



Published in final edited form as:

Arthritis Care Res (Hoboken). 2021 October ; 73(10): 1430–1435. doi:10.1002/acr.24447.

Trends in office visits during which opioids were prescribed for adults with arthritis: United States, 2006-2015

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Abstract

Objective—To analyze trends in opioid prescriptions during visits to office-based physicians made by adults with arthritis in the US from 2006 to 2015.

Methods—We analyzed nationally representative data on patient visits to office-based physicians from the National Ambulatory Medical Care Survey (NAMCS) 2006–2015. Visit percentages for first- and any-listed diagnosis of arthritis by age groups and sex are reported. Time points were grouped into 2-year intervals to increase the reliability of estimates. Annual percentage point change and 95% CI were reported from linear regression models.

Results—During 2006–2015, the percentage of visits to office-based physicians by adults with a first-listed diagnosis of arthritis increased from 4.1% (95%CI: 3.5%–4.7%) in 2006–2007 to 5.1% (95% CI: 3.9%–6.6%) in 2014–2015 ($p=.033$). Among these visits, the percentage of visits with opioids prescribed increased from 16.5% (95%CI: 13.1%–20.5%) in 2006–2007 to 25.6% (95%CI: 17.9%–34.6%) in 2014–2015 ($p=.017$). The percentage of visits with any-listed diagnosis of arthritis increased from 6.6% (95%CI: 5.9%–7.4%) in 2006–2007 to 8.4% (95%CI: 7.0%–10.0%) in 2014–2015 ($p=.001$). Among these visits the percentage of visits with opioids prescribed increased from 17.4% (95%CI: 14.6%–20.4%) in 2006–2007 to 25.0% (95%CI: 19.7%–30.8%) in 2014–2015 ($p=.004$).

Conclusion—During 2006–2015, the percentage of arthritis visits by adults to office-based physicians increased and the percentage of opioids prescribed at these visits increased as well. NAMCS data will allow continued monitoring of these trends after guidelines were implemented.

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Conflict of interest: The authors state no conflict of interest.

Financial disclosure: The authors have no financial disclosures.

Disclaimer: The findings and conclusions in this report are those of the authors and not necessarily the official position of the US Centers for Disease Control and Prevention (CDC)

Introduction

In the US, arthritis affected an estimated 54.4 million (22.7%) adults in 2013–2015 and is projected to affect 78.4 million by 2040 (1, 2). Arthritis is characterized by chronic pain that can be managed by a combination of non-pharmacological interventions, such as physical activity and self-management education, and pharmacologic therapy (3). Most common pharmacologic therapy includes nonsteroidal anti-inflammatory drugs (NSAIDs) and new disease modifying antirheumatic drugs. However, most patients with dispensed opioid prescriptions have arthritis suggesting that arthritis pain is often treated with opioids (4). This is a controversial issue for this population because of the potential adverse effects, especially among older adults with arthritis. The 2016 CDC Guideline for Prescribing Opioids for Chronic Pain recommends nonpharmacologic therapy and nonopioid therapy for chronic pain, and consideration of opioid therapy for chronic pain-related conditions, including osteoarthritis, only if expected benefits for pain and function are anticipated to outweigh risk due to the possible harms of opioids (5). Moreover, opioids to treat moderate to severe chronic back, hip or knee osteoarthritis pain have not been superior to nonopioid medications (6). There are gaps in literature regarding the use of prescription opioids for adults with arthritis in the ambulatory care setting, where most arthritis is diagnosed and managed. To begin addressing these gaps, we characterized opioid prescriptions among adults with arthritis by analyzing trends for visits to office-based physicians at which opioids were prescribed between 2006 and 2015.

