

# The use of opioids in post-caesarean delivery pain management: A systematic review of quality improvement studies

Javier Mejia-Gomez<sup>1</sup>, Nada Shaltout<sup>2</sup>, Ola Shaltout<sup>3</sup>, Jessie Tu<sup>4</sup>, Salwa Farooqi<sup>1</sup>, Bunmi Adesanya<sup>1</sup>, Ala Essalah<sup>1</sup>, Sarah Wildeman<sup>1</sup>, Eleni Philippopoulos<sup>1</sup>, Andrea Page<sup>1</sup>

<sup>1</sup> Department of Obstetrics and Gynecology, University of Toronto, Canada

<sup>2</sup> Royal College of Surgeons in Ireland, Dublin, Ireland

<sup>3</sup> Royal College of Surgeons in Ireland, Dublin, Ireland

<sup>4</sup> Temerty Faculty of Medicine, University of Toronto, Canada

## ABSTRACT

The rate of caesarean delivery has grown worldwide over the last 30 years and is one of the most frequently performed surgical procedures. Adequate postoperative pain management is vital in ensuring that pain does not impede self-care, infant care or negatively impact parent-child bonding. It also decreases the risk of persistent pain and postpartum depression. Although analgesia regimens are constantly reviewed and advanced, the use of opioids is the current effective and accepted practice. Opioid use has drastically risen throughout the last few decades, despite the complications and detrimental short- and long-term effects the drug class presents. The direct risks are not limited to physical dependence, opioid use disorder, and overdose. Potential long-term complications include bowel obstruction, serious fractures, respiratory depression, and consequently myocardial infarction. Due to opioid prescription misuse and addiction, The United States Department of Health and Human Services declared the use of this drug class a public health emergency in 2020. This is the first systematic review on quality improvement studies pertaining to the use of opioids post-caesarean delivery. This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement and yielded 15 full study texts for review. Data was extracted from studies and analyzed. 100% of these studies found that a quality improvement intervention resulted in significant decrease in opioid use, indicating that it is possible to provide satisfactory analgesia without excessive opioid use.

## KEYWORDS

Caesarean section, Opioids, Quality Improvement, Systematic Review.

## Introduction

Caesarean section (CS) delivery rates have risen dramatically worldwide over the last three decades<sup>[1]</sup>. In Canada, there has been a 50.8% increase between 1997 and 2016. In 2019, 288.80 per 1,000 live births (28.8%) were performed via caesarean delivery<sup>[1]</sup>. As surgical procedure rates increase and CS become one of the most common surgical procedures globally, the use of postpartum pain management has also risen<sup>[2]</sup>. Effective postpartum pain analgesia is essential for parent-child bonding and enhanced functional recovery as well as in the prevention of chronic pain and postpartum depression<sup>[2]</sup>. Novel regimens for pain management should focus on a balance between efficacy and safety.

Multiple modalities of postoperative analgesia are currently used in the immediate post-caesarean period, including NSAIDs and transversus abdominal plane (TAP) blocks<sup>[3]</sup>. However, the administration of opioids remains the gold standard and is the most frequently prescribed analgesic<sup>[3]</sup>. This presents many challenges due to the potentially dangerous and detrimental side effects and complications of this drug class<sup>[4]</sup>. In addition, the increase of prescribed opioid medications over the last few decades has been directly linked to a dramatic surge in opioid-related morbidity and mortality due to prescription diversion and addiction<sup>[5]</sup>.

## Article history

Received 1 Jun 2023 - Accepted 3 Nov 2023

## Contact

Javier Cesar Mejia-Gomez, MD, MSc; javier.mejiagomez@mail.utoronto.ca  
Department of Obstetrics and Gynecology; University of Toronto  
700 University Avenue Suite 8-712  
Toronto ON M5G 1Z5, Canada

