Assessing the Relationship Between Initial Opioid Prescription and Subsequent Pain-Related Healthcare Resource Utilization and Costs among Patients with Chronic Pain

Allison Perry, PhD, MHS[1], Chelsea Dutra, MPH[1], Sydnie Stackland, MS[1], Michael Munsell, PhD[1]

Panalgo, Boston, MA, USA

Background

- The CDC recommends starting opioid treatment for chronic pain at the "lowest effective dosage…for no longer than needed for the expected duration of pain severe enough to require opioids" (*Dowell et al., 2022*)
- The impact of specific dose-duration combinations on long-term healthcare costs and utilization is unclear
- Understanding the relationship between initial opioid prescription strategies and subsequent healthcare engagement is crucial, yet current knowledge gaps hinder optimal pain management and cost containment

Objectives

- To assess the impact of initial opioid prescription dosing and duration combinations on pain-related healthcare costs and utilization among chronic pain patients

Methods

Data Source: Tessa, a U.S. dataset that includes closed-claims data across Commercial, Medicare Advantage and Medicaid,10/1/2015 to 6/30/2023

Study Population: Patients who received an initial opioid prescription within 90 days of a confirmatory chronic pain diagnosis (*index date*) (**Figures 1, 2**)

Analysis:

- The initial opioid was characterized by its dose and days' supply in a "dose-days" naming convention, using categories based on morphine milligram equivalent (MME) dosage (mg) and duration (days) (*Edlund et al., 2014*):
  - Dose: low [>0-20]; medium [>20-50]
  - Days: short [1-7]; moderate [>7-30]; long [>30-90]
- Pain-related healthcare resource use and costs were measured in the 12 months following the initial opioid prescription
- Log-transformed costs were modeled using a generalized linear model
- Utilization outcomes were modeled using logistic regressions
- All models adjusted for: age, pain site, payor, Charlson comorbidity score, baseline opioid use disorder (OUD) status, and baseline all-cause medical costs
- All analyses were performed using Instant Health Data (IHD) software

Figure 1. Study Design

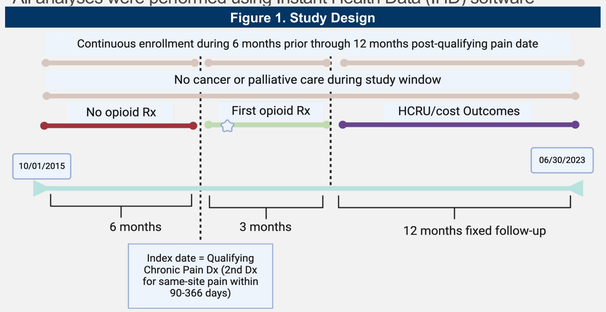
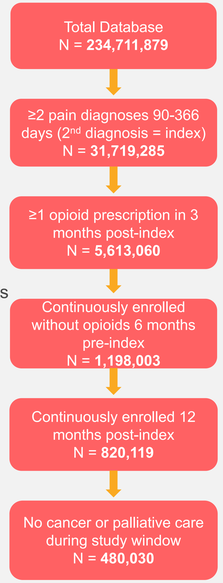


Figure 2. Cohort Attrition



Results

Table 1. Baseline Patient Characteristics

Age, *years*, Mean (SD)	45.09 (15.97)
Charlson Comorbidity, Mean (SD)	0.49 (0.98)
Pain Type on Index, N (%)	
Back/neck	186,169 (38.78)
Arthritis	94,466 (19.68)
Miscellaneous	89,081 (18.56)
Neck	46,913 (9.77)
Headache	40,652 (8.47)
Neurologic	22,353 (4.66)
Other unspecified back/neck	396 (0.08)
Opioid Use Disorder, N (%)	8,350 (1.74)
Payor, N (%)	
Commercial	258,315 (53.81)
Medicaid	176,704 (36.81)
Medicare Advantage	45,011 (9.38)
Healthcare Resource Utilization, N (%)	
1+ Emergency Department Visit	183,184 (38.16)
1+ Inpatient Hospitalization	43,910 (9.15)
Opioid Use Disorder, N (%)	8,226 (1.72)

- We identified N = 480,030 newly diagnosed chronic pain patients who initiated opioid therapy, with a majority experiencing back/neck (38.78%) or arthritic pain (19.68%) (**Table 1**)
- Most patients (99%) were prescribed low-dose opioids for short to moderate durations (**Table 2**)

