

Impact of Liposomal Bupivacaine on Healthcare Resource Utilization and Costs in Patients Undergoing Total Knee Arthroplasty in Real-world Ambulatory Surgical Centers

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OBJECTIVE

To evaluate the real-world impact of post-operative analgesia with liposomal bupivacaine (LB) on healthcare resource utilization (HRU), costs, and opioid prescription refills following outpatient total knee arthroplasty (TKA) procedures performed in ambulatory surgical centers (ASCs)

CONCLUSIONS

- The use of LB for outpatient TKA was associated with lower all-cause and pain-specific healthcare costs, largely attributable to lower outpatient expenditure (eg, physical therapy [PT] and occupational therapy [OT] visits) over 1 year of post-surgical follow-up
- These results have important implications for enhancing post-surgical analgesia pathways and reducing HRU and costs in patients undergoing TKA in outpatient care settings



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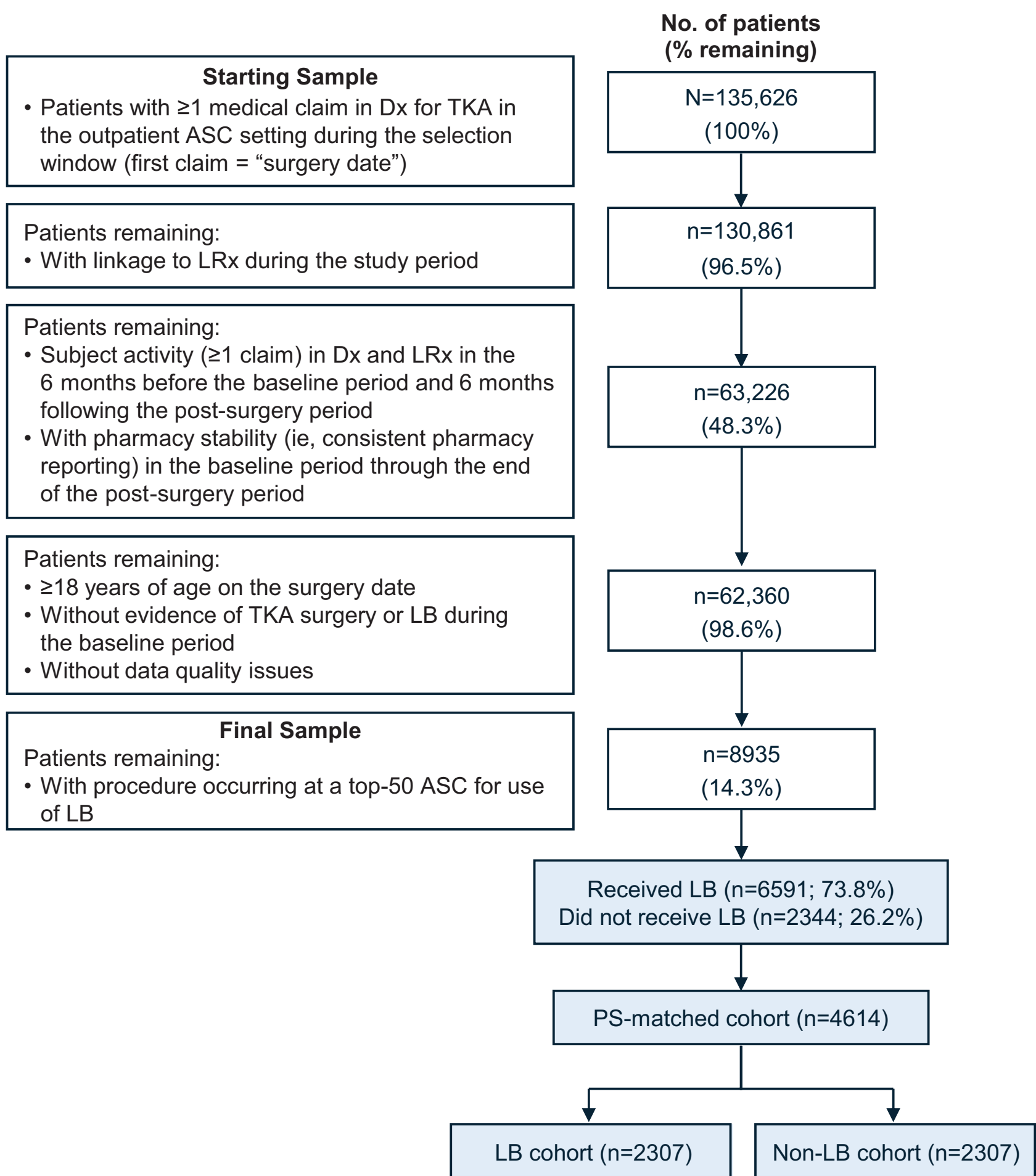
INTRODUCTION

