# Impact of Liposomal Bupivacaine on Postoperative Opioid Use and Medical Costs in Medicare Outpatient Total Hip Arthroplasty

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## OBJECTIVE

To evaluate the real-world impact of liposomal bupivacaine (LB) on opioid use and healthcare utilization for up to 12 months following total hip arthroplasty (THA)

## CONCLUSIONS

1. Medicare fee-for-service beneficiaries receiving LB for outpatient THA experienced lower opioid use and had fewer opioid-related adverse events (ORAEs) and lower total medical costs driven by fewer inpatient readmissions
2. These data support the clinical and economic value of LB for patients undergoing THA in outpatient care settings

## INTRODUCTION

- THA procedures are routinely performed in outpatient settings, supported by clinical pathways and Centers for Medicare and Medicaid Services reimbursement policies, including the Transforming Episode Accountability Model (TEAM)[1-3]
- Effective perioperative pain control is critical for patient recovery and can reduce opioid consumption, postsurgical complications, length of stay, and healthcare resource utilization after THA[4,5]
- Liposomal bupivacaine (LB) is a nonopioid treatment that has been associated with reduced opioid consumption in patients undergoing THA procedures[6]
- The NOPAIN Act has expanded reimbursement for qualifying nonopioid therapies, such as LB, when used for Medicare fee-for-service beneficiaries undergoing outpatient procedures[7]
  - However, real-world data regarding LB use for outpatient THA in Medicare-insured patients are limited

## METHODS

### STUDY DESIGN

- This study (spanned from 2019 and 2022) included adults undergoing a primary THA procedure (CPT: 27130) between January 2019 and December 2021 in a hospital outpatient department with ≥6 and ≥12 months of continuous enrollment, before and after THA respectively, from the Centers for Medicare & Medicaid Services (CMS) database
  - Data were extracted from the 20% Research Identifiable File Fee-for-Service claims records (Parts A, B, and D) and beneficiary enrollment/summary files under CMS-Medicare Data Use Agreement 70419
- Patients were divided into 2 groups on the basis of LB use (HCPCS: C9290) during THA; groups were generated with 1:1 propensity score matching between the LB and non-LB groups based on 17 baseline variables

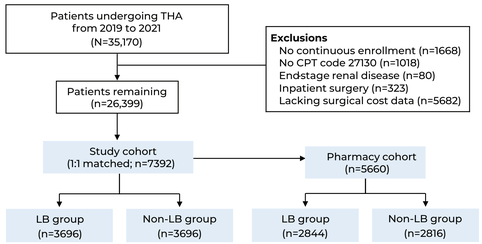
### STUDY OUTCOMES AND STATISTICAL ANALYSIS

- The main outcomes of the study included
  - Primary: opioid intake (in morphine milligram equivalents [MMEs]), opioid prescription days, and ORAEs assessed over 12 months in patients with Part D coverage (77%)
  - Secondary: any-cause healthcare utilization (inpatient admissions, emergency department [ED] visits, outpatient visits) and total medical costs (inpatient, ED, outpatient, and skilled nursing costs)
- Generalized linear regression modeling was performed to compare outcomes between LB and non-LB groups with gamma distribution for costs and Tweedie distribution for opioid metrics and healthcare resource utilization; *P* values <0.05 were considered statistically significant

## RESULTS

- Overall, 7392 patients were included in the analysis (LB, n=3696; non-LB, n=3696) (Figure 1)

### Figure 1. Sample population for retrospective analysis.




CPT, Current Procedural Terminology; LB, liposomal bupivacaine; THA, total hip arthroplasty.

- Patient characteristics were comparable between groups after propensity score matching (Table 1); the standardized mean difference (SMD) was <10% across all baseline variables
  - The mean age was 74 years; most patients had osteoarthritis (99%), were White (92%), and were female (61%)
  - The mean Charlson Comorbidity Index was 0.8, and ~40% of patients had prior opioid exposure; the range of patients having chronic pain or obesity was ~21%-25%