## DOI

10.53260/grem.2450103

In 2017, approximately 68% of fatal drug overdoses in The United States were associated with opioids, driven by misuse of excess prescriptions and leftover tablets, leading to chronic opioid consumption and heroin abuse<sup>[5]</sup>. That same year, the U.S. Department of Health and Human Services declared the opioid epidemic a public health emergency in part due to the diversion and misuse of opioids prescribed for the treatment of acute pain, often following surgery<sup>[6]</sup>. While this had an impact, the opioid crisis continues. In 2020, 75% of 91,799 drug overdoses involved an opioid in The United States<sup>[7]</sup>. Similar concerns were raised in Canada. In 2018, roughly 3.7 million people over the age of 15 reported use of opioids for analgesic purposes. Of those individuals,

roughly 351,000 engaged in problematic use<sup>[8]</sup>. According to the Government of Canada, Health Infobase, a total of 40,642 apparent opioid toxicity deaths between January 2016 and June 2023<sup>[9]</sup>.

The United States and Canada are the first and second-largest per capita consumers of opioids worldwide<sup>[10]</sup>. As such, due to the current opioid crisis, physicians have been called upon to reduce opioid prescribing and work towards finding alternative modes of postoperative analgesia<sup>[10]</sup>. In response to this epidemic, the Choosing Wisely Canada campaign – a national strategy to reduce unnecessary tests and treatments – has launched an Opioid Wisely campaign to encourage thoughtful opioid prescribing and minimize opioid-related harm.

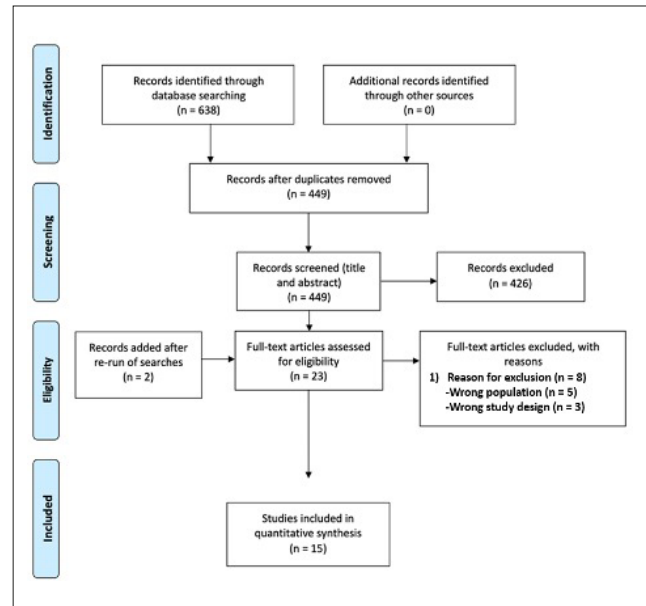
In supporting the efforts of this campaign, this systematic review will focus on highlighting the recent quality improvement (QI) studies that concentrate on decreasing the use of opioids post-caesarean section delivery. Through this study, we hope to encourage the uptake and implementation of some of the effective methods employed to minimize unnecessary opioid prescriptions. Recent studies have shown that the use of QI initiatives post-caesarean section, such as enhanced recovery pathway after surgery (ERAS) and individualized patient analgesia plans substantially decrease opioid prescriptions, ranging from a 35% decrease in one study<sup>[11]</sup> to 97.9% in another<sup>[12]</sup>. Exploring the successful interventions implemented and their results is another step in combatting the opioid crisis and optimizing post-caesarean patient care.

## Methods

This literature review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement. The review protocol was registered in the PROSPERO database, registration number: CRD42022331519. The following databases were searched from inception to 14 April 2022 using a comprehensive search strategy which included the following databases: Ovid MEDLINE, PubMed (non-MEDLINE records only), Ovid Embase, Web of Science, Cochrane Central Register of Control Trials, and Cochrane Database of Systematic Reviews. Searches were conducted using relevant Medical Subject Heading (MeSH) terms and keywords related to opioids, narcotics, QI studies, and caesarean sections. Search results were managed using Endnote and screened using Covidence. The search was re-run prior to submission on 10/20/2022, and two new studies were identified and included. Selected studies included quality improvement studies only.

