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Journal

The Journal of Clinical Psychiatry, 78(4)

ISSN

0160-6689

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Publication Date

2017-04-26

DOI

10.4088/jcp.16m10713

Peer reviewed

HHS Public Access

Author manuscript

J Clin Psychiatry. Author manuscript; available in PMC 2018 April 01.

Published in final edited form as:

J Clin Psychiatry. 2017 April ; 78(4): e363–e371. doi:10.4088/JCP.16m10713.

National Trends in Antidepressant, Benzodiazepine, and Other Sedative-Hypnotic Treatment of Older Adults in Psychiatric and Primary Care

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Abstract

Objective—To describe how use of antidepressants, benzodiazepines, and other anxiolytic/sedative-hypnotics among older adults (age ≥65) has changed over time among visits to primary care providers and psychiatrists in the United States.

Method—Data came from the National Ambulatory Medical Care Survey (years 2003–2005 and 2010–2012), a nationally-representative cross-section of outpatient physician visits. Analysis focused on visits to primary care providers (n=14,282) and psychiatrists (n=1,095) at which an antidepressant, benzodiazepine, or other anxiolytic/sedative-hypnotic was prescribed, which were stratified by demographic and clinical characteristic (including *ICD-9-CM* diagnosis) and compared across study intervals. Odds of medication use were calculated for each stratum, adjusting for demographic and clinical characteristics.

Results—The visit rate by older adults to primary care providers where any of the medications were prescribed rose from 16.4% to 21.8% (AOR 1.43, p<0.001), while remaining steady among psychiatrists (75.4% v. 68.5%; AOR 0.69, p=0.11). Primary care visits rose for antidepressants (9.9% to 12.3%; AOR 1.28, p=0.01) and other anxiolytic/sedative-hypnotics (3.4% to 4.7%; AOR 1.39, p=0.01), but the largest growth was among benzodiazepines (5.6% to 8.7%; AOR 1.62, p<0.001). Among patients in primary care, increases primarily occurred among men, non-Hispanic white patients, and both those with pain diagnoses as well as those without any mental health or pain diagnoses.

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Previous presentation: none

Potential conflicts of interest: SCM reports receipt of consulting fees from Alkermes, Shire, Johnson & Johnson, Forest, and Sunovion. The other authors have no financial or other relationship relevant to the subject of this article.

Conclusion—From 2003–2012, use of the most common psychotropic medications among older adults seen in primary care increased, concentrated among patients with no mental health or pain diagnosis. As the population of older adults grows and receives mental health treatment in primary care, it is critical to examine the appropriateness of psychotropic use.

INTRODUCTION

The Institute of Medicine released *The Mental Health and Substance Use Workforce for Older Adults: In Whose Hands?*[1] in 2012, the year after the first Baby Boomers turned 65. This report highlights the lack of providers with expertise to address the mental health needs of older adults, especially given the burden of mental disorders in this growing population.[2,3] The limited workforce of specialty-trained mental health providers and patient preference may help account for the fact that the principal mental health treatment setting for older adults is primary care[4] and the first-line treatment modality is overwhelmingly psychotropic medication,[5] despite a variety of effective evidence-based psychotherapies.[6]

Antidepressants, benzodiazepines, and other anxiolytic/sedative-hypnotics are the psychotropic medications most commonly prescribed to older adults[7] and understanding change in their use among this growing population is important, especially in light of potential harms associated with use. Since its inception, the Beers Criteria has listed a variety of psychotropic medications as inappropriate for older adults,[8] with the current version listing nearly every one as potentially inappropriate.[9] Benzodiazepines in particular have long been associated with harms in older adults, including falls,[10] fractures,[11] and motor vehicle accidents.[12] Other sedative-hypnotics are associated with similar problems,[13] and even SSRIs are associated with gastrointestinal bleeding.[14] All of these medications adversely impact cognition,[13,15–17] while benzodiazepines are possibly associated with incident dementia,[18] though evidence is mixed.[19] These potential harms for older adults are particularly concerning given growing evidence that much psychotropic prescribing occurs in the absence of significant symptoms[20] or a clearly-defined mental disorder.[21,22]

While evidence of adverse effects accumulates, less is known about whether and how psychotropic use has changed specifically among older adults in the United States. The most recent analyses of national trends in depression treatment[23] and antidepressant use[24] found no change among adults ≥65 but are from data nearly 10 years old. A study of Medicare beneficiaries from 1992–2005 demonstrated an increase in antidepressant use,[25] though this study interval was wide enough to include the introduction and uptake of the new, safer non-tricyclic antidepressants.[26] Another analysis found an increase in sedative-hypnotic use from 1993 to 2007 but did not stratify by age.[27] A recent cross-sectional analysis of 2008 data showed that benzodiazepine use is highest among older adults,[28] while another study shows that visits with benzodiazepines and non-benzodiazepine receptor agonists have increased through 2010, including among older adults, though they were not the focus of analysis.[29]

We use data from the National Ambulatory Medical Care Survey (NAMCS), a representative survey of visits to all office-based physicians in the US, to explore trends in use of the most commonly prescribed psychotropic medications among older adults: antidepressants, benzodiazepines, and other anxiolytics/sedative-hypnotics.[7] Our focus is on primary care

providers, who prescribe the majority of these medications, and psychiatrists to understand whether use has changed over time, and whether this change is concentrated among demographic or clinical subpopulations.

