

Stress & the city: Satellite and Ground-level Residential greenness and lower hair cortisol, during pregnancy

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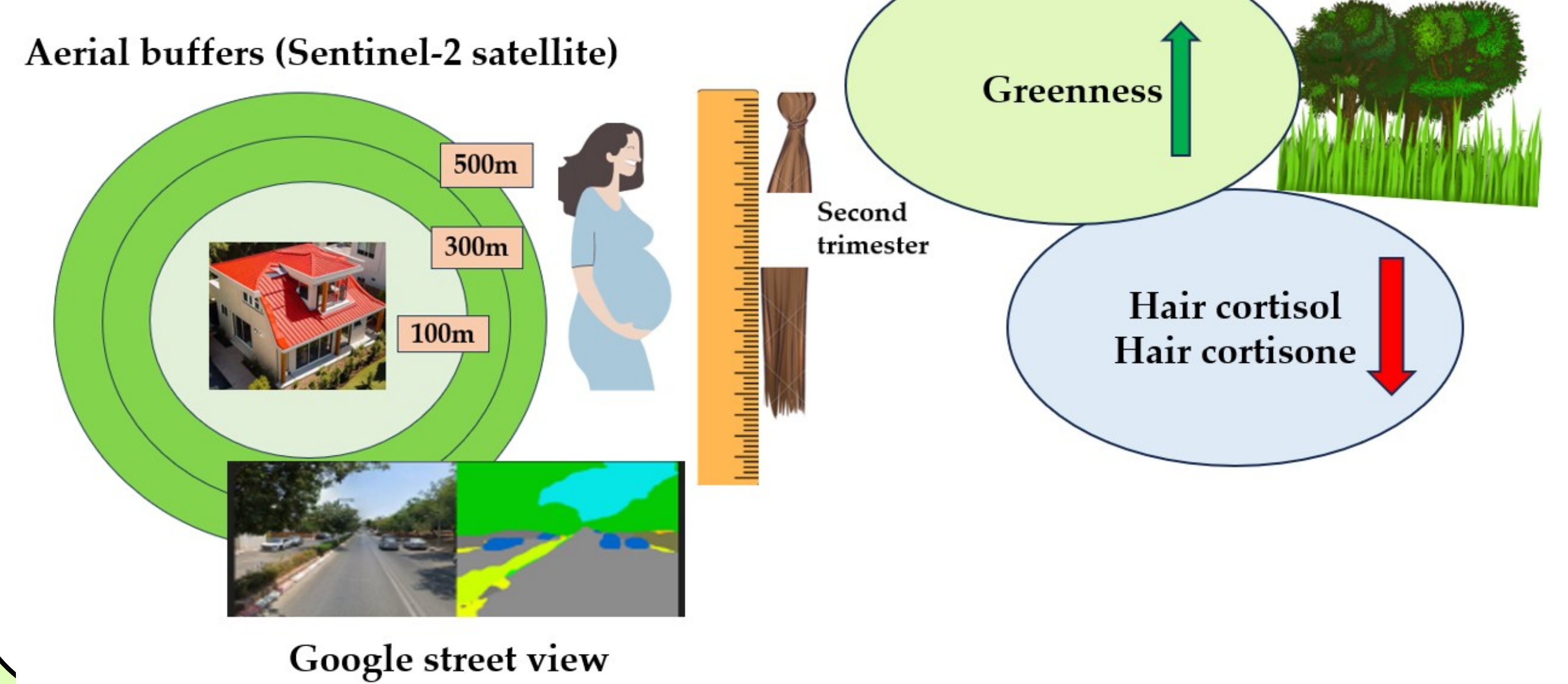
Introduction

Residential greenness includes land covered with natural vegetation, measured using satellite data is associated with lower cortisol. Although evidence during pregnancy is limited. Google Street View (GSV) images provide a pedestrian perspective, allowing assessment of specific greenness features. For evaluating chronic stress, hair samples are most appropriate as, in hair sample integrate steroid hormones over the time of growth.

