National Trends in Buprenorphine Treatment for Opioid Use Disorder From 2007 to 2018

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Abstract

Background: Buprenorphine is a key medication to treat opioid use disorder (OUD). Since its approval in 2002, buprenorphine access has grown markedly, spurred by major federal and state policy changes. This study characterizes buprenorphine treatment episodes during 2007 to 2018 with respect to payer, provider specialty, and patient demographics.

Methods: In this observational cohort study, IQVIA Real World pharmacy claims data were used to characterize trends in buprenorphine treatment episodes across four time periods: 2007-2009, 2010-2012, 2013-2015, and 2016-2018.

Results: In total, we identified more than 4.1 million buprenorphine treatment episodes among 2 540 710 unique individuals. The number of episodes doubled from 652 994 in 2007-2009 to 1 331 980 in 2016-2018. Our findings indicate that the payer landscape changed dramatically, with the most pronounced growth observed for Medicaid (increased from 17% of episodes in 2007-2009 to 37% of episodes in 2016-2018), accompanied by relative declines for both commercial insurance (declined from 35 to 21%) and self-pay (declined from 27 to 11%). Adult primary care providers (PCPs) were the dominant prescribers throughout the study period. The number of episodes among adults older than 55 increased more than 3-fold from 2007-2009 to 2016-2018. In contrast, youth under age 18 experienced an absolute decline in buprenorphine

treatment episodes. Buprenorphine episodes increased in length from 2007-2018, particularly among adults over age 45.

Conclusions: Our findings demonstrate that the U.S. experienced clear growth in buprenorphine treatment—particularly for older adults and Medicaid beneficiaries—reflecting some key health policy and implementation success stories. Yet, since the prevalence of OUD and fatal overdose rate have also approximately doubled during this period, the observed growth in buprenorphine treatment did not demonstrably impact the pronounced treatment gap. To date, only a minority of individuals with OUD currently receive treatment, indicating continued need for systemic efforts to equitably improve treatment uptake.

Keywords

buprenorphine; opioid use disorder; treatment access

Introduction

In the U.S., the opioid crisis claimed nearly 70 000 lives in 2020. Fatal overdoses increased nearly 40% from 2019, driven primarily by synthetic opioids (e.g., fentanyl).[1] Overdose deaths among all age groups continued to rise in 2021, with statistically significant increases (relative to 2020) observed for all age groups except age 15 to 24.[2] Buprenorphine is a gold standard medication for opioid use disorder (MOUD). It can be prescribed in office-based settings by physicians and other qualified clinicians who have obtained a federal waiver.[3,4] Key policy changes have sought to expand access, including expansion of buprenorphine waiver eligibility to include advance practice clinicians (APCs, e.g., nurse practitioners, physician assistants) and increases to the patient limit per prescriber.[5,6] Additional policy efforts sought to provide federal and state Medicaid financing (e.g., State Opioid Response and State Targeted Response grant programs, SUPPORT Act of 2018, Medicaid expansion under the Affordable Care Act [ACA]).[7]

Given the dynamic landscape for buprenorphine in recent years, the extent to which buprenorphine access has increased for different patient populations and across different prescriber specialties has not been fully characterized. In this study, we use national pharmacy claims data to characterize buprenorphine treatment episodes during 2007 to 2018 with respect to payer, provider specialty, and patient demographics. This study provides a novel contribution by examining buprenorphine treatment utilization across payers in all US states from 2007 to 2018, a time-frame which is significantly longer than previous studies and which encompasses key opioid-related policy actions. Our findings indicate that the payer landscape changed dramatically across the study period, with the most pronounced growth for Medicaid and relative declines in the proportion of episodes paid for with commercial insurance or by self-pay. As discussed below, these changes with respect to payer were accompanied by notable shifts in prescribing clinician specialty and age of individuals receiving buprenorphine. While buprenorphine access has grown markedly in the 20 years since U.S. Food and Drug Administration (FDA) approval in 2002,[8] profound treatment gaps remain, as less than 1 in 5 individuals with OUD receive medication treatment.[9]

Methods

De-identified pharmacy claims from IQVIA Real World Data—Longitudinal Prescriptions were used to characterize trends in buprenorphine treatment episodes during 2007 to 2018.[10] These data, which capture an estimated 90% of prescriptions filled at retail pharmacies in all 50 states and the District of Columbia, include information on the prescription, payer, patient demographics, and prescriber specialty and location. The study was approved with a waiver of consent by the corresponding author's Institutional Review Board.

We identified new treatment episodes as the period from the first observed fill-date of a prescription for a buprenorphine formulation with an FDA-approved indication for OUD treatment (occurring at least 90 days after any prior filled buprenorphine prescriptions) through the date of the last day's supply of the final filled buprenorphine prescription, allowing no more than a 30-day gap between consecutive prescriptions.