- TKA procedures are among the most frequently performed orthopaedic procedures in the United States, with a projected estimate of 3.42 million procedures to be performed by 2040^{1,2}
- TKA procedures are increasingly performed in outpatient settings to reduce healthcare costs, and it is estimated that approximately half of all joint replacements will be performed in outpatient settings by 2026³⁻⁵
- Optimized perioperative pain management for outpatient TKA is critical to facilitate shorter length of stay and to enable recovery at home^{6,7}
 - Poorly managed acute pain can increase the risk of chronic pain, which may result in downstream HRU and higher overall costs⁸
- LB is a nonopioid treatment option that has been found to be associated with reduced post-operative emergency department (ED) visits and opioid use in TKA procedures performed in hospital outpatient department settings^{9,10}

RESULTS

- After propensity score matching, each cohort included 2307 patients (Figure 1)

Figure 1. Sample population for retrospective analysis.



ASC, ambulatory surgery center; Dx, professional fee claims; LB, liposomal bupivacaine; LRx, longitudinal prescription claims; TKA, total knee arthroplasty.

- Total all-cause costs were significantly lower with LB than non-LB analgesia over 30 days after surgery (\$247 reduction [$P<0.01$]; Figure 2), 90 days after surgery (\$438 reduction [$P<0.01$]; Figure 3), and 360 days post-surgery (\$1318 reduction [$P<0.01$]; Figure 4)
- Total cost savings were generally driven by lower outpatient medical and prescription costs with LB versus non-LB analgesia

METHODS

- Adults undergoing a TKA procedure between January 2019 and November 2022 at an outpatient ASC were retrospectively identified from the IQVIA New Data Warehouse
 - This deidentified database included longitudinal prescription claims (LRx), professional fee claims (Dx), and Hospital Charge Data Master (CDM) data
- This analysis included data from ASCs with moderate-to-high volume of LB use (ie, the top 50 ASCs with the highest volume of LB use) for TKA during the selection window, similar to a previous study¹¹
- Patients were divided into 2 cohorts on the basis of LB use (HCPCS C9290) on the date of TKA (CPT 27447); 1:1 propensity score matching was used to create balanced cohorts
 - Propensity score matching variables included age group, geographic region, payer type, year of index date, Charlson Comorbidity Index categories, chronic kidney disease, diabetes, osteoarthritis, opioid use on the index date, and all-cause total outpatient medical costs for the index event
 - The standardized mean difference was required to be <0.1 after matching as a measure of balance between cohorts

Figure 2. All-cause and pain-related cost comparisons between the LB and non-LB cohorts over 30 days after surgery.