Objective

To find association between residential greenness and multiple hair steroids during pregnancy, considering both satellite and ground-level greenness exposure.

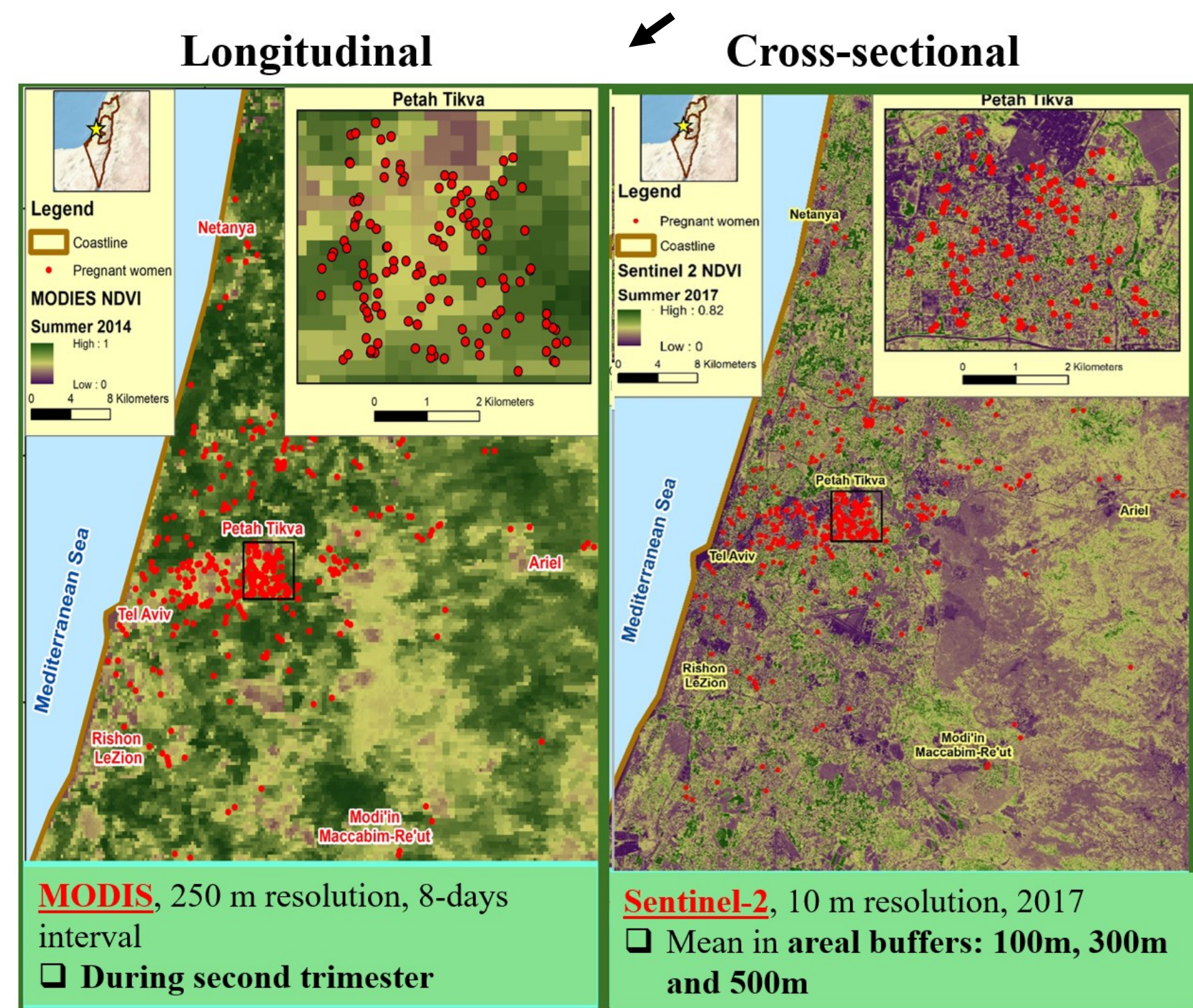
