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Opioid Prescriptions, Radiography, and Costs for Self-Limited "One-and-Done" Lower Back Pain Visits in a Commercially Insured Population

Jesse M. Pines, MD, MBA, MSCE, Kenneth Harwood, PhD, PT, FAPTA, C. Holly Andrilla, MS, Bianca K. Frogner, PhD

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INTRODUCTION

Low back pain is a common condition affecting nearly 80% of the population at one time in their lives and resolves within a short period in nearly 90% of cases.[1] Of the 138 million U.S. emergency department (ED) visits and 883 million outpatient clinic visits in 2017, approximately 2.8 million (2%) and 12.7 million (1.4%), respectively, involved symptoms of low back pain.[2,3] Reasons for care seeking for low back pain in EDs as well as clinics are symptom control and diagnosis, specifically identifying causes of pain and ruling out serious conditions. Direct care for symptom relief and functional improvement typically involves interventions from physical therapists, massage therapists, chiropractors, or acupuncturists.

In rare cases, patients have serious causes for their low back pain, such as cord compression or spinal infection requiring immediate intervention. Others require longitudinal care for prolonged symptoms, often involving a combination of medication and direct therapies, and infrequently surgery. Yet, the self-limited nature of low back pain commonly results in a single visit to a clinician followed by symptom resolution and no further visits. While common encountered in clinical settings, these single low back pain visits have not been directly studied.

In this study, we explore a large sample of commercial beneficiaries with a single encounter with a clinician without further visits, termed "one-and-done" low back pain visits. The purpose was to examine the frequency of one-and-done low back pain patient visits across different clinician types in a commercial insured population, and compare imaging, opioid prescription rates, and costs across clinician types.

METHODS

We used 2015-6 insurance claims data from Health Care Cost Institute (HCCI) that includes claims data on approximately 50 million individuals nationally across four private insurers. One-and-done visits were defined as unique individuals aged 18 years or older with a primary diagnosis of low back pain on an index visit date and no other visits in the subsequent 12 months of continuous enrollment (see **Appendix A** for inclusion diagnoses). We excluded individuals with more than one clinician claim on the index date and individuals with low back pain diagnoses or opioid prescriptions in a "clean" period of 6 months prior to the index date (see **Appendix B** for full exclusion criteria). We included visits to clinicians who commonly care for low back pain and identified by provider of service codes: acupuncturists; advanced practice registered nurses (APRN); physical therapists; chiropractors; emergency medicine physicians; family/internal medicine physicians; orthopedists; and physical medicine physicians.

We studied three outcomes: opioid prescription rates, commonly utilized imaging modalities used for low back pain, and costs of care. Early opioid use was defined as prescriptions filled within 30 days. Long-term opioid use was defined as prescriptions filled within 60 days and either 1) received 120 days or more pills supplied in the one-year post-index date or 2) received 90 or more days of pills supplied and had ten or more refills in that one year.[4] Diagnostic imaging included any lower back radiography, magnetic resonance imaging (MRI) or a computed tomography (CT) scan within 12 months of the index date.

Total costs were defined as the net amount paid to providers after deductions within one year. Out-of-pocket costs included payments (e.g., deductible, copayment, and/or coinsurance) paid by patients. We tabulated outcomes by clinician type. This study was approved by the George Washington University Institutional Review Board.

RESULTS

A total of 189,205 one-and-done visits for low back pain were studied. The most common provider type seen first was family/internal medicine physicians (55.0%), followed by chiropractors (21.7%), emergency medicine physicians (8.3%) and orthopedic physicians (6.0%) (Table 1). Early opioid prescriptions most commonly occurred after visits with physical medicine (8.0%), emergency medicine (7.7%), and family/internal medicine physicians (6.7%). Long-term opioid prescriptions most commonly occurred after visits with physical medicine (0.4%) and family/internal medicine physicians (0.2%). Long-term opioid use was rare among emergency medicine physicians (0.1%). Any radiography use was most frequently associated with orthopedic (41.2%) and physical medicine physicians (13.7%). Ordering of an MRI/CT scan was most frequently associated with orthopedics (1.8%) and emergency medicine (1.5%). Average total costs were highest for patients treated by emergency medicine physicians ($478), physical medicine physicians ($248), and APRNs ($224). Out-of-pocket costs were highest for patients seen by emergency medicine physicians ($202) and acupuncturists ($110).

DISCUSSION

Ensuring high quality, efficient care for conditions that are mostly self-limited such as low back pain require an understanding of care seeking behavior by patients, decision making by clinicians, and costs to both insurers as well as patients. In this study, we found considerable variation in both care seeking and clinical decisions in a population of patients with self-limited low back pain symptoms, as well as costs incurred.

More than half of one-and-done visits occurred in family/internal medicine physicians' offices, the common first contact for acute medical care for insured patients and a source of treatment for a wide range of conditions. Less than one in ten patients used the ED, suggesting that EDs are the less common care choice of setting for ambulatory back pain in the commercially insured population. Notably, chiropractor use was more than 10-fold higher than both physical therapy and acupuncture combined, and 3-fold higher than ED care. Many patients may be self-diagnosing their new symptoms of low back pain as musculoskeletal in origin and seeking non-physician clinicians, particularly if they are less concerned about other medical causes.

