

Indication-Specific Opioid Prescribing for US Patients with Medicaid or Private Insurance, 2017 ("Opioid Prescribing Estimates Project")

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Background

- **Opioid prescribing in the United States has peaked and begun to decline**
 - Decreases noted in¹:
 - Annual prescribing rate
 - Rate of prescriptions written for <30 days
 - Average daily MME per prescription
- **However, in 2015², prescribing rates still remained three times as high as in 1999**
 - Almost four times as high as the amount distributed in Europe³

¹Guy GP Jr., Zhang K, Bohm MK, et al. Vital Signs: Changes in Opioid Prescribing in the United States, 2006–2015. MMWR Morb Mortal Wkly Rep 2017;66:697–704.

²Data from 2015 represented the most recent data on prescribing practices currently available at the initiation of this project.

³International Narcotics Board; World Health Organization population data. By: Pain & Policy Studies Group, University of Wisconsin/WHO Collaborating Center, 2017

Background

- **Multiple entities have developed clinical guidelines for opioid prescribing for both acute and chronic pain**
 - Government agencies, e.g. CDC Guideline for Prescribing Opioids for Chronic Pain, 2016
 - Medical professional societies, e.g. American Pain Society Guidelines on the Management of Postoperative Pain, 2017
 - Health departments, e.g. NYC ED Discharge Opioid Prescribing Guidelines, 2013
 - Other regulatory agencies, e.g. Medical Board of California Guidelines for Prescribing Controlled Substances for Pain, 2014

Background

- **Existing research points to a need to reduce unnecessary opioid prescribing**
 - Variation in opioid prescribing practices across clinical indications, even across multiple patients in the same institution
 - Mismatched with evidence for treatment effectiveness, e.g., chronic pain
 - Multiple reports of unused excess opioids after surgery
 - Association between initial days' supply and likelihood of continued opioid use
- **Balanced against reports of undertreatment or delay in pain treatment in instances where opioid benefits may outweigh risks**

Background

- **Study aims:**
 - Estimate rates and amounts of opioids prescribed for specific painful indications in outpatient settings in the U.S.
 - Compare qualitatively these prescribing rates against evidence-based published clinical practice guidelines

NCIPC BSC Engagement

- **June 2018**

- NCIPC requested formation of a multidisciplinary Opioid Prescribing Estimates (OPE) Workgroup to help inform this project

- **September—October 2018**

- OPE Workgroup met via teleconference four times to discuss project approach

- **December 2018**

- OPE Workgroup Chair presented Workgroup's findings to the NCIPC BSC, who provided recommendations to NCIPC on the direction of the project based on review of the OPE Workgroup report

Methods

- **Retrospective cross-sectional analysis of administrative claims data from¹:**
 - OptumLabs Data Warehouse
 - Nationally representative sample of patients with commercial insurance and Medicare Advantage (“private insurance”)
 - Study period: January 1, 2017, to December 31, 2017
 - MarketScan Multi-State Medicaid Database
 - All Medicaid beneficiaries in 9 anonymized states distributed across census regions
 - Study period: October 1, 2016, to September 30, 2017

¹Mikosz CA, Zhang K, Haegerich T, Xu L, Losby JL, Greenspan A, Baldwin G, Dowell D. Indication-Specific Opioid Prescribing for US Patients with Medicaid or Private Insurance, 2017. JAMA Network Open. 2020;3(5):e204514.