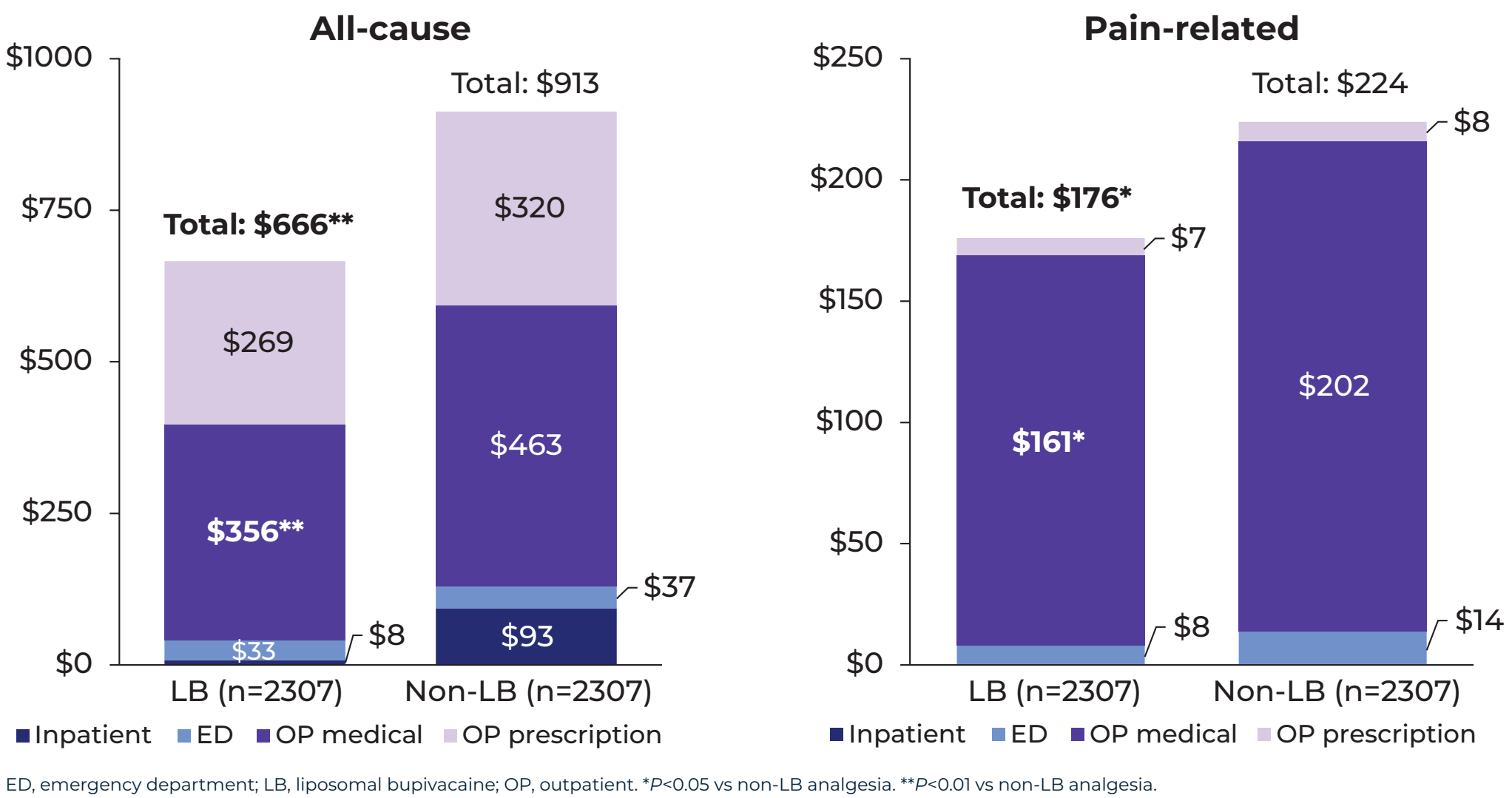