Table 2. Distribution of First Opioid Prescription Dose-Days

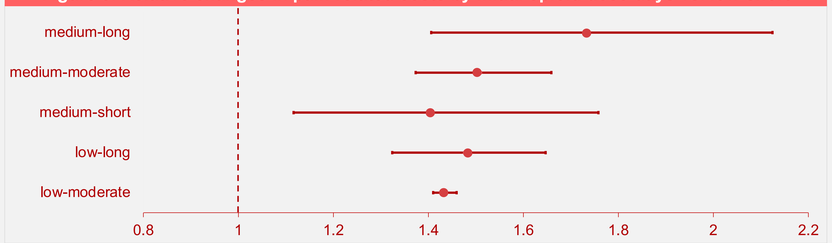
Dose-Days Category	N (%)
Low-short	369,595 (76.99)
Low-moderate	103,971 (21.66)
Low-long	1,925 (0.40)
Medium-short	442 (0.09)
Medium-moderate	2,571 (0.54)
Medium-long	535 (0.11)

Table 3. Chronic Pain-Related Medical Costs in 12-month Follow-up

Dose-Days Category	Mean (SD), $
Low-short	1,741.16 (52,996.32)
Low-moderate	2,602.15 (89,387.27)
Low-long	2,168.95 (15,075.33)
Medium-short	3,614.91 (23,861.97)
Medium-moderate	2,746.14 (29,283.66)
Medium-long	2,258.25 (8,985.87)

- Compared to low-short opioid initiators who had an average (SD) of $1,741 (± 52,996) in annual pain-related costs, costs increased by 36% for low-moderate, 39% for low-long, 34% for medium-short, 41% for medium-moderate, and 55% for medium-long initiators (**Table 3; Figure 3**)
- Relative to low-short opioid initiators, an initial medium-short opioid was associated with increased risk of pain-related inpatient hospitalization (OR 1.34; p<0.05) and emergency department visits (OR 2.02; p<0.01) in follow-up (**Figures 4, 5**)

Figure 3. Relative changes in pain-related costs by initial opioid dose-days vs. low-short



Results, *Continued*

Figure 4. Adjusted odds ratios of pain-related emergency department visits in 12-month follow-up by initial opioid dose-days vs. low-short

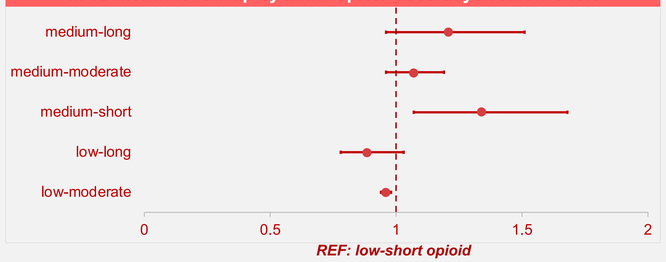
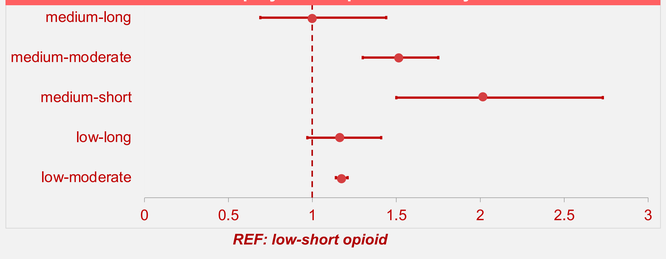


Figure 5. Adjusted odds ratios of pain-related inpatient hospitalizations in 12-month follow-up by initial opioid dose-days vs. low-short



Conclusions

- Most opioid-naïve chronic pain patients initiated 0-20 MME/day opioids for 1-30 days, aligning with guidelines
- Initiating higher dose and longer duration opioids was associated with higher subsequent pain-related healthcare costs; while these patients may have higher initial pain severity, their opioids may not effectively reduce pain-related healthcare burden
- Initiating >20-50 MME/day opioids for up to 30 days was associated with the highest pain-related resource use, potentially due to baseline pain severity, medication side effects, or uncontrolled pain; further research is warranted to understand driving factors

References

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- Edlund MJ, Martin BC, Russo JE, DeVries A, Braden JB, Sullivan MD. The role of opioid prescription in incident opioid abuse and dependence among individuals with chronic noncancer pain: the role of opioid prescription. Clin J Pain. 2014 Jul;30(7):557-64. doi: 10.1097/AJP.0000000000000021. PMID: 24281273; PMCID: PMC4032801.

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