### Table 1. Baseline Demographic and Clinical Characteristics

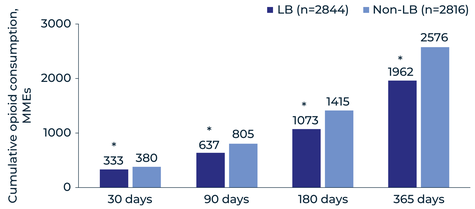
| | PS-matched LB group (n=3696) | PS-matched non-LB group (n=3696) | PS-matched standardized mean difference, % |
|---|---|---|---|
| **Age, mean (SD), y** | 73.8 (6.3) | 73.9 (6.1) | 1.2 |
| **Charlson Comorbidity Score, mean (SD)** | 0.80 (1.3) | 0.84 (1.4) | 3.4 |
| **Sex, female, n (%)** | 2191 (59.3) | 2280 (61.7) | -4.9 |
| **Race, White, n (%)** | 3413 (92.3) | 3413 (92.3) | 0.0 |
| **Comorbidities at baseline, n (%)** | | | |
| Anxiety | 530 (14.3) | 652 (17.6) | -9.0 |
| Chronic pain | 798 (21.6) | 923 (25.0) | -8.0 |
| Depression | 486 (13.2) | 568 (15.4) | -6.4 |
| Osteoarthritis | 3672 (99.4) | 3676 (99.5) | -1.4 |
| Smoking | 596 (16.1) | 700 (18.9) | -7.4 |
| Cancer | 566 (15.3) | 518 (14.0) | 3.7 |
| Obesity | 876 (23.7) | 916 (24.8) | -2.5 |
| Substance use disorder | 111 (3.0) | 164 (4.4) | -7.6 |
| Diabetes | 692 (18.7) | 730 (19.8) | -5.3 |
| Low back pain | 1616 (43.7) | 1713 (46.4) | -2.6 |
| **Prior opioid exposure, n (%)[a]** | 1188 (41.8) | 1255 (44.6) | -5.6 |
| **Procedure year, n (%)** | | | |
| 2019 | 14 (0.4) | 7 (0.2) | 3.6 |
| 2020 | 1630 (44.1) | 1671 (45.2) | -2.2 |
| 2021 | 2052 (55.5) | 2018 (54.6) | 1.8 |

LB, liposomal bupivacaine; PS, propensity score; SD, standard deviation. [a]Pharmacy cohort (Part D).

### OPIOID OUTCOMES

- Patients in the LB group consumed fewer opioids compared with the non-LB group during follow-up after THA (Figure 2)
  - Opioid consumption was significantly lower over 30 days (333 vs 380 MMEs), 90 days (637 vs 805 MMEs), 180 days (1073 vs 1415 MMEs), and 365 days (1962 vs 2576 MMEs) after surgery (*P*<0.0001 for all)

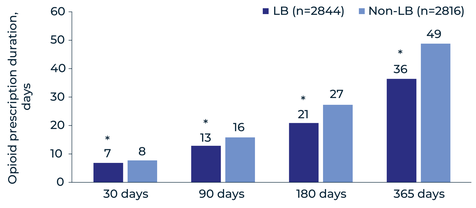
### Figure 2. Opioid consumption comparisons between the LB and non-LB groups.




LB, liposomal bupivacaine; MME, morphine milligram equivalent. *P<0.0001.

- Similarly, the LB group had a shorter duration of opioid prescription compared with the non-LB group during follow-up after THA (Figure 3)
  - Opioid prescription durations were significantly shorter over 30 days (6.9 vs 7.7 days), 90 days (12.9 vs 15.8 days), 180 days (20.9 vs 27.3 days), and 365 days (36.4 vs 48.8 days) after surgery (all *P*<0.0001)

### Figure 3. Opioid prescription duration comparisons between the LB and non-LB groups.

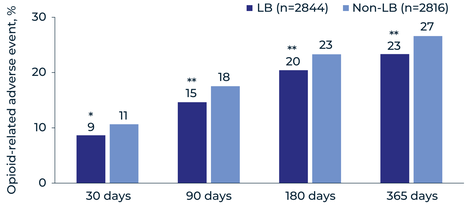



LB, liposomal bupivacaine. *P<0.0001.

### SAFETY

- Patients in the LB group experienced significantly fewer ORAEs compared with the non-LB group over 30 days (8.7% vs 10.7%; *P*=0.0108), 90 days (14.6% vs 17.5%; *P*=0.0029), 180 days (20.4% vs 23.3%; *P*=0.0091), and 365 days (23.3% vs 26.6%; *P*=0.0047) after THA (Figure 4)

### Figure 4. Opioid-related adverse event comparisons between the LB and non-LB groups.




LB, liposomal bupivacaine. *P<0.05. **P<0.01.

