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Documented Pain Diagnoses in Adults Prescribed Opioids: Results From the National Ambulatory Medical Care Survey, 2006–2015

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Abstract

Background: Medical use of opioids has increased dramatically over the past 2 decades (1, 2), far exceeding increases in the prevalence of pain (3–5). This discrepancy may reflect efforts to address undertreatment of pain but has raised concerns about the appropriateness of physicians' prescribing practices and whether patients' medical indications justify opioid therapy. We therefore examined the indications associated with opioid prescriptions in ambulatory care between 2006 and 2015 to determine the proportion of prescriptions written for conditions causing pain.

Objective: To determine the percentage of opioid prescriptions with a documented medical indication between 2006 and 2015, and to identify conditions commonly associated with opioid prescribing in ambulatory care.

Methods and Findings: We used data from the National Ambulatory Medical Care Survey (NAMCS), an annual cross-sectional survey of visits to physician offices by insured and uninsured patients. For each visit, the NAMCS reports patient characteristics, prescribed medications, and up to 3 (between 2006 and 2013) or 5 (between 2014 and 2015) provider-assigned diagnoses denoting specific conditions discussed (recorded as International Classification of Diseases, Ninth Revision, codes).

We identified visits by adults aged 18 years or older between 2006 and 2015 in which an opioid was prescribed (see the Supplement for the list of opioids). We coded visits as having a "pain diagnosis" if the provider assigned any ICD-9 codes for a condition that commonly causes pain severe enough to require prescription-strength analgesics. We broadly selected conditions that met this criterion to include more than 200 causes of pain. We included codes for encounters in which pain is often managed, such as postsurgical visits. We also classified

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all diabetes-related codes as pain diagnoses because physicians may not specify subcodes for such painful complications as neuropathy (see the Appendix Table [available at <http://Annals.org>] for pain diagnoses). We estimated the percentage of visits with and without a pain diagnosis and with new and continued prescriptions.

Opioids were prescribed in 31 943 visits, of which 5.1% (95% CI, 4.4% to 5.8%) were assigned a diagnosis of cancer-related pain and 66.4% (CI, 65.0% to 67.9%) were assigned a noncancer pain diagnosis. The remaining 28.5% (CI, 27.2% to 29.7%) of visits at which an opioid was prescribed had no recorded pain diagnosis (Table 1). Absence of a pain diagnosis was more common among visits in which an opioid prescription was continued (30.5% [CI, 29.0% to 32.0%]) than those in which an opioid was newly prescribed (22.7% [CI, 20.6% to 24.8%]).

Because the NAMCS only allows up to 3 diagnosis codes to be listed per visit, indications for an opioid may have been omitted if the number of conditions discussed exceeded this limit. We therefore verified that our findings were robust to restricting our sample to visits with 2 or fewer diagnoses listed (Table 1) such that survey constraints did not limit the number of diagnoses. At visits in which opioids were prescribed for noncancer pain, providers most frequently assigned diagnoses of back pain, diabetes, “other chronic pain,” and osteoarthritis (Table 2). At visits with no pain diagnosis recorded, the most common diagnoses were hypertension, hyperlipidemia, opioid dependence, and “other follow-up examination” (Table 2).

Discussion:

Many outpatient opioid prescriptions between 2006 and 2015 had no documented medical indication. Opioid dependence accounted for only 2.2% of diagnoses at these visits and thus cannot explain this discrepancy. Our sensitivity analysis shows that these results were not driven by constraints on the survey form.

An advantage of survey data is that they may contain more detailed visit information than administrative data alone and thus are well suited to investigate conditions associated with opioid prescribing. However, our analysis has limitations. The NAMCS does not identify prescribing that took place outside of visits or patients with multiple visits and does not sample hospital outpatient departments; the National Hospital Ambulatory Medical Care Survey samples the latter, but complete data are available only through 2011. Furthermore, a single internist determined the list of pain diagnoses; whether another physician would make similar designations is uncertain.

