Pain Physician 2013; 16:E379-E390 • ISSN 2150-1149

Health Policy Review

Utilization and Growth Patterns of Sacroiliac Joint Injections from 2000 to 2011 in the Medicare Population

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Disclaimer: There was no external funding in the preparation of this manuscript.
Conflict of interest: None.

Manuscript received: o
Revised manuscript received:
Accepted for publication:

Free full manuscript:
www.painphysicianjournal.com

Background: The high prevalence of persistent low back pain and growing number of diagnostic and therapeutic modalities employed to manage chronic low back pain and the subsequent impact on society and the economy continue to hold sway over health care policy. Among the multiple causes responsible for chronic low back pain, the contributions of the sacroiliac joint have been a subject of debate albeit a paucity of research. At present, there are no definitive conservative, interventional or surgical management options for managing sacroiliac joint pain. It has been shown that the increases were highest for facet joint interventions and sacroiliac joint blocks with an increase of 310% per 100,000 Medicare beneficiaries from 2000 to 2011. There has not been a systematic assessment of the utilization and growth patterns of sacroiliac joint injections.

Study Design: Analysis of the growth patterns of sacroiliac joint injections in Medicare beneficiaries from 2000 to 2011.

Objectives: To evaluate the utilization and growth patterns of sacroiliac joint injections.

Methods: This assessment was performed utilizing Centers for Medicare and Medicaid Services (CMS) Physician/Supplier Procedure Summary (PSPS) Master data from 2000 to 2011.

Results: The findings of this assessment in Medicare beneficiaries from 2000 to 2011 showed a 331% increase per 100,000 Medicare beneficiaries with an annual increase of 14.2%, compared to an increase in the Medicare population of 23% or annual increase of 1.9%. The number of procedures increased from 49,554 in 2000 to 252,654 in 2011, or a rate of 125 to 539 per 100,000 Medicare beneficiaries. Among the various specialists performing sacroiliac joint injections, physicians specializing in physical medicine and rehabilitation have shown the most increase, followed by neurology with 1,568% and 698%, even though many physicians from both specialties have been enrolling in interventional pain management and pain management. Even though the numbers were small for nonphysician providers including certified registered nurse anesthetists, nurse practitioners, and physician assistants, these numbers increased substantially at a rate of 4,526% per 100,000 Medicare beneficiaries with 21 procedures performed in 2000 increasing to 4,953 procedures in 2011. The, majority of sacroiliac joint injections were performed in an office setting. The utilization of sacroiliac joint injections by state from 2008 to 2010 showed increases of more than 20% in New Hampshire, Alabama, Minnesota, Vermont, Oregon, Utah, Massachusetts, Kansas, and Maine. Similarly, some states showed significant decreases of 20% or more, including Oklahoma, Louisiana, Maryland, Arkansas, New York, and Hawaii. Overall, there was a 1% increase per 100,000 Medicare population from 2008 to 2010. However, 2011 showed significant increases from 2010.

Limitations: The limitations of this study included a lack of inclusion of Medicare participants in Medicare Advantage plans, the availability of an identifiable code for only sacroiliac joint injections, and the possibility that state claims data may include claims from other states. .

Conclusions: This study illustrates the explosive growth of sacroiliac joint injections even more than facet joint interventions. Furthermore, certain groups of providers showed substantial increases. Overall, increases from 2008 to 2010 were nominal with 1%, but some states showed over 20% increases whereas some others showed over 20% decreases.

Key words: Chronic spinal pain, low back pain, sacroiliac joint arthritis, interventional techniques, interventional pain management, sacroiliac joint injections

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Even though low back is a common complaint in primary and tertiary care settings, it is often difficult to reach a definitive diagnosis and provide appropriate treatment (1-10). Along with muscles, ligaments, and nerve roots, the intervertebral discs, facet joints, and sacroiliac joints have all, utilizing controlled diagnostic blocks, been established as potential sources of low back pain (1-9). There has been an exponential growth in treatment modalities aimed in managing chronic spinal pain including pain of sacroiliac origin (10-34). These interventional techniques, along with sacroiliac joint injections, are considered to be a major component of increasing expenditures among patients with chronic pain, all of which garners significant attention by payers, public policy health experts, and researchers (26-30). In fact, the Office of Inspector General (OIG) of the U.S. Department of Health and Human Services (HHS) reviewed the appropriateness of facet joint interventions and transforaminal epidural injections (26,29) and showed excessive payments for both procedures and inappropriate documentation with 63% of the facet joint injections and 34% of the transforaminal epidural injections failing to meet the medical necessity criteria. Manchikanti et al (12,13) showed significant increases for facet joint interventions and sacroiliac joint blocks from 2000 to 2011. In addition, reviews evaluating the therapeutic modalities of sacroiliac joint pain have resulted in vastly disparate conclusions reflective of the ongoing debate and controversy in the medical community with multiple studies (1,2,20,35-50). Sacroiliac joint pain is diagnosed with diagnostic sacroiliac joint injections (1,7), whereas, it may be managed with intraarticular injections, extraarticular injections, or neurolysis of the nerve supply (2,7). However, there has been only limited evidence for all modalities of treatment including intraarticular injections. Further, there is only a well identifiable Current Procedural Terminology (CPT) code for intraarticular injections with no CPT codes identified separately for sacroiliac joint pain with neurolysis or periarticular injection.