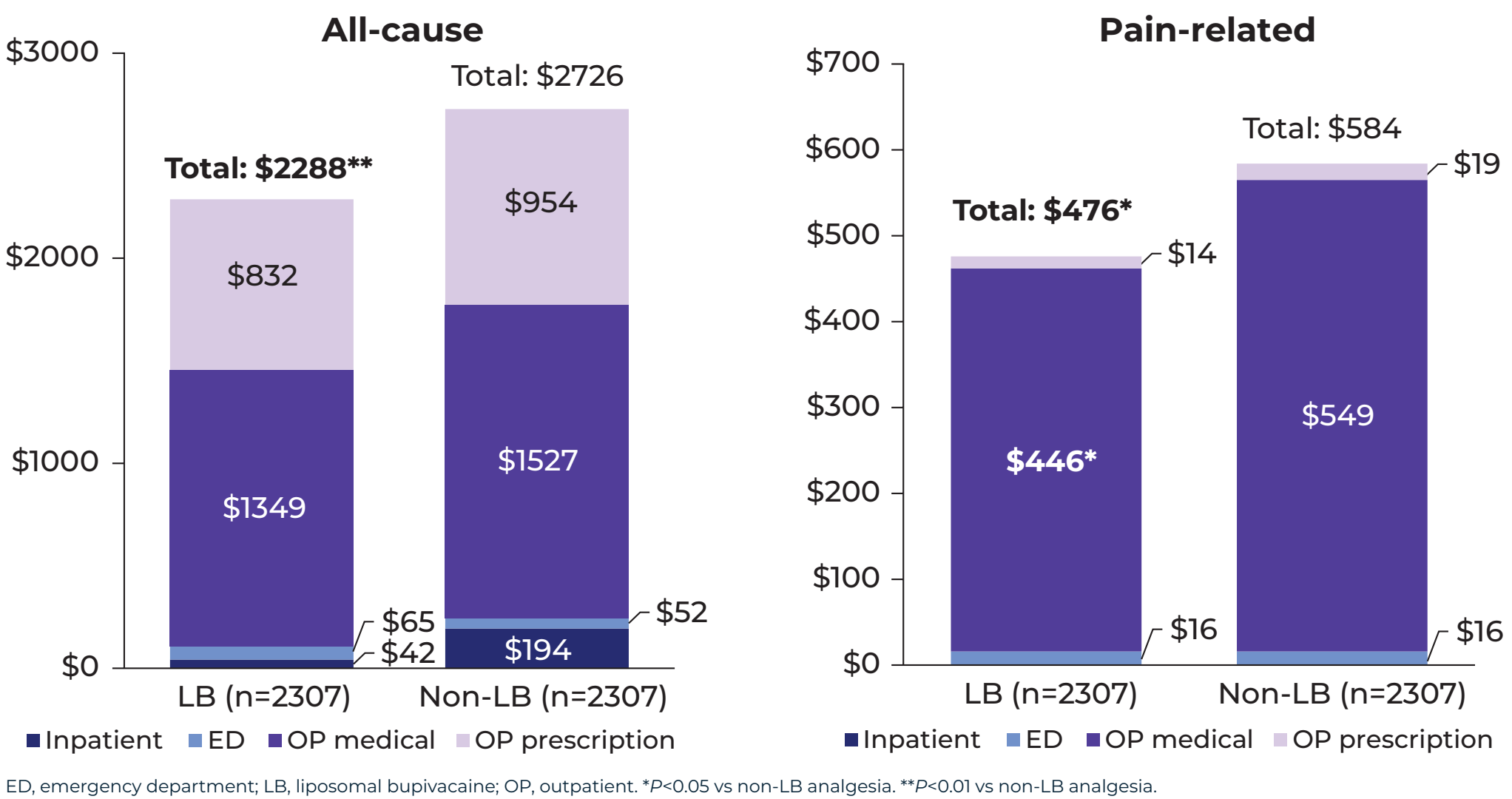
