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## Sensitivity of Medicaid claims data for identifying opioid use disorder in patients admitted to 6 New York City public hospitals

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### Abstract

**Objectives:** Behavioral health diagnoses are frequently underreported in administrative health data. For a pragmatic trial of a hospital addiction consult program, we sought to determine the sensitivity of Medicaid claims data for identifying patients with opioid use disorder (OUD).

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Conflict of Interest: None

**Methods:** A structured review of electronic health record (EHR) data was conducted to identify patients with OUD in six New York City public hospitals. Cases selected for review were adults admitted to medical/surgical inpatient units who received methadone or sublingual buprenorphine in the hospital. For cases with OUD based on EHR review, we searched for the hospitalization in Medicaid claims data and examined ICD-10 discharge diagnosis codes to identify opioid diagnoses (OUD, opioid poisoning, or opioid-related adverse events). Sensitivity of Medicaid claims data for capturing OUD hospitalizations was calculated using EHR review findings as the reference standard measure.

**Results:** Among 552 cases with OUD based on EHR review, 465 (84.2%) were found in the Medicaid claims data, of which 418 (89.9%) had an opioid discharge diagnosis. Opioid diagnoses were the primary diagnosis in 49 cases (11.7%), while in the remainder they were secondary diagnoses.

**Conclusion:** In this sample of hospitalized patients receiving OUD medications, Medicaid claims appear to have good sensitivity for capturing opioid diagnoses. Although the sensitivity of claims data may vary, it can potentially be a valuable source of information about OUD patients.

### Keywords

Opioid use disorder; Claims data; Pragmatic clinical trial; Substance-related disorders; Addiction consult service

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## BACKGROUND

Administrative health data, including electronic health records (EHR) and insurance claims, can be a powerful tool for understanding the prevalence, treatment, and outcomes of health conditions.[1, 2]) Unfortunately, the utility of these data sources for studying substance use disorders has been limited by low rates of clinical diagnosis, resulting from stigma and lack of provider knowledge, poor documentation, and federal regulations that restrict access to substance use information in medical records.[3–8]

We are conducting a pragmatic trial evaluating the effectiveness of an addiction consult program (Consult for Addiction Care and Treatment in Hospitals (CATCH)) that is ongoing at six public hospitals in the New York City Health + Hospitals (H+H) system.[9] The study relies on Medicaid claims to identify hospitalizations of individuals with opioid use disorder (OUD) or opioid-related overdose and to examine their outcomes post-discharge. Because underreporting of opioid diagnoses in Medicaid claims could threaten the validity of the trial, we undertook the current study to identify the sensitivity of claims data for identifying opioid diagnoses.

## METHODS

Briefly, our approach involved using data from the EHR to identify cases of hospital patients with OUD. We then searched Medicaid claims data for these OUD cases, and examined whether an opioid diagnosis was listed. The sensitivity of Medicaid claims data for identifying OUD cases was calculated using the EHR-identified cases as the reference standard measure.

## Setting

Data was reviewed from the six CATCH study hospitals during calendar year 2017, which was prior to the launch of the program. The [blinded] Institutional Review Board approved the study.

## Data sources

1. EHR data from the H+H Clinical Data Warehouse was used to identify eligible cases for subsequent review. The data warehouse contains records from all H+H facilities and includes dates of service, historical diagnoses (problem list), admission and discharge diagnoses, medication orders, and laboratory results. Reviews were conducted using the provider-facing interface of the EHR.
2. New York State Medicaid claims data includes managed care and fee-for-service claims.[10] Medicaid is a public insurance program. The dataset contains personal identifiers, demographics, dates of service, medications, and diagnoses for encounters, including hospital admission and discharge diagnoses (1 primary plus up to 19 secondary diagnoses).

## Study population

Cases eligible for inclusion were adults ( ≥ 18 years) hospitalized for at least 1 night on an inpatient medical/surgical service and who had medication for OUD (MOUD), defined as sublingual buprenorphine or oral methadone, ordered during the hospital stay. Our goal was to review a random sample of 100 eligible cases from each hospital. Hospital 2 had only 92 eligible cases, and all were reviewed.

## EHR review procedures

An EHR abstraction form was developed to capture information on demographics; MOUD orders; documentation of opioid-related conditions on an admission note or discharge summary; active opioid diagnosis during hospitalization; and toxicology tests positive for opioids. The form concluded with a question for the reviewer, ‘Does this patient have a clinical presentation that is consistent with having a current OUD?’ with response options yes/no/maybe.

A team of 3 clinician researchers (SG, EO, EB) were trained and conducted EHR reviews May 2019-September 2020. Data were recorded on paper forms and entered into an electronic database. Cases with an affirmative response to having a current OUD were classified as OUD admissions. For the 15 cases with a ‘maybe’ response, all reviewers plus the Principal Investigator (JM) met to review the full medical record from the hospitalization and reached consensus on a final yes/no classification.

To evaluate fidelity, 10 cases from each hospital were randomly selected to be reviewed by a blinded team member who did not complete the original EHR review. There was concordance on 57 (95%) reviews. Cases with discrepant findings were reviewed by the full team plus JM to reach consensus on their classification.

## Matching procedures

Cases determined to be clinically consistent with OUD were matched in 2017 Medicaid claims data. Name, date of birth, and gender were used to match cases to a Medicaid ID. The claim for the hospitalization was located by matching by facility for dates within 31 days of the admission date recorded in the EHR. Failure to find a match may have been due to the patient not having Medicaid coverage, or to discrepancies in the identifiers.

