

## Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

**eTable 1.** *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) Codes for Antipsychotic Use Denominator Exclusion and Dementia and Seizure Disorder Subanalyses*

<b>Condition</b>	<b>ICD-9-CM code</b>
Schizophrenia	295.x
Tourette's syndrome	307.23
Huntington's disease	333.4
Dementia	046.1x, 046.3x, 290.0, 290.1x, 290.2x, 290.3, 290.4x, 291.2, 294.10, 294.11, 331.0, 331.1, and 331.82
Seizure disorder	345.x

**eTable 2. Psychotropic Medication Classes**

Antidepressant	amitriptyline, amoxapine, atomoxetine, bupropion, citalopram, clomipramine, desipramine, doxepin, duloxetine, escitalopram, fluoxetine, fluvoxamine, imipramine, isocarboxazid, levomilnacipran, maprotiline, mirtazapine, nefazodone, nortriptyline, paroxetine, phenelzine, protriptyline, sertraline, tranylcypromine, trazodone, trimipramine, venlafaxine, vortioxetine
Anxiolytic/ Sedative-hypnotic	buspirone, chloral hydrate, eszopiclone, zaleplon, zolpidem, ramelteon
Anticonvulsant/mood stabilizer	carbamazepine, divalproex, felbamate, gabapentin, lamotrigine, lithium, oxcarbazepine, topiramate, valproic acid (also divalproex), sodium valproate
Antipsychotic	<i>conventional:</i> chlorpromazine, fluphenazine, haloperidol, loxapine, mesoridazine, molindone, perphenazine, pimozide, thioridazine, thiothixene, trifluoperazine <i>atypical:</i> aripiprazole, clozapine, lurasidone, olanzapine, paliperidone, quetiapine, risperidone, ziprasidone
Benzodiazepine	alprazolam, chlordiazepoxide, clonazepam, clorazepate, diazepam, estazolam, flurazepam, halazepam, lorazepam, midazolam, oxazepam, prazepam, quazepam, temazepam, triazolam
Memory medications	donepezil, rivastigmine, galantamine, memantine

**eTable 3.** Percentage of Long-term Stay Nursing Home Residents Prescribed an Antipsychotic or Other Psychotropic Medication (used for Figure 1)

Quarter	Medication class, %							
	Antipsychotics	Antidepressant	Mood stabilizer	Sedative-hypnotics (non-BZD <sup>a</sup> )	Non-AP psychotropics overall (non-BZD)	Psychotropics overall (non-BZD)	BZD	Memory
2009_Q1	21.3	52.0	16.6	8.1	60.1	64.9	n/a <sup>b</sup>	28.4
2009_Q2	20.7	51.8	16.8	8.6	60.2	64.8	n/a	27.7
2009_Q3	19.9	50.7	16.9	8.5	59.4	63.8	n/a	26.7
2009_Q4	19.1	49.8	16.8	8.4	58.5	62.7	n/a	25.7
2010_Q1	18.3	49.3	16.7	8.4	58.0	62.1	n/a	24.9
2010_Q2	17.7	48.7	16.9	8.3	57.6	61.6	n/a	24.3
2010_Q3	17.2	48.1	17.0	8.3	57.1	60.9	n/a	23.6
2010_Q4	16.8	47.6	17.0	8.2	56.6	60.3	n/a	22.8
2011_Q1	16.4	47.3	17.1	8.3	56.4	59.9	n/a	22.2
2011_Q2	16.0	47.2	17.2	8.3	56.3	59.7	n/a	21.6
2011_Q3	15.7	46.9	17.4	8.3	56.2	59.5	n/a	21.0
2011_Q4	15.3	46.4	17.5	8.3	55.7	59.0	n/a	20.4
2012_Q1	15.0	46.0	17.6	8.3	55.5	58.7	n/a	20.0
2012_Q2 <sup>c</sup>	14.6	45.7	17.9	8.1	55.3	58.4	n/a	19.4
2012_Q3	14.3	45.3	18.1	8.0	55.0	57.9	n/a	18.9
2012_Q4	13.7	44.9	18.2	7.9	54.6	57.5	n/a	18.4
2013_Q1	13.2	44.6	18.2	7.8	54.4	57.1	19.4	18.0
2013_Q2	12.8	44.5	18.6	7.7	54.4	57.0	20.2	17.6
2013_Q3	12.5	44.3	18.9	7.3	54.2	56.7	20.1	17.3
2013_Q4	12.2	44.1	19.1	7.1	54.0	56.4	20.0	17.0
2014_Q1	12.0	43.8	19.2	7.1	53.8	56.1	20.2	16.7
2014_Q2	11.7	43.6	19.4	6.8	53.6	55.9	19.9	16.4
2014_Q3	11.5	43.4	19.6	6.5	53.3	55.6	19.9	16.0
2014_Q4	11.5	43.9	20.1	6.4	53.9	56.1 <sup>d</sup>	19.9	15.8

