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Filled Prescriptions for Opioids After Vaginal Delivery

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Abstract

Objective—To estimate the prevalence of filled opioid prescriptions after vaginal delivery.

Methods—We conducted a retrospective cohort study of 164,720 Medicaid-enrolled women in Pennsylvania who delivered a live born infant vaginally from 2008 to 2013, excluding women who used opioids during pregnancy or who had an opioid use disorder. We assessed overall filled prescriptions, as well as filled prescriptions in the presence or absence of the following pain-inducing conditions: bilateral tubal ligation, perineal laceration, or episiotomy. Outcomes included a binary measure of whether a woman had any opioid prescription fill 5 days after delivery and, among those women, a second opioid prescription fill 6–60 days after delivery. Among women with no coded pain-inducing conditions at delivery, we used multivariable logistic regression, with standard errors clustered to account for within-hospital correlation, to assess the association between patient characteristics and odds of a filled opioid prescription.

Results—Twelve percent of women (n=18,131) filled an outpatient opioid prescription 5 days after vaginal delivery; among those women, 14% (n=2,592, or 1.6% of the total) filled a second opioid prescription 6–60 days after delivery. Of the former, 5,110 (28.2%) had one or more pain-inducing conditions. Predictors of filled opioid prescriptions with no observed pain-inducing condition at delivery included tobacco use (AOR: 1.3, 95% CI 1.2–1.4) and mental health condition (AOR: 1.3, 95% CI 1.2,1.4). Having a diagnosis of substance use disorder other than opioid use disorder was not associated with filling an opioid prescription 5 days after delivery,

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but was associated with having a second opioid prescription 6–60 days after delivery (AOR: 1.4; 95% CI 1.2–1.6).

Conclusions—More than one in 10 Medicaid-enrolled women fill an outpatient opioid prescription after vaginal delivery. National opioid prescribing recommendations for common obstetrics procedures such as vaginal delivery are warranted.

Précis

More than one in 10 Medicaid-enrolled women fill an outpatient opioid prescription after vaginal delivery.

INTRODUCTION

An average of 39% of Medicaid-enrolled women of reproductive age fill an outpatient prescription for opioid pain relievers each year.¹ In the last decade, overdose deaths from opioid pain relievers have increased fivefold among U.S. women.² These concerning trends along with the quadrupling of the sales of opioid pain relievers between 1999 and 2010 have called into question the appropriateness of opioid prescribing for a host of acute and chronic conditions.³ Outpatient prescription opioid use for acute pain may be a potential pathway to long-term use or opioid use disorders.⁴

While maternity care is the most common reason for hospitalization in the United States, little is known about opioid prescribing practices after obstetric delivery. Prior research examined the prevalence of opioid prescribing after cesarean delivery in privately insured women, with the finding that about 1 in 300 women became persistent users of opioids after filling an initial opioid prescription after cesarean delivery.⁶

The prevalence and patterns of opioid prescribing after vaginal delivery have been little investigated. Our objectives were therefore to determine the prevalence of filled opioid prescriptions and to identify demographic and clinical predictors of filled outpatient opioid prescriptions after vaginal delivery among a large cohort of Medicaid-enrolled women.

MATERIALS AND METHODS

We conducted a retrospective cohort study and obtained administrative health care claims data from the Pennsylvania Department of Human Services Medicaid program. The data included enrollment files, as well as inpatient, professional, and pharmacy claims and encounters for all Medicaid enrollees (including those in Medicaid managed care plans and in traditional fee-for-service coverage) from January 1, 2008–December 31, 2013. Enrollment files contain information about patient demographic characteristics; inpatient and professional files contain information about clinical characteristics and health care utilization during pregnancy, delivery, and postpartum. Pharmacy records contain information about all filled outpatient prescriptions, including the National Drug Code (NDC), the date the prescription was filled, and the duration of the prescription.