Methods

The National Ambulatory Medical Care Survey (NAMCS) is an annual, nationally representative survey of visits to nonfederal, office-based physicians in the United States, conducted by the National Center for Health Statistics. NAMCS currently uses a stratified two-stage probability sampling design, with physicians selected at the first stage and visits selected at the second stage. Survey data are weighted to produce national estimates. Detailed information on NAMCS methodology is available on the CDC website (<https://www.cdc.gov/nchs/ahcd/>). This analysis covers the period 2006–2015, preceding the 2016 CDC Guideline for Prescribing Opioids for Chronic Pain (5). We began with the 2006 NAMCS, the first year NAMCS adopted a new drug coding system and started coding drugs in terms of their generic components and therapeutic classifications using Lexicon Plus®, a proprietary database of Cerner Multum. We ended with the 2015 NAMCS, the last year using the ICD-9-CM codes needed to capture arthritis, to maintain a consistent definition of arthritis; comparable arthritis codes using the new ICD-10-CM codes for 2016 and later were not available. In 2016, NAMCS switched from coding diagnoses using ICD-9-CM to ICD-10-CM.

Response rates (the percentage of in-scope physicians for whom at least one-half of their expected number of visit records was completed) ranged from 58.9% in 2006 to 35.4% in 2015.

The unit of analysis was ambulatory care visit (number of visits rather than the number of people). Visits by adults aged 18 and over with a first-listed or first three-listed (hereafter

called any-listed) diagnoses of arthritis were analyzed. Arthritis was defined using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 274, 710, 712–716, 719, 729.1 (7) based on a subset of arthritis codes originally defined by the National Arthritis Data Workgroup (8). Arthritis visits with prescribed opioids were defined as arthritis visits where at least one opioid was prescribed (i.e., provided, or a new or continued prescription). Opioids were defined using Cerner Multum's Lexicon third level therapeutic category codes for narcotic analgesics (code 60) and narcotic analgesic combinations (code 191). Records with prescriptions of buprenorphine only were excluded. By 2014, NAMCS was collecting data on as many as 30 medications prescribed (i.e., provided or a new or continued prescription) at office visits. However, in 2005–2009, only eight medications were collected, which increased to 10 and later 12 medications. For comparability, only data for the first eight drugs were used across all years. The two analysis groups included in this study were: 1) visits to office-based physicians made by adults with a first-listed diagnosis of arthritis and 2) visits to office-based physicians made by adults with any-listed diagnosis of arthritis. First-listed diagnoses generally represent the primary diagnosis for the visit. In 2006–2013 up to three diagnoses could be reported at each visit. In 2014 and 2015, as many as five diagnoses could be reported, but only the first three diagnoses were reviewed in this analysis to be comparable across all study years.

Arthritis visits with prescribed opioids were defined as visits with a diagnosis of arthritis where at least one opioid was found among the first eight drugs reported at the sampled visit. An opioid can be prescribed at the sampled visit, provided at the sampled visits or continued if it was prescribed prior to the sampled visit. The survey instrument does not determine which drugs were prescribed for which diagnosis, so it is possible that among visits made by adults with arthritis as well as another diagnosis, opioids were prescribed for pain related to other conditions.

NAMCS collects data on medications that are prescribed during a patient visit, but it does not measure whether the patient actually took the medication; consequently, medication adherence is not examined in this report.

Visit percentages for first- or any-listed diagnosis, with 95% confidence intervals (CI), are reported. Time points were grouped into 2-year intervals to increase the reliability of estimates. Orthogonal polynomial contrasts were used to assess linear and quadratic trends (9). Annual percentage point change and 95% CI were reported from linear regression models. Statistical analyses accounted for the complex survey design and were conducted using SAS (SAS Institute), version 9.4; and SUDAAN (RTI International), version 11.0.

Results

Osteoarthritis and allied disorders (ICD-9-CM 715) was the most frequent form of arthritis in our sampled first-listed arthritis visits and any-listed arthritis visits (31% and 29%, respectively).

First-listed arthritis visits: Overall, the percentage of visits to office-based physician by adults with a first-listed diagnosis of arthritis increased from 4.1% (95% CI: 3.5%–4.7%) in

2006–2007 to 5.1% (95% CI: 3.9%–6.6%) in 2014–2015 ($p=.033$), with similar trends in the 45–64 age group. The increase in the age group 65 and over was not statistically significant ($p=.17$). During the study period, the percentage of visits significantly increased for men ($p=.019$) but not women ($p=.07$).

