Buprenorphine Treatment for Substance Use Disorder

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Abbreviations

DATA	Drug Addiction Treatment Act
DEA	Drug Enforcement Agency
FIA	Formulary Impact Analyzer
LRx	Prescription Claims Data
LTC	Long-term care
MAT	Mainstreaming Addiction Treatment Act
NP	Nurse practitioner
OUD	Opioid use disorder
PA	Physician assistant
RN	Registered nurse
SOB	Source of business
US	United States

Executive summary

Buprenorphine is a treatment option for opioid use disorder (OUD); however, despite its wide acceptance, less than half of all eligible patients consistently have access to buprenorphine. Prior to 2022, one key consideration to access for patients was a limited number of available providers with a physician waiver to prescribe buprenorphine in office-based settings. In December 2022, new legislation removed special registration requirements (known as the X-Waiver) for buprenorphine – intended to improve access to providers and expanding prescriber eligibility across specialties.

New Insights

From 2018 to 2024, the number of patients dispensed buprenorphine increased by 53%. This increase was consistent across geographic regions. At the same time, the proportion of patients newly starting treatment each month declined by 33% while longer-term users increased, indicating that the increase in total users was largely driven by longer-term users. More than half (56%) of patients were male and the majority (60-75%) were between the ages of 35-64 years. The number of patients aged 35-44 and 45-64 years nearly doubled (76% and 93%, respectively) over the study period. In contrast, the number of patients aged 18-24 and 25-34 years declined during the same period (-41% and – 17%, respectively).

Compared to the year prior to the X-waiver removal (2022), the number of unique buprenorphine prescribers increased by 36% in the year after implementation. Prescribing by nurse practitioners and physician assistants increased markedly between 2018 to 2024 (by 13-fold and 9-fold, respectively); nurse practitioners are now the most common prescribers of buprenorphine.

Implications for Policy and Practice

While the X-waiver removal may have increased the total number of prescribers, this increase has not yet impacted the number of patients dispensed buprenorphine. The declining trend in buprenorphine prescribing among adults under the age of 34 may reflect a gap between medical need and buprenorphine use among younger patients; further research is needed to understand factors influencing this trend.

Key findings

Trends in Buprenorphine Prescribing

- From 2018 to 2024 (Q1) the projected number of patients with a prescription for buprenorphine increased by 53%.
- From 2018 to 2024, on average most buprenorphine patients were between the ages of 35-44 (35%) and 45-64 (32%). Over this period the number of patients aged 65-84 more than tripled (277%) and the number of patients aged 45-64 and 35-44 nearly doubled (93% and 76%, respectively). At the same time, the number of patients aged 18-24 and 25-34 decreased by –41% and – 17%, respectively.
- By region, Northeast had the highest number of patients per 100,000 with one or more buprenorphine dispensing followed by the South. By division, New England had the highest number of patients, followed by the South Atlantic.
- Rejection and reversal/abandonment rates remained stable from 2018 to 2024. During this period, on average 19% of patients had at least one rejected claim and 7% of patients had at least one reversed/abandoned claim.

Trends in Buprenorphine Providers

- By March 2024, the top specialty prescribing buprenorphine was nurse practitioners, followed by family/internal medicine, physician assistants, psychiatry/neurology, and addiction medicine.
- From 2018 to 2024, the number of patients prescribed buprenorphine by nurse practitioners and physician assistants increased by 1,266% and 825%, respectively.

Impact of X-Waiver Removal

- The total number of unique buprenorphine prescribers increased by 36% in the year after the X-Waiver was removed compared to the year prior.
- The largest increases were observed for hospitalists (70%), emergency medicine (50%), and physician assistants (50%).

Background

Buprenorphine is a synthetic opioid medication indicated for acute and chronic pain management [1,2] and for the treatment of opioid use disorder (OUD). For patients with OUD, buprenorphine reduces cravings and withdrawal symptoms, without providing the euphoric effects of other opioids.[3] Despite its effectiveness in treating OUD, access to buprenorphine can be dependent on provider availability – in particular, the number of providers across all specialties who are eligible to prescribe buprenorphine in office-based settings.[4]

The buprenorphine X-Waiver, introduced in the Drug Addiction Treatment Act of 2000 (DATA 2000), allowed qualified clinicians to prescribe Schedule III, IV, and V substances for OUD in office-based settings. The DATA 2000 aimed to improve access to OUD treatment by permitting buprenorphine prescribing outside opioid treatment programs (i.e., in office-based settings). However, the X-Waiver also introduced additional training and certification requirements, as well as patient caps of 30 in the first year.[5]

In December 2022, Congress enacted the Mainstreaming Addiction Treatment (MAT) Act (effective January 12, 2023) expanding prescribing access to all providers and removing the special registration requirement for buprenorphine. Clinicians were no longer required to receive a waiver to prescribe buprenorphine for OUD, and patient caps for the first year were removed.

Removal of the X-Waiver is expected to expand access to buprenorphine by increasing the number of healthcare providers who can prescribe it. To date, research on the impact of the X-Waiver removal on buprenorphine prescribing has been limited. One study found that at six months post-X-waiver change, there was no change in the number of providers newly prescribing buprenorphine compared to the six months before.[6]

The DEA commissioned IQVIA to assess trends in buprenorphine use from 2018 to early 2024 and to describe factors associated with access to treatment. This report describes trends in buprenorphine use overall, and by patient and provider characteristics. We also evaluate the potential impacts of the buprenorphine X-Waiver removal, as well as other related policy changes. The findings in this report are descriptive and contextual and should be interpreted within the context of the study aims and population.

Methodology

Objective(s)

The goals of this study are to:

- Identify potential gaps in buprenorphine treatment by patient demographics, provider characteristics, and regional differences; and
- Evaluate the impact of the X-waiver removal by assessing trends in buprenorphine treatment before and after June 2023.

To accomplish these goals, we conducted a series of analyses to:

1. Describe overall trends in retail dispensing of buprenorphine from 2018 to 2024.
2. Characterize rates of initiation and maintenance/long-term use of buprenorphine from 2018 to 2024.
3. Assess claim rejection rate by co-pay amount and payor type (e.g., Medicare, Medicaid, commercial, and self-pay).
4. Assess claim reversal/abandonment by co-pay amount and payor type.
5. Describe trends in retail dispensing and initiation versus maintenance, stratified by patient demographics (e.g., age, sex, state) and provider specialty.

Data Sources

We used IQVIA's **Longitudinal Prescription Claims (LRx)** data to capture dispensing of buprenorphine prescriptions over time and **Xponent** data to project nationally. We included only prescriptions dispensed in the retail and mail-order channels (long-term care pharmacies were not included).

We used IQVIA's **Formulary Impact Analyzer (FIA)** to assess factors that impact patient's access to buprenorphine treatment such as co-pay, rejection status and prescription reversal/abandonment.

For a complete description of the LRx dataset, Xponent projection methodology, and FIA, see Appendix 1.

Product Market and Patient Selection

Buprenorphine Definition

We defined the buprenorphine market as prescriptions dispensed for all products containing buprenorphine (with or without naloxone). For a complete list of all products included, please refer to Appendix 3.

Patient Inclusion and Study Period

We selected patients study based on buprenorphine prescriptions identified in LRx. We included patients if they had at least one dispensed prescription for buprenorphine between January 2018 and March 2024 (the most recently available data).

Eligibility and Stability Criteria

We applied stability and eligibility rules to control for pharmacy data continuity and patient eligibility factors.

Pharmacy stability – To be included in monthly reporting, pharmacies reporting data for included patients must have consistently supplied data to the LRx for the month of interest and for the prior 12 months, totaling 13 months of rolling pharmacy stability.

Patient stability – Patients must have had at least one record of prescription activity (in any market) in the LRx database at any time prior to the look-back period (12 months prior to the index).

Analysis

Projected Patient Volume (LRx)

We used IQVIA's proprietary projection methodology which combines all raw prescription transactions captured in the LRx dataset and Xponent information to estimate the number of patients with a prescription for buprenorphine each month, stratified by patient and provider characteristics.

Patient and Provider Characteristics

We report projected estimates by age group (<18, 18-24, 25-34, 35-44, 45-64, 65-84, 85+), sex (female, male), and state on each month's index claim. We calculated patient age using the year of birth and the claim year. We grouped provider specialties into categories using information in IQVIA's National Prescription Audit (NPA) (see Appendix 4).

Treatment Categories

To assess and compare monthly prescribing among new buprenorphine initiators versus continuing users, we sorted patients to treatment categories based on prescription activity over the 12 months prior to their index claim. We defined patients as being new to any buprenorphine product (i.e., incident), new to specific buprenorphine formulation, or continuing based on the following criteria on index:

- **New-to-Therapy**: Patient did not have any prescriptions for any formulation of buprenorphine during the look-back period (12 months).
- **New-to-Brand**: Patient did not have any prescriptions for a specific formulation of buprenorphine during the look-back period (12 months) but did have a prescription for another formulation during the look-back period (e.g., a patient newly starting buprenorphine naloxone who had previously been prescribed buprenorphine in the preceding 12 months).
- **Continuing**: Patient had at least one prescription for any buprenorphine product during the look-back period (12 months).