We used an algorithm validated by the National Committee for Quality Assurance to identify women who had an inpatient delivery and a live birth (Figure 1).⁷ Using this method, we

identified the date of delivery and considered the 280 days prior to the date of delivery to approximate the period of pregnancy. In order to measure diagnoses and health care utilization that occurred throughout pregnancy, we included women with vaginal deliveries with live births from Oct. 1, 2008 to Dec. 31, 2013. We used ICD-9-CM diagnosis codes (66971, 64981, 64982) and surgical procedure codes (74.0, 74.1, 74.2, 74.4, 74.99) to identify and exclude women who had a cesarean delivery. Because we were interested in studying filled prescriptions for opioids that were related only to pain control after a delivery, we used pharmacy files to identify and exclude women who filled any opioid prescription, including opioid pain relievers, buprenorphine, or methadone, during the 280 days before delivery. We excluded women who were diagnosed with opioid use disorder during pregnancy, as well as a small number of women who had >1 outpatient opioid prescription fill within 5 days after delivery because this prescription pattern might indicate an unusually high level of pain or delivery complication or an opioid use disorder that was not diagnosed; excluding such cases ensures our study sample is focused on typical vaginal deliveries. Because opioids might be prescribed when NSAIDs are contraindicated, we additionally excluded women with renal disease, thrombocytopenia, and other bleeding disorders. Our final study sample included 164,720 women. The study was determined to be exempt by the University of Pittsburgh Human Research Protection Office.

Our primary outcome was the prevalence of a filled outpatient prescription for any opioid within 5 days after delivery, including the quantity of opioid filled. Our secondary outcome was the presence of a second filled opioid prescription between 6–60 days after vaginal delivery, including the quantity of opioid filled. We used NDCs to identify opioid prescriptions that are used for pain management (i.e., excluding drugs used for medication assisted treatment for opioid use disorder or intravenous drugs).

We identified women who had a diagnosis that would likely be associated with an increased level of pain after delivery, relative to deliveries without such diagnoses. These diagnoses included bilateral tubal ligation (ICD-9-CM code V25.2); third degree laceration or anal sphincter tear (ICD-9-CM codes 664.2 or 664.6); fourth degree laceration (ICD-9-CM codes 664.3); or episiotomy (ICD-9-CM procedure codes 73.6, 72.1, 72.2–7). We assessed first degree laceration (ICD-9-CM codes 664.0); second degree laceration (ICD-9-CM codes 664.1); or other trauma, including periurethral trauma, laceration of the cervix, and high vaginal laceration (ICD-9-CM codes 664.8, 664.3, 665.4) but note that the prevalence of opioid prescriptions did not differ by these diagnoses (data not shown; available from authors upon request).

Other measures included categorical measures of patient age (15–19, 20–34, or 35 years); patient race (black, white, Asian, or other) and Hispanic ethnicity; whether women had a prior delivery during the study time period (a proxy measure for parity); and geographic region of residence at Medicaid enrollment. We used Medicaid geographic regions because they correspond to women's access to certain Medicaid managed care organizations and their health care provider networks. We were particularly interested in whether other types of addiction in pregnancy (tobacco use or non-opioid substance use disorder) or mental health conditions might be predictive of filling opioid prescriptions after delivery.⁸ These conditions were based on diagnosis codes that occurred during pregnancy or delivery,

including non-opioid substance use disorder; tobacco use; or mental health conditions including major depressive disorder, anxiety, bipolar disorder, or schizophrenia.

We calculated descriptive characteristics of our study population, stratified by whether or not women filled any outpatient prescription for an opioid within 5 days after vaginal delivery, or within 6–60 days after vaginal delivery. Among women who filled an opioid prescription, we assessed the distribution of days' supply of opioid prescriptions, among women with and without observed pain-inducing conditions at delivery. Among women who filled an opioid prescription after delivery but had no observed pain-inducing conditions at delivery, we employed multivariable logistic regression to assess which factors were associated with any filled prescription within 5 days after delivery; and among women with an initial filled prescription, which factors were associated with a subsequent filled opioid prescription within 6–60 days after delivery. Both regression models controlled for demographic characteristics, as well as clinical characteristics that were associated with outcomes in bivariate analyses. Standard errors were clustered to account for correlation within hospitals where deliveries occurred.