Methods

- **Inclusion of >40 indications associated with pain:**
 - Nonsurgical acute pain, e.g., renal colic, low back pain
 - Chronic pain, e.g., back pain, fibromyalgia
 - Postsurgical pain, e.g., laparoscopic and open procedures
 - Pain related to sickle cell disease and active cancer was analyzed separately
- **Development of linkage algorithms** to link patients' opioid rx to medical encounters using patient ID, visit and rx dispensing dates, clinician ID, and index diagnosis
- **Calculation of:**
 - Prescribing rate by indication and by age
 - Days' supply
 - Daily dosage in morphine milligram equivalents (MME)

Nonsurgical Acute Pain Conditions

- Abdominal pain
- Acute low back pain
- Acute migraine
- Dental pain
- Herpes zoster
- Musculoskeletal sprains and strains
- Renal colic
- Rib fractures

Chronic Pain Conditions

- Chronic radicular or nonradicular back pain
- Chronic neck pain
- Fibromyalgia
- Inflammatory joint disorders
- Irritable bowel syndrome
- Non-migraine headaches
- Osteoarthritis or joint cartilage conditions
- Periarticular or soft tissue disorders

Postsurgical Pain Conditions

Total hip arthroplasty

Open cholecystectomy

Cesarean section

Spinal fusion

Lumbar decompression

Simple mastectomy

Laparoscopic appendectomy

Open inguinal hernia repair

Coronary artery bypass

Tonsillectomy

Laparoscopic colectomy

Parathyroid/thyroid surgery

Total knee arthroplasty

Laparoscopic cholecystectomy

Vaginal delivery

Combined spinal fusion/lumbar decompression

Excisional biopsy

Lumpectomy/partial mastectomy

Laparoscopic abdominal solid organ resection

Laparoscopic inguinal hernia repair

Arthroscopic rotator cuff repair

Arthroscopic knee surgery

Open colectomy

Sinus surgery

Key Findings: *Overall*

- **Private insurance**
 - 18,016,259 total patients
 - 50.3% female, with mean age 42.7 years
 - 35.4% had one or more visits with ≥ 1 pain-related diagnosis/surgical procedures
 - 35.6% of this group with at least 1 opioid prescription identified

Key Findings: *Overall*

- **Medicaid**

- 11,453,392 total patients
- 56.1% female, with mean age 20.4 years
- 27.7% had one or more visits with ≥ 1 pain-related diagnosis/surgical procedures
 - 35.5% of this group with at least 1 opioid prescription identified

Key Findings: *Nonsurgical acute pain*

- **Total visits:** 2,013,810 (private insurance) and 1,672,500 (Medicaid)
 - **Opioid prescribing rates:**
 - Private insurance: 4.6% (acute migraines) to 44.8% (rib fractures)
 - Medicaid: 6.6% (acute migraines) to 56.3% (rib fractures)
 - **Mean days' supply:**
 - Private insurance: 4.1 (dental pain) to 12.6 (acute migraine)
 - Medicaid: 4.0 (dental pain) to 9.9 (acute migraine and acute low back pain)
 - **Mean daily dosage:** ~30 MME per day

Key Findings: *Chronic pain (overall)*

- **Total patients:** 1,474,731 (private insurance) and 513,131 (Medicaid)
- **Back pain** was most common chronic pain indication
 - 49.3% privately insured and 52.2% Medicaid enrollees
- >30% (privately insured) and almost 50% (Medicaid) had ≥ 1 opioid rx linked to their chronic pain condition

Key Findings: *Chronic pain on LTOT**

- **12.6%** (private insurance) and **20.0%** (Medicaid) of patients with chronic pain received LTOT
- Most common chronic pain condition for which LTOT was continued: **chronic nonradicular back pain**
 - **87.7%** (private insurance) and **90.4%** (Medicaid)
- **Mean daily dosage**
 - Exceeded 50 MME/day for nearly all privately insured pts
 - <50 MME/day for Medicaid enrollees

*LTOT = long-term opioid therapy

Key Findings: *Chronic pain not on LTOT**

- **87.4%** (private insurance) and **80.0%** (Medicaid) of patients with chronic pain were not receiving LTOT
- **Opioid prescribing rates:**
 - Private insurance: 6.5% (IBS**) to 28.3% (chronic radicular back pain)
 - Medicaid: 13.4% (IBS) to 44.0% (chronic radicular back pain)
- **Mean daily dosage:** ~30 MME per day

