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Et al.

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ORIGINAL RESEARCH

Accuracy of the Drug-Dependency Checkbox on the Maine Birth Certificate for Medicaid-covered Births, 2016-2020

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Introduction: The accuracy of the drug-dependency checkbox on Maine birth certificates is unknown. Our objective was to compare the drug-dependency checkbox with information on substance use disorders (SUDs) documented in Medicaid claims.

Methods: Using rule-based deterministic matching, we linked Medicaid enrollment information to Maine birth-record data between 2016 and 2020 (N = 58 584). Among the linked records (n = 27 448), we identified maternal SUD diagnoses during the 280 days before through 7 days after delivery using ICD-CM-9/10 diagnosis codes. We used the following hierarchy to create mutually exclusive SUD categories: opioid use disorder (OUD), cannabis use disorder without cocaine use disorder, and other SUD disorders (alcohol, cocaine, nicotine, or other).

Results: Among women enrolled in Medicaid at the time of delivery, 12% had drug dependency indicated on their birth record and 34% had at least one SUD diagnosis recorded in their Medicaid claims. Among birth records with drug dependency indicated, 56% indicated OUD, 26% indicated cannabis use disorder without cocaine use disorder, 8% indicated other SUD, and 10% indicated no SUD. Among those without drug dependency indicated, the corresponding percentages were 4% for OUD, 9% for cannabis use disorder, 14% for other SUD, and 74% for no SUD.

Discussion: Although diagnoses of OUD and cannabis use disorder were more common among birth records with a checked drug-dependency checkbox, reporting of drug dependency on birth records does not appear to accurately indicate SUD during pregnancy.

Conclusions: Our findings suggest that the drug-dependency checkbox on Maine birth certificates may have limited value in identifying SUD during pregnancy.

Key words: substance use disorder, drug dependence, pregnancy, birth certificates

Maine has one of the highest rates of maternal opioid use disorder (OUD) in the United States (US).[1] In 2018, the prevalence of maternal OUD at delivery hospitalization was 34.9 per 1000 deliveries (nearly 3.5%)—a more than 40-fold increase since 1999.[2,3] Also, mortality rates related to drug overdose are at an all-time high in the US. In Maine, this mortality rate is nearly 50% higher than the nation overall [45.3 (Maine) vs 31.3 (US) drug overdose deaths per 100 000 in 2021].[4] Maine has the highest percentage of residents living in a rural area (61%),[5] and rural populations are at higher risk of morbidity and mortality associated with opioid drug use.[6] These factors warrant renewed efforts to reduce the prevalence of OUD during pregnancy and the adverse health consequences of maternal OUD, such as opioid exposure in utero.

The MaineMOM (Maternal Opioid Misuse) program began in 2020 with funding from the Centers for Medicare and Medicaid Services (CMS) of the US Department of Health and Human Services (DHHS).[7] The program aims to improve care for women in Maine who are pregnant or postpartum and have low-income and OUD. Specifically, MaineMOM works to increase access to high-quality care

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while reducing care costs and better integrating substance misuse treatment and maternal care for these women. As part of the MaineMOM evaluation, we linked birth records in Maine to Medicaid administrative data. Evaluation of care performance measures through these linkages has been done annually for more than 10 years.[7] However, the MaineMOM evaluation provided an opportunity to do quarterly linkages and compare information captured between the 2 data sources. A drug-dependency checkbox, added to the Maine birth record in 2013, had not been compared with substance use disorder (SUD) information from other data sources.

In this study, our objective was to estimate the accuracy of the drug-dependency checkbox on the Maine birth record as compared to information on SUDs documented in claims data for Medicaid-covered births.

METHODS

Data sources

We used data from records of live births in Maine for Maine residents of all ages between 2016 and 2020, as provided by the Data, Research and Vital Statistics (DRVS), Maine Center for Disease Control & Prevention, Maine DHHS. These data were transferred to the Muskie School of Public Service using a secure portal for file transfer. Medicaid enrollee information, medical claims, and pharmacy claims data from 2010 to 2020 were transferred securely to Muskie servers and updated monthly. Access to these restricted-use data and permission to use these data for our program evaluation project were granted through a cooperative agreement between the University of Southern Maine and DHHS, as well as a data-use agreement between the University of Southern Maine and DRVS. This study was deemed exempt by the University of Southern Maine's Institutional Review Board.

