

# Tracking Medicaid-Covered Prescriptions to Treat Opioid Use Disorder

**Methodology Appendix (last updated July 23, 2019)**

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This document describes the methods and limitations of the data and analysis published under “Tracking Medicaid-Covered Prescriptions to Treat Opioid Use Disorder.”

## Data

We obtained state records from Medicaid State Drug Utilization Data (Medicaid SDUD) of drug prescriptions filled and dispensed in outpatient settings, such as pharmacies, processed as Medicaid outpatient drug claims from the first quarter of 2010 through the second quarter of 2018.<sup>i</sup> We treat the most recent quarter of data as preliminary and suppress it from analysis, unless otherwise stated. Records include those enrolled in both Medicaid fee-for-service (FFS) and managed care programs.

To receive federal matching funds, states must report outpatient drugs reimbursed under Medicaid in the Medicaid Drug Rebate Program (Levinson 2012). However, certain data limitations and sample exclusions apply. Until the enactment of the Affordable Care Act on March 23, 2010, rebate and reporting requirements excluded prescriptions for Medicaid enrollees of managed care organizations, or MCOs (Levinson 2012). The rebate estimates may be underestimated because they do not include rebates to Medicaid for price increases greater than inflation (The Pew Charitable Trusts 2018), supplemental drug rebate pools or additional rebates for innovator drugs.<sup>ii</sup> We exclude data prior to 2010 because some states that covered prescriptions through MCOs (a carve-in managed care approach) reported this data to Medicaid SDUD inconsistently before then (Levinson 2012; Wen, Hockenberry, and Pollack 2018). Our analysis showed that most states appear to have reported Medicaid SDUD data consistently in 2010 (including several states that did not cover prescriptions

through MCOs); a separate study showed that all 21 states that covered prescriptions through MCOs completed managed care data reporting by the end of the second quarter of 2011 (for revised Medicaid SDUD data), but the District of Columbia inconsistently reported managed care data through the third quarter of 2011 (Wen, Hockenberry, and Pollack 2018). We did not suppress data for any state quarters, even in cases where data appeared to be inconsistently reported, because these data were used for federal reimbursement, despite apparent inconsistencies.

The data for FFS programs include records for filled outpatient prescriptions reimbursed in full or part by state Medicaid agencies, and the data for managed care programs include dispensed Medicaid outpatient prescriptions. Because some MCOs use capitated payment arrangements, the Medicaid SDUD managed care data may show outpatient prescriptions that have a nonzero value for the number of prescriptions dispensed but a zero value for the Medicaid amount reimbursed. The data include quarterly records of filled prescription drugs dispensed in outpatient settings—and, for FFS programs, reimbursed by Medicaid—but exclude drugs dispensed in emergency departments or inpatient settings or paid with cash.<sup>iii</sup> Medicaid-covered outpatient drugs include those dispensed to patients at pharmacies and administered by practitioners to patients (Murrin 2016). The Medicaid SDUD are collected to exclude claims representing drugs purchased under the 340B Drug Pricing Program (340B) by certain safety net providers, generally federally funded clinics and hospitals serving underserved or vulnerable populations, known as 340B-covered entities. However, these claims are difficult for states to identify and exclude (MACPAC 2018; Murrin 2016).

States can make revisions to the Medicaid SDUD data back to March 23, 2010 (Levinson 2012). Documentation of the Medicaid SDUD data states that, with each release of a new quarter of data, data from the previous five years may also be updated, and in the February data release each year, data from any preceding year may be updated.<sup>iv</sup> Revisions include adjustments to remove claims purchased under the 340B program, which are administratively difficult to identify (MACPAC 2018)

## **Imputation of Suppressed National Drug Code Data for Low Prescription Counts**

Medicaid SDUD suppresses data for National Drug Code (NDC) state-quarter-utilization types, where utilization types are FFS or MCO data, that have prescription counts under 11. We imputed the missing prescription count data based on an analysis of one year (2014) of claims-level data from Medicaid Statistical Information Statistics (MSIS). To do this, we tabulated quarterly fiscal year (FY) 2014 MSIS data for the 32 states for which we had MSIS prescription data in 2014, examining the number of buprenorphine prescriptions by state and quarter for each NDC with at least one suppressed quarter in the SDUD data for FY 2014. The MSIS prescription data files do not distinguish between FFS and MCO

at the claims level and include claims for both. For each NDC with at least one suppressed state-quarter in the SDUD state data for FY 2014, we calculated the quarterly median MSIS number of buprenorphine prescriptions across states when the state SDUD data were missing or zero for all FY 2014 quarters; the MSIS quarterly mean for state-quarter NDCs with this high level of suppression was 6. We also computed the quarterly median MSIS number of buprenorphine prescriptions across states when the SDUD mean had at least one nonmissing or nonzero value for an FY 2014 quarter; the MSIS quarterly mean for state-quarter NDCs with this lower level of suppression was 26.

