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# LINES OF THERAPY FOR POST-OPERATIVE ANALGESIA IN CHILDREN: A NATIONAL EHR ANALYSIS

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## Introduction

Post-operative pain control remains a central focus of management for all surgical patients. Traditionally, the mainstay of postoperative analgesia is opioid based, however there is increasingly more evidence to support a multimodal post-operative analgesic approach to minimize unwanted side effects and improve pain scores. Opiate-side effects are especially troublesome in the pediatric population, where it's well-established that multimodal analgesia is the mainstay of an effective post-operative care regiment. However, the extent to which this is adopted nationally is unknown. The aim of this study was to explore the adoption of multimodal analgesia, in post-operative pediatric orthopedic patients using a representative national EHR database. Utilizing a large national cohort, we explored the most common classes of analgesic medications utilized in the post-operative period – as well as the typical analgesic treatment pathway patterns. Furthermore, the goal of this work, is to assess the feasibility of using the TriNetX research network to better tailor pain management strategies for specific patient groups and glean insights into the effectiveness of current regimens.

## Materials and Methods

This study extracted data from fifty-six healthcare organizations (HCOs) within the United States via the TriNetX database. Patients diagnosed between the ages 8 to 18 undergoing orthopedic surgery were identified using CPT codes (1004038, 1004616, 1004841, 1004420, 1004987, 1004147, 1004550, 1004279, 1004279, 1004085, 1004123, 1004364, 1004568, 1004897, 1004232, 1004933, 1004886, 1004098, 1004617, 1004201, 1004038, 1004616, 1004841, 1004420, 1004987, 1004147, 1004550, 1004279, 1004780, 1004085, 1004123, 1004364, 1004568, 1004897, 1004933, 1004886, 1004098, 1004617, 1004201, and 1002796). Essential demographic variables included the patient's age, ethnicity, and race. We examined the time period from 30 days to 90 days post-operatively to examine pain management treatment strategies. To assess treatment approaches, the Treatment Pathways function of TriNetX was employed. A Lines of Treatment graph was developed to delineate the proportion of patients prescribed each medication at a specific of treatment (for instance, first-line or second-line). This allows examination of which treatment strategies were preferred among the cohort and what proportion of patients had to alter treatment approaches throughout the time period examined. Subsequently, a sunburst diagram was generated to depict the unique treatment pathways followed by patients. This analysis incorporated the following classes of pain medications: opioid analgesics, non-opioid analgesics, non-steroidal anti-inflammatory analgesics. As a federated

network TriNetX received a waiver from Western IRB since only aggregated counts, statistical summaries of de-identified information, but no protected health information is received, and no study specific activities are performed in retrospective analyses.

## Results/Case Report

The cohort comprised of 262,712 patients who matched the criteria. Figure 1 indicates that the majority of postoperative pediatric orthopedic patients are prescribed unimodal analgesia non-steroidal anti-inflammatory agents as the first line of treatment. Non-steroidal anti-inflammatory agents use sharply declines from 33% to 28% as second-line therapy but still comprises the majority portion for patients as second-line therapy. In contrast, non-opioid analgesia makes up roughly 20% of first-line therapy. It increases to 25% as second-line therapy and continues to steadily rise with subsequent lines of treatment, surpassing nonsteroidal anti-inflammatory agents and comprising the majority portion by LOT 3. While unimodal analgesia with opioids comprises just below 10% for the first line of treatment with a subtle decrease as the second line. Combination therapies consist of non-opioid and opioid analgesics; non-steroidal anti-inflammatory agents, non-opioid, and opioid analgesics; opioid analgesics and non-steroidal anti-inflammatory agents; and non-opioid analgesics and non-steroidal anti-inflammatory agents. Of the combination therapies, non-opioid and opioid analgesics represented about 24% of the first-line treatments, with a minor decline in second-line therapy. Triple therapy with non-steroidal anti-inflammatory agents, non-opioid analgesics, and opioid analgesics comprised about 10% of first and second-line therapy. Similarly, opioid analgesics and non-steroidal anti-inflammatory agents covered <5% of first and second-line therapy. Non-steroidal anti-inflammatory agents and non-opioid analgesics combination consisted of about 12% as first-line and increased to 15% as second-line. The sunburst diagram demonstrated that the majority portion of patients were initiated on a non-steroidal anti-inflammatory agent as the first line of treatment. However, every subsequent line of treatment consisted of non-opioid analgesics as the majority. (Figure 2).

## Discussion

The majority of pediatric orthopedic patients in our cohort were treated with nonsteroidal anti-inflammatory agents as first-line management therapy. A relatively small amount of patients required escalation in pain management in the time period studied. A surprising amount of patients were prescribed opiate monotherapy for pain control. Implementing a more specific postoperative recovery plans for patients could improve patient outcomes and decrease the use of unintended side effects and inadequate pain relief.

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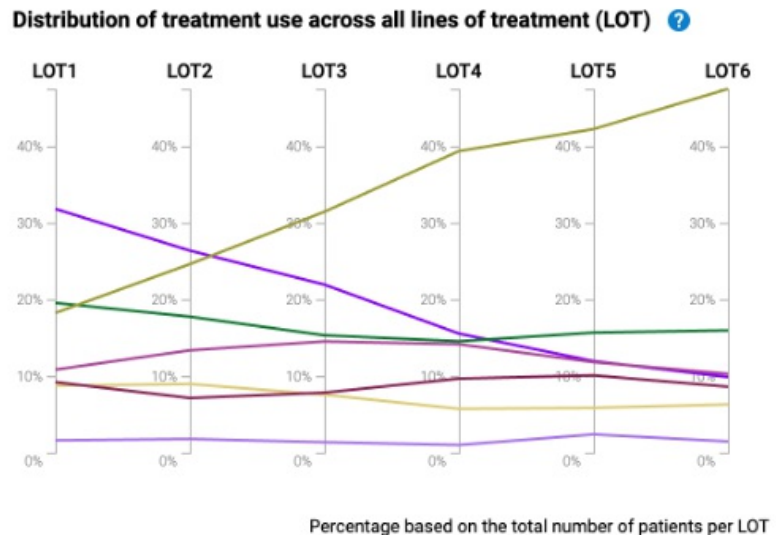
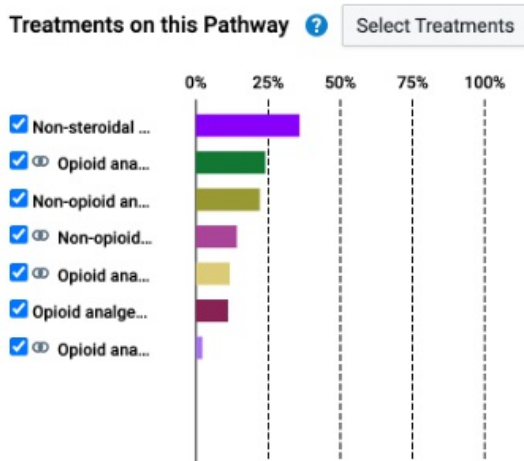
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## Disclosures

No

## Tables / Images





- Non-steroidal anti-inflammatory analgesics
- Opioid analgesics | Non-opioid analgesics
- Non-opioid analgesics
- Non-opioid analgesics | Non-steroidal anti-inflammatory analgesics
- Opioid analgesics | Non-opioid analgesics | Non-steroidal anti-inflammatory analgesics
- Opioid analgesics
- Opioid analgesics | Non-steroidal anti-inflammatory analgesics
- Other treatments

239,046 patients or 90% of the cohort don't have a pathway