Any-listed arthritis visits: Overall, the percentage of visits with any-listed diagnosis of arthritis increased from 6.6% (95% CI: 5.9%–7.4%) in 2006–2007 to 8.4% (95% CI: 7.0%–10.0%) in 2014–2015 ($p=.001$). Similar trends were observed among all three age groups and for women and men. (Table).

First-listed arthritis visits with opioids prescribed: Overall, among these visits, the percentage of visits with opioids prescribed increased from 16.5% (95% CI: 13.1%–20.5%) in 2006–2007 to 25.6% (95% CI: 17.9%–34.6%) in 2014–2015 ($p=.017$). Among adults 45–64, it increased from 18.2% (95% CI: 13.5%–23.7%) in 2006–2007 to 28.2% (95% CI: 18.4%–39.8%) in 2014–2015 ($p=.028$). The increases in the 18–44 and 65 and over age groups were not statistically significant ($p=.13$ and $p=.052$ respectively) (Figure 1). The percentage of visits with opioids prescribed increased from 18.0% (95% CI: 14.0%–22.6%) in 2006–2007 to 24.1% (95% CI: 18.3%–30.7%) in 2014–2015 ($p=.029$) among women. Similar trends were found among men ($p=.034$) (Intervening biennial data details not shown)

Any-listed arthritis visits with opioids prescribed: Overall, among visits with any-listed diagnosis of arthritis, the percentage of visits with opioids prescribed increased from 17.4% (95% CI: 14.6%–20.4%) in 2006–2007 to 25.0% (95% CI: 19.7%–30.8%) in 2014–2015 ($p=.004$). Among adults 45–64, it increased from 19.2% (95% CI: 15.6%–23.3%) in 2006–2007 to 27.9% (95% CI: 21.4%–35.3%) in 2014–2015 ($p=.009$). Among adults aged 65 and over, it increased from 13.7% (95% CI: 10.8%–17.0%) in 2006–2007 to 22.8% (95% CI: 17.1%–29.3%) in 2014–2015 ($p=.005$). No statistically significant trends among adults aged 18–44 were noted (Figure 2). The percentage of visits with opioids prescribed increased from 19.5% (95% CI: 16.3%–22.9%) in 2006–2007 to 24.5% (95% CI: 20.7%–28.7%) in 2014–2015 ($p=.008$) among women. Similar trends were found among men ($p=.016$) (Intervening biennial data details not shown).

Discussion

During 2006–2015, the percentage of visits to office-based physicians by adults with arthritis, whether first-listed or any-listed, significantly increased overall, for most age groups, and for men and often women. This growth in ambulatory care is consistent with the growing estimates and projections of arthritis prevalence and suggests two related problems. First is the growth in the costs of arthritis, which were \$304 billion in 2013 (7). Second is the growth of arthritis as a common comorbid condition that can reduce physical activity and thereby interfere with management of diabetes, heart disease, obesity, and other chronic conditions (10). During this same study period, the overall percentage of arthritis visits with opioids prescribed for this increasing ambulatory population, whether first-listed or any-listed, significantly increased as well. In part this may reflect greater opioid prescriptions during this time period and it also suggests, along with a report that those with arthritis

comprise the majority of those prescribed opioids (4), a growing ambulatory care problem of arthritis pain management, although there is limited evidence that opioids help with chronic arthritis pain (6).