When the national total number of prescriptions for an NDC from the Medicaid SDUD was not suppressed for a quarter for an FFS or MCO group, we used that national total number of prescriptions for the NDC to identify the number of prescriptions suppressed across states for that NDC within that quarter and within that FFS or MCO group. For a given NDC within a given quarter, we subtracted the total number of prescriptions in nonsuppressed states from the national total number of prescriptions, which aggregates all prescriptions across states, including those in suppressed states. This value, which we called the “total suppressed prescriptions,” is the total suppressed prescriptions across all suppressed states for the quarter and FFS/MCO group.

We use the national total number of prescriptions and the total suppressed prescriptions to allocate the total suppressed prescriptions across the suppressed NDC states within each quarter and FFS/MCO group. We used the following rules, based on our estimates from MSIS data, to impute suppressed prescription counts by NDC, year, quarter, and FFS/MCO group:

1. If the national total and two to ten states were suppressed, we imputed 1 if the quarter before or after was zero or suppressed, and we imputed 2 if the quarters before and after were not zero or suppressed. If the national total and over 10 states were suppressed, we imputed 1 to all states.
2. If the national total and only one state were suppressed, we imputed 1 if the quarter before or after was zero or suppressed, and we imputed 4 if the quarters before and after were not zero or suppressed.
3. If the national total was not suppressed, we distributed the total suppressed prescriptions value in a 1:4 ratio. We used a weight of 1 for an SDUD quarter that was zero or suppressed in the quarter before or after the suppression and a weight of 4 for an SDUD quarter that had a nonzero and nonsuppressed value before and after the suppressed value.

We did not impute spending, which was suppressed for NDC state-quarter-utilization types with prescription counts under 11, because the spending suppression did not relate to a minimum spending

value, and thus any potential spending imputation could not be strengthened by imposing a true maximum upper bound as was done in the prescription imputation (which had a maximum value of 10 prescriptions).

## Identification of Prescriptions Related to Opioid Use Disorder

We constructed three main types of outpatient prescriptions received by Medicaid enrollees: (1) buprenorphine or buprenorphine/naloxone FDA approved for opioid use disorder, (2) naltrexone FDA approved for indications including opioid use disorder, and (3) naloxone FDA approved to reverse opioid overdose.

Prescriptions were identified by linking the NDC numbers in Medicaid SDUD to drug information in the National Drug Code Directory, managed by the US Food and Drug Administration.<sup>v</sup> We also included NDCs identified in relevant publications that listed NDCs for the three drugs of interest (Hadland et al. 2018).<sup>vi</sup> These publications helped us identify NDC numbers from drugs that had expired, as these NDC numbers are not included in the National Drug Code Directory. We identified the primary use for each drug using the National Institutes of Health's DailyMed database, which contains drug label information by NDC number.<sup>vii</sup> When the DailyMed database did not contain information on NDC numbers, generally because the drug label had expired, we imputed the drug's most likely primary use based on information from archived labels from the DailyMed database and from relevant drug lists containing the drug's brand name and/or strength and formula.<sup>viii</sup>

For the buprenorphine estimates, we compiled a list of all prescription drugs used to treat opioid use disorder (OUD) containing buprenorphine. We used the National Drug Code Directory and the publications mentioned previously to identify all substances containing buprenorphine hydrochloride (or buprenorphine hydrochloride and naloxone hydrochloride) in their nonproprietary or substance name. We included the following drugs:

- Suboxone sublingual tablets and films (strength buprenorphine/naloxone: 2 mg/0.5 mg, 4 mg/1 mg, 8 mg/2 mg, 12 mg/3 mg);
- Subutex sublingual tablets (strength: 2mg, 8 mg);
- Bunavail buccal films (strength buprenorphine/naloxone: 2.1 mg/0.3 mg, 4.2 mg/0.7 mg, 6.3 mg/1 mg);
- the Probuphine implant (strength: 80 mg);

- Zubsolv sublingual tablets (strength buprenorphine/naloxone: 0.7 mg/0.18 mg, 1.4 mg/0.36 mg, 2.9 mg/0.71, 5.7 mg/1.4 mg, 8.6 mg/2.1 mg, 11.4 mg/2.9 mg);
- Sublocade injection (strength: 100 mg/mL, 300 mg/mL); and
- the generic equivalents.

