Healthcare Resource Utilization and Costs in Patients with Itch-Dominant Moderate-to-Severe Atopic Dermatitis Treated in Private Dermatology Facilities in the United States

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Background

- Atopic dermatitis (AD) is a chronic skin condition characterized by persistent itching and skin lesions of varying severity.
- Combined lesion and itch severity assessment can provide a more comprehensive view of disease burden and clinical phenotype.[1]
- Itch-dominant AD is characterized by intense itch despite relatively less severe skin lesions.
- Healthcare resource utilization (HCRU) and associated costs for itch-dominant and other AD phenotypes is not well documented.

Objectives

- Characterize patients with moderate-to-severe AD by combined itch and lesion severity.
- Assess relative HCRU and costs in patients with itch-dominant AD.

Methods

- A retrospective analysis (January 2022-May 2024) of electronic health records and linked claims of patients with AD (L20.xx, ICD-10-CM) from specialty dermatology facilities in the US-based OMNY Health platform was performed.
- Patients were indexed at the first encounter in EHR or claims designated as moderate or severe AD, defined as the initiation of phototherapy, mid/high potency topicals, or systemic treatment for AD.[2]
- Patients were selected if they were ages ≥ 12 years, had ≥ 12 months of pre-index data, and had an Investigator's Global Assessment (IGA; range 0-4) and Itch Numerical Rating Scale (NRS; range: 0-10) measurement from 1 month before to 1 week after the index date.
- Documented itch and lesion severity at index encounter were dichotomized as follows:
  - Mild-moderate itch (MI; NRS: 0-6) or severe itch (SI; NRS: 7-10)
  - Mild-moderate lesions (ML; IGA: 0-3) or severe lesions (SL; IGA: 4)
- Patients were categorized into the following combined itch and lesion severity groups: MI-ML, MI-SL, SI-ML, SI-SL.
- The following outcome variables were annualized over a 12-month follow-up period:
  - Number of hospitalizations, emergency visits, and outpatient visits.
  - Charges associated with each healthcare resource and pharmacy.
- Multinomial propensity score weighting was applied to estimate and compare adjusted annualized 12-month outcomes across phenotypes.[3]

Results

- Of 256,386 patients with moderate or severe AD from specialty dermatology facilities with linked claims:
  - 92,109 patients met age and pre-index data criteria.
  - 9,096 patients had both IGA and Itch NRS data associated with the index encounter, comprising the study population.
- The distribution of combined lesion and itch severity was as follows: 62% MI-ML, 2% MI-SL, 26% SI-ML, 10% SI-SL (Figure 1).
- Patient demographic, medical history, and treatment history characteristics are presented in Table 1. Patients with SI-ML had the following characteristics compared to other phenotype groups:
  - Older and more likely to be female and publicly insured (along with SI-SL).
  - Greater overall comorbidity burden and greater prevalence of depression/anxiety and type 2 diabetes.
  - Most likely to have experience with topical corticosteroids, opioids/analgesics, and sleep aids.
- Adjusted mean annualized number of visits for each resource is summarized in Figure 2.
  - HCRU for hospitalizations and emergency visits was similar across lesion and itch severity groups.
  - Patients with SI-SL had a slightly greater mean number of outpatient visits.
- Adjusted mean annualized charges associated with HCRU are presented in Figure 3.
  - Patients with SI-ML had the highest mean hospitalization charges and the second highest mean emergency and outpatient charges.
  - Concurrently, patients with SI-ML exhibited the lowest mean pharmacy charges.

Conclusions

- Results suggest a complex relationship between AD clinical phenotype and healthcare charges.
- Patients with itch-dominant phenotype appear to have significant need for high-cost healthcare; however, they appear not to access the same prescriptions and pharmacy resources as other clinical phenotypes.
- Future research would need to further investigate the role of AD clinical phenotypes in HCRU and their contribution to the overall economic burden of AD