For each dispensed prescription, IQVIA data provides the primary payment source recorded by the dispensing pharmacy, classified as follows: commercial insurance; Medicaid; Medicare; self-pay; and other (comprising pharmacy prescription discount cards, prescription coupons/vouchers, Tricare, and workers compensation). Using the same categories, we classified episode payer as the payment source that accounted for the most dispensed days across the treatment episode. Episodes were attributed to the prescriber who wrote the most days' supply during the episode. We classified prescriber specialty as addiction specialists (including addiction medicine and addiction psychiatry physicians); adult primary care physicians (PCPs, including internists and family practice physicians); psychiatrists; pain specialists, (including anesthesiologists and neurologists); pediatricians; advance practice providers (APPs, including nurse practitioners and physician assistants); and other prescribers (comprising primarily surgeons and adult subspecialties). Patient characteristics included gender (male, female) and age group (12-17, 18-25, 26-35, 36-45, 46-55, 56-65, and 66+). We note that patients have unique identifiers in the IQVIA data, allowing patients to be tracked across payers. Secondary analyses considered characteristics of the county that buprenorphine prescribers were located in (i.e., urbanicity, median household income, resident race/ethnicity, fatal overdose rate); results are provided in Table A1.

We characterized buprenorphine episodes across 4 time periods: 2007-2009, 2010-2012, 2013-2015, and 2016-2018. Descriptive statistics regarding prescriber specialty, payer, and patient characteristics were calculated for each period. We assessed linear growth trends in the number of episodes from 2007-2009 to 2016-2018. When comparing growth trends across subgroups, we descriptively benchmarked growth from 2007-2009 to 2016-2018 relative to the overall national growth ratio (e.g., relatively lower growth compared to the overall national trend). We note that we also examined trends more granularly with respect to year and concluded that the parsimony created by 4 time periods yielded results that illustrated the temporal trends we identified yet were more easily interpretable. See Tables A2 and A3 for selected results tables by year.

Results

We identified more than 4.1 million buprenorphine treatment episodes during 2007-2018 among 2 540 710 unique individuals. The number of episodes doubled from 652 994 in 2007-2009 to 1 331 980 in 2016-2018, yielding a growth ratio of 2.04 (alternatively 204%; hereafter referred to as *overall national trend*).

Payer Type

The payer landscape changed dramatically during 2007-2018 (Figure 1). The most pronounced growth was observed for Medicaid. In 2007-2009, Medicaid paid for 108 728 episodes, accounting for 17% of episodes. By 2016-2018, the number of episodes paid for by Medicaid had more than quadrupled (exceeding national trend) to 489 966, representing 37% of episodes.

Additionally, the number of episodes paid by other sources (e.g., pharmacy prescription discount cards; prescription coupons/vouchers; Tricare; or workers compensation) increased 3-fold (exceeding national trend) from 109 544 (17% of episodes) in 2007-2009 to 334 087 (25% of episodes) in 2016-2018. While Medicare paid for a relatively small proportion of buprenorphine episodes during the study period, the number of episodes paid for by Medicare grew approximately 3-fold (exceeding national trend) from 28 275 (4% of episodes) in 2007-2009 to 90 962 (7% of episodes) in 2016-2018.

Growth in coverage by Medicaid, Medicare, and other payer sources led to the a decline in the proportion of episodes paid for by commercial insurance or self-pay. Self-pay episodes declined in absolute number from 178 297 in 2007-2009 to 142 714 in 2016-2018, representing a decline from 27 to 11% of all episodes. The number of episodes paid by commercial insurance also grew more slowly than the overall national trend, increasing approximately 20% from 228 150 in 2007-2009 to 274 251 in 2016-2018. The proportion of episodes paid for by commercial insurance fell from 35 to 21% across the study period.

Clinician Specialty

Key changes across time regarding clinician specialty were observed (Figure 2). Adult PCPs were the dominant prescribers throughout the study period, accounting for 352 422 of episodes in 2007-2009 and 768 841 in 2016-2018. Growth among adult PCPs was somewhat higher than the overall national trend, resulting in the proportion of episodes prescribed by an adult PCP increasing from 54% in 2007-2009 to 58% in 2016-2018. The most rapid growth was observed for clinicians classified as "other" specialties. The number of episodes prescribed by other specialties experienced nearly 3-fold (exceeding national trend) growth across the study period from 36 382 (6% of episodes) to 106 991 (8% of episodes). APCs, newly granted authority to prescribe buprenorphine, accounted for 60 973 episodes (5%) in 2016-2018.