## Measures

The reference standard measure was the EHR review classification of meeting criteria for OUD during the hospitalization. The experimental measure was identification of OUD in Medicaid claims based on having one or more ICD-10 codes<sup>1</sup> for opioid diagnoses (OUD, opioid poisoning, or opioid adverse effects) in the discharge diagnoses for the same hospitalization. Demographic characteristics were drawn from Medicaid claims data.

## Analysis

For cases classified as OUD based on EHR review that had a matching Medicaid claim, all discharge diagnoses in the Medicaid data for that hospitalization were reviewed. The percentage of cases with an opioid discharge diagnosis in Medicaid claims data represents the sensitivity of Medicaid claims for identifying OUD in our study population.

## RESULTS

EHR reviews of 592 eligible cases identified 552 cases meeting clinical criteria for OUD, of which 465 (84.2%) had a matching hospital admission in the Medicaid claims data (Table 1). Of the matched cases, 418 (89.9%) had an opioid discharge diagnosis. The sensitivity of OUD in claims data varied between hospitals, ranging from 82.9–96.7%.

Table 2 describes characteristics of the 418 patients with an opioid discharge diagnosis. Over half (64.6%) had at least one hospitalization in the prior year, and 29.2% had three or more hospitalizations. Opioid diagnoses were the primary diagnosis in 49 cases (11.7%), and were listed among the secondary diagnoses for all others.

## DISCUSSION

In this study of hospitalized patients receiving MOUD, Medicaid claims data had 90% sensitivity for capturing opioid diagnoses. Opioid and other substance use disorders were rarely listed as the primary diagnosis. We found higher sensitivity than in other studies that have examined the sensitivity of administrative health data for substance use diagnoses.[3–5, 7] This may be due to restricting our sample to individuals who received MOUD in the hospital, or to improvements in the identification of OUD due to the high degree of attention to the opioid crisis, an increased focus on opioids in medical education, and the relatively high prevalence of OUD in medical and publicly-insured populations.[11–13]

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<sup>1</sup>F11.10-F11.15; F11.18-F11.25; F11.28-F11.29; F11.9; T40.0X1–4; T40.1X1–4; T40.2X1–4; T40.3X1–4; T40.4X1–4; T40.601–604; T40.691–694; and A,D, and S subcodes of the following: T40.0X1–5, T40.1X1–5, T40.2X1–5, T40.3X1–5, T40.4X1–5, T40.605, T40.695. These codes were also included if accompanied by an OUD diagnosis: T40.601–604, T40.691–694

Our study has some limitations. Because our concern was for sensitivity of the claims data for identifying OUD, specificity was not explored. Not all individuals could be identified in Medicaid claims, and those with dual Medicaid-Medicare eligibility at the time of the reviewed hospitalization were not included. Because the CATCH study focuses on general medicine/surgery inpatients, individuals admitted to detoxification or psychiatric units were excluded. Finally, our findings do not generalize to all claims data, as we were studying Medicaid claims among an urban public hospital population in a state with high rates of Medicaid coverage.

### Conclusion:

Medicaid claims data may be a valuable source of information about treatment and outcomes of hospitalized patients with OUD. Although the sensitivity of claims data for detecting OUD can vary depending on payer, geographic location, and patient populations, our findings support the use of Medicaid claims for our pragmatic trial, and suggest that they may be a useful data source for future evaluations of programs that seek to improve care for patients with OUD.

### Funding source:

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**Table 1.**

Opioid Use Disorder (OUD) cases from EHR review and Medicaid claims data at each study hospital

	Study Hospitals						Total
	Hospital 1	Hospital 2	Hospital 3	Hospital 4	Hospital 5	Hospital 6	
Cases with OUD based on EHR review <sup>^</sup> N (%)	94	84	87	98	97	92	552
Identified in Medicaid claims N (%)	71 (75.5%)	59 (70.2%)	82 (94.3%)	91 (92.9%)	83 (85.6%)	79 (85.9%)	465 (84.2%)
Opioid discharge diagnosis <sup>*</sup> in Medicaid claims N (%)	65 (91.5%)	51 (86.4%)	68 (82.9%)	88 (96.7%)	78 (94.0%)	68 (86.1%)	418 (89.9%)

<sup>^</sup> Cases were found to be not clinically consistent with OUD for the following reasons: medication ordered for pain management (N=35); insufficient documentation (N=3); MOUD order entered in error and discontinued (N=2)

<sup>\*</sup> Opioid diagnoses included were those listed in Footnote 1.

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**Table 2.**

Characteristics of patients in the sample having an opioid discharge diagnosis identified in Medicaid claims (n=418)

Characteristic	N	%
Age, median ( <i>min,max</i> )	52 (23, 80)	
Gender		
Male	301	72.0
Female	117	28.0
Race/Ethnicity		
Black	83	19.9
White	114	27.3
Hispanic	186	44.5
Other	14	3.3
Unknown	21	5.0
Number of hospital admissions in the prior year		
0 admission	148	35.4
1 admission	84	20.1
2 admissions	64	15.3
3 or more admissions	122	29.2
Primary discharge diagnosis for this hospitalization		
Opioid use or opioid use disorder	36	8.6%
Opioid poisoning	13	3.1%
Other substance use disorder	23	5.5%
Other diagnoses	346	82.8%