Birth record-Medicaid linkage, ever enrolled in Medicaid

We linked enrollment information for the Medicaid/Children's Health Insurance Program (CHIP; hereafter together referred to as "Medicaid") to birth-record data using rule-based deterministic matching. We followed a methodology described in training provided by AcademyHealth, on behalf of the US Centers for Disease Control and Prevention[8] and CMS, that was attended by staff of the University of Southern Maine (A.K.). Using fields available in both data sources, we constructed a linkage algorithm containing 12 rules and ranked them in order of our confidence in yielding a true match (Supplemental Tables 1 and 2). The fields used for matching included maternal date of birth (either full date or month and year only); name (several combinations of first name, first name first letter, middle name first letter, current last name, maiden name, child's last name); Medicaid identification number (ID); and last 4 digits of the social security number (SSN). Although Medicaid ID and the 9-digit SSN are collected on the Maine birth record, by Maine statute, the 9-digit SSN cannot be used for purposes other than administration of the Social Security Act plan.[9]

We then identified rows from the birth-record data containing maternal information that exactly matched information from the Medicaid enrollee data. Among the rule-based matches, we selected the match with the most discriminating combination of fields for each birth record. For the birth records that did not match, we identified those with Medicaid listed as the expected payer and/or a Medicaid ID number for the mother. For this group of birth records, we matched manually by visually scanning Medicaid claims for a delivery that took place on the same day to a woman with the same name, birthdate, and/or Medicaid ID. Finally, we identified some maternal matches based on mother-infant dyads identified after infants were linked to their birth-record information (using a separate linkage algorithm). After each preliminary set of matches, we evaluated the quality of the matches by comparing information in the 2 data sources to ensure there were no obvious false linkages.

Maternal Medicaid enrollment at time of birth

For each match identified, we determined if the woman giving birth was enrolled in full-benefit Medicaid coverage during the month the birth took place and, separately, if we could find her delivery-related claims. We identified full-benefit coverage using Recipient Aide Codes documented for the delivery month in the Medicaid eligibility file. We scanned Medicaid medical claims for delivery-related claims to link to the birth using an algorithm and code list from the State University Partners Learning Network, Medicaid Outcomes Distribute Research Network.[10,11] We allowed for a 28-day window between the date of birth on the birth

record and the date of delivery in the claims data to provide leeway for dates not being a perfect match.

Maternal and pregnancy characteristics in the birth record

Maternal and pregnancy characteristics were based on information collected in the birth record, as reported by the pregnant woman or transcribed from the medical record.[12,13] Maine has used the 2003 version of the US Standard Certificate of Live Birth since 2013.[14] Maternal characteristics included maternal age, race and ethnicity, education, and marital status. Pregnancy characteristics included plurality (singleton or plural birth), birthweight (categorized as low birthweight if < 2500 g), gestational age at birth (categorized as preterm if < 37 completed weeks), and infection with hepatitis C virus. We constructed a measure of facility volume, which was the average number of births per year at each birthing facility (categorized as 10-249, 250-499, 500-999, 1000-2499, and ≥ 2500 births).

Revised-Graduated Prenatal Care Utilization Index

Using information from the birth record, we calculated the Revised-Graduated Prenatal Care Utilization Index as a measure of adequacy of prenatal care received during pregnancy.[15] This index is based on the timing and number of prenatal visits recommended by the American College of Obstetricians and Gynecologists.[16]

Drug-dependency checkbox in the birth record

On August 1, 2013, checkboxes were added to the Maine birth record to indicate “Drug dependency” and “Alcohol dependency”. These checkboxes were located within the section for “Risk factors for this pregnancy”, which contained a series of checkboxes and the instructions “Check all that apply”. The drug and alcohol dependency items were not part of the 2003 version of US Standard Certificate of Live Birth. No guidance was provided to the birth-record certifier for the circumstances under which these checkboxes should be checked.

SUD diagnosis during pregnancy

For women who were enrolled in Medicaid at the time of delivery, we scanned their medical claims to identify maternal SUD diagnoses during the 280 days before through 7 days after delivery. These diagnosis were based on diagnosis codes in the International Classification of Diseases, Ninth and Tenths Revisions, Clinical Modification related to substance use, abuse, and dependence. We used a code list from a multi-state analysis of Medicaid data on the prevalence of medication for opioid use disorder (MOUD),[17] which we modified to include tobacco use disorder codes and “in remission” codes (see Supplemental Table 3 for code list).

MOUD during pregnancy

For women with at least one OUD diagnosis during pregnancy, we scanned their medical and pharmacy claims to identify any use of MOUD during the 280 days before through 7 days after delivery. We looked for procedure codes indicating MOUD, such as “H0020” for methadone administration. We also looked for National Drug Codes indicating a prescription was filled for buprenorphine, naltrexone (oral), injectable naltrexone, or buprenorphine and naloxone.[17]

Statistical analyses

For women enrolled in Medicaid at the time of delivery, we tabulated birth records by the status of the drug-dependency checkbox and if we found an SUD diagnosis in the Medicaid claims data. We also parsed out the SUD diagnoses by SUD type and, for those with OUD, by whether they received MOUD. We used the following hierarchy to create mutually exclusive SUD categories: OUD, cannabis use disorder without cocaine use disorder, and other SUD disorder (alcohol, cocaine, nicotine, or other substance use diagnosis). Our hierarchy prioritized OUD and combined less common SUDs into one category to avoid small cell counts. Per our data-use agreement with DRVS, we suppressed presentation of results based on cell counts between 1 and 9.

