LN patients had a greater frequency of ED visits; LN patients with an encounter with a rheumatologist had fewer ED visits, whereas an encounter with a nephrologist was associated with more ED visits. Finally, cost of care was increased in lupus cohorts in the year before diagnosis and the year subsequently, and was highest in LN.

Conclusion The steadily increasing frequency of laboratory tests, emergency department visits, and cost in the year before diagnosis demonstrates the complexity of lupus diagnosis and management. At diagnosis and thereafter, there are major differences between the evaluation and management of lupus patients observed in the general care community reflected within claims databases than those set forth by professional society guidelines.

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621 RISK OF DAMAGE PROGRESSION WITH BELIMUMAB VERSUS ORAL IMMUNOSUPPRESSANT USE IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Background/Purpose Belimumab was approved for the treatment of non-renal SLE in 2011 and has been previously associated with a lower risk of damage progression when compared with prior 'usual care.' We sought to determine the risk of damage progression with belimumab versus alternative SLE immunosuppressants in a contemporary real world setting.

Methods We identified all adults with SLE (defined by ≥2 ICD codes >30 days and < 2 years apart) in a United States multi-center electronic health record (EHR) database, TriNetX. We identified all patients who initiated belimumab, azathioprine (AZA), methotrexate (MTX), or mycophenolate (MMF) between 3/2011 and 8/2021. We designed and

Abstract 621 Table 1 Baseline characteristics of belimumab and azathioprine initiators with non-renal systemic lupus erythematosus

Before overlap weighting				After overlap weighting		
	Belimumab (n=2434)	AZA (n=5644)	Std. Diff.	Belimumab	AZA	Std. Diff.
Age, years, mean (SD)	44.2 (12.6)	44.7 (14.6)	0.0377	44.3	44.3	<0.001
Female, n (%)	2322 (95.4)	5218 (92.5)	0.1236	94.8	94.8	<0.001
Race/Ethnicity, n (%)			0.2828			<0.001
White	1438 (59.1)	2603 (46.1)		54.5	54.5	
Black	587 (24.1)	1869 (33.1)		27.0	27.0	
Asian	51 (2.1)	139 (2.5)		2.3	2.3	
Hispanic	169 (6.9)	593 (10.5)		8.2	8.2	
Other	189 (7.8)	440 (7.8)		8.0	8.0	
Geographic Region, n (%)			0.4104			<0.001
East	808 (33.2)	969 (17.2)		25.4	25.4	
Midwest	300 (12.3)	1011 (17.9)		14.7	14.7	
South	915 (37.6)	2827 (50.1)		42.4	42.4	
West	411 (16.9)	837 (14.8)		17.4	17.4	
Treatment initiation year, median	2018	2017	0.4990	2018	2018	<0.001
Comorbidities, n (%)						
CKD stage ≥3	228 (9.4)	468 (8.3)	0.0379	8.5	8.5	<0.001
CVD	179 (7.4)	549 (9.7)	0.0850	8.1	8.2	<0.001
Heart Failure	59 (2.4)	246 (4.4)	0.1070	2.9	2.9	<0.001
Obesity	200 (8.2)	528 (9.4)	0.0402	8.8	8.8	<0.001
Charlson Comorbidity Index, mean (SD)	1.0 (0.8)	1.0 (0.9)	0.0375	1.0	1.0	<0.001
Tobacco use, n (%)	107 (4.4)	393 (7.0)	0.1111	5.1	5.1	<0.001
SLE Severity Index, n (%)			0.0930			<0.001
Mild	1360 (55.9)	3123 (55.3)		56.2	56.2	
Moderate	802 (32.9)	1772 (31.4)		32.2	32.2	
Severe	272 (11.2)	749 (13.3)		11.7	11.7	
SLE disease duration, n (%)			0.2354			<0.001
≤ 2 years	1435 (59.0)	3938 (69.8)		62.1	62.1	
2-4 years	472 (19.4)	830 (14.7)		18.2	18.2	
≥4 years	527 (21.7)	876 (15.5)		19.7	19.7	