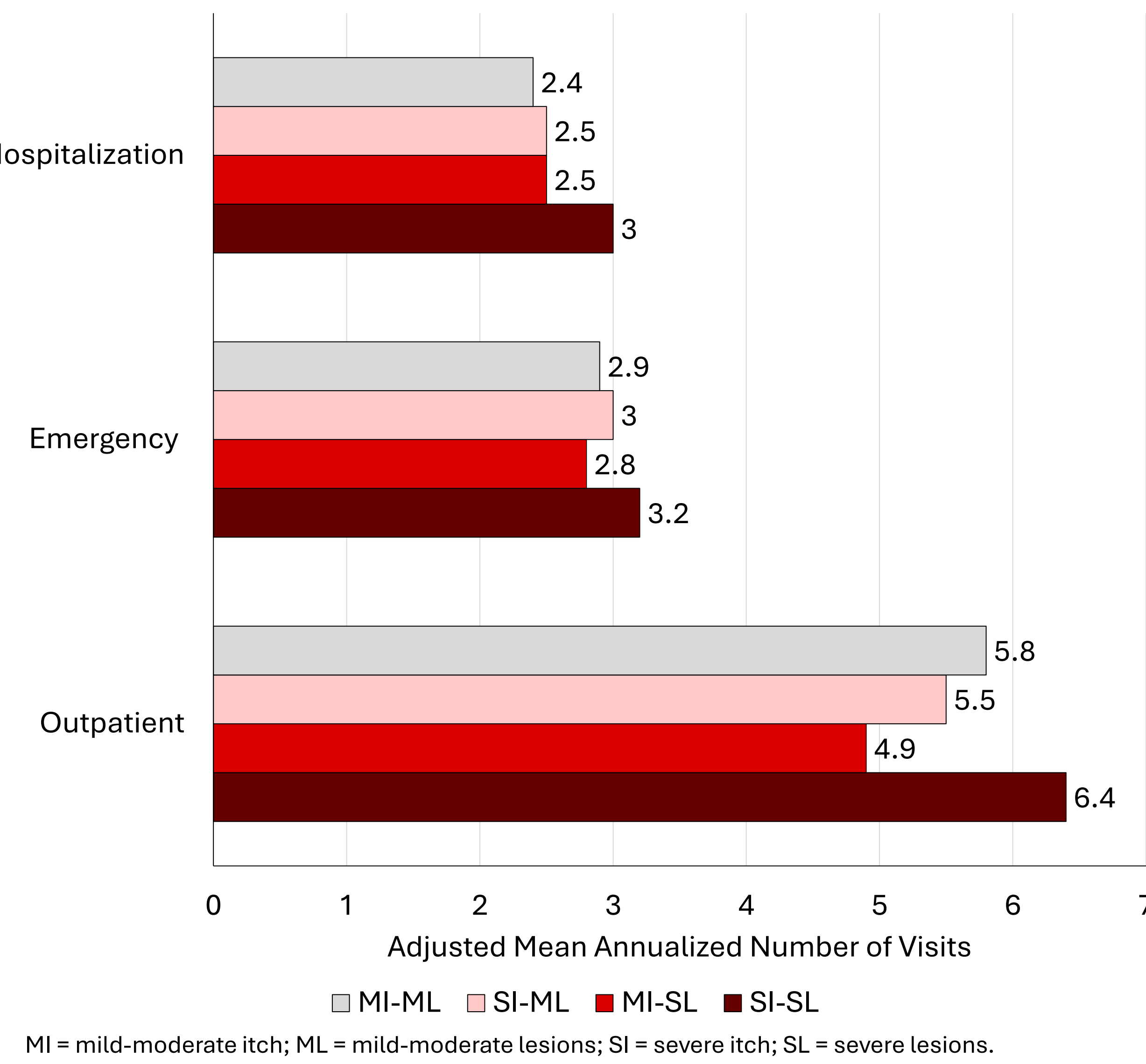**Figure 1.** Distribution of Combined Itch and Lesion Severity

