

Supplementary Material:**Disease and Economic Burden Increase With Systemic Lupus Erythematosus Severity 1 Year Before and After Diagnosis: A Real-World Cohort Study, United States, 2004–2015**

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Table S1. SLE-Related Medications Required Within 6 Months Before and After the Index Date

Medication class	Code	Medication description
Azathioprine	C9436	Azathioprine, parenteral, brand name, per 100 mg
	J7500	Azathioprine, oral, 50 mg
	J7501	Azathioprine, parenteral, 100 mg
	K0119	Azathioprine - oral, tab, 50 mg
	K0120	Azathioprine - parenteral, 100 mg
Belimumab	J0490	Injection, belimumab, 10 mg
	Q2044	Injection, belimumab, 10 mg
Chloroquine	J0390	Injection, chloroquine hydrochloride, up to 250 mg
Corticosteroids	J0702	Injection, betamethasone acetate 3 mg and betamethasone sodium phosphate 3 mg
	J0704	Injection, betamethasone sodium phosphate, per 4 mg
	J0810	Injection, cortisone, up to 50 mg
	J1020	Injection, methylprednisolone acetate, 20 mg
	J1030	Injection, methylprednisolone acetate, 40 mg
	J1040	Injection, methylprednisolone acetate, 80 mg
	J1094	Injection, dexamethasone acetate, 1 mg
	J1095	Injection, dexamethasone acetate, per 8 mg
	J1100	Injection, dexamethasone sodium phosphate, 1 mg
	J1690	Injection, prednisolone tebutate, up to 20 mg
J1700	Injection, hydrocortisone acetate, up to 25 mg	

	J1710	Injection, hydrocortisone sodium phosphate, up to 50 mg
	J1720	Injection, hydrocortisone sodium succinate, up to 100 mg
	J2640	Injection, prednisolone sodium phosphate, to 20 mg
	J2650	Injection, prednisolone acetate, up to 1 ml
	J2920	Injection, methylprednisolone sodium succinate, up to 40 mg
	J2930	Injection, methylprednisolone sodium succinate, up to 125 mg
	J3300	Injection, triamcinolone acetonide, preservative free, 1 mg
	J3301	Injection, triamcinolone acetonide, not otherwise specified, 10 mg
	J3302	Injection, triamcinolone diacetate, per 5 mg
	J3303	Injection, triamcinolone hexacetonide, per 5 mg
	J7506	Prednisone, oral, per 5mg
	J7509	Methylprednisolone oral, per 4 mg
	J7510	Prednisolone oral, per 5 mg
	J7512	Prednisone, immediate release or delayed release, oral, 1 mg
	J8540	Dexamethasone, oral, 0.25 mg
	S0173	Dexamethasone, oral, 4mg
Cyclophosphamide	C9420	Cyclophosphamide, brand name, 100 mg
	C9421	Cyclophosphamide, lyophilized, brand name, 100 mg

	J8530	Cyclophosphamide; oral, 25 mg
	J9070	Cyclophosphamide, 100 mg
	J9080	Cyclophosphamide, 200 mg
	J9090	Cyclophosphamide, 500 mg
	J9091	Cyclophosphamide, 1.0 gram
	J9092	Cyclophosphamide, 2.0 gram
	J9093	Cyclophosphamide, lyophilized, 100 mg
	J9094	Cyclophosphamide, lyophilized, 200 mg
	J9095	Cyclophosphamide, lyophilized, 500 mg
	J9096	Cyclophosphamide, lyophilized, 1.0 gram
	J9097	Cyclophosphamide, lyophilized, 2.0 gram
Methotrexate	J8610	Methotrexate; oral, 2.5 mg
	J9250	Methotrexate sodium, 5 mg
	J9260	Methotrexate sodium, 50 mg
Mycophenolate mofetil	J7517	Mycophenolate mofetil, oral, 250 mg
	K0412	Mycophenolate mofetil, oral, 250 mg
Rituximab	J9310	Injection, rituximab, 100 mg

Table S2. Claims-Based Algorithm for Defining SLE Disease Severity*

Claims-based algorithm*	EMR adaptation
Mild Disease	
<ul style="list-style-type: none"> • Did not meet criteria for moderate or severe disease • Patients who died and had less than 1 month (30 days) of enrollment in the time period (follow-up, year 1, or year 2) were classified as having died with short enrollment rather than being assigned an SLE disease severity level 	<ul style="list-style-type: none"> • Did not meet criteria for moderate or severe disease
Moderate Disease	
<ul style="list-style-type: none"> • Had no filled prescriptions for cyclophosphamide or rituximab or oral corticosteroid with ≥ 60 mg/day of prednisone equivalent dose and no claims with a diagnosis of a ‘severe’ condition; AND • Met one or both of the following criteria at any time during the follow-up period: <ul style="list-style-type: none"> ○ Had ≥ 1 nonlaboratory claim with a diagnosis of a condition listed as ‘moderate’, where the 	<ul style="list-style-type: none"> • Had ≥ 1 EMR record with a diagnosis listed as ‘moderate’

diagnosis occurs in any position
on the claim; OR

- Had ≥ 1 filled prescription for an oral corticosteroid with a prednisone equivalent dose of ≥ 7.5 mg/day and < 60 mg/day or for an immunosuppressive agent (other than cyclophosphamide)
 - Moderate conditions: acute pancreatitis, chorioretinitis, demyelinating syndrome/acute inflammatory demyelinating polyradiculoneuropathy, episcleritis/scleritis, hemolytic anemia, hepatitis (nonviral), ischemic necrosis of bone, nephritis, renal impairment other than nephritis or end-stage renal disease, lupus enteritis/colitis, mononeuropathy/polyneuropathy, myelopathy, myocarditis, pericarditis, pleurisy/pleural effusion, pseudotumor cerebri, seizure, uveitis vasculitis (excluding aortitis)
 - Moderate conditions: acute pancreatitis, chorioretinitis, demyelinating syndrome/acute inflammatory demyelinating polyradiculoneuropathy, episcleritis/scleritis, hemolytic anemia, hepatitis (nonviral), ischemic necrosis of bone, nephritis, renal impairment other than nephritis or end-stage renal disease, lupus enteritis/colitis, mononeuropathy/polyneuropathy, myelopathy, myocarditis, pericarditis, pleurisy/pleural effusion, pseudotumor cerebri, seizure, uveitis vasculitis (excluding aortitis)
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Severe Disease