METHOD

Sample

The analyses use data from NAMCS, years 2003–2005 and 2010–2012 (2012 is the most recent year available). NAMCS is a national probability sample survey of office-based and community health center-based physicians designed to "provide objective, reliable information about the provision and use of ambulatory medical care services in the United States."[30] Physicians are sampled from the American Medical Association and American Osteopathic Association master files; physicians in anesthesiology, pathology, and radiology are excluded. Encounters such as house calls or those to institutional settings (e.g., nursing homes) are not included.

Each physician is assigned a one-week reporting period, with data collected from a random sample of visits during that week. For survey years prior to 2012, data for selected visits were recorded on a standardized form by the physician, their office staff, or field representatives of the U.S. Census Bureau. Beginning in 2012, NAMCS implemented computer-assisted data collection, which was performed primarily by Census staff.[31] The average physician response rate for the study years was 57.5%, yielding a total of 214,670 patient encounters from visits to 10,532 physicians. The 2012 NAMCS public use data file currently available does not include visits to community health centers; therefore, such visits from other years were excluded from analysis, as recommended by NAMCS.[31] The current analysis was limited to visits by patients ≥65 to primary care providers and psychiatrists (n=14,282 and 1,095 visits, respectively). NAMCS data and related documentation are available from the National Center for Health Statistics (http://www.cdc.gov/nchs/ahcd/about_ahcd.htm).

Medications and Diagnoses

Survey data include up to 8 medications prescribed, ordered, supplied, administered, or continued during each visit. The 2012 survey includes up to 10 medications, but was limited for analysis to the first 8 reported to be consistent with earlier years. Medications reported in NAMCS are assigned to therapeutic classes according to Lexicon Plus®, a proprietary database of Cerner Multum, Inc.[31], with the following classes used for analysis: antidepressants, benzodiazepines, and miscellaneous anxiolytic/sedative-hypnotics (*sedative-hypnotic* hereafter), which includes the non-benzodiazepine receptor agonists. Using the Lexicon Plus® classification system, antidepressants were further subdivided into the following 3 subclasses: SSRIs; tricyclic antidepressants and monoamine oxidase inhibitors; and other. Benzodiazepines were subdivided into short- and long-acting.[28] The medication classes assigned to each patient visit were not mutually exclusive (e.g., a patient on sertraline and lorazepam was included in both the antidepressant and benzodiazepine analyses).

At each encounter, up to three diagnoses are recorded based on what the provider identified as the primary visit diagnoses (using the *International Classification of Disease, Ninth Revision, Clinical Modification* [ICD-9-CM]). We classified encounters that were for depression, anxiety, insomnia, dementia, and non-cancer pain, the diagnoses most likely associated with the psychotropic classes of interest. A given visit could include any of the diagnoses of interest; categories were not mutually exclusive.

Other Patient, Visit, and Provider Characteristics

In addition to medication and diagnoses, we include patient age, sex, and race/ethnicity, which are known to be associated with psychotropic use.[5,32] NAMCS classifies providers into fifteen specialty groups. Analysis was limited to primary care providers (family medicine and internal medicine) and psychiatrists. The following additional visit-related variables were included: 1) whether psychotherapy was provided or ordered; and 2) whether stress management health education or other mental health counseling was provided or ordered.

Statistical Methods

We grouped survey years (2003–2005 and 2010–2012) as recommended by NAMCS to produce more reliable annual visit rate estimates.[33] Clinical and demographic characteristics for all visits were compared across the time period using Chi-square tests. Analyses were adjusted using survey design elements for visit weight, clustering within physician practice, and stratification to allow national inferences.[31]

We generated national visit rate estimates by provider type for the three medication classes during each time period. We tested a time × specialty interaction to determine whether the change in medication visit rate, if present, differed by specialty. Then for each medication and specialty, we used logistic regression models stratified by demographic and clinical characteristics to explore how medication use changed for specific patient subpopulations. Among antidepressant users and benzodiazepine users, we also examined whether use of specific medication classes (e.g., SSRIs or long-acting benzodiazepines) changed. All regression models were adjusted for age, gender, race/ethnicity, and clinical diagnosis to account for changes over time.

Analyses were conducted in Stata 13.1 (College Station, TX) using two-sided tests with $\alpha = .05$.

