

Natural environments, health and health inequalities



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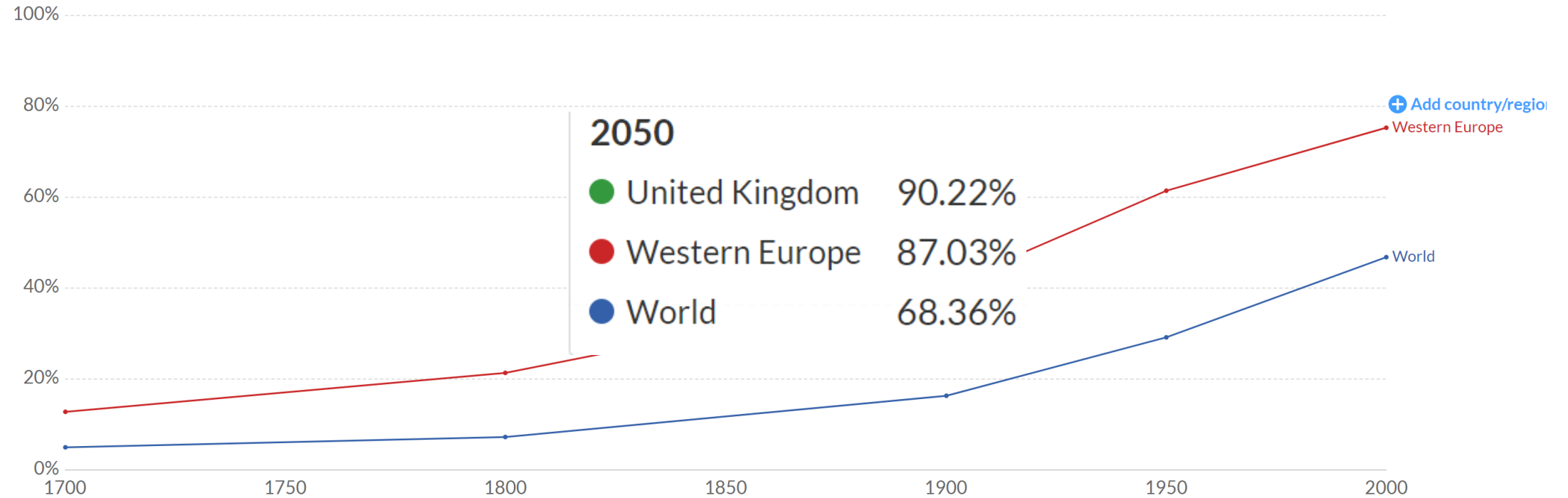
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Urban migration...

Share of the population living in urbanized areas

Share of the total population, in a particular region or country, who live in urbanized areas.

Our World
in Data



Source: HYDE 3.1 (2010)

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The benefits of living in greener neighbourhoods ...



Urban green space premature all cause mortality for England

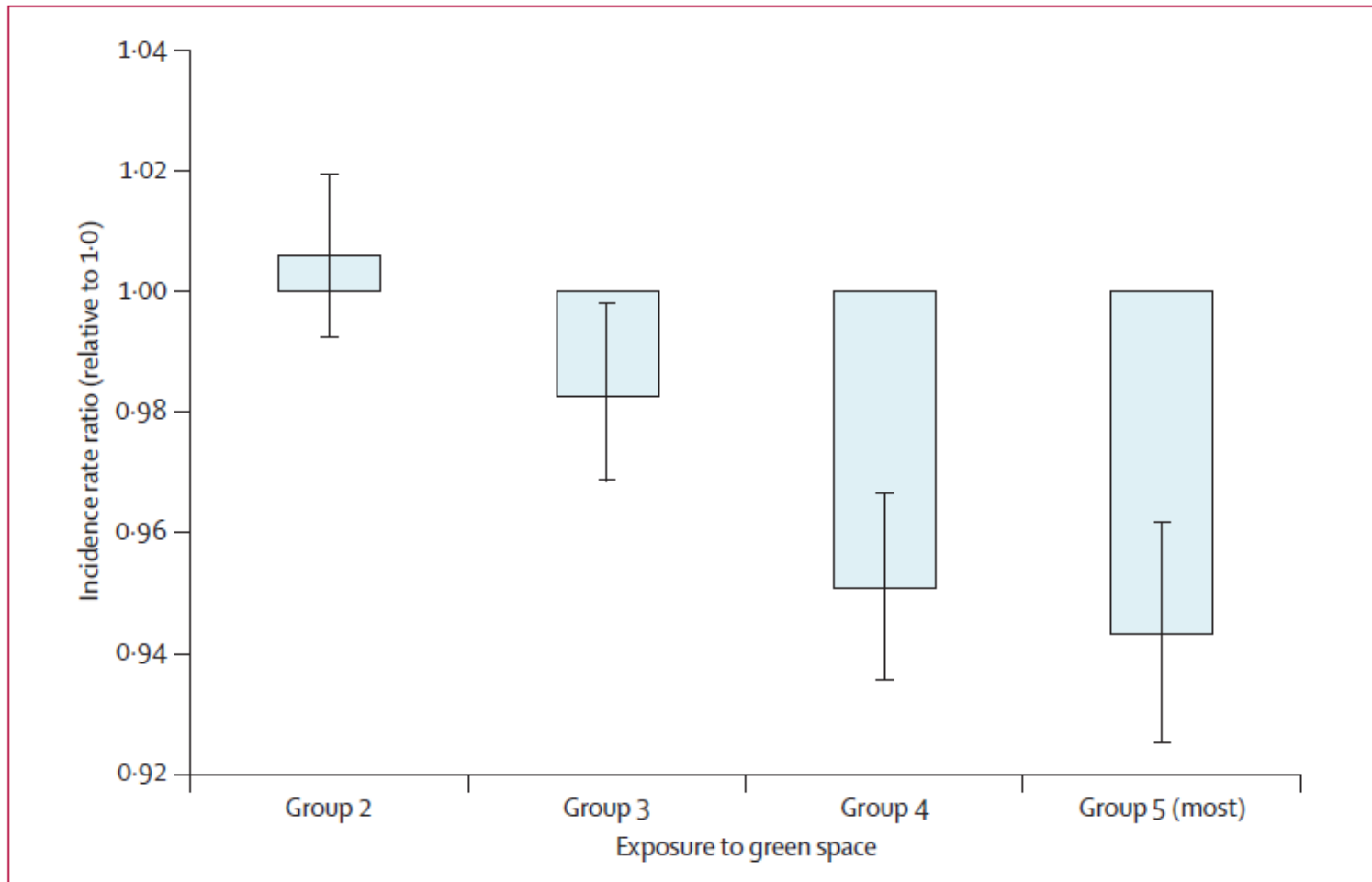


Figure 1: Incidence rate ratios for all-cause mortality in groups of exposure to green space, relative to group 1 (least exposure to green space)
Error bars indicate 95% CIs.