Graphical abstract



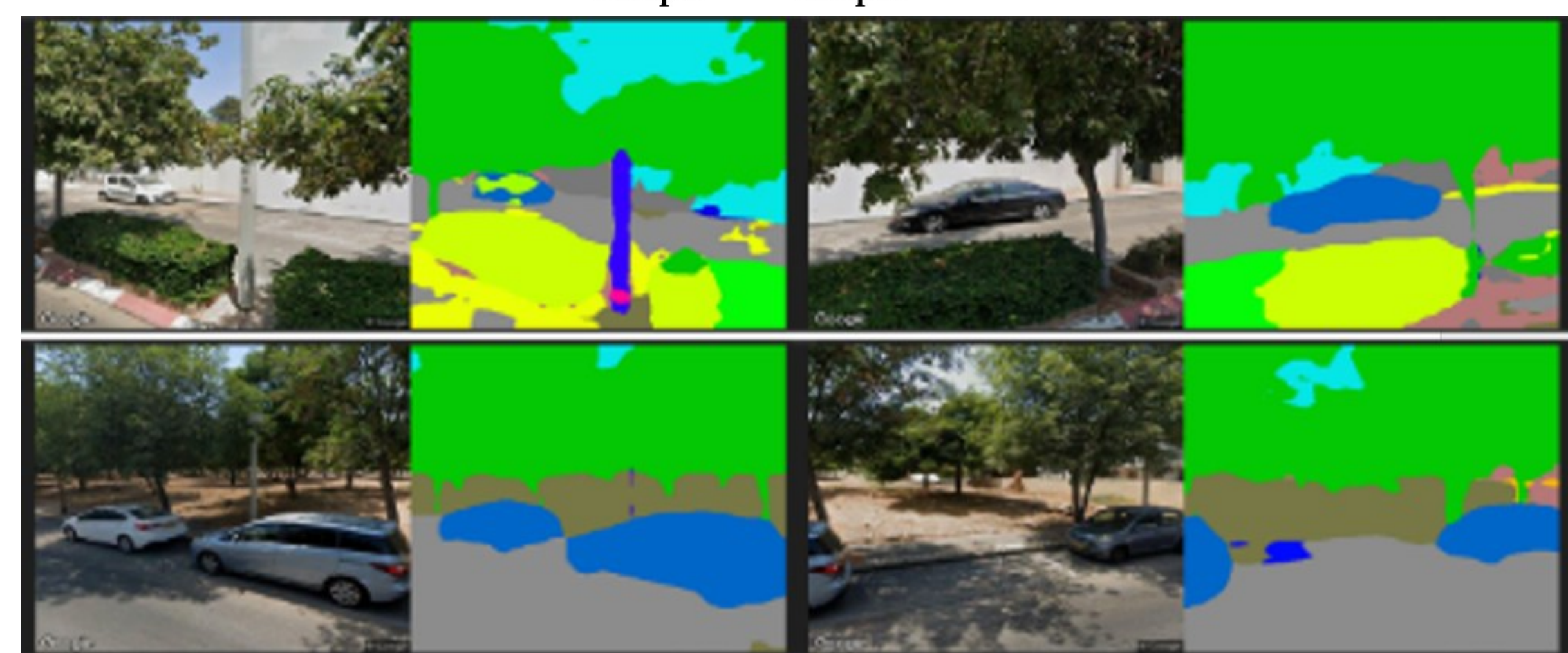
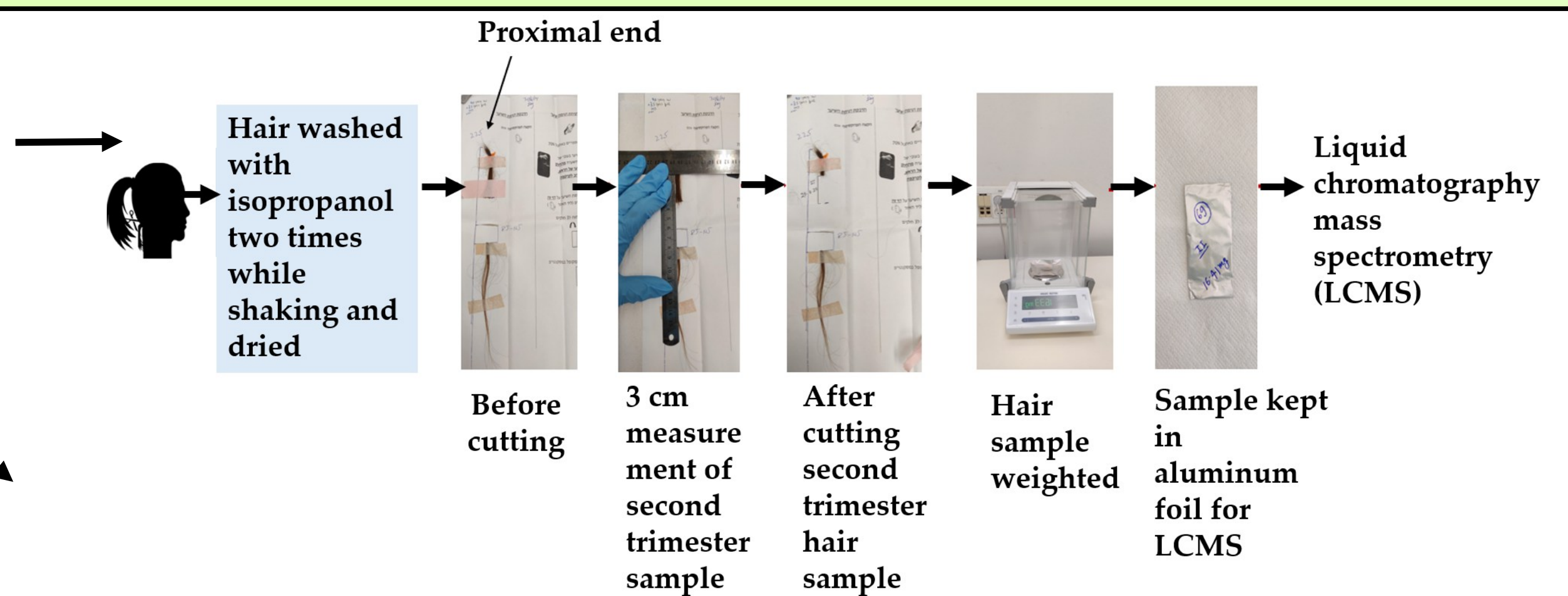
Method