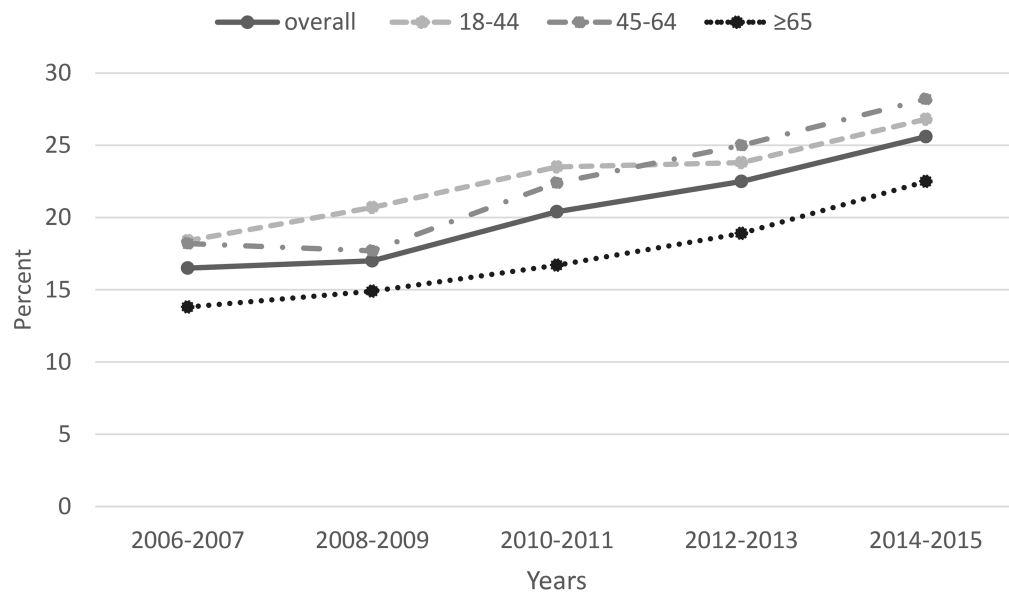
Limitations of this study include the inability to ascertain medication adherence, the inability to directly link prescribed opioids to an arthritis diagnosis (although, the three most common other diagnostic categories were endocrine, nutritional, metabolic diseases, and immunity disorders (17%), diseases of the circulatory system (8%) and diseases of the nervous system (5%), for which opioids are not typically prescribed), and the need to combine 2-year periods to enable reliable estimation. Even with two years of data combined, statistical power was limited to detect significant trends for some groups, and stratified analysis by specific diagnoses within the arthritis definition could not be conducted. Strengths include using a large, standard, nationally representative survey with multiple years of data and the ability to address diagnoses, medications, and demographic variables concurrently. NAMCS data from 2016 and later may help monitor these trends.

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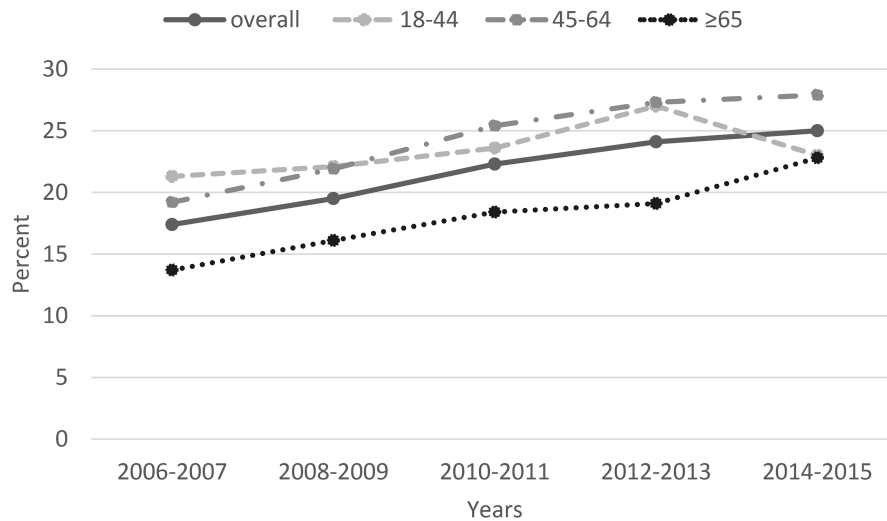
Significance and Innovations

- Arthritis and opioid use represent significant public health and clinical problems in the United States. Arthritis patients taking opioid medications are at risk for the potentially adverse effects of these drugs. There are gaps in literature regarding prescription of opioids for adults with arthritis in the ambulatory care setting.
- We used 2006–2015 National Ambulatory Medical Care Survey data to determine trends in the percentage of visits to office-based physicians by adults at which opioids were prescribed
- During 2006–2015, the percentage of arthritis visits by adults to office-based physicians increased significantly. Among these visits, the percentage of visits at which opioids were prescribed increased as well.