There have not been any systematic assessments of utilization patterns or growth patterns of sacroiliac joint injections. Consequently, this study was undertaken to assess sacroiliac joint injections along with their utilization and growth patterns in the Medicare population from 2000 to 2011.

Methods

The study was performed utilizing the Centers for Medicare and Medicaid Services (CMS) Physician Supplier Procedure Summary Master Data from 2000 to 2011 (51). The data were purchased from the CMS by the American Society of Interventional Pain Physicians. This study was conducted with internal resources of the primary author's practice without any external funding either from industry or elsewhere. The CMS's 100% data set is therefore unbiased and unpredictable in terms of any patient characteristics. Medicare with the elderly and disabled population represents the single largest health care payer in the United States, with over 46.9 million beneficiaries in 2011 (51). Thus, the procedures performed on the Medicare beneficiaries represent a large proportion of the procedures for chronic pain being performed in the United States. Rates of sacroiliac joint injections were calculated based on Medicare beneficiaries for the corresponding year and are reported as procedures per 100,000 Medicare beneficiaries.

For analysis, the CPT procedure codes for sacroiliac joint injections were identified for years 2000 to 2011. The data were then tabulated based on the place of service – facility (ambulatory surgery center, hospital outpatient department) or non-facility (office). The calculated data included number of sacroiliac joint services and rate of services per 100,000 Medicare beneficiaries.

Various specialties were described as those providers designated in interventional pain management -09, pain medicine -72, anesthesiology -05, physical medicine and rehabilitation -25, neurology -13, psychiatry -26, as interventional pain management; orthopedic surgery -20, neurosurgery -14, and general surgery -02 as a surgical group; radiology specialties as a separate group; all other physicians as a separate group; and all other non-physician providers were considered as other providers.

Statistical Analysis

The data were analyzed using SPSS (9.0) statistical software, Microsoft Access 2003, and Microsoft Excel 2003. The procedure rates were calculated per 100,000 Medicare beneficiaries.

Results

Population and Procedural Characteristics

As illustrated in Table 1, the number of Medicare beneficiaries increased from 39,632 million in 2000 to 46,918 million in 2011 with an increase of 18%. In contrast, sacroiliac joint injections increased from 49,554

Table 1. *Characteristics of Medicare beneficiaries and sacroiliac joint injections.*

	U.S. Population (,000)			Medicare Beneficiaries (,000)						SI Joint Injections		
Year	All Ages	≥ 65 Years	Percent	< 65 Years	Percent	≥ 65 Years	Percent	Total Medicare Beneficiaries	% to U.S.	Services	% of change from Previous Year	Rate per 100,000 Medicare Beneficiaries
Y2000	**282,172**	35,077	12.4%	5,370	13.5%	34,262	86.5%	**39,632**	14.0%	49,554 (59%)		**125**
Y2001	**285,040**	35,332	12.4%	5,567	13.9%	34,478	86.1%	**40,045**	14.0%	85,664 (51%)	72.90%	**214**
Y2002	**288,369**	35,605	12.3%	5,805	14.3%	34,698	85.7%	**40,503**	14.0%	101,749 (48%)	18.80%	**251**
Y2003	**290,211**	35,952	12.4%	6,078	14.8%	35,050	85.2%	**41,126**	14.2%	128,864 (42%)	26.60%	**313**
Y2004	**292,892**	36,302	12.4%	6,402	15.3%	35,328	84.7%	**41,729**	14.2%	172,704 (41%)	34.00%	**414**
Y2005	**295,561**	36,752	12.4%	6,723	15.8%	35,777	84.2%	**42,496**	14.4%	188,606 (42%)	9.20%	**444**
Y2006	**299,395**	37,264	12.4%	7,022	16.2%	36,317	83.8%	**43,339**	14.5%	211,928 (40%)	12.40%	**489**
Y2007	**301,290**	37,942	12.6%	7,297	16.5%	36,966	83.5%	**44,263**	14.7%	213,489 (41%)	0.70%	**482**
Y2008	**304,056**	38,870	12.8%	7,516	16.6%	37,896	83.4%	**45,412**	14.9%	228,687 (42%)	7.10%	**504**
Y2009	**307,006**	39,570	12.9%	7,624	16.6%	38,177	83.3%	**45,801**	14.9%	228,946 (42%)	0.10%	**500**
Y2010	**308,746**	40,268	13.0%	7,923	16.9%	38,991	83.1%	**46,914**	15.2%	237,905 (42%)	3.90%	**507**
Y2011	**313,848**	41,122	13.1%	7,786	16.6%	39,132	83.4%	**46,918**	14.9%	252,654 (43%)	6.20%	**539**
Change	**11%**	17%		45%		14%		**18%**		410%		**331%**
(GM)	**1.0%**	1.5%		3.4%		1.2%		**1.5%**		16.0%		**14.2%**