Duration of Therapy

We assessed duration of therapy by adding total days' supply for each patient within 6 months after their earliest prescription in that month. For the next month, we re-evaluated patients to the earliest prescription in that month and calculated total days dispensed from the updated index date; this was done for each month in the study period. We then categorized each month into the following categories based on the days' supply observed in the following six months: 1-29 days, 30-89 days, 90-119 days, 120-179 days, 180+ days.

Prescription Claim Reversal/Abandonment and Rejection

We assessed the proportion of patients with at least one buprenorphine claim *reversed/abandoned* (e.g., pharmacy reversed an authorized claim because patient refused the prescription, did not pick up prescription from pharmacy, or other reasons) or *rejected* (e.g., insurance payor rejected authorization for prescription claim) each month. Reasons for claim rejections were consolidated in to 7 categories: product not covered, distribution limitation, refill restriction, plan limitations exceeded, step edit, prior authorization required, or other.

Impact of Waiver Removal

To assess the potential impact of the X-waiver removal, we compared the percent change between the number of unique providers who prescribed buprenorphine one year (12 months) before the removal of the X-waiver requirement to one year after, overall and by specialty. While the removal of the X-waiver occurred in January 2023, there was a six-month training requirement and implementation period which ended in June 2023,[7] therefore, we choose June 2023 to evaluate pre- versus post-period changes.

Data Considerations

Listed below are data considerations to provide context in interpreting the findings of this study:

- While report characterizes prescribing trends of buprenorphine using real-world prescribing and claims information, it cannot differentiate between appropriate use and potential misuse or diversion, nor can it be confirmed whether patients took the full course of each prescriptions' days' supply.
- Due to data restrictions, we were not able to include Zubsolv® in the list of buprenorphine formulations captured in this report.
- The methodology used to project patient counts to the full US population may be impacted by dynamic changes at the provider level. Of note, the number of projected patients declined significantly in December 2020, but rebounded back to roughly previous levels in January 2021. This was observed in the projected estimates generated using Xponent data, but not in the raw count of patients for the same month in LRx, indicating that this outlier was likely due to variation in provider data at that point in time. For clarity and ease of interpretation, we removed this projected data point (12/2020) from figures in this report. Data for December 2020 are included in the accompanying pivot tables.

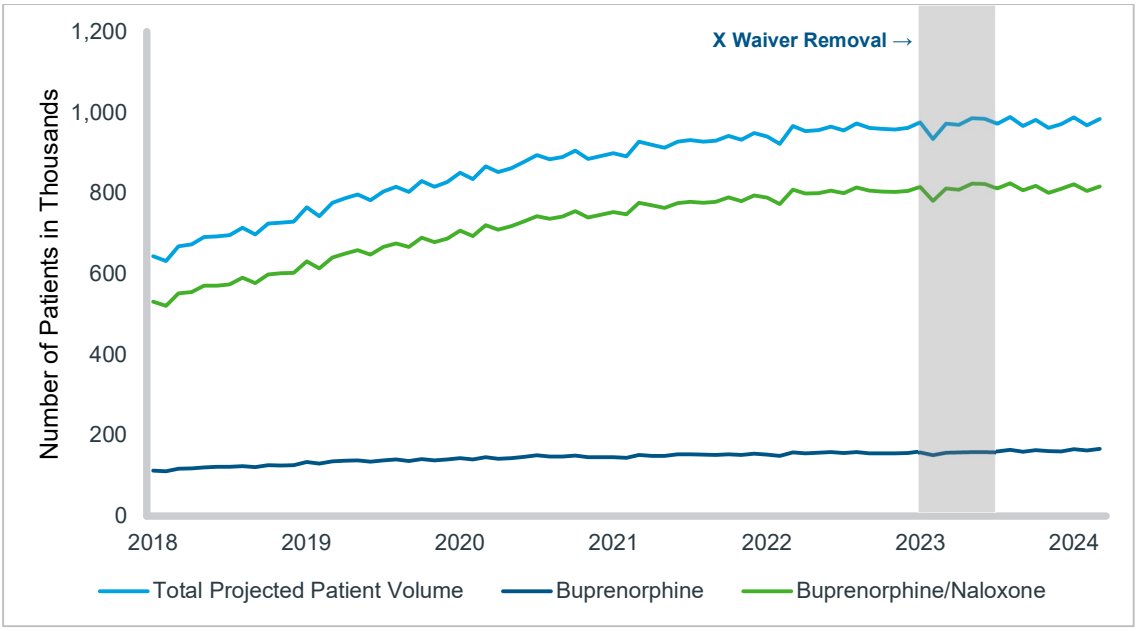
Results

Trends in Buprenorphine Prescribing

From 2018 to early 2024, the projected number of patients with a prescription for buprenorphine increased by **53%** from 644,257 in 2018 to 983,724 in Q1 of 2024, at an average rate of 4,526 patients per month [**Figure 1**]. Consistently, the majority of patients (~83%) were prescribed the combination therapy buprenorphine/naloxone (branded as Suboxone and Bunavail).[8] We observe no marked changes in the proportion of patients dispensed buprenorphine/naloxone versus buprenorphine alone.

The vertical grey bar on [**Figure 1**] (and all subsequent figures) denotes the approximate implementation period for the X-waiver removal (January – June 2023); we observe minimal change in the total number of patients after the implementation of the new policy.

Figure 1: Monthly Projected Number of Buprenorphine Patients, Total and by Product (2018 – 2024)



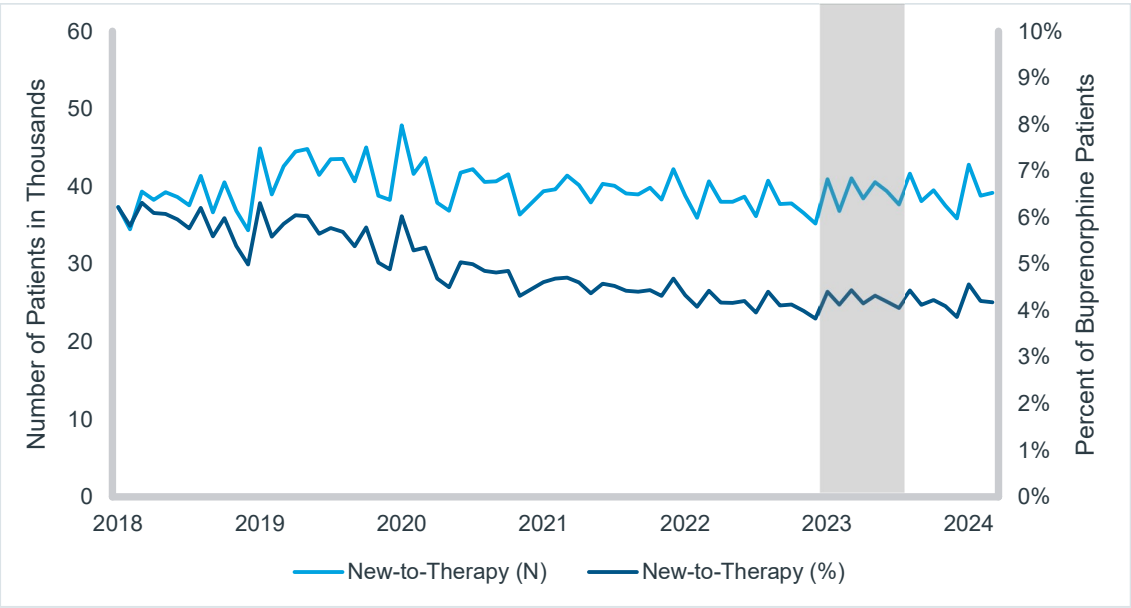
Note: December 2020 removed due to unreliable projection estimate

The average monthly increase remained relatively stable from 2019 to 2021 (between 4,000 to 6,000 patients per month) before slowing in 2022 and 2023 (2022: 1,741; 2023: 671).

New-to-Therapy vs. Continuing Use

While the total number of buprenorphine patients increased between 2018 – 2024**, the proportion of patients newly initiating buprenorphine each month (i.e., new-to-therapy) decreased from 6.2% in 2018 to 4.2% in 2024** [**Figure 2**].

Figure 2: Projected New-to-Therapy Buprenorphine Patients (2018 – 2024)



Note: December 2020 removed due to unreliable projection estimate.