Transparently and accurately documenting the justification for opioid therapy is essential to ensure appropriate, safe prescribing; yet, providers currently fall far short of this, particularly when renewing prescriptions. Requiring more robust documentation to show the clinical necessity of opioids—which many insurers already do for novel, costly drugs—could prompt providers to more carefully consider the need for opioids while facilitating efforts to identify inappropriate prescribing.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Appendix Table. ICD-9 Codes for Pain Diagnoses*

Infectious diseases

003.23, 003.24, 015.[†], 036.82, 040.0, 040.81, 053.12, 053.13, 053.2.[†], 053.7.[†], 053.8, 053.9, 054.1.[†], 056.71, 060.[†], 061, 066.40, 066.49, 072.0, 072.3, 074.1, 074.20, 074.21, 074.23, 088.81, 095.5, 095.7, 099.3, 101, 112.84, 117.5, 122.[†], 135, 136.0, 136.1, 136.5, 137.3, 321.2

Endocrine disease

245.0, 245.1, 249.[†], 250.[†], 251.5, 268.0, 268.1, 268.2, 277.1

Nutrition

266.0, 266.2

Joint disease

135, 136.1, 274.0, 274.0.[†], 274.9, 275.01, 275.02, 275.03, 275.49, 277.2, 277.30, 277.31

Cancer

140.[†], 141.[†], 142.[†], 143.[†], 144.[†], 145.[†], 146.[†], 147.[†], 148.[†], 149.[†], 150.[†], 151.[†], 152.[†], 153.[†], 154.[†], 155.[†], 156.[†], 157.[†], 158.[†], 159.[†], 160.[†], 161.[†], 162.[†], 163.[†], 164.[†], 165.[†], 166.[†], 167.[†], 168.[†], 169.[†], 170.[†], 171.[†], 172.[†], 173.[†], 174.[†], 175.[†], 176.3, 176.4, 177.[†], 178.[†], 179.[†], 180.[†], 181.[†], 182.[†], 183.[†], 184.[†], 185.[†], 186.[†], 187.[†], 188.[†], 189.[†], 191.[†], 192.[†], 194.[†], 195.[†], 196.[†], 197.[†], 198.[†], 199.[†], 200.[†], 201.[†], 202.[†], 203.[†], 204.[†], 205.[†], 206.[†], 207.[†], 208.[†], 209.[†], 218.[†], 235.[†], 236.[†], 237.[†], 238.[†], 239.[†], 528.01, 357.3, V10.[†], V58.0, V58.1.[†], 990

Immune disorders

279.5.[†], 282.42, 282.62, 282.64, 282.69

Hematologic disorders

282.41, 282.60, 282.61, 282.63, 282.68, 286.0, 286.1, 289.1

Neurologic disorders (including headache)

321.4, 322.[†], 324.[†], 325, 332.0.[†], 336.0, 339.[†], 340, 341.0, 341.2.[†], 346.[†], 349.0, 350.1, 350.2, 353.[†], 354.[†], 355.[†], 356.0, 356.2, 356.4, 356.8, 356.9, 357.0, 357.1, 357.2, 357.4, 357.5, 357.6, 357.7, 357.81, 357.82, 357.89, 357.9, 359.4, 359.5, 359.6, 359.7.[†], 359.8.[†], 359.9.[†], 430, 431.[†], 432.[†], 437.4, 437.6

Pain (cause unspecified)

338.[†], 780.96

Eye disorders

360.03

Ear disorders

360.11, 360.12, 376.02, 376.03, 379.91, 380.02, 380.03, 380.14, 383.[†], 388.7.[†]

Cardiovascular disorders

390, 391, 393, 415.1[†], 420.0[†], 422.0[†], 429.0, 443.1, 443.8[†], 443.9, 444.2[†], 444.8[†], 444.9, 445.0[†], 446.0, 446.3, 446.4, 446.7, 447.6, 449, 451.0[†], 453.0, 453.1, 453.4[†], 453.82, 453.83, 453.84, 453.89, 454.0, 454.1, 454.2, 454.8, 457.0, 457.1, 457.2

Gastrointestinal disorders

455.1, 455.4, 455.7, 522.1, 522.4, 522.5, 522.6, 522.7, 523.3[†], 523.4[†], 525.11, 526.5, 527.2, 527.3, 528.00, 528.02, 528.09, 528.3, 530.10, 530.12, 530.13, 530.19, 530.2[†], 530.4, 530.7, 531.0[†], 532.0[†], 533.0[†], 534.0[†], 535.0[†], 535.3[†], 535.40, 535.41, 535.5[†], 535.6[†], 535.7[†], 536.3, 536.41, 536.8, 537.3, 538, 540.0[†], 541.0[†], 542.0[†], 550.0[†], 550.1[†], 551.0[†], 552.0[†], 555.0[†], 556.0, 556.1, 556.2, 556.3, 556.5, 556.6, 556.8, 556.9, 557.0, 558.1, 558.2, 558.3, 558.41, 558.42, 558.9, 560.1, 560.2, 560.81, 560.89, 560.9, 562.01, 562.03, 562.11, 562.13, 564.1, 566, 567.0[†], 569.3, 569.41, 569.42, 569.5, 569.61, 569.71, 569.82, 569.83, 572.0, 572.1, 573.4, 574.0[†], 574.1[†], 574.3[†], 574.4[†], 574.51, 574.7[†], 574.8[†], 574.91, 575.0, 575.10, 575.12, 575.2, 575.3, 575.4, 576.1, 576.2, 576.3, 577.0, 577.1, 577.2, 578.0[†]

