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The Hidden Cost of the Opioid Epidemic in the United States: Drug Screening in Insurance Claims

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Background: The opioid crisis has had a substantial financial impact on the health care system in the United States. This study evaluates how health plans have been affected financially and shows how a laboratory benefit management (LBM) program can be used to address related drug testing in an outpatient setting.

Methods: Monthly claims data from private health plans were collected from June 1, 2016 to February 29, 2020. The total number of claims (units) for definitive and presumptive drug testing were calculated and the number of paid claims recorded. Claims distribution by laboratory type and medical code billed, the paid rate and compound annual growth rate, and the test distribution and paid rate of rendering providers who had submitted a minimum of 1000 claims were determined.

Results: In total, 2,004,230 drug testing claims were submitted. After the LBM program was implemented, the percentage of paid claims for definitive drug testing (Healthcare Common Procedure Coding System code G0483) decreased and the paid rate for the low-cost tests (HCPCS code G0480) in physician office and independent laboratory settings increased. The compound annual growth rate for G0483 claims submitted indicated a 70.5% and 31.9% decrease in payments to physician offices and independent laboratories, respectively, for the period ending February 2020.

Conclusions: An LBM program can positively address policy enforcement while reducing unnecessarily complex tests and limiting potential fraud, waste, and abuse by directing testing toward laboratories amenable to cost-efficient contractual savings. Moreover, for definitive drug testing, the enforcement of the use of Healthcare Common Procedure Coding System codes and a move toward more cost-efficient tests (G0480), when clinically applicable, supported by clinical practice guidelines, or evidence-based medicine, is an approach to providing medical benefits while maintaining health costs.

Key Words: drug testing, laboratory benefit management, opioid crisis

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INTRODUCTION

Drug abuse in the United States is widespread, despite the long acknowledgement of the problem and historical attempts to mitigate the problem. The 2016 National Survey on Drug Use and Health (NSDUH) found that as many as 28.6 million Americans aged 12 years and older used illicit drugs during the last 30 days, which corresponds to 10.6% of Americans and 25% of young adults aged 18 to 25 years. Furthermore, 11.8 million individuals misused opioids in the previous year and 11.5 million misused prescription pain relievers.[1] In 2011, the Centers for Disease Control and Prevention (CDC) declared the overuse of opioid medications an epidemic in the United States.[2] A recent review reported that over 66% of overdose episodes in 2016 alone were opioid related.[3] This is supported by data from the CDC and the National Center for Health Statistics, where the most recent data from 2018 shows that 69.5% of all drug overdose deaths involved the use of opioids.[4] An overall 4.1% decrease in the number of opioid-related deaths in the United States was reported from 2017 to 2018, and the number of deaths in all opioid subclasses decreased, except for synthetic opioids, which increased by 10%.[5]

Opioids are commonly prescribed as an aid in acute and chronic pain management. In 2016, more than 60 million individuals filled, or refilled, a prescription for an opioid analgesic.[6] Unfortunately, approximately 21%–29% of patients prescribed opioids for chronic pain abused these medications,[7] but prescriptions continue to be written. A recent study reported that 91% of patients who have suffered a nonfatal overdose continued to receive prescription opioids, even though opioid discontinuation is correlated with a lower risk of subsequent overdose.[8] Unwarranted opioid abuse is an immense clinical and economic burden. In the United States, the economic burden of opioid abuse, overdose, and dependence is estimated at $78.5 billion, with a third of this, or $28.9 billion, due to substance abuse costs and increased health care utilization.[9] Research shows that opioid abusers are more likely to use medical services, and therefore generate higher medical spend than nonabusers.[6,10] Furthermore, opioid abusers with private insurance generate a mean excess health care cost of between $14,054 and $20,546 annually.[10]

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Urine drug testing (UDT) has long been used in clinical and legal settings to assess illicit drug use. It is currently also used as an aid in monitoring prescription opioid therapy and an indicator of patient compliance with treatment programs. The Substance Abuse and Mental Health Services Administration (SAMHSA) lists a group of 5 commonly abused drugs, "SAMHSA-5", including amphetamines, cannabinoids, cocaine, opiates, and phencyclidine (PCP), that are targeted in federally regulated testing programs in the United States. The SAMHSA web site also includes additional drug categories that may be used in screening, such as benzodiazepines, alcohol, opioids, and 3,4-methylenedioxy-methamphetamine (MDMA). UDT is the most commonly used test for drug-related clinical management, although tests of other matrices, including hair, sweat, and oral fluid, are increasing in popularity.[11] The CDC recommends UDT before starting opioid therapy and suggests that this type of testing may be used at least annually during treatment for monitoring purposes.[12] Frequent UDT for opioid abusers may also help to avoid misuse and overdose and may lead to long-term economic benefits by preventing the high costs associated with opioid abuse comorbidities.[13]

Traditionally, substance abuse was considered a criminal or social problem, and health care systems did not play a role in its management. In addition, many individuals who required assistance for substance abuse disorders did not have access to treatment options covered by insurance.[14] However, this has started to change due to the implementation of new legislation, such as the Affordable Care Act. The associated increases in UDT frequency inevitably led to a rise in testing costs, including costs deemed to be "excessive" when panels of UDT were billed individually rather than under a single code.[15] The Centers for Medicare and Medicaid Services (CMS) chose to no longer recognize the American Medical Association's Current Procedural Terminology (CPT®) drug testing codes in response to this problem. Currently, Medicare requires the use of the Healthcare Common Procedure Coding System (HCPCS), which uses codes based on the number of drug classes tested. Several health plans have also developed methods to combat unnecessary drug testing and poor billing practices. These include programs to improve preventive treatment for opioid abuse with a bundled payment tactic, combining behavioral and physical health management, health care analytics to identify at-risk patients, and increased training for clinicians in high-risk regions.[16]