RESULTS

Among all visits to primary care providers across the study period (Table 1), there was an increase in both the proportion of visits by the young old (65–74) as well as the oldest old (≥85). Psychiatrists saw an increase in visits by the young old. The proportion of male primary care visits increased but was unchanged among psychiatrists. The race/ethnicity balance of visits to primary care providers was unchanged, while visits by non-Hispanic white patients to psychiatrists dropped and visits by Hispanic patients increased. Visits for insomnia and dementia to primary care providers increased; among psychiatrists, there was an increase in insomnia visits.

The overall rate of visits by older adults to primary care including an antidepressant, benzodiazepine, or other sedative-hypnotic rose from 16.4% (CI 14.7–18.3%) to 21.8% (CI 20.1–23.6%; AOR 1.43 [1.22–1.69], p<0.001). The proportion of such visits to psychiatrists dropped but was not statistically significant (75.4% [CI 69.6–80.4%] v. 68.5% [CI 62.0–74.3%]; AOR 0.69 [0.43–1.08], p=0.11).

The odds of an antidepressant visit (Table 2) to primary care providers increased but dropped among psychiatrists; the interaction test for the trend across time by specialty was significant. In stratified analyses of primary care visits, increases occurred largely among visits by the middle old (75–84), men, non-Hispanic white patients, those with pain diagnoses, but also those with no mental health or pain diagnosis. The decline among visits to psychiatrists was among the oldest group and women, as well as those with depression and anxiety disorders. There were no significant changes in use of any antidepressant subclass by either specialty (Table 3).

The odds of benzodiazepine use (Table 4) increased among visits to primary care providers but were unchanged among psychiatrists. Among primary care providers, the odds increased across most demographic strata, with the largest increase among men. The odds of benzodiazepine use increased among both those with pain disorders and those with no mental health or pain disorder diagnosed. Among visits to psychiatrists, the only stratum where the odds changed was among visits for anxiety disorders, where benzodiazepine use decreased. Use of long-acting benzodiazepines in primary care declined, though there was a sufficiently large increase in short-acting agents to drive the overall increase (Table 3).

Other sedative-hypnotic use (Table 5) also increased among primary care providers and was unchanged among psychiatrists. The increase among primary care providers was generally limited to the young old and non-Hispanic white patients. As with antidepressants and benzodiazepines, use increased among those with no mental health or pain diagnosis.

DISCUSSION

This analysis of nationally representative data of physician visits by older adults demonstrates that use of each of the three psychotropic classes increased in primary care from 2003–2012. While use overall was highest among antidepressants, benzodiazepine visits increased the most, from 5.6 to 8.7% of visits. In contrast, psychotropic visit rates to psychiatrists remained relatively steady and even declined for antidepressants. These overall results are consistent with demonstrated increases in antidepressant prescribing in international settings.[34–37], though international findings about benzodiazepine prescribing have been more mixed.[34,35,38,39]

What accounts for these increases in primary care? First, it may reflect expanding use of psychotropic medication beyond that for specific mental health diagnoses: the clinical subpopulation for which use of all medication groups increased was in those without any mental health or pain diagnosis. While prior work has demonstrated use of psychotropic medication in the absence of clearly defined mental disorders,[20,21,40–42] this is the first to demonstrate that such use has increased over time in the U.S. In a recent analysis of the

Health and Retirement Study, Soldo et al. found that, relative to previous cohorts, Baby Boomers approaching retirement reported they have "more difficulty with a range of everyday physical tasks, [but also report] more pain, more chronic conditions, [and] more drinking and psychiatric problems."[43] In light of this work, a possible interpretation of our results is that newer cohorts of older adults have additional aging-associated distress, leading to increased non-specific use of psychotropic medication in an attempt to address these concerns. This expansion beyond clearly defined mental disorders is concerning, as there is limited evidence of benefit from such non-specific use, while the risk of harms in older adults remains.

Second, public attitudes have grown more favorable towards the use of psychotropic medication,[44] with older adults more open to mental health treatment than previous cohorts.[45] However, since older patients prefer to be seen in primary care[46] and may have limited access to specialty mental health care,[47] it follows that an increase in psychotropic use would be realized in the primary care setting.

