**Supplemental Material**.

**Supplementary Table S1.** Hospital International Classification of Disease Adaptation (HICDA), International Classification of Diseases (ICD)-9 and ICD-10 codes, and laboratories used to screen for cutaneous and systemic lupus erythematosus cases in the Rochester Epidemiology Project from 1976 to 2018.

|  |  |
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| **HICDA CODE** | **CODE DESCRIPTION** |
| 07161110 | LUPUS, NEPHRITIS |
| 07161111 | LUPUS, GLOMERULONEPHRITIS |
| 07161112 | LUPUS, GLOMERULITIS |
| 07161113 | LUPUS, RENAL INVOLVEMENT |
| 07161114 | LUPUS, NEPHROPATHY |
| 07161115 | NEPHRITIS, LUPUS |
| 07161116 | GLOMERULONEPHRITIS, LUPUS |
| 07161117 | NEPHROPATHY, LUPUS |
| 07161120 | LUPUS, ERYTHEMATOSUS, DISSEMINATED |
| 07161121 | LUPUS, ERYTHEMATOSUS, SYSTEMIC |
| 07161122 | LUPUS, NOS (DISSEMINATED) |
| 07161123 | SYNDROME, ROWELL, (RAULL'S) (ROULL'S) |
| 07161130 | LUPUS, ERYTHEMATOSUS, DISSEMINATED, DRUG-INDUCED |
| 07161131 | LUPUS, ERYTHEMATOSUS, SYSTEMIC, DRUG-INDUCED |
| 07161210 | DISEASE, LIBMAN-SACKS |
| 07161250 | LUPUS, CEREBRITIS |
| 07161252 | LUPUS, ERYTHEMATOSUS WITH CNS INVOLVEMENT |
|  |  |
| 06954110 | LUPUS, ERYTHEMATOSUS |
| 06954111 | LUPUS, NOS (NONTUBERCULOUS, NOT DISSEMINATED) |
| 06954210 | LUPUS, DISCOID, ERYTHEMATOSUS |
| 06954211 | LUPUS, DISCOID |
| 06954220 | LUPUS, DISCOID, EYELID |
| 07161140 | LUPUS, PANNICULITIS |
| 07161141 | PANNICULITIS, LUPUS |
| 07748213 | CHILBLAIN, HUTCHINSON'S (LUPUS) |
| 07748210 | PERNIO |
| 07748212 | CHILBLAIN, NOS |
|   |   |
| 02865130 | SYNDROME, ANTI PHOSPHOLIPID ANTIBODY (CREATED 1988) |
|  |  |
| 07169110 | DISEASE, COLLAGEN (CONNECTIVE TISSUE#) |
| 07169111 | DISORDER, CONNECTIVE TISSUE |
| 07169112 | DISEASE, CONNECTIVE TISSUE, NOS |
| 07169114 | DISORDER, AUTO-IMMUNE (CONNECTIVE TISSUE#), SEE ALSO DISEASE |
| 07169115 | REACTION, AUTO-IMMUNE |
| 07169116 | INFLAMMATION, CONNECTIVE TISSUE, NEC |
| 07169120 | DISEASE, CONNECTIVE TISSUE, MIXED |
| 07169250 | SYNDROME, OVERLAP (CONNECTIVE TISSUE) |
|  |  |
| 02865112 | LUPUS, ANTI-INHIBITOR/ANTICOAGULANTS |
| 02865110 | CIRCULATING ANTICOAGULANT |
| 02865111 | ANTICOAGULANTS, CIRCULATING |
| 34727210 | ABNORMAL, SEROLOGY FOR SYPHILIS, FALSE POSITIVE |
| 34727211 | ABNORMAL, RPR, FALSE POSITIVE |
| 34728115 | SYNDROME, ANTICARDIOLIPIN |
|  |  |
| 34729211 | HYPOCOMPLEMENTEMIA |
| 34729210 | ABNORMAL, COMPLEMENT (CH)(C)(CH50)(C4) |
|  |  |
| 34728111 | ANTIBODY-ANTIGEN REACTIONS (ANTINUCLEAR ANTIBODIES) |
| 34728118 | ABNORMAL, DNA (INCLUDES ANTI DSDNA) |
|  |  |
| 34728220 | TEST, COOMBS' (POSITIVE) |
|  |  |
| **ICD-9 CODE** | **CODE DESCRIPTIONS** |
| 710.0 | SYSTEMIC LUPUS ERYTHEMATOSUS (INCLUDES NEPHROTIC INVOLVEMENT, LIBMAN-SACKS DISEASE) |
|  |  |
| 695.4 | LUPUS ERYTHEMATOSUS |
| 373.34 | DISCOID LUPUS ERYTHEMATOSUS OF EYELID |
| 991.5 | CHILBLAIN |
|  |  |
| 710.8 | OTHER SPECIFIED DIFFUSE DISEASES OF CONNECTIVE TISSUE |
| 710.9 | UNSPECIFIED DIFFUSE CONNECTIVE TISSUE DISEASE |
|  |  |
| **ICD-10 CODE** | **CODE DESCRIPTION**  |
| M32.0 | DRUG-INDUCED SYSTEMIC LUPUS ERYTHEMATOSUS |
| M32.10 | SYSTEMIC LUPUS ERYTHEMATOSUS, ORGAN OR SYSTEM INVOLVEMENT UNSPECIFIED |
| M32.11 | ENDOCARDITIS IN SYSTEMIC LUPUS ERYTHEMATOSUS |
| M32.12 | PERICARDITIS IN SYSTEMIC LUPUS ERYTHEMATOSUS |
| M32.13 | LUNG INVOLVEMENT IN SYSTEMIC LUPUS ERYTHEMATOSUS |
| M32.14 | GLOMERULAR DISEASE IN SYSTEMIC LUPUS ERYTHEMATOSUS |
| M32.15 | TUBULO-INTERSTITIAL NEPHROPATHY IN SYSTEMIC LUPUS ERYTHEMATOSUS |
| M32.19 | OTHER ORGAN OR SYSTEM INVOLVEMENT IN SYSTEMIC LUPUS ERYTHEMATOSUS |
| M32.8 | OTHER FORMS OF SYSTEMIC LUPUS ERYTHEMATOSUS |
| M32.9 | SYSTEMIC LUPUS ERYTHEMATOSUS, UNSPECIFIED |
|  |  |
| L93.0 | DISCOID LUPUS ERYTHEMATOSUS |
| L93.1 | SUBACUTE CUTANEOUS LUPUS ERYTHEMATOSUS |
| L93.2 | OTHER LOCAL LUPUS ERYTHEMATOSUS |
| H01.121 | DISCOID LUPUS ERYTHEMATOSUS OF RIGHT UPPER EYELID |
| H01.122 | DISCOID LUPUS ERYTHEMATOSUS OF RIGHT LOWER EYELID |
| H01.123 | DISCOID LUPUS ERYTHEMATOSUS OF RIGHT EYE, UNSPECIFIED EYELID |
| H01.124 | DISCOID LUPUS ERYTHEMATOSUS OF LEFT UPPER EYELID |
| H01.125 | DISCOID LUPUS ERYTHEMATOSUS OF LEFT LOWER EYELID |
| H01.126 | DISCOID LUPUS ERYTHEMATOSUS OF LEFT EYE, UNSPECIFIED EYELID |
| H01.129 | DISCOID LUPUS ERYTHEMATOSUS OF UNSPECIFIED EYE, UNSPECIFIED EYELID |
| T69.1 | CHILBLAIN |
|  |  |
| D68.61 | ANTIPHOSPHOLIPID SYNDROME |
| D68.62 | LUPUS ANTICOAGULANT SYNDROME |
| D68.312 | ANTIPHOSPHOLIPID ANTIBODY WITH HEMORRHAGIC DISORDER |
|  |  |
| M35.1 | OTHER OVERLAP SYNDROMES |
| M35.8 | OTHER SPECIFIED SYSTEMIC INVOLVEMENT OF CONNECTIVE TISSUE |
| M35.9 | SYSTEMIC INVOLVEMENT OF CONNECTIVE TISSUE, UNSPECIFIED |