( ) shows percentage of procedures utilized in facility settings (HOPD and ASC)

to 252,654, overall a 410% increase with an increase of 331% per 100,000 Medicare beneficiaries.

Utilization Characteristics

Table 2 shows the frequency of sacroiliac joint injections in the Medicare population from 2000 to 2011. Overall, the rate of increase for sacroiliac joint injections was 331% per 100,000 Medicare beneficiaries. Specialties with the highest increases were physical medicine and rehabilitation with an increase of 1,568%, and neurology which showed a 698% increase, despite many of the physicians from these specialties being enrolled in interventional pain management and pain management. There were significant increases for general surgery also, along with family practice and nurse practitioners; however, all these groups started with extremely low base numbers. Figure 1 shows the utilization of sacroiliac joint injections by specialty from 2000 to 2011 in Medicare recipients.

Utilization Characteristics by State

Table 3 shows the utilization of sacroiliac joint injections by state based on statistics from 2008 to 2010. New Hampshire ranked the highest in growth per 100,000 Medicare beneficiaries with 40% followed by Alabama at 38%, Minnesota at 28%, and Vermont at 25%. There was a decrease in the growth in some states significantly as high as 48% in Hawaii.

Table 4 shows utilization by state listed in alphabetical order.

Discussion

This evaluation of utilization patterns of sacroiliac joint injections in the Medicare population showed a 331% increase per 100,000 Medicare recipients with a rate of 125 in 2000, increasing to 539 by 2011. This increase is reflected from 49,554 services in 2000 to 252,654 in 2011. The majority of procedures were performed in office settings.

The results also showed significant increases among physical medicine and rehabilitation physicians even though a significant proportion of physicians of this specialty practicing interventional pain management have been enrolled in interventional pain management and pain management specialties. The increases observed for physical medicine and rehabilitation were 1,568%, whereas for neurology it was 698%. Substantial increases were also observed with nonphysician providers when they billed on their own including CRNAs, nurse practitioners, and physician assistants, increasing by 4,526%, however, there numbers were very modest starting with 21 in 2000, increasing to 4,953,

Table 2. *Frequency of utilization of sacroiliac joint injections from 2000 to 2011, in Medicare recipients.*