Year	2006-2007	2008-2009	2010-2011	2012-2013	2014-2015	P value for trends
Age	No. of visits % (CI)	No. of visits % (CI)	No. of visits % (CI)	No. of visits % (CI)	No. of visits % (CI)	
All	216 16.5 (13.1-20.5)	242 17.0 (14.1-20.2)	317 20.4 (17.4-23.7)	992 22.5 (20.2-24.9)	536 25.6 (17.9-34.6)	0.017
18-44	47 18.4 (12.3-25.9)	53 20.7 (14.8-27.6)	71 23.5 (17.2-30.7)	177 23.8 (19.2-28.9)	96 26.8 (17.2-38.4)	0.13
45-64	101 18.2 (13.5-23.7)	111 17.7 (14.0-21.9)	146 22.4 (18.3-27.0)	490 25.0 (21.8-28.4)	257 28.2 (18.4-39.8)	0.028
65 and over	68 13.8 (10.1-18.4)	78 14.9 (11.1-19.4)	100 16.7 (12.7-21.3)	325 18.9 (16.2-21.8)	183 22.5 (14.2-32.7)	0.052

Figure 1.
Trends in percentage of visits to office-based physicians made by adults with first-listed diagnosis of arthritis in which at least one opioid was prescribed, by age group: United States, 2006 to 2015



Year	2006-2007	2008-2009	2010-2011	2012-2013	2014-2015	P value for trends
Age	No. of visits % (CI)	No. of visits % (CI)	No. of visits % (CI)	No. of visits % (CI)	No. of visits % (CI)	
All	388 17.4 (14.6-20.4)	444 19.5 (17.0-22.2)	547 22.3 (19.9-24.9)	1784 24.1 (21.9-26.5)	984 25.0(19.7-30.8)	0.004
18-44	91 21.3 (15.7-27.9)	95 22.1 (17.5-27.3)	114 23.6 (18.5-29.3)	351 27.0 (23.1-31.2)	162 23.0 (16.2-31.1)	0.398
45-64	180 19.2 (15.6-23.3)	214 21.9 (18.3-25.9)	265 25.4 (21.6-29.5)	873 27.3 (24.1-30.6)	469 27.9 (21.4-35.3)	0.009
65 and over	117 13.7 (10.8-17.0)	135 16.1(12.9-19.8)	168 18.4 (15.5-21.6)	560 19.1 (17.0-21.5)	353 22.8 (17.1-29.3)	0.005

Figure 2. Trends in percentage of visits to office-based physicians made by adults with any-listed diagnosis of arthritis in which at least one opioid was prescribed, by age group: United States, 2006 to 2015

Table.

Trends in percentage* of visits to office-based physicians by adults with a first- or any-listed diagnosis of arthritis, by age group and sex, among all visits to office-based physicians: United States, 2006 to 2015