Patient Demographics

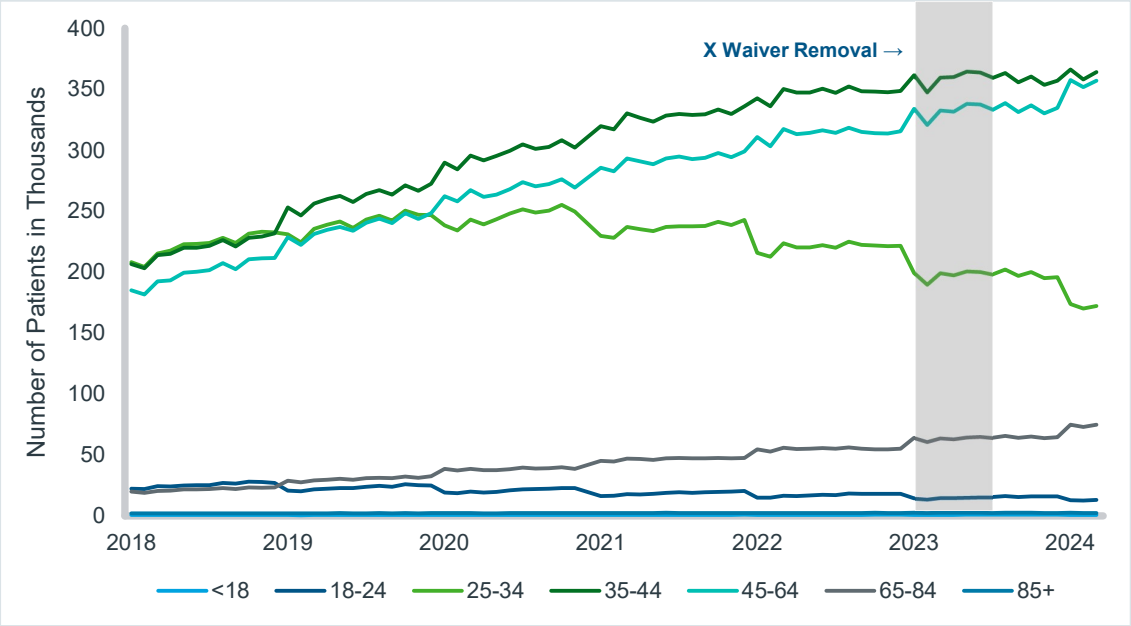
Sex

From 2018 to 2024, approximately 44% of patients were female and 56% were male **[Appendix Figure 1]** Consistent with the overall trend in patients, the total number of both male and female patients increased over time. We observed no differences in the percent increase from 2018 to 2024 by sex (Female: 54%; Male: 52%).

Age

When stratified by age, **we observed the largest increases in the number of patients between the ages of 65 – 84** (277%), followed by those aged 45 – 64 (93%), 35 – 44 (76%), >85 (19%), and <18 (16%) from 2018 to 2024 [**Figure 3**] However, while the number of patients over the age of 35 increased significantly, **the number of patients in the 18-24 and 25-34 age groups decreased over the same period** – by 41% and 17%, respectively.

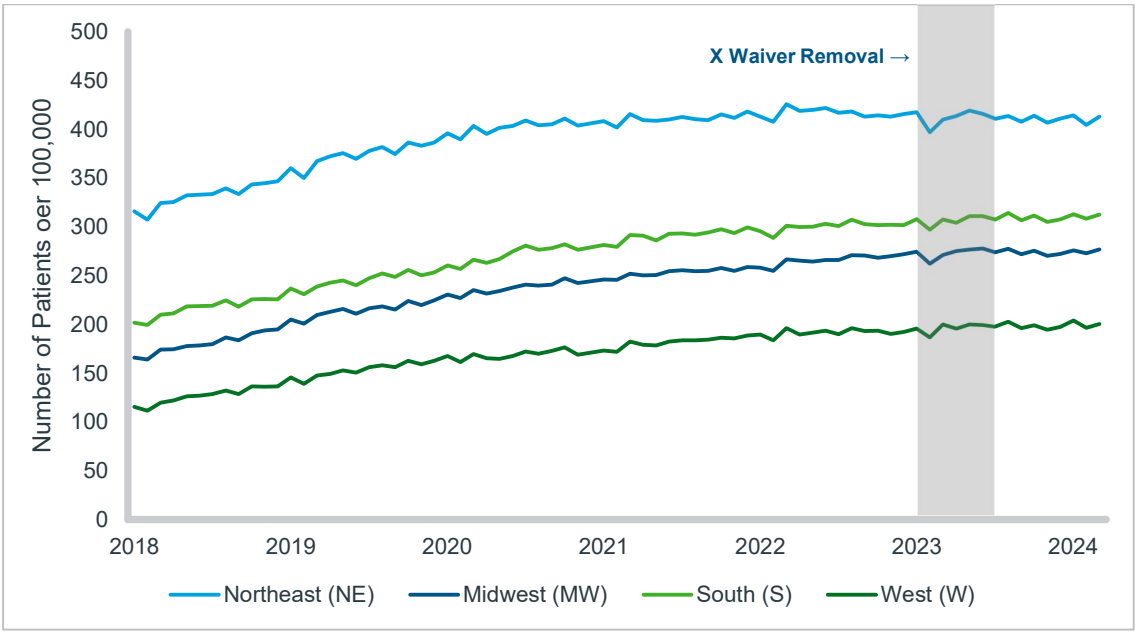
Figure 3: Total Projected Buprenorphine Patients by Age (2018 – 2024)



Geography

Overall, the number of patients increased across all US regions and divisions. The Northeast Census region consistently had the highest number of patients per 100,000 population, followed by the South, Midwest, and West [**Figure 4**].

Figure 4: Total Projected Buprenorphine Patients per 100,000 by Census Region (2018 – 2024)



When further broken down by Census division, the highest number of patients per 100,000 were seen in New England (CT, ME, MA, NH, RI, VT), followed by the South Atlantic division (DE, DC, FL, GA, MD, NC, SC, VA, WV).

We observed the greatest increase from 2018 to 2024 in the West North Central division (IA, KS, MN, MO, NE, ND, SD), where the number of patients per 100,000 more than doubled (+104%), while the smallest change was observed in New England (+29%) [**Table 1**].

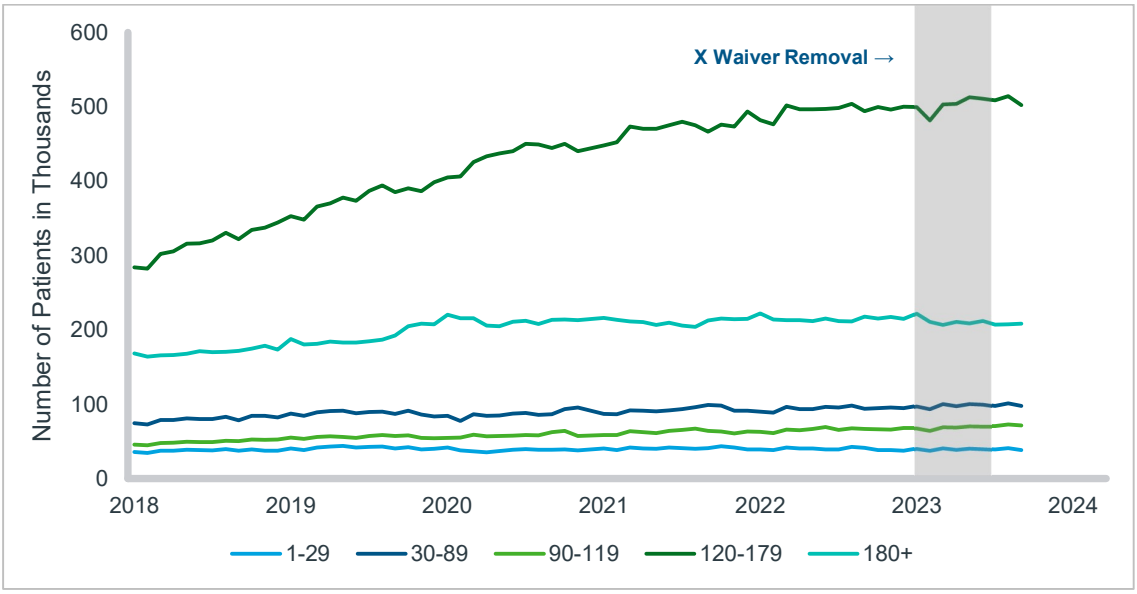
Table 1: Percent Change in Buprenorphine Patients per 100,000 by Census Region and Division (2018 – 2024)

Census Region	Census Division	Percent Change (2018 – 2024)
Northeast	New England (CT, ME, MA, NH, RI, VT)	28.9%
	Middle Atlantic (NJ, NY, PA)	39.0%
Midwest	East North Central (IN, IL, MI, OH, WI)	70.0%
	West North Central (IA, KS, MN, MO, NE, ND, SD)	104.1%
South	South Atlantic (DE, DC, FL, GA, MD, NC, SC, VA, WV)	46.9%
	East South Central (AL, KY, MS, TN)	55.0%
	West South Central (AK, LA, OK, TX)	78.2%
West	Mountain (AZ, CO, ID, NM, MT, UT, NV, WY)	85.5%
	Pacific (AK, CA, HI, OR, WA)	61.4%

Duration of Use

Patient days' supply within the following six-month period was relatively consistent across groups over the study period, except for patients with a day's supply of more than 120 days which increased each month [**Figure 5**].

