Benzodiazepine Use among Medicare, Commercially Insured, and Veteran Older Adults, 2013–2017

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BACKGROUND/OBJECTIVES: Benzodiazepines (BZDs) are widely prescribed to older adults. Although prescribing has declined in the U.S. Department of Veterans Affairs (VA), Medicare introduced BZD coverage in 2013. It is unknown whether declines in the VA have been widespread among older adults in the United States.

DESIGN: Observational study in traditional fee-for-service Medicare, commercial insurance, and the VA.

SETTING: United States, 2013–2017.

PARTICIPANTS: Adults aged 55 and older in traditional Medicare (234,290,693 person-months), commercial insurance (337,827,125 person-months), and the VA (256,590,369 person-months).

MEASUREMENTS: (1) Change in BZD and BZD-opioid co-prescribing modeled by Poisson regression over time; and (2) standardized ratios of BZD and BZD-opioid co-prescribing, using Medicare as the reference.

RESULTS: From April 2013 to December 2017, the monthly percentage of adults aged 55 and older who received BZDs fell from 10.4% to 9.3% in Medicare, 6.6% to 6.5% in commercial insurance, and 5.7% to 3.0% in the VA. Monthly BZD-opioid co-prescribing over the same time fell from 4.0% to 3.0% in Medicare, 2.3% to 2.0% in commercial, and 2.2% to .6% for the VA. Age- and sex-adjusted rates of decline for BZD and BZD-opioid co-prescribing were statistically significant for all systems. Annual BZD rate reductions were .98 (Medicare), .99 (commercial), and .87 (VA; $P < .001$ for all); co-prescribing rate reductions were .95, .99, and .75 ($P < .001$ for all). Using standardized ratios accounting for demographic and clinical characteristics, both prescribing and co-prescribing were lowest for the VA relative to Medicare (standardized BZD ratio = .40; 95% confidence interval [CI] = .39–.40; standardized BZD-opioid co-prescribing ratio = .35; 95% CI = .35–.35). Prescribing in commercial insurance was also lower (BZD = .65; 95% CI = .65–.65; BZD-opioid co-prescribing = .65; 95% CI = .65–.65).

CONCLUSION: BZD prescribing has declined much more to older adults receiving care through the VA than Medicare or commercial insurance. Other systems may learn from strategies implemented in the VA. **J Am Geriatr Soc 69:98-105, 2021.**

Keywords: benzodiazepine; veteran; Medicare

The link between benzodiazepine (BZD) use and fall-related injury in older adults has been known for more than 30 years,[1,2] leading to their recognition as medications to avoid in older adults.[3,4] Although additional evidence of potential harms has emerged, such as motor vehicle accidents[5] and impaired cognition,[6] perhaps the most concerning is increased overdose risk.[7] After opioids, BZDs are the second most common prescription medication involved in pharmaceutical overdose mortality,[8] and they increase the risk of opioid-related overdose in a dose–response fashion.[9]

Despite the potential harms associated with BZD prescribing and the availability of alternative treatment options, prevalence of use among older adults in the United States did not change over nearly two decades through

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2013.[10] The lack of reduction may reflect patient or physician reluctance to discontinue therapy,[11,12] lack of the resources and tools that contribute to successful reduction,[13-16] or both. This makes recent declines in BZD prescribing within the U.S. Department of Veterans Affairs system (VA) notable, where prevalent use among adults aged 65 and older fell from 9.2% to 7.3% between 2010 and 2016.[17] Medicare's prescription drug coverage benefit (ie, Part D) did not cover BZD prescriptions until 2013,[18] and prescribing since then has not been examined. It is not known whether the declines in the VA reflect broader changes nationally or whether the declines among veterans are unique.

This analysis had two primary goals. First, we compared the rate of change in BZD prescribing and in BZD-opioid co-prescribing to adults aged 55 and older from 2013 to 2017 in three parallel U.S. healthcare populations: traditional fee-for-service Medicare, commercial insurance (ie, Optum which includes both employer-sponsored insurance and Medicare Advantage), and the VA. We used a lower age cutoff of 55 rather than 65 years given evidence of growing BZD use among middle-aged adults,[10] with use that now equals or exceeds that of adults aged 65 and older in the general population.[19] Second, to account for the potential that different prescribing patterns might reflect differences in patient populations (eg, a much lower proportion of female patients in the VA), we used the final year of data (ie, 2017) to perform cross-population comparisons of BZD prescribing and BZD-opioid co-prescribing. If BZD prescribing in the VA is lower or declines over time are limited to the VA, which is the nation's largest integrated healthcare system, such findings may suggest strategies that could be implemented in other settings or systems interested in reducing BZD prescribing.