<sup>a</sup> BZD: benzodiazepine

<sup>b</sup> Medicare Part D coverage did not include BZD until 2013

<sup>c</sup> Start of CMSNP

<sup>d</sup> When including benzodiazepines, psychotropic prevalence overall is 60.4%

**eTable 4.** Rates and Trends of Antipsychotic and Other Psychotropic Use per 100 Long-Stay Nursing Home Residents with No Hospitalization in Study Period (N=449 205)

Medication	Period 1 (2009–2012Q1)				Period 2 (2012Q2–2014)						
	Use, % <sup>a</sup>	Slope	95% CI	P Value	Use, % <sup>a</sup>	Slope	95% CI	P Value	Slope change	95% CI	P Value
Antipsychotics	22.0	-0.63	(-0.74, -0.52)	<.001	14.2	-0.27	(-0.37, -0.17)	<.001	0.36	( 0.19, 0.52)	<.001
Antidepressant	51.6	-0.57	(-0.68, -0.46)	<.001	44.7	-0.09	(-0.21, 0.03)	.140	0.48	( 0.29, 0.66)	<.001
Mood stabilizer	16.5	0.09	( 0.06, 0.12)	<.001	17.8	0.22	( 0.18, 0.26)	<.001	0.13	( 0.08, 0.18)	<.001
Sedative-hypnotics (non-BZD)	7.3	0.05	( 0.02, 0.08)	<.001	8.0	-0.17	(-0.20, -0.14)	<.001	-0.22	(-0.26, -0.17)	<.001
Non-antipsychotic psychotropics overall (non-BZD)	59.8	-0.46	(-0.56, -0.35)	<.001	54.3	-0.05	(-0.17, 0.06)	.347	0.40	( 0.23, 0.58)	<.001
Psychotropics overall (non-BZD)	64.9	-0.63	(-0.76, -0.51)	<.001	57.2	-0.12	(-0.26, 0.02)	.091	0.51	( 0.31, 0.72)	<.001
BZD	n/a <sup>b</sup>	n/a	n/a	n/a	18.9	0.05	(-0.04, 0.13)	.206	n/a	n/a	n/a
Memory	28.1	-0.80	(-0.91, -0.69)	<.001	18.1	-0.23	(-0.33, -0.13)	<.001	0.57	( 0.39, 0.75)	<.001

CI: confidence interval; BZD: benzodiazepine

<sup>a</sup> During first quarter of the period.

<sup>b</sup> Medicare did not cover BZD until 2013

**eTable 5.** Rates and Trends of Antipsychotic and Other Psychotropic Use per 100 Long-Stay Nursing Home Residents Censored 180 days Prior to Death (N=583 169)