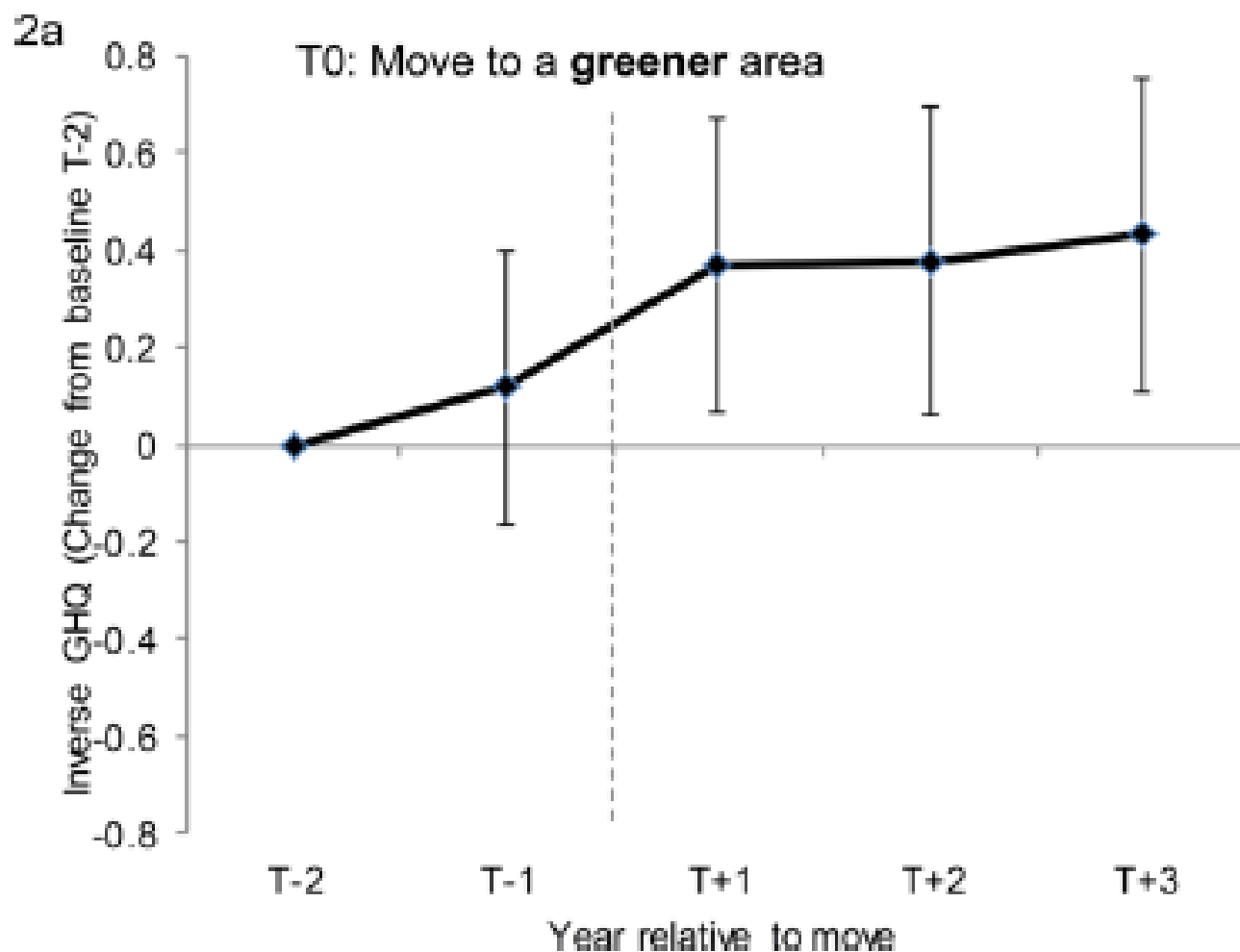
Groups 1-5 = quintiles of green space exposure
(% of GS in their neighbourhood area).

Neighbourhood natural environments and mental health



Longitudinal Effects on Mental Health of Moving to Greener and Less Green Urban Areas

Ian Alcock,[†] Mathew P. White,^{*,†} Benedict W. Wheeler,[†] Lora E. Fleming,[†] and Michael H. Depledge[†]



‘Urban green space may be ‘equigenic’ i.e. ,
health benefits linked with access to green space may be
strongest among the disadvantaged groups’



Socio-economic patterning: e.g., Birth weight and NH greenness

- 10,780 births from the Born in Bradford cohort (2007–2010)

Positive association
between birth weight
and residential
surrounding greenness

Indications of stronger
associations for
participants living in
**MOST deprived
neighbourhoods**

Inequality, green spaces, and pregnant women: Roles of ethnicity and individual and neighbourhood socioeconomic status

Payam Dadvand^{a,b,c,*}, John Wright^d, David Martinez^{a,b,c}, Xavier Basagaña^{a,b,c}, Rosemary R.C. McEachan^d, Marta Cirach^{a,b,c}, Christopher J. Gidlow^e, Kees de Hoogh^f, Regina Gražulevičienė^g, Mark J. Nieuwenhuijsen^{a,b,c}

	N	Residential surrounding greenness	
		250 m buffer	
		β (95% CI)	p-Value
Ethnicity ^b			
White British	4238	26.2 (3.1, 49.3)	0.026
Pakistani origin	4889	6.5 (−16.4, 29.5)	0.576
Other	1608	41.3 (6.2, 76.4)	0.021
Maternal education ^c			
Less than five GCSEs	2333	15.1 (−16.4, 46.7)	0.348
Five GCSE or A level equivalent	4880	19.3 (−2.1, 40.7)	0.076
Higher than A level equivalent	2745	17.2 (−12.6, 46.9)	0.258
Other	822	30.4 (−20.1, 80.9)	0.238
Neighbourhood IMD ^d			
1st tertile (least deprived)	3530	20.1 (−6.5, 46.6)	0.138
2nd tertile	3528	11.4 (−13.4, 36.2)	0.369
3rd tertile (most deprived)	3701	35.8 (9.9, 61.7)	0.007

Socio-economic patterning: e.g., Birth weight and NH greenness

- 7547 women recruited to the 'Born in Bradford' (<50% WBRI)
- Self-reported depressive symptoms during pregnancy

Pregnant women in the greener quintiles 18–23% less likely to report depressive symptoms than those in the least green quintile

Association was significant for women with lower education or who were active



The association between green space and depressive symptoms in pregnant women: moderating roles of socioeconomic status and physical activity

R R C McEachan,¹ S L Prady,² G Smith,³ L Fairley,⁴ B Cabieses,^{1,5} C Gidlow,⁶ J Wright,¹ P Dadvand,⁷ D van Gent,⁷ M J Nieuwenhuijsen⁷

Table 4 Stratified models for relationship between NDVI and depression (300 m buffer zone) stratified by maternal education (top half of table) and physical activity (bottom half of table)

Education status	Low†	High‡
Model 5: Adjusted for ethnicity, demographics, SES and health behaviours		
Quintile 2	0.77 (0.63–0.94)*	1.18 (0.90–1.54)
Quintile 3	0.72 (0.58–0.90)**	0.92 (0.70–1.21)
Quintile 4	0.71 (0.57–0.88)***	1.00 (0.76–1.33)
Quintile 5 (greenest)	0.74 (0.59–0.94)*	1.00 (0.75–1.34)

But, context is
important...