Sensitivity analyses

We reran the analysis using only women with full-benefit and non-dual enrollment during their entire pregnancy (for the 9 months before the delivery month). With this approach, we could see how the findings would change if we restricted the analysis to women whose medical claims we could fully assess during pregnancy. We also reran the analysis after adding information from the alcohol dependency checkbox (which was rarely checked) to see how our findings would change if we included all indications of SUD from the birth record.

RESULTS

We examined 58 584 live births in Maine from 2016 to 2020. Of the total births, 47% were to women enrolled in Medicaid at the month of delivery (Table 1; see Supplemental Table 4 for results by birth year). We found Medicaid delivery-related claims for 43% of total births.

Among the full sample of birth records, 13% of women with Medicaid listed as the primary payer had drug dependency indicated on the birth record. This percentage was higher than that of women whose primary payer was reported as private insurance (2%), self-pay (6%), Tricare (2%), and other/unknown (4%); and lower than that of women whose primary payer was other government (eg, Medicare) (18%) (Table 2). Among the 27 448 birth records to women enrolled in Medicaid at the month of delivery, 12% had drug dependency indicated on their birth record, and 34% had at least one SUD diagnosis recorded in their Medicaid claims during pregnancy.

Several maternal and pregnancy characteristics varied by Medicaid enrollment at the month of delivery (Table 3). The characteristics more common among these women included younger age, non-Hispanic White race and ethnicity, high school educational attainment, unmarried, and infection with hepatitis C virus. The Revised-Graduated Prenatal Care Utilization Index scores; birth weight; and rates of plurality, low birthweight, and preterm births were similar to total births. Of the Medicaid-enrolled births, 56% occurred in facilities with less than 1000 deliveries annually versus 51% of total births.

Among the 3228 Medicaid-linked birth records with drug dependency indicated, 1821 (56%) had medical claims during pregnancy with at least one OUD diagnosis; 822 (26%) had a cannabis use disorder diagnosis (and no OUD nor cocaine use disorder); and 264 (8%) had an alcohol, cocaine, nicotine, or other SUD diagnosis (and no OUD nor cannabis use disorder) (Table 3; for non-mutually exclusive SUD diagnoses, see Supplemental Table 5). No SUD diagnoses were found in Medicaid claims for 321 (10%) births in which drug dependency was indicated on the birth record. Among the 24 220 Medicaid-linked birth records without drug dependency indicated, 874 (4%) had at one least OUD diagnosis; 2210 (9%) had a cannabis use disorder diagnosis (and no OUD nor cocaine use disorder); and 3307 (14%) had an alcohol, cocaine, nicotine, or other SUD diagnosis (and no OUD nor cannabis use disorder) (Table 3). No SUD diagnoses were found in Medicaid claims for 17 829 (74%) births. Overall, 68% (1821/2695) of women with OUD were identified with the drug-dependency checkbox.

Some of these patterns varied across birth years. For example, among Medicaid-enrolled births with drug dependency indicated, 63% had at least one OUD diagnosis in the Medicaid claims during pregnancy in 2016, but only 50% had at least one diagnosis in 2020 (Figure 1). In 2016, a cannabis use disorder diagnosis (and no OUD nor cocaine use disorder) was found in the Medicaid claims for 20% of births with drug dependency indicated on the birth record, which increased to 31% by 2020. Similar increases in cannabis use disorder occurred between 2016 and 2020, which we observed when we examined non-mutually exclusive SUD diagnoses (Figure 2) (which coincides with the legalization of recreational marijuana use in Maine in 2016).[18]

Among the births to women enrolled in Medicaid at the month of delivery with at least one OUD diagnosis in their Medicaid claims and with drug dependency indicated on the birth record, 81% had MOUD documented in their medical claims during pregnancy (Supplemental Table 6). Among women without drug dependency indicated on the birth record, 48% had MOUD documented during pregnancy.

In our sensitivity analysis restricted to women enrolled in Medicaid for their entire pregnancy, 15% had drug dependency indicated on their birth record, and 42% had at least one SUD diagnosis in their Medicaid claims data. These percentages were higher than in our primary analysis (12% with drug dependency and 34% with at least one SUD diagnosis) (Supplemental Table 7). Also, the percentage of women with a checked drug-dependency checkbox who had no SUD diagnosis in their medical claims was lower (5% in our sensitivity analysis vs 10% in our primary analysis) (Supplemental Figure 1). In our sensitivity analysis that also included information from the alcohol dependency checkbox, we only identified 30 more (3258 in our sensitivity analysis vs 3228 in our primary analysis) women with SUD, and our findings changed negligibly (data not shown).

