

**Patient Diagnostic Journey and Time to Diagnosis in Axial
Spondyloarthritis: A Retrospective Cohort Study Using US Claims Data**

Maureen Dubreuil,¹ Marina Magrey,² Kathrin Haeffs,³ Evgueni Ivanov,⁴ Julie Gandrup Horan⁵

¹Section of Rheumatology, Boston University School of Medicine, Boston, MA, USA;

²Case Western Reserve University, University Hospitals, Cleveland, OH, USA; ³UCB, Monheim am Rhein, Germany; ⁴UCB, Bulle, Switzerland; ⁵UCB, Copenhagen, Denmark

Correspondence to: Professor Maureen Dubreuil (Boston University School of Medicine, Boston, MA, USA; mdubreui@bu.edu)

SUPPLEMENTARY MATERIALS

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Data collected from MarketScan® to characterize inpatient and outpatient healthcare encounters used a pre-specified list of healthcare provider types relevant to the diagnosis and treatment of axSpA, and included rheumatology, pain management, orthopaedic surgery, chiropractor, acute care emergency medicine, primary care, advanced practice, ophthalmology, gastroenterology, dermatology, radiology, and mental health.

Supplementary Table S1. ICD-9 and ICD-10 clinical modification codes for axSpA diagnoses

Code description	ICD-10-CM
Radiographic axSpA	
Ankylosing spondylitis of multiple sites in spine	M45.0
Ankylosing spondylitis of occipito-atlanto-axial region	M45.1
Ankylosing spondylitis of cervical region	M45.2
Ankylosing spondylitis of cervicothoracic region	M45.3
Ankylosing spondylitis of thoracic region	M45.4
Ankylosing spondylitis of thoracolumbar region	M45.5
Ankylosing spondylitis lumbar region	M45.6
Ankylosing spondylitis of lumbosacral region	M45.7
Ankylosing spondylitis sacral and sacrococcygeal region	M45.8
Ankylosing spondylitis of unspecified sites in spine	M45.9
Non-radiographic axSpA	
Other specified inflammatory spondylopathies (Oct 2020)	M46.8x
Non-radiographic axial spondyloarthritis (Oct 2021)	M45.Ax
Code description	ICD-9-CM
Ankylosing spondylitis and other inflammatory spondylopathies	720.0

axSpA: axial spondyloarthritis; ICD-9-CM: International Classification of Diseases-9, Clinical Modification; ICD-10-CM: International Classification of Diseases-10, Clinical Modification.

SUPPLEMENTARY MATERIALS

Supplementary Table S2. Current Procedural Terminology (CPT) codes and descriptions of diagnostic tests and imaging procedures included

Type	Anatomical region	Code description
MRI		
72141	Cervical Spine	Without contrast material
72142		With contrast material
72156		With and without contrast material
72148	Lumbar Spine	Without contrast material
72149		With contrast material
72158		With and without contrast material
72146	Spinal Thoracic	Without contrast material
72147		With contrast material
72157		With and without contrast material
72195	Sacroiliac joint	Without contrast (Pelvis without contrast)
72197		With and without contrast (Pelvis with and without contrast)
CT		
72125	Cervical spine	Without contrast material
72126		With contrast material
72127		With and without contrast material
72128	Thoracic spine	Without contrast material
72129		With contrast material
72130		With and without contrast material
72131	Lumbar spine	Without contrast material
72132		With contrast material
72133		With and without contrast material
72192	Pelvis	Without contrast material
72193		With contrast material
72194		With and without contrast material
X-ray		
73221	Upper extremity (hand, wrist, elbow, shoulder sternoclavicular joint)	Without contrast material
73222		With contrast material
73223		With and without contrast material
73721	Lower extremity (foot, ankle, knee, hip)	Without contrast material
73722		With contrast material
73723		With and without contrast material
72050	Cervical spine	4–5 views
72040		<4 views
72052		Including oblique, flexion, and extension; 6 views
72100	Lumbar spine	<4 views
72110		4 views
72114		6 views
72070	Thoracic spine	2 views
72200	Sacroiliac joints	Left or right; 3 views
72202		Bilateral; 3 views
73521	Hips and pelvis	Bilateral with pelvis; 2 views