Initially, 638 studies were retrieved. After duplicate were removed, a total of 449 studies were identified based on our search strategy. Titles and abstracts were screened through Covidence and a further 326 studies were dismissed leaving 23 full text studies for review. After additional exclusion based on eligibility of studies, 15 studies met the inclusion criteria and were included for further full text review (Figure 1). A total of 13,319 patients have been included in QI studies aimed at decreasing the use of opioids post-caesarean delivery. Data was recorded in a table with the following factors extracted: Author, Country, Intervention used, Number of patients, and Results (Table 1).

**Figure 1** PRISMA Study Selection Flow Diagram



## Results

All studies were undertaken at academic, tertiary, urban or suburban medical centers in the United States (93.3%) or Canada (6.7%). Pre- to post- study designs were utilized, such that outcomes were before and after the QI initiative was implemented, with a “washout” period in between during which no data was collected. Pre-intervention and post-intervention data were collected using Electronic Medical Record (EMR) and/or surveys for women who underwent caesarean delivery at the setting<sup>[11-25]</sup>.

While the interventions varied in type and duration, common approaches include enhancing patient and staff education, increasing the use of non-opioid analgesics, emphasizing shared decision-making, and implementing a maximum quantity of opioids prescribed at time of discharge. Trends in findings were similar across all studies; this included reduction in opioid prescription both in-patient and at discharge and increased use of non-opioid pain control measures, particularly acetaminophen. All studies demonstrated an improvement or no significant changes to pain scores and/or patient satisfaction with pain control<sup>[11-25]</sup>.

The most common intervention used was ERAS, which was employed by 4 out of 15 studies<sup>[13-16]</sup>. This included but was not limited to multimodal pain control with pharmacologic and non-pharmacologic interventions, dietary modifications, early postoperative return to oral intake and ambulation, and improved pre- and postoperative education on pain control and recovery expectations<sup>[13-16]</sup>. Notably, Hedderson *et al.* also decoupled opioids from other medications to facilitate maximization of acetaminophen use before addition of opioids<sup>16</sup>. Findings were similar across studies and showed a significant decrease in morphine milligram equivalents (MME) consumption in an in-patient setting<sup>[13-16]</sup>, an increase in the use of non-opioid analgesics<sup>[16]</sup>, improvement<sup>[13,16]</sup> or no significant difference in reported pain score<sup>[14]</sup> and decreased<sup>[14]</sup>

or no significant change<sup>[15,16]</sup> in the length of hospital stay. In addition, Hedderson *et al.* demonstrated decreased time to first post-surgical ambulation<sup>[16]</sup>, and Tepper *et al.* demonstrated decreased prescription of opioids at discharge<sup>[15]</sup>.

Three studies used the Plan, Do, Study, Act (PDSA) or Plan, Do, Check, Act (PDCA) model for QI<sup>[11,12,17]</sup>. Specifically, Kahn *et al.* developed a standardized visual tool to facilitate integration of women's preferences in their post-caesarean delivery care and emphasize routine use of non-pharmacological pain management measures. There was an observed 79% reduction in the total in-patient opioid consumption, with 85% of patients reporting their pain to be controlled at a satisfactory level<sup>[17]</sup>. Similarly, Prabhu *et al.* employed a two-phase QI protocol that implemented 1) discharge counselling with shared decision-making on the quantity of opioids to be prescribed, up to a maximum of 30 tablets of 5 mg oxycodone, and 2) standardized prescribing of ibuprofen and acetaminophen in both in-patient and out-patient settings. Opioid prescriptions post-discharge decreased by 35% ( $p<0.01$ ), from a mean of 33.2 to 21.5 tablets ( $p<0.01$ ). While ibuprofen was prescribed at high rates throughout the study, acetaminophen prescription rates increased from 32.6% to 92.0% ( $p<0.001$ )<sup>[11]</sup>. Lastly, Lakhi *et al.* implemented a restrictive prescribing policy, whereby physicians were not allowed to prescribe opioids upon discharge after caesarean delivery, but patients may call to request additional analgesia if necessary. As a result, opioid prescriptions at discharge decreased from 97.9% to 0%. 18% of women requested opioid prescriptions post-discharge, and only 51% filled the prescription. Pain control was reported as satisfactory in 89.7% of patients. Notably, patient factors associated with opioid consumption included white race, multiparity, and opioid consumption during their inpatient stay<sup>[12]</sup>.