Table 1. Medicaid linkage to Maine birth records for 58 584 in-state resident livebirths, 2016-2020

Primary payer reported on birth record	Medicaid-enrolled at month of delivery, No. (%)*		Medicaid delivery-related claim found, No. (%)†	
	Yes	No	Yes	No
Medicaid	22 837 (39.0)	429 (0.7)	22 359 (38.2)	907 (1.5)
Non-Medicaid	4611 (7.9)	30 707 (52.4)	3075 (5.2)	32 243 (55.1)
Total	27 448 (46.9)	31 136 (53.1)	25 434 (43.4)	33 150 (56.6)

*Approximately half of women who reported their primary payer as non-Medicaid on the birth record were also enrolled in either Medicare (n = 107) or private insurance (n = 2160) at the month of delivery (2267/4611).
†Approximately half of women who reported their primary payer as non-Medicaid on the birth record were also enrolled in either Medicare (n = 98) or private insurance (n = 1298) at the month of delivery (1396/3075).

Table 2. Medicaid linkage to Maine birth records for 58 584 in-state resident livebirths by drug-dependency checkbox on the birth record and SUD diagnosis in Medicaid claims, 2016-2020

Primary payer reported on birth record	Full sample of birth record, N	Medicaid-enrolled at month of delivery‡, No. (%)	Drug dependency on birth record				Any SUD diagnosis in Medicaid claims*	
			Full sample of birth records, No. (%) (N = 58 584)		Medicaid-enrolled at month of delivery, No. (%) (N = 27 448)		Medicaid-enrolled at month of delivery, No. (%) (N = 27 448)	
			Yes	No	Yes	No	Yes	No
Medicaid	23 266	22 837 (98.2)	2954 (12.7)	20 312 (87.3)	2899 (12.7)	19 938 (87.3)	8592 (37.6)	14 245 (62.4)
Private insurance	31 471	3426 (10.9)	466 (1.5)	31 005 (98.5)	198 (5.8)	3228 (94.2)	395 (11.5)	3031 (88.5)
Self-pay	2488	862 (34.7)	143 (5.8)	2345 (94.2)	88 (10.2)	774 (89.8)	215 (24.9)	647 (75.1)
Indian Health Service	39	14 (35.9)	†	35 (89.7)	†	11 (78.6)	†	†
Champus/Tricare	774	64 (8.3)	15 (1.9)	759 (98.1)	†	55 (85.9)	12 (18.8)	52 (81.2)
Other government	133	67 (50.4)	24 (18.1)	109 (81.9)	22 (32.8)	45 (67.2)	43 (64.2)	24 (35.8)
Other/Unknown	413	178 (43.1)	18 (4.4)	395 (95.6)	†	169 (94.9)	34 (19.1)	144 (80.9)
Total	58 584	27 448 (46.9)	3624 (6.2)	54 963 (93.8)	3228 (11.8)	24 220 (88.2)	9298 (33.9)	18 150 (66.1)

Abbreviations: SUD, substance use disorder.

*SUDs include alcohol-related disorders; opioid-related disorders; cannabis-related disorders; sedative-, hypnotic-, or anxiolytic-related disorders; cocaine-related disorders; other stimulant-related disorders; hallucinogen-related disorders; nicotine dependence; inhalant-related disorders; and other substance use and multiple drug–use disorders.
†Data counts between 1 and 9 were suppressed for privacy.
‡Primary payer reported on the birth record as Medicaid does not always correspond to being Medicaid-enrolled at the month of delivery because of dual coverage with commercial insurance, reporting or linkage error, retroactive enrollment in Medicaid, or primary payer information was not known at the time of delivery.

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Table 3. Maine birth records for 58 584 in-state resident live births by Medicaid enrollment at month of delivery, drug-dependency checkbox, and hierarchical categorization of SUD diagnosis in medical claims during pregnancy, 2016-2020