The number of episodes prescribed by psychiatrists and addiction specialists both grew more slowly than the overall national trend, leading to a decline in the proportion of episodes prescribed by these specialties. Episodes prescribed by psychiatrists grew only 30% from 163 528 (25% of episodes) to 219 761 (17% of episodes) across the study period. Similarly,

the number of episodes prescribed by an addiction specialists grew only 40% from 38 682 (6% of episodes) in 2007-2009 to 53 934 (4% of epispdoes) in 2016-2018. The number of episodes prescribed by pain specialists grew commensurate with national trends; pain specialists consistently prescribed 9 to 10% of all buprenorphine episodes.

Overall, in 2007-2009, approximately 55% buprenorphine episodes were prescribed by an adult PCP; 3 in 10 by a psychiatrist or addiction specialist; and 15% by a pain specialist or clinician of another specialty. By 2016-2018, approximately 6 in 10 buprenorphine episodes were prescribed by an adult PCP or APC, 2 in 10 by a psychiatrist or addiction specialist; and nearly 20% by a pain specialist or clinician of another specialty.

Patient Demographics

In 2007-2009, males accounted for approximately 62% of buprenorphine episodes (Figure 3). Growth among females was faster than among males, such that the share of female patients increased from 38% of episodes 2007-2009 to 42% of episodes in 2016-2018. We note that national survey data from 2019 indicate that 45% of individuals diagnosed with OUD are female,[11] suggesting that the gender ratio among buprenorphine patients generally reflects that among individuals diagnosed with OUD.

The age distribution of buprenorphine patients also changed, with a relative increase in older patients and a relative decrease in younger patients (Figure 4). Consistently, buprenorphine patients were primarily aged 26 to 35 (accounting for 35% of episodes in 2007-2009 and 40% in 2016-2018) or aged 36 to 45 (accounting for 21% of episodes in 2007-2009 and 25% in 2016-2018). Likewise, national survey data indicate that the majority of individuals diagnosed with OUD are adults between ages 25 and 50 (29% are aged 26 to 34 and 32% are aged 35 to 49).[11]

The number of episodes among both adults aged 56 to 65 and adults aged 66+ increased more than 3-fold (exceeding national trend) across 2007-2009 to 2016-2018. The number of episodes among adults aged 56 to 65 increased from 31 076 (5% of episodes) to 95 852 (7% of episodes) and the number of episodes among adults aged 66+ increased from 8966 (1% of episodes) to 28 372 (2% of episodes). In total, by 2016-2018, 9% of buprenorphine episodes were among adults aged 56 and older, up from 6% in 2006-2008.

Strikingly, buprenorphine episodes among adolescent patients aged 12 to 17 fell in absolute number from 2502 (0.4% of episodes) in 2007-2009 to 1450 (0.1% of episodes) in 2016-2018. Growth among young adults aged 18 to 25 also did not keep pace with national trends: rather than doubling, the number of episodes increased only 9% across the study period, from 146 863 to 160 724 in 2016-2018. Resultantly, the proportion of buprenorphine episodes among individuals under 26 years fell from 23% in 2006-2008 to 12% in 2016-2018.

Notably, comparing these rates of buprenorphine prescribing to national rates of OUD diagnosis suggest that older adults and adolescents have disproportionately low rates of buprenorphine utilization. Specifically, 2019 national survey data indicates that 4% of individuals with OUD were adults aged 12 to 17,[11] yet we observed that adolescents only

comprised 0.1% of all buprenorphine episodes in 2016-2018. Likewise, 24% of individuals with OUD were aged 50+,[11] yet our results indicate that only 9% of buprenorphine episodes in 2016-2018 were among adults aged 56 and older.

Treatment Episode Length

In Table 1, we report median episode length by patient characteristics, payer, and provider specialty. Overall, buprenorphine episodes increased in length from 2007 to 2018. In 2007-2009, 23% of all episodes were 180 days or longer; this had increased to 30% of episodes in 2013-2015 and 2016-2018. The average number of treatment episodes per patient remained constant at 1.3 across the study period.

Treatment length was very similar for male and female patients. However, differences in episode length were observed by age. Across the study period, median episode length increased consistently for adults aged 46 to 55 (from 45 days in 2007-2009 to 69 days in 2016-2018), adults aged 56 to 65 (from 40 to 71 days) and adults aged 66 and older (from 30 to 60). Episode length first increased and then decreased for individuals aged 12 to 17, aged 18 to 25, and aged 26 to 35.