METHODS

Study Population

For this cohort study, we included data from three healthcare populations from 2013 to 2017:

- Traditional fee-for-service Medicare ("Medicare" hereafter), a national health insurance program that provides coverage to disability-eligible beneficiaries and those aged 65 and older. Data were derived from the 20% sample including the Medicare Provider Analysis and Review (MedPAR), Outpatient, Carrier, Hospice, and Part D files.
- Optum Clinformatics Data Mart Database ("commercial" hereafter), derived from a large U.S. national health insurance company that covers 20% of employer-sponsored insurance and also covers approximately one-quarter of Medicare beneficiaries enrolled in Medicare Advantage plans (ie, managed Medicare). All beneficiaries in this commercial population had prescription drug coverage.
- The VA, composed of individuals who received care through the Veterans Health Administration that serves nearly 9 million veterans across more than 150 hospitals and 800 community-based outpatient clinics across the United States.

To compare prescribing trends over time, we created a monthly rolling cohort for each of the three healthcare populations that included all individuals who were aged 55 and older on the first of the year, alive as of the first of each month, and resided in the 50 states or Washington, D.C. For all populations, age eligibility was determined at the beginning of each year because the commercial data used in this analysis only included birth year. Because many veterans do not obtain health care through the VA,[20] the monthly VA cohort was limited to active VA healthcare users by requiring that, in the prior 12 months, an individual had either one or more inpatient or outpatient healthcare encounters or one or more prescription drug claims. The monthly Medicare cohort was limited to those who had Part D prescription drug coverage but were not in Part C (ie, managed care); all adults in the commercial and VA populations had prescription drug coverage.

Individuals who either died or had hospice use in a given month were included in that month but then excluded from the cohort all months thereafter. In Medicare, hospice enrollment was determined using the Hospice claims file. Receipt of hospice services in Optum and VA was determined by a claim with either a hospice procedure code or a hospice revenue code.[21]

Outcomes

For each monthly cohort from January 2013 to December 2017, we determined BZD prescribing and BZD-opioid co-prescribing. BZDs were identified using American Hospital Formulary System classes 28:12.08 and 28:24.08; opioids were classes 28:08.08 and 28:08.12. In the Medicare and commercial populations, prescription fills were identified from claims submitted by the dispensing pharmacy to the insurer (eg, Medicare) for payment. In the VA, prescription fills were identified using the Corporate Data Warehouse that captures pharmacy information from the electronic health record for each new prescription fill.

Information from each population included the generic medication name, fill date, and day's supply. Use each month was based on exposure to the medication(s) using the date dispensed and number of days supplied (eg, a 30-day supply dispensed on January 20 contributed to exposure for January and February). Co-prescribing was present if there were days of medication available for both a BZD and an opioid in the same month, regardless of overlap. As a sensitivity analysis, we also used a stricter definition of co-prescribing that required 1 day or longer of overlap in the BZD and opioid exposure days during the month.[7,22]

Cohort Characteristics

We determined sex and age based on data at the beginning of the year; comorbidity was determined using the Elixhauser comorbidity index.[23] We also determined the presence of these specific conditions associated with BZD prescribing: depression, anxiety, posttraumatic stress disorder (PTSD), alcohol use disorder, other substance use disorders, dementia, insomnia, and noncancer chronic pain[24] (Supplementary Table S1).

Analysis, Part 1: Time Trends

To compare change in BZD prescribing over time, accounting for any changes in the age and sex distributions, we obtained monthly counts of BZD users in each population, stratified by sex-by-age subgroups ([male and female] × [55–64, 65–74, 75–84, and ≥85 years]). We modeled monthly population counts of BZD users from 2013 to 2017 using a generalized linear mixed model with Poisson distribution, with log link; the log of the monthly cohort size was the offset. The model included age groups, sex, time (incrementing by 1 for each month forward) with autoregressive correlation, and two indicators for the VA and commercial populations (with Medicare as the referent). We included a time-by-population interaction term to determine whether the monthly rate of change in prescribing risk varied between populations. Because Part D did not cover BZDs until 2013,[18] the models used data from April 2013 forward to exclude the rapid increase in BZD fills at the start of 2013 due to the coverage expansion.[25] We modeled time trends in BZD-opioid co-prescribing similarly including the sensitivity analysis with the stricter definition of co-prescribing.