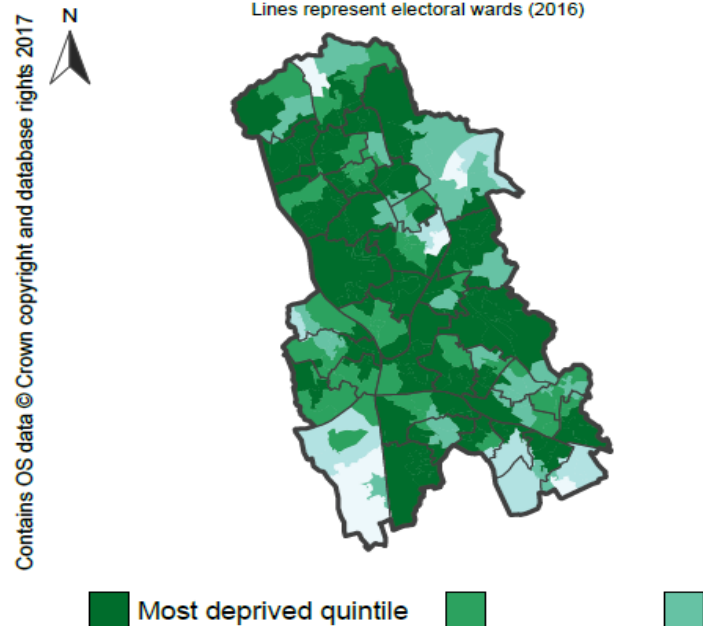
Why is Stoke-on-Trent an
interesting case study?



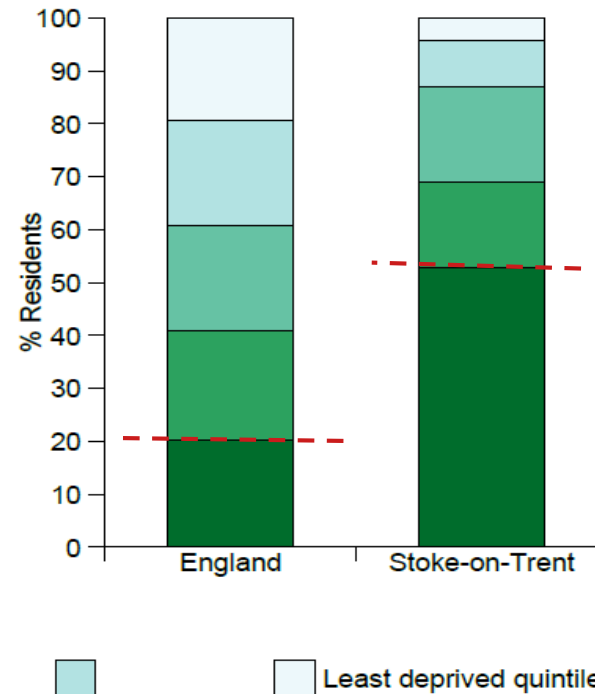
Stoke-on-Trent...

Deprivation: a national view

The map shows differences in deprivation in this area based on national comparisons, using national quintiles (fifths) of the Index of Multiple Deprivation 2015 (IMD 2015), shown by lower super output area. The darkest coloured areas are some of the most deprived neighbourhoods in England.



This chart shows the percentage of the population who live in areas at each level of deprivation.

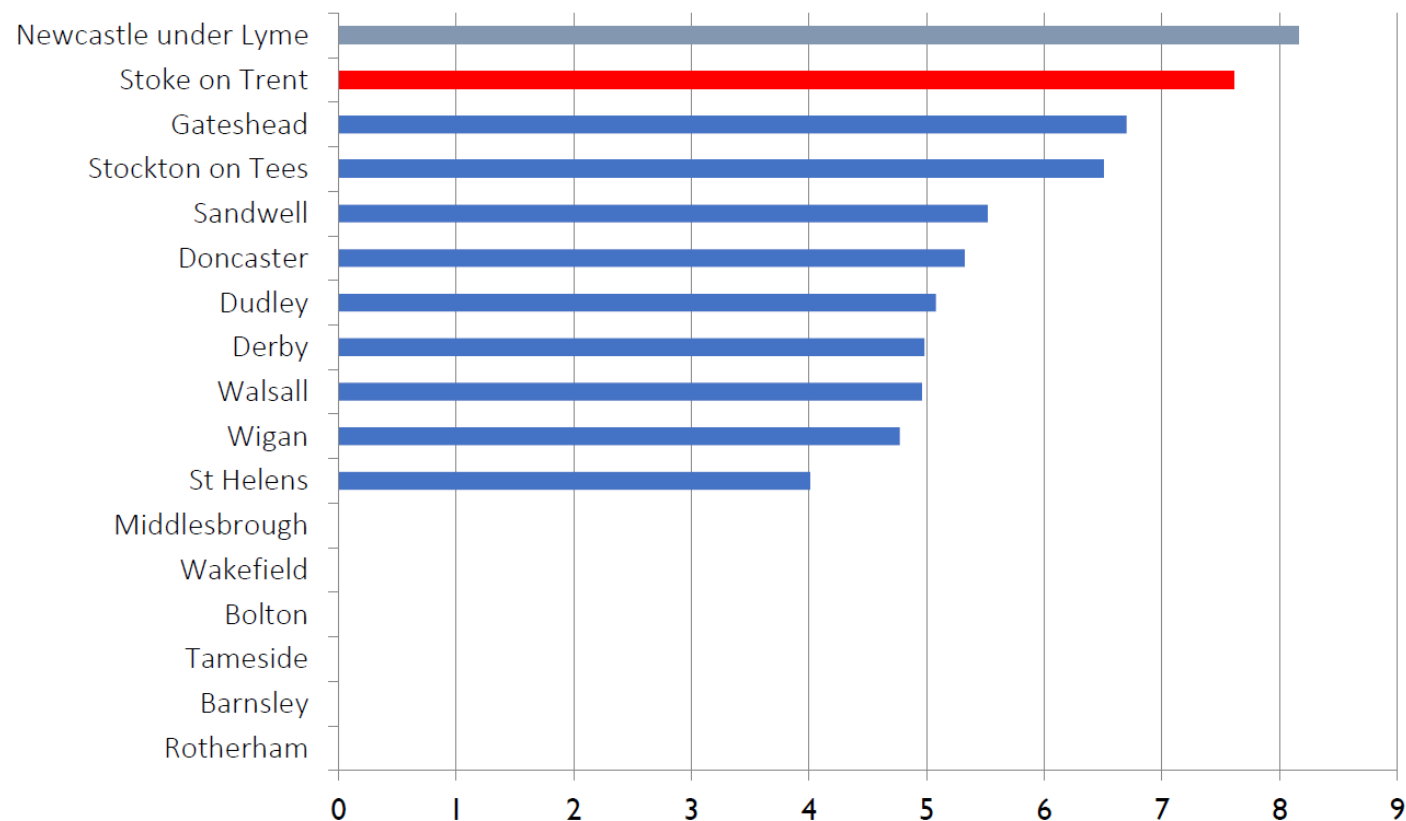


53% of residents living in areas in the most deprived 20% based on national rankings





Total Green Space per 1,000 population



2nd overall in the
nearest neighbour
comparison
(2007 figures)

So, if Stoke-on-Trent is very green, with a lot of deprivation and marked health inequalities within the city...

... where might natural environments come in to play?

Stoke -on-Trent...