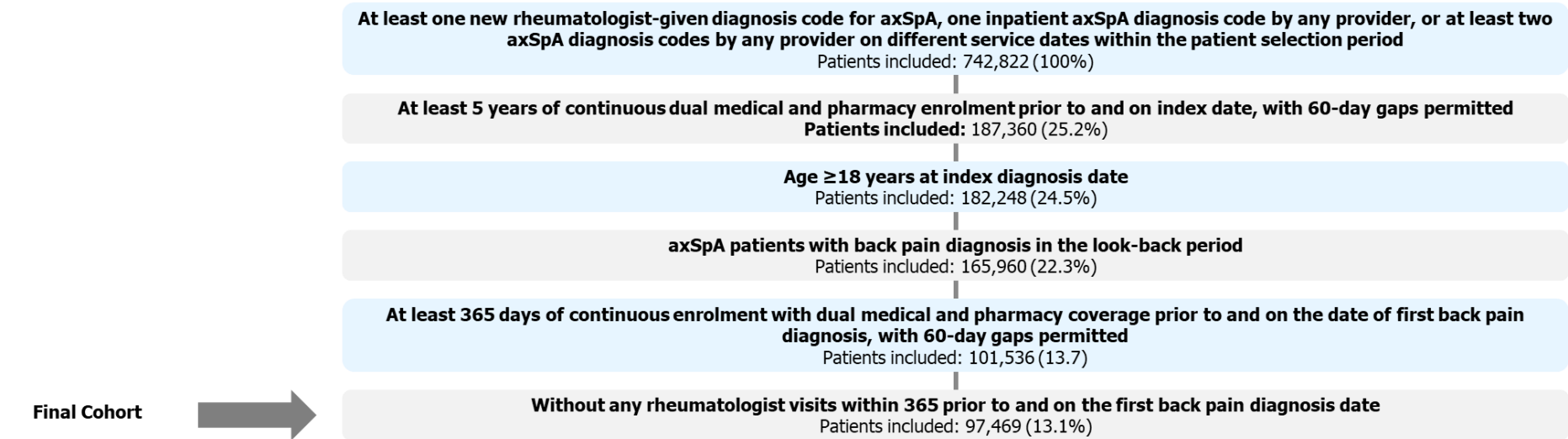
SUPPLEMENTARY MATERIALS

Type	Anatomical region	Code description
73522		Bilateral with pelvis; 3–4 views
73523		Bilateral with pelvis; ≥ 5 views
73501		Unilateral with pelvis; 1 view
73502		Left or right; with or without pelvis; ≥ 2 –3 views
73503		Left or right; with or without pelvis; ≥ 4 views
HLA		
81374		HLA Typing; Class 1 antigen; low resolution
86812		HLA Typing; A, B, or C; single antigen (e.g. A10, B27)
CRP		
86140		C-reactive protein diagnostic test for the detection and evaluation of infection, tissue injury and inflammatory disease, not involving atherosclerosis of the arteries
ESR		
85651		Erythrocyte sedimentation rate; non-automated
85652		Erythrocyte sedimentation rate; automated

CPT: Common Procedural Terminology; CRP: C-reactive protein; CT: computed tomography;
 ESR: erythrocyte sedimentation rate; HLA: human leukocytic antigen; MRI: magnetic
 resonance imaging.

SUPPLEMENTARY RESULTS

Supplementary Figure S1. Patient selection attrition funnel



axSpA: axial spondyloarthritis.

