

# Associations between area-level factors at birth and childhood obesity

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# Childhood obesity: links with geography

- In England, children in the ‘most deprived’ areas almost twice as likely to be overweight/obese than in the ‘least deprived’
- Limited cross-sectional evidence that obesity rates are higher in schools with high density of fast food outlets and ‘convenience stores’
- Links with spaces that encourage physical activity
- Unclear ‘when’ geography matters, especially as disadvantaged populations are overrepresented in disadvantaged places!



# SLOPE Population-based Cohort

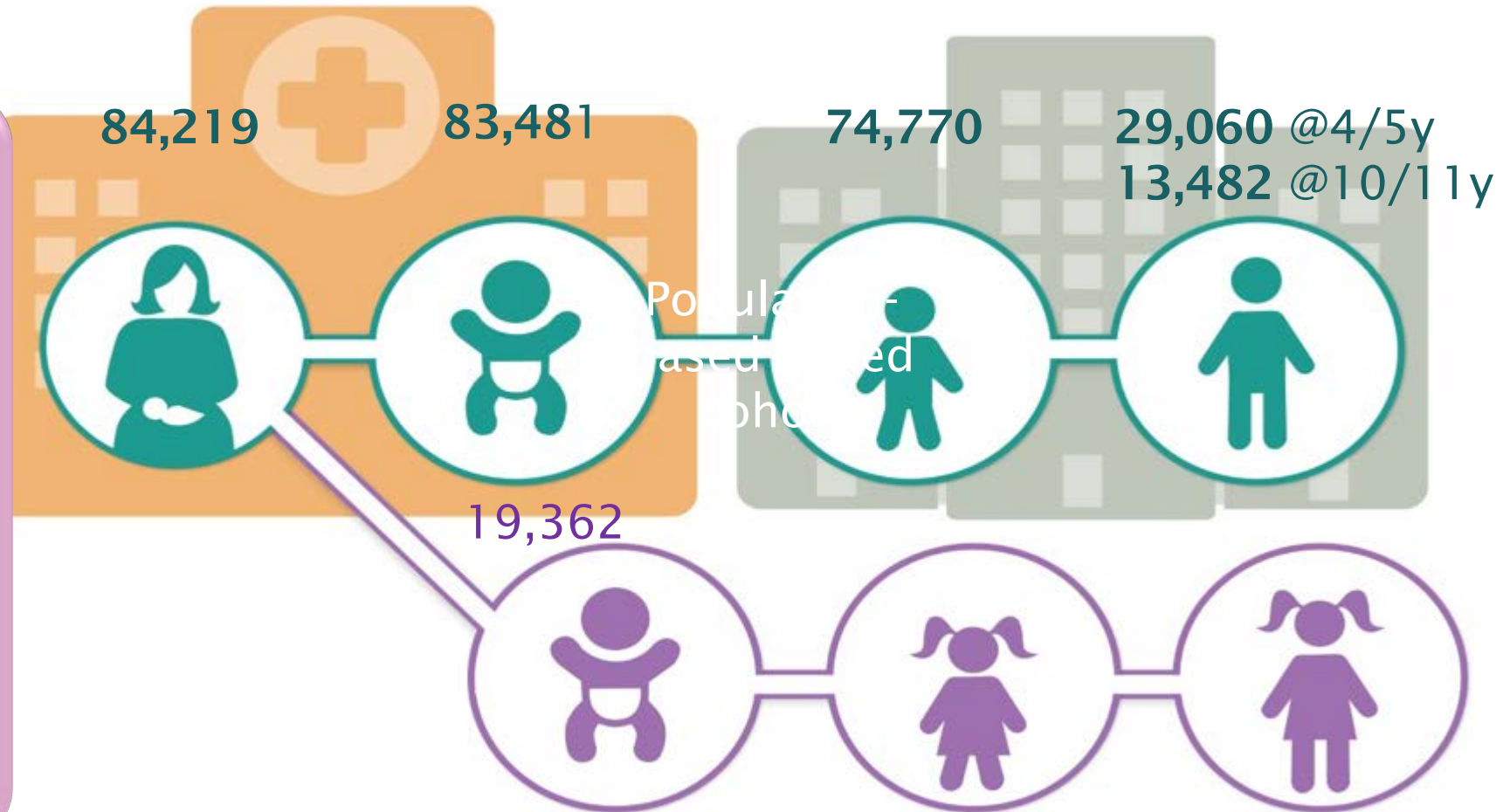
Southampton:

14,084 at 4-5

5,637 at 10-11

BMI > 85<sup>th</sup>  
centile

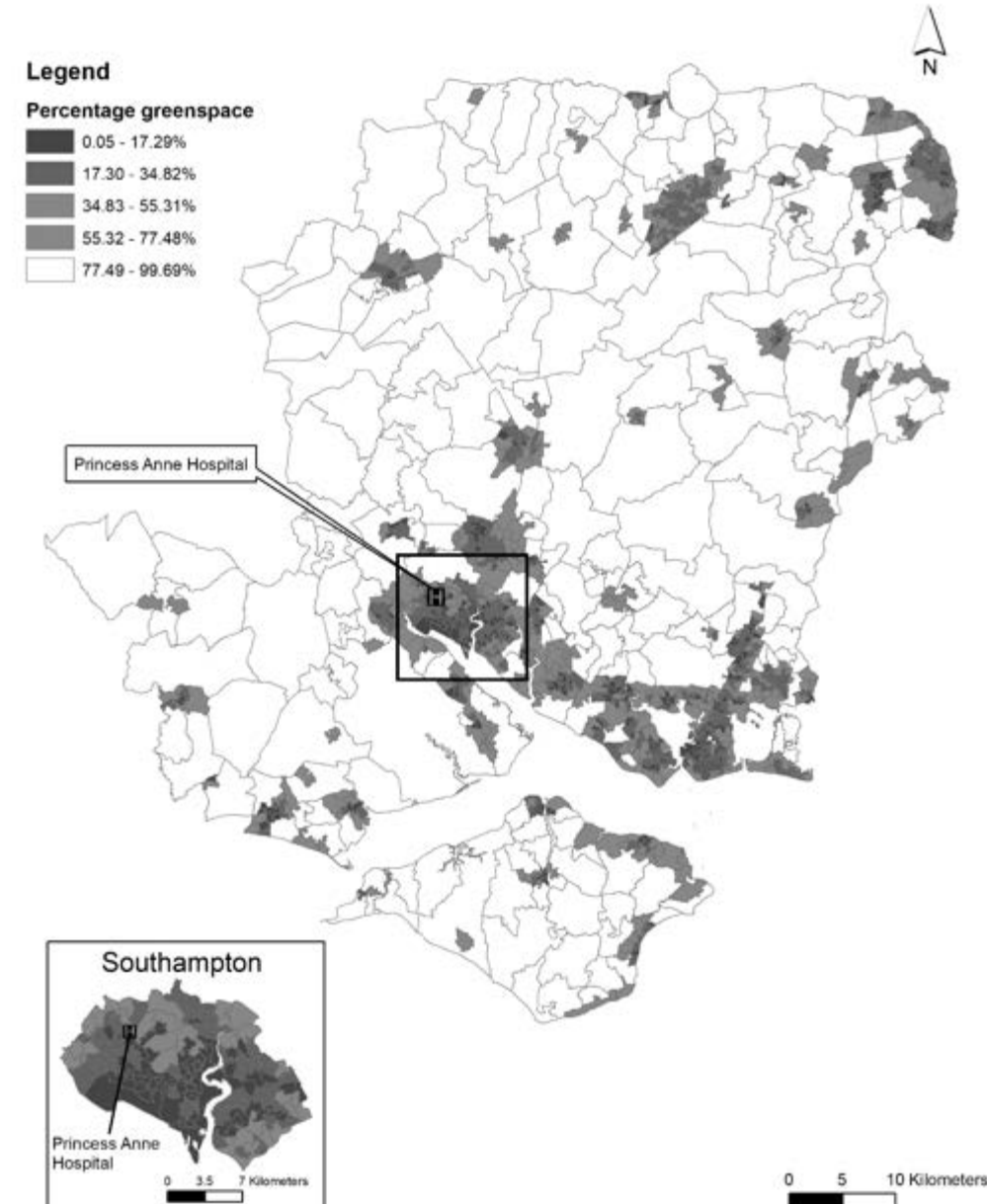
Aggregated to  
LSOA (average  
population of  
1,500) and  
MSOA (average  
population of  
7,000)



# Greenspace

- Natural space – more physical activity, cleaner air, mental health benefits
- Identified as polygons flagged as ‘natural environment’ in Ordnance Survey MasterMap
- Not freshwater or marshes
- Each year 2006-2016