RESULTS

The age distribution among women with and without outpatient filled opioid prescriptions after vaginal delivery was similar; women with filled opioid prescriptions were more likely to be white and reside in the Southwest region of the state relative to those without opioid prescription fills (Table 1). Approximately 12% (n=18,131) of women with a vaginal delivery filled an outpatient opioid prescription within 5 days after delivery, of which 28.2% had any pain inducing condition after delivery. Among women who filled an initial opioid prescription, 14.3% (n=2,592, or 1.6% of the total) filled a second opioid prescription 6–60 days after delivery, of which 26.2% had any pain inducing condition after delivery. Relative to women who did not fill an opioid prescription, women who filled an initial opioid prescription within 5 days after delivery were more likely to have undergone tubal ligation (12.0% vs. 1.4%), sustained a third or fourth degree laceration (3.1% vs. 1.5% and 1% vs. 0.3%, respectively), or to have undergone episiotomy (14.1% vs. 7.6%). In contrast, the prevalence of pain-inducing conditions at delivery did not differ substantially between women who did or did not fill a second opioid prescription 6–60 days after vaginal delivery (Table 2). The prevalence of tubal ligation, laceration, and episiotomy was similar between women who did or did not fill a second opioid prescription.

Among women with vaginal deliveries and who filled a prescription for opioids within 5 days after delivery, the modal days' supply of opioid prescription was 3 days (Figure 2). The distribution of days' supply was nearly identical for women with (Figure 2, Panel A) and without (Figure 2, Panel B) tubal ligation, third or fourth degree laceration, or episiotomy. Although most women received between 3 and 7 days' supply, a small proportion of women with vaginal deliveries received up to 30 days' supply. Most filled prescription were combinations of acetaminophen and oxycodone (53.5%), codeine (20.5%), and hydrocodone (19.6%) (Table 3).

Among women who had no tubal ligation, severe perineal laceration, or episiotomy, white race, residing in the Southwest part of the state, tobacco use, and mental health conditions were significantly associated with filling an outpatient opioid prescription within 5 days after vaginal delivery (Table 4). A diagnosis of tobacco use in pregnancy was associated with a small increase in the odds of filling a prescription within 5 days after delivery (AOR: 1.3, 95% CI 1.2–1.4), as well as filling a second opioid prescription 6–60 days after delivery (AOR: 1.4, 95% CI 1.3–1.6), relative to no tobacco use. Having a diagnosis of substance use disorder other than opioid use disorder was not associated with filling an opioid prescription within 5 days after delivery, but was associated with filling a second opioid prescription 6–60 days after delivery (AOR: 1.4; 95% CI 1.2–1.6) conditional on filling a first prescription. A diagnosis of a mental health condition, relative to not having such a diagnosis, was associated with slightly increased odds of filling an opioid prescription within 5 days after delivery (AOR: 1.3, 95% CI 1.2,1.4), as well as filling a second opioid prescription 6–60 days after delivery (AOR: 1.3, 95% CI 1.1,1.5).

DISCUSSION

Among Medicaid-enrolled women, slightly more than one in 10 women with a vaginal delivery and no opioid use during pregnancy filled an outpatient prescription for an opioid after delivery. Importantly, the majority of women who filled an outpatient opioid prescription within 5 days after vaginal delivery had no tubal ligation, severe perineal laceration, or episiotomy coded in in our administrative database. Tobacco use was associated with a small increase in the odds of filling outpatient opioid prescriptions after vaginal delivery, as were mental health conditions. The modal days' supply of filled opioid prescriptions was 3 days, and the distribution of days' supply was nearly identical for women with and without documented pain-inducing conditions at delivery. A small proportion of women filled opioid prescriptions with days' supply ranging from 7 to 30 days.

Medicaid-enrolled patients have an increased risk of potentially inappropriate use or prescribing of opioids relative to privately insured patients.⁹ Approximately one-third of all Medicaid-enrolled women had an outpatient opioid prescription in the prior year.¹ Our results suggest that many opioid prescriptions after vaginal delivery in Medicaid are unexplained by clinical complications or observed pain-inducing conditions that occur during the delivery hospitalization.