In the last decade, laboratory benefit management (LBM) solutions have evolved to manage laboratory test utilization and spending on behalf of payers. Examples of LBM providers include Evicore, Beacon, and Avalon Healthcare Solutions, among others, and these LBMs apply medical policies created using clinical guidelines, syntheses of evidence-based medicine literature, and expert input from clinical advisory boards comprised of practicing physicians and laboratorians. Effective LBM programs include a routine testing management component powered by automated claims-editing software. The claims-editing software provides, at scale and nearly instantaneously, advice to health plans to inform decisions to deny, reduce, or approve reimbursement claims in accordance with specific policy details supporting the ruling. This approach is exemplified by Avalon Healthcare Solutions (an LBM employing several of the authors of this manuscript), which uses a proprietary claims editing application (Automated Policy Enforcement Application) to enforce a policy titled "*Prescription Medication and Illicit Drug Testing in the Outpatient Setting*." This policy addresses both presumptive and definitive drug testing. "Presumptive drug testing" is used in claims language to describe immunoassays that detect either a drug or drug metabolite, whereas "definitive drug testing" will often rely on chromatographic and/or mass spectrometric methodologies to measure the drug or drug metabolite directly.[17–20] Based on the directives of the policy regarding these 2 testing modalities, Automated Policy Enforcement Application manages the utilization of unnecessary laboratory procedures and promotes appropriate testing and coding practices over time.

The aim of this study was to survey how health plans are addressing drug testing in the outpatient setting and to assess the impact of an LBM on such testing.

Ethical Considerations

The requirement to obtain informed consent was waived because the authors used only anonymized data for quality improvement purposes. This study was approved by the Quality Improvement Committee at Avalon (No. QIP2002) in compliance with the guidelines for improvement studies in health care (SQUIRE protocol).[21]

MATERIALS AND METHODS

Data Sources

This study analyzed the claims history data of 3 private health plans in the United States. Demographic data of individual patients were not extracted for this study. The study period was from June 2016 to February 2020, with data during the COVID-19 pandemic intentionally excluded due to the significant associated decrease in test frequency observed (data not shown). The HCPCS and CPT® codes of commonly ordered drug screens are shown in Table 1. Briefly, HCPCS code G0479 is used to code for presumptive/screening testing, whereas the G0480/1/2/3 series of codes are used to represent definitive testing (typically mass spectrometry) measuring increasingly large numbers of drug classes. Specifically, G0480 is the code for a definitive drug testing panel of 1–7 different drug classes, whereas G0483 is the code for a definitive drug testing panel of 22 or more drug classes. Note that these codes are overwhelmingly used for UDT, but the data source does not record the specimen type (urine, blood, oral fluid, etc.). Although we cannot confirm the proportion of these claims that correspond to urine testing versus testing an alternative matrix, we suspect that the dataset represents almost entirely UDT.

The monthly total number of units of each test ordered and proportion paid are shown in Table 2. Likewise, the rendering provider National Provider Identifier (NPI) was collected for monitoring possible fraud, waste, or abuse. The clinical diagnostic laboratory reimbursement values shown are based on the 2020 CMS Clinical Diagnostic Laboratory Fee Schedule[22] with an effective date of January 1, 2020.

TABLE 1. Presumptive and Definitive Drug Testing Medical Codes With 2020 CMS Clinical Diagnostic Laboratory Fee Schedule Reimbursement Rates

Code	Definition*	CMS Clinical Diagnostic Laboratory Reimbursement† (Usd)
Presumptive		
80305	Drug tests(s), presumptive, any number of drug classes; any number of devices or procedures, (eg, immunoassay) capable of being read by direct optical observation only (eg, dipsticks, cups, cards, cartridges), includes sample validation when performed, per date of service	12.60
80306	Drug tests(s), presumptive, any number of drug classes; any number of devices or procedures, (eg, immunoassay) read by instrument-assisted direct optical observation (eg, dipsticks, cups, cards, cartridges), includes sample validation when performed, per date of service	17.14
80307	Drug test(s), presumptive, any number of drug classes, any number of devices or procedures, by instrument chemistry analyzers [eg, using immunoassay (eg, EIA, ELISA, EMIT, FPIA, IA, KIMS, RIA)], chromatography (eg, GC, HPLC), and mass spectrometry either with or without chromatography (eg, DART, DESI, GC-MS, GC-MS/MS, LC-MS, LC-MS/MS, LDTD, MALDI, TOF) includes sample validation when performed, per date of service	62.14
G0479‡	Drug test(s), presumptive, any number of drug classes; any number of devices or procedures by instrumented chemistry analyzers using immunoassay, enzyme assay, TOF, MALDI, LDTD, DESI, DART, GHPC, and GC mass spectrometry, includes sample validation when performed, per date of service	N.A.
Definitive		
G0480	Drug test(s), definitive, using drug identification methods able to identify individual drugs and distinguish between structural isomers (but not necessarily stereoisomers), including, but not limited to GC/MS (any type, single or tandem) and LC/MS [any type, single or tandem and excluding immunoassays (eg, IA, EIA, ELISA, EMIT, FPIA) and enzymatic methods (eg, alcohol dehydrogenase)]; qualitative or quantitative, all sources, includes specimen validity testing, per day, 1–7 drug class(es), including metabolite(s) if performed	114.43