Genitourinary disorders

588.0, 590.00, 590.01, 590.10, 590.11, 590.2, 590.80, 590.81, 590.9, 591, 592.0[†], 595.1, 596.6, 596.81, 599.0, 599.6, 599.60, 599.69, 601.2, 607.3, 608.2[†], 611.0, 611.71, 614.1, 614.2, 614.4, 614.5, 614.7, 614.8, 614.9, 616.5[†], 616.81, 616.89, 616.9, 617.0[†], 620.5, 629.3[†], 633.0[†], 639.0, 664.0[†], 664.1[†], 664.2[†], 664.3[†], 664.4[†], 664.6[†], 664.8[†], 664.9[†], 665.0[†], 665.1[†], 665.3[†], 665.4[†], 665.5[†], 665.8[†], 665.9[†], 673.0[†], 674.1[†], 674.2[†], 674.3[†]

Skin disorders

682.0[†], 683, 686.01, 694.4, 695.2, 695.81, 705.83, 707.0[†]

Musculoskeletal disorders

696.0, 710.0[†], 710.3[†], 710.4[†], 710.5[†], 711.0[†], 712.0[†], 713.0[†], 714.0[†], 714.1[†], 714.2[†], 714.3[†], 714.4[†], 714.89, 714.9[†], 715.0[†], 716.0[†], 717.0[†], 718.0[†], 718.1[†], 718.2[†], 718.3[†], 718.8[†], 718.9[†], 719.1[†], 719.2[†], 719.3[†], 719.4[†], 720.0[†], 721.0[†], 722.0[†], 722.1[†], 722.2[†], 722.3[†], 722.4[†], 722.5[†], 722.6[†], 722.7[†], 722.8[†], 723.0[†], 723.1[†], 723.2[†], 723.3[†], 723.4[†], 723.5[†], 723.6[†], 724.0[†], 725, 726.0[†], 727.0[†], 727.2[†], 727.3[†], 727.6[†], 728.0, 728.1[†], 728.81, 728.83, 728.85, 728.86, 728.88, 729.0, 729.1, 729.2, 729.3[†], 729.4, 729.5, 729.7[†], 729.82, 730.0[†], 731.2[†], 733.1[†], 733.4[†], 733.6[†], 733.7, 733.93, 733.94, 733.95, 733.96, 733.97, 733.98, 784.0, 784.1, 784.92, 786.5[†], 788.0, 788.20, 788.29, 789.0[†], 789.6[†], 789.7, 800–897.0[†], 920.0[†], 921.0, 921.1, 922.0[†], 923.0[†], 924.0[†], 925–949.0[†], 953.0[†], 954.8, 954.9, 955–957.0[†], 958.9[†], 959.0[†], 997.41, 997.62, V13.4, V13.5[†], V43.6[†]

Mental disorders

307.8[†]

Miscellaneous

V45.89, V64.4[†], V66.0, V66.4, V67.0[†], V67.4[†], V50.0[†], V51.0[†], V54.0[†], V58.4[†], V58.7[†], V66.1, V66.2, V66.7, V67.1[†], V67.2[†], V68.01, V57.1

Respiratory disorders

475, 478.11, 478.21, 478.22, 478.24, 478.71, 511.0, 511.1, 517.3, 519.2

ICD-9 = International Classification of Diseases, Ninth Revision.

*

We defined *pain diagnoses* as those in which prescription-strength pain medications might be needed to provide adequate relief.

[†]

Indicates that all subcodes were included.