Specialty	F2000	F2001	F2002	F2003	F2004	F2005	F2006	F2007	F2008	F2009	F2010	F2011	Change	Average
Anesthesiology -05	36,811	62,183	64,851	71,969	72,475	79,597	82,373	80,455	78,847	75,418	70,652	68,103	85%	5.8%
Interventional Pain Management -09	-	-	-	5,329	20,889	22,613	29,470	41,041	53,194	56,882	61,836	67,653	-	-
Pain Management -72	-	426	10,424	16,236	29,112	31,695	31,356	22,935	17,928	15,325	21,038	28,344	-	-
PM&R -25	2,754	6,245	9,887	14,990	21,978	23,735	28,294	33,591	37,908	40,564	42,659	45,936	1568%	29.2%
Neurology -13	614	1,354	2,239	4,248	2,836	3,073	4,423	4,652	6,334	5,895	5,934	4,900	698%	20.8%
Psychiatry -26	95	94	139	161	105	137	225	286	226	242	267	271	185%	10.0%
Interventional Pain Management	**40,274**	**70,302**	**87,540**	**112,933**	**147,395**	**160,850**	**176,141**	**182,960**	**194,437**	**194,326**	**202,386**	**215,207**	**434%**	**16.5%**
Percent	81.3%	82.1%	86.0%	87.6%	85.3%	85.3%	83.1%	85.7%	85.0%	84.9%	85.1%	85.2%		
Rate	81	82	86	88	85	85	83	86	85	85	85	85	5%	0.4%
Neurosurgery -14	196	704	1,369	1,454	1,497	1,627	1,691	1,438	2,589	3,573	1,959	1,575	704%	20.9%
Orthopedic Surgery -20	2,525	3,558	3,577	4,250	5,562	6,074	6,683	7,315	7,539	7,377	6,795	6,532	159%	9.0%
General Surgery -02	57	54	155	221	448	514	622	711	620	602	719	898	1,475%	28.5%
Surgery	**2,778**	**4,316**	**5,101**	**5,925**	**7,507**	**8,215**	**8,996**	**9,464**	**10,748**	**11,552**	**9,473**	**9,005**	**224%**	**11.3%**
Percent	5.6%	5.0%	5.0%	4.6%	4.3%	4.4%	4.2%	4.4%	4.7%	5.0%	4.0%	3.6%		
Rate	6	5	5	5	4	4	4	4	5	5	4	4	-36%	-4.0%
Interventional Radiology -94	147	160	200	224	389	463	549	886	1,135	1,342	1,121	1,184	705%	20.9%
Diagnostic Radiology -30	2,024	1,446	2,010	2,796	3,766	4,103	4,331	4,696	5,052	5,221	5,449	6,104	202%	10.6%
Radiology	2,171	1,606	2,210	3,020	4,155	4,566	4,880	5,582	6,187	6,563	6,570	7,288	236%	11.6%
Percent	4.4%	1.9%	2.2%	2.3%	2.4%	2.4%	2.3%	2.6%	2.7%	2.9%	2.8%	2.9%		
Rate	4	2	2	2	2	2	2	3	3	3	3	3	-34%	-3.7%
Family Practice -08	447	872	1,176	1,963	3,316	3,560	5,932	3,949	5,137	5,143	5,954	6,226	1,293%	27.1%
General Practice -01	258	490	509	589	1,599	1,701	5,202	1,152	1,177	1,345	1,165	1,048	306%	13.6%
Internal Medicine -11	555	1,301	1,265	2,229	4,132	4,556	4,998	4,526	3,863	3,535	4,241	3,805	586%	19.1%
General Physicians	**1,260**	**2,663**	**2,950**	**4,781**	**9,047**	**9,817**	**16,132**	**9,627**	**10,177**	**10,023**	**11,360**	**11,079**	**779%**	**21.8%**
Percent	2.5%	3.1%	2.9%	3.7%	5.2%	5.2%	7.6%	4.5%	4.5%	4.4%	4.8%	4.4%		
Rate	3	3	3	4	5	5	8	5	4	4	5	4	72%	5.1%
Other Physicians	**3,050**	**6,606**	**3,589**	**1,584**	**2,951**	**3,296**	**3,152**	**3,251**	**4,508**	**3,609**	**4,584**	**5,122**	**68%**	**4.8%**
Percent	6.2%	7.7%	3.5%	1.2%	1.7%	1.7%	1.5%	1.5%	2.0%	1.6%	1.9%	2.0%		
Rate	6	8	4	1	2	2	1	2	2	2	2	2	-67%	-9.6%

Table 2 (cont.). *Frequency of utilization of sacroiliac joint injections from 2000 to 2011, in Medicare recipients.*

CRNA -43	-	23	41	70	63	89	106	181	221	248	315	519		
NP -50	-	111	177	177	727	787	947	773	875	1,221	1,489	2,296		
PA -97	21	37	141	374	859	986	1,574	1,651	1,534	1,404	1,728	2,138	10,081%	52.2%
CRNA, NP & PA	**21**	**171**	**359**	**621**	**1,649**	**1,862**	**2,627**	**2,605**	**2,630**	**2,873**	**3,532**	**4,953**	**23,486%**	**64.3%**
Percent	0.04%	0.2%	0.4%	0.5%	1.0%	1.0%	1.2%	1.2%	1.2%	1.3%	1.5%	2.0%		
Rate	0.04	0.2	0.4	0.5	1.0	1.0	1.2	1.2	1.2	1.3	1.5	2.0	4,526%	41.7%
Total SI Joint Injections	49,554	85,664	101,749	128,864	172,704	188,606	211,928	213,489	228,687	228,946	237,905	252,654	410%	16.0%
Rate	125	214	251	313	414	444	489	482	504	500	507	539	331%	14.2%

which constitutes only a small percent of the overall procedure volume of 2% which increased from 1.5% in 2010. The state wise data showed increases of 20% or more in multiple states including New Hampshire, Alabama, Minnesota, Vermont, Oregon, Utah, Massachusetts, and Kansas. Similarly, decreases were observed in multiple states with a number of states showing more than a 25% decrease including Oklahoma, Louisiana, Maryland, Arkansas, New York, and Hawaii.