Our finding that antidepressant and benzodiazepine use increased among those with a pain diagnosis suggests the emphasis on pain as the "fifth vital sign"[48] may have had an impact beyond opioid prescribing.[49,50] Previous work by Olfson and Marcus demonstrated a pain-associated increase in antidepressant use in the general adult population through 2005,[24] but to our knowledge this is the first analysis to demonstrate an increase in benzodiazepines associated with pain. This is particularly concerning if these patients are co-prescribed opioids in light of the role of benzodiazepines in opioid overdose.[15,51]

Finally, increased medication use may be a legacy of direct-to-consumer advertising. An early randomized-controlled trial that studied the effects of brand-specific medication requests used standardized patients (SPs) with either major depressive disorder or an adjustment disorder with depressed mood presenting to primary care physicians.[52] Prescribing was higher for both conditions when SPs requested medication. More concerning, physicians were as likely to respond to a request for a specific brand-name medication from patients with adjustment disorders as patients with major depression, even though antidepressants are not effective for adjustment disorders. The SSRIs were subject to extensive advertising until they went off-patent around the start of the analytic time period, meaning patients were likely familiar with and could request specific medications. Among the sedative-hypnotics, several new medications were introduced during the study period (e.g., eszopiclone and ramelteon), which, combined with a marketing push from the pharmaceutical industry,[53] may have created increased demand.

Neither advertising nor new products explain the increase of benzodiazepines, which have been available for decades, but with evidence of adverse events for nearly as long,[54,55] which only grew leading up to and during the study period.[10,13,56,57] It is notable, however, that we found primary care providers have shifted from long- to short-acting benzodiazepines, which may reflect provider attempts at harm-reduction given evidence suggesting shorter-acting agents are not associated with a fall risk.[55] However, subsequent analyses early in the study period demonstrated that the risk extends to all benzodiazepines.[11,56] Our findings do differ from a recent analysis including NAMCS

which found no recent increase in benzodiazepine use among older adults.[58] However, this analysis was limited to specific visit reasons or diagnoses (e.g., anxiety or back sprain) which the authors hypothesized might prompt a benzodiazepine prescription. Our analysis found that the increase in benzodiazepine prescribing occurred among older adults without such diagnoses.

Among all ages[23]—and older adults in particular[5]—women account for a larger share of mental health treatment. However, psychotropic use among men in primary care rose for every medication except sedative-hypnotics. In addition, the odds of use over time for every medication class were larger among men than women. It is possible that as attitudes towards mental health care have changed,[44] men are increasingly willing to use psychotropic medication, whereas women experience a ceiling effect with less room for additional use.

It is notable that antidepressant use decreased among visits to psychiatrists. Given the emphasis on detection and treatment of depression in primary care, growing comfort with newer antidepressants, and limited availability of psychiatrists, primary care providers may be delivering more care and referring fewer of these patients to psychiatrists. Otherwise, the use of psychotropic medications among psychiatrists was largely unchanged. While public attitudes have become more accepting of psychotropic medications, older adults that were willing to see a psychiatrist at any point during the 2003–2012 study period were likely always willing to take psychotropic medication.

Finally, it is important to note that these psychotropic increases have occurred in the context of an overall increase in the use of prescription medication among all ages recently described by Kantor et al. using the National Health and Nutrition Examination Survey (NHANES).[59] The authors suggest that enactment of Medicare Part D may have facilitated this increase through improved access to medication, which has been demonstrated with antidepressant use[60,61] but with unclear impact on benzodiazepine use given the Part D benzodiazepine coverage exclusion.[62,63] Kantor et al. also suggest direct-to-consumer advertising as a possible cause for increase, as discussed above, as well as the increased need to treat obesity-related complications, which is a less likely cause of increased psychotropic use.

Our work has several limitations. Patient-level clinical assessments of current symptoms and function are not available, nor outcomes associated with medication use. NAMCS does not account for whether a prescribed medication is taken regularly versus as needed, so it is possible that the extent of regular use is overestimated. The analytic time period begins before NAMCS began to capture whether a medication is a new prescription, which means we cannot determine incident versus prevalent use. The relatively small number of respondents in particular strata limits the reliability of some estimates. Because NAMCS is a survey of office-based practice, it does not include physicians practicing in other settings. In addition, as it is a survey of US physicians, our results only examine trends in the US healthcare system and do not generalize internationally. While physician non-response might introduce bias into the results, the survey weights designed by NAMCS account for this to produce unbiased national estimates.[31] Finally, in 2012 NAMCS began using Census Field Representatives rather than physician office staff to conduct data collection. NAMCS reports

that these changes did not affect diagnosis results, while the number of medications reported did decrease, for which NCHS staff "have researched … [all] possible contributing factors" without clear explanation.[31] This suggests that our results may potentially underestimate the increases seen.

These nationally representative analyses describe and characterize an increase in use of psychotropic medication among older adults in the US, building upon prior work in international settings. The growth appears to be limited to primary care settings and occurs primarily among patients with pain or otherwise without clearly defined mental disorders, as well as among men. These increases suggest that patients in distress are seeking treatment and, given growing public acceptance of psychotropic use, are increasingly willing to consider psychotropic medication. Prior analyses have suggested that such prescribing may be in response to mild or subsyndromal symptoms;[22] many of these patients may in fact benefit from treatment and engagement with their providers. However, there is little evidence that *psychotropic* treatment helps with subsyndromal or mild symptoms,[64,65] while the risk of harm remains constant regardless of the potential for benefit.[66] It is of critical public health significance to address the appropriateness of psychotropic prescribing among older adults, as well as provide additional support to primary care providers to assist with diagnosis and treatment.