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Table 1.**Diagnoses Assigned for Office Visits With an Opioid Prescription ***

Variable	Visits (95% CI), %		
	With Noncancer Pain	With Cancer Pain	With No Pain Diagnosis
All visits with opioid prescriptions			
Any opioid prescription (<i>n</i> = 31 943; weighted <i>n</i> = 809 408 550)	66.4 (65.0–67.9)	5.1 (4.4–5.8)	28.5 (27.2–29.7)
New opioid prescriptions (<i>n</i> = 7316; weighted <i>n</i> = 205 025 603)	74.2 (71.9–76.5)	3.1 (2.6–3.6)	22.7 (20.6–24.8)
Continued opioid prescriptions (<i>n</i> = 22 951; weighted <i>n</i> = 569 281 165)	63.7 (61.9–65.5)	5.8 (4.9–6.7)	30.5 (29.0–32.0)
Subsample of visit records with space for additional diagnosis codes[†]			
Any opioid prescription (<i>n</i> = 17 269; weighted <i>n</i> = 421 939 712)	60.7 (59.0–62.5)	4.8 (4.1–5.6)	34.4 (32.8–36.0)
New opioid prescriptions (<i>n</i> = 4687; weighted <i>n</i> = 128 318 523)	70.6 (67.7–73.5)	3.0 (2.3–3.7)	26.4 (23.8–29.0)
Continued opioid prescriptions (<i>n</i> = 11 736; weighted <i>n</i> = 275 438 223)	56.2 (54.0–58.5)	5.7 (4.7–6.8)	38.0 (36.0–40.1)

* Estimates account for complex sampling design, including sample weights and clustering by physicians, and were calculated in Stata (StataCorp) using the svy command with the tabulate and regress subcommands. Visits with both new and continued opioid prescriptions (2% of visits in which an opioid was prescribed) were coded as visits with new opioid prescriptions so that each visit was counted only once. Visits missing data that allow for distinction between new and continued opioid prescriptions (4% of visits in which an opioid was prescribed) were included only in the analysis of any opioid prescription. Visits with diagnoses of both noncancer and cancer pain were both coded exclusively as visits with cancer pain. The National Ambulatory Medical Care Survey patient record form allows the provider to enter only 3 diagnosis codes (except for survey years 2014 and 2015, which allowed for 5 codes). Beginning in 2012, the survey no longer sampled community health centers; we thus excluded data from these centers from our analysis in all years to obtain a sample of practices that was defined consistently across years. These centers accounted for only 2% of visits before 2012.

[†] Evaluates the subsample of visit records in which 2 of 3 diagnoses were recorded; that is, the subsample of visits in which the provider was not constrained by the form and would have had enough space to record any additional diagnoses addressed.

Table 2.

10 Most Common Diagnoses Assigned for Office Visits With an Opioid Prescription, by Presence or Absence of Pain Diagnosis*

International Classification of Diseases, Ninth Revision, Diagnosis Code	Definition	Diagnoses, %
Visits with a pain diagnosis (except for cancer)		
724.2	Lumbago	6.9
250.00	Type 2 or unspecified-type diabetes mellitus without mention of complication and not defined as uncontrolled	5.2
338.29	Other chronic pain	4.0
724.5	Unspecified backache	3.7
715.90	Site-unspecified osteoarthritis unspecified as generalized or localized	2.4
729.1	Unspecified myalgia and myositis	2.4
723.1	Cervicalgia	2.3
724.4	Unspecified thoracic or lumbosacral neuritis or radiculitis	2.1
729.5	Limb pain	1.9
722.52	Lumbar or lumbosacral intervertebral disc degeneration	1.8
Total	—	32.7
Visits without a pain diagnosis		
401.9	Unspecified essential hypertension	6.0
272.4	Other and unspecified hyperlipidemia	2.7
304.00	Unspecified opioid-type dependence	2.2
V67.59	Other follow-up examination	1.9
414.00	Unspecified native- or graft-vessel coronary atherosclerosis	1.9
530.81	Esophageal reflux	1.6
311	Depressive disorder not elsewhere classified	1.5
496	Chronic airway obstruction not elsewhere classified	1.5
427.31	Atrial fibrillation	1.4
V58.89	Other specified aftercare	1.3
Total	—	22.0

* Data obtained from the National Ambulatory Medical Care Survey. We identified all visits with opioid prescriptions and their associated diagnoses. We then reshaped the data set to the visit–diagnosis level and estimated the number of visits with a given diagnosis code using the Stata (StataCorp) collapse command. We accounted for complex sampling design using the National Ambulatory Medical Care Survey weights and then identified the most common diagnoses for visits in which an opioid was prescribed. The sample of 31 943 visits represents 809 408 550 visits when weighted to be nationally representative. Visits to community health centers were excluded.