Supplementary Table S3. Sensitivity analysis comparing patients with 2 years of continuous medical and pharmacy coverage against 8 years of coverage

	2-year continuous data (N=143,734)		8-year continuous data (N=52,092)	
	At initial back pain diagnosis ^a	At axSpA diagnosis	At initial back pain diagnosis ^a	At axSpA diagnosis
Age , years, mean (SD)	48.0 (14.6)	51.4 (14.8)	48.6 (14.7)	54.1 (14.6)
Sex , n (%)				
Women	–	91,902 (63.9)	–	33,076 (63.5)
Men	–	51,832 (36.1)	–	19,016 (36.5)
Race , n (%)				
Missing	–	128,045 (89.1)	–	48,976 (94.0)
White	–	11,062 (7.7)	–	1,887 (3.6)
Black	–	3,730 (2.6)	–	1,141 (2.2)
Hispanic	–	446 (0.3)	–	38 (0.1)
Other	–	451 (0.3)	–	50 (0.1)
Region , n (%)				
Missing	–	17,506 (12.2)	–	3,407 (6.5)
Northeast	–	17,220 (12.0)	–	5,288 (10.2)
North Central	–	32,043 (22.3)	–	13,761 (26.4)
South	–	58,956 (41.0)	–	23,506 (45.1)
West	–	17,807 (12.4)	–	6,045 (11.6)
Unknown	–	202 (0.1)	–	85 (0.2)
Length of look-back , years, mean (SD)	–	6.8 (3.0)	–	10.0 (1.8)
Comorbidities , n (%)				
Hyperlipidemia	42,463 (29.5)	55,498 (38.6)	15,115 (29.0)	22,277 (42.8)
Fatigue	20,589 (14.3)	25,163 (17.5)	6,968 (13.4)	8,979 (17.2)
Anxiety	21,868 (15.2)	34,732 (24.2)	5,747 (11.0)	11,973 (23.0)
Depression	20,511 (14.3)	28,936 (20.1)	5,979 (11.5)	9,943 (19.1)
Atherosclerosis	8,429 (5.9)	12,417 (8.6)	3,055 (5.9)	5,161 (9.9)
Malignancies	8,376 (5.8)	11,150 (7.8)	3,071 (5.9)	4,614 (8.9)
Fibromyalgia	7,860 (5.5)	10,286 (7.2)	2,726 (5.2)	2,778 (5.3)
Osteoporosis	2,792 (1.9)	5,010 (3.5)	1,009 (1.9)	2,056 (3.9)
Extramusculoskeletal manifestations , n (%)				
Enthesitis/tendinitis	10,439 (7.3)	10,008 (7.0)	3,934 (7.6)	3,430 (6.6)

SUPPLEMENTARY MATERIALS

	2-year continuous data (N=143,734)		8-year continuous data (N=52,092)	
	At initial back pain diagnosis ^a	At axSpA diagnosis	At initial back pain diagnosis ^a	At axSpA diagnosis
Psoriasis	1,551 (1.1)	2,407 (1.7)	489 (0.9)	857 (1.6)
Dactylitis	1,076 (0.7)	1,431 (1.0)	336 (0.6)	533 (1.0)
Crohn's Disease	805 (0.6)	1,034 (0.7)	274 (0.5)	387 (0.7)
Ulcerative colitis	804 (0.6)	1,124 (0.8)	264 (0.5)	407 (0.8)
Uveitis	623 (0.4)	1,001 (0.7)	169 (0.3)	328 (0.6)
Psoriatic arthritis	279(0.2)	1,054 (0.7)	87 (0.2)	401 (0.8)
Insurance type, n (%)				
Commercial	—	107,243 (74.6)	—	40,484 (77.7)
Medicare	—	18,985 (13.2)	—	8,201 (15.7)
Medicaid	—	17,506 (12.2)	—	3,407 (6.5)
Total time to diagnosis, years, mean (SD)	—	3.4 (2.8)	—	5.5 (3.0)

[a] Initial back pain diagnosis is defined as the time of earliest observable back pain diagnosis prior to axSpA diagnosis. axSpA: axial spondyloarthritis; N: total number of patients in each sensitivity analysis; n: number of patients in each characteristic category specified; SD: standard deviation.