*LTOT = long-term opioid therapy; **IBS = irritable bowel syndrome

Key Findings: *Postsurgical pain*

- **Total procedures (postsurgical prescribing rates):**
 - Private insurance: 385,254 (66%)
 - Medicaid: 285,996 (55%)
- **Opioid prescribing rates among patients not on LTOT*:**
 - Private insurance: 23.6% (vaginal delivery) to 93.0% (arthroscopic rotator cuff repair)
 - Medicaid: 30.7% (vaginal delivery) to 94.4% (arthroscopic rotator cuff repair)

*LTOT = long-term opioid therapy

Key Findings: *Postsurgical pain*

- **Mean days' supply of opioids among pts not on LTOT*:**
 - Private insurance: 4.1 (vaginal delivery) to 9.5 (spinal fusion/decompression)
 - Medicaid: 4.2 (vaginal delivery) to 9.1 (spinal fusion)
- **Mean daily dosage (MME/day) among pts not on LTOT:**
 - Private insurance: 37.4 (lumpectomy/partial mastectomy) to 63.5 (spinal fusion/decompression)
 - Medicaid: 27.3 (tonsillectomy) to 62.9 (spinal fusion/decompression)
- **Patients already on LTOT:**
 - Nearly always received opioids at discharge
 - Mean days' supply and daily dosage nearly always higher

*LTOT = long-term opioid therapy

Key Findings: *Sickle cell disease (SCD)*

- **Almost half of all patients with SCD received opioids**
 - 42.6% (private insurance) and 44.9% (Medicaid)
- **Differences in prescribing indicators by age**
 - Children aged ≤ 18 years
 - 29.0% (Medicaid) versus 12.2% (privately insured)
 - Adults aged 19-64 years
 - 117.3 days supplied (Medicaid) versus 59.2 (privately insured)
- **Limitations**
 - Unable to differentiate between acute crisis and chronic SCD pain
 - Small # of privately insured patients with SCD may not represent the general SCD population

Key Findings: *Cancer*

- **Differences in opioid prescribing by insurance types**
 - Overall prescribing rate:
 - 31.7% (private insurance) versus 56.6% (Medicaid)
 - Days' supply:
 - 34.2 days (private insurance) versus 115.2 (Medicaid)
 - Daily dosage in MME/day:
 - 46.2 (private insurance) versus 61.1 (Medicaid)

Key Findings: *Variations by age*

- **Compared to adults, children (≤ 18 years) received:**
 - Shorter prescription durations for most indications
 - Lower dosages for SCD, postsurgical pain, and cancer
 - Similar dosages for nonsurgical acute pain
 - Fewer prescriptions for chronic pain (Medicaid)
- **Compared to nonelderly adults (19-64 years), elderly adults (aged 65 years+) received:**
 - Fewer prescriptions for dental pain, renal colic, most surgeries, and cancer
 - Lower mean dosages for LTOT*, after surgery, or for SCD or cancer

*LTOT = long-term opioid therapy

Comparisons to published guidance

- Nonopioid treatment is recommended for the following conditions, but opioid prescriptions were found to be issued to patients in this study:
 - **Fibromyalgia^{2,3}**
 - 23.5% (privately insured) and 31.1% (Medicaid) of patients not already receiving LTOT* rx'd at least one full month's supply of opioids
 - **Chronic^{2,4,5} and acute back pain^{2,4,5}**
 - Chronic: 28% (privately insured) and 44.0% (Medicaid) not already on LTOT* were started on opioids
 - Acute: 11.8 (privately insured) and 9.9 (Medicaid) days' supply rx'd
 - **Musculoskeletal strains/sprains⁶**
 - 12.9% (privately insured) and 14.8% (Medicaid) rx'd opioids
 - **Dental pain^{7,8}**
 - 27.2% (privately insured) and 11.8% (Medicaid) rx'd opioids