Analysis, Part 2: Cross-System Comparison

We used 2017 data to determine the overall yearly crude rate of BZD prescribing and BZD-opioid co-prescribing, as well as yearly rates by patient characteristic within each population. The overall crude rate was calculated as the total count of persons with any BZD use in 2017 divided by the total person-years (PY) of exposure. Those who died or received hospice care in 2017 contributed a fraction of a year until death or hospice care, whichever was earlier.

To compare covariate-adjusted prescribing rates between populations, we used the 2017 Medicare population as the standard population. We first used a Poisson regression to model BZD prescribing in the 2017 Medicare population with log of PY as the offset, adjusting for baseline characteristics in 2016. We then applied this model to the 2017 commercial and VA populations separately to obtain the expected annual count of BZD prescribing in each population, accounting for individual covariate characteristics and exposure periods of the individuals in the respective populations.

To generate a covariate-adjusted between-system comparison of BZD prescribing, we calculated the standardized prescribing ratio in the commercial and VA populations as the ratio of expected prescribing—if the adjusted prescribing rates seen in the Medicare population were applied in the commercial or VA populations—over the observed (actual) prescribing. We calculated the 95% confidence intervals (CIs) using an exact method from the Poisson distribution.[26]

Analysis for BZD-opioid co-prescribing was done similarly including the sensitivity analysis with the stricter definition of co-prescribing.

Finally, given the potential influence of 55- to 64-year-old disability-eligible Medicare beneficiaries on Medicare prescribing overall, we completed an additional sensitivity analysis limiting the cross-system comparison analysis just outlined to patients aged 65 and older in the three populations.

Analyses were conducted using SAS v.9.4; tests were two sided with $\alpha = .05$. This study was approved by the Michigan Medicine institutional review board; informed consent was waived.

RESULTS

Across all 5 years, the Medicare population included 6,292,510 individuals; commercial, 11,321,222; and VA, 6,265,985. Characteristics of the three cohorts in 2013 are presented in Table 1. For Medicare, commercial, and VA, the mean (standard deviation) ages were 73.2 (9.0), 68.2 (9.0), and 69.9 (9.6), respectively; the percentages female were 60.3%, 54.1%, and 4.2%. A total of 56.9% of the commercial cohort was in Medicare Advantage.

Part 1: Time Trends

In April 2013, the monthly unadjusted prevalence of BZD use in Medicare was 10.4%; by December 2017, it was 9.3%. For the same points in time, monthly commercial BZD use was 6.6% and 6.5%; for the VA, 5.7% and 3.0% (Figure 1; Supplementary Tables S2–S4). In the model accounting for age and sex distribution over time, likelihood of BZD use in the Medicare population declined at a yearly rate of .98 (ie, $= \exp[-.002 \times 12]$; 95% CI = −.002 to −.002; $P < .001$) (Table 2). There was an even smaller yearly decrease in the likelihood of BZD use in the commercial population of .99 (ie, $= \exp[(-.002 + .001) \times 12]$; commercial × time interaction 95% CI = −.001 to .003; $P < .001$). The likelihood of BZD use in the VA declined at a much larger rate relative to Medicare, with an estimated yearly likelihood reduction of .87 (ie, $= \exp[(-.002 + [-.01]) \times 12]$; VA × time interaction 95% CI = −.01 to −.01; $P < .001$).