(*continued on next page*)

TABLE 1. (*Continued*) Presumptive and Definitive Drug Testing Medical Codes With 2020 CMS Clinical Diagnostic Laboratory Fee Schedule Reimbursement Rates

Code	Definition*	CMS Clinical Diagnostic Laboratory Reimbursement† (Usd)
G0481	Drug test(s), definitive, using drug identification methods able to identify individual drugs and distinguish between structural isomers (but not necessarily stereoisomers), including, but not limited to GC/MS (any type, single or tandem) and LC/MS [any type, single or tandem and excluding immunoassays (eg, IA, EIA, ELISA, EMIT, FPIA) and enzymatic methods (eg, alcohol dehydrogenase)]; qualitative or quantitative, all sources, includes specimen validity testing, per day, 8–14 drug class(es), including metabolite(s) if performed	156.59
G0482	Drug test(s), definitive, using drug identification methods able to identify individual drugs and distinguish between structural isomers (but not necessarily stereoisomers), including, but not limited to GC/MS (any type, single or tandem) and LC/MS [any type, single or tandem and excluding immunoassays (eg, IA, EIA, ELISA, EMIT, FPIA) and enzymatic methods (eg, alcohol dehydrogenase)]; qualitative or quantitative, all sources, includes specimen validity testing, per day, 15–21 drug class(es), including metabolite(s) if performed	198.74
G0483	Drug test(s), definitive, using drug identification methods able to identify individual drugs and distinguish between structural isomers (but not necessarily stereoisomers), including, but not limited to GC/MS (any type, single or tandem) and LC/MS [any type, single or tandem and excluding immunoassays (eg, IA, EIA, ELISA, EMIT, FPIA) and enzymatic methods (eg, alcohol dehydrogenase)]; qualitative or quantitative, all sources, includes specimen validity testing, per day, 22 or more drug class(es), including metabolite(s) if performed	246.92

*For 80305–80307, the CPT® definition of the American Medical Association is given. For G0480–G0483, G0479, and G0659, the HCPCS definition is given.
†The CMS Clinical Diagnostic Lab Reimbursement values are based on the 2020 CMS Clinical Diagnostic Laboratory Fee Schedule with an effective date of January 1, 2020.
‡HCPCS code G0479 was deleted January 1, 2017.
DART, direct analysis in real time; DESI, desorption electrospray ionization; EIA, enzyme immunoassay; ELISA, enzyme-linked immunosorbent assay; EMIT, enzyme multiplied immunoassay technique; FPIA, fluorescence polarization immunoassay; GHPC, graphitic hierarchical porous carbon; GC/MS, gas chromatography/mass spectrometry; GC, gas chromatography; GC-MS, gas chromatography–mass spectrometry; GC-MS/MS, gas chromatography–tandem mass spectrometry; HPLC, high-performance liquid chromatography; IA, immunoassay; KIMS, kinetic interaction of microparticles in solution; LC-MS/MS, gas chromatography/mass spectrometry; LC-MS, liquid chromatography–mass spectrometry; LC-MS/MS, liquid chromatography–tandem mass spectrometry; LDTD, laser diode thermal desorption; MALDI, matrix-assisted laser desorption/ionization; RIA, radioimmunoassay; TOF, time-of-flight.

The drug testing policy enacted in this study is provided as **Supplemental Digital Content 1** (see **Supplemental Information**, http://links.lww.com/TDM/A459).

Statistical Analysis

We calculated the monthly total number of claims submitted during the study period using the codes listed in Table 1. Additionally, the monthly total number of paid claims for each code was determined. The relative amount, that is, the percentage of the total claims (%Claims) of each code, was calculated by dividing the number of units of each test submitted of a particular code by the total number of units, and then multiplied by 100. Likewise, to determine the percentage paid (or paid rate, %Claims Paid), the number of paid claims of a test was divided by the total number of paid claims, and then multiplied by 100.

TABLE 2. The Number of Definitive and Presumptive Drug Tests by Month

Month*	No. of Total Claims	No. of Paid Claims	% of Claims Paid
Before LBM Automation			
−5	33130	27189	82.1
−4	30135	24466	81.2
−3	37629	30185	80.2
−2	34126	27324	80.1
−1	34584	28005	81.0
After LBM automation			
April 2019	39809	32714	82.2
May 2019	40676	33757	83.0
June 2019	36891	30401	82.4
July 2019	40143	32766	81.6
August 2019	39219	32099	81.8
September 2019	36951	30238	81.8
October 2019	40813	34214	83.8
November 2019	34586	29351	84.9
December 2019	34887	29405	84.3
January 2020	39209	32765	83.6
February 2020	35517	29855	84.1
Total†	2,004,230	1,532,581	ND

*Because each health plan implemented LBM automation at a different time, months (−1) through (−5) indicate the months before implementation of each health plan.
†Total data represent the aggregate data from the entire time period of the study (June 2016 to February 2020).