We excluded Buprenex injectable, Butrans transdermal patches, Belbuca buccal films, and the generic equivalents because they are typically prescribed for pain management.

For the naltrexone estimates, we compiled a list of all prescription drugs containing naltrexone with a primary use to treat alcohol dependence and to block the effects of exogenously administered opioids. Because naltrexone is also FDA approved for the treatment of alcohol use disorder, some prescriptions may relate to treating alcohol rather than opioid use disorder; the data do not distinguish between the two. We included Vivitrol (strength: 380 mg/4mL), Revia (strength: 50 mg), Depade (strength: 50 mg), and all generic forms of naltrexone hydrochloride (strength: 50mg/1). We excluded Contrave, which is typically prescribed for weight management; Embeda, which is typically prescribed for pain; and Relistor, which is typically prescribed for constipation.

For naloxone estimates, we compiled a list of all prescription drugs containing naloxone with a primary indication of use to reverse opioid overdose. We included the following drugs: Evzio autoinjector formulations (strength: 2 mg/0.4 mL, 0.4 mg/mL); Narcan nasal sprays (strength: 2 mg/0.1 mL, 4 mg/0.1 mL, 0.02 mg/mL, 0.4 mg/mL, 1 mg/mL); and generic naloxone injections (strength: 0.4 mg/mL, 1 mg/mL). We excluded drugs containing both naloxone and buprenorphine, which are primarily used to treat OUD, and drugs containing naloxone and pentazocine, which are used primarily to treat pain.

We excluded all methadone drugs because methadone treatment for OUD is dispensed at special clinics called opioid treatment programs and is not consistently reported in the Medicaid SDUD. To test this, we used the National Drug Code Directory to compile a list of methadone NDCs. We then analyzed literature as well as the MSIS claims to learn more about the various methadone formulations (diskettes, liquid, tablets, etc.) and dosages to differentiate methadone used exclusively for the treatment of OUD from methadone used for pain management, though this was not always possible. Using the final list, we looked at the NDCs reported in the SDUD and could not find reliably reported prescription counts.

# Measures

We compute three main measures of outpatient prescriptions received: (1) number of Medicaid prescriptions of each type, (2) Medicaid spending on each type of prescription, and (3) Medicaid spending on prescriptions of each type per year per 1,000 Medicaid enrollees age 12 and older. We report nominal spending.

## Adjustment for Estimated Rebates in Medicaid Reimbursement

For spending estimates, we apply an estimate of the amount rebated by drug manufacturers through the Medicaid Drug Rebate Program.<sup>ix</sup> We estimate that this rebate reduces net Medicaid spending by 13.0 percent for generic drugs and 23.1 percent for brand-name drugs. The adjustment for this rebate is a methodological improvement that we did not apply in previous spending estimates published in and before 2018 based on Medicaid SDUD.

## Per Medicaid Enrollee

We updated the methodology used to estimate Medicaid enrollee counts in July 2019. We compute annual prescription estimates per 1,000 Medicaid enrollees ages 12 and older with full benefits in each state.<sup>x</sup> To estimate state Medicaid enrollment for this population from 2010 to 2018, we used person-level analytical data files of administrative records derived from the MSIS and the Medicaid Analytic eXtract to directly derive enrollment counts. When we lacked data to directly compute enrollment counts, we adjusted counts based on relevant MSIS/Medicaid Analytic eXtract data and/or reports states submitted to the Centers for Medicare & Medicaid Services with counts of broader Medicaid populations. For a more detailed description of how the Medicaid enrollee counts were computed, see additional documentation (Lynch, Winiski, and Clemans-Cope 2019).

## Medicaid Expansion Status

We categorize states and the District of Columbia into four groups by the timing and status of state action on Medicaid expansion, either through the Affordable Care Act or by waiver (Sommers et al. 2013):<sup>xi</sup>

1. “Early 2014 expansion states” are the 25 states and DC that expanded Medicaid through the ACA or waiver on or before April 2014 (some states had expanded Medicaid under the ACA by early 2014, with dates indicated, and/or had expanded eligibility for adults before the ACA): Minnesota (3/1/2010), Connecticut (4/1/2010), California (7/1/2010), DC (7/1/2010),

Washington (1/3/2011), New Jersey (4/14/2011), Colorado (4/1/2012), Arizona (1/1/2014), Arkansas (1/1/2014), Delaware (1/1/2014), Hawaii (1/1/2014), Illinois (1/1/2014), Iowa (1/1/2014), Kentucky (1/1/2014), Maryland (1/1/2014), Massachusetts (1/1/2014), Nevada (1/1/2014), New Mexico (1/1/2014), New York (1/1/2014), North Dakota (1/1/2014), Ohio (1/1/2014), Oregon (1/1/2014), Rhode Island (1/1/2014), Vermont (1/1/2014), West Virginia (1/1/2014), and Michigan (4/1/2014).