Variation in median episode length by payer was observed. Consistently, episode length was longest (and similar) for Medicaid, Medicare, and commercial insurance, whereas self-pay episodes were shortest. In 2016-2018, median episode length was 90 days for Medicare, 84 days for commercial insurance, and 75 days for Medicaid compared to 24 days for self-pay; and 47 days for other payment sources. Across clinical specialties, episode length was relatively similar in 2007-2009, ranging from a median of 50 days for psychiatrists to 39 days for other specialists. More differentiation was seen by 2016-2018, as episode length ranged from 65 days for APCs and 63 days for PCPs to 43 days for addiction specialists.

Discussion

Overall, our findings demonstrate that the U.S. experienced clear growth in buprenorphine treatment, with a doubling of treatment episodes occurring from 2007-2009 to 2016-2018 as well as increases in treatment episode duration. Yet, this growth in buprenorphine utilization should be viewed in context of an evolving opioid epidemic. Given that the prevalence of OUD and fatal overdose rate have also approximately doubled during this period,[12,13] the observed growth in buprenorphine treatment did not demonstrably impact the pronounced treatment gap. This has also been observed in previous studies among Medicaid beneficiaries[14] and in the Veterans Health Administration (VHA)[15] that concluded that growth in buprenorphine waivered clinicians and prescribing did not notably increase the overall proportion of OUD patients who received buprenorphine.

However, our results highlight some clear health policy and implementation success stories. First, efforts to encourage buprenorphine prescribing among non-specialists, including PCPs and advance practice clinicians, have succeeded. By 2016-2018, the majority—approximately 60%—of buprenorphine episodes were prescribed by non-specialists; mean treatment length was also longest for APCs and PCPs. Our findings indicate rapid growth in prescribing by APCs after the federal policy change expanding waiver eligibility to these

clinicians, consistent with prior work.[16,17] Recent studies have indicated that increases in the number of waivered prescribers in rural areas in recent years have been driven by uptake among APCs, yielding improved access to MOUD in rural areas.[18,19] However, recent work has highlighted important state-by-state differences regarding APC buprenorphine prescribing, finding that 6 states have regulations that either fully prohibit prescribing by APCs or impose restrictive requirements (e.g., must have full supervision by an MD).[20]

Additionally, we observed a decline in buprenorphine treatment that was not paid for by insurance (i.e., self-pay, pharmacy voucher) and the profound growth in buprenorphine treatment paid for by Medicaid. This reflects concerted efforts beginning with the ACA to expand Medicaid, both in terms of coverage for SUD treatment and expansion of the Medicaid beneficiary population in many states, resulting in an additional 13.1 million low-income individuals gaining Medicaid coverage.[21] As coverage expanded, Medicaid became a key payer for buprenorphine treatment—our results indicate that the number of buprenorphine episodes paid for by Medicaid grew 4-fold across the study period, such that Medicaid paid for nearly 4 in 10 episodes by 2016-2018, consistent with prior work.[22,23] Our results indicated relatively limited growth in the number of episodes paid for by commercial insurance—this is consistent with emerging evidence that buprenorphine initiation (per capita) has been declining among the commercially insured population[24] and that changes in the buprenorphine payer mix may have served more to shift costs than to robustly expand treatment access.[25,26] Furthermore, studies have found that growth was primarily in Medicaid expansion states, underscoring important state heterogeneity in treatment access.[23] While Medicaid expansion represents an important step in improving MOUD access, continued policy efforts are needed to improve access in non-expansion states as well as to eliminate insurance-related barriers such administrative hurdles (e.g., prior authorization) and inadequate provider networks. Finally, while declining self-pay likely primarily reflects expansion in insurance coverage, it may also reflect decreasing stigma regarding buprenorphine use (which may cause some insured individuals to choose self-pay) over the study period.

Our findings also indicate that buprenorphine treatment has shifted toward older age groups, with adults ages 55 and older representing a growing proportion of all buprenorphine patients and length of treatment increasing among adults ages 45 and older. This is consistent with prior work highlighting that opioid misuse, OUD diagnosis, and MOUD treatment have been shifting toward older age groups.[27-29] Specifically, Medicare data indicates that OUD diagnosis tripled between 2013 and 2018 among older adults.[30] However, a recent Department of Health and Human Services report found that only 16% of the approximately 1 million Medicare beneficiaries with OUD were receiving MOUD treatment.[31] One contributing factor may be Medicare's increasing restrictions on buprenorphine coverage—a recent study found that while nearly 90% of Medicare plans covered any buprenorphine product without restriction in 2007, this proportion decreased to 35% in 2018. In contrast, over 90% of these plans continued to cover opioid analgesics without restrictions during 2007 to 2018.[32]

Importantly, our findings highlight a widening treatment gap for adolescents and young adults, who experienced a relative decline in treatment compared to other age groups.

