Predictors of Long-Term Opioid Use Following Acute Pain Treatment: A Clinical Review

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Better Risk Identification
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Introduction

• Long-term opioid use following acute pain treatment remains a major public health concern.

• Although opioids provide effective short-term analgesia, prolonged exposure increases the risk of opioid dependence, opioid use disorder (OUD) and overdose.

• Identifying predictors of persistent opioid use is essential for targeted prevention strategies.

Methods

• Systematic review of medical literature (2022–2025).

• Included observational studies and clinical guidelines examining predictors of long-term opioid use after acute pain treatment.

• Data extracted on demographics, pain type, opioid exposure, comorbidities, and psychosocial factors.

• Outcomes focused on persistent opioid use, OUD and overdose risk.

Inclusion Criteria

• Adults (≥18 years) with acute pain treatment
• Studies reporting predictors of long-term opioid use
• Peer-reviewed articles, guidelines, and meta-analyses Published 2022–2025

Outcomes Assessed

• Persistent opioid use (≥3 months)
• Opioid use disorder (OUD)
• Overdose risk

Results

Key Predictors of Long-Term Opioid Use

Category	Predictor	Evidence / Key Finding
Demographic Factors	Younger age Socioeconomic disadvantage	Higher risk of persistent use [1,2] Increased risk [2,3]
Psychosocial Factors	Mental health disorders (depression, anxiety) Substance use disorder	Higher risk [2,3] Strongly associated with persistent use [2,3]
Clinical Factors	Prior opioid exposure Chronic pain Greater baseline pain severity	Significantly increased risk ($p < 0.05$) [2,5] Higher risk [2,3] Increased risk [1,3]
Prescribing-Related Factors	Higher initial opioid dose Prescriptions > 7 days Multiple refills Concurrent benzodiazepine use	Increased risk ($p < 0.05$) [1] Increased risk ($p < 0.05$) [1] Increased risk ($p < 0.05$) [1] Increased risk [1,3]
Technology / Models	Machine-learning EHR models	Better risk identification vs. traditional assessment [3]

Evidence from Key Studies

Study (Year)	Design / Population	Key Findings
Dowell et al. (2022) [1]	Clinical guideline	Identified high-risk populations and prescribing recommendations to reduce long-term use
Hollmann et al. (2023) [2]	Systematic review	Prior opioid use, mental health, SUD and younger age increase risk of persistent use
Song et al. (2024) [3]	Systematic review	Validated prediction models show improved risk identification vs. clinical assessment
Ellerbroek et al. (2024) [4]	Systematic review	Pharmacologic strategies and multimodal analgesia reduce long-term opioid use
Khelemsky et al. (2024) [5]	Review	Shorter prescriptions and patient education associated with lower persistent use

Prevention and Intervention Strategies

Strategy	Impact
Shorter initial prescriptions (≤ 7 days)	Reduced long-term use ($p < 0.05$) [1,4]
Multimodal analgesia (non-opioid options)	Lower opioid exposure [4]
Patient education	Improved understanding and adherence [4]
Follow-up monitoring	Early identification of continued use [1,4]
Risk assessment tools (machine learning / EHR)	Improved identification of high-risk patients [3]

Discussion

• Persistent opioid use is influenced by patient, clinical and prescribing factors.
• Targeted risk assessment can identify vulnerable populations and support individualized opioid stewardship.
• Interventions (shorter prescriptions, multimodal analgesia, education, follow-up) are associated with reduced opioid exposure ($p < 0.05$) [1,4].
• Prediction models require prospective validation, external testing and evaluation of clinical impact before widespread implementation [3,5].

Conclusion

• Early identification of patients at risk for persistent opioid use can improve individualized pain management and promote safer opioid prescribing.
• Future research should focus on validated prediction tools, integration of clinical decision-support systems and personalized interventions to reduce long-term opioid-related harm.

References

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