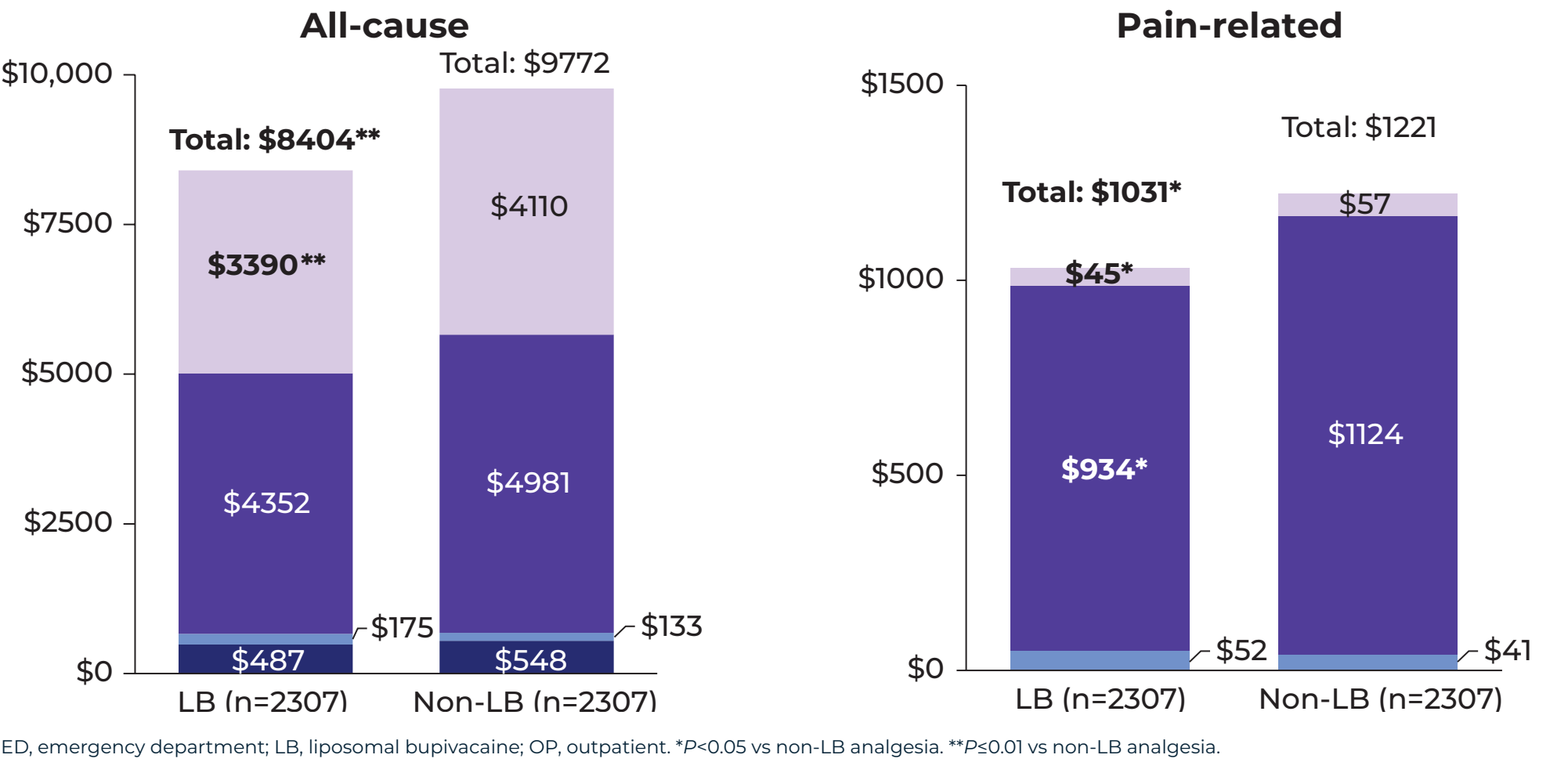