- 1044 adults surveyed (CAPI) across 30 neighbourhoods
- Home addresses geocoded
- Natural environment exposure measures calculated (NDVI, distance to nearest, % area, counts – all by type and using various buffer sizes)
- Income deprivation of neighbourhood area

Same data collection in 3 other European cities (Barcelona, Spain; Doetinchem, Netherlands; Kaunas, Lithuania)

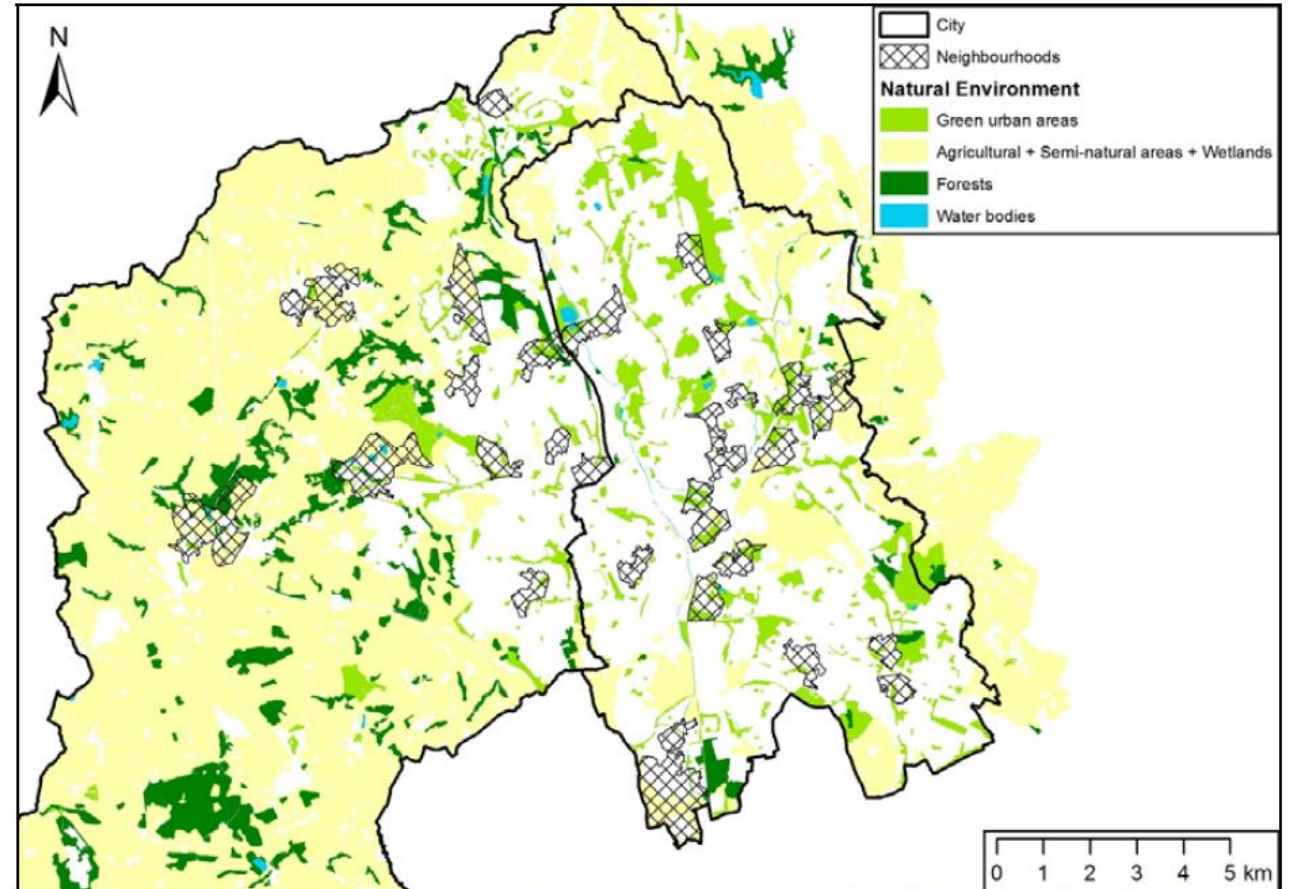
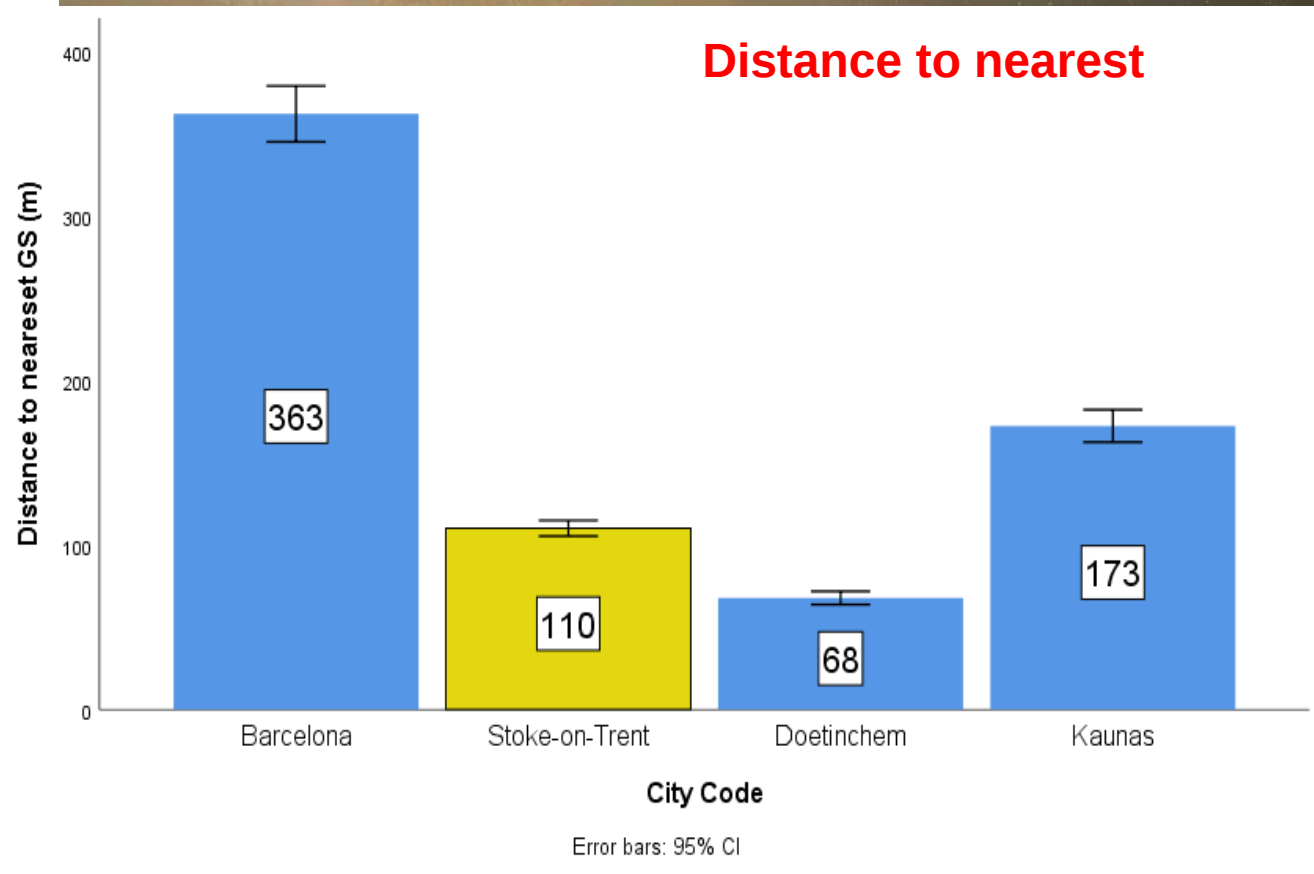
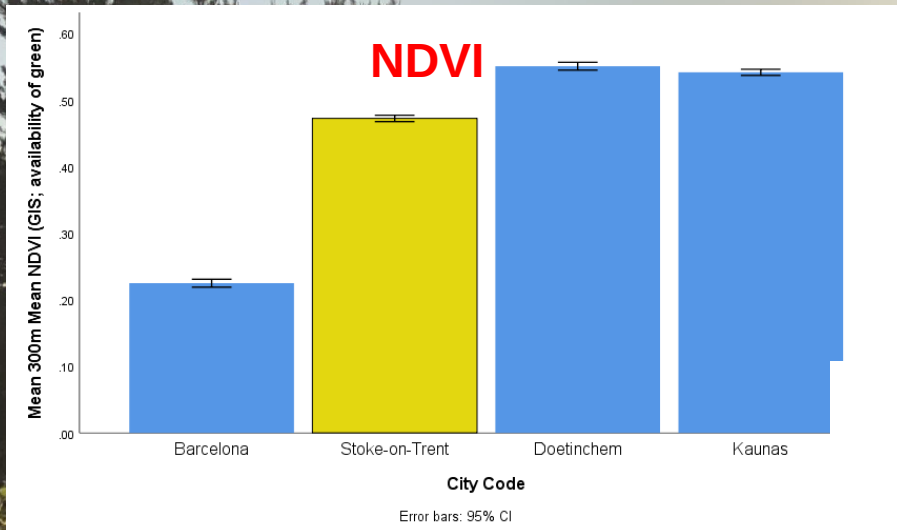