To examine testing trends within each laboratory type [place of service (POS)], we determined the paid rate–POS distribution ratio. First, the paid rate for a specific POS (POS 11 Physician Office Laboratory, 19/22 Hospital Laboratories, or 81 Independent Laboratory) is calculated by dividing the number of paid claims for the POS by the total number of claims for that POS. Then, the market share for a specific POS is calculated by dividing the number of claims submitted by the total number of claims submitted for all outpatient POS within the scope of the study (ie, POS 11 + POS 19/22 + POS 81). Next, the ratio of the paid rate to the market share distribution is calculated by dividing the paid rate by the market share. A ratio greater than 1 indicates that a claim is being approved (or paid) at a fraction higher than the fraction of claims submitted for that specific POS, whereas a ratio value less than 1 indicates that a claim is being denied at a frequency higher than the fraction of claims submitted for that POS as related to other outpatient places of service. All graphs of the data were generated using KaleidaGraph 4.5 (Synergy Software, Reading, PA). To further describe testing trends, the compound annual growth rate (CAGR)[23,24] was determined using Equation 1 below, where V_f, V_i, and t represent the final value (in number of claims), initial value (in number of claims), and time (in years), respectively:

$$\mathrm{CAGR} = \left[\frac{V_f}{V_i}\right]^{\left(\frac{1}{t}\right)} - 1 \qquad (1)$$

RESULTS

For 3 private health plans, between June 1, 2016 and February 29, 2020, a total of 2,004,230 claims (Table 2) were submitted for either presumptive or definitive drug testing using one of the codes listed in Table 1 and 1,532,581 of these claims were approved (ie, paid). Each of these health plans contracted an LBM program to automate medical policy at some point during this period, allowing for the comparison of testing before LBM automation to testing after LBM automation. Because each health plan initiated automation in a different month, the period of comparison for the period just before automation was designated as months (−5) through (−1), indicating the months preceding LBM automation (eg, if automation began December 2016, then month −1 was November 2016 and month −2 was October 2016 and so on) to establish a baseline. For the period after LBM automation, a uniform period of April 2019 to February 2020 was used for all the data. As seen in Table 2, the aggregate data before LBM automation ranged in the total number of claims submitted from 30,135 to 37,629; however, the paid rate, as indicated by the percentage of claims paid, remained relatively constant (80.2%–82.1%). Viewing the current trend after LBM automation (ie, April 2019–February 2020), an increase in the total number of claims was seen (from 34,586 to 40,813), but the paid rate was relatively unchanged (81.6%–84.9%). The trends concerning presumptive testing before and after the implementation of the LBM program were similar. The percent paid rate before implementing the LBM program was between 87.1% and 87.5% after implementation (data not shown).

To further characterize the trends in testing, the POS of outpatient settings was determined and how this was related to the paid rate before and after LBM automation. This ratio, the Paid Rate–POS Distribution Ratio, relates the fraction of the claims that are paid for a specific POS to the relative market share of that POS with respect to the total outpatient

setting (eg, total number of claims of POS 11 + POS 19/22 + POS 81). For the scope of this study, only POS 11 (physician's office), POS 19/22 (off campus-outpatient hospital/on campus-outpatient hospital, which were combined for simplicity in this study), and POS 81 (independent laboratory) were included. Figure 1 shows the Paid Rate–POS Distribution Ratio for the aggregate data (panel A) and for the individual health plans (panels B–D) before and after LBM policy automation. For the aggregate data, the POS 11 paid rate fluctuated between 0.785 and 0.838. An interesting phenomenon, however, was the inverse trend observed between POS 19/22 and POS 81. POS 19/22 had a high preautomation ratio of 0.704, but in February 2020, the trend decreased to a low of 0.617. POS 81, however, had a preautomation nadir of 0.581, after which the ratio trend for POS 81 increased to surpass that of POS 19/22 after LBM automation. Similar data trends were seen in 2 of the 3 individual health plans (Figs. 1B, C). Both saw a sharp decrease in the ratio of POS 19/22 with a marked increase in the ratio of POS 81. For health plan 3 (Fig. 1D), the trends for the period April 2019 to February 2020 were muted. Both POS 11 and POS 19/22 were unchanged, whereas POS 81 showed a positive slope from June 2019 onward.

Next, because there was a considerable cost differential between presumptive and definitive drug testing (Table 1), the distribution of definitive drug testing only by POS was determined for the aggregate data (Fig. 2) before and after LBM policy automation. Only the HCPCS codes G0480–G0483, as listed in Table 1, were included in this study, and no proprietary laboratory tests (PLA codes) were included. For each POS, the distribution of the units ordered for each test (eg, % Claims) and the distribution of paid claims (eg, %Claims Paid) were calculated monthly. Panels A–C show the % Claims, and panels D–F show the %Claims Paid.