In April 2013, the monthly unadjusted prevalence of BZD-opioid co-prescribing in Medicare was 4.0% and declined to 3.0% by December 2017. For the same points in time, commercial co-prescribing declined from 2.3% to 2.0%; for the VA, 2.2% to .6% (Figure 2; Supplementary Table S2–S4). Based on the model, in the Medicare population the likelihood of BZD-opioid co-prescribing declined significantly by .95 per year (ie, $= \exp[-.004 \times 12]$; 95% CI = −.004 to −.004; $P < .001$) (Table 2). The annual rate of change in commercial co-prescribing was close to null at .99 (ie, $= \exp[(-.004 + .003) \times 12]$; commercial × time interaction 95% CI = .003–.003; $P < .001$). As with BZD prescribing, the VA experienced significantly larger declines in BZD-opioid co-prescribing over time relative to Medicare, with an estimated annual likelihood reduction of .75 (ie, $= \exp[(-.004 + [-.02]) \times 12]$; VA × time interaction 95% CI = −.02 to −.02; $P < .001$). Results from the sensitivity analysis using a stricter definition of co-prescribing (ie, requiring ≥1 day of BZD-opioid overlap) were consistent in magnitude and direction (Supplementary Table S5).

Part 2: Cross-System Comparison

In 2017, the unadjusted yearly rate of BZD use was 17.7 per 100 PY in Medicare, 12.6 per 100 PY in commercial,

Table 1. Characteristics of Medicare, Commercial, and VA Populations in 2013

Characteristic[a], %	Medicare (n = 3,262,087)	Commercial (n = 4,999,447)	VA (n = 3,768,742)
BZD use	18.5	12.1	9.7
Opioid use	36.0	26.5	25.5
BZD-opioid co-prescribing	9.2	5.5	4.7
Sex			
Male	39.7	45.9	95.8
Female	60.3	54.1	4.2
Age, y, mean (SD)	73.2 (9.0)	68.2 (9.0)	69.9 (9.6)
55–64	14.0	38.3	34.6
65–74	45.9	36.1	34.3
75–84	27.2	23.5	21.0
≥85	12.9	2.0	10.2
Clinical conditions			
Depression	3.2	2.9	4.9
Anxiety disorder	7.6	6.3	7.2
PTSD	.3	.2	10.2
Alcohol-related disorder	.0	.8	5.8
Nonalcohol substance-related disorder	.0	.6	3.0
Dementia	7.8	3.1	2.4
Insomnia	3.0	3.8	4.2
Chronic pain	47.2	45.8	49.6
Elixhauser score			
0	17.6	39.7	15.9
1	24.8	15.5	19.5
2	20.6	13.9	22.0
3	12.8	10.1	17.2
≥4	24.3	20.8	25.3

Abbreviations: BZD, benzodiazepine; PTSD, posttraumatic stress disorder; SD, standard deviation; VA, Veterans Affairs.
[a]Between-group comparisons (χ^2 tests) are statistically significant for all characteristics that were determined based on 2013 encounters.

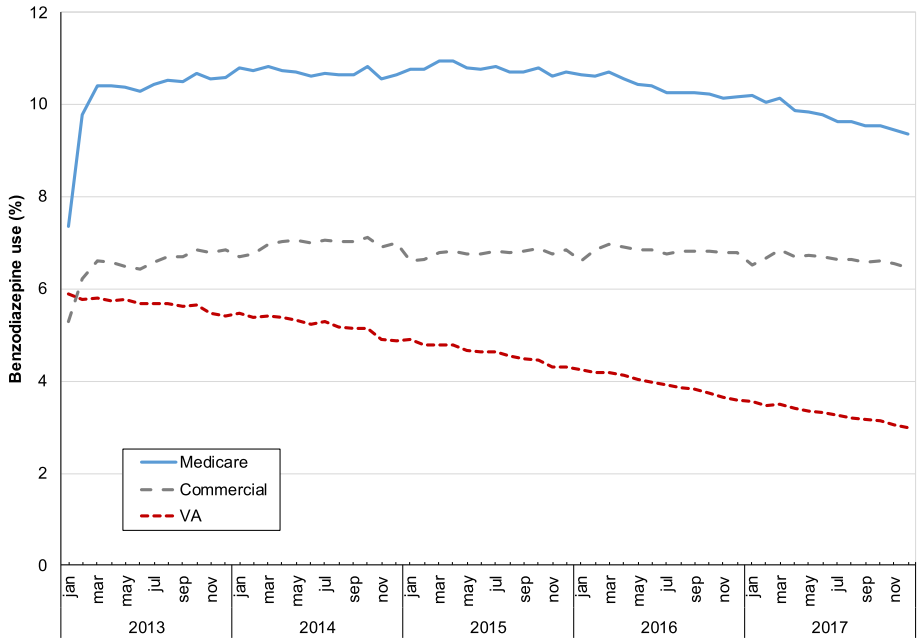

Figure 1. Monthly prevalence of benzodiazepine (BZD) use among adults aged 55 and older in Medicare, commercial, and Veterans Affairs (VA) populations, 2013–2017. The large increases at the start of 2013 in the Medicare and commercial populations (the latter includes beneficiaries in Medicare Advantage) are artifacts of Medicare beginning coverage of BZDs in 2013.

