

# Why do lupus patients go to the Emergency Department in the United States?

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**Background:** Patients with systemic lupus erythematosus (SLE) are often seen in the Emergency Department (ED) and hospitalized for complications of their disease. While there are several studies on reasons for hospitalization in SLE patients, there is little information on epidemiology, causes or economics of ED visits in these patients.

**Methods:** The US Nationwide Emergency Department Sample (NEDS) is a stratified random sample of all ED visits in community hospitals in the US. It contains almost 28 million records annually for ED visits from over 980 hospitals that can be weighted to produce reliable national estimates of the 125 million annual ED visits. We recognized SLE ED visits using International Classification of Diseases (ICD-9) code 710.0. CDC's Clinical classification software (CCS) diagnoses of consultation and hospitalization were identified. Comorbidities were analyzed through ICD-9 codes. SLE ED visits were compared with ED visits from other causes in the general population.

**Results:** A total of 81,378 ED visits in SLE patients were identified in 2008. 91.2% of lupus ED visits were in women, with a mean age 40.2 years (Table 1). SLE patients had more hypertension and chronic renal failure (23.2% vs 15.7% and 9.1 % vs 2.1%) and smoked more (11.1% vs 8.8%). They were hospitalized significantly more often than general ED population (34.2% vs 16.8%) and males were hospitalized more often than females with lupus (42.99% vs 33.83%,  $p < 0.0001$ ). However, mortality at ED or after hospitalization was lower than the general population (0.25% vs 0.61%). Main CCS diagnoses at ED visit are shown in table 2, stratified by age and gender. 25.1% of SLE patients ( $n = 20391$ ) went to ED because of the disease itself and this was also the principal cause of hospitalization (36.6% of hospitalizations). Non specific chest pain, headache, infections (pneumonia, skin or urinary) and musculoskeletal complains followed as other diagnoses. Cardiovascular events were only seen in older lupus patients. Sick cell anemia appeared in association with lupus in male children. Costs per ED visit were higher for SLE patients (1864.9 vs 1674.8 US dollars) (table 1).

**Conclusions:** ED visits in SLE patients resulted in hospitalization in a high proportion. SLE itself was the main diagnosis at ED visits and admissions.

Table 1. Patients' characteristics

	Lupus patients	Non lupus patients
Total number of visits, n	81378	124863886
Mean age, years	40.2 (CI 95% 39.8-40.7)	38.3 (CI 95% 37.8 -38.9)
Female, n (%)	74244 (91.2%)	68554644 (54.9%)

<b>Comorbidities</b>		
<b>Hypertension, n (%)</b>	18863 (23.18%) (CI 95% 21.02-25.33)	19640951 (15.73%) (CI 95% 14.91-16.55)
<b>Diabetes, n (%)</b>	6193 (7.61%) (CI 95% 6.76-8.46)	10917997 (8.74%) (CI 95% 8.29-9.19)
<b>Dyslipidemia, n (%)</b>	4616 (5.67%) (CI 95% 5.05-6.3)	7738400 (6.2%) (CI 95% 5.81-6.58)
<b>Smoking, n (%)</b>	8997 (11.06%) (CI 95% 9.91-12.2)	11025395 (8.83%) (CI 95% 8.08-9.58)
<b>COPD, n (%)</b>	2077 (2.55%) (CI 95% 2.19-2.91)	4667468 (3.74%) (CI 95% 3.54-3.94)
<b>CRF, n (%)</b>	7434 (9.14%) (CI 95% 8.03-10.24)	2554895 (2.05%) (CI 95% 1.92-2.17)
<b>Hospitalization, n (%)</b>	28182 (34.22%)	21016909 (16.83%)
<b>Female, n (% of total F)</b>	25115 (33.83%F)	11211011 (16.35% F)
<b>Male, n (% of total M)</b>	3067 (42.99%M)	9805898 (17,42% M)
<b>Mortality</b>	202 (0.25%)	756851 (0.61%)
<b>Female, n (% of total F)</b>	189 (0.26% F)	358629 (0.53% F)
<b>Male, n (% of total M)</b>	13 (0.18% M)	398064 (0.71%M)
<b>Total ED visits cost, US dollars</b>	117529976 (CI 95% 105494592-129565359)	171554271390 (CI 95% 159802715755 - 183305827025)
<b>Average cost per ED visit, US dollars</b>	1864.9 (CI 95% 1760.3-1969.5)	1674.82 (CI 95% 1608.1 - 1741.6)
<b>Payment source</b>		
<b>Medicare, n (%)</b>	17906 (22.05%)	25463357 (20.49%)
<b>Medicaid, n (%)</b>	21553 (26.54%)	27680568 (22.28%)
<b>Private, n (%)</b>	28741 (35.39%)	43317150 (34.86%)
<b>Others, n (%)</b>	13012 (16.02%)	27799407 (22.37%)