Three studies investigated the efficacy of single-method interventions in reducing opioid use post-caesarean delivery<sup>[18,19,25]</sup>. Similar to Prabhu *et al.*, Loomis *et al.* developed a shared decision-making tool focused on patient education, multimodal pain control, and safe storage and disposal of excess medications. Women were allowed to choose up to 30 tablets of 5 mg oxycodone and were given a home opioid deactivation system to dispose of excess tablets. On average, participants selected 18 tablets and consumed 13 tablets. Interestingly, 37% of participants felt that they received just enough medication to adequately control pain, while 55% of participants felt that they received too much<sup>[18]</sup>. Next, Kim *et al.* used the DMAIC (design, measure, analyze, improve, control) protocol to develop a post-caesarean section opioid prescription algorithm based on chart review and validated surveys. Post-intervention, mean prescription at discharge decreased from 17.6 MMEs to 8.4 MMEs ( $p<0.01$ ), with a 23% increase in women discharged without a prescription ( $p<0.01$ ). There were no differences in patient satisfaction or pain perception<sup>[19]</sup>. Finally, Voelker *et al.* used an academic detailing intervention that provided baseline data and remeasurement to all delivering providers, including obstetricians, family physicians, and nurse-midwives. Opioid prescription rates decreased from 100% to 93% in post-caesarean deliveries ( $p=0.054$ ), alongside a decrease in number of tablets ( $p=0.0002$ )<sup>[25]</sup>.

Five studies utilized other combinations of interventions to reduce opioid use post-caesarean delivery<sup>[20-24]</sup>. Burgess *et al.* designed a comfort bundle that consisted of standardized use of pre-operative acetaminophen, postoperative comfort education, simethicone, postoperative gum chewing, and abdominal binders. MME use in-patient was reduced by 61% and the proportion of women prescribed <20 tablets of 5 mg oxycodone increased from 26.3% to 96.7%. Patient satisfaction scores on pain control showed improvements post-intervention<sup>[20]</sup>. Laksono *et al.* employed a bundled QI intervention consisting of opioid prescribing instructions in resident physician orientation, nursing and patient education, and standard electronic prescriptions consisting of 10 tablets of 5 mg morphine or 5 tablets of 1 mg hydromorphone if requiring opioids. The quantity of opioids prescribed at discharge decreased from 97.6 MMEs to 35.8 MME ( $p<0.001$ ), with no post-intervention visits to the clinic due to insufficient pain control<sup>[21]</sup>. Next, Holland *et al.* eliminated routine use of opioids post-caesarean delivery by implementing a short course of opioids when necessary, utilizing in-patient opioid use patterns to determine prescription at discharge, and shared decision-making. There was a 23% reduction in in-patient opioid use ( $p<0.001$ ), from a median of 60.0 MME to 52.5 MME ( $p=0.05$ ). The proportion of women prescribed opioids at discharge decreased from 91% to 40% ( $p<0.001$ ). Among those who were prescribed opioids, the median quantity decreased from 157.5 MME to 112.5 MME ( $p<0.001$ ). There were no changes to pain scores or patient satisfaction in pain control<sup>[22]</sup>.

Like Hedderson *et al.*, 2 other studies also incorporated decoupling opioids from other medications<sup>[23,24]</sup>. Llarena *et al.* designed Reduced Option for Opioid Therapy (ROOT), which maximized the use of NSAIDs and acetaminophen, physician and nursing education, and data-driven nursing feedback. Median in-patient opioid use decreased by over 60% from 75 MME to 30 MME ( $p<0.001$ ), while median opioid prescription at discharge decreased from 210 MME to 150 MME ( $p<0.001$ ). There was a decrease in pain scores post-intervention ( $p<0.001$ )<sup>[23]</sup>. Smith *et al.* employed a similar in-patient approach involving decoupling of opioids from acetaminophen, scheduled administration of NSAIDs and acetaminophen, and limitation of opioid use to breakthrough pain. There was a 75% reduction in median in-patient opioid use, from 120 MME to 30 ME ( $p<0.001$ ). While ketorolac and ibuprofen use did not change, there was an increase in acetaminophen use ( $p<0.001$ ). There was no difference in pain scores or length of hospital stay<sup>[24]</sup>.