MI-ML (62%) | SI-ML (26%) | SI-SL (10%) | MI-SL (2%)
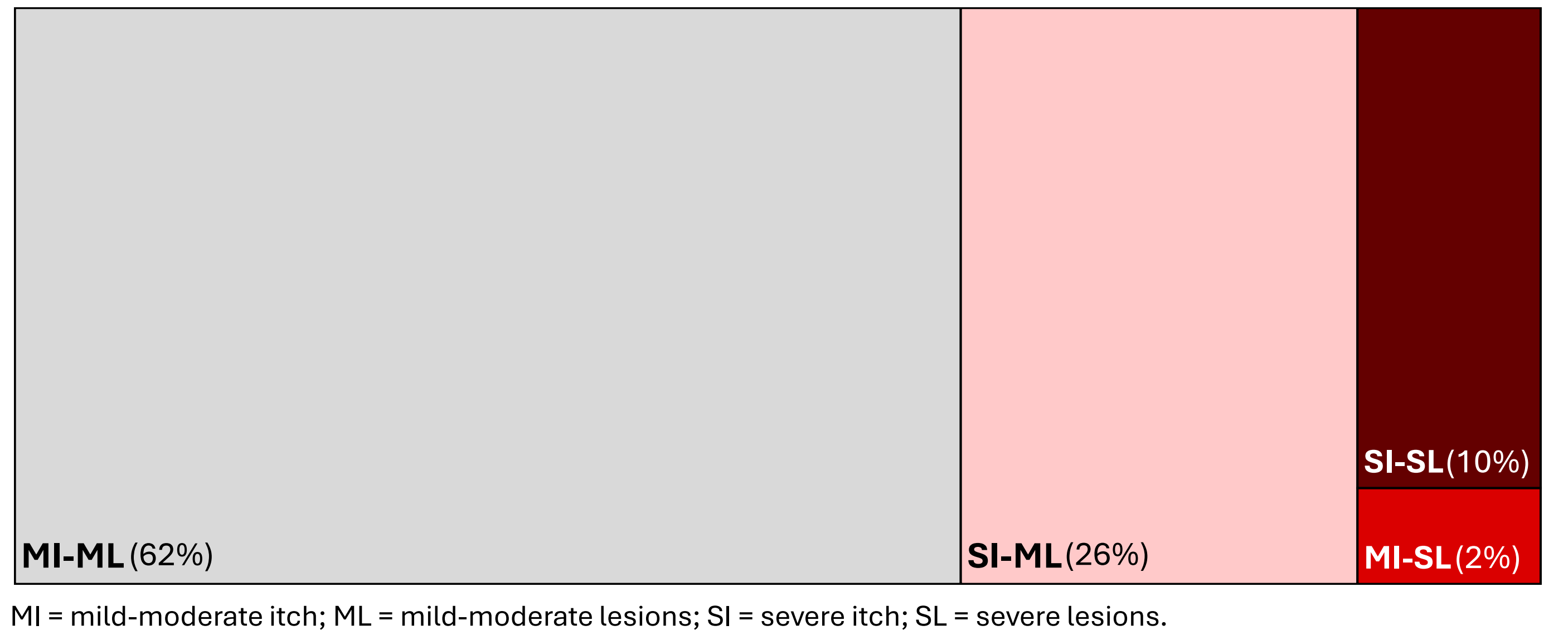
MI = mild-moderate itch; ML = mild-moderate lesions; SI = severe itch; SL = severe lesions.