Acknowledgments

Funding source: DTM was supported by the Beeson Career Development Award Program (NIA K08AG048321, AFAR, The John A. Hartford Foundation, and The Atlantic Philanthropies). The funders had no role in the design, analysis, interpretation, or publication of this study.

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CLINICAL POINTS

- Psychotropic use overall has been increasing, including among older adults, but it is unclear whether this is concentrated among certain demographic or clinical subpopulations.
- Increases in use of antidepressants, benzodiazepines, and other sedative-hypnotics are concentrated among men, patients with pain, and patients without any mental health diagnosis.
- For older adults with minimal symptoms, it is important to consider whether an alternative psychosocial intervention might be more appropriate and safer than medication.

Table 1

Characteristics of Visits by Older Adults to Primary Care Providers and Psychiatrists in 2003–2005 and 2010–2012

	Primary Care			Psychiatry		
	2003–2005 (n=4,735)	2010–2012 (n=9,547)		2003–2005 (n=428)	2010–2012 (n=667)	
	%[a]	%[a]	p	%[a]	%[a]	p
Demographics						
Age						
65–74 years	47.7	50.2	<0.001	59.6	72.2	0.009
75–84 years	39.7	35.3		31.3	22.6	
85+ years	12.7	14.5		9.1	5.2	
Sex						
Male	38.4	43.4	0.001	34.5	36.1	0.67
Female	61.6	56.6		65.5	63.9	
Ethnicity						
Non-Hispanic white[b]	83.7	83.3	0.98	89.6	79.7	0.005
Non-Hispanic black	8.4	8.6		6.7	6.4	
Hispanic	7.9	8.1		3.7	13.9	
Clinical Characteristics						
Diagnoses[c]						
Depression[d]	2.1	2.5	0.24	57.8	54.7	0.48
Anxiety[e]	1.5	2.0	0.12	18.9	23.6	0.25
Insomnia[f]	0.6	1.3	0.003	0.9	2.9	0.03
Dementia[g]	0.8	1.3	0.04	5.4	2.8	0.08
Pain[h]	21.4	20.1	0.29	1.7	1.2	0.58
No mental health or pain diagnosis[i]	73.3	73.8	0.68	4.3	3.1	0.42
Psychotherapy	0.3	0.2	0.71	64.2	56.4	0.29
Other counseling/stress education	3.6	2.0	0.005	44.2	41.9	0.72

[a]Represents the weighted percentage of office-based visits by patients ≥65 to the indicated specialty within the time interval

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[b] Includes other race/ethnicity

[c] Diagnosis groups are not mutually exclusive (e.g., a visit of a patient with depression and pain would be represented in both diagnosis rows)

[d] ICD-9-CM diagnosis codes: 296.2x, 296.3x, 296.82, 298.0x, 300.4x, 309.1x, or 311.x

[e] ICD-9-CM diagnosis codes: 293.84, 300.0x, 300.2x, 300.3, 309.21, 309.81, 313.0

[f] ICD-9-CM diagnosis codes: 307.4x, 327.00, 327.01, 327.02, 327.09, 780.50, 780.51, 780.52, 780.55, 780.56, 780.59

[g] ICD-9-CM diagnosis codes: 290.0, 290.1x, 290.2x, 290.3, 290.4x, 291.2, 292.82, 294.1x, 294.2x, 331.0, 331.1x, 331.2, 331.82

[h] ICD-9-CM diagnosis codes: back pain (720.0–724.9), arthritis (710.0–739.9, excluding back pain codes), migraines (346.0–346.9), headache or tension headache (784.0, 307.81), psychogenic pain (307.80, 307.89), neuropathy (256.60, 355.0, 355.9, 356.0, 357.2, 357.9), fibromyalgia (729.1)

[i] Visit with no ICD-9-CM diagnosis code from 290–319, nor for any condition included in the other diagnostic groups (e.g., fibromyalgia [729.1])

J Clin Psychiatry. Author manuscript; available in PMC 2018 April 01.

