



Introduction

The atmosphere of post-Hurricane Maria Puerto Rico left behind, among other things, upper-respiratory hardships to many of its residents. The residents from an affected community in San Juan, Puerto Rico were interviewed and self-reported upper respiratory symptoms (i.e. rhinitis, nasal congestion, and nasal, throat, & eye irritation) were obtained. Each of these symptoms were then assessed using an Upper Respiratory Symptom Score (URSC) with > 3 (worsening symptoms) scored as 1 and symptoms ≤ 3 (improved symptoms) scored as 0. Each individual's URSC scores were compared to their self-reported level of water damage, and indoor dust pro-inflammatory (IL-1β)-inducing potential.

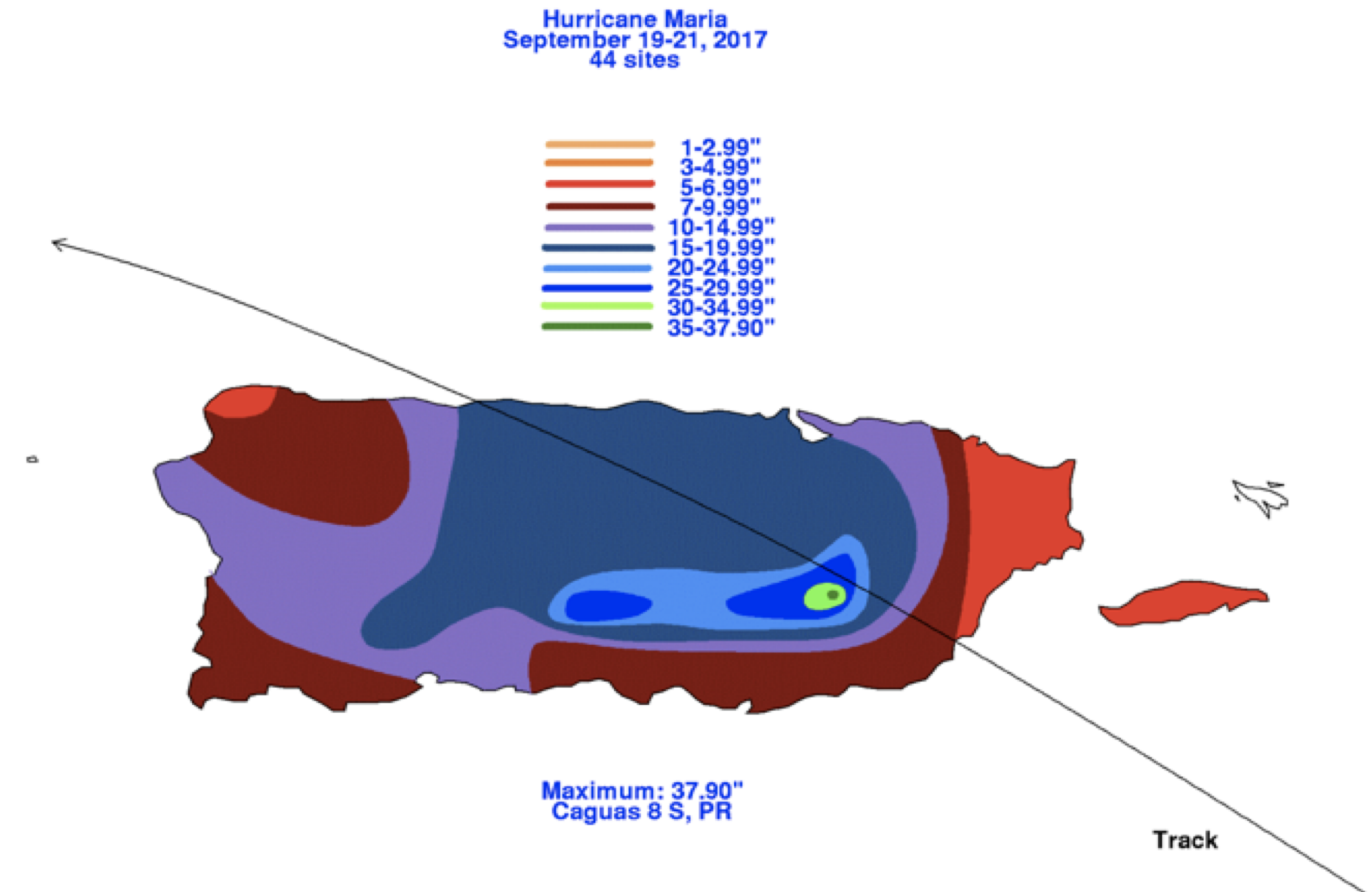


Figure 1. Map of total rainfall in Puerto Rico during the Hurricane Maria. NOAA Tropical Cyclone Report: Hurricane Maria (Accessed Feb, 2019).