Table 1. Patient Characteristics at Index Encounter

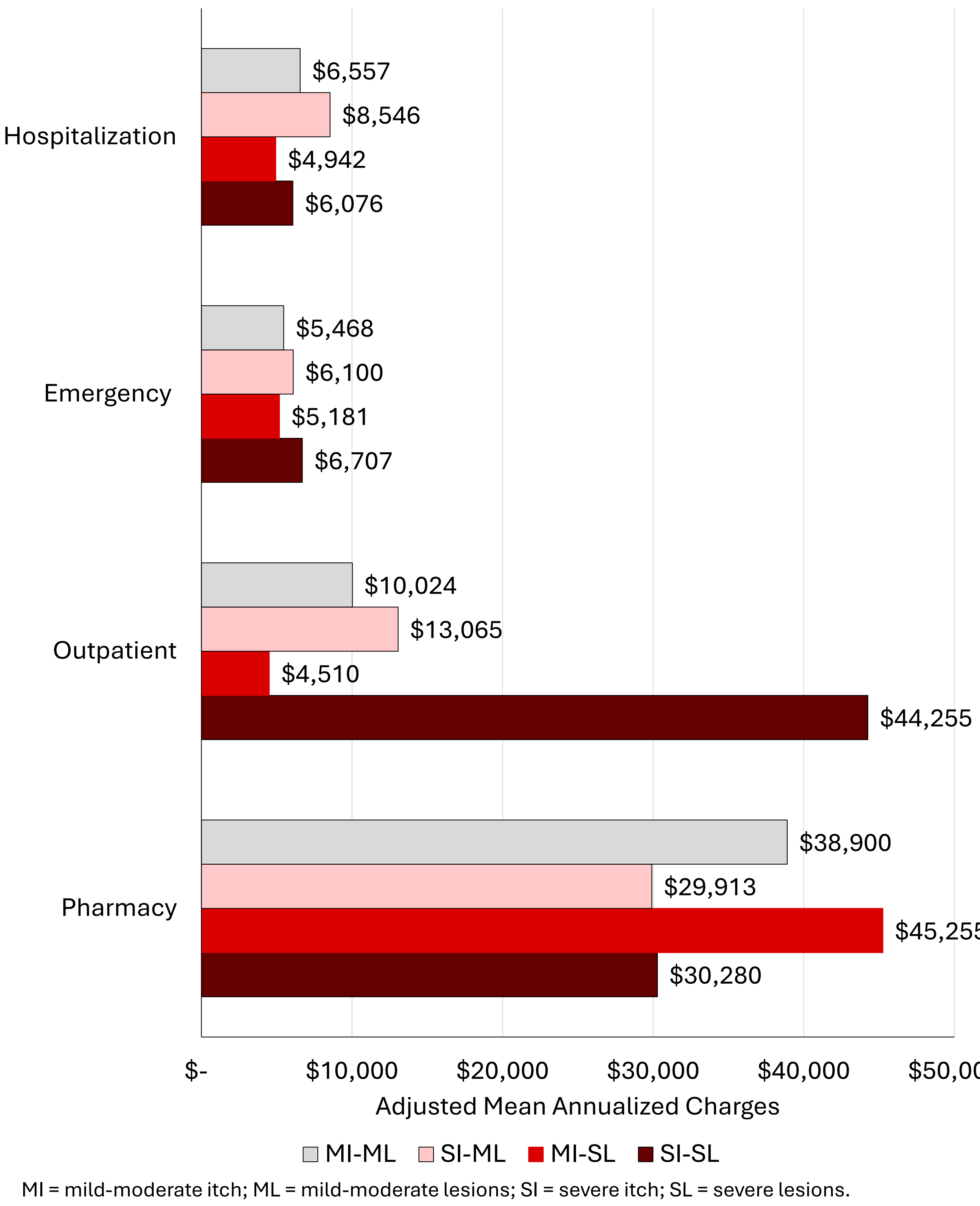| Characteristic	MI-ML N = 5626	SI-ML N = 2337	MI-SL N = 204	SI-SL N = 929
Demographics				
Female, n (%)	3509 (62.7%)	1513 (65.0%)	114 (56.4%)	520 (56.2%)
Age in years, mean (SD)	53.5 (21.6)	54.1 (21.9)	47.8 (20.5)	50.4 (22.7)
Non-White, n/N (%)	313/1986 (15.8%)	155/729 (21.3%)	23/61 (37.7%)	96/303 (31.7%)
Index year, n (%)				
2022	816 (14.5%)	317 (13.6%)	45 (22.1%)	201 (21.6%)
2023	3012 (53.5%)	1216 (52.0%)	111 (54.4%)	483 (52.0%)
2024	1798 (32.0%)	804 (34.4%)	48 (23.5%)	245 (26.4%)
Medicare/Medicaid, n/N (%)	2762/5602 (49.3%)	1243/2323 (53.5%)	97/203 (47.8%)	498/923 (54.0%)
Medical History				
Contact dermatitis, n (%)	1291 (22.9%)	605 (25.9%)	46 (22.5%)	248 (26.7%)
Prurigo nodularis, n (%)	100 (1.8%)	33 (1.4%)	6 (2.9%)	21 (2.3%)
Allergic rhinitis, n (%)	1545 (27.5%)	689 (29.5%)	49 (24.0%)	298 (32.1%)
Asthma, n (%)	1058 (18.8%)	481 (20.6%)	51 (25.0%)	242 (26.0%)
Crohn's disease or UC, n (%)	116 (2.1%)	46 (2.0%)	6 (2.9%)	23 (2.5%)
Rheumatoid arthritis, n (%)	233 (4.1%)	117 (5.0%)	11 (5.4%)	46 (5.0%)
Chronic sinusitis, n (%)	588 (10.5%)	251 (10.7%)	11 (5.4%)	107 (11.5%)
Depression or anxiety, n (%)	2117 (37.6%)	973 (41.6%)	70 (34.3%)	373 (40.2%)
Sleep disorders, n (%)	1619 (28.8%)	706 (30.2%)	64 (31.4%)	275 (29.6%)
Chronic pulmonary disease, n (%)	1605 (28.5%)	770 (32.9%)	67 (32.8%)	337 (36.3%)
Type 2 Diabetes, n (%)	1023 (18.2%)	481 (20.6%)	35 (17.2%)	174 (18.7%)
CCI, mean (SD)	3.3 (3.7)	3.6 (3.8)	2.7 (3.2)	3.3 (3.6)
CCI, n (%)				
0	1463 (26.0%)	550 (23.5%)	64 (31.4%)	234 (25.2%)
1 to 2	1524 (27.1%)	635 (27.2%)	58 (28.4%)	278 (29.9%)
3 to 4	1059 (18.8%)	423 (18.1%)	34 (16.7%)	158 (17.0%)
≥ 5	1580 (28.1%)	729 (31.2%)	48 (23.5%)	259 (27.9%)
Treatment History				
Phototherapy, n (%)	14 (0.2%)	10 (0.4%)	3 (1.5%)	15 (1.6%)
TCS, n (%)	5292 (94.1%)	2228 (95.3%)	185 (90.7%)	869 (93.5%)
TCI, n (%)	1190 (21.2%)	720 (30.8%)	82 (40.2%)	358 (38.5%)
Topical PDE-4I, n (%)	345 (6.1%)	158 (6.8%)	25 (12.3%)	110 (11.8%)
SCS, n (%)	3415 (60.7%)	1553 (66.5%)	145 (71.1%)	668 (71.9%)
SIS, n (%)	1067 (19.0%)	623 (26.7%)	69 (33.8%)	404 (43.5%)
Hydroxyzine, n (%)	687 (12.2%)	490 (21.0%)	39 (19.1%)	267 (28.7%)
Biologics, n (%)	427 (7.6%)	330 (14.1%)	41 (20.1%)	278 (29.9%)
JAK inhibitors, n (%)	514 (9.1%)	233 (10.0%)	26 (12.7%)	130 (14.0%)
Opioids/analgesics, n (%)	2183 (38.8%)	987 (42.2%)	82 (40.2%)	328 (35.3%)
Sleep aids, n (%)	485 (8.6%)	232 (9.9%)	12 (5.9%)	68 (7.3%)