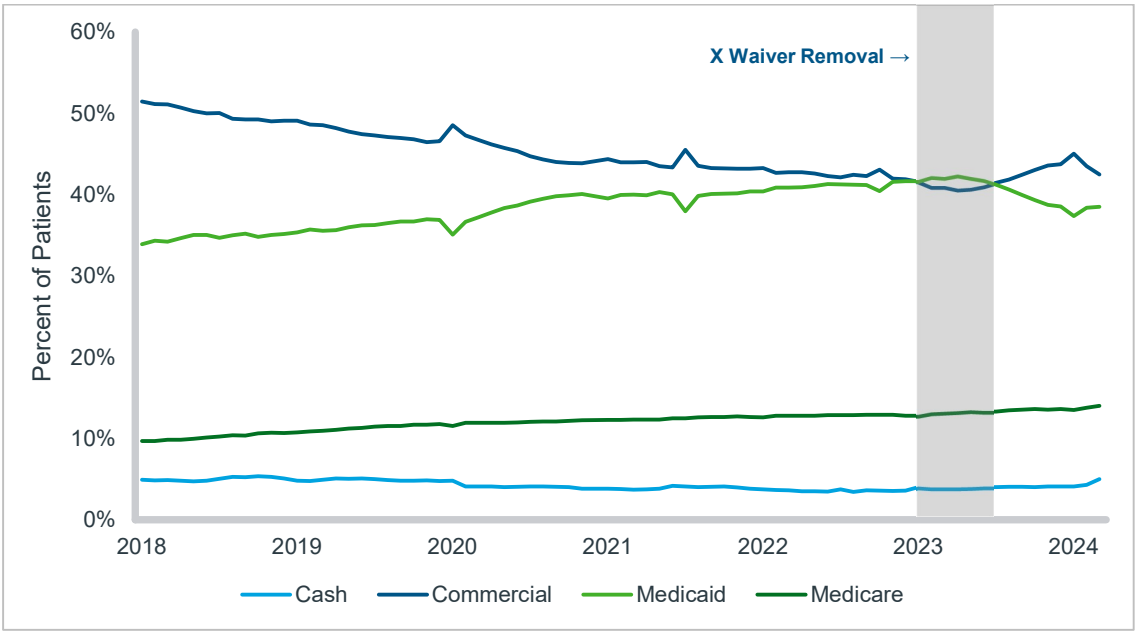
Figure 5: Buprenorphine Days' Supply (2018 – 2023)



Coverage Type

Most buprenorphine patients were covered by Commercial insurance, followed by Medicaid. From 2018 to 2023, the proportion of patients covered by Medicare and Medicaid increased by 44% and 14%, respectively [**Figure 6**].

Figure 6: Proportion of Buprenorphine Patients by Payor Type (2018 – 2024)



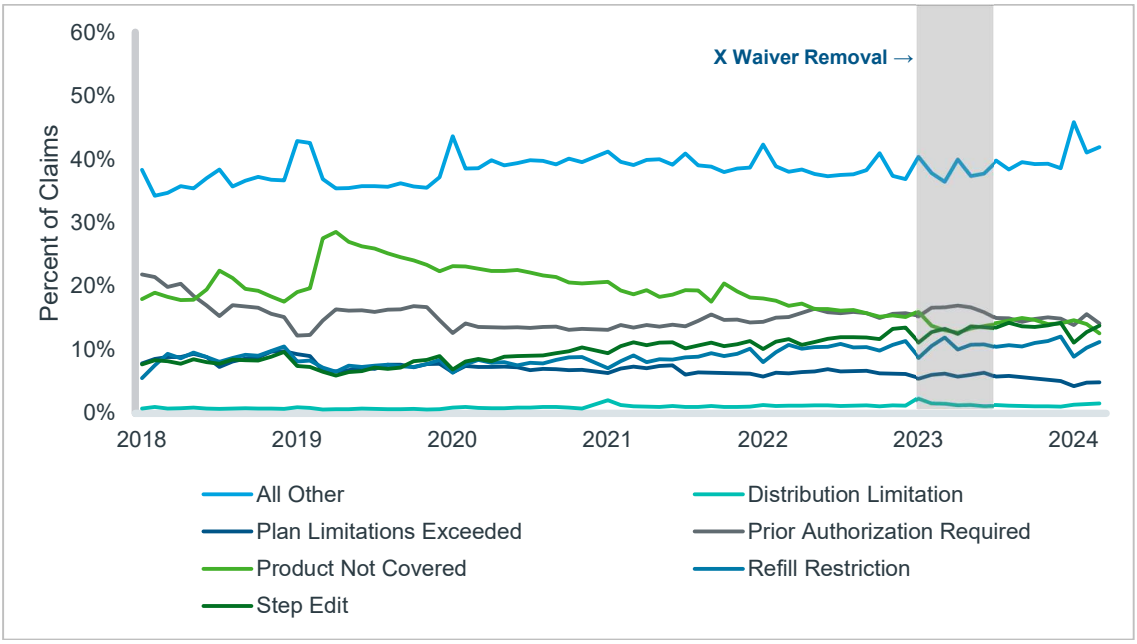
Claim Rejection and Reversal/Abandonment

On average, approximately 19% of patients had a rejected claim between 2018 and 2024 [**Appendix Figure 3]**. In 2019, the percentage of patients with a rejected claim rose from a previous year average of 17% to 20% and remained relatively stable through 2022, before dropping to 18% in 2023. The proportion patients with a reversed/abandoned prescription also remained stable at ~7%.

When stratified by payor type (i.e. Commercial, Medicare, or Medicaid), patients covered by Medicaid had the highest average proportion of claims rejected but the lowest proportion of prescriptions reversed/abandoned each year [**Appendix Figure 4** and **Appendix Figure 5**]. Claim reversal/abandonment rates were similar for Commercial and Medicare patients.

The most frequent reasons for claim rejections included product not being covered, prior authorization requirements, and requirements that patients try drugs in a particular order (i.e., step edits). Notably, the proportion of claims rejected due to lack of product coverage declined from 2019 to 2024, while the proportion of claims rejected due to step edits and refill restrictions rose during the same period [**Figure 7**].

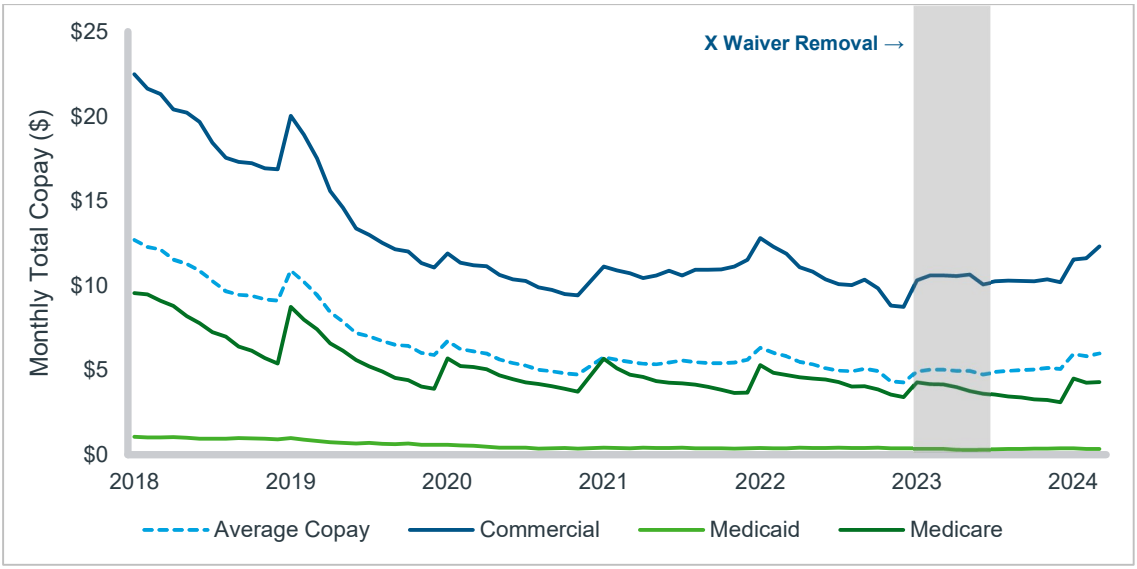
Figure 7: Reasons for Buprenorphine Claim Rejections (2018 – 2024)



Co-payment

From 2018 to 2024, the average monthly co-pay per patient declined by 53% from $12.69 to $5.98 [**Figure 8**]. Commercial insurance co-pays, the highest per patient, declined by 45% during the same period, while Medicaid and Medicare co-pays declined 67% and 55%, respectively.