There are several possible explanations for this finding. First, health care providers may be motivated to prescribe opioids for any level of pain after vaginal deliveries after efforts to make pain a “fifth vital sign” and to include pain management as part of patient satisfaction measures.¹⁰ Recently, the American Medical Association recommended that pain not be considered a vital sign and that patient satisfaction scores not include pain management questions.¹¹ Second, some share of women who have vaginal deliveries may be requesting additional pain medication and receiving prescriptions for opioids. Third, health care provider preferences for different pain management strategies may explain opioid prescribing patterns. Our analyses accounted for correlation at the hospital level, but our data did not allow a detailed description of variation of the clinician level. Future work, including

qualitative interviews or surveys, is warranted to assess the reasons that some obstetric health care providers may prescribe opioids after vaginal delivery.

These findings build on prior research suggesting that Medicaid-enrolled women, who have low incomes and often face adverse social circumstances, may have greater rates of opioid prescription fills compared to privately insured women.^{12, 13} Our finding that women with tobacco use or mental health disorders have a slightly greater odds of filling opioid prescriptions after vaginal delivery are consistent with a prior study of opioid use after cesarean delivery in Massachusetts.⁶

Currently, there are no national guidelines regarding outpatient opioid pain relievers for pain management after vaginal delivery. Notably, the Commonwealth of Pennsylvania recently published a report outlining opioid prescribing guidelines for obstetric care. To our knowledge, these are the first state-issued opioid prescribing guidelines to specifically address pain management after delivery. These guidelines include a hierarchical approach to managing postpartum pain after vaginal delivery: First, non-pharmacologic treatments such as cold, heat, sitz baths should be offered as first-line interventions for all patients with postpartum pain. If non-pharmacologic treatments are ineffective, nonsteroidal anti-inflammatory agents (NSAIDs) and acetaminophen are often sufficient analgesia for women with mild to moderate postpartum pain. Finally, only after pain control has not been achieved with non-pharmacologic interventions, NSAIDs, or both, especially in women with severe perineal trauma, a short-acting opioid can be used for five to seven days.⁵ Since these guidelines were published after our study time period, future research is needed to evaluate whether these state-level prescribing guidelines are associated with changes in opioid prescribing patterns after vaginal delivery.

This study has limitations. First, our data include only women enrolled in Pennsylvania Medicaid, so findings might not be generalizable to other populations or other states. However, our results are consistent with data from New York state Medicaid,¹² and Pennsylvania is in the mid-point among all states in terms of overall opioid prescribing patterns.¹⁴ Second, our health care claims data do not include any measures of patient pain, so we are unable to account for whether differences in patient-reported pain explained filled outpatient opioid prescriptions after vaginal delivery. It is possible that some health conditions were under-coded in the data; if pain-inducing conditions at delivery were under-coded, we would under-estimate the proportion of opioid prescriptions that were filled by women with documented pain-inducing conditions. Third, we were able to measure only filled prescriptions, and cannot determine whether a woman was prescribed an opioid but did not fill the prescription. This means that our results likely reflect only a proportion of opioid prescriptions that were written. Similarly, we are unable to measure if a woman took any or all of the opioids dispensed, so we are unable to draw conclusions about opioid use per se. Fourth, although our study excluded women with any opioid prescription during pregnancy, it is an imperfect measure of an opioid-naïve population because we did not measure pre-pregnancy opioid prescriptions. Because many women become eligible for Medicaid because of their pregnancy, it was not feasible for us to measure pre-pregnancy opioid prescription fills. Finally, our study does not measure longer-term persistent use of opioids after delivery. Nearly 60% of our sample gained Medicaid eligibility due to

pregnancy, and many women therefore lose Medicaid coverage 60 days post-delivery, making long-term follow-up challenging in our administrative data. Long-term persistent use is an important outcome that should be studied when data are available for years after the expansion of Medicaid eligibility to non-pregnant adults, when more women would be expected to retain longer-term coverage under Medicaid.