Objective

To identify the relationships between URSC, self-reported residence water damage, and IL-1β-inducing potential by indoor settled dust from homes in a community in San Juan, PR affected during Hurricane Maria (see Fig 2)

Methods



Figure 2. Site of study (Figueroa Community) in San Juan, PR. Image retrieved with the ggmap R package.



Figure 3: Summary of the sampling site, timing of survey for self-reported respiratory symptoms, and variables to evaluate against self-reported symptoms.

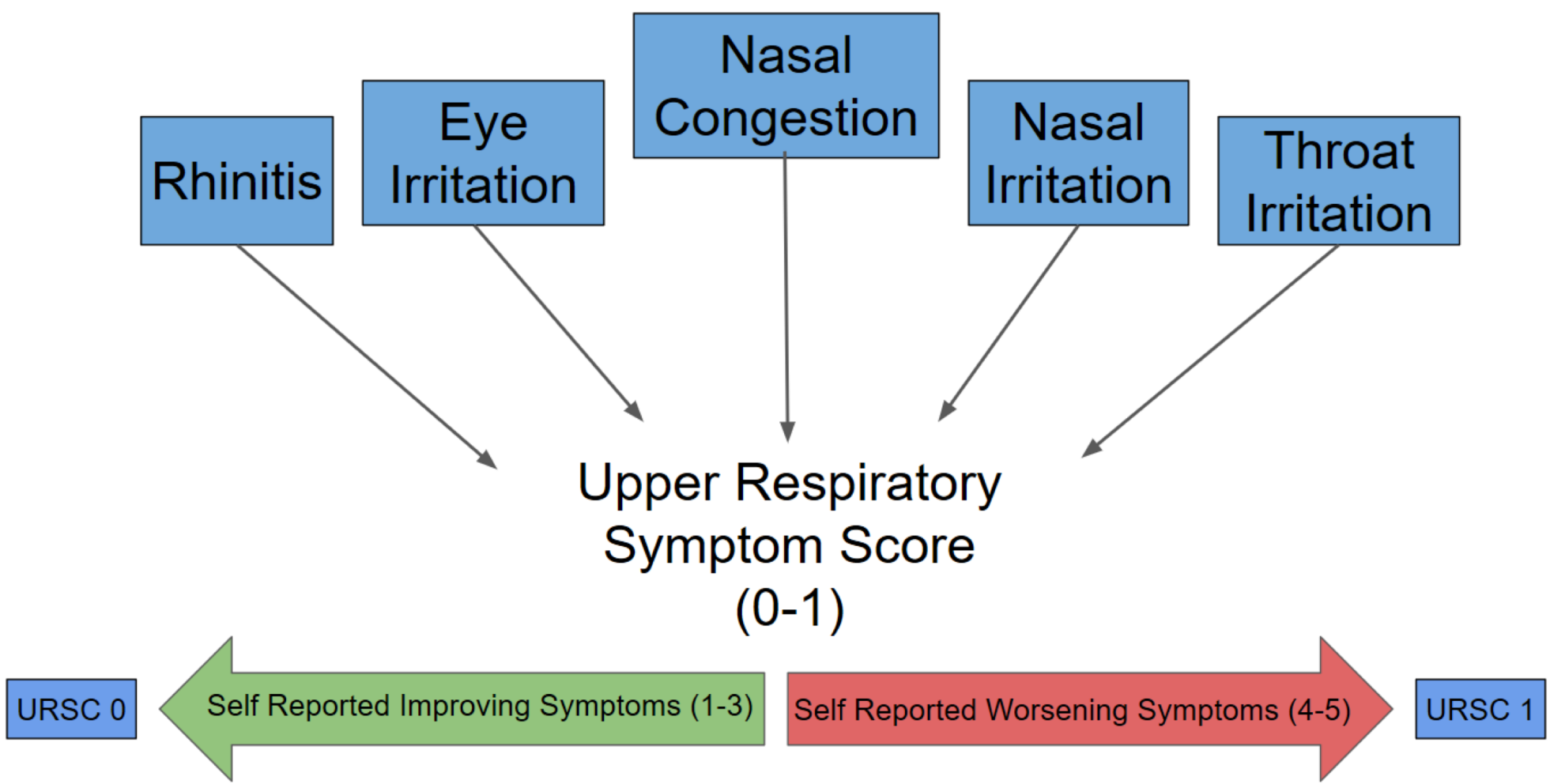


Figure 4: Approach to calculate the Upper Respiratory Score (URSC)