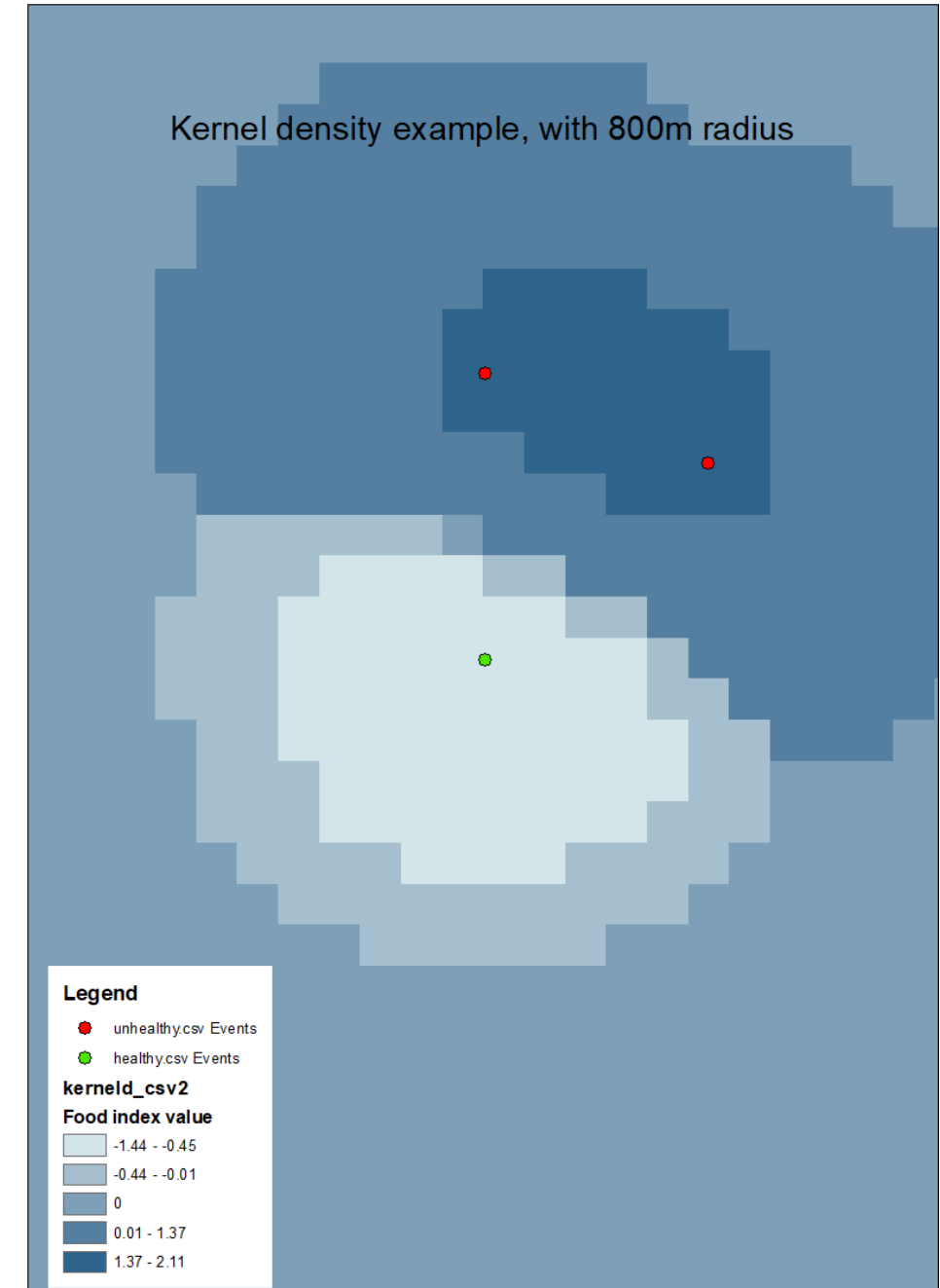
Greenspace coverage in Hampshire, LSOAs



# Unhealthy food index

Healthy	Unhealthy
Grocers	Bakeries
Markets	Confectioners
Organic foods	Convenience stores
	Takeaways

Kernel density estimates for each point, with a radius of 800m, averaged over the LSOA/MSOA



# Air pollution

- PM2.5, PM10 & NO<sub>x</sub>
- 1 km x 1 km grid
- Spatially weighted averages across LSOA/MSOA





# Methods

- Population-average estimating equations
  - Account for clustering
- Relative risk of being overweight/obese
  - Separate models for each area indicator
  - Separately at age 4-5 and 10-11
- Also look at association for children who moved
  - i.e. different area at birth and measurement

Key set of confounders we adjust for:

- ❖ Maternal BMI
- ❖ Maternal age
- ❖ Maternal education
- ❖ Maternal ethnicity
- ❖ Maternal smoking
- ❖ Maternal parity

## Summary of results

- 23% of children aged 4-5 were overweight or obese
- 35% of children aged 10-11 were overweight or obese
- No evidence of an association between area factors at birth and risk of being overweight/obese at age 4-5
- Greater concentration of greenspace at birth associated with lower risk at age 10-11 (persists for children who migrate) [1 % increase = RR 0.995-0.999]
- Greater concentrations of unhealthy food outlets [1 unit increase = RR 1.005-1.037] and PM associated with higher risk at age 10-11 [1  $\mu\text{g}/\text{m}^3$  increase = RR 0.990-0.999] (not for children who migrate)



# Conclusion

- In summary, this study suggests that the amount of greenspace in the local area at birth was negatively associated with the risk of becoming affected by overweight or obesity at the end of primary school, even in those children who potentially had a change in exposure to greenspace after birth.

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Project website – [www.southampton.ac.uk/slope](http://www.southampton.ac.uk/slope)



**welcome**trust



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