



AGENCY FOR HEALTHCARE RESEARCH AND QUALITY



Factors Affecting Opioid Use among Patients with and without Chronic Pain

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The views expressed in this article are those of the authors, and no official endorsement by the Department of Health and Human Services or the Agency for Healthcare Research and Quality is intended or should be inferred.

Outline

- Background on the opioid crisis
- Research objective & approach
- Literature review
- Data
- Definitions of chronic pain & opioid use measures
- Methods
- Results
- Policy implications & related research

Background on the opioid crisis



- Opioids were mostly used to treat acute pain
- In the 1990s, physicians started to use opioids to treat chronic pain
- Sharp rise until 2010, steady decline from 2010 to 2016
- 2016 CDC Guidelines for prescribing opioids for chronic pain
- Sharp decline in opioid use 2016 to 2018
- Concern that the Guidelines may have been implemented incorrectly

Research Objective

- To determine whether the effects of patient attributes on opioid use vary between people with and without chronic pain

Approach

- Identify chronic pain treatment in the survey
- Correct for the sample selection bias (i.e., certain types of people may pursue pain treatment more so than others)
- First paper to use models that *jointly* predict chronic pain and opioid use (a Heckman correction)

Literature review

- A. G. White, H. G. Birnbaum, M. Schiller, J. Tang, N. P. Katz, Analytic models to identify patients at risk for prescription opioid abuse. *Am. J. Manag. Care* **15**, 897–906 (2009).
- M. D. Sullivan *et al.*, Risks for possible and probable opioid misuse among recipients of chronic opioid therapy in commercial and Medicaid insurance plans: The TROUP study. *Pain* **150**, 332–339 (2010).
- R. E. Palmer *et al.*, The prevalence of problem opioid use in patients receiving chronic opioid therapy: Computer-assisted review of electronic health record clinical notes. *Pain* **156**, 1208–1214 (2015).
- Z. Yang *et al.*, Defining risk of prescription opioid overdose: Pharmacy shopping and overlapping prescriptions among long-term opioid users in Medicaid. *J. Pain* **16**, 445– 453 (2015).

Literature review (cont.)

- G. A. Brat *et al.*, Postsurgical prescriptions for opioid naive patients and association with overdose and misuse: Retrospective cohort study. *BMJ* **360**, j5790 (2018).
- R. Dufour *et al.*, Understanding predictors of opioid abuse: Predictive model development and validation. *Am. J. Pharm. Benefits* **6**, 208–216 (2014).
- T. R. Hylan *et al.*, Automated prediction of risk for problem opioid use in a primary care setting. *J. Pain* **16**, 380–387 (2015).

Data

- The Medical Expenditure Panel Survey is produced by the Agency for Healthcare Research and Quality (AHRQ) and the National Center for Health Statistics.
- Provides detailed, person-level information on socioeconomic characteristics, and healthcare use and expenditures from a nationally representative sample of households in the civilian, non-institutionalized population.
- Overlapping panel design, data are collected through 5 rounds of interviews during a 2.5 year period to cover use and expenditures over 2 calendar years.
- We use full year populations for 2014 to 2017.

Chronic pain measure



- Based on a method from the Weitzman Quality Institute:¹ use ICD-9-CM & ICD-10-CM condition codes to classify individuals as having chronic pain.
- The most common conditions among persons classified as having chronic pain are:
 - Back problems
 - Osteoarthritis and other non-traumatic joint disorders
 - Systemic lupus and connective tissue disorders
 - Other CNS disorders
 - Mental disorders

¹Tian TY, Zlaveta I, Anderson DR. Using electronic health records data to identify patients with chronic pain in a primary care setting. *J Am Med Inform Assoc* 2013;20: e275-e280

Outcome Measures:

- Probability of opioid use
- Probability of non-opioid analgesic use (without concurrent opioid use)
- Probability of high risk opioid use

Outcome Measures: Estimated with Multivariate Heckman Models



- For opioid-naïve adults (no opioid use in prior year)
 - ▶ Probability of opioid use
 - ▶ Probability of non-opioid analgesic use (without concurrent opioid use)
 - ▶ Probability of high risk opioid use
- For adults with opioid use in prior year
 - ▶ Probability of continuing opioid use
 - ▶ Probability of non-opioid analgesic use (without concurrent opioid use)
 - ▶ Probability of high risk opioid use

Drug therapeutic classes from the 2018 Redbook:

- nonsteroidal anti-inflammatory drugs (NSAIDs),
- muscle relaxants,
- anticonvulsants,
- corticosteroids,
- antidepressants, and
- antiarrhythmics.

S Ryder and C F Stannard. Treatment of chronic pain: antidepressant, antiepileptic and antiarrhythmic drugs. Continuing Education in Anaesthesia, Critical Care & Pain, | Volume 5 Number 1 2005, 18-21.

High risk opioid use during the year if

- (1) had a prescription with 50 or more MME per day, or
- (2) overlapping benzodiazepine use, or
- (3) extended-release/long-acting [ER/LA] opioid use without chronic pain)

Based on the 2016 CDC Guideline.