Table 2. Trends in Monthly Likelihood of Benzodiazepine Use and Benzodiazepine-Opioid Co-Prescribing among Adults Aged ≥55 in Medicare, Commercial, and VA Populations, 2013–2017

Characteristic	BZD use[a]		BZD-opioid co-prescribing[a]	
	Estimate (95% CI)	*P* value	Estimate (95% CI)	*P* value
Sex				
Female	Reference		Reference	
Male	−.40 (−.56 to −.24)	<.001	−.51 (−.72 to −.30)	<.001
Age, y				
55–64	Reference		Reference	
65–74	−.32 (−.55 to −.10)	.006	−.59 (−.88 to −.29)	<.001
75–84	−.43 (−.66 to −.20)	<.001	−.88 (−1.18 to −.58)	<.001
≥85	−.51 (−.74 to −.28)	<.001	−1.11 (−1.40 to −.81)	<.001
Time, mo	−.002 (−.002 to −.002)	<.001	−.004 (−.004 to −.004)	<.001
Commercial × time[b]	.001 (−.001 to .003)	<.001	.003 (.003 to .003)	<.001
VA × time[b]	−.01 (−.01 to −.01)	<.001	−.02 (−.02 to −.02)	<.001
Commercial	−.54 (−.73 to −.34)	<.001	−.70 (−.96 to −.44)	<.001
VA	−.66 (−.85 to −.46)	<.001	−.67 (−.92 to −.41)	<.001

Abbreviations: BZD, benzodiazepine; CI, confidence interval; VA, Veterans Affairs.

[a]Results from generalized linear mixed models with Poisson distribution for the number of people using BZDs (or co-prescribed a BZD and opioid) each month from April 2013 to December 2017 to compare systems (Medicare [reference], Optum, and VA) over time, adjusting for age and sex.

[b]Estimates reflect the incremental association of time (month) with BZD use in the commercial and VA populations, relative to the association of time in Medicare. To interpret the monthly time coefficient for BZD use, the annual likelihood for BZD use in Medicare is .98 (ie, exp[−.002/month × 12 months]). The yearly likelihood for a comparison population is exp([*time* coefficient + *population* × *time* interaction coefficient]/month × 12 months). For the VA, this is exp ([−.002 + (−.01)]/month × 12 months) = .87.

and 6.3 per 100 PY in the VA (Table 3). In all three populations, prescribing rates were higher for women than men and higher for those aged 55 to 64 than for older patients. Use increased with the burden of medical comorbidity in all three populations.

The commercial population's overall standardized BZD prescribing ratio—that is, the observed level compared with what would have been predicted from the Medicare model—was .65 (95% CI = .65–.65). The commercial standardized ratios were lower than expected for all population strata. Among the clinical conditions of interest, they ranged from .66 (95% CI = .65–.67) for dementia to .91 (95% CI = .90–.92) for nonalcohol substance-related disorders. The overall VA standardized prescribing ratio was