2. “Late 2014–2016 expansion states” are the 6 states that expanded Medicaid between April 2014 and before August 2016: New Hampshire (8/15/2014), Pennsylvania (1/1/2015), Indiana (2/1/2015), Alaska (9/1/2015), Montana (1/1/2016), and Louisiana (7/1/2016).
3. “2019 expansion states” are the 2 states that expanded Medicaid after December 2018: Maine (1/10/2019) and Virginia (1/1/2019).
4. “Nonexpansion states” are the 17 states that had not enacted a Medicaid expansion by January 1, 2019: Alabama, Florida, Georgia, Idaho, Kansas, Mississippi, Missouri, Nebraska, North Carolina, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Utah, Wisconsin, and Wyoming.<sup>xii</sup>

## Limitations

This analysis has several limitations. First, as indicated previously, this analysis underestimates the total spending and quantity of medication treatment for OUD in Medicaid, because the estimates do not include methadone treatment, a long-standing effective treatment for OUD. As discussed, methadone treatment for pain is included in the Medicaid SDUD, but methadone treatment for OUD may not be fully reported in the Medicaid SDUD, and distinguishing methadone treatment for OUD from methadone treatment for pain in the Medicaid SDUD is difficult. Second, states may inconsistently report the SDUD, including whether claims representing drugs purchased under the 340B Drug Pricing Program are excluded from data reporting, as required by the Centers for Medicare & Medicaid Services. Third, as noted, some states that covered prescriptions through MCOs in 2010 and 2011 may have underreported data related to MCOs in 2010 and, to a smaller extent, in 2011. Fourth, the per capita estimates have limitations: they may not reflect treatment relative to need, because prevalence of the need for OUD treatment varies across states, as does access to methadone for OUD, which can substitute for other OUD treatment medications. Additionally, per capita estimates are derived from aggregate data, not individual-level data, and thus are a rough measure of prescriptions per individual. Fifth, increases in buprenorphine prescriptions in Medicaid may have been offset somewhat by decreases in buprenorphine prescriptions among other payers and the uninsured; however, the total volume of buprenorphine prescriptions across all payment types increased every year from 2012 to

2016 (IMS Institute for Healthcare Informatics 2016). Sixth, these data aggregate prescriptions across all strengths, dosage forms, and routes of administration and thus contain considerable heterogeneity. Seventh, Medicaid drug rebate information is not available by drug and manufacturer, and we do not have data on state supplemental rebates, thus we apply the aggregate rebate adjustments, which may over- or understate a state or NDC's rebate. Eighth, there are limitations in the estimation of Medicaid enrollment, as described in additional documentation (Lynch, Winiski, and Clemans-Cope 2019).