Results

Table 1: Proportion of URSC by self-reported level of water damage

Level of water damage	Upper Respiratory Symptom Score (proportions %)					
	0	1	2	3	4	5
No Damage	37.5	12.5	25.0	20.0	0.0	16.7
Damage/Dry Area	25.0	0.0	25.0	20.0	33.3	66.7
Damage/Flooded Area	16.7	37.5	25.0	40.0	33.3	0.0
Fully Flooded	20.8	50.0	25.0	20.0	33.3	16.7

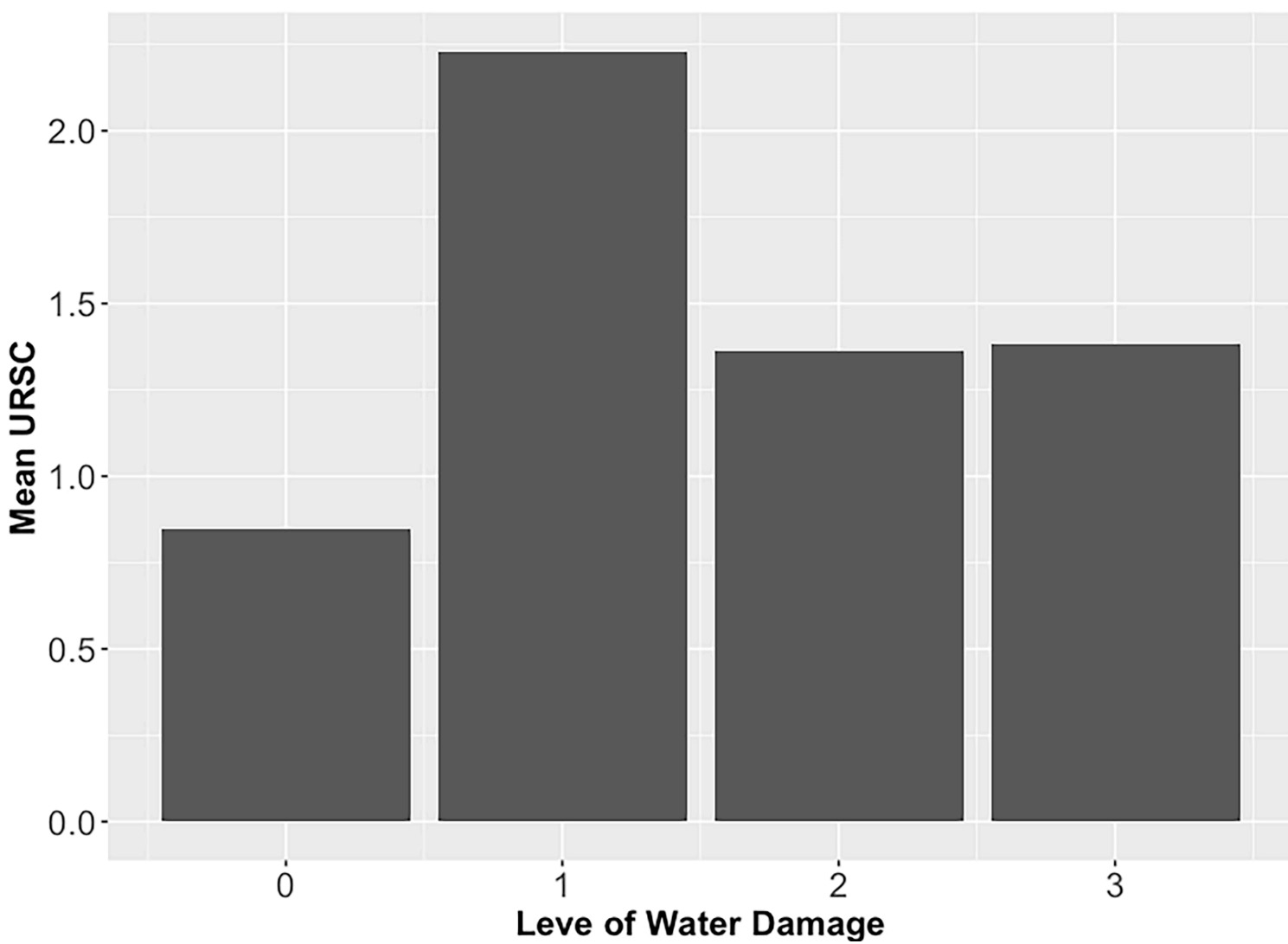


Figure 5: Residents from homes that did not experienced any water damage reported the lowest URSC. 0= no water damage; 1 = water damage but house in non-flooded area; 2 = house damage, in flooded area but no inside flooded; 3 = house fully-flooded.