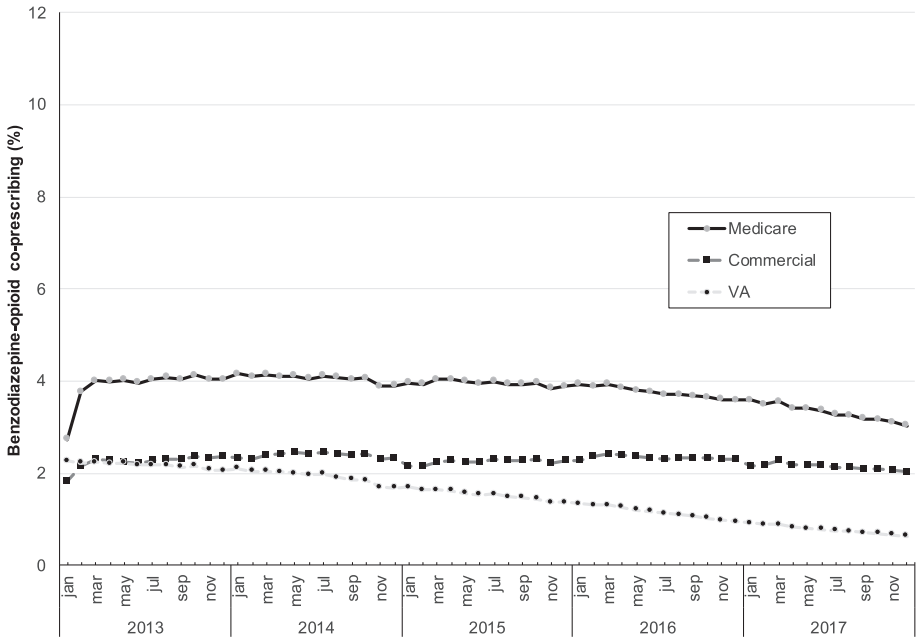

Figure 2. Monthly prevalence of benzodiazepine (BZD)-opioid co-prescribing among adults aged 55 and older in Medicare, commercial, and Veterans Affairs (VA) populations, 2013–2017. The large increases at the start of 2013 in the Medicare and commercial populations (the latter includes beneficiaries in Medicare Advantage) are artifacts of Medicare beginning coverage of BZDs in 2013.

Table 3. Annual Rates and Standardized Ratios of Benzodiazepine Use and Benzodiazepine-Opioid Co-Prescribing in Medicare, Commercial, and VA Populations in 2017

	BZD use					BZD-opioid co-prescribing				
		Commercial		VA			Commercial		VA	
Characteristics[a]	Medicare Rate[b], per 100 PY	Rate[b], per 100 PY	Standardized ratio[c] (95% CI)[d]	Rate[b], per 100 PY	Standardized ratio[c] (95% CI)[d]	Medicare Rate[b], per 100 PY	Rate[b], Rx per 100 PY	Standardized ratio[c] (95% CI)[d]	Rate[b], per 100 PY	Standardized ratio[c] (95% CI)[d]
Overall	17.7	12.6	.65 (.65–.65)	6.3	.40 (.39–.40)	8.1	5.5	.65 (.65–.65)	2.2	.35 (.35–.35)
Sex										
Male	13.2	9.1	.63 (.63–.64)	6.1	.40 (.40–.40)	6.0	4.0	.65 (.65–.65)	2.2	.36 (.35–.36)
Female	20.8	15.4	.66 (.66–.66)	9.6	.34 (.33–.34)	9.6	6.7	.65 (.65–.66)	3.5	.28 (.27–.28)
Age, y										
55–64	29.6	13.1	.58 (.57–.58)	7.3	.33 (.32–.33)	19.0	6.2	.55 (.55–.56)	2.9	.27 (.26–.27)
65–74	15.9	12.3	.71 (.71–.71)	6.9	.49 (.48–.49)	7.0	5.4	.74 (.74–.75)	2.4	.44 (.44–.44)
75–84	16.5	12.2	.70 (.70–.71)	4.3	.38 (.37–.38)	6.8	4.9	.73 (.73–.74)	1.3	.36 (.35–.37)
≥85	18.2	12.1	.64 (.64–.65)	4.0	.36 (.35–.36)	7.2	4.7	.67 (.66–.68)	1.2	.36 (.35–.37)
Clinical conditions										
Depression	41.6	3.2	.74 (.73–.74)	15.7	.50 (.49–.50)	23.5	16.0	.73 (.72–.73)	6.0	.38 (.38–.39)
Anxiety disorder	58.7	44.7	.77 (.77–.77)	26.1	.53 (.53–.54)	32.5	21.9	.73 (.73–.73)	9.1	.39 (.39–.40)
PTSD	54.7	43.5	.76 (.74–.77)	18.0	.68 (.68–.69)	33.6	24.9	.75 (.73–.77)	6.5	.51 (.51–.52)
Alcohol-related disorder	30.1	21.5	.79 (.78–.80)	8.8	.39 (.38–.39)	17.2	11.3	.78 (.76–.80)	3.3	.31 (.30–.32)
Nonalcohol substance-related disorder	45.3	39.3	.91 (.90–.92)	10.8	.36 (.36–.37)	37.3	30.1	.87 (.86–.88)	5.0	.27 (.26–.28)
Dementia	31.5	20.6	.66 (.65–.67)	9.2	.45 (.48–.46)	13.7	8.8	.68 (.67–.69)	3.2	.42 (.40–.43)
Insomnia	45.4	33.7	.78 (.77–.78)	17.1	.51 (.50–.52)	26.0	17.3	.74 (.73–.75)	6.3	.38 (.37–.39)
Chronic pain	23.9	15.9	.67 (.67–.68)	8.3	.43 (.43–.43)	13.6	8.0	.67 (.66–.67)	3.6	.37 (.37–.37)
Elixhauser score										
0	10.7	7.0	.59 (.58–.59)	3.0	.31 (.30–.31)	3.8	2.2	.58 (.57–.58)	.8	.25 (.25–.26)
1	17.0	10.6	.57 (.56–.57)	5.0	.35 (.34–.35)	6.8	3.6	.53 (.52–.53)	1.4	.28 (.28–.29)
2	18.7	12.5	.62 (.62–.62)	6.0	.38 (.38–.39)	8.3	4.9	.59 (.58–.60)	1.9	.31 (.31–.32)
3	20.9	14.2	.65 (.65–.66)	7.2	.42 (.41–.42)	10.1	6.1	.64 (.63–.64)	2.5	.34 (.34–.35)
≥4	26.3	18.4	.73 (.73–.74)	9.8	.49 (.49–.50)	14.8	9.8	.74 (.74–.75)	4.3	.42 (.42–.43)
Prescribed opioid	27.4	23.7	.74 (.74–.74)	11.9	.46 (.46–.47)	19.5	16.4	.68 (.68–.68)	7.5	.38 (.38–.38)