Methods

Heckman Probit Model:

1. *Selection regression:*

$$\text{chronic pain} = X + IV + e_1$$

2. *Opioid use regression:*

$$\text{opioid use} = X + e_2 \quad \text{if chronic pain} = 1$$

$$\rho = \text{corr}(e_1, e_2)$$

- We find that this estimated rho is statistically significant and negative, indicating that there are some unmeasured characteristics that jointly predict having treatment for chronic pain and opioid use.
- This indicates that a naive estimate of the opioid equation alone would be biased.

Excluded instruments

- The excluded IVs are Primary Care Service Area (PCSA) level
 - ▶ Supply of primary care physicians
 - ▶ % working in retail sector
 - ▶ % poverty
- These predict treatment for chronic pain, but are not correlated with opioid use
- Primary care seems to be related to young healthy people (pediatrics). Negatively predicts having treatment for chronic pain, and not related to opioid use.
- Retail—more musculoskeletal back problems from standing, positively predicts having treatment for chronic pain.
- Poverty—less contact with health care system, positively predicts having treatment for chronic pain.

Attitudes about health

The MEPS asks four questions about health-related attitudes

- No Need for Insurance: Do not need health insurance
- Can Overcome Illness on Own: Can overcome illness without help from medically trained person
- Insurance Cost not Worth It: Health insurance is not worth the money it costs
- Risk Taker: More likely to take risks than the average person

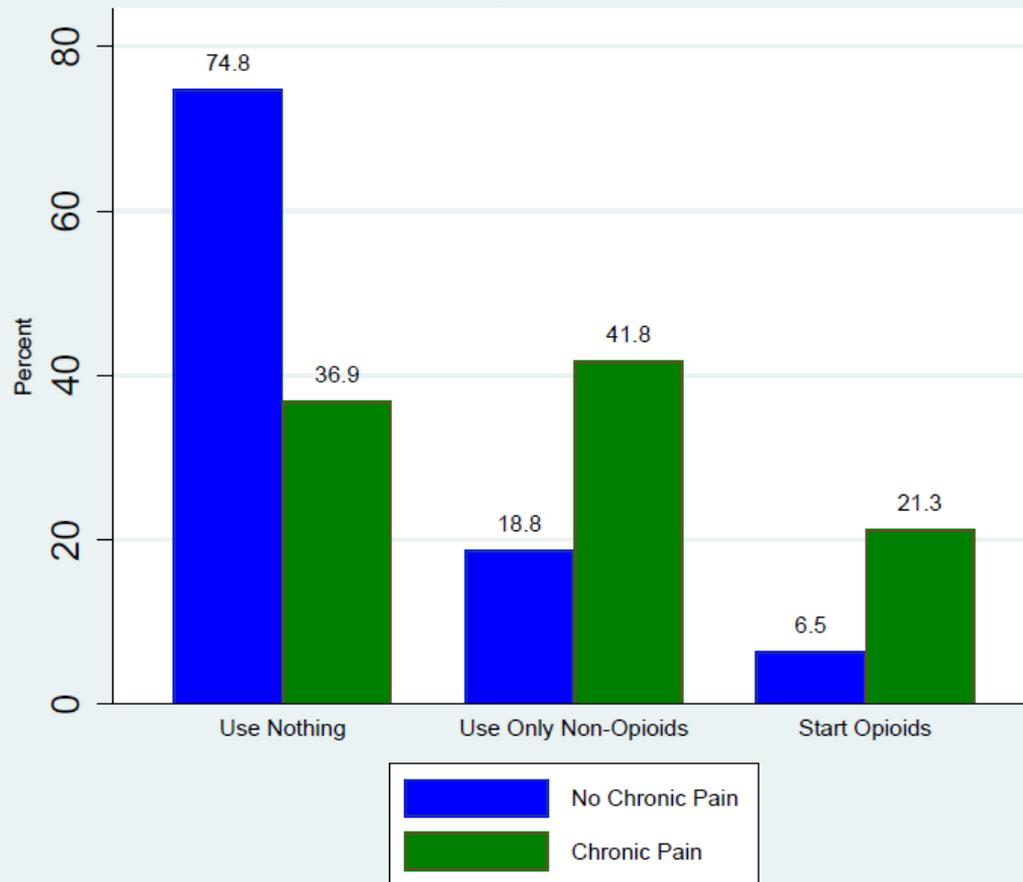
Patient characteristics included in regressions



Age, age squared, sex, race/ethnicity,
marital status
employment, poverty, education
pain limitations,
insurance status (private, public, uninsured, dual/SSI nonelderly,
elderly)
priority chronic conditions (angina, arthritis, asthma, chronic
bronchitis, coronary heart disease, cholesterol, diabetes,
emphysema, high blood pressure, joint pain, mild heart attack,
other heart attack, stroke)
Self-reported mental health status, hopelessness,
surgery, obesity, pregnancy, smoking
rural, year dummies