Furthermore, youth under age 18 experienced an absolute decline in treatment episodes across the study period, which is worrisome given that opioid-related mortality among children and adolescents increased over 250% across 1999 to 2016.[33] Strikingly, mortality among young adults (ages 15-24) rose, with the overall proportion of deaths attributable to opioids increasing from 2.9% in 2001 to 12.4% in 2016.[34] Prior studies have shown that the majority of young people with OUD do not receive treatment,[35] and, of those who do, they primarily receive abstinence-based residential treatment or outpatient psychosocial therapy rather than buprenorphine.[36] A recent study using Treatment Episode Data Set (TEDS) from 2008 to 2017 found that MOUD referral was planned at treatment admission for 93% of adults ages 25 and older with OUD, compared to 56% of individuals ages 18 to 24 and only 2% of youth ages 12 to 17.[37] Given widespread clinical hesitancy to prescribe buprenorphine to children and adolescents,[38] it is imperative to improve access to efficacious treatment modalities for these groups to stem rising overdose fatalities.

Limitations

There are several study limitations. While our data quantifies the number of patients receiving buprenorphine prescriptions, we do not have data quantifying the "at-need" patient population with OUD, so we are unable to examine trends in unmet treatment need. Pharmacy claims contain no information on clinical status; while we restricted our analysis to buprenorphine formulations indicated, and overwhelmingly used, for OUD treatment, some misclassification may be present, as buprenorphine is infrequently used for other conditions, including pain management. We were unable to examine trends by patient race/ethnicity because this data is not available in the IQVIA data. However, continued efforts to examine disparities and advance equitable access to buprenorphine are needed, given evidence of racial/ethnic disparities.[39-42] Although IQVIA data reflect an estimated 90% of prescriptions filled at U.S. retail pharmacies, they do not represent the full census of buprenorphine prescriptions (e.g., excluded prescription from non-retail pharmacies, excluded buprenorphine dispensed in emergency departments or other institutional settings). It is possible that buprenorphine episodes not captured in these data may differ with respect to payer, clinician, or patient characteristics.

Conclusion

Buprenorphine can be a life-saving treatment for individuals with OUD. Despite important gains in treatment access over the past decade, only a minority of individuals with OUD currently receive treatment, indicating continued need for systemic efforts to improve treatment uptake. Our findings help to characterize the nature of buprenorphine treatment in the U.S. during 2007 to 2018 with respect to prescribing clinician specialty, payer, patient gender, and patient age.

Funding

Appendix

Table A1.

Buprenorphine Treatment Episodes With Respect to County Characteristics.

	2007-2009	2010-2012	2013-2015	2016-2018
	n (%)	n (%)	n (%)	n (%)
Geographic characteristics (county-level)				
Urbanicity				
Urban	593 425 (90.9)	833 062 (89.9)	1 108 123 (89.1)	1 165 705 (87.5)
Rural	59 569 (9.1)	93 622 (10.1)	136 086 (10.9)	166 275 (12.5)
Median household income				
Lowest tertile	75 807 (11.6)	127 414 (13.8)	168 314 (13.5)	175 170 (13.2)
Middle tertile	195 993 (30.0)	298 459 (32.2)	407 638 (32.8)	403 345 (30.3)
Highest tertile	381 194 (58.4)	500 811 (54.0)	668 257 (53.7)	753 465 (56.6)
% Black residents				
Lowest tertile	89 401 (13.7)	113 567 (12.3)	153 205 (12.3)	163 954 (12.3)
Middle tertile	232 015 (35.5)	331 908 (35.8)	429 438 (34.5)	455 418 (34.2)
Highest tertile	331 578 (50.8)	481 209 (51.9)	661 566 (53.2)	712 608 (53.5)
% Hispanic residents				
Lowest tertile	98 228 (15.0)	139 992 (15.1)	226 696 (18.2)	249 683 (18.8)
Middle tertile	200 837 (30.8)	286 716 (30.9)	394 578 (31.7)	446 085 (33.5)
Highest tertile	353 929 (54.2)	499 976 (54.0)	622 935 (50.1)	636 212 (47.8)
Fatal overdose rate				
Lowest tertile	34 352 (5.3)	51 430 (5.6)	63 334 (5.1)	69 066 (5.2)
Middle tertile	80 957 (12.4)	106 921 (11.5)	148 888 (12.0)	173 530 (13.0)
Highest tertile	537 685 (82.3)	768 333 (82.9)	1 031 987 (82.9)	1 089 384 (81.8)

Provider location was characterized with respect to the prescriber's 5-digit FIPS code (denoting county or county equivalents). County urbanicity was classified based on Rural-Urban Continuum Codes (RUCC) from the Area Health Resources Files (AHRF), with counties classified as "urban" (RUCC 1, 2, or 3) or "rural" (RUCC 4 to 9). County drug overdose rate was calculated as the per capita rate of overdose deaths due to any drug using the 2015 restricted multiple-cause-of-death mortality file from the Centers for Disease Control and Prevention and classified into tertiles. Additional county characteristics included percentage of Black and Hispanic residents (classified into tertiles) and median household income (classified into tertiles), based on data from the 2015 American Community Survey.