Abbreviations: BZD, benzodiazepine; CI, confidence interval; PTSD, posttraumatic stress disorder; PY, person-year; VA, Veterans Affairs.

[a]Clinical characteristics determined based on 2016 encounters.

[b]100 × number of persons with any benzodiazepine (or benzodiazepine-opioid) use in 2017/total PY, either overall or by stratum, where PY is 1 if an eligible individual is alive throughout the year or a fraction (number of days to death or hospice care/365) if died or entered hospice during 2017.

[c](Observed number of persons with benzodiazepine prescription in 2017 in commercial or VA)/(expected number of persons with benzodiazepine prescription in 2017, predicted using Poisson multivariable regression model from Medicare population including all table row characteristics). For example, the rate of BZD prescribing to women in the VA is .34 times what would be expected if prescribing practices in the Medicare cohort were applied to female patients in the VA.

[d]The 95% CI = rate ± (1.96 × [√observed]/expected)[26].

even lower at .40 (95% CI = .39–.40). Compared with prescribing in Medicare, the standardized ratios for clinical conditions ranged from .36 (95% CI = .36–.37) for nonalcohol substance-related disorders to .68 (95% CI = .68–.69) for those with PTSD.

In 2017, the unadjusted rate of BZD-opioid co-prescribing was 8.1 per 100 PY for Medicare, 5.5 per 100 PY for commercial, and 2.2 per 100 PY in the VA (Table 3). In all three populations, the co-prescribing rate was higher for women than men and higher for those aged 55 to 64 than for older groups. Co-prescribing increased as the burden of medical comorbidity increased in all three populations. The overall commercial standardized co-prescribing ratio was .65 (95% CI = .65–.65). As with BZD prescribing, the co-prescribing ratios in the commercial population were lower for all population strata compared with Medicare. The VA's overall standardized co-prescribing ratio was .35 (95% CI = .35–.35). Similarly, the observed rate of VA co-prescribing was lower than Medicare for every demographic and clinical stratum.

Crude rates and standardized ratios were similar with co-prescribing that required overlap (Supplementary Table S6). Findings were also consistent with populations limited to those aged 65 and older (Supplementary Table S7).

DISCUSSION

This analysis of BZD prescribing in nearly 24 million U.S. adults aged 55 and older finds modest reductions in prescribing among Medicare beneficiaries and commercial enrollees during the period 2013 to 2017, with lower prescribing and larger declines among the VA population. These differences are not accounted for by the different patient populations. Taking into account population differences, overall BZD prescribing in the VA in 2017 was less than half what might have been expected had Medicare prescribing practices been applied in the VA; BZD-opioid co-prescribing was about a third what would have been expected.