Adults with no opioid use in prior year

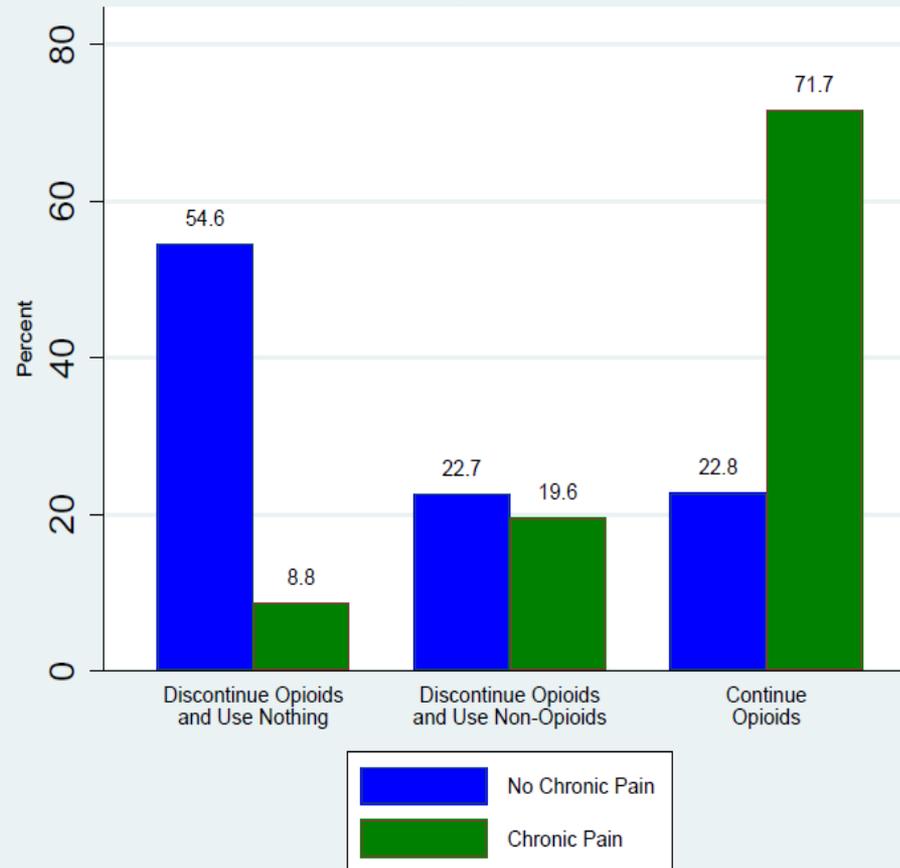
Figure 1: National Estimates of the Percent Starting Opioids vs. Using Only Non-Opioids Among Adults With and Without Chronic Pain, 2014-2017
Current-Year Use Among Adults With No Prior-Year Opioid Use



Notes: Nationally representative estimates of current-year opioid use or non-opioid analgesics-only use (via prescription fills) among adults with no opioids in the prior year, excluding cancer patients.
Sources: Authors' calculations using MEPS.

Adults with opioid use in prior year

Figure 2: National Estimates of the Percent Discontinuing Opioids and Using Non-Opioid Analgesics Among Adults With and Without Chronic Pain, 2014-2017
Current-Year Use Among Adults With Prior-Year Opioid Use



Notes: Nationally representative estimates of current-year opioid use or non-opioid analgesics-only use (via prescription fills) among adults with opioids in the prior year, excluding cancer patients.
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Predictors common to adults with and without chronic pain treatment



- Predictors of higher opioid use:
smoking, surgery
- Predictors of lower opioid use:
Hispanic, high education
- For predictors common to both groups, the magnitude of the effect can vary substantially for those with chronic and acute pain
 - ▶ Examples include: surgery, smoking

- Predictors of higher opioid use:
Public insurance (18-64), pregnancy, pain limitations, feeling hopeless, dental events, bad mental health, obesity, arthritis, joint pain, high blood pressure, stroke
- Predictors of lower opioid use:
Uninsured (18-64), HMO, male, Black, Hispanic

- Predictors of lower opioid use:

I can overcome illness

No need for insurance

Those who strongly agree with these statements are less likely to use opioids

- Predictors of higher opioid use:
male, arthritis, joint pain
- Predictors of lower opioid use:
age

Policy implications

- The health care industry is developing predictive analytics in population health programs to better target outreach to the people more likely to use opioids.
- Our research is aimed at refining the methods and science to more accurately identify those most likely to use opioids in the national population.
- Outreach is extremely costly, especially since the opioid epidemic is spread across the entire population. Our findings may help health care providers and insurers improve their outreach, reach those at risk faster, and lower costs.
- We can track trend sin opioid use separately for those with and without chronic pain.

Related research

- The effect of State reforms and the CDC guidelines on opioid use
- Opioid use follow-back survey
 - ▶ Among MEPS participants who report using opioids
 - ▶ Contact them in 2022
 - ▶ Collect data on whether they are still using opioids, if and which alternative treatments they have tried, what has worked, whether they are satisfied with their current pain treatment