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| **eMERGE Network: Manuscript Concept Sheet** |
| **Reference Number** *(to be assigned by CC)* | NT441 |
| **Submission Date** | 2/2/22 |
| **Project Title** | Utilization of Electronic Health Record Data to Evaluate the Impact of Urban Environment on Risk of Systemic Lupus Erythematosus |
| **Tentative Lead Investigator** *(first author)* | Janet Song |
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| **Tentative Senior Author** *(last author)* | Abel Kho |
| **All Other Authors**  | Theresa Walunas, Noah James Forrest |
| **Sites Participating** | Northwestern Medicine, Kaiser Permanente Washington Health Research Institute, Marshfield Medical Center, Columbia University Irving Medical Center, Mayo Clinic |
| **Background / Significance** | Systemic Lupus Erythematous (SLE) is a complex autoimmune disease with heterogeneous presentation and etiology with environmental and genetic factors contributing to the occurrence of disease (Tsokos et al., 2016). Due to SLE’s diverse presentation and variable effects on organs, SLE presents a diagnostic challenge to physicians.SLE is heritable as studies have established familial aggregation of SLE and autoimmune disease in general (Alarcón-Segovia et al., 2005). As data processing methods have improved in the past decade, there have been reports of loci increasing susceptibility of SLE, (Harley et al., 2008). Beyond genetics, SLE is associated with several environmental factors including silica(Parks et al., 2002), alcohol consumption(Wang et al., 2008), cigarette smoking(Wang et al., 2008). While there has been a lot of research in the past decade looking at the genetic associations, genetics explain only a small amount of the variance. I hope to expand on the narrow category of environmental exposures by looking at geospatial patterns and social determinants of health to see if there exist any underlying systemic and institutional causes of disease. By better understanding the interplay between genetics and environmental risk involved in SLE, I hope to better phenotype SLE and its subsets and make it less challenging to recognize the risk a patient has for getting a SLE diagnosis.1. Tsokos, G. C., et al. (2016). Nature Reviews. Rheumatology, 12(12), 716–730.
2. Alarcón-Segovia, D., et al. (2005). Arthritis and Rheumatism, 52(4), 1138–1147.
3. Harley, J. B., et al. (2008). Nature Genetics, 40(2), 204–210.
4. Parks, C. G., et al. (2002). Arthritis and Rheumatism, 46(7), 1840–1850.
5. Wang, J., et al. (2008). Clinical Rheumatology, 27(12), 1557–1563.
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| **Outline of Project** | 1. Calculate the incidence of SLE according to the SLICC criteria in each neighborhood.
2. Find socioeconomical differences in the neighborhoods of patients that satisfy SLICC criteria vs. patients that don’t
	1. Urban vs. Rural
	2. High income vs. low income
	3. Race
3. Create model quantifying how much socioeconomical variables contribute to SLE incidence.
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| **Desired Data - Common Variables\*** *(Available from the CC)* | [x]  Demographics [x]  ICD9/10 codes☐CPT codes☐Phecodes☐BMI | ☐Common Variable Labs☐Common Variable Meds[x]  Geocoding 2015 ACS variables[x]  Other: Case/Control status |
| **Other Desired Data *(Available from participating sites)*** | *Please specifically list out any data elements that participating sites would collect or extract from clinical or other sources for this project (i.e. not common variables above)* SLICC criteria (immunologic and clinical criteria) data already provided by sites |
| **Desired Genetic Data** | ☐eMERGE I-III Merged set (HRC imputed, GWAS)☐eMERGE PGx/PGRNseq data set ☐eMERGEseq data set (Phase III)☐eMERGE Whole Genome sequencing data set☐eMERGE Exome chip data set☐eMERGE Whole Exome sequencing data set☐Other (not listed above): |
| **Does project pertain to an existing eMERGE Phenotype?** | [x]  Yes, if so please list: SLE (Systemic Lupus Erythematosus) using SLICC (Systemic Lupus International Collaborating Clinics) Criteria ☐No |
| **Planned Statistical Analyses** | Multivariate logistic regression |
| **Ethical Considerations** | None |
| **Target Journal** | *Rheumatology* |
| **Milestones***(This section should include the key dates for completion of project, including approval, project duration, draft completion, and submission.)* | 02/2022: Completion of project and first manuscript draft02/25/2022: 1st draft sent to all authors03/14/2022: final draft sent to all authors for final approval03/25/2022: Submission to journal |

***\*\**** *This section should include the timeline for completion of project, including: approval, project duration, first and second draft of the paper and submission.*