## Discussion

The use of opioids remains the gold standard for post-caesarean section analgesia, but they have many detrimental side effects such as sedation, constipation, respiratory depression, tolerance, and physical dependence, and the potential for fatal toxicity<sup>[4,26]</sup>. In the United States and Canada, the majority of drug-related morbidity and mortality is related to opioid misuse<sup>[7-9]</sup>. This is exacerbated by excess prescriptions and the diversion

**Table 1** Quality improvement studies focused on decreasing the use of opioids post-caesarean delivery.

Author	Country	Year	Intervention	n	Results
Prabhu <sup>11</sup>	USA	2018	Multiphase quality improvement protocol.	624	35% decrease in opioid prescribing ( $p < 0.01$ ).
Lakhi <sup>12</sup>	USA	2019	Restrictive opioid prescription policy.	283	Decrease in opioid prescriptions from 97.9% to 0%. 18% prescription rate after discharge; only 51% of these women ( $n = 27$ ) consuming them.
McCoy <sup>13</sup>	USA	2021	Enhanced Recovery After Surgery (ERAS).	289	The median inpatient morphine milligram equivalents (MME) consumed per patient decreased from 141 [range: 90-195] to 114 [range: 45-168] ( $p = 0.002$ ).
Shinnick <sup>14</sup>	USA	2021	Enhanced Recovery After Surgery (ERAS).	250	Opioid consumption decreased by an average of 36.5 mg of oxycodone per patient, no significant differences in pain scores from post-operative day 1 to day 4 ( $p > 0.05$ ).
Hedderson <sup>16</sup>	USA	2019	Enhanced Recovery After Surgery (ERAS).	4,689	Opioids dispensed at discharge decreased from 85.9% to 82.2% post-ERAS ( $p < 0.001$ ); average number of dispensed pills decreased from 38 to 26 ( $p < 0.001$ ).
Tepper <sup>15</sup>	USA	2021	Enhanced Recovery After Surgery (ERAS).	91	Opioid consumption in hospital decreased by 87.3% from pre-ERAS group (124.7 MME) compared to post-ERAS (15.8 MME), $p < 0.001$ . 75.4% increase in patients who did not consume any opioids during stay from pre to post ( $p = 0.02$ ), and 25.6% decrease in opioid prescription from pre to post ( $p = 0.007$ ).
Kahn <sup>17</sup>	USA	2021	A standardized visual tool with quantifiable milestones.	1,754	Total number of opioids consumed by women in-hospital was reduced by 79%.
Loomis <sup>18</sup>	USA	2022	Shared decision-making tool.	60	92% ( $n = 47$ ) of patients utilized all their prescribed tablets or properly disposed of them.
Kim <sup>19</sup>	USA	2022	Prospective longitudinal quality improvement initiative utilizing Define, Measure, Analyze, Improve, and Control (DMAIC) method.	212	Mean (SD) prescription decreased from 17.6 MME to 8.4 ( $p < 0.01$ ); 39% compared with 16% discharged without a prescription ( $p < 0.01$ ); 82.7% compared with 59.6% ( $p < 0.01$ ) had $< 4$ pills remaining. No differences in patient satisfaction or pain perception.
Voelker <sup>25</sup>	USA	2018	Quality improvement format of providing baseline data, academic detailing, and remeasurement.	323	Opioid prescriptions decreased from 100% to 93% ( $p = 0.054$ ). MME decreased from 171 to 143 ( $p = 0.001$ ).
Burgess <sup>20</sup>	USA	2019	Multimodal comfort bundle: pre-operative: Standardized use acetaminophen, post-operative: comfort education, simethicone, gum chewing, and abdominal binders.	339	61% reduction in opioid MME given to women post-operative.
Laksono <sup>21</sup>	Canada	2021	Quality improvement bundle.	2578	Opioid prescription decreased from 97.6 MME in 2018 to 35.8 MME in 2019 ( $p < 0.001$ ). No post intervention visits to postnatal assessment clinic for inadequate pain control.
Holland <sup>22</sup>	USA	2019	Multimodal stepwise approach: 1) Eliminating routine ordering of oral opioids after caesarean delivery. 2) Implementing guidelines for ordering a short course of opioids when deemed necessary. 3) Coupling opioid prescribing at discharge to patterns of opioid use in-hospital combined with shared decision-making.	191	Post-intervention 40% of patients were discharged with opioid prescriptions compared to 91% of patient's pre-intervention ( $p < 0.001$ ).
Llarena <sup>23</sup>	USA	2022	Quality improvement initiative titled Reduced Option for Opioid Therapy (ROOT).	1350	Median inpatient opioid use decreased by over 60%; 75 to 30 MME per admission ( $p < 0.001$ ).
Smith <sup>24</sup>	USA	2019	Multimodal approach: 1) Acetaminophen separated from opioids. 2) Scheduled NSAID and acetaminophen administration. 3) Opioids were used only for breakthrough pain.	286	MME decreased by 75% during stay from pre-intervention group (120 MME) to post-intervention group (30 MME) ( $p < 0.001$ ). MME decreased by 77% per day (51 MME pre-intervention vs. 12 MME post-intervention) ( $p < 0.001$ ). No difference in median pain scores between groups at discharge.