The small declines in BZD prescribing to nonveteran older adults in the United States have not, to our knowledge, been previously described. Analyses using the National Ambulatory Medical Care Survey demonstrated increasing use over time among older adults through 2015,[27,28] although such estimates are based on office visits, an imperfect proxy for use. In contrast, a prevalence estimate based on the Medical Expenditure Panel Survey suggested no significant change among adults aged 65 and older from 1996 to 2013, although use among those aged 45 to 64 did grow.[10] The finding of declines in VA BZD prescribing extends results from a recent international comparison through 2016 that included the VA.[17] That analysis examined annual prevalence that accounts for the higher 2016 prevalence (7.3%) than reported here that are based on monthly medication possession.

Unlike BZD use, recent analyses have examined BZD-opioid co-prescribing in the United States and have found it to be declining. A study of commercial prescription claims from 2001 to 2013 found growth in BZD-opioid co-prescribing,[7] but more recent analyses through 2017 found declines, potentially in response to the Centers for Disease Control and Prevention's 2016 Opioid Guidelines[22] and the U.S. Food and Drug Administration's boxed warning advising against co-prescribing.[29] Declines in co-prescribing have been underway even longer in the VA, following the start of the Opioid Safety Initiative in 2013.[30]

The size of the prescribing declines in the VA, despite already beginning in 2013 with lower prescribing than the other two populations, is striking. The VA is the largest integrated healthcare system in the United States and has two national initiatives focused on the safety of prescribing psychoactive medications: the Opioid Safety Initiative and the Psychotropic Drug Safety Initiative, which both began in 2013.[30,31] Both programs include informatics tools that derive data from the electronic health record to identify high-risk patients (eg, older veterans prescribed a BZD; a veteran of any age co-prescribed a BZD and opioid), allowing facility leadership and quality improvement champions to provide feedback to the prescribing clinicians. These tools also help target educational efforts both to providers and patients alike, many of which are delivered by or with support from the VA's Academic Detailing Service.[32]

Given no reduction in BZD use among older adults through 2013[10] and the Part D BZD coverage expansion in 2013, it was surprising to find even small reductions in the non-VA populations. The declines may have been a by-product of opioid-related prescribing guidelines that emphasized reducing opioid-BZD co-prescribing.[33] It was also unexpected that the declines in traditional Medicare slightly exceeded those in the commercial population that included a large proportion of Medicare Advantage enrollees. This commercial insurance group would theoretically have population health management options like utilization management (eg, prior authorization) or programs to incentivize healthy behaviors more similar to the VA's integrated system than to traditional Medicare.[34]

A variety of interventions are effective at reducing BZD use. Although they may range in complexity from brief educational approaches to multi-session psychological augmentation, even the most simple are more effective than usual care.[13,15,16] The critical element to reduce BZD prescribing may be countering clinical inertia that may otherwise be the default prescribing approach[35,36] and would account for the years of stable use. As a large integrated healthcare system charged with coordinating delivery of primary care, mental health care, and prescription drugs to veterans, the VA may be uniquely equipped to counter this clinical inertia.

This analysis has several limitations. It describes medication prescription fills but does not account for actual consumption. The measure of co-prescribing is an estimate based on the days prescribed but may not actually reflect co-consumption. Prescriptions paid for out of pocket and misuse of another person's prescription are not captured. The Medicare population is limited to fee-for-service coverage, whereas the commercial population includes only a portion of Medicare Advantage. Because the analysis was completed in three separate data sources that could not be linked, some individuals are possibly included in more than one cohort, such as a veteran who obtained a BZD prescription from both the VA and Medicare Part D. In addition, these populations may vary in other characteristics associated with BZD prescribing that we did not adjust for, such as income.

In conclusion, BZD prescribing and BZD-opioid co-prescribing have declined markedly among older adults who receive care through the VA, in contrast to much smaller declines in Medicare and commercial populations. Given decades of evidence highlighting potential harms yielding minimal change in prescribing, the VA may offer lessons to apply in other healthcare populations to achieve meaningful reductions in BZD prescribing.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article.

Appendix S1: Supporting information.