Regarding opioids, this study was conducted using 2015-6 data, when there was already awareness of America's opioid crisis.[5] Overall, early opioid prescription rates across all provider types were less than one in 10 visits, which is encouraging given that opioids only have marginal benefits for symptom relief and may have other adverse consequences.[6] Of providers who can prescribe opioids, prescriptions were highest in physical and emergency medicine, and lowest among APRNs and orthopedists. This pattern may reflect symptom severity differences in the case of ED visits, which are often sought when pain is most severe. For physical medicine, the relatively higher rate of opioid prescribing may reflect clinician prescribing preferences or the higher preponderance of cases with pain related dysfunctions. Long-term opioid use was notably rare but highest among physicians in physical medicine and family/internal medicine. In one-and-done visits, some may be prescribing opioid refills on an initial visit despite our 6-month clean period. Long-term opioid use also was very low after ED visits, which has also been confirmed in other studies of ED patients.[7]

Any radiography and MRI/CT use also varied greatly, suggesting differences in practice style among providers and suggesting an opportunity to reduce variation through better clinical decision support as outlined in the Protecting Access

to Medicare Act (PAMA) of 2014, took effect January 1, 2021. This finding is particularly relevant for x-ray which is commonly unrevealing in the diagnosis of uncomplicated low back pain.[8]

We observed some opioid prescriptions and radiography–albeit low–for non-prescribing clinicians. It is possible that these medications and services were obtained though providers not captured in our dataset. A limitation of the data is that we are unable to directly attribute the reason for any radiography orders and opioid prescriptions; we can only infer that the recent diagnosis of low back pain is related to the timing of the fulfillment of an imaging order or opioid prescription.

Importantly, there were large differences in costs across providers, likely due to differences in billing codes and negotiated rates. In particular, emergency medicine visits were most expensive at $478; other physicians and APRN visits ranged from $151-$248, while non-physician care ranged from $91-$206. Out-of-pocket costs were also highest for emergency medicine physicians and were lower for other clinicians, likely explained by differences in deductibles, coverage, and co-pay policies. The new relaxation of restrictions on telehealth billing during the coronavirus (COVID-19) pandemic offers new opportunities for ED and other types of providers to deliver care remotely to help triage less serious symptoms of low back pain, potentially utilizing less healthcare interventions, lower care costs and reducing such avoidable care.[9]

Our study was limited by our inability to assess care seeking decisions by patients, symptom severity, and improvements in symptoms from physical manipulation and interventions, pharmacological therapy or psychological benefits of reassurance. We were also not able to assess the quality or safety of care delivered, which requires further study. We also did not account for variations in patient demographics. Patients seen by orthopedists, family/internal medicine physicians, and APRNs had slightly more comorbidities, which tended to correlate with an older patient population, compared to patients seen by other providers. Detailed data available upon request.

Table 1: Individuals with an initial diagnosis of low back pain in a commercially insured population from 2015-6

	Acupuncturist	Advanced Practice Registered Nurse	Chiropractor	Emergency Medicine Physician	Family/ Internal Medicine Physician	Orthopedic Physician	Physical Medicine Physician	Physical Therapist
Patient numbers n=187,205 (% of sample)	1,125 (0.6%)	6,465 (3.4%)	41,067 (21.7%)	15,753 (8.3%)	104,004 (55%)	11,339 (6.0%)	6,829 (3.6%)	2,623 (1.4%)
Early opioid (Col %)	NA	5.4%	0.3%	7.6%	6.7%	4.8%	8.0%	0.6%
Long-term opioid (Col %)	0.0%	NA	NA	0.1%	0.2%	0.1%	0.4%	NA
Any radiography (Col %)	NA	6.8%	7.9%	8.9%	6.0%	41.2%	13.7%	0.6%
MRI/CT scan (Col %)	0.0%	0.3%	NA	1.5%	0.2%	1.8%	0.6%	0.0%
Total cost (mean, SD)	$206 ($289)	$224 ($889)	$91 ($157)	$478 ($1,077)	$151 ($277)	$211 ($377)	$248 ($379)	$160 ($326)
Out-of-pocket cost (mean, SD)	$110 ($125)	$90 ($227)	$57 ($82)	$202 ($420)	$61 ($131)	$95 ($154)	$103 ($180)	$90 ($187)

SD = Standard deviation; MRI = Magnetic Resonance Imaging; CT = Computed Tomography; NA = results suppressed due to cell having less than 10 observations

Overall, we demonstrate broad variation in the course of care by the initial clinician seen for one-and-done patients with low back pain in the commercially insured market. The variation in care suggests that provider type dictates type of care received for this subset of patients with self-limited illness. In addition, prior work also suggests that care for lower back pain may not always be consistent with clinical practice guidelines.[10] Policymakers should consider reducing regulatory barriers for seeking care with specific provider types for common, musculoskeletal complaints like lower back pain, and direct patients preferentially to providers who deliver higher rates of guideline-concordant care. Future work is needed to understand the reasons for patient selection for accessing specific clinicians for self-limiting symptoms and designing interventions to reduce health care use and costs.