*LTOT = long-term opioid therapy

Comparisons to published guidance

- For many patients with chronic pain conditions receiving long-term opioid therapy, daily dosages were >50 MME/day, a threshold above which adverse events is increased⁹
- Postoperative opioid prescribing exceeds many published recommendations
- One-third of privately insured and about half of Medicaid enrollees with cancer received opioids, despite opioids being recommended for pain associated with cancer¹⁰
- Fewer than half of all patients with SCD across the entire study were prescribed opioids, despite reports of suboptimal management of SCD-related pain

Conclusions

- Opioid prescribing patterns for some indications were incongruent with existing evidence-based guidelines
 - Low clinician awareness of guidelines?
 - Reluctance to adhere to guidance?
- Implementation guidance that emphasizes evidence-based recommendations has potential to better align opioid prescribing with evidence on benefits, improving pain management and patient safety

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.



Supplemental slides



Opioid prescription linkage algorithm

A. Linkage of opioid prescriptions for CANCER

Identify patients with cancer between 01/01/2017 and 12/31/2017 using the following criteria:
1) At least two visits during the study period with an ICD-10-CM code for a cancer diagnosis under study;
2) Provider specialty listed as “oncologist” or “oncology”

Apply 10-month continuous enrollment criteria

EXCLUDE patients with < 10 months of continuous enrollment

1) For each patient with cancer, identify the first claim of a cancer diagnosis during the study period, i.e. “index diagnosis.”
2) Apply the inclusion criterion that the diagnosis must last at least 90 days after the index diagnosis

Link opioid prescriptions to visits containing a cancer diagnosis, starting with the index visit and for 3 months after that visit, as follows:
1) Prescription filled within 14 days of the visit;
2) No visit with any other pain indication in the study between the linked visit and the date on which the prescription is filled

1) Prescribing measures for cancer (e.g., number of prescriptions, days’ supply, and dosage) are calculated and reported using linked prescriptions at the patient level
2) Linked prescriptions are flagged as prescriptions for cancer

EXCLUDE these flagged prescriptions from the remainder of the linkage algorithm (i.e., postsurgical pain, nonsurgical acute pain, chronic pain, and sickle cell disease [SCD])

B. Linkage of opioid prescriptions for POSTOPERATIVE INDICATIONS

Identify all surgical procedures between 01/01/2017 and 12/31/2017

EXCLUDE patients with cancer and patients receiving palliative care

Apply 10-month continuous enrollment criteria

EXCLUDE patients with < 10 months of continuous enrollment

For each patient with an associated surgical procedure, identify nonexcluded opioid prescriptions within 3 months prior to the date of the procedure

NO OPIOIDS in 3 months prior to date of procedure ("not on LTOT")

ALREADY ON LTOT* in 3 months prior to date of procedure

Link nonexcluded opioid prescription to the procedure, as follows:

- 1) Prescription filled within 5 days of the procedure, including the procedure day;
- 2) No other procedure between the linked procedure and the date of prescription filling;
- 3) Prescription filled within 30 days prior to the procedure AND prescribed by surgeon, with no other procedure prior to this prescription

Link nonexcluded opioid prescription to the procedure, as follows:

- 1) Prescription filled within 5 days of the procedure, including the procedure day;
- 2) No other procedure between the linked procedure and the date of prescription filling;
- 3) Prescription filled within 30 days prior to the procedure AND prescribed by surgeon, with no other procedure prior to this prescription

- 1) Prescribing measures (e.g., dosage and days' supply) are calculated and reported for patients not on LTOT using linked prescriptions;
- 2) Linked prescriptions are flagged as prescriptions for postsurgical pain

- 1) Prescribing measures (e.g., dosage and days' supply) are calculated and reported for patients on LTOT using linked prescriptions;
- 2) Linked prescriptions are flagged as prescriptions for postsurgical pain

*LTOT = long-term opioid treatment.