Figure 6. Map of the Stoke-on-Trent study area, 30 selected neighbourhoods and level 1 natural environment data taken from Urban Atlas

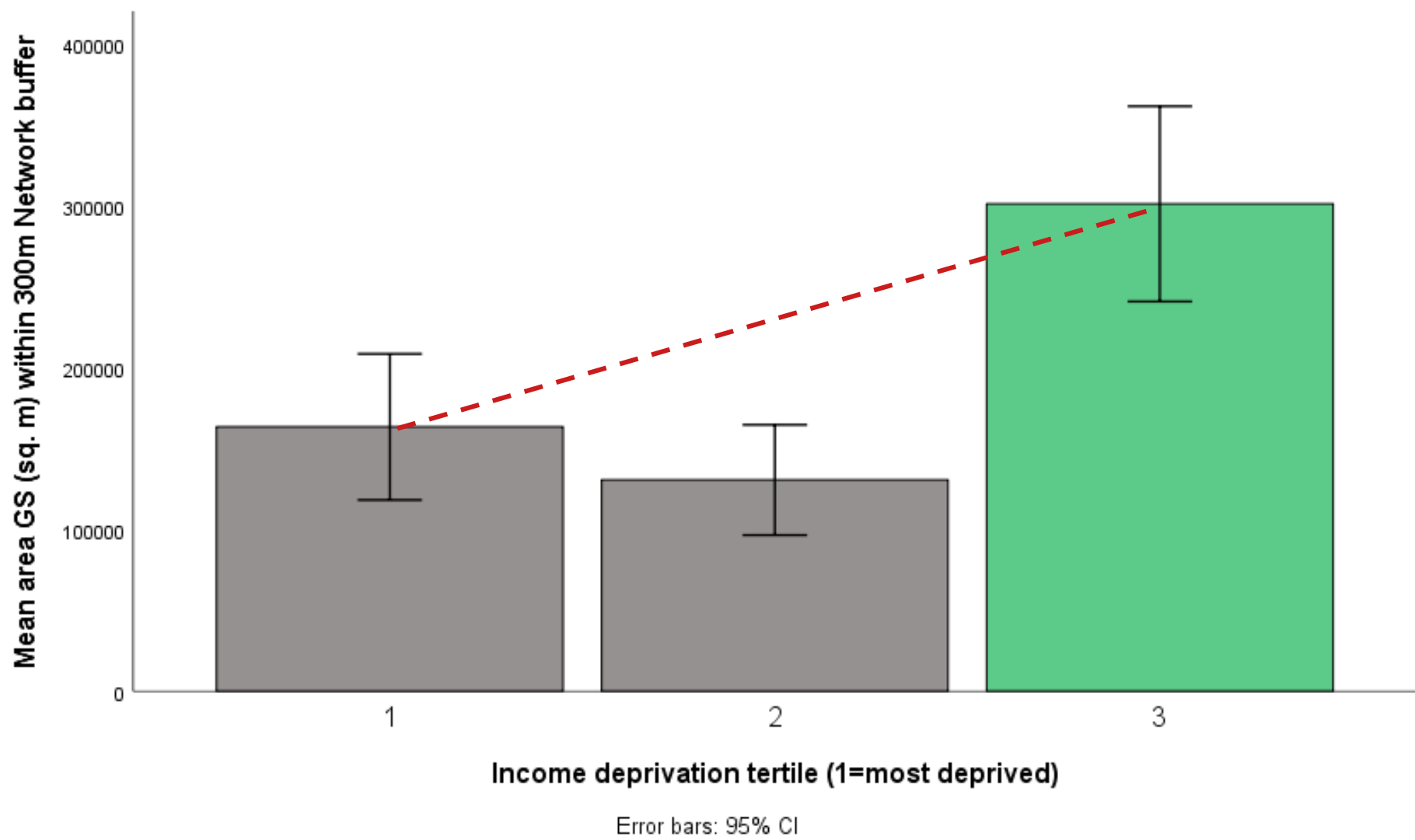
Sample GS (within 300m):