Table 2

Rates of Antidepressant Use among Older Adults Seen by Primary Care Providers and Psychiatrists between 2003 and 2012 Stratified by Demographic and Clinical Characteristics

	Primary Care (n=14,282)					Psychiatry (n=1,095)				
	2003–2005	2010–2012	Adjusted[a]			2003–2005	2010–2012	Adjusted[a]		
	%[b]	%[b]	OR	95% CI	p	%[b]	%[b]	OR	95% CI	p
Overall[c]	**9.9**	**12.3**	**1.28**	**1.06–1.54**	**0.01**	**70.1**	**59.8**	**0.62**	**0.40–0.96**	**0.03**
Demographics										
Age										
65–74 years	9.7	12.1	1.23	0.97–1.58	0.09	67.5	66.1	0.62	0.37–1.04	0.07
75–84 years	10.0	12.0	1.34	1.07–1.67	0.01	74.7	44.4	0.75	0.33–1.68	0.48
85+ years	10.0	13.8	1.30	0.81–2.07	0.28	70.9	56.0	0.16	0.03–0.79	0.02
Sex										
Male	6.3	9.6	1.48	1.12–1.96	0.006	63.8	56.0	0.82	0.43–1.56	0.55
Female	12.1	14.4	1.19	0.96–1.47	0.11	73.4	62.0	0.54	0.33–0.87	0.01
Ethnicity										
Non-Hispanic white	10.2	12.9	1.31	1.08–1.60	0.007	71.5	62.4	0.70	0.46–1.06	0.09
Non-Hispanic black	7.3	6.7	0.79	0.39–1.59	0.51	46.4[e]	29.0	--[e]	--	--
Hispanic	9.3	11.8	1.28	0.67–2.45	0.46	77.3[e]	59.2	--[e]	--	--
Clinical Characteristic										
Diagnoses[d]										
Depression	67.7	62.8	0.83	0.47–1.46	0.52	83.7	71.9	0.52	0.27–0.99	0.05
Anxiety	38.9	27.7	0.55	0.29–1.04	0.07	81.8	60.9	0.38	0.18–0.83	0.02
Insomnia	34.0	29.0	0.78	0.23–2.65	0.69	85.4[e]	76.5[e]	--[e]	--	--
Dementia	29.1	25.8	0.72	0.26–1.99	0.52	30.8	49.3[e]	--[e]	--	--
Pain	9.6	13.7	1.47	1.08–2.00	0.01	92.1[e]	95.8[e]	--[e]	--	--
No mental health or pain dx	7.7	9.8	1.31	1.03–1.66	0.03	63.5[e]	26.2[e]	--[e]	--	--
Other psychotropic medication										

	Primary Care (n=14,282)					Psychiatry (n=1,095)				
	2003–2005	2010–2012	Adjusted[a]			2003–2005	2010–2012	Adjusted[a]		
	%[b]	%[b]	OR	95% CI	p	%[b]	%[b]	OR	95% CI	p
Benzodiazepine	27.7	27.6	0.95	0.63–1.44	0.82	85.5	76.7	0.75	0.34–1.63	0.47
Other anxiolytic/sedative-hypnotic	14.9	23.6	1.72	0.90–3.28	0.10	83.5	75.9	0.58	0.19–1.80	0.34
Psychotherapy	21.6[e]	53.8[e]	--[e]	--	--	67.4	62.3	0.83	0.52–1.32	0.44
Other counseling/stress education	31.2	33.3	1.23	0.55–2.75	0.61	74.4	67.9	0.72	0.37–1.43	0.35

[a] Adjusted for age, gender, race/ethnicity, and diagnosis; OR (odds ratio); CI (confidence interval)

[b] For the indicated provider type and interval, represents the weighted percentage of office-based visits within the strata (row) prescribed an antidepressant (e.g., among visits by men ≥65 to primary care providers during 2010–2012, 9.6% were taking an antidepressant)

[c] Time × provider specialty interaction: p=0.005

[d] Diagnosis groups are not mutually exclusive

[e] Estimates based on <30 visit records are deemed unreliable by NAMCS[31]

Table 3

Antidepressant and Benzodiazepine Subclass Use as a Percentage of Within-class Medication Visits among Older Adults Seen by Primary Care Providers and Psychiatrists between 2003 and 2012

	Primary Care					Psychiatry				
	2003–2005 (n=467)	2010–2012 (n=1189)		Adjusted[a]		2003–2005 (n=286)	2010–2012 (n=392)		Adjusted[a]	
	%[b]	%[b]	OR[c]	95% CI	p	%[b]	%[b]	OR[c]	95% CI	p
Antidepressant										
SSRI[d]	62.9	63.3	1.06	0.77–1.45	0.72	53.4	58.4	1.17	0.81–1.69	0.39
SNRI/other[e]	28.1	31.3	1.15	0.84–1.57	0.40	51.2	49.1	1.02	0.68–1.53	0.94
TCA/MAOI[f]	16.6	13.1	0.71	0.48–1.07	0.11	12.5	11.6	0.89	0.51–1.53	0.67
	2003–2005 (n=273)	2010–2012 (n=797)		Adjusted[a]		2003–2005 (n=136)	2010–2012 (n=196)		Adjusted[a]	
	%[b]	%[b]	OR[c]	95% CI	p	%[b]	%[b]	OR[c]	95% CI	p
Benzodiazepine										
Long-acting[g]	23.5	14.2	0.52	0.32–0.85	0.009	10.1	7.6	0.49	0.18–1.33	0.16
Short-acting[h]	76.6	86.5	1.98	1.20–3.26	0.007	92.2	93.8	1.69	0.59–4.89	0.33