- The rate of surgical complications was significantly lower for patients in the LB group versus the non-LB group at 30 and 90 days after THA (both *P*<0.05; data not shown)

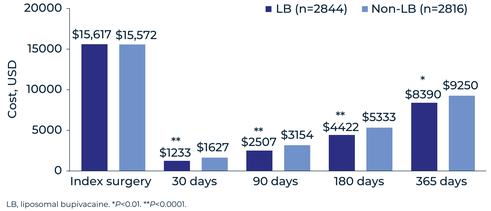
### HEALTHCARE RESOURCE UTILIZATION

- Patients in the LB group had significantly lower healthcare utilization over 30/90/180/365 days after THA versus the non-LB group
  - Inpatient admissions (n): 30-day (42 vs 79); 90-day (174 vs 243); 180-day (327 vs 447); 365-day (698 vs 883); all *P*<0.001
  - ED visits (n): 30-day (673 vs 639, *P*=0.348); 90-day (1147 vs 1404, *P*<0.0001); 180-day (1770 vs 2485, *P*<0.0001); 365-day (3309 vs 4382, *P*<0.0001)
  - Outpatient admissions (n): 30-day (3440 vs 3493, *P*=0.524); 90-day (9406 vs 10,202, *P*<0.0001); 180-day (16,981 vs 18,433; *P*<0.0001); 365-day (32,241 vs 34,388; *P*<0.0001)

### TOTAL MEDICAL COST OUTCOMES

- Both groups had similar costs on the day of surgery; however, the LB group had significantly lower total medical costs compared with the non-LB group during follow-up after THA (Figure 5)
  - Specifically, total medical costs were significantly lower in the LB group than the non-LB group over 30 days ($394 reduction; *P*<0.0001), 90 days ($647 reduction; *P*<0.0001), 180 days ($911 reduction; *P*<0.0001), and 365 days ($860 reduction; *P*=0.0038) after surgery

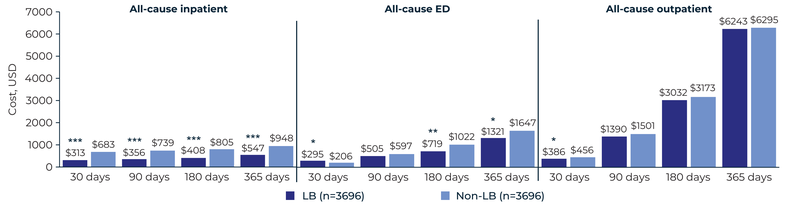
### Figure 5. Medical cost comparisons between the LB and non-LB groups.




LB, liposomal bupivacaine. *P<0.01. **P<0.0001.

- Total medical cost savings in the LB group were primarily driven by lower inpatient costs with significantly fewer inpatient readmissions compared with the non-LB group; reductions in ED and outpatient costs also contributed to cost savings (Figure 6)
  - Total all-cause inpatient costs were significantly lower in the LB group than the non-LB group over 30 days ($370 reduction), 90 days ($383 reduction), 180 days ($397 reduction), and 365 days ($401 reduction) after surgery (*P*<0.0001 for all)
  - Although total all-cause ED costs were numerically higher in the LB group than the non-LB group over 30 days after surgery ($89 increase; *P*=0.0097), costs were numerically lower over 90 days after surgery ($92 reduction; *P*=0.1437); additionally, costs were significantly lower over 180 days ($303 reduction; *P*=0.0002) and 365 days ($326 reduction; *P*<0.01) after surgery
  - Total all-cause outpatient costs were significantly lower in the LB group than the non-LB group over 30 days after surgery ($70 reduction; *P*=0.0013), and costs were numerically lower in the LB group than the non-LB group over 90 days ($111 reduction; *P*=0.0684), 180 days ($141 reduction; *P*=0.2267), and 365 days ($52 reduction; *P*=0.8054) after surgery

### Figure 6. All-cause inpatient, all-cause ED, and all-cause outpatient cost comparisons between the LB and non-LB groups.




ED, emergency department; LB, liposomal bupivacaine. *P<0.01. **P<0.001. ***P<0.0001.

### LIMITATIONS

- Study limitations include unmeasured confounding, an inability to identify alternative analgesics, and reliance on prescription fills
- Additionally, given this study focused on Medicare-insured patients, generalizability of the findings is limited to elderly patients

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**REFERENCES: 1.** Kim et al. *J Arthroplasty*. 2003;18:69-74. **2.** Centers for Medicare & Medicaid Services. Federal Register. https://www.federalregister.gov/id/2019-24138. Updated November 12, 2019. Accessed February 11, 2026. **3.** Centers for Medicare & Medicaid Services. TEAM (Transforming Episode Accountability Model). https://www.cms.gov/priorities/innovation/innovation-models/team-model. Updated February 11, 2026. Accessed February 11, 2026. **4.** Haslam et al. *BJA Education*. 2024;24(6):183-190. **5.** Memtsoudis et al. *Anesthesiology*. 2018;128:891-902. **6.** Van Horne et al. *Am Health Drug Benefits*. 2022;15:21-29. **7.** Pacira BioSciences Inc. NOPAIN Act. https://www.exparelpro.com/access-reimbursement#nopain-act. Accessed February 11, 2026.

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