			Drug dependency = Yes, % (n = 3228)				Drug dependency = No, % (n = 24 220)			
Characteristics	Total sample, % (N = 58 584)	Medicaid-enrolled at month of delivery, % (N = 27 448)	Opioids (n = 1821)	Cannabis (n = 822)	Alcohol, cocaine, nicotine, other* (n = 264)	No SUD (n = 321)	Opioids (n = 874)	Cannabis (n = 2210)	Alcohol, cocaine, nicotine, other* (n = 3307)	No SUD (n = 17 829)
Total row %			56.4	25.5	8.2	9.9	3.6	9.1	13.7	73.7
Maternal age, mean, y	29.1	27.2	29.2	25.5	26.9	26.6	28.8	25.4	27.1	27.3
Maternal age, y										
<18	0.8	1.5	†	1.5	†	†	†	2.1	1.3	1.6
18-19	3.0	5.7	0.9	8.8	4.0	7.2	3.0	10.5	6.2	5.6
20-24	18.5	28.7	16.0	37.6	27.1	34.9	17.3	36.7	29.6	28.9
25-34	60.6	52.2	70.2	45.9	61.4	46.1	65.0	44.8	51.2	51.2
35-39	14.3	9.7	11.3	5.5	6.0	8.4	12.8	5.2	9.6	10.2
≥40	2.9	2.2	1.5	†	†	†	1.4	0.7	2.1	2.6
Missing data	0.0	0.0	0.0	0.0	0.0	†	0.0	0.0	0.0	†
Maternal race and ethnicity										
Asian/Pacific Islander	1.1	1.8	3.2	3.0	4.5	†	2.7	1.9	2.2	1.4
Hispanic	1.7	2.0	1.3	1.6	†	†	1.5	2.9	1.4	2.1
Native American	1.9	1.5	†	†	0.0	†	†	†	0.6	2.0
Non-Hispanic Black	4.6	8.0	0.9	3.6	†	†	1.4	2.4	1.7	11.3
Non-Hispanic other	0.2	0.2	0.0	†	†	0.0	0.0	†	†	0.2
Non-Hispanic White	90.1	86.3	94.0	91.1	91.3	91.0	93.5	91.8	93.9	82.7
Missing data	0.4	0.3	†	0.0	0.0	†	†	†	†	0.4
Maternal education at delivery										
No high school diploma	6.8	12.4	18.9	18.2	17.0	13.1	13.8	19.0	16.5	9.7
High school diploma or equivalent	26.5	42.7	47.4	51.8	50.0	44.2	48.2	49.9	52.8	38.6
>High school diploma	66.2	44.6	33.2	29.6	32.6	39.9	37.5	31.0	30.5	51.4
Missing data	0.5	0.4	†	†	†	†	†	†	†	0.4
Maternal marital status										
Married	60.2	33.1	13.0	13.0	10.6	17.8	15.4	14.7	19.8	42.3
Unmarried	39.0	65.6	84.1	85.0	88.3	819	82.2	83.7	77.9	56.8
Missing data	0.8	1.3	2.9	1.9	†	†	2.4	1.6	2.4	0.8
R-GINDEX‡										
Intensive	11.1	12.3	14.3	7.8	10.8	7.7	15.2	10.7	13.5	12.2
Adequate	55.3	50.0	37.0	49.8	45.0	48.4	41.8	49.9	50.2	51.9
Intermediate	27.4	29.7	32.1	32.5	31.1	32.9	31.2	31.3	29.0	29.2

Table 3. Maine birth records for 58 584 in-state resident live births by Medicaid enrollment at month of delivery, drug-dependency checkbox, and hierarchical categorization of SUD diagnosis on medical claims during pregnancy, 2016-2020 (continued)

			Drug dependency = Yes, % (n = 3228)				Drug dependency = No, % (n = 24220)			
Characteristics	**Total sample, %, (N = 58 584)**	**Medicaid-enrolled at month of delivery, % (N = 27 448)**	**Opioids (n = 1821)**	**Cannabis (n = 822)**	**Alcohol, cocaine, nicotine, other* (n = 264)**	**No SUD (n = 321)**	**Opioids (n = 874)**	**Cannabis (n = 2210)**	**Alcohol, cocaine, nicotine, other* (n = 3307)**	**No SUD (n = 17 829)**
Inadequate	4.4	6.1	13.0	7.3	12.0	7.7	10.3	6.8	5.8	5.0
None	0.5	0.5	1.9	†	†	†	†	†	0.6	0.3
Missing data	1.4	1.3	1.6	1.8	0.0	†	†	1.1	1.0	1.3
Plurality										
Singleton birth	96.6	96.7	96.3	97.8	92.8	98.9	96.2	97.1	96.6	96.7
Plural birth	3.4	3.3	3.7	2.2	7.2	†	3.8	2.9	3.4	3.3
Birth weight, g, mean	3339.3	3275.3	2999.6		3042.8	3237.8	3088.6	3170.0	3175.2	3356.8
Low birth weight (<2500 g)										
Yes	7.3	9.1	18.9	15.2	17.4	11.2	14.8	11.1	11.7	6.6
No	92.7	90.9	81.0	84.8	82.6	88.8	85.2	88.9	88.2	93.3
Missing data	0.0	0.0	†	0.0	0.0	0.0	0.0	0.0	†	†
Gestational age, wks, mean	38.8	38.5	38.2	38.2	38.0	38.4	38.1	38.4	38.3	38.6
Preterm birth (gestation <37 wks)										
Yes	8.8	10.1	15.0	14.6	18.9	10.6	14.5	10.5	11.3	8.8
No	91.0	89.8	84.7	85.4	81.1	89.4	85.5	89.5	88.6	91.1
Missing data	0.2	0.1	†	0.0	0.00	0.0	0.0	0.0	†	0.1
Hepatitis C virus infection	1.4	2.7	26.0	1.8	7.6	3.1	12.9	1.1	1.2	0.2
Facility delivery volume§										
10-249	18.0	23.0	19.5	19.3	21.6	15.9	16.7	24.9	30.1	22.4
250-499	7.5	7.7	5.5	3.9	†	3.1	7.4	14.1	7.3	7.5
500-999	25.1	25.4	18.6	26.5	29.9	37.1	17.4	23.8	22.8	26.9
1000-2499	23.0	24.9	37.0	37.7	31.1	26.8	30.1	23.9	24.5	22.9
≥2500	24.1	17.6	18.6	12.2	14.8	15.6	27.9	13.0	14.8	18.4
Missing data‖	2.2	1.5	0.8	†	†	†	†	†	0.6	2.0