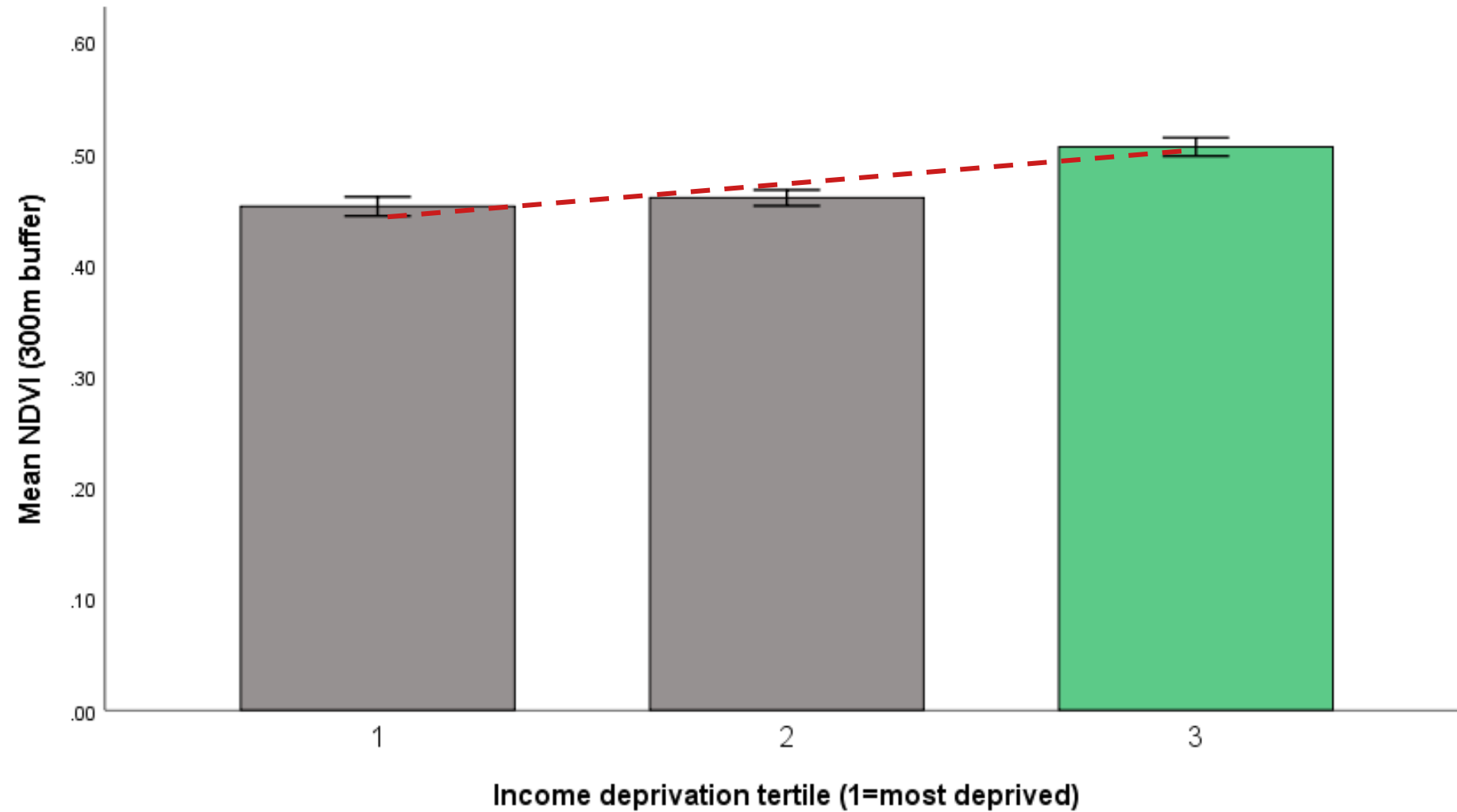
Worse access in more deprived groups in Stoke-on-Trent?



... Area of GS (within 300m)

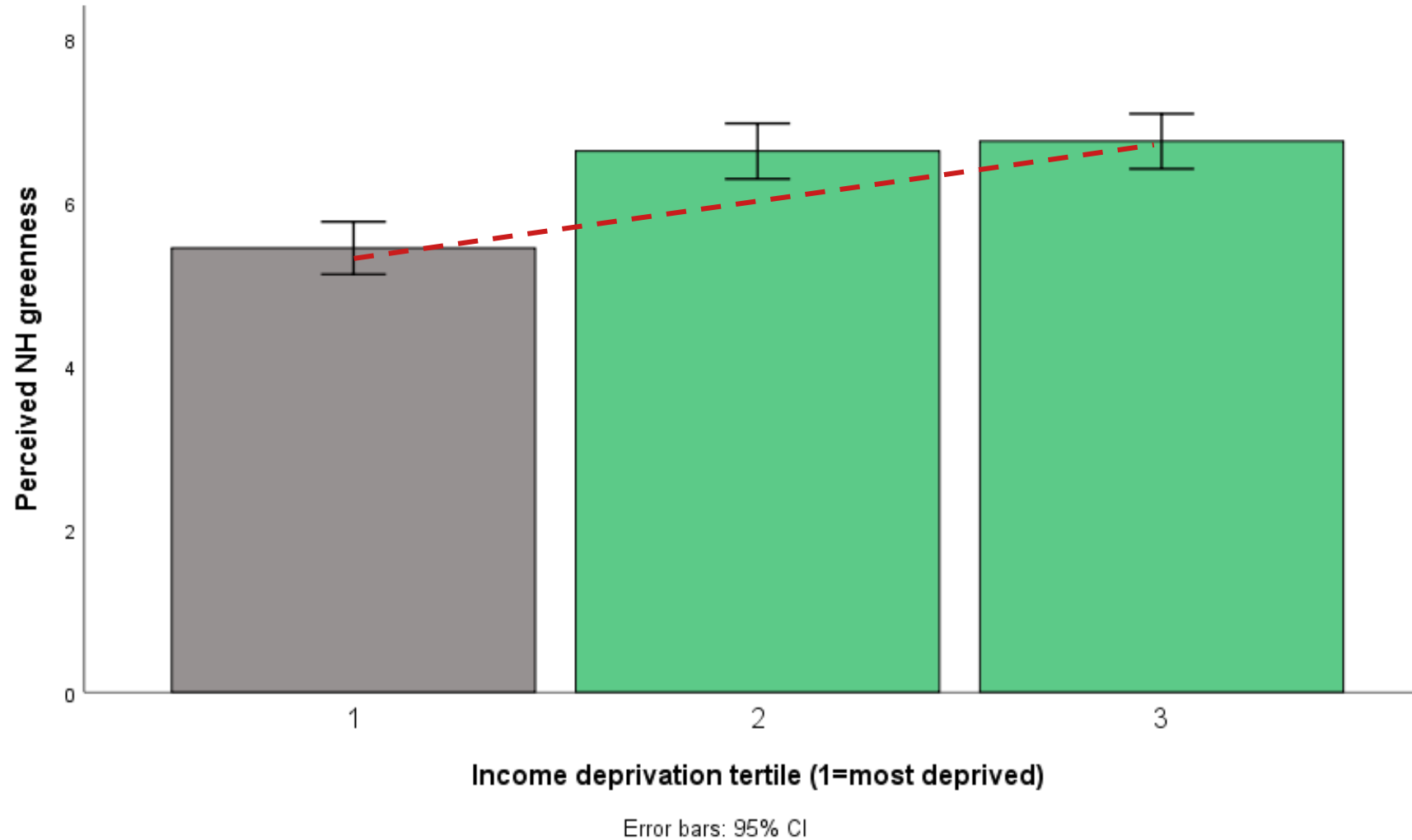


BUT... Surrounding greenness?