Outpatient opioid prescriptions were not rare after vaginal delivery in our large sample of Medicaid-enrolled women, and were not easily explained by any single patient demographic or clinical characteristic. Our findings support further investigation into persistent use of opioids among women who fill opioid prescriptions after vaginal delivery. Given the concerns about prevention and treatment of opioid use disorder in the perinatal period,¹⁵ our findings also suggest a need for improved clinical guidelines about pain management after vaginal delivery.

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Figure 1.

Selection of the analytic sample of Medicaid-enrolled women with live births between 2008 and 2013. NSAID, nonsteroidal anti-inflammatory drug.

Figure 2.

Distribution of number of days of supply remaining of outpatient opioid prescription fills within the 5 days after vaginal delivery among Medicaid-enrolled women without pain-inducing condition at delivery (**A**) and with pain-inducing condition at delivery (**B**). Pain-inducing conditions defined based on diagnoses at delivery and include bilateral tubal ligation, perineal laceration or other tissue trauma, and episiotomy.

Table 1

Characteristics of Medicaid-enrolled women with and without any outpatient opioid prescription within 5 days after vaginal delivery

N (%)	Opioid prescription ^a (N=18,131)	No opioid prescription ^a (N=146,589)
Pain-inducing condition at delivery		
Tubal ligation ^b	2,170 (12)	1,989 (1.4)
Third degree laceration ^c	563 (3.1)	2,174 (1.5)
Fourth degree laceration	189 (1)	470 (0.3)
Episiotomy	2,550 (14.1)	11,106 (7.6)
Any pain inducing condition	5,110 (28.2)	14,784 (10.1)
Age group		
15–19 years	2,378 (13.1)	26,616 (18.2)
20–34 years	14,579 (80.4)	11,1460 (76)
35–45 years	1,174 (6.5)	8,513 (5.8)
Race		
Black	4,351 (24)	41,945 (28.6)
White	12,031 (66.4)	74,518 (50.8)
Asian	419 (2.3)	5,043 (3.4)
Other	1,330 (7.3)	25,083 (17.1)
Hispanic ethnicity	1,424 (7.9)	26,641 (18.2)
Geographic region ^d		
Lehigh	2,651 (14.6)	34,334 (23.4)
New East	1,526 (8.4)	19,021 (13)
New West	2,328 (12.8)	8,621 (5.9)
Southeast	4,570 (25.2)	57,718 (39.4)
Southwest	6,578 (36.3)	23,255 (15.9)
Substance use/mental health conditions (%)		
Non-opioid substance use	849 (4.7)	6,583 (4.5)
Tobacco use	5,044 (27.8)	27,045 (18.5)
Mental health conditions	2,272 (12.5)	13,995 (9.6)
Previous live birth	3,286 (18.1)	24,644 (16.8)
Second opioid prescription ^e	2,592 (14.3)	--

^a Any outpatient prescription fill for opioids used for pain treatment within 5 days after vaginal delivery

^b Tubal ligation occurred during the delivery hospitalization

^c Includes third degree laceration or anal sphincter tear

^d Geographic regions correspond to Medicaid managed care plan regions

^e Any outpatient prescription fill for opioids 6–60 days after vaginal delivery

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Table 2

Characteristics of Medicaid-enrolled women with and without any outpatient opioid refill prescription within 6–60 days after vaginal delivery