Medication	Period 1 (2009–2012Q1)				Period 2 (2012Q2–2014)						
	Use, % <sup>a</sup>	Slope	95% CI	P Value	Use, % <sup>a</sup>	Slope	95% CI	P Value	Slope change	95% CI	P Value
Antipsychotics	21.0	-0.56	(-0.67, -0.44)	<.001	14.0	-0.24	(-0.36, -0.13)	<.001	0.32	( 0.14, 0.50)	.001
Antidepressant	51.7	-0.52	(-0.62, -0.43)	<.001	45.2	-0.12	(-0.25, 0.01)	.062	0.40	( 0.22, 0.58)	<.001
Mood stabilizer	16.6	0.08	( 0.06, 0.11)	<.001	17.9	0.22	( 0.19, 0.26)	<.001	0.14	( 0.09, 0.18)	<.001
Sedative-hypnotics (non-BZD)	8.1	0.004	(-0.02, 0.03)	.765	8.2	-0.18	(-0.22, -0.15)	<.001	-0.19	(-0.23, -0.14)	<.001
Non-antipsychotic psychotropics overall (non-BZD)	59.8	-0.41	(-0.49, -0.32)	<.001	55.0	-0.10	(-0.23, 0.02)	.095	0.30	( 0.14, 0.47)	.001
Psychotropics overall (non-BZD)	64.6	-0.56	(-0.66, -0.45)	<.001	57.8	-0.16	(-0.29, -0.03)	.018	0.39	( 0.21, 0.57)	<.001
BZD	n/a <sup>b</sup>	n/a	n/a	n/a	19.0	0.05	(-0.02, 0.12)	.120	n/a	n/a	n/a
Memory	28.1	-0.73	(-0.80, -0.67)	<.001	19.0	-0.32	(-0.39, -0.24)	<.001	0.42	( 0.31, 0.53)	<.001

CI: confidence interval; BZD: benzodiazepine

<sup>a</sup> During first quarter of the period.

<sup>b</sup> Medicare did not cover BZD until 2013

**eTable 6.** Percentage of Long-term Stay Nursing Home Residents with Dementia Prescribed an Antipsychotic or Other Psychotropic Medication (used for Figure 2)

Quarter	Medication class, %							
	Antipsychotics	Antidepressant	Mood stabilizer	Sedative-hypnotics (non-BZD <sup>a</sup> )	Non-antipsychotic psychotropics overall (non-BZD)	Psychotropics overall (non-BZD)	BZD	Memory
2009_Q1	29.9	57.6	16.3	7.0	64.2	71.2	n/a <sup>b</sup>	45.6
2009_Q2	29.5	57.8	16.5	7.4	64.6	71.4	n/a	45.4
2009_Q3	28.8	57.1	16.6	7.4	64.1	70.8	n/a	44.7
2009_Q4	28.0	56.7	16.6	7.2	63.7	70.2	n/a	44.1
2010_Q1	27.5	56.5	16.6	7.1	63.5	69.9	n/a	43.8
2010_Q2	27.1	56.4	16.7	7.0	63.4	69.7	n/a	43.6
2010_Q3	26.7	56.1	16.8	7.0	63.1	69.4	n/a	43.2
2010_Q4	26.4	55.9	16.9	7.0	63.0	69.1	n/a	42.5
2011_Q1	26.1	55.9	17.0	7.0	62.9	68.9	n/a	42.3
2011_Q2	25.9	56.2	17.1	7.0	63.2	69.0	n/a	42.1
2011_Q3	25.8	56.1	17.4	7.0	63.2	69.0	n/a	41.6
2011_Q4	25.3	55.8	17.5	7.0	63.0	68.6	n/a	41.0
2012_Q1	25.1	55.7	17.6	7.0	63.0	68.6	n/a	40.7
2012_Q2 <sup>c</sup>	24.8	55.7	17.8	7.0	63.0	68.4	n/a	40.2
2012_Q3	24.3	55.2	18.1	6.8	62.7	68.0	n/a	40.0
2012_Q4	23.5	55.1	18.3	6.7	62.5	67.6	n/a	39.5
2013_Q1	22.8	55.0	18.3	6.7	62.4	67.5	20.7	39.4
2013_Q2	22.5	55.0	18.6	6.7	62.6	67.5	21.7	39.3
2013_Q3	22.1	54.9	19.0	6.3	62.5	67.3	21.5	39.0
2013_Q4	21.7	54.8	19.3	6.1	62.4	67.1	21.5	38.8
2014_Q1	21.4	54.8	19.5	6.0	62.3	66.9	21.7	38.6
2014_Q2	21.0	54.5	19.6	5.9	62.1	66.6	21.4	38.4
2014_Q3	20.7	54.2	19.8	5.7	61.7	66.1	21.6	37.9
2014_Q4	20.5	54.5	20.3	5.5	62.1	66.4 <sup>d</sup>	21.5	37.3

<sup>a</sup> BZD: benzodiazepine

<sup>b</sup> Medicare Part D coverage did not include BZD until 2013

<sup>c</sup> Start of CMSNP

<sup>d</sup> When including benzodiazepines, psychotropic prevalence overall is 69.5%