

Effects of a Multimodal Analgesic Approach on Opioid Exposure Among Vaginal Delivery Patients: A Retrospective Study

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Background:

- In 2019, CHI Health CUMC Bergan Mercy (Omaha, NE) implemented a postpartum standardized integrated care protocol centered on overhauling provider order sets to:
 - Order scheduled doses of acetaminophen & ibuprofen
 - Initial inpatient limit of 3 opioid doses
 - Anesthesia consulted after 2nd opioid dose

Hypothesis:

- We hypothesized there would be a decrease in inpatient opioid administration rate & MMEs administered to vaginal delivery patients after protocol implementation
- We also hypothesized an interaction between inpatient opioid administration & outpatient prescription, with a greater decrease in patients not receiving an inpatient opioid than those that did following protocol implementation

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Methods & Study Design

Single-center retrospective study at CHI Health CUMC Bergan Mercy examining vaginal delivery cases in 2018 (pre-protocol) & 2023 (post-protocol & post-COVID)

Inclusion Criteria

- > 19 years old

Exclusion Criteria

- Postpartum hospital stay > 10 days
- Chronic opioid use prior to delivery
- Post-delivery hysterectomy

Covariates

- Age, BMI, race, ethnicity, preferred language, and zip code associated median household income¹

1. Estimated Median Income of a Household, between 2019-2023. PolicyMap. www.policymap.com. Accessed July 2025.
2. MMWR Recomm Rep 2022;71(No. RR-3):1–95.

Analysis

- All opioids standardized to MMEs.²
- Multivariable log-binomial regression to assess inpatient administration & outpatient prescription
- Multivariable linear regression to assess MMEs in patients who were administered an inpatient opioid

*Outpatient excluded due to low prescription rates post-protocol

- For all covariates, two-way interaction effects with order set implementation were estimated.

Results

	2018 (n=2,666)	2023 (n=2,316)
White	1,781 (67%)	1,478 (64%)
Black	267 (10%)	209 (9%)
Other	618 (23%)	629 (27%)
Hispanic	759 (28%)	837 (36%)
Non-Hispanic	1,832 (69%)	1,335 (58%)
Other	75 (3%)	144 (6%)
English	2,135 (80%)	1,654 (71%)
Spanish	394 (15%)	530 (23%)
Other	137 (5%)	132 (6%)
Age*	35.36 (5.44)	30.59 (5.52)
BMI*	30.07 (6.70)	30.70 (6.62)
Zip associated Income	\$78,612 (\$25,480)	\$75,269 (\$24,699)

Table 1. Eligible cohort breakdown and mean (SE) age, BMI, & zip-associated income
*Reflects time of data collection (July 2025) not time of delivery

	Estimate	SE	P
Intercept	0.04	2.30	0.985
Year (2018 vs 2023)	11.05	0.57	<.001
Age	0.03	0.05	0.570
BMI	0.02	0.04	0.683
Median Income*	0.01	0.01	0.314
Hispanic vs Non-Hispanic	0.25	0.77	0.743
Non-Hispanic vs Other	-0.92	1.46	0.529
Hispanic vs Other	-0.67	1.48	0.653
White vs Black	-3.02	0.93	0.001
White vs Other	3.38	1.07	0.002
Black vs Other	0.37	0.69	0.594
Spanish vs English Language	2.20	0.91	0.016
English Language vs Other	-0.47	1.45	0.747
Spanish Language vs Other	1.74	1.25	0.165

Table 2. Inpatient Regression Coefficients (MMEs)
*Median income per \$1000 increase