For POS 11 (Figs. 2A, D), before LBM policy automation, G0483 comprised 22.7%–30.0% of all claims submitted and 11.4%–24.9% of all claims paid. This high fraction was unexpected, as physician office laboratories (POS 11) are unlikely to have the instrumentation required to perform the complexity of testing and it is likely that "pass through billing," in which one laboratory bills for the work of another laboratory, was occurring. After LBM policy automation, the percentage of claims paid that were G0483 dropped to between 0.8% and 3% while they comprised between 2.7% and 12% of all claims submitted. G0480, before LBM policy automation, was made up of between 55.0% and 64.8% of all the claims submitted and 66.8%–84.9% of all the claims paid; these numbers increased considerably with LBM policy automation to between 73.0% and 83.9% of claims submitted and 92.4%–95.6% of total paid claims. The CAGR for the number of claims *submitted* was also determined for the preceding year at POS 11 for G0480 and G0483. The total number of units of G0480 increased from 3843 to 3922, resulting in a CAGR of 0.0206, whereas the number of G0483 total claims

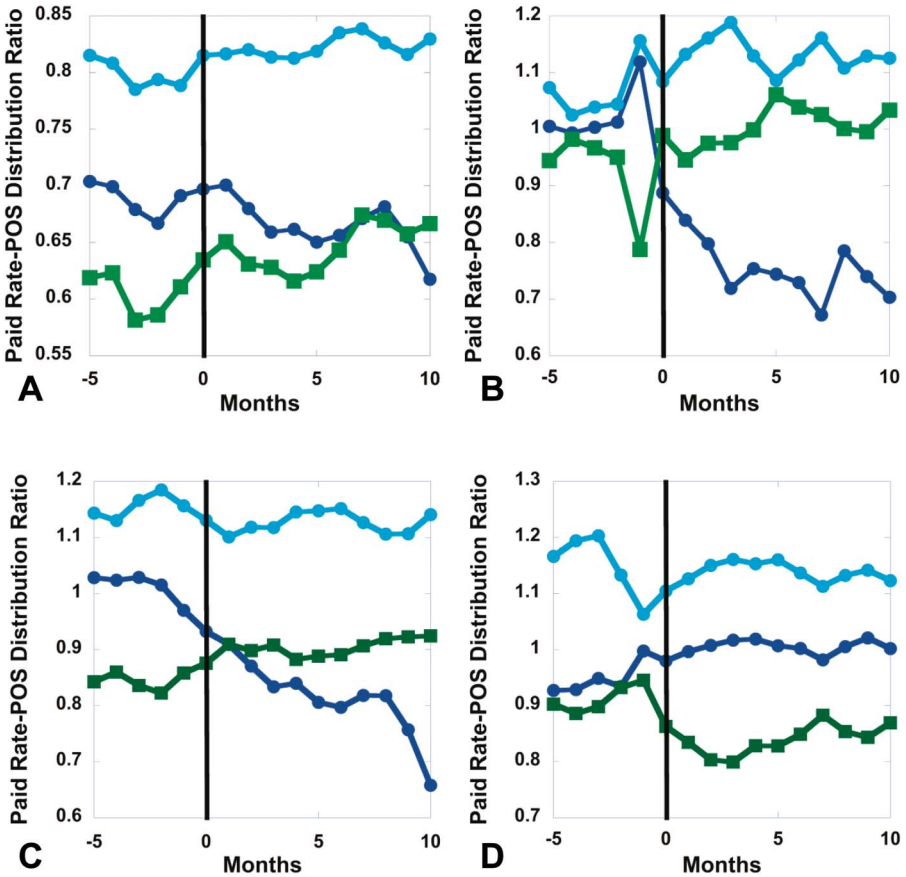

FIGURE 1. Paid rate–POS distribution ratio for the aggregate data (A) and individual health plans (B–D) are shown with a black vertical bar to show the time at which policy automation by the LBM program began. Data for POS 11 (physician's offices) are in light blue, data for POS 19/22 (outpatient hospitals) are in dark blue, and data for POS 81 (independent laboratories) are in green.