of leftover tablets given for acute pain management and following surgery<sup>[5]</sup>. Several studies have assessed various strategies to minimize the adverse events related to opioids including symptomatic management, dose reduction, opioid rotation, and altering route of administration<sup>[27,28]</sup>. However, the majority of these studies were focused on chronic pain management in an older population and were not specified to post-caesarean care.

To minimize the administration of opioids in the post-caesarean period, the efficacy of alternative interventions has been evaluated through numerous studies. These include enhancing patient and provider education, highlighting shared decision-making and increasing the frequency or duration of non-opioid analgesia. The most studied non-opioid techniques include TAP block, NSAIDs and IV paracetamol<sup>[3]</sup>. Other analgesics, such as ketamine, ilioinguinal-iliohypogastric nerve block, and wound infiltration with local anesthetic may be used in specific cases, however their efficacy has been less studied<sup>[3]</sup>. Further research is still needed to guide physician decision-making on optimal pain control options to increase the use of non-opiate modalities for long-term safety while maintaining or improving overall patient satisfaction.

In this systematic review, 4 out of 15 studies (25%) implemented ERAS<sup>[13-16]</sup>. ERAS is a multidisciplinary program that aims to optimize patient recovery post-operatively while reducing opiate exposure, and consequently the incidence of substance use disorder. ERAS encourages early return to function, reducing the length of hospital stay, and decreasing the rate of post-surgical complications<sup>[16,29]</sup>. The utilization of ERAS programs in patients undergoing caesarean section resulted in a reduction of inpatient and outpatient opioid exposure without worsening surgical outcomes<sup>[15,16]</sup>. Where opioids were used for pain control, the dose or the average number of pills prescribed was decreased<sup>[13,16]</sup>. Although this has been the most studied QI initiative, it is unclear if ERAS alone was the most effective as studies utilizing alternate approaches have demonstrated greater results in reduction of opioid use.

Our results show that there are a multitude of initiatives that can be implemented to reach the same goal: a reduction in opioid use post-caesarean delivery. In addition to ERAS, other interventions studied included a combination of discharge counselling and patient education, shared decision-making on the quantity of opioids to be prescribed, restrictive prescribing policies to maximize NSAIDs and acetaminophen use, and comfort bundles consisting of non-opioid analgesia, simethicone, postoperative gum chewing, and abdominal binders<sup>[11,12,18,20]</sup>. Overall, the implementation of these interventions reduced inpatient opioid consumption and decreased post-discharge opioid prescriptions with improved patient satisfaction on pain control.