Hair sample preparation for the second trimester (14-27 gestational age weeks) and steroid hormone quantification (n=385). Previously, First-trimester hair cortisol was quantified by ELISA

Based on geo-coded birth address, residential greenness exposure assessment

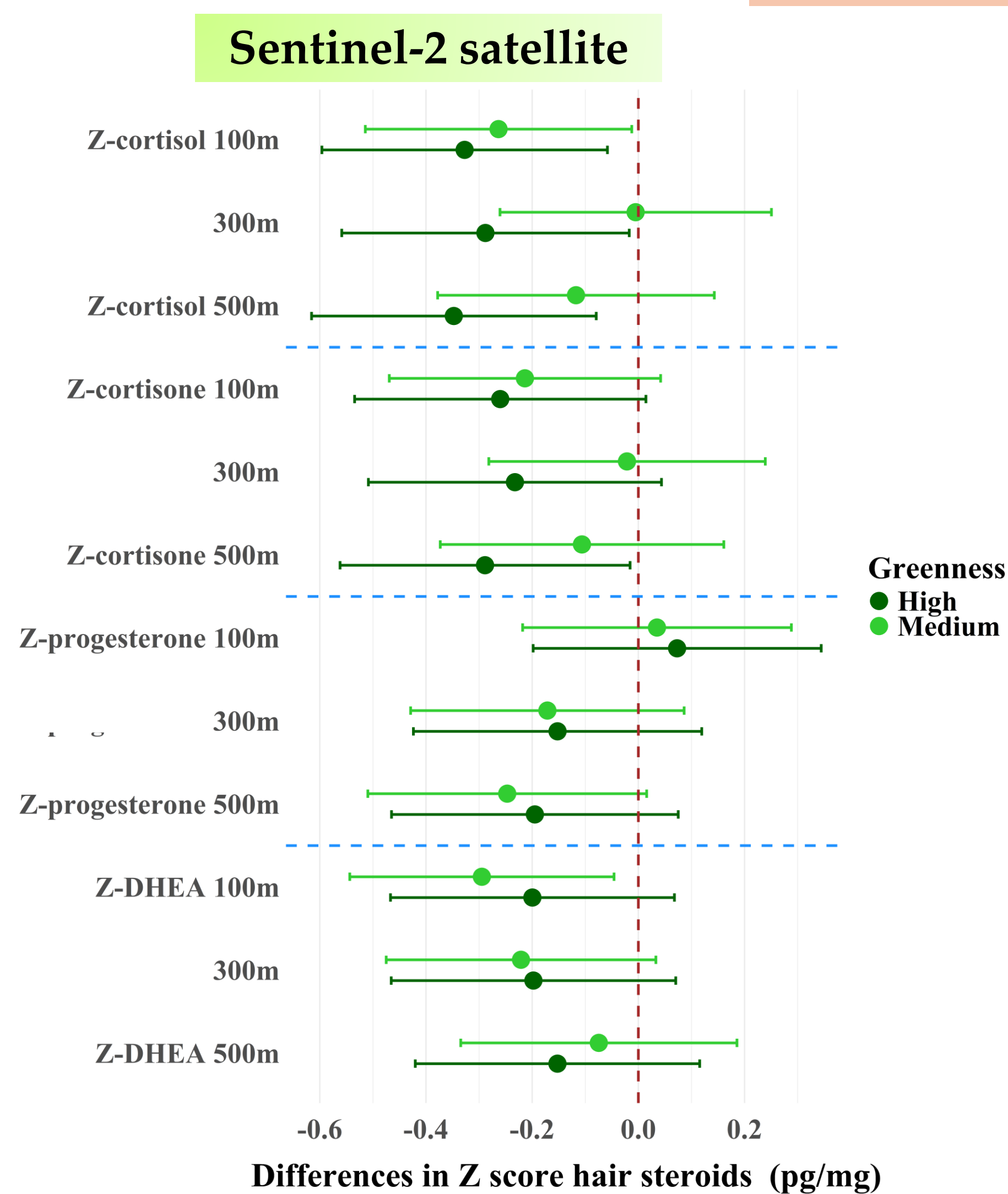


Normalized Difference Vegetation Index (NDVI), estimated from satellite images



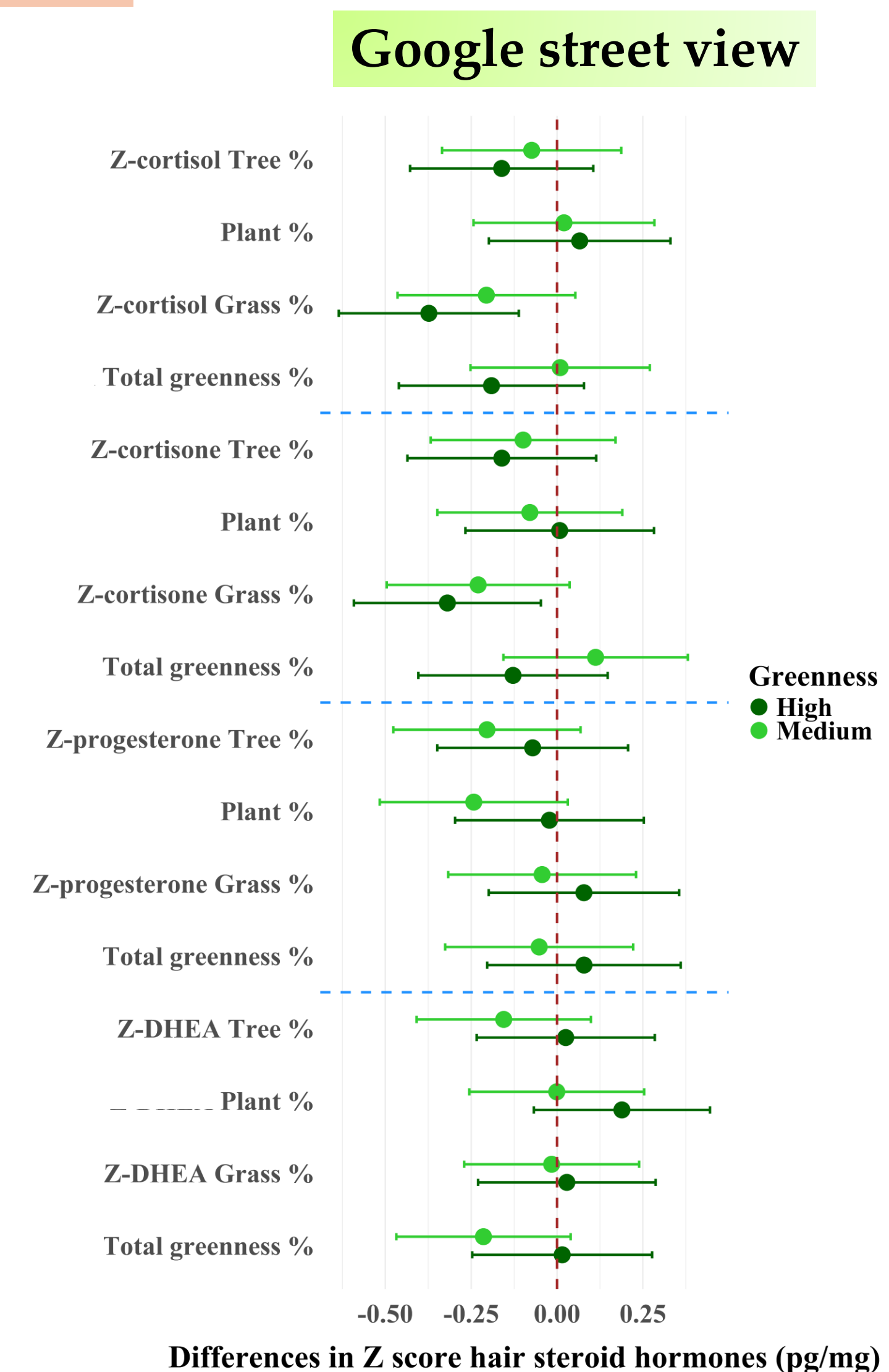
% of different categories of greenness, estimated from google street view images