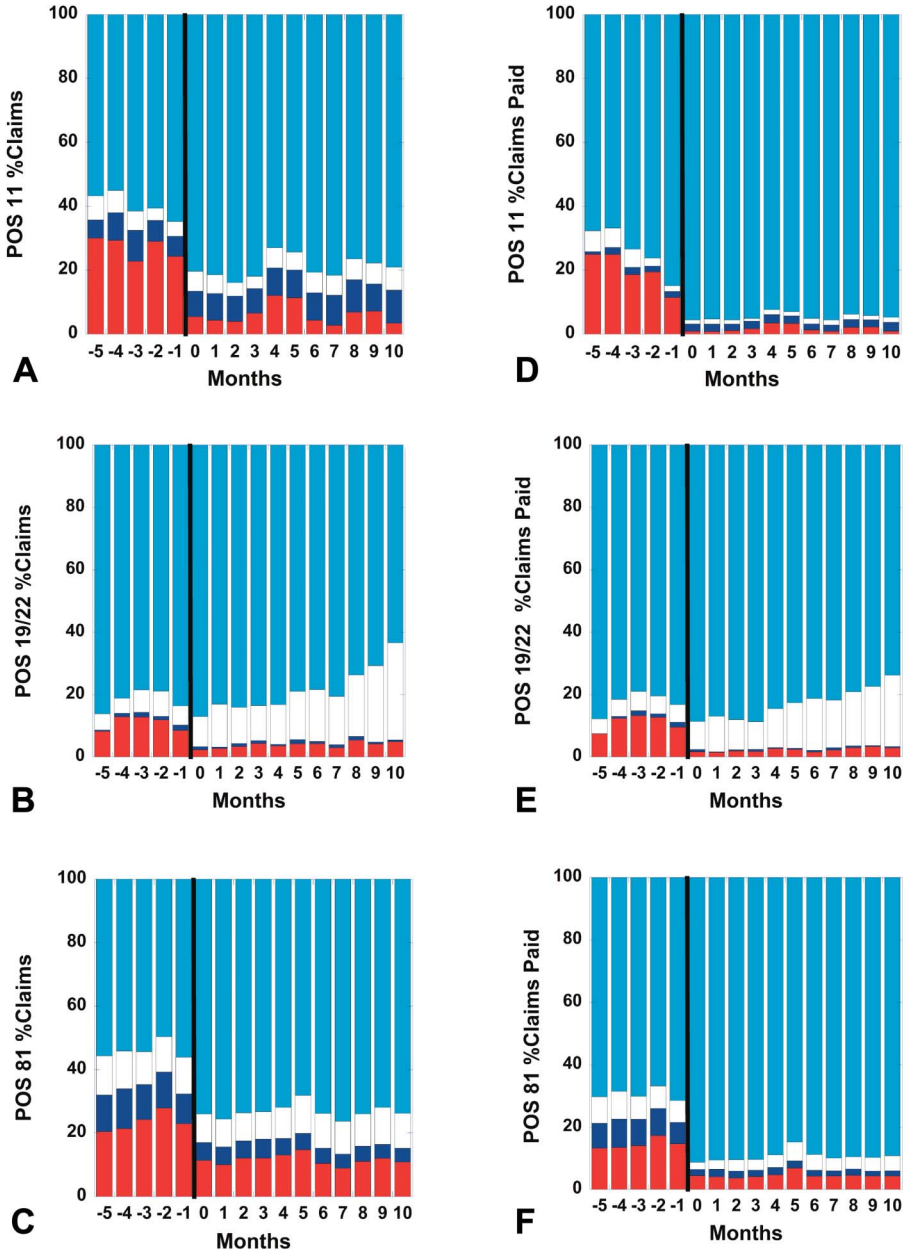

FIGURE 2. Distribution of definitive drug testing of aggregate data by POS. Data for code G0480 are shown in light blue, data for code G0481 in white, data for code G0482 in dark blue, and data for code G0483 in red. For code descriptions, Table 1. The distribution of definitive drug testing as a function of the number of units submitted by POS (%Claims) is shown in (A–C). The distribution of paid definitive drug testing claims by POS (%Claims paid) is shown in (D–F). The data for POS 11 are shown in (A, D). The data for POS 19/22 are shown in (B, E), and the data for POS 81 in (C, F). The black vertical bar in each graph indicates the time of LBM policy automation.

submitted decreased from 342 to 101, resulting in a CAGR of −0.705. This indicated a 70.5% decrease in the ordering of G0483 at POS 11 with an increase of 2% in submitted claims of G0480.

For POS 19/22 (Figs. 2B, E), before LBM policy automation, 8.3%–12.9% of all claims submitted and 7.6%–13.3% of all claims paid were G0483. After LBM policy automation, these values decreased, with G0483 accounting for 2.3%–5.5% of all claims submitted and 1.4%–3.3% of all claims paid. Before LBM policy automation, 78.5%–86.1% of all claims were G0480, and 79.0%–87.7% of all paid claims were G0480. After LBM policy automation, 63.3%–87.0% of all claims submitted and 73.7%–88.7% of all claims paid were G0480. The CAGR for the number of claims *submitted* at POS 19/22 for G0480 decreased from 666 to 420, resulting in a CAGR of −0.369, whereas few monthly claims of G0483 were submitted at POS 19/22 (30 versus 8 from the previous year). The resulting CAGR for G0483 claims *submitted* by POS 19/22 was 2.75. The data indicate that the ordering of G0480 over the course of a year decreased by 36.9% at POS 19/22, but there was a substantial increase in the ordering of G0483. However, the G0483 trend was skewed by the low sample number relative to the number of claims of G0480.

For POS 81 (Figs. 2C, F), before LBM policy automation, 20.4%–27.8% of all claims submitted and 13.3%–17.3% of all claims paid were G0483. After LBM policy automation, these values decreased. G0483 account for 9.0%–14.7% of all

claims submitted and 3.6%–6.9% of all claims paid. For G0480, before LBM policy automation, they comprised 50.0%–56.1% of total claims submitted and 66.7%–71.4% of total claims paid, whereas after LBM policy automation, these numbers increased to 68.2%–76.3% of total claims submitted and 84.8%–91.2% of total claims paid. The CAGR for the number of claims of G0480 submitted at POS 81 is 0.119 (due to an increase in the monthly claims submitted from 7521 to 8413). The number of monthly claims of G0483 submitted at POS 81 decreased from 1813 the previous year to 1235, resulting in a CAGR of −0.319. These data indicate that over the course of a year, there is an increase of 11.9% in the ordering of G0480 and a decrease of 31.9% in the ordering of G0483 at POS 81.