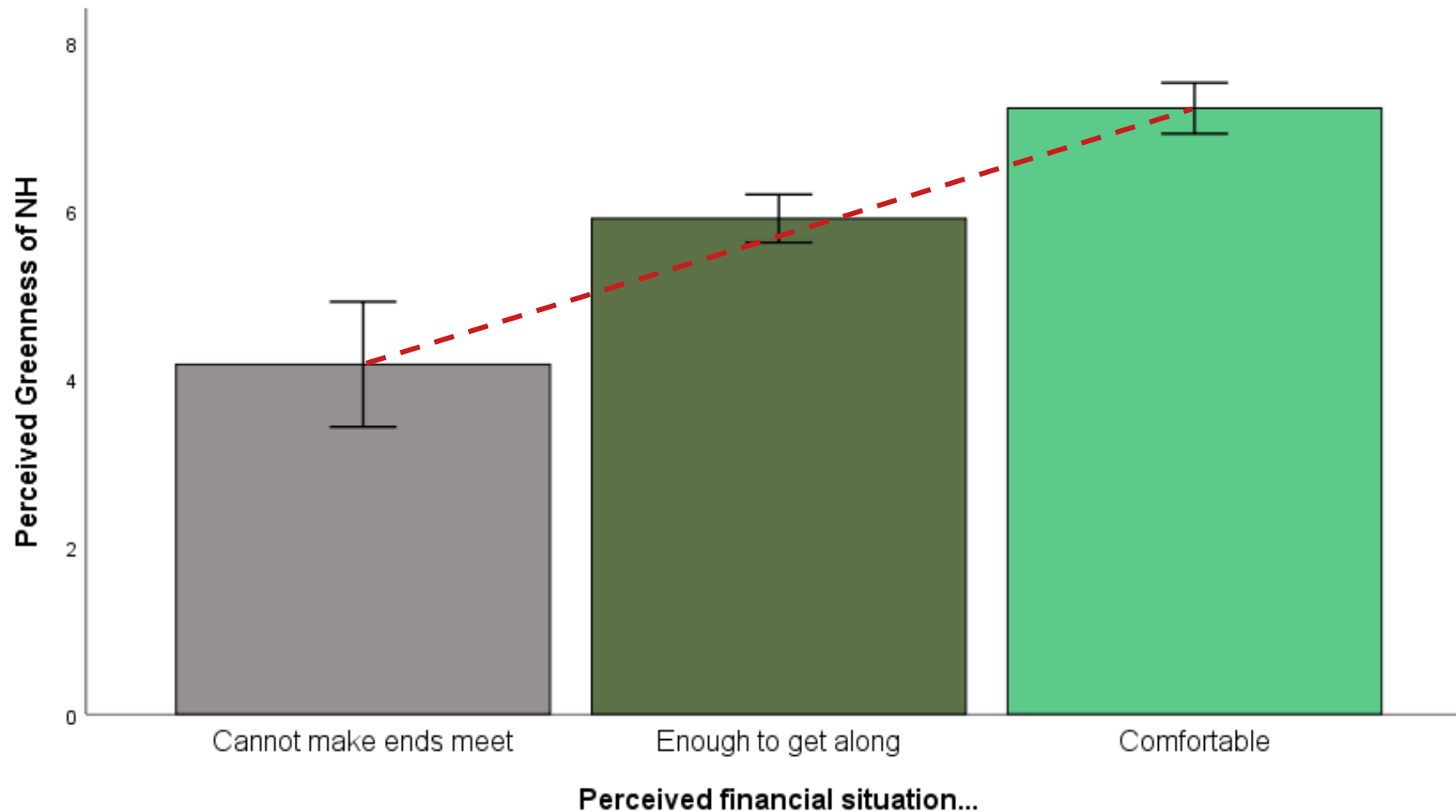
F=49.7, $p < .001$ (sig. diff 1 vs. 3 and 2 vs. 3)

... Perceived neighbourhood greenness (by NH income deprivation)?



F=17.9, $p < .001$ (sig. diff. 1 vs.2, 1 vs. 3)

... Perceived greenness by perceived income situation?



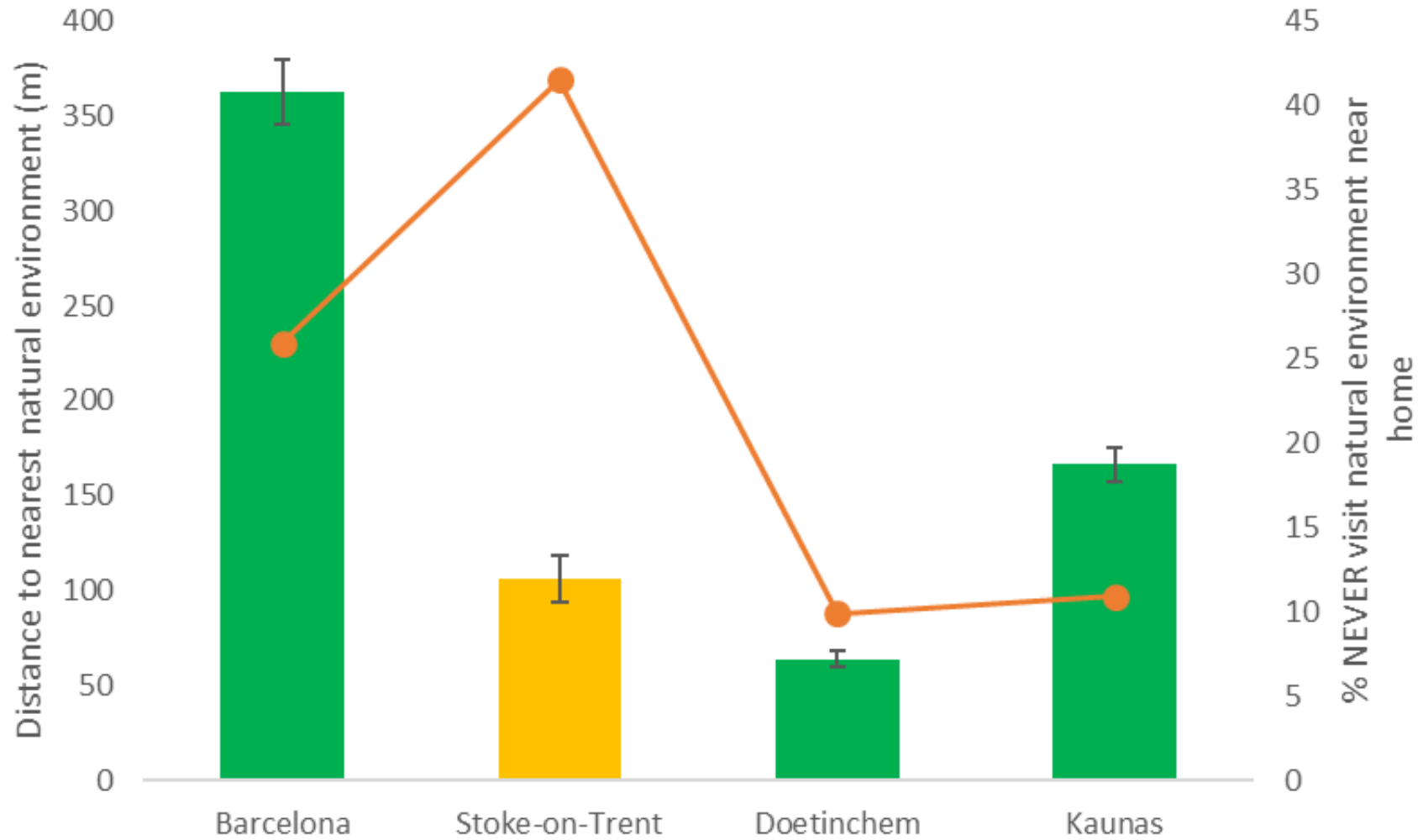
So, social patterning of access indicating that residents of MOST deprived areas of city:

- > HIGHER NUMBER OF 'accessible' GSs close to home

- > LESS green neighbourhoods (real and perceived)

What about use...?