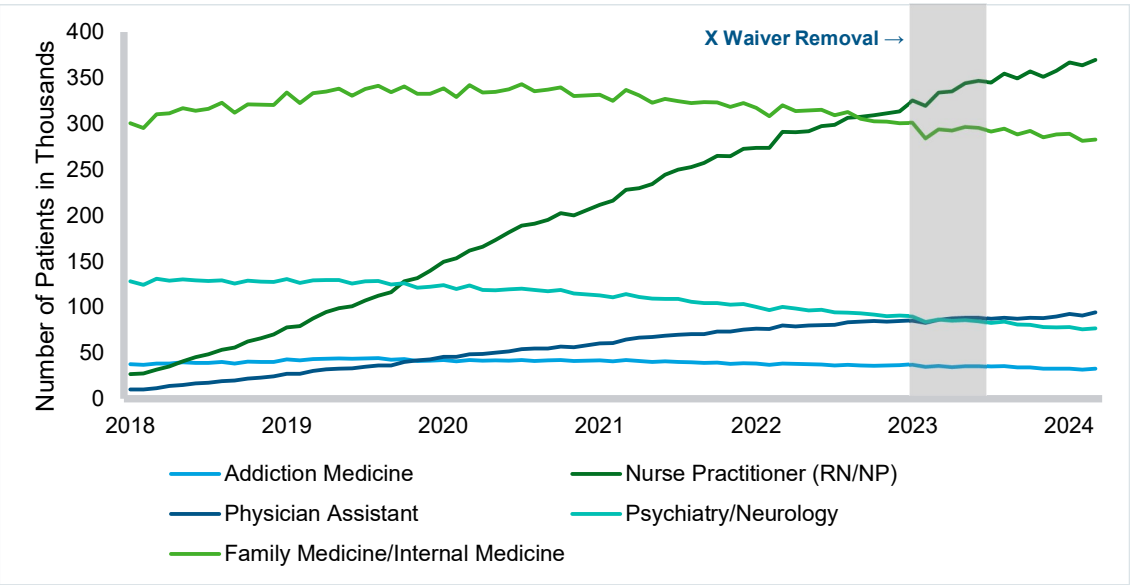
Figure 8: Average Monthly Total Copay per Patient, Overall and By Payor (2018 – 2024)



Prescriber Specialties

In 2018, the top five prescribers for buprenorphine were family/internal medicine specialties, psychiatry/neurology, addiction medicine, nurse practitioner (RN/NP), and emergency medicine. By March 2024, **the number of patients prescribed buprenorphine by nurse practitioners increased by 1,266%** compared to 2018, making them the highest prescribers, followed by family/internal medicine (-6%), physician assistants (+826%), psychiatry/neurology (-40%), and addiction medicine (-13%) [**Figure 9**].

Figure 9: Total Buprenorphine Patients by Top Specialties (2018 – 2024)



After the removal of the X-waiver (January 2023) and the six-month training requirement period (ending June 2023) for new providers[7], **the total number of unique prescribers increased by 36%.** Prior to the X-waiver removal, the number of family/internal medicine, nurse practitioners (RN/NP), and psychiatry and neurology prescribers increased [**Figure 9**]. This trend continued after the waiver removal, with increases in the number of total providers in these categories between 16-37% [**Table 2**]. Following the waiver removal, the largest percentage increases were observed for hospitalists (70%), emergency medicine (50%), physician assistants (50%), and pediatric (40%) providers.

Table 2: Change in Unique Providers, Pre- and Post-Wavier Removal

Provider Type	Number of Providers		% Change
	Pre-Waiver Jul 2022 – May 2023	Post-Waiver Jun 2023 – Apr 2024	
Total Providers	**85,696**	**116,429**	**36%**
Family Medicine/Internal Medicine	27,752	38,152	37%
Nurse Practitioner (RN/NP)	21,729	29,820	37%
Psychiatry/Neurology	9,340	10,816	16%

Provider Type	Number of Providers		% Change
	Pre-Waiver Jul 2022 – May 2023	Post-Waiver Jun 2023 – Apr 2024	
Emergency Medicine	7,965	11,930	50%
Physician Assistant	7,525	11,258	50%
Other	2,823	3,793	34%
Pain Medicine	2,066	2,358	14%
Anesthesiology	1,053	1,152	9%
Obstetrics & Gynecology	1,039	1,366	31%
Addiction Medicine	968	983	2%
Hospitalist	903	1,531	70%
Pediatrics	898	1,258	40%
Physical Medicine & Rehabilitation	893	1,072	20%
Surgery	716	897	25%
Unknown	26	43	65%

Discussion

Increases in Buprenorphine Dispensing

The increase in the total number of patients dispensed buprenorphine observed in this report is consistent with other literature that found similar trends in recent years.[9,10] The decline in the number of new patients each month suggests that the overall increase in the total number of patients from 2018 to 2024 was due to patients continuing treatment, rather than an increase in the number of patients newly initiating treatment. The number of patients with greater than a 120 days' supply of buprenorphine within the following six-month period increased each month, suggesting that more patients are dispensed buprenorphine for longer periods over time. This is consistent with evidence that the average day's supply of buprenorphine prescriptions increased from 2019 – 2021.[10]

Demographic Changes in Patients

From 2018 to early 2024 the number of patients dispensed buprenorphine rose proportionally across geographic and demographic groups, with the most notable exception being younger adults which declined. This is consistent with evidence that only about a quarter of adolescent and young adult patients with OUD received medication for OUD within three months of their diagnosis, even though opioid-related emergency department admissions and opioid-related mortality rates have increased among adolescents and young adults.[11]

The increase in patients between the ages of 35–84 was also not driven by a marked increase in the number of new-to-market patients. The number of new-to-market patients per month aged 35-84 increased at a slower rate compared to the total population, while the number of new-to-market patients aged 25-34 decreased at a faster rate than the overall population. This suggests that the increase in total patients among adults over 35 was driven by an increasing number of continuing users (i.e. the number of users who stayed on drug month-to-month, for increasing periods of time) rather than an influx of new users; while the decrease among adults aged 18-34 was driven by a potential combination of both (1) fewer new users, and (2) fewer continuing users over time.

The increase in the proportion of patients covered by Medicare is consistent with the increase in buprenorphine patients over the age of 64 and may be at least partially attributable to a 2018 Centers for Medicare & Medicaid Services (CMS) policy change which removed requirements for prior authorization for buprenorphine products more frequently than once a year [12], potentially making buprenorphine more accessible for older, Medicare-insured populations compared to younger populations. The adoption of Medicaid expansion policies across states between 2018 – 2023 may also play a role in the increasing proportion of buprenorphine patients who are covered by Medicaid.

In investigating potential causes for the age-related differences in buprenorphine prescribing we determined that there do not appear to be significant changes in coverage and cost-related factors (i.e., insurance type, monthly copays, prescription rejection and reversal/abandonment) that might drive differences in prescribing between older and younger patients. These findings suggest that additional data are needed to understand why younger populations are not connecting to buprenorphine treatment for OUD. Clinical guidelines and approaches to treatment should consider how to address the needs of various patient populations, with some needing ongoing assessments for

inappropriate use and other potentially underserved groups needing expanded access to buprenorphine treatment itself.

Impact of the X-Waiver Removal

Compared to the preceding time, we did not observe meaningful changes in buprenorphine prescribing trends across patient demographics, new vs. continuing patients, or claim reversal/abandonment or rejection after the implementation of the X-waiver removal. While the total number of buprenorphine prescribers increased post-X-waiver removal, overall prescribing practices (i.e., the rate at which buprenorphine is being prescribed) remained consistent, suggesting that the increasing number of providers did not significantly impact the total number of buprenorphine patients. In addition, the increase in the number of NPs and PAs prescribing buprenorphine reflects a trend that predated the X-waiver removal – while this increase may in part be influenced by the removal of the X-waiver, it is also consistent with evidence that the amount of prescribing by NPs and PAs has increased dramatically overall – particularly for older adults.[13] Increased accessibility of effective medications is critical to reducing harm from OUD, and reducing the burden on prescribers is a key element in ensuring that accessibility. However, continued monitoring and additional data are needed to ensure that increases in prescribing providers does not inadvertently lead to increases in diversion.

Future Research

The results of this report suggest that while overall prescribing of buprenorphine has increased over the last five years, trends in the patient profile of buprenorphine users have remained relatively consistent – with the notable exception of age. Future analyses can build on the findings of this report to provide more granular insights on that specific group, and other larger observed trends (e.g., geographic differences in prescribing; changes in the number of buprenorphine prescribers). These types of analyses may include:

- In-depth analysis of healthcare utilization patterns among young and older adults with OUD to understand how these patient profiles differ, and where there may be opportunities for targeted interventions.
- Assessment of buprenorphine access in areas with known healthcare shortages and limited healthcare accessibility to better isolate drivers of regional and geographic differences in prescribing and access.
- Time-series analysis to quantitatively assess the magnitude of changes in the number of buprenorphine prescribers and patient sub-groups comparing the pre – and post-X-waiver removal periods accounting for state-level policy implementation differences.