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APPENDIX A: DIAGNOSTIC INCLUSION CRITERIA

Descriptor	ICD-9	ICD-10
Sacroiliitis, not elsewhere classified	720.2	M46.1
Lumbosacaral spondylosis without myelopathy	721.3	M47.817
Spondylosis with myelopathy, lumbar region	721.42	M47.16
Lumbar disc displacement	722.1	M51.26, M51.27
Displacement of intervertebral disc, site unspecified, without myelopathy	722.2	M51.9
Degeneration of thoracic or thoracolumbar intervertebral disc	722.51	M51.35
Lumbar/lumbosacral disc displacement	722.52	M51.36, M51.37
Lumbar disc disease with myelopathy	722.73	M51.06, M51.07
Other disc disorder - lumbar region	722.93	M46.47, M51.86, M51.87
Spinal stenosis - lumbar	724.02	M48.06
Lumbago	724.2	M54.5
Sciatica	724.3	M54.30
Thoracic or lumbosacral neuritis or radiculitis, unspecified	724.4	M54.214-M54.17
Backache, unspecified	724.5	M54.89, M54.9

Descriptor (*continued*)	ICD-9	ICD-10
Disorders of the sacrum	724.6	M53.3
Other unspecified back disorders	724.9	M53.9
Acquired spondylolisthesis	738.4	M43.00, M43.01
Nonallopathic lesions, lumbar region	739.3	m99.03
Nonallopathic lesions, sacral region	739.4	M99.04
Spondylolysis, lumbosacral region	756.11	Q76.2
Spondylolesthesis	756.12	Q76.2
Sprain-lumbosacral region	846.x	S33.8XXA
Sprain -sacroiliac	846.1	S33.6XXA
Sprain- other specified sites of sacroiliac region	846.8	S33.8XXA
Sprain- unspecified sites of sacroiliac region	846.9	S33.9XXA
Sprain-lumbar region	847.2	S33.5XXA
Sprain - sacrum	847.3	S33.8XXA

APPENDIX B: EXCLUSION CRITERIA

Description	ICD-9 Codes	ICD-10 codes	CPT Codes
Non MSK reasons for LBP			
Calculus of kidney	592.xx	N20.0, N20.1, N20.9	
Calculus of gallbaldder without mention of cholecytitis	574.2	K80.20	
Polynephritis	590.9	N15.9	
UTI (site not specified)	599	N39.0	
Urinary tract infection	V13.02	Z87.440	
Neoplasms	140.xx-239.xx	C00.xx - D49.xx	
Osteoporosis	V17.81, V82.81	Z82.62, Z13.820	
Cauda equina syndrome	344.6	G83.4	
Osteomyolitis, peroiostitis and other infections involving bone	730.xx	M86.xx, M89.60, M89.619, M89.629, M89.639, M89.649, M89.659, M89.669, M89.679, M89.968, M89.69, M90.80, M90.810, M90.829, M90.830, M90.849, M90.859, M90.869, M90.879, M90.88, M90.89, M46.20, M46.30	
Major osseous deficit	731.3	M89.70	
Fracture of spine or pelvis	805.x - 809.x, 733.13-733.15 or 733.96-733.98	S12.9XXA, S12.000A, S12.001A, S12.100A, S12.101A, S12.200A, S12.201A, S12.300A, S12.301A, S14.101A, S14.102A, S14.103A, S14.104A, S22.0XXX, S32.501A, S32.502A, S32.509A, S32.501B, S32.502B, S32.509B, S32.9XXA, S32.9XXB, S22.99XA, S22.9XXB, S32.009A, S32.019A, S32.029A, S32.039A, S32.049A,S32.059A, S34.109A, S34.119A, S34.129A, S34.101A, S34.111A,S34.121A, S34.102A, S34.112A, S34.122A,S34.103A,S34.113A, S34.123A,S34.104A, S34.114A, S34.124A, S34.105A, S34.115A, S34.125A, M84.453A, M84.750A, M84.359A, M84.353A, M84.350A, M48.50XA, M80.08XA, S32.1	
Intraspinal abscess	324.1	G06.1	
Other Exclusions			
Low back surgery			00630, 00670, 20930, 20936, 22102, 22103, 22224, 22226, 22558, 22585, 22612,22630, 22802, 22840, 22842–22844, 22851, 62287, 63005, 63011, 63012, 63030, 63035, 63042, 63047, 63048, 63088–63091,63185, 63190, 63200, 63267, 63272, 63290, 63303, 63047, 63048, 64622, 64623
Opioid dependence		F11.20	

Appendix B continued next page

APPENDIX B: EXCLUSION CRITERIA *continued*

Description	ICD-9 Codes	ICD-10 codes	CPT Codes
Substance abuse disorder		291.x, 303.x, 304.x, 305, 305.2x - 305.9x, 648.3	
Opioid use disorder	304.00' 305.5		
Proxy for opioid use disorder			99233, 99221, 99222, 99231, 99232, 90805, 90807, 90809, 90801, 90804, 90806, 90808, 90853, 90899