Result

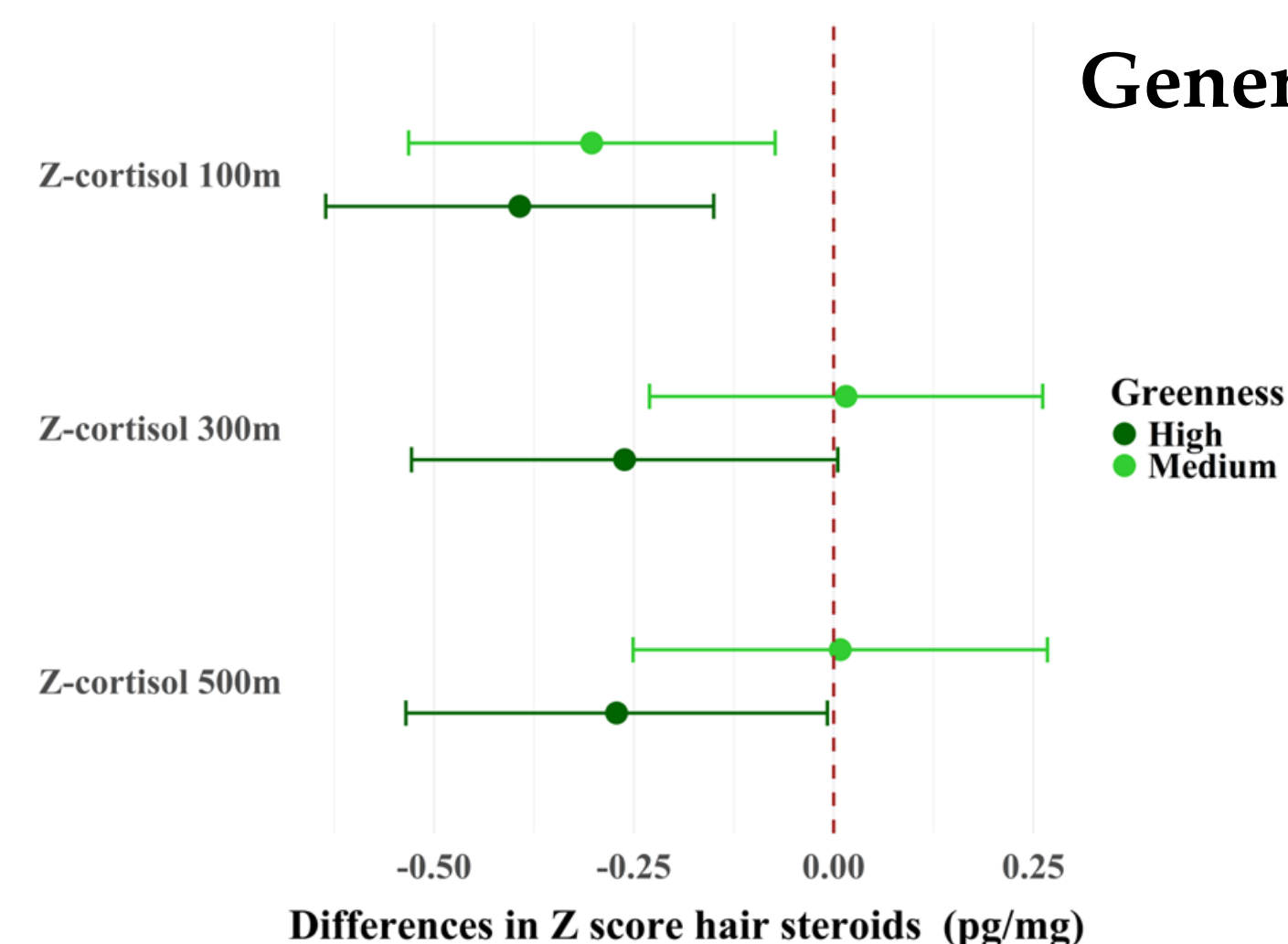


Second trimester Z-score hair steroids

Linear models
Medium and high exposure tertiles are compared to low exposure tertile