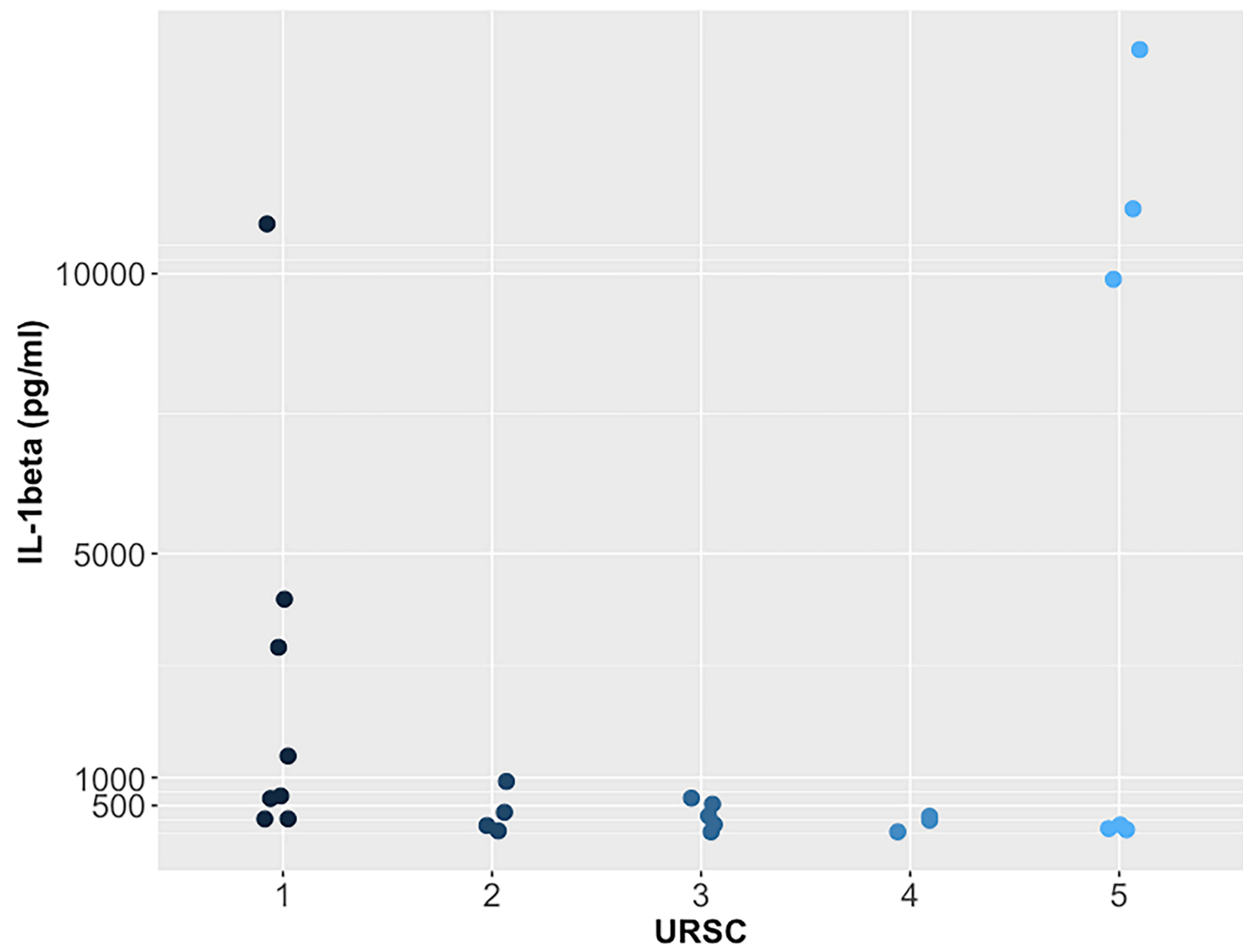


Figure 6: The IL-1beta-inducing potential of dust was highest, but not statistically significant, in homes in which residents had the lowest URSC. The exception would be outliers in URSC of 5.

Conclusion

- Our findings suggest that individuals with higher URSC lived in homes that reported to have water damage or inside flooding.
- The increased IL-1beta inducing potential in homes with lower URSC suggest immunosuppressing properties in the dust from homes self-reported to have been fully-flooded or water-damaged without inside flooding. damaged and located in flooded areas..

Future Studies

Future studies,

- will evaluate relationships of URSC with other pro-inflammatory biomarkers induced by the indoor settled dust samples.
- will evaluate the relationships between URSC and fungal and microbiome profiles of the indoor settled dust.

Acknowledgments

- This study was supported by the National Institute of Environmental Health Sciences (R21ES029762-01).
- We are grateful of the Tras Talleres/Figueroa Community for their support of the research, and the volunteers from the Larkin University who participated in the blood draws.
- The Field Team for their remarkable job administering the surveys and carrying out the indoor sampling of the homes.

Conflict of Interest

- The authors have no conflict of interest to disclose.