EXCLUDE these flagged prescriptions from the remainder of the linkage algorithm (i.e., nonsurgical acute pain, chronic pain, and SCD pain)

C. Linkage of opioid prescriptions for NONSURGICAL ACUTE PAIN INDICATIONS

Identify patients with any of the nonsurgical acute pain indications under study between 01/01/2017 and 12/31/2017

EXCLUDE patients with cancer and patients receiving palliative care

Apply 10-month continuous enrollment criteria

EXCLUDE patients with < 10 months of continuous enrollment

1) For each patient, identify the first claim of a specific nonsurgical acute pain ICD-10-CM code, i.e. "index diagnosis";
2) Apply the criteria for defining nonsurgical acute pain, i.e. pain lasts less than 90 days after the index diagnosis AND no same diagnosis in 6 months prior to the index diagnosis

For each patient, identify opioid prescriptions within 3 months prior to the date of index diagnosis ("not on LTOT")

EXCLUDE patients who are on LTOT

Link nonexcluded opioid prescriptions to visits, using the following criteria:

- 1) Prescription filled within 7 days of a visit, including the visit day;
- 2) No visit with any other pain indication in the study between the linked visit and the date on which the prescription is filled

- 1) Prescribing measures (e.g., dosage and days' supply) are calculated and reported using linked prescriptions;
- 2) Linked prescriptions are flagged as prescriptions for nonsurgical acute pain

EXCLUDE these flagged prescriptions from the remainder of the linkage algorithm (i.e., chronic pain and SCD pain)

D1. Linkage of opioid prescriptions for CHRONIC PAIN INDICATIONS

Identify patients with any of the chronic pain indications under study between 01/01/2017 and 12/31/2017

Apply 10-month continuous enrollment criteria

EXCLUDE patients with cancer and patients receiving palliative care

EXCLUDE patients with <10 months of continuous enrollment

- 1) For each patient, identify the first claim of a specific chronic pain ICD-10-CM code during the study period, i.e. "index diagnosis";
- 2) Apply the criteria for defining chronic pain, i.e. pain lasts at least 90 days after the index diagnosis

For each patient, identify nonexcluded opioid prescriptions within 3 months prior to the date of index diagnosis

Patients who are not on LTOT in the 3 months prior to the index diagnosis

Patients ALREADY ON LTOT in the 3 months prior to the index diagnosis

For each patient, link nonexcluded opioid prescriptions to visits containing a specific ICD-10-CM code for a chronic pain diagnosis, starting with the index visit and for 3 months after that visit, using the following algorithm:

- 1) Prescription filled within 14 days of the visit;
- 2) No visit with any other pain indication in the study between the linked visit and the date on which the prescription is filled

For each patient, link nonexcluded opioid prescriptions to visits containing a specific ICD-10-CM code for a chronic pain diagnosis, starting with the index visit and for 3 months after that visit, using the following algorithm:

- 1) Prescription filled within 14 days of the visit;
- 2) No visit with any other pain indication in the study between the linked visit and the date on which the prescription is filled

Prescribing measures (e.g., # prescriptions, dosage, days' supply) are calculated and reported for patients not on LTOT using linked prescriptions.

Prescribing measures (e.g., # prescriptions, dosage, and days' supply) are calculated and reported for patients already on LTOT using linked prescriptions.

D2. Linkage of opioid prescriptions for SCD

Identify patients with ICD-10-CM codes for SCD between 01/01/2017 and 12/31/2017

Apply 10-month continuous enrollment criteria

- 1) For each patient, identify the first claim of SCD diagnosis during the study period, i.e. "index diagnosis."
- 2) Apply the inclusion criteria for defining SCD: i) at least 3 distinct visits with an SCD claim during the 2017 continuous enrollment period; ii) SCD diagnosis lasts at least 90 days after the index diagnosis, i.e. visits extend across a period of at least 90 days.

For each patient, link nonexcluded opioid prescriptions to visits containing SCD diagnosis, starting with the index visit and for 3 months after that visit, as follows:

- 1) Prescription filled within 14 days of the visit;
- 2) No visit with any other pain indication in the study between the linked visit and the date on which the prescription is filled

Prescribing measures for SCD (e.g., number of prescriptions, days' supply, and dosage) are calculated and reported using linked prescriptions at the patient level