Table A2.

Percentage of Buprenorphine Episodes by Payment Source, by Year.

	Medicaid	Medicare	Commercial	Cash	Other
2006	12.3	3.2	35.1	32.6	16.9
2007	13.3	4.0	35.9	30.4	16.4
2008	15.3	4.3	36.0	27.4	17.0
2009	18.4	4.6	35.9	23.9	17.3
2010	19.9	4.7	35.6	20.2	19.7
2011	20.1	5.0	35.4	16.5	23.0
2012	19.4	5.6	35.5	17.2	22.4
2013	19.9	6.6	32.3	15.2	25.9

	Medicaid	Medicare	Commercial	Cash	Other
2014	25.2	6.2	27.3	13.9	27.3
2015	29.3	6.4	25.8	13.0	25.6
2016	32.2	6.5	23.1	11.5	26.7
2017	36.4	7.2	21.3	9.8	25.4
2018	39.4	7.6	19.2	9.4	24.4

Table A3.

Episode Length, by Year.

	0-1 month	1-3 months	3-6 months	6-9 months	9-12 months	1-2 years	2+ years
	%	%	%	%	%	%	%
2006	32.9	7.7	11.5	6.2	16.6	16.3	8.7
2007	28.5	7.6	11.5	6.3	18.4	17.9	9.9
2008	25.1	7.8	11.6	6.3	19.9	18.9	10.5
2009	19.9	8.3	12.2	6.6	21.7	20.9	10.5
2010	17.5	8.6	12.5	6.7	22.5	20.9	11.4
2011	17.4	8.5	12.2	6.8	21.7	20.5	13.0
2012	14.9	8.4	12.4	7.0	21.4	21.2	14.7
2013	14.5	8.9	13.0	7.0	20.7	21.1	14.9
2014	14.7	9.5	13.7	7.3	20.3	20.2	14.4
2015	14.4	9.5	13.7	7.3	20.2	19.9	15.0
2016	14.8	10.6	14.1	7.4	19.1	18.9	15.2
2017	14.7	11.4	14.4	7.4	18.6	33.5	0.0
2018	21.5	23.1	25.8	16.2	13.4	0.0	0.0