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| --- |
| **LABORATORY TEST** |
| ANTINUCLEAR ANTIBODIES |
| DS-DNA ANTIBODY |
| ANTI-SM |
| LUPUS ANTICOAGULANT |
| ANTICARDIOLIPIN, IGG, IGM, IGA |
| BETA 2 GLYCOPROTEIN 1 IGG, IGM, IGA |
| C4 COMPLEMENT, S |
| C3 COMPLEMENT, S |

**Supplementary Table S2.** Age- and sex-specific average annual incidence rates of lupus nephritis (LN,) Olmsted County, MN (1976–2009) and eight-county region (2010–2018) in southeast Minnesota

|  |  |  |  |
| --- | --- | --- | --- |
|  |  **Female** |  **Male** |  **Total** |
| **Age** | **N** | **Rate****per 100,000\*** | **N** | **Rate****per 100,000** | **N** | **Rate****Per 100,000** |
| 0-17 | 6 | 0.7 | 2 | 0.2 | 8 | 0.4 |
| 18-29 | 13 | 1.8 | 3 | 0.5 | 16 | 1.2 |
| 30-39 | 14 | 2.6 | 3 | 0.6 | 17 | 1.7 |
| 40-49 | 9 | 2.0 | 4 | 1.0 | 13 | 1.5 |
| 50-59 | 8 | 1.9 | 4 | 1.0 | 12 | 1.5 |
| 60-69 | 1 | 0.3 | 0 | 0.0 | 1 | 0.2 |
| 70-79 | 4 | 1.9 | 1 | 0.6 | 5 | 1.3 |
| 80-110 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Total | 55 | 1.5\*\* (1.1, 1.9) | 17 | 0.5\* (0.3, 0.8) | 72 | 1.0\*\*\* (0.8, 1.3) |

\*Rates are per 100,000 population. Denominator data are based on the Rochester Epidemiology Project census (see reference in text).

\*\*Age-adjusted to the 2000 projected US 2000 population

\*\*\*Age- and sex-adjusted to the 2000 projected US population.

**Supplementary Table S3.** County specific incidence rates of lupus nephritis for Olmsted County (1976-2009) and in Olmsted County and seven-county region (Mower, Freeborn, Waseca, Steele, Dodge, Wabasha, Goodhue) region (2010 to 2018)

|  |  |
| --- | --- |
|  | **EULAR/ACR criteria** |
|  | **Olmsted county (1976 to 2009)** | **Olmsted county (2010 to 2018)** | **Seven counties (2010 to 2018)** | **Overall (1976 to 2018)** |
| **Incidence rate** p100,000 (95%CI)\* |  |  |  |  |
|  **Total** | 0.9 (0.6-1.2) | 1.2 (0.6-1.9) | 1.4 (0.8-1.9) | 1.3 (1.0-1.6) |
| Female | 1.5 (0.9-2.0) | 1.9 (0.8-2.9) | 1.6 (0.3-1.8) | 1.9 (1.4-2.4) |
| Male  | 0.3 (0.0-0.5) | 0.6 (0.0-1.2) | 1.1 (0.3-1.8) | 0.7 (0.3-1.0) |