Abbreviations: R-GINDEX, Revised-Graduated Prenatal Care Utilization Index; SUD, substance use disorder; wks, weeks.

*Other include sedative-, hypnotic-, or anxiolytic-related disorders; other stimulant-related disorders; hallucinogen-related disorders; inhalant-related disorders; and other substance use and multiple drug–use disorders.

†Data counts between 1 and 9 were suppressed for privacy.

‡Measurement of the adequacy of prenatal care received during the prenatal period. Measure considers the number of prenatal visits, gestational age of the newborn, and the date when prenatal care began.

§Average number of births per year.

‖Missing data includes births that could not be categorized: homebirths (n = 1222), en route to hospital, doctor's office/clinic or other (n = 42), or missing facility information (n = 24).

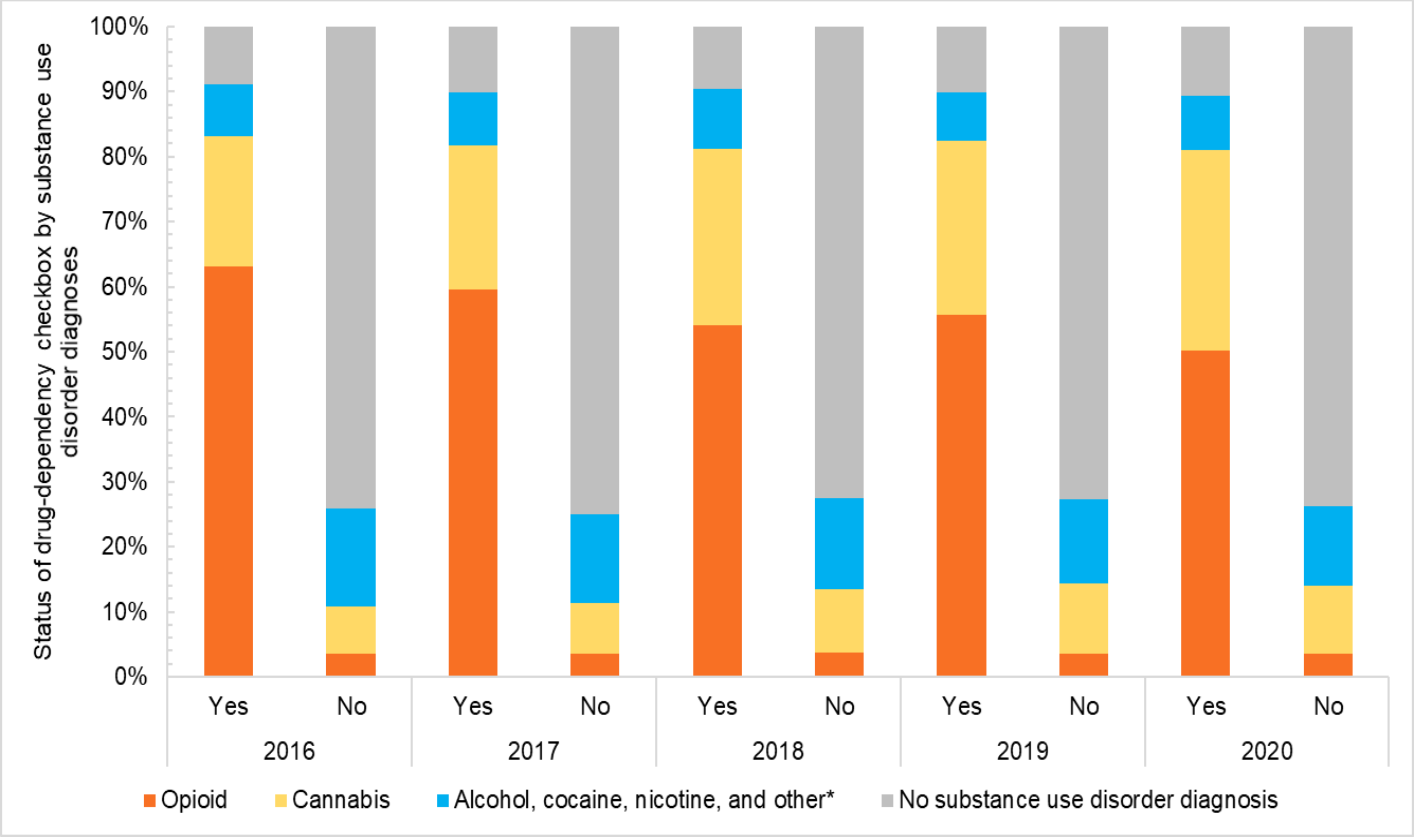