In addition, the results of this utilization assessment also illustrate that while overall interventional techniques increased 177% per 100,000 Medicare beneficiaries, with a 130% increase for epidural injections, 308% for facet joint interventions, with SI joint injections at 331% exceeding both epidural injections and facet joint interventions (12,52,53). Overall there is evidence that spinal pain is increasing along with continuing disability, even though some researchers claim that there is no increase in the prevalence of low back pain (10,11,31,34,54-58). Consequently, the significance of low back and lower extremity pain along with related disability in addition to escalating economic costs continue to be a concern to the public-at-large, policy makers, and providers (7,10,11,26,27,29,31,32,34,52-56). Cassidy et al (57) in assessing the prevalence of low back pain and related disability in Saskatchewan adults showed that at least 25% of patients reported Grade II to IV low back pain with high pain intensity and disability, whereas Grade III and IV levels of pain with significant disability was seen in 15% of patients with low back pain. In addition, the prevalence of care seeking continues to increase due to many baby boomers entering the elderly population (34,58). Advances in understanding of the structural basis of chronic low back and lower extremity pain, evidence-based medicine, comparative effectiveness research, and continuing research with multitude of modalities of treatments have increased the utilization (1,2,7). Furthermore, systematic reviews and guidelines addressing the diagnostic and therapeutic utility of sacroiliac joint interventions have shown good evidence for a diagnosis of sacroiliac joint pain with controlled diagnostic techniques, whereas evidence has been variable for therapeutic interventions with mostly limited evidence, specifically for sacroiliac joint injections (1,2). The majority of evidence is based on observational studies (59-65). Consequently, the growth of sacroiliac joint interventions at such high levels without significant evidence is of concern. Furthermore, there have not been any cost utility analyses performed for sacroiliac joint in-

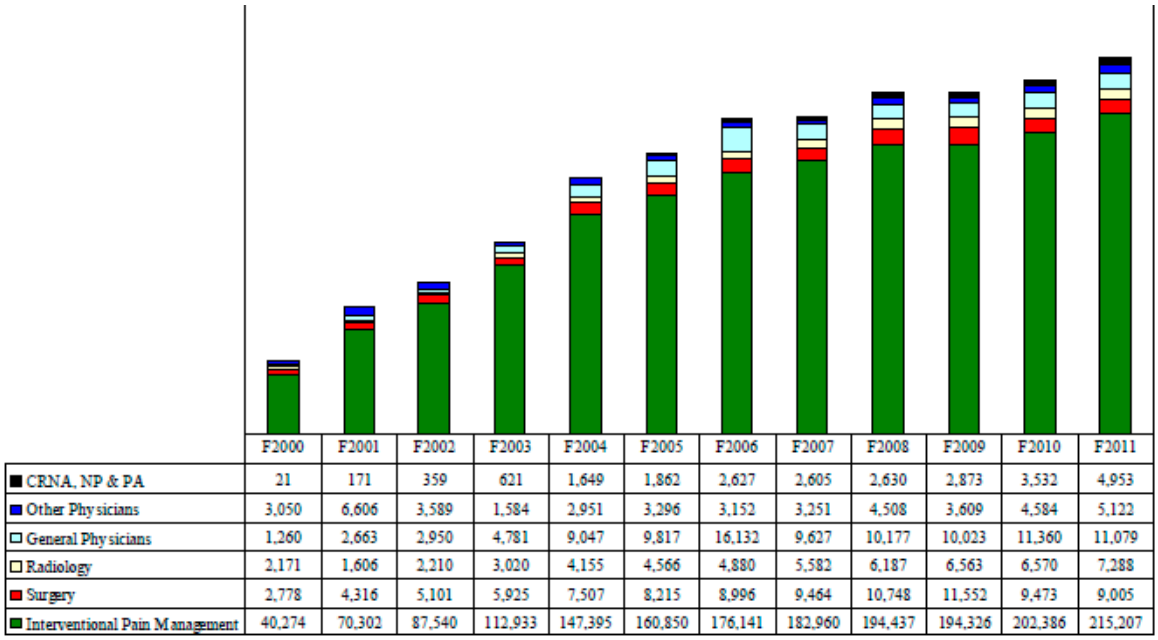

Fig. 1. *Utilization of sacroiliac joint injections by specialty from 2000 to 2011 in Medicare recipients.*