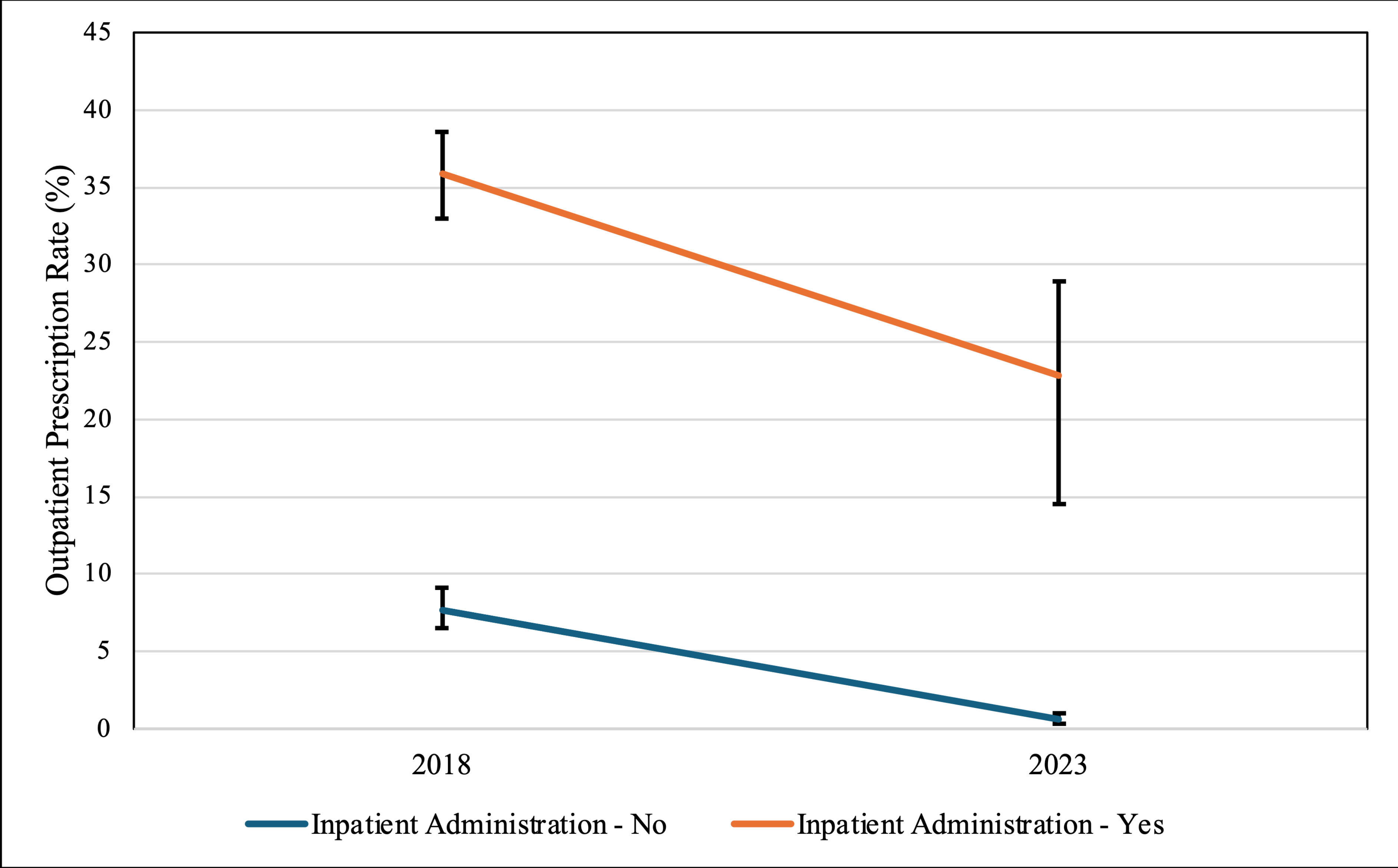


Figure 1. Outpatient Prescription Rate By Inpatient Opioid Administration
Interaction $p < .001$. Error bars are 95% confidence intervals.
Inpatient administration rate decreased from 40.9% (2018) to 5.9% (2023), $p < .0001$

Conclusions and Discussion

Conclusions:

- A multimodal analgesic protocol with standardization of provider order sets is an effective first step to reduce opioid exposure among vaginal delivery patients

Limitations:

- Potentially variable postpartum length of stay across cohort
- Provider turnover between pre- to post-protocol

Future Steps:

- Next steps should target patients' in-hospital pain scores, emergency room visits, and hospital readmissions for pain-related complications before & after protocol implementation