Rural Residence, Neighborhood Socioeconomic Disadvantage, and Early Postoperative Mobility Following Major Orthopedic Surgery

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"Making Waves"
25th Annual Pain Medicine Meeting
November 5-7, 2026 | Tampa, Florida

Introduction:

- Postoperative complications are common and drive morbidity and mortality
- **Early mobilization** (core element of ERAS) improves outcomes: fewer complications, shorter stays, fewer readmissions
- **Disparities in recovery** remain underexplored, especially in rural populations
- Rural communities: higher mortality, limited healthcare access, socioeconomic disadvantage, higher chronic disease burden
- **North Carolina has the 2nd largest Rural population in the USA -- less equal access to health care**
- Impact of these factors on **postoperative mobility and outcomes** after major surgery is poorly understood
- **Study aim:** assess whether rurality influences early postoperative mobility and outcomes after major orthopedic surgery

Hypothesis:

- Rurality → reduced postoperative mobility
- Reduced mobility → more complications



Methods:

- Retrospective cohort study of **5,593 adult patients** who underwent major orthopedic surgery at Atrium Health Wake Forest Baptist
- All patients were **North Carolina residents**
- Postoperative mobility tracked for 48 hours using **ViSi Mobile® wearable devices**
- Surgeries categorized as **hip, lower limb, upper limb, or other**
- **Rurality** determined by patient ZIP code (urban vs. rural)
- **Socioeconomic context** measured using the **Area Deprivation Index (ADI)**
- Postoperative outcomes: **30-day readmission, 30-day ED visits, unplanned ICU admission**

Results:

Geographic & socioeconomic factors

Urban patients → more mobile than rural patients (P = 0.025)

Lower Area Deprivation Index (ADI) → greater mobility (P = 0.034)

Urban patients with low ADI values had the **highest mobility**

30-day readmissions: higher in urban vs. rural (not statistically significant)

Surgical factors

Shorter surgeries → greater postoperative mobility (P = 0.008)

Surgical site significantly impacted mobility (P < 0.001)

Patient characteristics

Hypertension → reduced mobility (P < 0.001)

Male patients → higher mobility than female patients (P < 0.001)

***Figure 1:** Odds Ratio for Rural vs. Urban Populations*

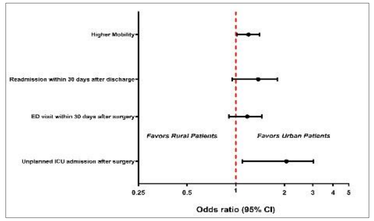


***Figure 2:** Odds Ratio for High ADI vs. Low ADI*

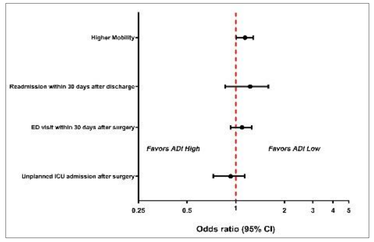


***Table 1:** Population Characteristics Rural vs. Urban*

	Rural	Urban
Number (#)	837	4,756
Age (Mean)	56.27	56.79
Male	54%	53%
Race: White or Caucasian	91%	72%
Race: Black or African American	6%	22%
Race: Other	3%	6%
ASA Rating: 1-2	29%	29%
ASA Rating: 3-5	71%	71%
CCI Score (Mean)	2.46	2.41
Diabetes	12%	11%
Hypertension	20%	22%
Surgical Duration (Hours) (Mean)	0.14	0.13
Surgery Location: Hip	35%	33%
Surgery Location: Lower Extremity	36%	41%
Surgery Location: Upper Extremity	13%	13%
Surgery Location: Other	16%	13%
Monitoring Duration (Days)	1.86	1.85
State: ADI Low	20%	33%

Conclusion:

Key findings:

- **Rurality and socioeconomic disadvantage → lower postoperative mobility**
- Independent predictors of decreased mobility: hypertension, female sex, longer surgical duration
- No significant association between mobility and improved postoperative outcomes in this study

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Funding Source: Department of Medical Education