[a] Adjusted for age, gender, race/ethnicity, diagnosis; OR (odds ratio); CI (confidence interval)

[b] Represents the weighted percentage that the given medical subclass comprised of all class visits for the indicated provider type and interval. Categories within a column are not mutually exclusive; total may exceed 100%

[c] OR represents the odds ratio of use of the specific subclass in 2010–2012 relative to 2003–2005 (e.g., the odds ratio of SSRI use, among all antidepressant use in primary care, for 2010–2012 relative to 2003–2005 was 1.06)

[d] SSRI: selective serotonin reuptake inhibitor (citalopram, escitalopram, fluoxetine, fluvoxamine, paroxetine, sertraline)

[e] SNRI: serotonin norepinephrine reuptake inhibitor (desvenlafaxine, duloxetine, venlafaxine); other (bupropion, maprotiline, milnacipran, mirtazapine, nefazodone, trazodone)

[f] TCA: tricyclic antidepressant (amitriptyline, amoxapine, clomipramine, desipramine, doxepin, imipramine, nortriptyline, protriptyline, trimipramine); MAOI: monoamine oxidase inhibitor (isocarboxazid, pargyline, phenelzine, selegiline, tranylcypromine)

[g] Long-acting (chlordiazepoxide, clorazepate, diazepam, flurazepam, halazepam, prazepam, quazepam)

[h] Short-acting (alprazolam, clonazepam, estazolam, lorazepam, midazolam, oxazepam, temazepam, triazolam)

Table 4

Rates of Benzodiazepine Use among Older Adults Seen by Primary Care Providers and Psychiatrists between 2003 and 2012 Stratified by Demographic and Clinical Characteristics

	Primary Care (n=14,282)					Psychiatry (n=1,095)				
	2003–2005	2010–2012	Adjusted[a]			2003–2005	2010–2012	Adjusted[a]		
	%[b]	%[b]	OR	95% CI	p	%[b]	%[b]	OR	95% CI	p
Overall[c]	**5.6**	**8.7**	**1.62**	**1.30–2.02**	**<0.001**	**32.1**	**29.5**	**0.83**	**0.57–1.22**	**0.34**
Demographics										
Age										
65–74 years	5.1	7.9	1.59	1.16–2.17	0.004	33.9	27.6	0.72	0.47–1.12	0.14
75–84 years	5.8	8.8	1.66	1.23–2.24	0.001	31.2	37.7	1.42	0.72–2.81	0.31
85+ years	6.8	11.5	1.60	0.96–2.66	0.07	24.2	20.2	0.67	0.11–4.03	0.66
Sex										
Male	3.8	7.1	1.88	1.30–2.71	0.001	22.0	28.0	1.29	0.72–2.31	0.39
Female	6.7	10.0	1.52	1.20–1.93	0.001	37.5	30.4	0.66	0.41–1.06	0.09
Ethnicity										
Non-Hispanic white	5.8	9.4	1.69	1.33–2.16	<0.001	34.2	31.2	0.80	0.54–1.18	0.26
Non-Hispanic black	4.4	3.9	0.72	0.30–1.75	0.48	6.6[e]	16.3	--[e]	--	--
Hispanic	4.4	7.0	1.66	0.86–3.18	0.13	29.8[e]	25.8	--[e]	--	--
Clinical Characteristics										
Diagnoses[d]										
Depression	15.8	24.2	1.72	0.87–3.43	0.12	37.0	28.6	0.65	0.37–1.12	0.12
Anxiety	44.6	48.1	1.22	0.62–2.42	0.57	60.5	40.5	0.47	0.23–0.97	0.04
Insomnia	9.5	22.1	2.19	0.62–7.78	0.22	54.3[e]	47.8[e]	--[e]	--	--
Dementia	7.2	14.9	2.01	0.46–8.76	0.35	10.8[e]	15.7[e]	--[e]	--	--
Pain	5.9	10.0	1.74	1.19–2.56	0.005	27.5[e]	8.3[e]	--[e]	--	--
No mental health or pain dx	4.5	6.9	1.62	1.27–2.06	<0.001	39.9[e]	25.2[e]	--[e]	--	--
Other psychotropic medication										

	Primary Care (n=14,282)					Psychiatry (n=1,095)				
	2003–2005	2010–2012	Adjusted[a]			2003–2005	2010–2012	Adjusted[a]		
	%[b]	%[b]	OR	95% CI	p	%[b]	%[b]	OR	95% CI	p
Antidepressant	15.7	19.6	1.36	0.91–2.02	0.13	39.2	37.8	0.91	0.58–1.43	0.69
Other anxiolytic/sedative-hypnotic	12.9	11.7	0.93	0.46–1.89	0.83	37.2	35.3	1.17	0.40–3.44	0.77
Psychotherapy	14.2[e]	30.5[e]	--[e]	--	--	37.0	31.6	0.76	0.48–1.19	0.23
Other counseling/stress education	14.3	24.8	2.47	1.21–5.04	0.01	31.9	29.0	0.83	0.49–1.39	0.48