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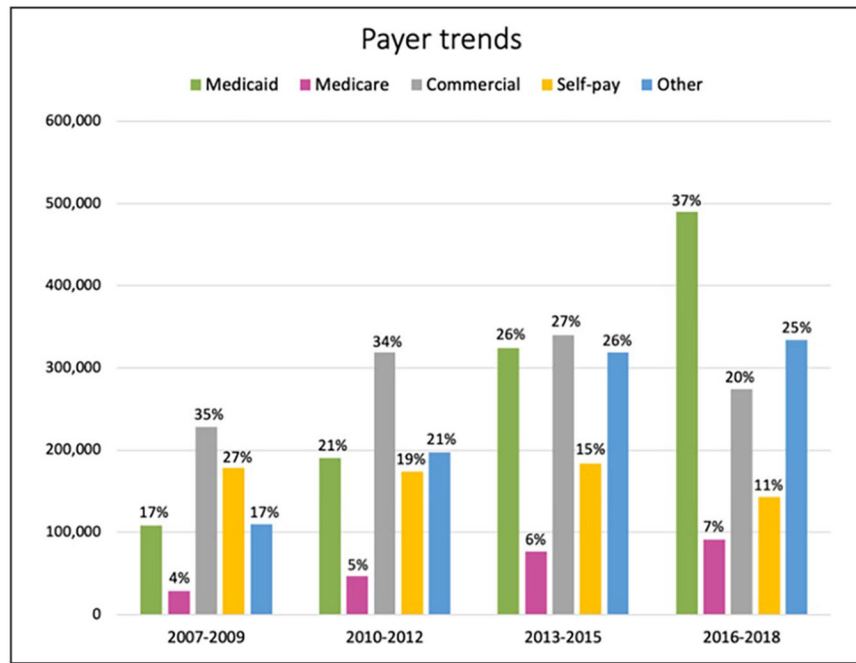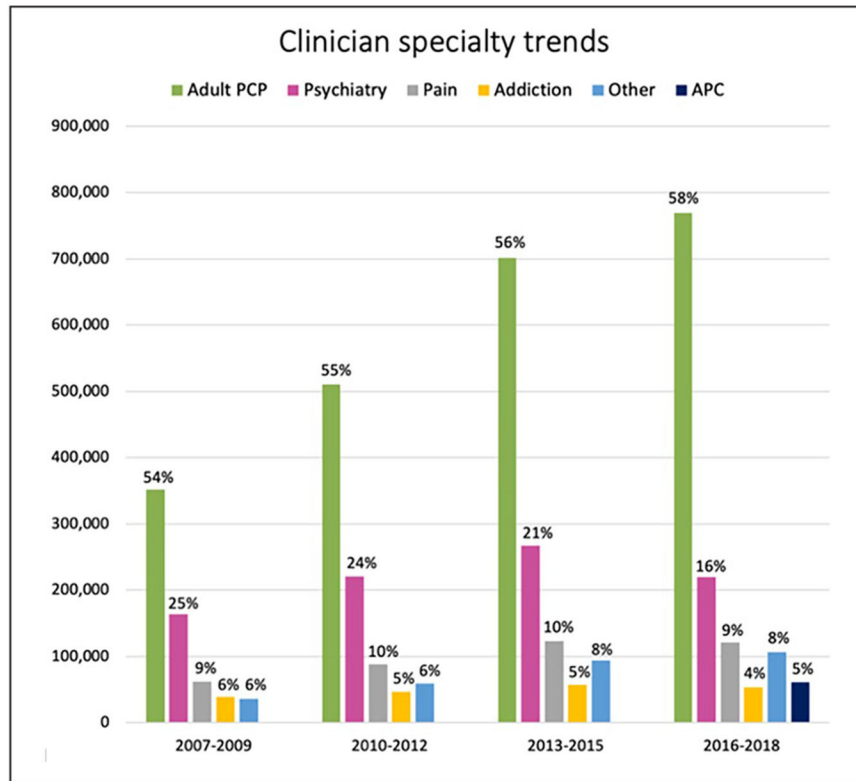
Figure 1.
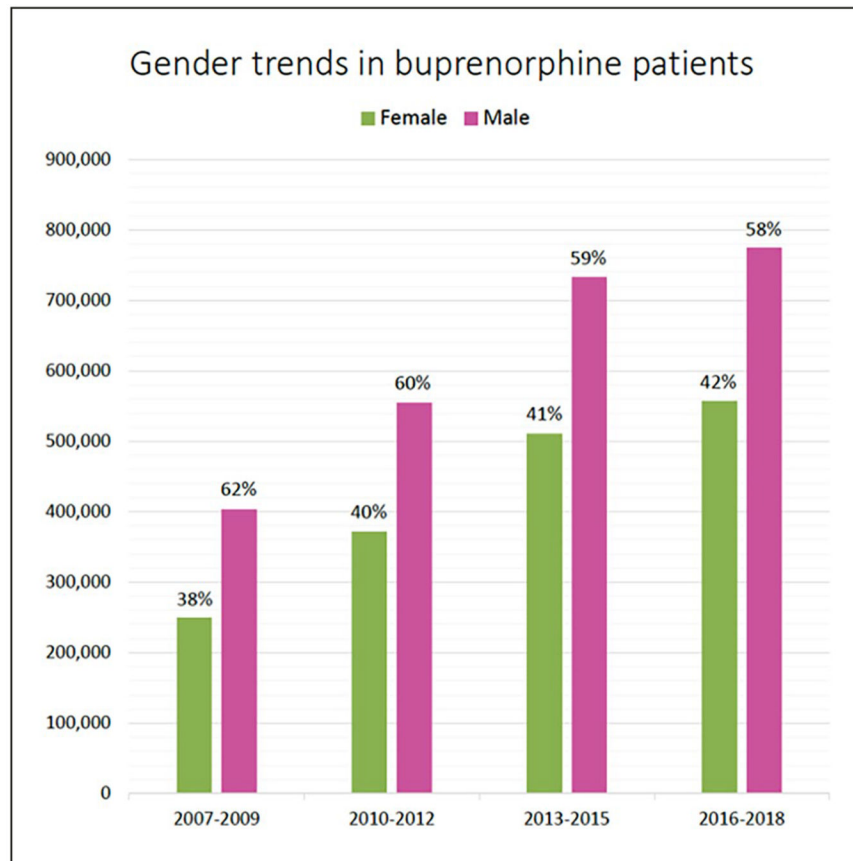Payer trends: number and relative proportion of buprenorphine episodes by payer.