Figure 1. Maine birth records for in-state resident live births among women who were Medicaid-enrolled at the month of delivery by drug-dependency checkbox and hierarchical categorization of substance use disorder in medical claims during pregnancy, 2016-2020 (n = 27 448).

*Other substance use disorder diagnoses include sedative-, hypnotic-, or anxiolytic-related disorders; other stimulant-related disorders; hallucinogen-related disorders; inhalant-related disorders; and other substance use and multiple drug use disorders.

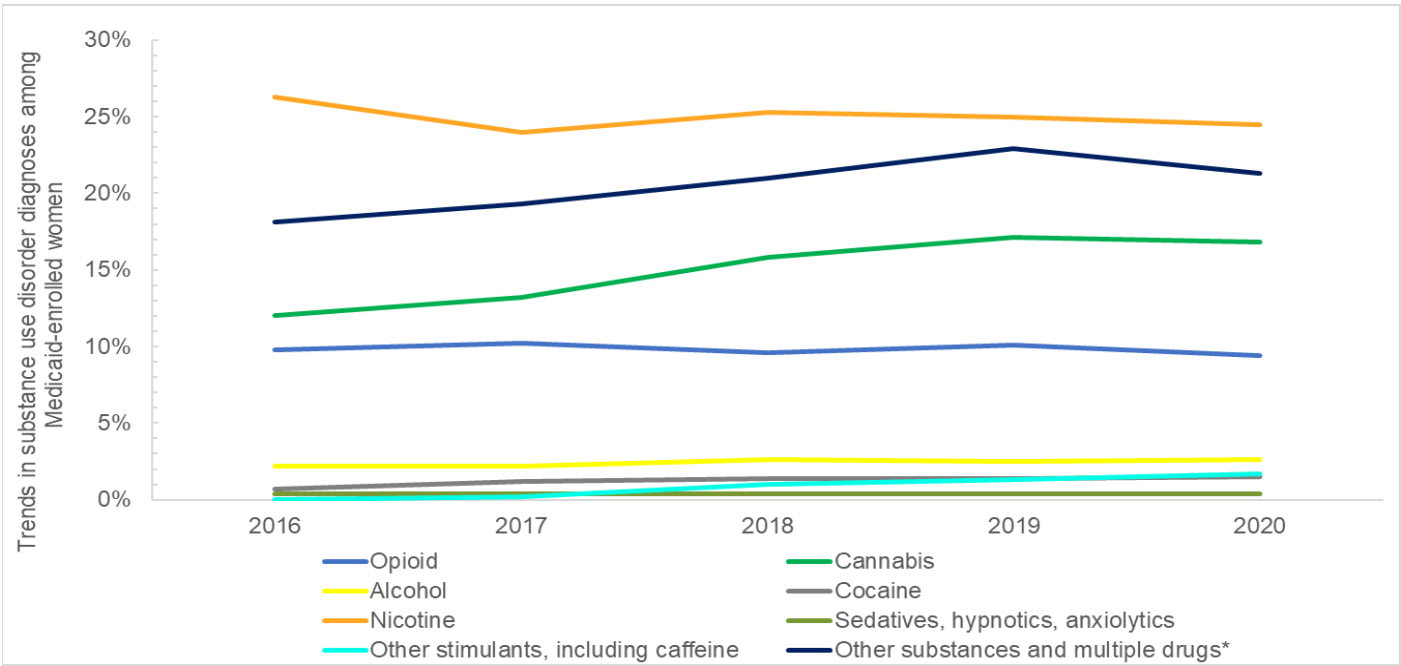

Figure 2. Maine women who were Medicaid-enrolled at the month of delivery by drug-specific substance use disorder in medical claims during pregnancy, 2016-2020 (n = 27 448). Substance use disorders shown are not mutually exclusive (See Supplemental Table 3 for list of ICD-9/10 codes related to use of other substances and multiple drugs). Disorders due to use of hallucinogens and inhalants were suppressed from presentation because the counts were between 1 and 9.