Of the studies included in this paper, 100% of them were performed in North America<sup>[11-25]</sup>. To further expand on this topic, additional research needs to be implemented by clinicians worldwide to tackle the ongoing opioid crisis and share strategies on minimizing postpartum pain. Educating patients on alternative pain control methods, involving them in decisions regarding

their postoperative pain management, and maximizing the use of non-opioid medications can reduce overall opioid consumption and shorten the length of hospital stay without influencing their perception of pain relief or increasing complications and readmission rates. Providing patients with methods to safely dispose excess tablets can also reduce the number of tablets available for misuse or diversion into the community. Implementing a combination of these strategies can potentially prevent opioid-naïve patients from experiencing adverse side effects from opioids post-caesarean delivery and decrease the number of opioids that may be potentially diverted and misused in our communities.

## Conclusion

There is a multitude of convincing and impactful data to demonstrate that reducing the use of opioids after caesarean delivery via alternative safer approaches is possible and highly achievable. Each study included in this systematic review showed a statistically significant decrease in opioid use and prescription once a QI initiative was implemented thus decreasing the opioid related risk to both postpartum patients and the wider community. While it is known that the United States and Canada are the largest per-capita consumers of opioids worldwide<sup>[10]</sup>, further work on quality improvement strategies should be performed in other settings to further enhance the reliability and acceptability of effective interventions worldwide. Despite the risks associated with them, opioids continue to be the gold standard for postoperative pain control. Thus, further research is needed to explore alternative non-opioid, yet equally effective analgesic options post-caesarean section to shift the focus to safer alternatives. By highlighting effective QI strategies, this systematic review aims to push forward the efforts of the Opioid Wisely Campaign in Canada and encourage physicians managing post-caesarean pain to choose wisely when determining treatment modalities for the good of both the postoperative patient and the overall health of our communities.

## References

1. OECD. OECD Cesarean Sections. <https://data.oecd.org/healthcare/caesarean-sections.htm>
2. Carvalho B, Butwick AJ. Postcesarean delivery analgesia. *Best Pract Res Clin Anaesthesiol.* 2017;31(1):69-79.
3. Kerai S, Saxena KN, Taneja B. Post-caesarean analgesia: What is new? *Indian J Anaesth.* 2017;61(3):200-214.
4. Benyamin R, Trescot AM, Datta S, et al. Opioid complications and side effects. *Pain Physician.* 2008;11(2 Suppl):S105-120.
5. Upp L, Waljee J. The Opioid Epidemic. *Clinics in Plastic Surgery.* 2020;47(2):181-190.
6. CMS. Centers for Medicare & Medicaid Services Ongoing Emergencies & Disasters. Available at: <https://www.cms.gov/about-cms/agency-information/emergency/epro/current-emergencies/ongoing-emergencies#:~:text=On%20Thursday%20October%2026%2C%202017,is%20a%20national%20health%20emergency>
7. CDC. Understanding the Epidemic. <https://www.cdc.gov/opioids/basics/epidemic.html>
8. Canada S. Pain relief medication containing opioids, 2018. Available at: <https://www150.statcan.gc.ca/n1/pub/82-625-x/2019001/article/00008-eng.htm>