N (%)	Opioid prescription ^a (N=2,592)	No opioid prescription ^a (N=15,539)
Pain-inducing condition at delivery		
Tubal ligation ^b	250 (9.7)	1,920 (12.4)
Third degree laceration ^c	78 (3)	485 (3.1)
Fourth degree laceration	20 (0.8)	169 (1.1)
Episiotomy	385 (14.9)	2,165 (13.9)
Any pain inducing condition	686 (26.2)	4,424 (28.5)
Age group		
15–19 years	303 (11.7)	2,075 (13.4)
20–34 years	2,107 (81.3)	12,472 (80.3)
35–45 years	182 (7)	992 (6.4)
Race		
Black	487 (18.8)	3,864 (24.9)
White	1,902 (73.4)	10,129 (65.2)
Asian	42 (1.6)	377 (2.4)
Other	161 (6.2)	1,169 (7.5)
Hispanic ethnicity	170 (6.6)	1,254 (8.1)
Geographic region ^d		
Lehigh	402 (15.5)	2,249 (14.5)
New East	219 (8.5)	1,307 (8.4)
New West	337 (13)	1,991 (12.8)
Southeast	569 (22)	4,001 (25.8)
Southwest	985 (38)	5,593 (36)
Substance use/mental health conditions		
Non-opioid substance use	172 (6.6)	677 (4.4)
Tobacco use	926 (35.7)	4,118 (26.5)
Mental health conditions	417 (16.1)	1,855 (11.9)
Previous live birth	448 (17.3)	2,838 (18.3)

^a Any outpatient prescription fill for opioids used for pain treatment 6–60 days after vaginal delivery

^b Tubal ligation occurred during the delivery hospitalization

^c Includes third degree laceration or anal sphincter tear

^d Geographic regions correspond to Medicaid managed care plan regions

Table 3

Frequency of opioid prescription fills within 5 days after vaginal delivery among Medicaid-enrolled women

Generic name	N (%)
Oxycodone-Acetaminophen	9668 (53.3)
Acetaminophen-Codeine	3725 (20.5)
Hydrocodone-Acetaminophen	3553 (19.6)
Propoxyphene-Acetaminophen	743 (4.1)
Oxycodone	203 (1.1)
Meperidine	137 (0.8)
Hydromorphone	53 (0.3)
Tramadol	33 (0.2)
Hydrocodone-Ibuprofen	Not shown ^b
Butalbital-Aspirin-Caffeine-Codeine	Not shown ^b
Codeine	Not shown ^b
Oxycodone-Aspirin	Not shown ^b
Propoxyphene	Not shown ^b

^a Any outpatient prescription fill for opioids used for pain treatment within 5 days of the date of vaginal delivery^b Data not shown because n<11.

Table 4

Predictors of outpatient opioid prescription fills after vaginal delivery among Medicaid-enrolled women with no pain inducing condition at delivery

	Opioid 5 days after delivery	Second opioid 6–60 days after delivery
	Adjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Age Group		
15–19 years	0.8 (0.7, 0.8) **	0.8 (0.7, 0.9) **
20–34 years		
35–45 years	1 (0.9, 1.1)	1.1 (0.9, 1.4)
Race		
Black		
White	1.2 (1, 1.4) *	1.5 (1.3, 1.8) **
Asian	0.8 (0.7, 0.9) **	0.7 (0.5, 1.1)
Other	0.9 (0.8, 1) *	1.3 (1.1, 1.6) **
Hispanic Ethnicity	0.9 (0.8, 1)	0.8 (0.7, 1)
Geographic region ^a		
Lehigh	0.9 (0.7, 1.1)	1.1 (0.9, 1.5)
New East	0.8 (0.6, 1) *	1 (0.7, 1.4)
New West	1.3 (0.8, 2)	0.8 (0.7, 1.1)
Southeast		
Southwest	1.5 (1.1, 2) **	1 (0.8, 1.2)
Substance use/mental health conditions		
Non-opioid substance use	0.9 (0.8, 1)	1.4 (1.2, 1.6) **
Tobacco use	1.3 (1.2, 1.4) **	1.4 (1.3, 1.6) **
Mental health conditions	1.3 (1.2, 1.4) **	1.3 (1.1, 1.5) **
Previous live birth	1.1 (1, 1.1)	0.9 (0.8, 1) *

^aGeographic regions correspond to Medicaid managed care plan regions. The Southeast is most populous and thus selected as the referent group.

Note: Pain related conditions defined based on diagnoses at delivery and include bilateral tubal ligation, perineal laceration or other tissue trauma, and episiotomy.

* p<0.05;

** p<0.01