every patient visit. A flare was defined as a PGA score increase of 1 point or more compared to the previous visit. Environmental and atmospheric data was obtained from the EPA, including PM2.5 and ozone concentration, temperature, residual wind, relative humidity, and barometric pressure. The average values of each factor 10 days prior to patient visit was calculated. Univariate and multivariate models were built in order to study the association of these variables with lupus disease activity. The models were adjusted for age, sex, income, racial distribution, and rural vs. urban patient residence. Multivariate logistic regression was used to identify significant determinants associated with lupus flares. Regression was performed for each organ flare outcome. Regression inference was based on generalized estimating equations (GEE) to account for the time repeated outcomes. Standard regression techniques on model building and evaluation were followed, including but not limited to performing both univariate and multivariate regressions, coefficient significance, collinearity, confounding, variable interaction and inclusion or exclusion in the model.AIC:

Results: Rash, serositis, hematologic, and joint flares were statistically significantly associated (p<0.005) with an increase in temperature in univariate and multivariate analysis. Renal flares were negatively associated with increases in temperature (p<0.05) in univariate and multivariate analysis. Ozone concentration, residual wind, and relative humidity were significantly associated with lupus flares in univariate analysis only, while barometric pressure had no associations.

Conclusion: There is a strong association between changes in PM2.5 concentration and temperature 10 days prior to patient visit and organ specific lupus activity at the visit. These data could add an important aspect to lupus trials, the outcomes of which may be affected by so far unrecognized environmental factors, and ultimately it could allow predictive modelling of lupus flares which would revolutionize the approach to treatment.

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