- Had ≥ 1 filled prescription for cyclophosphamide or rituximab or oral corticosteroid with a prednisone equivalent dose of ≥ 60 mg/day; OR
- Had ≥ 1 nonlaboratory claim with a diagnosis listed as ‘severe’, where the diagnosis occurs in any position on the claim
- Severe conditions: acute confusional state/psychosis, aortitis, arterial/venous thrombosis, aseptic meningitis, cardiac tamponade, cranial neuropathy, intestinal pseudo-obstruction, end-stage renal disease, optic neuritis, pulmonary hemorrhage, stroke/transient ischemia attack
- Had ≥ 1 EMR record with a diagnosis listed as ‘severe’
- Severe conditions: acute confusional state/psychosis, aortitis, arterial/venous thrombosis, aseptic meningitis, cardiac tamponade, cranial neuropathy, intestinal pseudo-obstruction, end-stage renal disease, optic neuritis, pulmonary hemorrhage, stroke/transient ischemia attack

EMR = electronic medical records, SLE = systemic lupus erythematosus.

*Claim-based algorithm previously published, from Garris C, Jhingran P, Bass D, et al.

Healthcare utilization and cost of systemic lupus erythematosus in a US managed care health plan. *J Med Econ* 2013;16:667-77.

Table S3. Medications Prescribed in the 1-Year Post-Diagnosis (Follow-up) Period for All Patients With Newly Diagnosed SLE and by SLE Disease Severity

Medication	All patients (N=2227)	SLE disease severity at index*			P-value
		Mild (n=586)	Moderate (n=1135)	Severe (n=506)	
Corticosteroids, n (%)	1695 (76.1)	266 (45.4)	993 (87.5)	436 (86.2)	<0.0001
Antimalarial drugs, n (%)					
Hydroxychloroquine	1330 (59.7)	373 (63.7)	696 (61.3)	261 (51.6)	<0.0001
Chloroquine	9 (0.4)	4 (0.7)	4 (0.4)	1 (0.2)	0.4545
Immunosuppressants, n (%)					
Methotrexate	327 (14.7)	55 (9.4)	197 (17.4)	75 (14.8)	<0.0001
Mycophenolate mofetil	145 (6.5)	0 (0.0)	84 (7.4)	61 (12.1)	<0.0001
Azathioprine	116 (5.2)	0 (0.0)	81 (7.1)	35 (6.9)	<0.0001
Cyclophosphamide	23 (1.0)	1 (0.2)	2 (0.2)	20 (4.0)	<0.0001
NSAIDs, n (%)	818 (36.7)	190 (32.4)	454 (40.0)	174 (34.4)	0.0039
Biologics, n (%)					
Belimumab	32 (1.4)	2 (0.3)	21 (1.9)	9 (1.8)	0.0342
Rituximab	29 (1.3)	0 (0.0)	0 (0.0)	29 (5.7)	<0.0001

NSAIDs = nonsteroidal anti-inflammatory drugs; SLE = systemic lupus erythematosus.

*Disease severity was assessed during the 1-year period after diagnosis, and patients were classified to the most severe level during that period.

Table S4. All-Cause Health Care Costs per Patient During the 1-Year Post-Diagnosis (Follow-up) Period by Setting of Care for All Patients With Newly Diagnosed SLE and by SLE Disease Severity

All-cause cost [†]	SLE disease severity*				P-value
	All patients (N=2227)	Mild (n=586)	Moderate (n=1135)	Severe (n=506)	
Total cost, mean (SD)	\$33,897 (\$54,013)	\$13,415 (\$15,707)	\$29,152 (\$40,466)	\$68,260 (\$84,713)	<0.0001
By setting, mean (SD)					
Inpatient	\$10,252 (\$30,550)	\$2379 (\$8278)	\$7544 (\$25,719)	\$25,442 (\$47,217)	<0.0001
Emergency department	\$1125 (\$4237)	\$418 (\$1320)	\$975 (\$4236)	\$2280 (\$5903)	<0.0001
Outpatient [‡]	\$13,566 (\$32,747)	\$5807 (\$9382)	\$11,496 (\$21,757)	\$27,193 (\$57,414)	<0.0001
Office	\$2029 (\$1483)	\$1388 (\$876)	\$2009 (\$1378)	\$2815 (\$1854)	<0.0001
Laboratory	\$1442 (\$2636)	\$813 (\$1287)	\$1332 (\$2151)	\$2417 (\$4108)	<0.0001
Pharmacy	\$5484 (\$10,446)	\$2609 (\$4371)	\$5797 (\$9590)	\$8113 (\$15,351)	<0.0001

SD, standard deviation; SLE, systemic lupus erythematosus.

*Disease severity was assessed during the 1-year period after diagnosis, and patients were classified to the most severe level during that period.

[†]2017 US dollars.

[‡]Outpatient services included all nonpharmacy claims not categorized as inpatient, emergency department, office, or laboratory services.