Baseline SDI, n (%)			0.0985			<0.001
SDI = 0	1328 (54.6)	2856 (50.6)		53.3	53.3	
SDI = 1	564 (23.2)	1293 (22.9)		23.1	23.1	
SDI ≥ 2	542 (22.3)	1495 (26.5)		23.6	23.6	
Medication Use, n (%)						
Glucocorticoids	1561 (64.1)	3189 (56.5)	0.1564	61.2	61.2	<0.001
Hydroxychloroquine	1503 (61.8)	2875 (50.9)	0.2193	57.2	57.2	<0.001
Methotrexate	584 (24.0)	628 (11.1)	0.3431	18.0	18.0	<0.001
Mycophenolate	419 (17.2)	477 (8.5)	0.2643	13.5	13.5	<0.001
Other oral immunosuppressant	258 (10.6)	310 (5.5)	0.1886	8.3	8.3	<0.001
Rituximab	51 (2.1)	86 (1.5)	0.0429	1.9	1.9	<0.001
Cyclophosphamide	16 (0.7)	49 (0.9)	0.0242	0.7	0.7	<0.001
Healthcare Utilization						
Outpatient visits, median (IQR)	5 (9)	4 (10)	0.0751	5	4	<0.001
ER/Inpatient visits, n (%)	602 (24.7)	1699 (30.1)	0.1206	27.0	27.0	<0.001

Covariates assessed within the 12 months prior to the index date. Non-renal lupus defined by meeting SLE definition (≥2 SLE ICD codes ≥2 months and ≤2 years apart) and not meeting lupus nephritis definition (defined by ≥1 LN code (ICD-10 M32.14) or ≥2 nephritis codes (e.g., ICD-9 580–586, 791.0 or ICD-10 N00, N04–5, N17–18, R80.9) prior to the index date.
CKD, chronic kidney disease, defined by ≥1 ICD codes or GFR <60 on ≥2 occasions. CVD, cardiovascular disease; SDI, SLICC Damage Index; ER, emergency room. SLE Severity Index is adapted from Garris algorithm for administrative data, based on ICD codes and not including medication dosing. Other oral immunosuppressant use includes leflunomide, sulfasalazine, cyclosporine, tacrolimus, abatacept, tocilizumab, TNF inhibitors, IL17 inhibitors, IL12/23 inhibitors, and JAK inhibitors

Abstract 621 Table 2 Risk of SLICC damage index progression over 5-years of use, per-protocol analysis

Comparisons	Events	5-year cumulative incidence	Adjusted* Hazard Ratio (95% CI)
Intention-to-treat Analysis			
Belimumab vs. Azathioprine			
Azathioprine	2619	58.13	1.00 (ref)
Belimumab	851	55.94	0.94 (0.87–1.02)
Belimumab vs. Methotrexate			
Methotrexate	2936	54.16	1.00 (ref)
Belimumab	809	57.50	1.10 (1.01–1.19)
Belimumab vs. Mycophenolate			
Mycophenolate	3262	62.38	1.00 (ref)
Belimumab	801	54.34	0.80 (0.74–0.87)
Per-Protocol Analysis			
Belimumab vs. Azathioprine			
Azathioprine	1808	47.30	1.00(ref)
Belimumab	622	44.96	0.92 (0.82–1.03)
Belimumab vs. Methotrexate			
Methotrexate	1949	41.40	1.00(ref)
Belimumab	591	45.19	1.15 (1.03–1.29)
Belimumab vs. Mycophenolate			
Mycophenolate	2312	53.63	1.00(ref)
Belimumab	575	45.05	0.74 (0.67–0.83)

*Adjusted for adherence to treatment using inverse probability of treatment weighting.