Table 3. *Utilization of sacroiliac joint injections performed (claims data) in each state with claims data from 2008 to 2010, in Medicare recipients*

	Services					Rate per 100,000 Medicare Beneficiaries				
State	2008	2009	2010	Overall Change	Annual Change	2008	2009	2010	Overall Change	Annual Change
New Hampshire	990	1,384	1,460	47%	14%	468	637	654	40%	12%
Alabama	4,914	5,108	7,069	44%	13%	607	617	836	38%	11%
Minnesota	1,901	2,118	2,543	34%	10%	254	276	324	28%	8%
Vermont	323	364	429	33%	10%	308	337	385	25%	8%
Oregon	1,150	1,295	1,484	29%	9%	197	215	239	21%	7%
Utah	1,445	1,610	1,868	29%	9%	547	588	660	21%	6%
Massachusetts	3,332	3,668	4,251	28%	8%	327	353	401	22%	7%
Kansas	2,238	2,341	2,817	26%	8%	535	550	651	22%	7%
Maine	706	777	893	26%	8%	279	300	337	21%	7%
Arizona	3,276	3,671	4,102	25%	8%	377	408	441	17%	5%
Michigan	13,611	13,501	16,928	24%	8%	862	836	1025	19%	6%
Nebraska	1,313	1,552	1,614	23%	7%	484	563	578	20%	6%
Nevada	1,167	1,339	1,429	22%	7%	354	390	401	13%	4%
California	12,122	13,186	14,236	17%	6%	270	285	299	11%	4%
Indiana	6,061	6,069	7,107	17%	5%	629	616	707	12%	4%
South Carolina	7,327	7,663	8,585	17%	5%	1,012	1,024	1,110	10%	3%
Wisconsin	3,525	3,910	4,132	17%	5%	403	438	454	12%	4%
Colorado	1,908	2,027	2,198	15%	5%	329	337	352	7%	2%
Washington	1,849	2,110	2,109	14%	4%	205	225	217	6%	2%

Table 3 (cont.). *Utilization of sacroiliac joint injections performed (claims data) in each state with claims data from 2008 to 2010, in Medicare recipients*

	Services					Rate per 100,000 Medicare Beneficiaries				
State	2008	2009	2010	Overall Change	Annual Change	2008	2009	2010	Overall Change	Annual Change
South Dakota	1,201	1,346	1,362	13%	4%	910	1,001	997	10%	3%
Tennessee	8,465	9,229	9,525	13%	4%	843	895	900	7%	2%
Iowa	1,995	2,015	2,229	12%	4%	394	394	431	9%	3%
Virginia	5,990	6,253	6,656	11%	4%	555	563	584	5%	2%
Kentucky	6,025	5,818	6,573	9%	3%	827	783	865	5%	1%
Mississippi	2,530	2,887	2,749	9%	3%	528	592	553	5%	2%
Idaho	847	918	898	6%	2%	395	414	391	-1%	0%
Missouri	8,035	8,527	8,538	6%	2%	832	865	850	2%	1%
North Carolina	8,686	8,883	9,212	6%	2%	618	613	618	0%	0%
Pennsylvania	6,812	6,649	7,211	6%	2%	307	295	316	3%	1%
Alaska	85	87	89	5%	2%	142	139	135	-5%	-2%
New Mexico	875	923	913	4%	1%	297	304	291	-2%	-1%
North Dakota	574	512	598	4%	1%	538	474	547	2%	1%
Montana	435	564	447	3%	1%	271	343	264	-3%	-1%
Ohio	10,192	10,420	10,177	0%	0%	554	557	535	-3%	-1%
Georgia	8,389	8,544	8,267	-1%	0%	728	716	669	-8%	-3%
West Virginia	1,667	1,853	1,636	-2%	-1%	447	491	429	-4%	-1%
Connecticut	1,684	1,617	1,627	-3%	-1%	307	290	287	-7%	-2%
Illinois	7,691	6,980	7,395	-4%	-1%	433	386	402	-7%	-2%
Florida	28,436	28,531	26,725	-6%	-2%	885	867	792	-11%	-4%
New Jersey	4,956	4,500	4,629	-7%	-2%	386	345	349	-10%	-3%
Delaware	497	431	432	-13%	-5%	352	297	289	-18%	-6%
Texas	17,465	16,413	15,163	-13%	-5%	623	566	505	-19%	-7%
Wyoming	242	208	210	-13%	-5%	318	266	262	-18%	-6%
DC	1,493	1,280	1,281	-14%	-5%	1,987	1,669	1,639	-18%	-6%
Rhode Island	2,935	2,444	2,518	-14%	-5%	1,650	1,356	1,376	-17%	-6%
Oklahoma	2,401	2,020	1,886	-21%	-8%	415	341	313	-25%	-9%
Louisiana	2,464	2,033	1,931	-22%	-8%	375	303	281	-25%	-9%
Maryland	3,965	3,085	3,036	-23%	-9%	533	404	387	-27%	-10%
Arkansas	3,384	2,827	2,490	-26%	-10%	665	543	469	-30%	-11%
New York	8,978	7,348	6,169	-31%	-12%	311	250	206	-34%	-13%
Hawaii	135	108	75	-44%	-18%	70	54	36	-48%	-19%
Total	228,687	228,946	237,905	4%	1%	504	500	507	1%	0.3%