Figure 3. All-cause and pain-related cost comparisons between the LB and non-LB cohorts over 90 days after surgery.



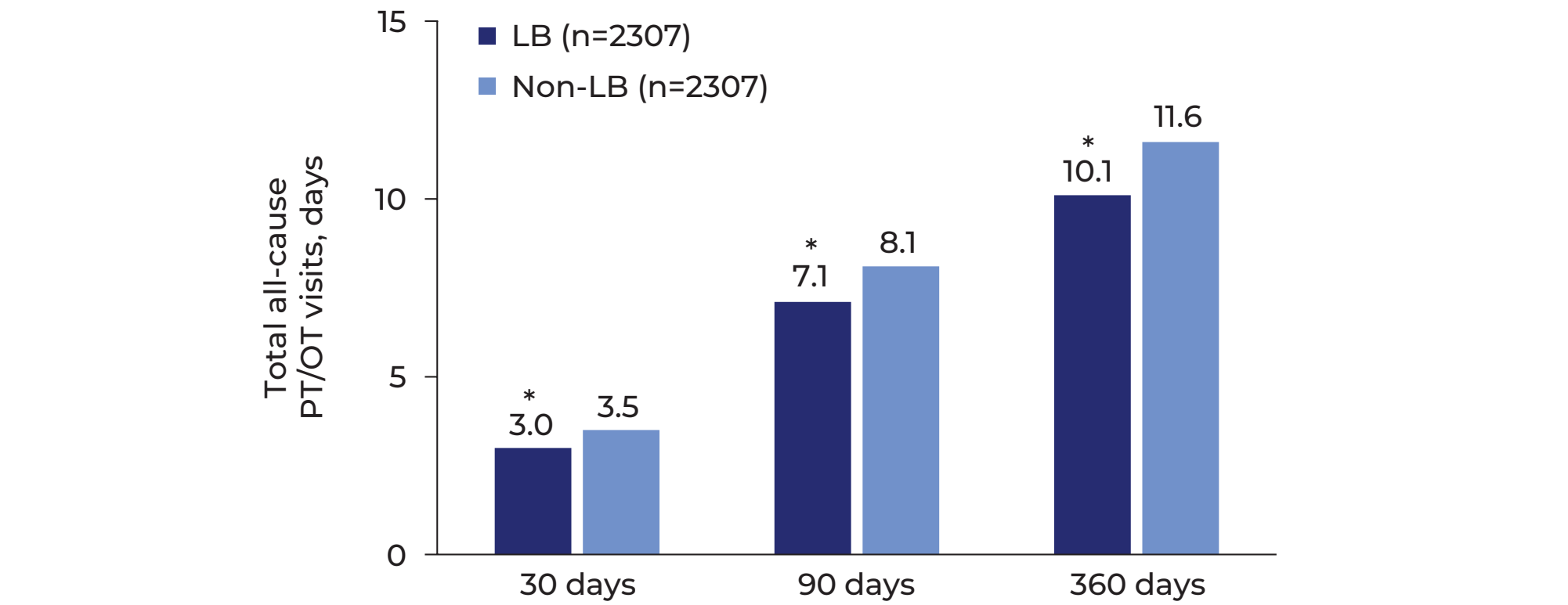
- All-cause and pain-related HRU and costs were evaluated at 30, 90, and 360 days after surgery
 - Costs were reported as mean costs per patient; costs were converted to 2024 US dollars using the medical component of the consumer price index
 - All-cause costs included inpatient stays, ED visits, outpatient visits, and prescription drug fills at outpatient pharmacies; for all-cause HRU, outpatient office visits were reported as PT/OT related versus non-PT/OT related
 - Pain-related HRU and costs were defined for inpatient stays with a primary diagnosis of acute/chronic post-procedural pain, outpatient claims with any diagnosis for acute/chronic post-procedural pain, and medications used to manage post-operative pain
- Mean opioid treatment duration was calculated as the sum of days' supply across all opioid prescriptions and reported over 30, 90, and 360 days after surgery
- Post-match comparisons used McNemar's test for categorical variables, paired t tests for continuous variables, and nonparametric Wilcoxon signed-rank test for any medians; a P value <0.05 was considered statistically significant

Figure 4. All-cause and pain-related cost comparisons between the LB and non-LB cohorts over 360 days after surgery.



- Similarly, total pain-related costs were significantly lower with LB over 30 days after surgery (\$48 reduction [$P<0.05$]; Figure 2), 90 days after surgery (\$108 reduction [$P<0.05$]; Figure 3), and 360 days after surgery (\$190 reduction [$P<0.05$]; Figure 4) than with non-LB analgesia
 - Total pain-related cost savings were generally driven by lower outpatient medical costs with LB
- Patients who received LB had lower HRU, with fewer all-cause PT/OT visits compared with patients who did not receive LB at all follow-up periods ($P<0.01$ for all; Figure 5), with similar trends observed for pain-related PT/OT visits ($P<0.01$ for all)

Figure 5. Healthcare resource utilization comparisons between the LB and non-LB cohorts.



- Use of LB was associated with a similar duration of opioid treatment over 30 days (7.7 vs 8.0 opioid-treated days) and 90 days (13.8 vs 15.0 opioid-treated days) after surgery and a significantly lower duration of opioid treatment over 360 days after surgery (30.4 vs 35.2 opioid-treated days; $P<0.05$) versus use of non-LB analgesia