Abstract 621 Table 3 Change in SLICC damage index at three years of use, per-protocol analysis

Comparisons	Number of Initiators with ≥ 3 Years Follow-up	Change in SDI at 3 Years (95% CI)	Difference (95% CI)	P value
Intention-to-treat Analysis				
Belimumab vs. Azathioprine				
Azathioprine	3250	1.00 (0.94, 1.05)	Ref	<0.01
Belimumab	1040	0.87 (0.79, 0.94)	-0.13 (-0.21, -0.05)	
Belimumab vs. Methotrexate				
Methotrexate	4081	0.85 (0.81, 0.89)	Ref	0.21
Belimumab	962	0.90 (0.82, 0.98)	0.05 (-0.03, 0.12)	
Belimumab vs. Mycophenolate				
Mycophenolate	3602	1.10 (1.05, 1.16)	Ref	<0.01
Belimumab	982	0.85 (0.77, 0.93)	-0.25 (-0.34 -0.17)	
Per-Protocol Analysis				
Azathioprine	662	0.94 (0.84, 1.05)	Ref	0.31
Belimumab	326	0.86 (0.72, 0.99)	-0.09 (-0.26, 0.08)	
Belimumab vs. Methotrexate				
Methotrexate	927	0.77 (0.69, 0.85)	Ref	0.26
Belimumab	309	0.85 (0.72, 0.98)	0.08 (-0.06, 0.22)	
Belimumab vs. Mycophenolate				
Mycophenolate	857	1.31 (1.19, 1.43)	Ref	<0.01
Belimumab	301	0.85 (0.70, 0.99)	-0.47 (-0.64,-0.29)	

emulated a pragmatic target trial to compare the risk of damage progression with initiation of belimumab vs. AZA, belimumab vs. MTX, and belimumab vs MMF. For each comparison, eligible patients had never used the direct comparator but could have used other immunosuppressants and did not have lupus nephritis prior to the index date of treatment initiation. To emulate randomization, we used propensity score overlap weighting to balance baseline covariates, including demographics, geographic region, treatment initiation year, comorbidities including CKD, congestive heart failure, obesity, cardiovascular disease, the Charlson comorbidity index, tobacco use, SLE severity index (Garris C. *J Med Econ* 2013), SLE disease duration, baseline SLICC damage index score (categorized as 0, 1, or ≥2), medication use including glucocorticoids, hydroxychloroquine, and other immunosuppressants, and healthcare utilization. We assessed the outcome of damage progression defined by an increase in the SLICC damage index (SDI), which was adapted to administrative data using ICD codes. We conducted an intention-to-treat analysis and a per-protocol analysis using pooled logistic regression where we adjusted for adherence to assigned treatment with inverse probability of treatment weighting. We also assessed the mean change in the SDI at three years among patients with ≥3 years of follow-up using linear regression.

Results We compared 2,434 and 5,644 initiators of belimumab and AZA, (**table 1**), 2,163 and 7,224 initiators of belimumab and MTX, and 2,431 and 6,350 initiators of belimumab and MMF, respectively. In each comparison, covariates were balanced after propensity score overlap weighting. 95% were female; the mean age was 44 years. 53% had a baseline SDI of zero. After 5 years, over 41% in each treatment group developed ≥1 new damage item on the SDI. The risk of damage progression was lower with belimumab than mycophenolate (HR 0.74 [95% CI 0.67–0.83]; **table 2**), but there was no difference in the risk of damage progression between belimumab and AZA or belimumab and MTX. Similarly, belimumab was associated with a lower 3-year change in SDI when compared with MMF, but there was no difference when compared with AZA and MTX (**table 3**).

Conclusion In this real world EHR-based SLE cohort, after accounting for baseline covariates associated with the risk of organ damage, belimumab was associated with a lower risk of damage progression than MMF but not AZA or MTX use. Limitations include the use of administrative claims to identify components of the SDI.