Annual change = geometric average

jections (1,2,7,23,66-76). Consequently, these patterns of utilization result in various types of policies including national coverage determinations, local coverage determinations, noncoverage by private insurers and other payers. This is more frequent for sacroiliac joint interventions than other interventions (77). In fact, OIG has recommended strengthening program safeguards to prevent improper payments for facet joint injections as well as transforaminal epidural injections, along with recommendations to enforce proper documentation (26,29,77). However, neither the OIG report, nor the multitude of LCDs have deterred the explosive growth of the utilization pattern of sacroiliac joint injections. Despite a multitude of disadvantages and continued

Table 4. *Utilization of sacroiliac joint injections by state (claims data) shown in alphabetical order from 2008 to 2010 in Medicare recipients*

State	F2008	F2008	F2009	Overall Change	Annual Change	R2008	R2009	R2010	Overall Change	Annual Change
Alabama	4,914	5,108	7,069	44%	13%	607	617	836	38%	11%
Alaska	85	87	89	5%	2%	142	139	135	-5%	-2%
Arizona	3,276	3,671	4,102	25%	8%	377	408	441	17%	5%
Arkansas	3,384	2,827	2,490	-26%	-10%	665	543	469	-30%	-11%
California	12,122	13,186	14,236	17%	6%	270	285	299	11%	4%
Colorado	1,908	2,027	2,198	15%	5%	329	337	352	7%	2%
Connecticut	1,684	1,617	1,627	-3%	-1%	307	290	287	-7%	-2%
DC	1,493	1,280	1,281	-14%	-5%	1,987	1,669	1,639	-18%	-6%
Delaware	497	431	432	-13%	-5%	352	297	289	-18%	-6%
Florida	28,436	28,531	26,725	-6%	-2%	885	867	792	-11%	-4%
Georgia	8,389	8,544	8,267	-1%	0%	728	716	669	-8%	-3%
Hawaii	135	108	75	-44%	-18%	70	54	36	-48%	-19%
Idaho	847	918	898	6%	2%	395	414	391	-1%	0%
Illinois	7,691	6,980	7,395	-4%	-1%	433	386	402	-7%	-2%
Indiana	6,061	6,069	7,107	17%	5%	629	616	707	12%	4%
Iowa	1,995	2,015	2,229	12%	4%	394	394	431	9%	3%
Kansas	2,238	2,341	2,817	26%	8%	535	550	651	22%	7%
Kentucky	6,025	5,818	6,573	9%	3%	827	783	865	5%	1%
Louisiana	2,464	2,033	1,931	-22%	-8%	375	303	281	-25%	-9%
Maine	706	777	893	26%	8%	279	300	337	21%	7%
Maryland	3,965	3,085	3,036	-23%	-9%	533	404	387	-27%	-10%
Massachusetts	3,332	3,668	4,251	28%	8%	327	353	401	22%	7%
Michigan	13,611	13,501	16,928	24%	8%	862	836	1025	19%	6%
Minnesota	1,901	2,118	2,543	34%	10%	254	276	324	28%	8%
Mississippi	2,530	2,887	2,749	9%	3%	528	592	553	5%	2%
Missouri	8,035	8,527	8,538	6%	2%	832	865	850	2%	1%
Montana	435	564	447	3%	1%	271	343	264	-3%	-1%
Nebraska	1,313	1,552	1,614	23%	7%	484	563	578	20%	6%
Nevada	1,167	1,339	1,429	22%	7%	354	390	401	13%	4%
New Hampshire	990	1,384	1,460	47%	14%	468	637	654	40%	12%
New Jersey	4,956	4,500	4,629	-7%	-2%	386	345	349	-10%	-3%
New Mexico	875	923	913	4%	1%	297	304	291	-2%	-1%
New York	8,978	7,348	6,169	-31%	-12%	311	250	206	-34%	-13%
North Carolina	8,686	8,883	9,212	6%	2%	618	613	618	0%	0%
North Dakota	574	512	598	4%	1%	538	474	547	2%	1%
Ohio	10,192	10,420	10,177	0%	0%	554	557	535	-3%	-1%
Oklahoma	2,401	2,020	1,886	-21%	-8%	415	341	313	-25%	-9%
Oregon	1,150	1,295	1,484	29%	9%	197	215	239	21%	7%
Pennsylvania	6,812	6,649	7,211	6%	2%	307	295	316	3%	1%
Rhode Island	2,935	2,444	2,518	-14%	-5%	1,650	1,356	1,376	-17%	-6%
South Carolina	7,327	7,663	8,585	17%	5%	1,012	1,024	1,110	10%	3%
South Dakota	1,201	1,346	1,362	13%	4%	910	1,001	997	10%	3%
Tennessee	8,465	9,229	9,525	13%	4%	843	895	900	7%	2%
Texas	17,465	16,413	15,163	-13%	-5%	623	566	505	-19%	-7%