CCI = Charlson comorbidity index; JAK = janus kinase; MI = mild-moderate itch; ML = mild-moderate lesions; n = numerator (number of patients with the characteristic); N = denominator (number of patients with available data); PDE-4I = phosphodiesterase-4 inhibitors; SCS = systemic corticosteroids; SD = standard deviation; SI = severe itch; SIS = systemic immunomodulators; SL = severe lesions; TCI = topical calcineurin inhibitors; TCS = topical corticosteroids; UC = ulcerative colitis.

Figure 2. Healthcare Resource Utilization by Combined Itch and Lesion Severity

Hospitalization: MI-ML 2.4; SI-ML 2.5; MI-SL 2.5; SI-SL 3
Emergency: MI-ML 2.9; SI-ML 3; MI-SL 2.8; SI-SL 3.2
Outpatient: MI-ML 5.8; SI-ML 5.5; MI-SL 4.9; SI-SL 6.4

Adjusted Mean Annualized Number of Visits

☐ MI-ML ☐ SI-ML ◼ MI-SL ◼ SI-SL

MI = mild-moderate itch; ML = mild-moderate lesions; SI = severe itch; SL = severe lesions.

Figure 3. Associated Charges by Combined Itch and Lesion Severity

Hospitalization: MI-ML $6,557; SI-ML $8,546; MI-SL $4,942; SI-SL $6,076
Emergency: MI-ML $5,468; SI-ML $6,100; MI-SL $5,181; SI-SL $6,707
Outpatient: MI-ML $10,024; SI-ML $13,065; MI-SL $4,510; SI-SL $44,255
Pharmacy: MI-ML $38,900; SI-ML $29,913; MI-SL $45,255; SI-SL $30,280

Adjusted Mean Annualized Charges

☐ MI-ML ☐ SI-ML ◼ MI-SL ◼ SI-SL

MI = mild-moderate itch; ML = mild-moderate lesions; SI = severe itch; SL = severe lesions.