prescription Drug Monitoring Program Mandates

Estimated mean probabilities of opioid dispensing following an emergency department (ED) encounter by patients with sickle cell disease or cancer with bone metastasis, conditional on exposure to no prescription drug monitoring program mandate, noncomprehensive, or comprehensive mandates, based on a difference-in-differences analysis including 18 345 ED encounters by 6239 patients with SCD and 26 427 ED encounters by 14 389 patients with cancer with bone metastasis in 2011-2017. Error bars depict 95% CIs.
Figure 2. Morphine Milligram Equivalents of Opioids Dispensed Following an ED Encounter, by Prescription Drug Monitoring Program Mandates

Estimated mean morphine milligram equivalents of opioids dispensed following an emergency department (ED) encounter by patients with sickle cell disease or cancer with bone metastasis, conditional on exposure to no prescription drug monitoring program mandate, noncomprehensive, or comprehensive mandates, based on a difference-in-differences analysis including 2757 opioid prescriptions dispensed to 1111 patients with SCD and 3715 opioid prescriptions dispensed to 2939 patients with cancer with bone metastasis in 2011-2017. Error bars depict 95% CIs.

Discussion | Comprehensive PDMP mandates were associated with substantial reductions in opioids dispensed to patients with SCD or cancer with bone metastasis following ED encounters. Potential explanations include decreased prescribing due to clinician concerns about misuse or diversion, increased administrative burden, and prescriber perception of liability associated with opioid prescribing. Study limitations include lack of data on whether opioids were clinically indicated and whether prescriptions were written by ED or non-ED clinicians. Future studies should consider whether opioid prescribing policies restrict appropriate uses and limit access to treatment for patients with serious acute pain.

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