622 PERFORMANCE CHARACTERISTICS OF SYSTEMIC LUPUS ERYTHEMATOSUS AND LUPUS NEPHRITIS ELECTRONIC PHENOTYPE ALGORITHMS AMONG MEDICARE PATIENTS IN A WELL-DEFINED SOUTH CAROLINA COHORT

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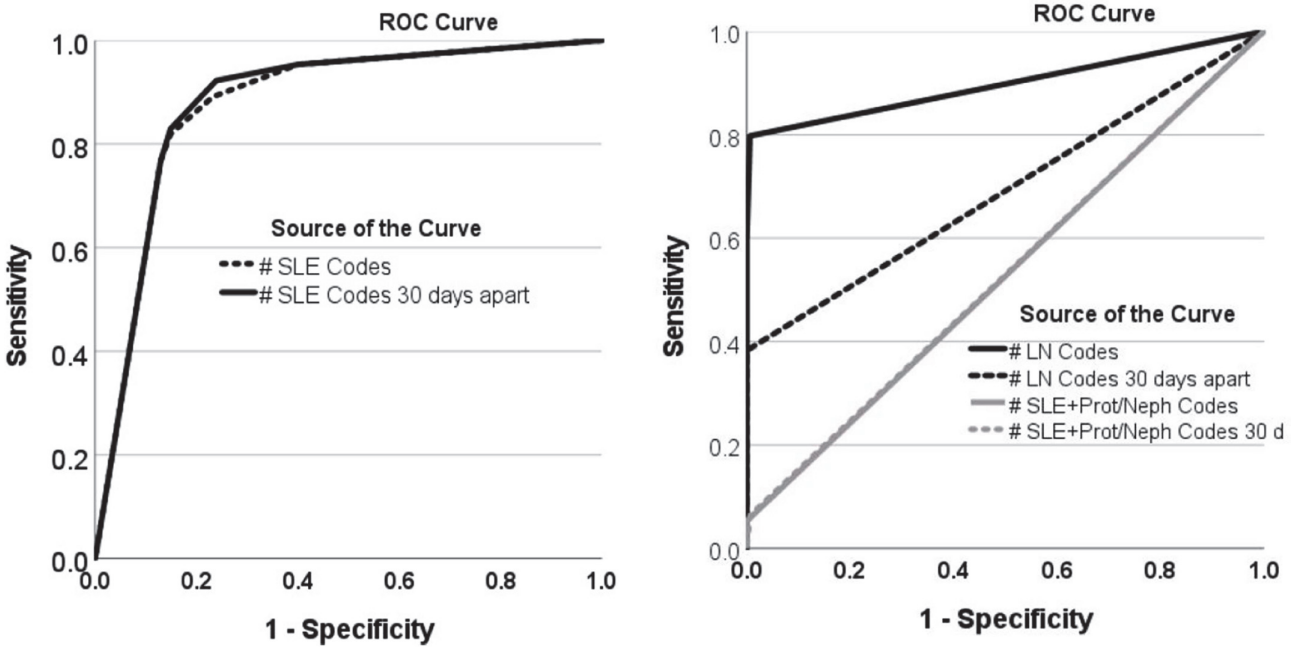
Introduction To investigate health disparities in SLE, geographic variables must be considered in predicting outcomes of patients with systemic lupus erythematosus (SLE). The Lupus Index is a GIS-based data set was developed by the Lupus Research Alliance in collaboration with the Center for Medicare Services and the National Minority Quality Forum. This database includes diagnosis codes, geographic, demographic, and provider specialty information, and outcomes from fee for service Medicare patients in the years 2014–2016. Mortality, prevalence, hospital and emergency room visit rates, and cost of care outcomes can be exported at



Abstract 622 Figure 1 ROC AUC for algorithm performance in classifying SLE and LN. A) Curves represent algorithms using only the number of SLE M32.* codes (dashed) and the number of codes 30 days apart (solid). Note slight differences in sensitivity and specificity with 2 code algorithms. B) LN algorithm performance for number of LN codes (solid black), # of LN codes 30 days apart (dashed black), # of SLE and proteinuria or nephritis codes (solid gray), and # of SLE and proteinuria or nephritis codes at least 30 days apart (superimposed dashed gray).