References

1. White LD, Hodge A, Vlok R, Hurtado G, Eastern K, Melhuish TM. Efficacy and adverse effects of buprenorphine in acute pain management: systematic review and meta-analysis of randomised controlled trials. British Journal of Anaesthesia. 2018;120(4):668-678. doi:10.1016/j.bja.2017.11.086
2. Buprenorphine for Chronic Pain: A Systemic Review | Current Pain and Headache Reports. Accessed June 19, 2024. https://link.springer.com/article/10.1007/s11916-018-0732-2
3. Buprenorphine treatment for opioid use disorder: recent progress: Expert Review of Clinical Pharmacology: Vol 12, No 8. Accessed June 19, 2024. https://www.tandfonline.com/doi/abs/10.1080/17512433.2019.1635454
4. Determinants of buprenorphine treatment for opioid dependence – PubMed. Accessed August 20, 2024. https://pubmed.ncbi.nlm.nih.gov/24209382/
5. Lanham HJ, Papac J, Olmos DI, et al. Survey of Barriers and Facilitators to Prescribing Buprenorphine and Clinician Perceptions on the Drug Addiction Treatment Act of 2000 Waiver. JAMA Network Open. 2022;5(5):e2212419. doi:10.1001/jamanetworkopen.2022.12419
6. Roy PJ, Suda K, Luo J, et al. Buprenorphine dispensing before and after the April 2021 X-Waiver exemptions: An interrupted time series analysis. International Journal of Drug Policy. 2024;126:104381. doi:10.1016/j.drugpo.2024.104381
7. Waiver Elimination (MAT Act). January 10, 2023. Accessed August 13, 2024. https://www.samhsa.gov/medications-substance-use-disorders/waiver-elimination-mat-act
8. Buprenorphine and naloxone oral/sublingual Uses, Side Effects & Warnings. Drugs.com. Accessed August 6, 2024. https://www.drugs.com/mtm/buprenorphine-and-naloxone-oral-sublingual.html
9. Olfson M, Zhang V (Shu), Schoenbaum M, King M. Trends in Buprenorphine Treatment in the United States, 2009-2018. JAMA. 2020;323(3):276-277. doi:10.1001/jama.2019.18913
10. Ali MM, Creedon TB, Jacobus-Kantor L, Sherry TB. National trends in buprenorphine prescribing before and during the COVID-19 pandemic. Journal of Substance Abuse Treatment. 2023;144:108923. doi:10.1016/j.jsat.2022.108923
11. Welsh JW, Dennis ML, Funk R, Mataczynski MJ, Godley MD. Trends and age-related disparities in opioid use disorder treatment admissions for adolescents and young adults. Journal of Substance Abuse Treatment. 2022;132:108584. doi:10.1016/j.jsat.2021.108584
12. Mark TL, Parish W, Zarkin GA. Association Between Medicare and FDA Policies and Prior Authorization Requirements for Buprenorphine Products in Medicare Part D Plans. JAMA. 2019;322(2):166-167. doi:10.1001/jama.2019.6581
13. Hooker RS, Zobitz JM. Prescribing by Physician Associates and Nurse Practitioners in Older Adults Is Outpacing Traditional Prescribers: Implications for Practice in American Medicine. Med Care Res Rev. 2024;81(2):156-163. doi:10.1177/10775587231211966

Appendix

Appendix 1. Data Sources

Longitudinal Prescription Claims Data (LRx)

LRx data track individual patients' prescriptions over time. IQVIA receives approximately 3.7 billion prescription claims for 250 million patients per year. LRx is open source (i.e., payor agnostic) and captures approximately 94% of all prescription transactions from retail pharmacies across the US, 72% for traditional and specialty mail order pharmacies, and 75% for long-term care pharmacies. IQVIA receives data from pharmacies, payors, software providers, and transactional clearinghouses. LRx data contain granular prescription-level information on the pharmaceutical product dispensed, prescription specifications (e.g., dose, duration, etc.), prescriber, payor, and geographical location of the patient. Using an anonymous patient identifier, LRx data are longitudinally linked to other IQVIA patient-level data. For this analysis, we included only prescriptions dispensed in the retail and mail-order channels.

Xponent

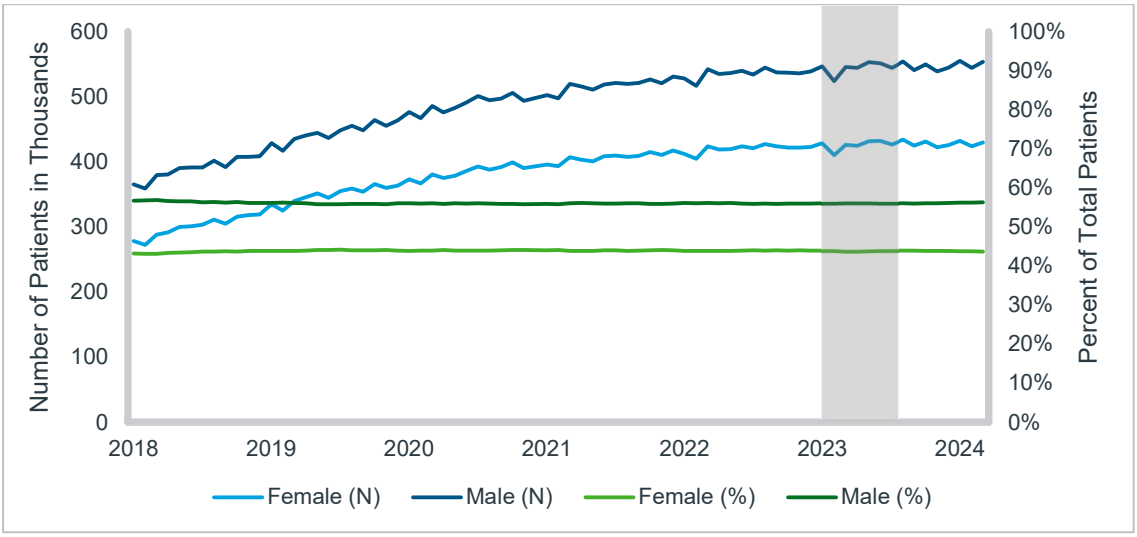
We used Xponent, IQVIA's subnational prescription insights database, to produce national projections. Xponent delivers prescriber-level prescription trends for retail, mail, and long-term care channels of distribution, and covers 94% of retail, 72% of mail, and 75% of long-term care prescriptions. We calculate projection factors using the pharmaceutical product, channel, and month, computing the ratio of LRx prescriptions to Xponent provider-level projections. Because of this methodology, it is possible to get anomalous projections for some isolated time periods when projecting monthly due to dynamic changes in provider level data.

Formulary Impact Analyzer (FIA)

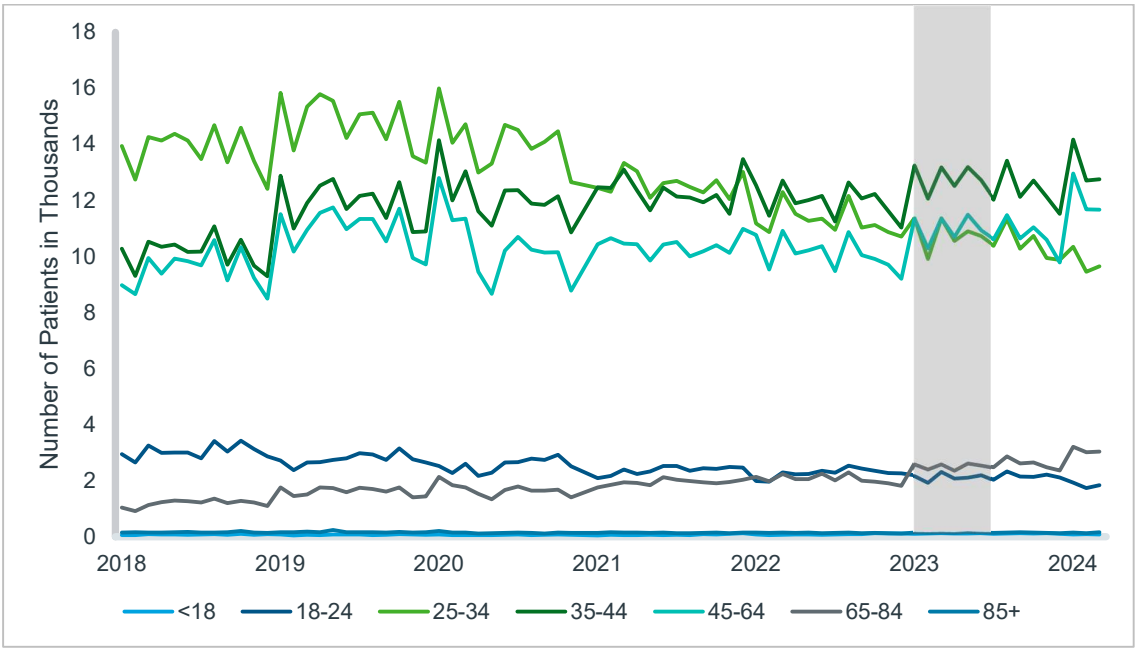
FIA is a claim-level dataset that incorporates the full claim lifecycle generated during the adjudication process. FIA provides key insights into the volume and characteristics of both paid and unpaid claims through payor rejections and reversals. IQVIA tracks all claims adjudication between the retail pharmacy, payor, and patient at the point of sale. IQVIA uses a comprehensive data sourcing strategy that allows visibility across all types of retail pharmacies with geographic granularity. Prescription data are sourced and reported weekly and monthly from national and regional chains, independent pharmacies, and clearinghouses, providing a comprehensive view across retailer types and geographies. Prescription lifecycle data (i.e., information on out-of-pocket costs, reversals, rejections, and reason for reversals and rejections) are sourced from retail, mail, long-term care (LTC) facilities, atypical pharmacies, and switch clearinghouses. FIA contains 58% of all prescription transactions, linked to lifecycle transactions.