9. Opioid- and Stimulant-related Harms in Canada Published: (December 2023). Available at: <https://health-infobase.canada.ca/substance-related-harms/opioids-stimulants/>
10. Quan AML, Wilson LA, Mithani SS, Zhu DT, Bota AB, Wilson K. Reporting on the opioid crisis (2000-2018): role of The Globe and Mail, a Canadian English-language newspaper in influencing public opinion. *Harm Reduct J.* 30 2020;17(1):93.
11. Prabhu M, Dubois H, James K, et al. Implementation of a Quality Improvement Initiative to Decrease Opioid Prescribing After Cesarean Delivery. *Obstet Gynecol.* 2018;132(3):631-636.
12. Lakhi N, Tricorico G, Kanninen T, Suddle R, Pontorio J, Moretti M. Post-cesarean delivery outpatient opioid consumption and perception of pain control following implementation of a restrictive opioid prescription protocol. *Am J Obstet Gynecol MFM.* 2019;1(4):100049.
13. McCoy JA, Gutman S, Hamm RF, Srinivas SK. The Association between Implementation of an Enhanced Recovery after Cesarean Pathway with Standardized Discharge Prescriptions and Opioid Use and Pain Experience after Cesarean Delivery. *Am J Perinatol.* 2021;38(13):1341-1347.
14. Shinnick JK, Ruhotina M, Has P, et al. Enhanced Recovery after Surgery for Cesarean Delivery Decreases Length of Hospital Stay and Opioid Consumption: A Quality Improvement Initiative. *Am J Perinatol.* 2021;38(S 01):e215-e223.
15. Tepper JL, Harris OM, Triebwasser JE, et al. Implementation of an Enhanced Recovery after Surgery Pathway to Reduce Inpatient Opioid Consumption after Cesarean Delivery. *Am J Perinatol.* 2023;40(9):945-952.
16. Hedderson M, Lee D, Hunt E, et al. Enhanced Recovery After Surgery to Change Process Measures and Reduce Opioid Use After Cesarean Delivery: A Quality Improvement Initiative. *Obstet Gynecol.* 2019;134(3):511-519.
17. Kahn KM, Demarco K, Pavsic J, Sangillo J. A Quality Improvement Project to Reduce Postcesarean Opioid Consumption. *MCN Am J Matern Child Nurs.* 2021;46(4):190-197.
18. Loomis EA, McNaughton D, Genord C. A Quality Improvement Initiative Addressing Safe Opioid Prescribing and Disposal Postcesarean Delivery. *Pain Manag Nurs.* 2022;23(2):174-179.
19. Kim S, King A, Parikh P, et al. Optimizing Post-Cesarean Opioid Prescription Practices at Mayo Clinic: A Quality Improvement Initiative. *Am J Perinatol.* 2022;39(4):337-341.
20. Burgess A, Harris A, Wheeling J, Dermo R. A Quality Improvement Initiative to Reduce Opioid Consumption after Cesarean Birth. *MCN Am J Matern Child Nurs.* Sep/Oct 2019;44(5):250-259.
21. Laksono I, Matelski J, Flamer D, Gold S, Selk A. Evaluation of a quality improvement bundle aimed to reduce opioid prescriptions after Cesarean delivery: an interrupted time series study. *Can J Anaesth.* 2022;69(8):1007-1016.
22. Holland E, Bateman BT, Cole N, et al. Evaluation of a Quality Improvement Intervention That Eliminated Routine Use of Opioids After Cesarean Delivery. *Obstet Gynecol.* 2019;133(1):91-97.
23. Llarena NC, Krivanek K, Yao M, et al. A multimodal approach to reducing post-caesarean opioid use: a quality improvement initiative. *BJOG.* 2022;129(9):1583-1590.
24. Smith AM, Young P, Blosser CC, Poole AT. Multimodal Stepwise Approach to Reducing In-Hospital Opioid Use After Cesarean Delivery: A Quality Improvement Initiative. *Obstet Gynecol.* 2019;133(4):700-706.
25. Voelker KA, Schauburger C. Academic Detailing for Postpartum Opioid Prescribing. *J Am Board Fam Med.* 2018;31(6):944-946.
26. Stein C. New concepts in opioid analgesia. *Expert Opin Investig Drugs.* 2018;27(10):765-775.
27. Swegle JM, Logemann C. Management of common opioid-induced adverse effects. *Am Fam Physician.* 2006;74(8):1347-1354.
28. Rogers E, Mehta S, Shengelia R, Reid MC. Four Strategies for Managing Opioid-Induced Side Effects in Older Adults. *Clin Geriatr.* Apr 2013;21(4).
29. Tamang T, Wangchuk T, Zangmo C, Wangmo T, Tshomo K. The successful implementation of the Enhanced Recovery After Surgery (ERAS) program among caesarean deliveries in Bhutan to reduce the postoperative length of hospital stay. *BMC Pregnancy Childbirth.* 2021;21(1):637.

#### Conflicts of interest

The authors declare having no conflicts of interest.