## Notes

- i "State Drug Utilization Data," the Centers for Medicare & Medicaid Services, accessed November 7, 2018, <https://www.medicaid.gov/medicaid/prescription-drugs/state-drug-utilization-data/index.html>.
- ii "State Prescription Drug Resources," Medicaid.gov, updated October 12, 2018, <https://www.medicaid.gov/medicaid/prescription-drugs/state-prescription-drug-resources/index.html>; "Medicaid Drug Rebate Program," Medicaid.gov, updated November 13, 2018, <https://www.medicaid.gov/medicaid/prescription-drugs/medicaid-drug-rebate-program/index.html>.
- iii "State Drug Utilization Data FAQs," Medicaid.gov, accessed February 5, 2019, <https://www.medicaid.gov/medicaid/prescription-drugs/state-drug-utilization-data/state-drug-utilization-data-faq/index.html>.
- iv "State Drug Utilization Data FAQs," Medicaid.gov, accessed February 5, 2019, <https://www.medicaid.gov/medicaid/prescription-drugs/state-drug-utilization-data/state-drug-utilization-data-faq/index.html>.
- v "National Drug Code Directory," US Food and Drug Administration, accessed February 5, 2019, <https://www.fda.gov/drugs/informationondrugs/ucm142438.htm>.
- vi "Chronic Conditions Data Warehouse Opioid-Related Indicators and Algorithms," Chronic Conditions Data Warehouse, accessed February 5, 2019, <https://www.ccwdata.org/documents/10280/19139421/other-condition-algorithms-and-reference-list-opioids.pdf>; and "HEDIS 2018 Final NDC Lists," National Committee for Quality Assurance, accessed February 5, 2019, <https://www.ncqa.org/hedis/measures/hedis-2018-ndc-license/hedis-2018-final-ndc-lists/>.
- vii "DailyMed," National Institutes of Health, US National Library of Medicine, accessed February 5, 2019, <https://dailymed.nlm.nih.gov/dailymed/index.cfm>.
- viii "Opioid Overdose Data Resources," Center for Disease Control and Prevention, accessed February 5, 2019, <https://www.cdc.gov/drugoverdose/resources/data.html>; "DataFacts by Medi-Span: Medi-Span Drug File Changes Reports," accessed February 5, 2019, [https://wds.medispans.com/DataFacts/DataFactsDocumentsDownload.aspx?file=%5C120%20United%20States%5C120%20Medi-Span%20Drug%20File%20Changes%20Reports%5C150%202003%5CDrug\\_File\\_Changes\\_10-22-2003.xls](https://wds.medispans.com/DataFacts/DataFactsDocumentsDownload.aspx?file=%5C120%20United%20States%5C120%20Medi-Span%20Drug%20File%20Changes%20Reports%5C150%202003%5CDrug_File_Changes_10-22-2003.xls); "Washington State Department of Social and Health Services: Drug Codes," Washington State Department of Social and Health Services, accessed February 5, 2019, <https://www.dshs.wa.gov/sites/default/files/SESA/rda/documents/cross-system/SUD-Tx-Pen-Value-Set-3.xls>; and "Wyoming Medicaid NDC Crosswalk," Wyoming Medicaid Program, accessed February 5, 2019, [https://wymedicaid.acs-inc.com/bulletins/E01%20NDC%20Crosswalk%203\\_10\\_16.pdf](https://wymedicaid.acs-inc.com/bulletins/E01%20NDC%20Crosswalk%203_10_16.pdf).
- ix "Medicaid Drug Rebate Program," Medicaid.gov, accessed February 5, 2019, <https://www.medicaid.gov/medicaid/prescription-drugs/medicaid-drug-rebate-program/index.html>; and Payment for Covered Outpatient Drugs § 1927, 42 U.S.C. § 1396r-8.

- <sup>x</sup> We focus on those ages 12 and older because national data indicate that OUD rates are not zero among adolescents ages 12 to 17, though rates are higher for older age groups (and presumably lower among younger age groups). Data from the National Survey on Drug Use and Health (NSDUH) show that in 2017, an estimated 0.4 percent of adolescents ages 12 to 17 had an OUD in the past year, representing about 103,000 adolescents.
- <sup>xi</sup> Several states (Arizona, Arkansas, Indiana, Iowa, Kentucky, Michigan, Montana, and New Hampshire) used Section 1115 waivers for Medicaid expansion. See “Status of State Action on the Medicaid Expansion Decision,” Henry J. Kaiser Family Foundation, accessed February 5, 2019, <https://www.kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>; Lynn A. Blewett, “Medicaid ‘Early Opt-In’ States,” State Health Access Data Assistance Center, February 5, 2013, <https://www.shadac.org/news/medicaid-%E2%80%9Cearly-opt-in%E2%80%9D-states>.
- <sup>xii</sup> Medicaid expansion has been approved via ballot initiative in Idaho, Nebraska, and Utah but has not yet been implemented. Wisconsin did not expand Medicaid under the Affordable Care Act but has Medicaid eligibility for adults up to 100 percent of the federal poverty level. See “Status of State Action on the Medicaid Expansion Decision,” Henry J. Kaiser Family Foundation.

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# Acknowledgments

This research was funded by Laura and John Arnold Foundation. We are grateful to them and to all our funders, who make it possible for Urban to advance its mission.

The views expressed are those of the authors and should not be attributed to the Urban Institute, its trustees, or its funders. Funders do not determine research findings or the insights and recommendations of Urban experts. Further information on the Urban Institute's funding principles is available at [urban.org/fundingprinciples](http://urban.org/fundingprinciples).

For more information on this project, see <https://www.urban.org/policy-centers/health-policy-center/projects/tracking-medicare-covered-prescriptions-treat-opioid-use-disorder>.



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