Appendix 2. Supplementary Tables and Figures

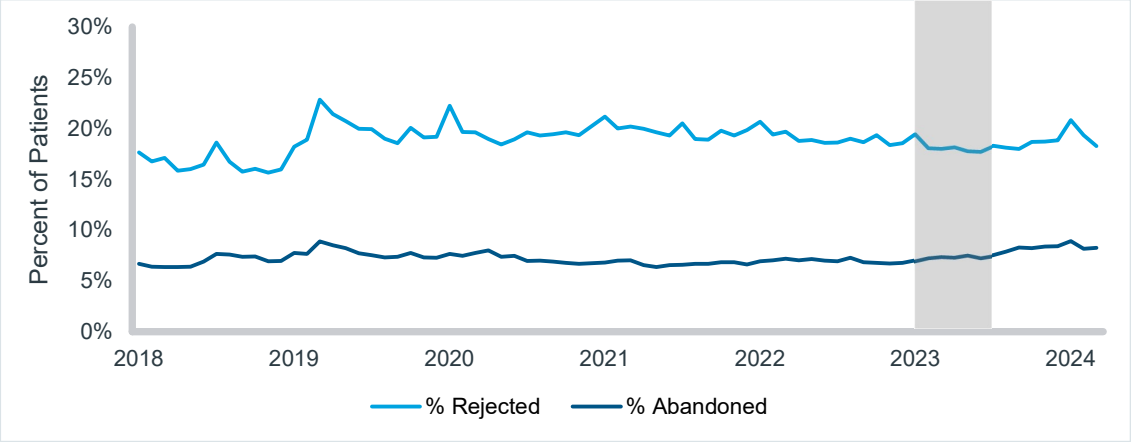
Appendix Figure 1: Number and Percent of Buprenorphine Patients by Sex (2018 – 2024)



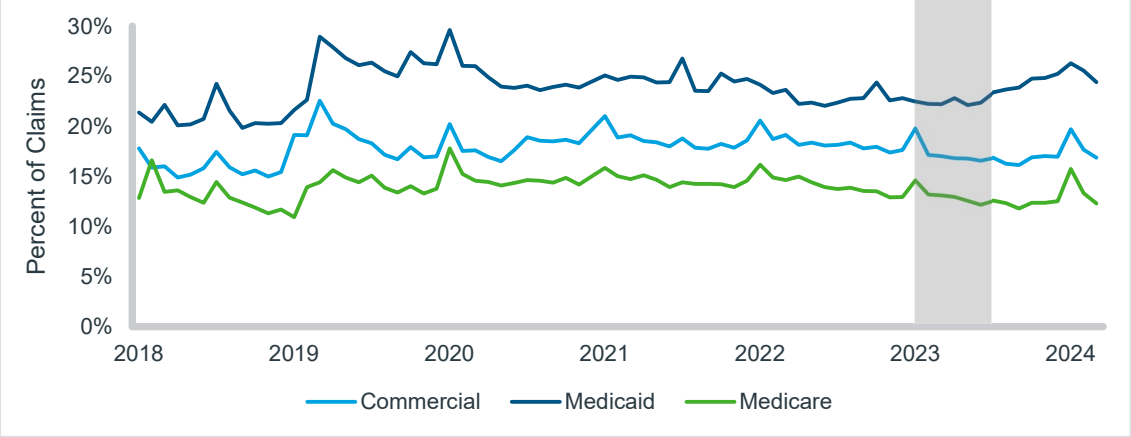
Appendix Figure 2: Number of New-to-Market Buprenorphine Patients by Age Group (2018 – 2 024)



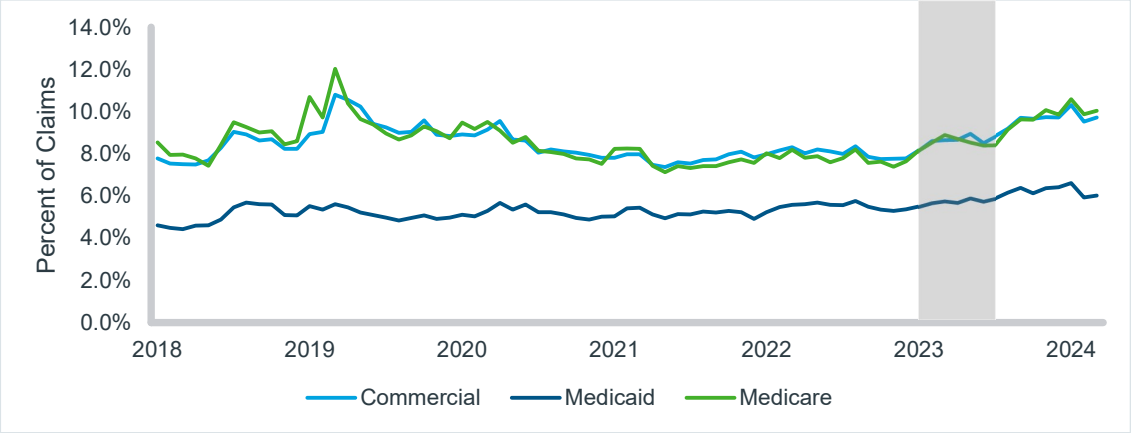
Appendix Figure 3: Percent of Buprenorphine Patients with a Reversed/Abandoned or Rejected Claim (2018 – 2024)



Appendix Figure 4: Percent of Buprenorphine Claims Rejected by Payor (2018 – 2024)



Appendix Figure 5: Percent of Buprenorphine Patients with a Reversed/Abandoned Claim, by Payor (2018 – 2024)



Appendix Table 1: Percent Change in Provider Types (2018 – 2024)

Provider Type	% Change	
	All Patients	New to Market Patients
Addiction Medicine	-12.9%	-44.5%
Anesthesiology	-22.9%	-31.6%
Emergency Medicine	24.0%	19.0%
Family Medicine/Internal Medicine	-6.0%	-44.3%
Hospitalist	-19.3%	-48.7%
Nurse Practitioner (RN/NP)	1266.4%	453.2%
Obstetrics & Gynecology	-13.0%	-57.8%
Other	-20.1%	-57.6%
Pain Medicine	-7.2%	-17.5%
Pediatrics	13.5%	-45.1%
Physical Medicine & Rehabilitation	-16.2%	-23.8%
Physician Assistant	825.6%	367.0%
Psychiatry/Neurology	-40.1%	-63.8%
Surgery	-22.8%	-56.8%

Appendix 3. Buprenorphine Products

Market	Products	Formulations
Buprenorphine	BRIXADI	Buprenorphine Ext Rel Soln Pref Syr (Weekly) 16 MG/0.32ML
		Buprenorphine Ext Rel Soln Pref Syr (Weekly) 24 MG/0.48ML
		Buprenorphine Ext Rel Soln Pref Syr (Weekly) 32 MG/0.64ML
		Buprenorphine Ext Rel Soln Pref Syr (Weekly) 8 MG/0.16ML
		Buprenorphine Extended Release Soln Pref Syr 128 MG/0.36ML
		Buprenorphine Extended Release Soln Pref Syr 64 MG/0.18ML
		Buprenorphine Extended Release Soln Pref Syr 96 MG/0.27ML
	SUBLOCADE	Buprenorphine Extended Release Soln Pref Syr 100 MG/0.5ML
		Buprenorphine Extended Release Soln Pref Syr 300 MG/1.5ML
	BUPRENORPHINEH	Buprenorphine HCl SL Tab 2 MG (Base Equiv)
		Buprenorphine HCl SL Tab 8 MG (Base Equiv)
	BUPRENORPHINE HYDROCHLORIDE	Buprenorphine HCl SL Tab 2 MG (Base Equiv)
		Buprenorphine HCl SL Tab 8 MG (Base Equiv)
	PROBUPHINE IMPLANT KIT	Buprenorphine HCl Subdermal Implant 74.2 MG (Base Equiv)
	BRIXADI	Buprenorphine Ext Rel Soln Pref Syr (Weekly) 16 MG/0.32ML
		Buprenorphine Ext Rel Soln Pref Syr (Weekly) 24 MG/0.48ML
		Buprenorphine Ext Rel Soln Pref Syr (Weekly) 32 MG/0.64ML
		Buprenorphine Ext Rel Soln Pref Syr (Weekly) 8 MG/0.16ML

Market	Products	Formulations
Buprenorphine/Naloxone	BUNAVAIL	Buprenorphine-Naloxone Buccal Film 2.1-0.3 MG (Base Equiv)
		Buprenorphine-Naloxone Buccal Film 4.2-0.7 MG (Base Equiv)
		Buprenorphine-Naloxone Buccal Film 6.3-1 MG (Base Equiv)
	BUPRENORPHINE HCL/NALOXON	Buprenorphine HCl-Naloxone HCl SL Tab 2-0.5 MG (Base Equiv)
		Buprenorphine HCl-Naloxone HCl SL Tab 8-2 MG (Base Equiv)
	BUPRENORPHINE HYDROCHLORI	Buprenorphine HCl-Naloxone HCl SL Film 12-3 MG (Base Equiv)
		Buprenorphine HCl-Naloxone HCl SL Film 2-0.5 MG (Base Equiv)
		Buprenorphine HCl-Naloxone HCl SL Film 4-1 MG (Base Equiv)
		Buprenorphine HCl-Naloxone HCl SL Film 8-2 MG (Base Equiv)
		Buprenorphine HCl-Naloxone HCl SL Tab 2-0.5 MG (Base Equiv)
		Buprenorphine HCl-Naloxone HCl SL Tab 8-2 MG (Base Equiv)
	SUBOXONE	Buprenorphine HCl-Naloxone HCl SL Film 12-3 MG (Base Equiv)
		Buprenorphine HCl-Naloxone HCl SL Film 2-0.5 MG (Base Equiv)
		Buprenorphine HCl-Naloxone HCl SL Film 4-1 MG (Base Equiv)
		Buprenorphine HCl-Naloxone HCl SL Film 8-2 MG (Base Equiv)
		Buprenorphine HCl-Naloxone HCl SL Tab 2-0.5 MG (Base Equiv)
		Buprenorphine HCl-Naloxone HCl SL Tab 8-2 MG (Base Equiv)