Additionally, the distribution of G0480 and G0483 among the top rendering providers (laboratories) before and after LBM policy automation was also determined. Rendering providers included in this analysis had performed a minimum of 1000 units in any combination of the codes listed in Table 1. The percentage of claims submitted (%Claims) and the paid rate (%Paid) were calculated for the 5 months preceding LBM policy automation ("Pre-") and for the same period (April 2019–February 2020) after LBM policy automation ("Post-"). Because a filed claim may have an empty rendering provider field, such claims were combined and listed as "Null" in Table 3. The top rendering provider (provider A) before LBM policy automation was paid for 51.3% of G0483 claims and 56.8% of G0480 claims, and G0480 comprised only 28.9% of all definitive drug tests performed. After LBM policy automation, however, these results changed drastically, with G0483 accounting for 0% of the claims submitted, and G0480 accounting for 99.5% of all claims submitted and 96.5% of the claims paid (Table 3). Another striking example was provider H, where before LBM policy automation none of the claims submitted were G0480 and 62.1% were G0483, and 100% of those claims were paid. Upon LBM policy automation, none of the G0483 claims were paid, even though those claims constituted 23.4% of the total number of claims submitted, and 89.0% of the G0480 claims were paid. It is interesting to note that the "Null" claims for G0480 showed little effect from LBM automation (64.9% paid out before automation and 60.9% after), but the percentage of paid claims of G0483 dropped from 61.9% of all claims to 12.8%. In addition, in the period of LBM postimplementation, additional providers, such as providers DD, EE, and FF, were added as rendering providers, performing G0480 testing rather than G0483 testing. Taken together, the data indicated that LBM policy automation positively directed G0480 testing while decreasing the use of G0483.

DISCUSSION

In this study, we describe trends in drug testing in outpatient settings as seen in the claims history of 3 private health plans in the period between June 2016 and February 2020 and assessed the effects of implementing policy automation by an LBM on such testing. Over the course of the study, 2,004,230 claims of either definitive or presumptive drug testing were submitted. Before policy automation by an LBM, the percentage of the claims paid ranged from 80.1% to 82.1%. For the period after LBM automation (April 2019 to February 2020), the paid rates of total claims submitted were similar (81.6%–84.9%) overall (Table 2), but the codes, and therefore specific types of tests included in these fractions, changed from a large to a small fraction of highly complex definitive testing. This was in keeping with the aim of the implemented UDT policy, which generally encouraged screening with presumptive testing and using the smallest definitive testing panel possible to address the clinical need. Upfront testing with a large definitive panel (such as that represented by G0483, which simultaneously quantifies more than 22 drug classes) was strongly discouraged by this policy, as we are unaware of published, peer-reviewed literature demonstrating improved outcomes resulting from the use of such large panels.

We first assessed the trends in drug testing by POS in outpatient settings—POS 11 (physician's offices), POS 19/22 (off campus-outpatient hospitals/on campus-outpatient hospitals), and POS 81 (independent labs)—using a ratio of the paid rate to the POS distribution of claims. The aggregate data (Fig. 1A) showed that, after LBM policy automation, the POS 81 trend increased while POS 19/22 decreased, and POS 11 remained unchanged. This reflected a shift from hospital laboratories to independent laboratories, with little overall change in testing from physician office laboratories. Likewise, 2 of the 3 private health plans (Figs. 1B, C) showed an increase in paid rate distribution trends for POS 81, whereas POS 19/22 decreased substantially after LBM policy automation. This potentially indicated a shift away from approving claims performed at POS 19/22 as the rate of claims approvals at POS 81 had increased.

Using the 2020 CMS Clinical Diagnostic Lab Reimbursement Fee Schedule as a guide (Table 1),[22] it was apparent that considerable variation existed in potential reimbursement between a presumptive test, such as a lateral flow immunoassay billed using CPT® code 80305 reimbursed at $12.60, and a definitive drug panel test of 22 or more billed drug classes using HCPCS code G0483 reimbursed at $246.92. Because of this large difference, we examined trends of definitive drug testing by measuring the distribution of tests ordered by POS. As seen in Figure 2, across all service locations, the number of claims of G0483 decreased after incorporating the LBM program. For both POS 11 and 81, the total number of claims for G0480 increased after LBM policy automation, whereas at POS 19/22, there was an increase in G0481, whereas G0483 usage decreased. Across all the places of service, the percentage of claims paid by G0483 decreased substantially after implementing the LBM program, and the relative amount of paid claims of the lower cost tests G0480 and G0481 increased substantially, for example, at POS 11, G0480 ultimately accounted for between 92.4% and 95.6% of paid claims. With the exception of POS 19/22, where there were too few monthly claims for a CAGR calculation to be statistically relevant (n = 8), the CAGR for the last year of the study, where all 3 health plans had implemented the LBM automation program, showed a substantial decrease in testing for G0483—a 70.5% decrease at POS 11 and a 31.9% decrease at POS 81. This trend

TABLE 3. Top-Rendering Providers of Definitive Drug Testing, by HCPCS Code, Before and After the Implementation of LBM Automation

