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What is the role of longitudinal exposure to residential greenness and greenspace on childhood body mass index?

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Objectives

This study examines the association between residential greenness, access to green space, and childhood Body Mass Index (BMI) on a national population of children in Wales. Using linked environmental and national surveillance data, we assess whether long-term exposure to greener environments is associated with children being overweight or obese.

carefully as it is a measure of vegetation health and may not capture how children use green environments. BMI is measured at a single time point in Wales (ages 4-5) when children are less independent and therefore these findings may not reflect greenspace's health benefits in older childhood. Future studies should focus on objective exposures that can accurately reflect children's interactions with their built environment.

Method

BMI was calculated using height and weight records from the Child Measurement Programme for Wales (2012/13–2018/19). We used Landsat satellite imagery (30-meter resolution) to derive an annual Enhanced Vegetation Index (EVI) within 300m of each child's residence in Wales for 2008–2019. EVI values were averaged over four-years preceding their BMI measurement. Green space access was calculated using Ordnance Survey Open Greenspaces to create a count of green spaces within 800m of each child's residence. Logistic regression was used to assess associations between EVI, green space, and BMI, adjusting for sociodemographic characteristics.

Results

The study included 201,698 children aged 4–5 years old. After adjusting for covariates, every unit increase in EVI was associated with a 20% higher likelihood of a child being overweight or obese. For every additional green space within 800m of a child's home, the likelihood of unhealthy weight increased by 0.3%. Findings suggest that higher EVI levels and greater green space availability do not necessarily translate into healthier BMI outcomes.

Conclusion

This study explored associations between objective measures of ambient greenness, green space and BMI in a national population of children. Findings demonstrate that higher EVI was associated with greater odds of unhealthy weight, highlighting the complexity of the relationship. EVI should be interpreted



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