Appendix 4. Prescriber Specialty Categories

Specialty Category	Included Specialties
Addiction Medicine	Addiction Medicine, Addiction Psychiatry
Anesthesiology	Adult Cardiothoracic Anesthesiology, Anesthesiology, Critical Care Medicine (Anesthesiology), Hospice & Palliative Medicine (Anesthesiology), Internal Medicine/Anesthesiology, Obstetric Anesthesiology, Pediatric Anesthesiology, Pediatrics/Anesthesiology
Emergency Medicine	Clinical Informatics (Emergency Medicine), Critical Care Medicine (Emergency Medicine), Emergency Medical Services, Emergency Medicine, Hospice & Palliative Medicine (Emergency Medicine), Medical Toxicology (Emergency Medicine), Pediatric Emergency Medicine, Pediatric Emergency Medicine (Pediatrics), Pediatrics/Emergency Medicine, Sports Medicine (Emergency Medicine), Underseas Medicine (Emergency Medicine)
Family Medicine/Internal Medicine	Adolescent Medicine (Internal Medicine), Clinical Informatics (Family Medicine), Clinical Informatics (Internal Medicine), Critical Care Medicine (Internal Medicine), Family Medicine, General Practice, General Preventive Medicine, Geriatric Medicine (Family Medicine), Geriatric Medicine (Internal Medicine), Hematology (Internal Medicine), Hospice & Palliative Medicine (Family Medicine), Hospice & Palliative Medicine (Internal Medicine), Internal Medicine, Internal Medicine/Emergency Medicine, Internal Medicine/Family Medicine, Internal Medicine/Preventive Medicine, Public Health & General Preventive Medicine, Sports Medicine (Family Medicine), Sports Medicine (Internal Medicine)
Hospitalist	Hospitalist
Nurse Practitioner (RN/NP)	Advanced Registered Nurse, Certified Nurse Anesthetist, Clinical Nurse Specialist, Licensed Practical Nurse, Nurse Midwife, Nurse Practitioner, Registered Nurse
Obstetrics and Gynecology	Complex Family Planning (Obgyn), Gynecology, Obstetrics, Obstetrics & Gynecology
Pain Medicine	Hospice & Palliative Medicine, Pain Medicine, Pain Medicine (Anesthesiology), Pain Medicine (Neurology), Pain Medicine (Physical Medicine & Rehabilitation), Pain Medicine (Psychiatry), Palliative Medicine
Pediatrics	Adolescent Medicine (Pediatrics), Internal Medicine/Pediatrics, Pediatrics
Physical Medicine and Rehabilitation	Brain Injury Medicine (Physical Medicine & Rehabilitation), Hospice & Palliative Medicine (Physical Medicine & Rehabilitation), Physical Medicine & Rehabilitation, Sports Medicine (Physical Medicine & Rehabilitation)
Physician Assistant	Physician Assistant

Specialty Category	Included Specialties
Psychiatry/Neurology	Child & Adolescent Psychiatry, Child Neurology, Forensic Psychiatry, Geriatric Psychiatry, Hospice & Palliative Medicine (Psychiatry & Neurology), Internal Medicine/Psychiatry, Neurocritical Care (Psych & Neuro), Neurodevelopmental Disabilities (Psychiatry & Neurology), Neurology, Neuromuscular Medicine (Neurology), Pediatrics/Psychiatry/Child & Adolescent Psychiatry, Psychiatry, Psychiatry/Family Medicine, Psychiatry/Neurology
Surgery	Abdominal Surgery, Cardiothoracic Surgery, Colon & Rectal Surgery, Congenital Cardiac Surgery (Thoracic Surgery), Facial Plastic Surgery, Female Pelvic Medicine & Reconstructive Surgery, Female Pelvic Medicine & Reconstructive Surgery (Urology), General Surgery, Hand Surgery, Hand Surgery (Orthopedics), Hand Surgery (Plastic Surgery), Hand Surgery (Surgery), Head & Neck Surgery, Neurological Surgery, Oral & Maxillofacial Surgery, Orthopedic Surgery, Orthopedic Surgery Of The Spine, Pediatric Surgery, Plastic Surgery, Sports Medicine (Orthopedic Surgery), Surgical Critical Care (Surgery), Surgical Oncology, Thoracic Surgery, Transplant Surgery, Trauma Surgery, Vascular Surgery

Specialty Category	Included Specialties
Other	Abdominal Radiology, Acupuncturist, Adult Reconstructive Orthopedics, Advanced Heart Failure & Transplant Cardiology, Aerospace Medicine, Allergy, Allergy & Immunology, Alternate Therapy, Anatomic Pathology, Anatomic/Clinical Pathology, Ancillary Services, Audiology, Behavioral Health & Social Services, Blood Banking/Transfusion Medicine, Cardiovascular Disease, Case Manager/Care Coordinator, Chiropractic, Clinical & Laboratory Immunology (Internal Medicine), Clinical Cardiac Electrophysiology, Clinical Informatics (Pathology), Clinical Informatics (Pediatrics), Clinical Neurophysiology, Clinical Pathology, Clinical Pharmacology, Clinical Social Worker, Community Health Advocate, Cytopathology, Dentist, Dentistry/Anesthesiology, Dentistry/Endodontics, Dentistry/Orthodontics, Dentistry/Pedodontics, Dentistry/Periodontics, Dermatology, Dermatopathology, Developmental/Behavioral Pediatrics, Diabetes, Diagnostic Radiology, Endocrinology, Diabetes & Metabolism, Epidemiology, Epilepsy, Foot & Ankle, Orthopedics, Forensic Pathology, Gastroenterology, Gynecological Oncology, Hematology (Pathology), Hematology/Oncology, Hepatology, Home Health/Personal Care, Hospice & Palliative Medicine (Obstetrics & Gynecology), Hospice & Palliative Medicine (Pediatrics), Infectious Disease, Interventional Cardiology, Interventional Radiology-Integrated, Legal Medicine, Massage Therapy, Maternal & Fetal Medicine, Medical Genetics, Medical Management, Medical Oncology, Medical Toxicology (Pediatrics), Medical Toxicology (Preventive Medicine), Musculoskeletal Oncology, Musculoskeletal Radiology, Naturopathic Doctor, Neonatal-Perinatal Medicine, Nephrology, Neurodevelopmental Disabilities (Pediatrics), Neuromuscular Medicine (Physical Medicine & Rehabilitation), Neuropathology, Neuroradiology, Nuclear Medicine, Nuclear Radiology, Occupational Medicine, Occupational Therapy, Occupational Therapy – Assistant, Ophthalmology, Optometrist, Orthopedic Trauma, Orthotics, Osteopathic Manipulative Medicine, Osteopathic Neuromusculoskeletal Medicine, Otolaryngology, Pediatric Allergy, Pediatric Cardiology, Pediatric Critical Care Medicine, Pediatric Dermatology, Pediatric Endocrinology, Pediatric Gastroenterology, Pediatric Hematology/Oncology, Pediatric Hospital Medicine (Pediatrics), Pediatric Infectious Disease, Pediatric Nephrology, Pediatric Ophthalmology, Pediatric Orthopedics, Pediatric Otolaryngology, Pediatric Pulmonology, Pediatric Radiology, Pediatric Rehabilitation Medicine, Pediatric Rheumatology, Pediatric Urology, Pharmaceutical Medicine, Pharmacist, Phlebology, Physical Therapy, Physical Therapy – Assistant, Plastic Surgery Within The Head & Neck (Otolaryngology), Podiatrist, Procedural Dermatology, Psychoanalysis, Psychology, Pulmonary Critical Care Medicine, Pulmonary Disease, Radiation Oncology, Radiological Physics, Radiology, Registered Dietician, Reproductive Endocrinology & Infertility, Retinal Specialist, Rheumatology, Selective Pathology, Sleep Medicine, Specialist/Technologist/Technician-Other, Spinal Cord Injury Medicine, Sports Medicine (Pediatrics), Student, Health Care, Surgical Assistant, Technologist – Audiology/Speech/Language, Technologist – Radiologic, Therapeutic Radiology, Transitional Year, Transplant Hepatology (Internal Medicine), Underseas Medicine (Preventive Medicine), Urology, Vascular & Interventional Radiology, Vascular Neurology, Veterinarian
Unknown/Not Applicable	Unknown, Not applicable