		G0480				G0483			
		Pre		Post		Pre		Post	
Provider	Total Units*	%Claims†	%Paid‡	%Claims†	%Paid‡	%Claims†	%Paid‡	%Claims†	%Paid‡
A	29736	28.9	56.8	99.5	96.5	18.5	51.3	0	—
Null§	29488	27.3	64.9	39.1	60.9	44.7	61.9	40.5	12.8
B	15246	52.6	91.8	32.4	92.1	8.0	100.0	13.5	39.3
C	14809	15.4	100.0	96.9	94.9	3.6	100.0	0	—
D	8683	100.0	22.9	92.8	81.0	0	—	0	—
E	7860	0	—	85.1	95.6	69.2	67.1	3.6	52.4
F	5687	14.1	31.0	89.1	60.3	85.9	50.5	10.9	0
G	5460	100.0	30.2	96.2	81.5	0	—	0	—
H	5012	0	0	20.5	89.0	62.1	100.0	23.4	0
I	4545	0	0	100.0	89.1	100.0	46.3	0	—
J	4465	0	0	74.1	100.0	100.0	100.0	15.0	77.7
K	4107	0	0	22.1	100.0	37.2	33.9	8.4	100.0
L	4086	0	—	66.0	100.0	0	—	25.0	73.1
M	3613	22.3	100.0	100.0	100.0	0	—	0	—
N	3542	0	0	93.0	95.1	100.0	100.0	3.1	0
O	2975	19.3	100.0	100.0	100.0	7.0	100.0	0	—
P	2581	100.0	100.0	100.0	100.0	0	—	0	—
Q	2417	0	—	100.0	91.1	0	—	0	—
R	2022	0	—	0	—	0	—	0	—
S	1930	0	—	58.8	85.5	0	—	41.2	24.3
T	1667	69.7	60.4	100.0	100.0	0	—	0	—
U	1397	0	—	12.0	100.0	0	—	25.5	50.0
V	1365	0	—	100.0	100.0	0	—	0	—
W	1323	0	—	0	—	0	—	100.0	24.3
X	1284	0	—	69.4	65.2	0	—	30.6	63.4
Y	1215	0	—	100.0	100.0	0	—	0	—
Z	1212	84.6	26.1	0	—	0	—	0	—
AA	1198	88.4	85.9	100.0	100.0	0	—	0	—
BB	1136	0	—	100.0	100.0	100.0	100.0	0	—
CC	1124	59.2	34.6	0	—	0	—	0	—
DD	1070	0	—	100.0	100.0	0	—	0	—
EE	1038	0	—	89.2	74.3	0	—	10.8	0
FF	1022	0	—	100.0	85.5	0	—	0	—

*Total units include the total number of units of all definitive drug tests submitted by a rendering provider during the study period.
†%Claims refers to the percentage of the total number of claims of definitive drug tests submitted by a rendering provider that are of a particular test (eg, G0480 or G0483).
‡%Paid refers to the percentage of the number of claims of a particular test (eg, G0480 or G0483) that were paid.
§"Null" provider indicates that the National Provider Identifier (NPI) field for the rendering provider was left empty on the filed claim.

for the testing distribution of top rendering providers is summarized in Table 3. After LBM implementation, a clear shift occurred in ordering trends for many providers, such as providers A, C, and D, from G0483 to G0480.

Taken together, the implementation of an LBM program with respect to the scope of this study (eg, drug testing in the outpatient setting) positively directed testing toward the use of G0480 for definitive drug testing, primarily at POS 11 and 81, while decreasing the use of the more expensive G0483. G0483 was reimbursed at $246.92/unit compared with $114.43/unit for G0480, according to the 2020 CMS Clinical Diagnostic Laboratory Fee Schedule,[22] indicating that substantial monetary savings are associated with the intervention. It was also not surprising to see a shift toward certain POS where selective contracting may be negotiated. Previous studies have shown that selective contracting could help to decrease expenditures for health insurance plans.[25–27] One possible concern was that a contracting network would be too narrow or limited.[26] As seen in Table 3, after the implementation of a comprehensive LBM program, additional top rendering providers were added (such as providers Q, S, V, X, Y, DD, EE, and FF).

This study has several limitations. First, this study only addresses testing in specific outpatient settings and does not address testing in other POS, such as inpatient or emergency services, nor does it address the use of proprietary laboratory testing (PLA codes), which is a burgeoning field as new laboratories seek unique billing codes for their proprietary

tests. Another limitation is that without coupling the HCPCS or CPT® billing codes to the individual patient's diagnostic results (ICD-10 code), testing directly related to the opioid epidemic was not the only testing assessed in this study. As mentioned previously, UDT is a ubiquitous clinical tool that is used for many purposes, and it is conceivable that a portion of the testing included in this study was ordered for nonopioid concerns. However, our experience indicates that a large proportion of these HCPCS/CPT® codes stem from testing ordered in the context of opioid use (data not shown), so we believe that the trends represented here would not likely be directionally different if narrowed only to opioid users. Finally, the data included in this study only contain information on the rendering provider (the clinical laboratory performing testing) rather than the ordering provider. Additional studies should be performed to look at the trends of testing by ordering providers, which could be a useful metric for possible fraud, waste, and abuse for the health plan.

CONCLUSIONS

The data analyzed in this study demonstrate the frequency of the performance of several common UDT that were billed to commercial insurers in the United States, and the effect of policy implementation intended to reduce wasteful overtesting with larger-than-necessary UDT panels. Within the outpatient setting, drug testing can be directed toward places of service amenable to cost-efficient contractual savings, such as POS 11 and POS 81, and away from high-cost testing facilities. Likewise, for definitive drug testing, the enforcement of the use of HCPCS codes based on the number of drug classes being tested rather than a single drug or metabolite and in a direction away from high-cost testing, such as G0483, toward the more cost-efficient G0480 when clinically relevant, could save health plans money while providing members the necessary medical benefits.

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