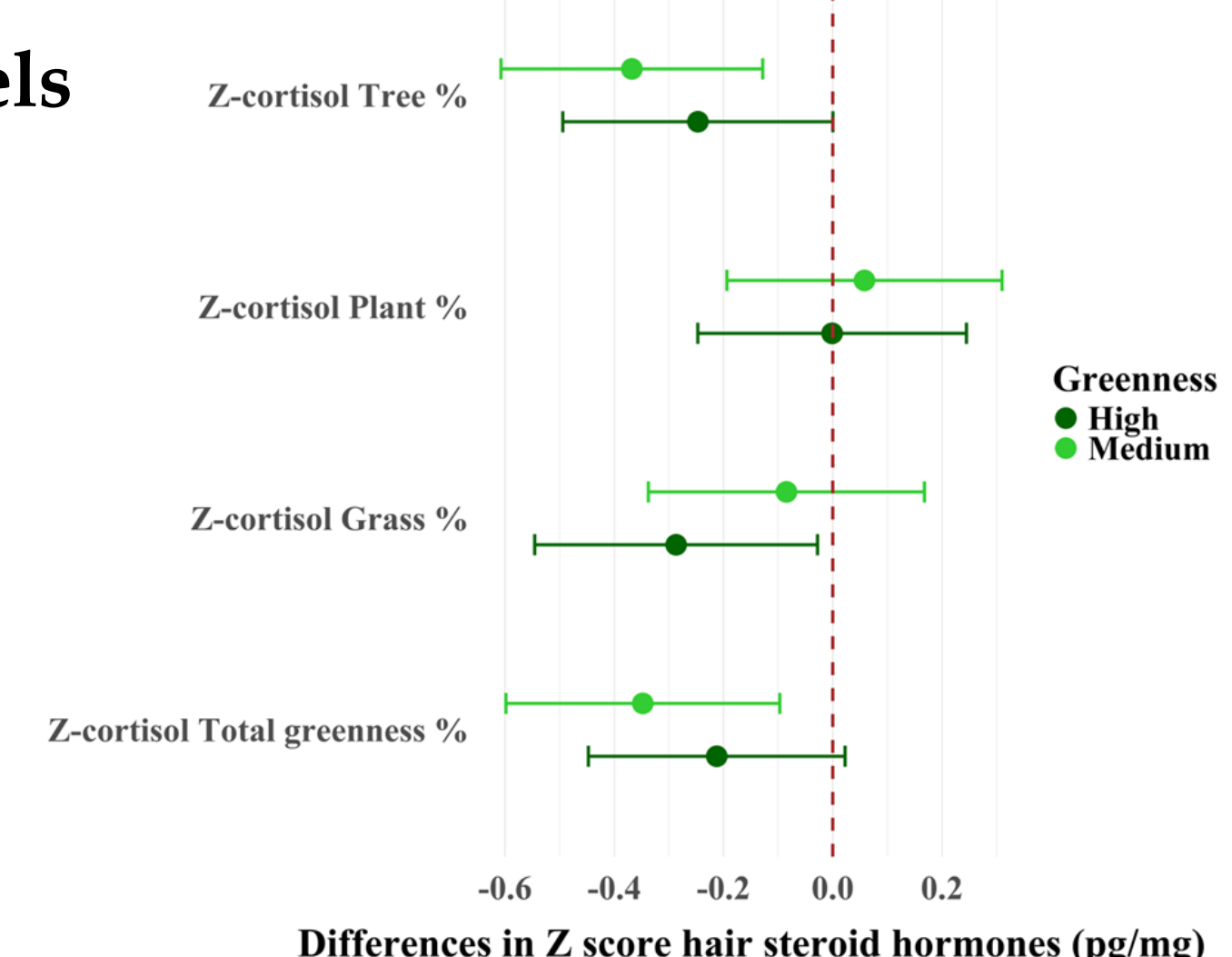


Repeated measures of first and second trimester Z-cortisol levels



Generalized Estimating Equations models

Medium and high exposure tertiles are compared to low exposure tertile



*Each models adjusted to Rural-urban residence, season of last menstrual period and socio-economic status.

Conclusion

Increased greenness exposure during the second trimester of pregnancy associated with lower chronic stress markers, both hair cortisol and hair cortisone.