[a] Adjusted for age, gender, race/ethnicity, and diagnosis; OR (odds ratio); CI (confidence interval)

[b] For the indicated provider type and interval, represents the weighted percentage of office-based visits within the strata (row) prescribed a benzodiazepine

[c] Time × provider specialty interaction: p=0.004

[d] Diagnosis groups are not mutually exclusive

[e] Estimates based on <30 visit records are deemed unreliable by NAMCS[31]

Table 5

Rates of Other Sedative-Hypnotic Use among Older Adults Seen by Primary Care Providers and Psychiatrists between 2003 and 2012 Stratified by Demographic and Clinical Characteristics

	Primary Care (n=14,282)					Psychiatry (n=1,095)				
	2003–2005	2010–2012	Adjusted[a]			2003–2005	2010–2012	Adjusted[a]		
	%[b]	%[b]	OR	95% CI	p	%[b]	%[b]	OR	95% CI	p
Overall[c]	**3.4**	**4.7**	**1.39**	**1.07–1.79**	**0.01**	**8.5**	**11.7**	**1.41**	**0.70–2.86**	**0.34**
Demographics										
Age										
65–74 years	3.0	4.8	1.60	1.11–2.30	0.01	7.3	11.9	0.85	0.38–1.87	0.68
75–84 years	3.6	4.3	1.21	0.83–1.76	0.31	13.2	11.7	0.78	0.30–2.01	0.60
85+ years	3.7	5.2	1.15	0.62–2.16	0.66	0.0	9.8	n/a	n/a	n/a
Sex										
Male	2.3	3.6	1.49	0.98–1.01	0.06	10.1	9.4	1.02	0.41–2.54	0.96
Female	4.0	5.5	1.33	0.97–1.83	0.08	7.7	13.1	1.40	0.73–2.70	0.31
Ethnicity										
Non-Hispanic white	3.3	5.0	1.51	1.14–1.99	0.004	8.8	9.8	1.07	0.60–1.90	0.83
Non-Hispanic black	3.2	2.5	0.70	0.26–1.87	0.47	1.6[e]	20.2[e]	--[e]	--	--
Hispanic	4.4	4.3	0.99	0.47–2.08	0.99	14.4[e]	19.1	--[e]	--	--
Clinical Characteristics										
Diagnoses[d]										
Depression	7.2	8.6	1.22	0.47–3.13	0.68	8.7	13.6	1.43	0.78–2.61	0.25
Anxiety	7.3	6.0	0.72	0.27–1.96	0.52	17.6	6.1	0.30	0.12–0.75	0.01
Insomnia	26.7	40.2	2.29	0.84–6.20	0.10	16.4[e]	9.4[e]	--[e]	--	--
Dementia	6.4	2.3	0.20	0.02–2.01	0.17	4.5	13.7[e]	--[e]	--	--
Pain	4.7	5.1	1.07	0.68–1.69	0.77	26.2[e]	4.1[e]	--[e]	--	--
No mental health or pain dx	2.7	4.3	1.59	1.19–2.11	0.002	11.2[e]	23.2[e]	--[e]	--	--
Other psychotropic medication										

	Primary Care (n=14,282)					Psychiatry (n=1,095)				
	2003–2005	2010–2012	Adjusted[a]			2003–2005	2010–2012	Adjusted[a]		
	%[b]	%[b]	OR	95% CI	p	%[b]	%[b]	OR	95% CI	p
Antidepressant	5.1	9.0	1.81	1.04–3.16	0.04	10.1	14.9	1.41	0.77–2.57	0.26
Benzodiazepine	7.8	6.3	0.73	0.36–1.49	0.38	9.9	14.0	1.11	0.48–2.60	0.81
Psychotherapy	5.8[e]	5.3[e]	--[e]	--	--	9.2	13.7d	1.47	0.74–2.95	0.28
Other counseling/stress education	6.9	6.7	1.20	0.36–4.03	0.77	9.3	11.1	1.21	0.56–2.60	0.62

[a] Adjusted for age, gender, race/ethnicity, and diagnosis; OR (odds ratio); CI (confidence interval)

[b] For the indicated provider type and interval, represents the weighted percentage of office-based visits within the strata (row) prescribed a non-benzodiazepine sedative-hypnotic

[c] Time × provider specialty interaction: p=0.80

[d] Diagnosis groups are not mutually exclusive

[e] Estimates based on <30 visit records are deemed unreliable by NAMCS