	First listed diagnosis											
	Age group								Sex			
	Overall		18–44		45–64		65		Women		Men	
Year	No. of visits\1	% (CI)\2	No. of visits\1	% (CI)\2	No. of visits\1	% (CI)\2	No. of visits\1	% (CI)\2	No. of visits\1	% (CI)\2	No. of visits\1	% (CI)\2
2006–2007	1395	4.1 (3.5–4.7)	261	2.4 (2.0–2.8)	583	4.9 (4.0–5.9)	551	4.9 (4.1–5.7)	865	4.2 (3.5–5.0)	530	3.9 (3.4–4.4)
2008–2009	1356	3.5(3.1–3.9)	242	1.9 (1.6–2.3)	569	4.0 (3.5–4.5)	545	4.5 (3.8–5.2)	854	3.6 (3.1–4.1)	502	3.4 (3.0–3.9)
2010–2011	1556	4.8 (4.1–5.7)	318	3.3 (2.6–4.2)	649	5.4 (4.6–6.3)	589	5.7 (4.7–6.8)	968	5.1 (4.2–6.2)	588	4.5 (3.8–5.2)
2012–2013	4564	4.5 (4.1–5.0)	792	2.6 (2.3–3.0)	2062	5.6 (5.1–6.2)	1710	5.1 (4.6–5.7)	2866	4.8 (4.3–5.3)	1698	4.2 (3.8–4.7)
2014–2015	2621	5.1 (3.9–6.6)	436	2.8 (2.2–3.5)	1107	5.9 (4.5–7.6)	1078	6.1 (4.3–8.4)	1622	5.0 (3.8–6.6)	999	5.2 (4.0–6.7)
Year of trend change		none		none		none		none		none		none
Annual percentage point change (95% CI)\3		0.31 (0.02–0.61)		0.08 (0.002–0.31)		0.38 (–0.01–0.74)		0.32 (–0.14–0.77)		0.29 (–0.03–0.61)		0.36 (0.06–0.65)
P value for trends		0.033		0.047		0.044		0.17		0.07		0.019
Any listed diagnosis												
2006–2007	2322	6.6 (5.9–7.4)	427	3.8 (3.2–4.4)	940	7.7 (6.7–8.9)	955	8.2 (7.3–9.2)	1471	6.9 (6.1–7.9)	851	6.1 (5.4–6.9)
2008–2009	2206	5.9 (5.4–6.4)	403	3.1 (2.7–3.6)	925	6.7 (6.0–7.5)	878	7.5 (6.7–8.4)	1391	6.0 (5.4–6.6)	815	5.8 (5.2–6.4)
2010–2011	2464	7.3 (6.5–8.2)	475	4.6 (3.8–5.5)	1054	8.4 (7.4–9.4)	935	8.7 (7.5–9.9)	1536	7.6 (6.6–8.7)	928	6.8 (6.1–7.6)
2012–2013	7612	7.7 (7.2–8.3)	1379	4.7 (4.2–5.2)	3363	9.3 (8.6–10.0)	2870	8.7 (8.0–9.4)	4799	8.0 (7.4–8.7)	2833	7.2 (6.6–7.8)
2014–2015	4361	8.4 (7.0–10.0)	715	4.5 (3.7–5.3)	1827	9.6 (7.8–11.6)	1819	10.3 (8.1–12.9)	2707	8.5 (7.0–10.2)	1654	8.3 (6.9–10.0)
Year of trend change		none		none		none		none		none		none

	First listed diagnosis											
Annual percentage point change (95% CI) \c		0.55 (0.21– 0.90)		0.30 (0.10– 0.50)		0.64 (0.19– 1.1)		0.56 (0.02– 1.1)		0.35 (0.15– 0.90)		0.59 (0.24– 0.95)
P value for trends		0.001		0.003		0.005		0.04		0.006		0.001

* Percentages reflect sample data that were weighted to produce national estimates of visits by adults ages 18 and over to nonfederally employed, office-based physicians. For 2006-2011, visits to physicians working in community health centers were excluded from the analysis to be consistent with the 2012-2015 NAMCS sampling design. Additional funding for 2012-2015 meant that sample sizes were higher than previous years. As many as 5 diagnoses could be reported in 2014 and 2015, but only the first 3 diagnoses were reviewed to be comparable across all study years. \1 Unweighted number of visits represents the number of sampled visits to office-based physicians made by adults with first- or any- listed diagnosis of arthritis. \2 Percentages are weighted to represent the visits to nonfederally employed office-based physicians made by adults with first- or any- listed diagnosis of arthritis. \3 The annual percentage point change, 95% CI, and P values were calculated using linear regression models.

SOURCE: NAMCS, 2006- 2015 National Ambulatory Medical Care Survey.

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