COPD: Chronic obstructive pulmonary disease, CRF: Chronic renal failure

Table 2. Primary 10 lupus patients' CCS diagnosis of ED consultation in 2008 stratified by age and gender

	FEMALES (n=74244)				MALES (n=7134)			
	0-17 y (n=2233)	18-40 y (n=35673)	41-64 y (n=32002)	+65 y (n=4336)	0-17 y (n=465)	18-40 y (n=3184)	41-64 y (n=2949)	+65 y (n=536)
1	Lupus (43.6%)	Lupus (29.7%)	Lupus (19.1%)	Lupus (16.4%)	Lupus (47.9%)	Lupus (34.1%)	Lupus (19.5%)	Lupus (20.3%)
2	Non Specific Chest Pain (4.7%)	Headache (4.6%)	Non Specific Chest Pain (6.8%)	Non Specific Chest Pain (4.5%)	Epilepsy, convulsions (4.1%)	Non Specific Chest Pain (4.5%)	Non Specific Chest Pain (5.5%)	Pneumonia (7.3%)
3	Headache	Non Specific Chest	Headache (4.4%)	Pneumonia (3.3%)	Fever of unknown origin	Non traumatic joint	Skin and subcutaneous tissue	Non Specific Chest Pain

	(4.2%)	<b>Pain</b> (4.3%)			(4.1%)	<b>disorders</b> (3.6%)	<b>infection</b> (3.2%)	(5.8%)
4	<b>Other connective tissue diseases</b> (2.02%)	<b>Abdominal pain</b> (4.1%)	<b>Other connective tissue diseases</b> (3.5%)	<b>COPD and bronchiectasis</b> (2.8%)	<b>Skin and subcutaneous tissue infection</b> (3.4%)	<b>Other connective tissue diseases</b> (2.98%)	<b>Other connective tissue diseases</b> (2.95%)	<b>Back problems</b> (4.5%)
5	<b>Superficial injury, contusion</b> (1.8%)	<b>Other connective tissue diseases</b> (3.3%)	<b>Abdominal pain</b> (3.02%)	<b>Urinary tract infection</b> (2.5%)	<b>Sickle cell anemia</b> (3.4%)	<b>Back problems</b> (2.9%)	<b>Abdominal pain</b> (2.9%)	<b>Other connective tissue diseases</b> (3.7%)
6	<b>Urinary tract infection</b> (1.8%)	<b>Urinary tract infection</b> (2.8%)	<b>Back problem</b> (2.8%)	<b>Cardiac dysrhythmias</b> (2.3%)	<b>Other skin disorders</b> (3.01%)	<b>Abdominal pain</b> (2.7%)	<b>Pneumonia</b> (2.7%)	<b>Cardiac dysrhythmias</b> (3.2%)
7	<b>Skin and subcutaneous tissue infection</b> (1.7%)	<b>Non traumatic joint disorders</b> (2.5%)	<b>Skin and subcutaneous tissue infection</b> (2.8%)	<b>Superficial injury, contusion</b> (2.3%)	<b>Pneumonia</b> (2.8%)	<b>Skin and subcutaneous tissue infection</b> (2.3%)	<b>Non traumatic joint disorders</b> (2.6%)	<b>Coronary atherosclerosis and other heart disease</b> (2.8%)
8	<b>Essential hypertension</b> (1.7%)	<b>Skin and subcutaneous tissue infection</b> (2.4%)	<b>Non traumatic joint disorders</b> (2.3%)	<b>Fracture of upper limb</b> (2.03%)	<b>Abdominal pain</b> (2.4%)	<b>Pneumonia</b> (2.1%)	<b>Other nervous system disorders</b> (2.6%)	<b>Acute myocardial infarction</b> (2.4%)
9	<b>Other lower respiratory diseases</b> (1.7%)	<b>Sprains and strains</b> (1.9%)	<b>Sprains and strains</b> (2.2%)	<b>Back problems</b> (1.9%)	<b>Sprains and strains</b> (2.4%)	<b>Epilepsy, convulsion</b> (2.1%)	<b>Back problems</b> (2.3%)	<b>Transient cerebral ischemia</b> (2.2%)
10	<b>Fever of unknown origin</b> (1.2%)	<b>Back problems</b> (1.9%)	<b>Urinary tract infection</b> (2.1%)	<b>Abdominal pain</b> (1.9%)	--- (less than 10 patients)	<b>Residual codes, unclassified</b> (2.1%)	<b>Mood disorders</b> (2.2%)	<b>Abdominal pain</b> (2.2%)