Table 4 (cont.). *Utilization of sacroiliac joint injections by state (claims data) shown in alphabetical order from 2008 to 2010 in Medicare recipients*

State	F2008	F2008	F2009	Overall Change	Annual Change	R2008	R2009	R2010	Overall Change	Annual Change
Utah	1,445	1,610	1,868	29%	9%	547	588	660	21%	6%
Vermont	323	364	429	33%	10%	308	337	385	25%	8%
Virginia	5,990	6,253	6,656	11%	4%	555	563	584	5%	2%
Washington	1,849	2,110	2,109	14%	4%	205	225	217	6%	2%
West Virginia	1,667	1,853	1,636	-2%	-1%	447	491	429	-4%	-1%
Wisconsin	3,525	3,910	4,132	17%	5%	403	438	454	12%	4%
Wyoming	242	208	210	-13%	-5%	318	266	262	-18%	-6%
Total	228,687	228,946	237,905	4%	1%	504	500	507	1%	0.3%

Annual change = geometric average

growth, we continue to believe that proper diagnostic techniques and judicious utilization of sacroiliac joint injections as per proper indications and medical necessity described in well-prepared LCDs may provide value based interventional pain management while reducing excessive utilization.

Recent arguments allege that informed consent will transform spine care, and question the ethics and legality of spine care providers by claiming that decisions are neither informed nor consensual (78). The techniques included in these claims include facet joint interventions, epidural injections for axial or discogenic low back pain, and disc prosthesis and fusion. The authors, however, are apparently unaware of the complex decision process that precedes interventions and the high demand by the patient population in general. Thus, shared decision making may increase utilization rather than decreasing it.

There are several limitations to our study; most significantly the lack of inclusion of participants from Medicare Advantage plans. However, this study included all fee-for-service Medicare patients, rather than only the ones above the age of 65. Additional disadvantages that detailed state data was not available from 2000 to 2007 along with facility and cost data which has been published elsewhere (13), even though it was not specific for sacroiliac joint injections. Further, states' claims data includes claims only, rather than population based utilization.

Overall, the growth of sacroiliac joint injections is explosive exceeding facet joint injection interventions. Consequently, appropriate measures must be enforced to control this growth. Thus, the appropriate evidence development utilizing proper methodologic criteria and description of limitations of indications and medical necessity, frequency, and limiting these procedures to be performed by only well-trained and qualified physicians not only will curb or eliminate the explosive growth, reduce utilization, but maintain patient access.

Acknowledgments

The authors wish to thank Sekar Edem for assistance in the search of the literature; Alvaro F. Gómez, MA, and Laurie Swick, BS for manuscript review; and Tonie M. Hatton and Diane E. Neihoff, transcriptionists, for their assistance in preparation of this manuscript. We would like to thank the editorial board of *Pain Physician* for review and criticism in improving the manuscript.

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