*Other substances include unspecified drugs.

DISCUSSION

We evaluated women enrolled in Medicaid at the time of delivery in Maine between 2016 and 2020. We found that the prevalence of OUD and cannabis use disorder (without OUD or cocaine use disorder) diagnoses in claims data during pregnancy were higher among women with drug dependency indicated on the birth record versus those without. However, nearly 1 in 10 birth records with a checked drug-dependency checkbox had no evidence of SUD during pregnancy and 1 in 4 birth records with the checkbox unchecked had evidence of an SUD during pregnancy. Also, only 7 in 10 birth records indicating maternal OUD had a checked drug-dependency checkbox. We conclude that reporting of drug dependency on the birth record does not appear to accurately indicate SUD during pregnancy, and the drug-dependency checkbox may have limited value.

Few studies have reported on the accuracy of the birth record in assessing maternal SUD. A study analyzing Oregon births over a 1 month period in 1989 found that birth certificate reporting identified only 41% of women with recognized illicit drug use.[19] Several other studies analyzed the accuracy of birth certificate data versus medical records or Medicaid data for tobacco and alcohol use, finding generally low agreement between the data sources.[20-24] Additionally, the Iowa Health in Pregnancy Study compared birth certificates and maternal recall data from live births between 2002 and 2005, also finding low agreement between the data sources for smoking and alcohol use during pregnancy.[25] One explanation for these discrepancies in SUD documentation is a woman's hesitancy to report health-limiting behaviors during pregnancy to medical providers and birth certifiers for fear of repercussions.[25]

How a birth record is completed may also influence its accuracy. Each item on the US Standard Certificate of Live Birth has detailed instructions for how the item should be completed.[12,13] However, as a state-specific item, the drug-dependency checkbox did not have explicit instructions for which drugs and frequency of drug use count as "drug dependency", what time frames are considered (eg, during the entire pregnancy or at the time of delivery), and how treatment for SUD and legal status of the drug being used should be handled. This lack of instructions likely led to variability in how the drug-dependency checkbox is used. We found that women with OUD who had drug dependency indicated on their birth record were more likely to be in MOUD treatment than women with OUD who did not have drug dependency indicated on their birth certificate. This finding suggests that women in MOUD treatment might be more noticeable to their provider as having SUD, and, therefore, more likely to be recorded as such on their infant's birth record.

Strengths and limitations

Our study had several strengths. First, we examined SUD diagnoses among women covered by Medicaid during pregnancy, who account for more than 80% of pregnant women with OUD.[2,26] Second, Maine Medicaid/CHIP (MaineCare) has used a fee-for-service model to pay providers since the late 1990s. This model means that claims are collected and submitted in a standardized way for each service provided, an advantage over other states that use managed care arrangements.[27]

However, our study had some limitations. First, the number of women with cocaine and alcohol use disorders was small and, therefore, collapsed with other SUDs into a single category. This approach created a heterogenous group largely comprising women with nicotine use disorder. Second, because there was no definition for what the drug-dependency checkbox indicated, we did not know how to define an appropriate comparison using the Medicaid data. Our primary analysis was among all women enrolled in Medicaid at the month of delivery, even though some women may have had health care outside of Medicaid during pregnancy. Our sensitivity analysis addressed this limitation by restricting the analysis to women enrolled during their pregnancy. However, these findings are likely not generalizable to all Medicaid-covered deliveries (eg, longer duration of coverage due to disability). Finally, Maine modified the alcohol and drug dependency items on the birth record in March 2021 to separately capture "alcohol use disorder" and "substance use disorder" (Supplemental Figure 2). These items will be further changed in late 2022 to capture specific drugs used during pregnancy. These changes suggest the findings from our study may not be generalizable to Maine birth records collected after 2022.

CONCLUSIONS

In conclusion, although diagnoses of OUD and cannabis use disorder were more common among Maine birth records with drug dependency indicated, reporting of drug dependency on the birth record does not accurately indicate SUD during pregnancy. Our findings suggest that the drug-dependency checkbox on the Maine birth certificate may have limited value in identifying SUD during pregnancy, and that plans to separately capture specific drugs used during pregnancy appear warranted. Explicit instructions as to how to complete this item may improve its accuracy.

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