Figure 2.
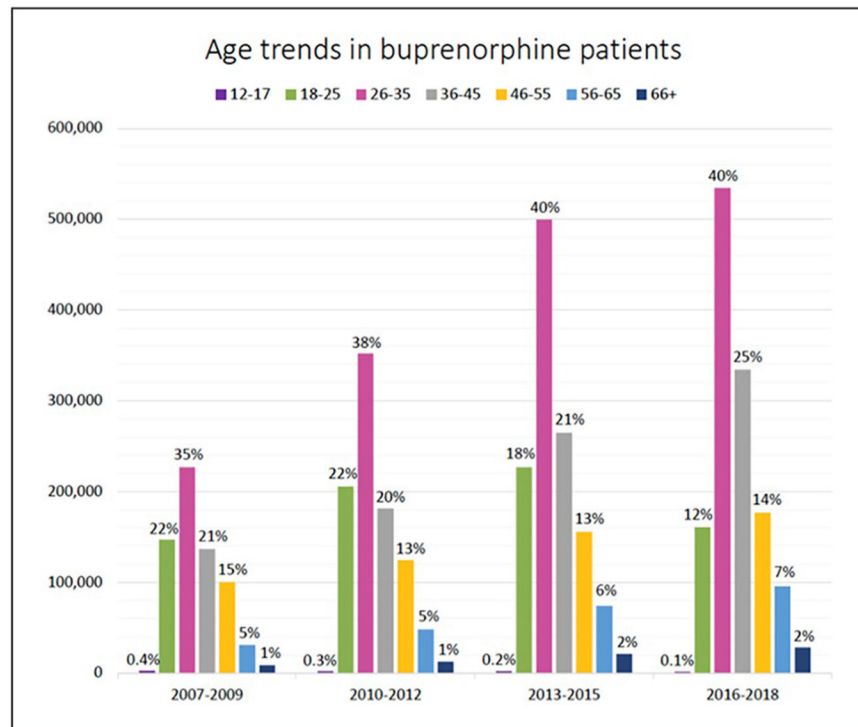Clinician specialty trends: number and relative proportion of buprenorphine episodes by clinician specialty.

Figure 3.
Gender trends: number and relative proportion of buprenorphine episodes by gender.

Figure 4.
Age trends: number and relative proportion of buprenorphine episodes by age group.

Table 1.

Median Episode Length by Patient Characteristics, Payer, and Provider Specialty.

	Median episode length [Inner Quartile Range]				
	2007-2009	**2010-2012**	**2013-2015**	**2016-2018**	
% of episodes that are 180+ days	23%	28%	30%	30%	
Mean number of episodes per patient	1.3	1.3	1.3	1.3	
	Median episode length [Inner Quartile Range]				
Patient gender					
Female	44 [18, 159]	60 [25, 206]	63 [25, 241]	61 [21, 238]	
Male	45 [18, 162]	60 [25, 210]	62 [24, 234]	60 [21, 224]	
Patient age					
12-17	37 [15, 126]	46 [17, 143]	42 [15, 145]	35 [15, 142]	
18-25	42 [15, 142]	56 [20, 176]	50 [15, 170]	38 [12, 147]	
26-35	46 [17, 168]	61 [25, 222]	65 [25, 243]	60 [20, 223]	
36-45	47 [20, 173]	60 [28, 226]	70 [28, 226]	66 [24, 249]	
46-55	45 [21, 173]	60 [28, 217]	67 [28, 277]	69 [28, 260]	
56-65	40 [21, 156]	57 [29, 200]	63 [30, 272]	71 [29, 273]	
66+	30 [15, 105]	33 [24, 136]	54 [29, 195]	60 [29, 222]	
Payer type					
Medicaid	67 [29, 226]	76 [30, 244]	87 [30, 287]	75 [27, 246]	
Medicare	60 [30, 225]	79 [30, 302]	87 [30, 336]	90 [30, 297]	
Commercial	62 [30, 220]	74 [30, 262]	87 [30, 324]	84 [30, 292]	
Self-pay	30 [10, 73]	30 [8, 86]	29 [7, 80]	24 [7, 82]	
Other	44 [20, 162]	60 [23, 208]	56 [18, 201]	47 [15, 186]	
Provider specialty					
Addiction	40 [15, 150]	58 [20, 212]	53 [15, 207]	43 [13, 193]	
Psychiatry	50 [20, 180]	60 [26, 214]	60 [21, 222]	52 [15, 210]	
Adult PCP	45 [18, 159]	60 [25, 210]	65 [27, 245]	63 [22, 237]	
Pain	42 [20, 148]	56 [27, 182]	61 [28, 223]	61 [28, 227]	
Other	39 [15, 144]	60 [23, 205]	67 [26, 258]	60 [17, 225]	
APC	.	.	.	65 [16, 242]	

Values not reported for APC prior to 2016-2018 as APCs did not have prescribing authority.