Access $\neq$ Use





Use by SEP

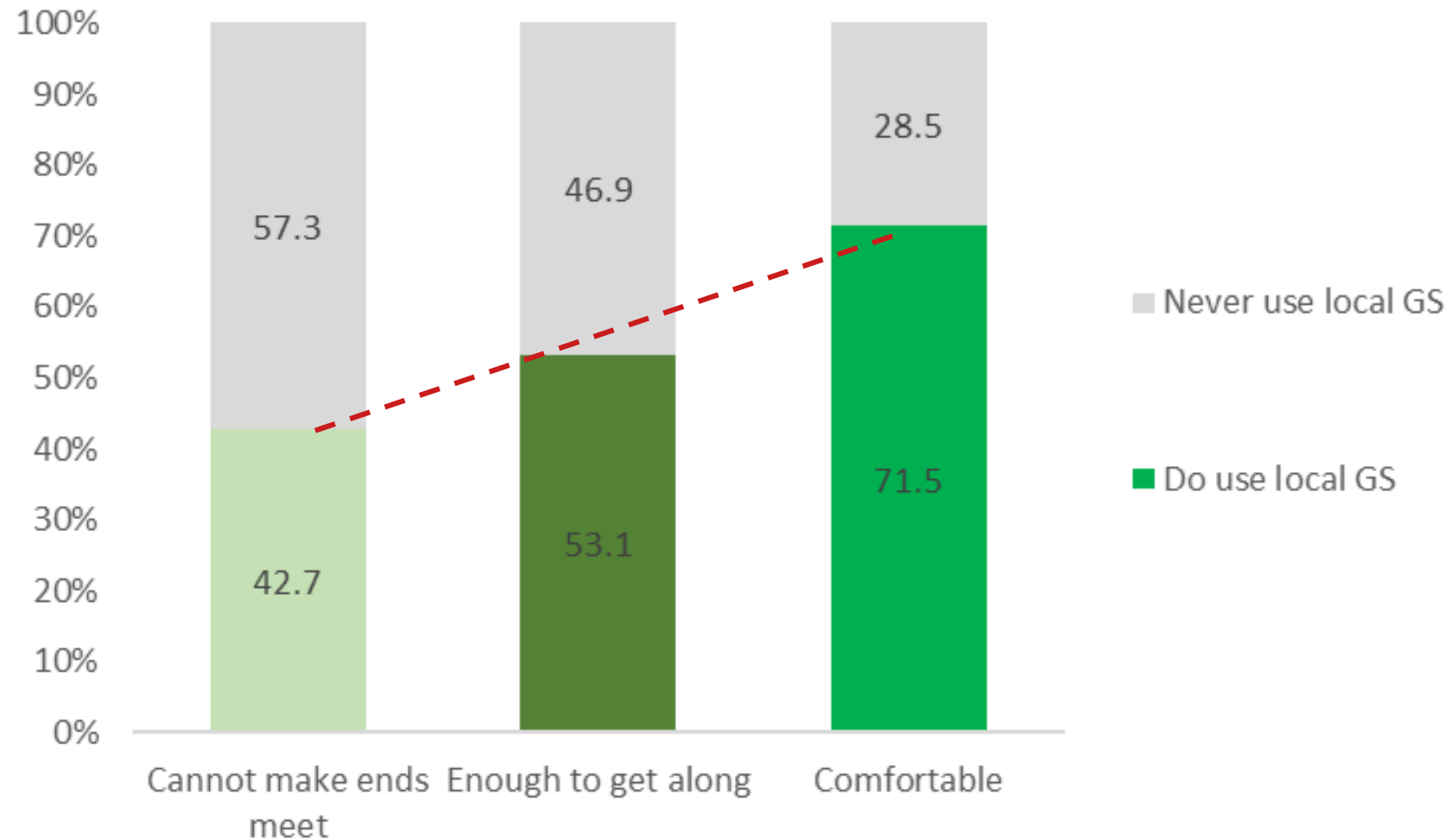
Use (any vs. none) of Green space by NH income deprivation



Lower levels of use among residents in MOST vs. LEAST income deprived NHs

$\chi^2 = 67.9$ $p < .001$

...by perceived income



Predictors of use...



Exploratory model of predictors of GS use (vs. non-use) in SoT...

- Neighbourhood greenness
 - Objective (NDVI)
 - Perceived
- Importance of GS
- Adjusted for:
 - Age
 - Gender
 - Having young children in the household (<12 yr)
 - Dog ownership
 - Neighbourhood-level deprivation
- Satisfaction with quality -> excluded
- Audited quality -> excluded
- Have garden or yard -> excluded
- Etc. etc.



... results (preliminary):

		Individual			2-level		
		OR	95%CI	p	OR	95%CI	p
GIS NH greenness		1.00	1.00-1.00	.310	1.00	1.00-1.00	.354
Perceived NH greenness		1.11	1.06-1.17	<.001	1.08	1.02-1.14	.006
Perceived NON-importance of GS		0.95	.91-0.99	.013	0.95	.91-.99	.031
Perceived financial situation	<i>Cannot make ends meet</i>	1.00	-		1.00	-	
	<i>Enough to get along</i>	1.42	0.83-2.40	.196	1.21	.68-2.15	.524
	<i>Comfortable</i>	2.86	1.65-4.95	<.001	2.21	1.20-4.05	.011
Age		0.99	.98-1.00	.091	0.99	.98-1.00	.220
Sex	<i>Male</i>	1.00	-		1.00	-	
	<i>Female</i>	0.96	.72-1.29	.799	1.05	.77-1.43	.738
Dog ownership	<i>No</i>	1.00	-		1.00	-	
	<i>Yes</i>	1.94	1.41-2.68	<.001	2.13	1.50-3.02	<.001



So what does this mean for Stoke-on-Trent...

- Overall access is very high (74% meet 300m WHO standard)
- Levels of use of local GS are not...
- Predictors of USE:*

- Perceived Neighbourhood greenness
- Importance of GS
- Perceived financial situation

- Objectively defined access/area/N of GS
- Perceived/audited quality
- Satisfaction

*Independent of other individual and neighbourhood factors (age, gender, dog ownership, young children, neighbourhood/deprivation)



So what does this mean for Stoke-on-Trent...

- This reduces the potential for health benefits of natural environment exposure in lower socio-economic groups in Stoke-on-Trent (who have most to gain)

Interventions....

Quality

*Urban green space is the most effective way to get people to the green space. **engagement** promotes the green space as a new target.*

Activities



Urban Green Space Interventions and Health

A review of impacts and effectiveness



interventions and health: A review of impacts and effectiveness. Copenhagen: WHO.

Interventions....

... or we prescribed dogs...





THANK YOU

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The results show that whilst all families recognised the benefits of greenspaces, use was bounded by a variety of structural, community, and individual determinants.

Individual determinants preventing use included lack of knowledge about where to go, or how to get there and confidence in managing young children whilst outdoors.

Fear of crime, antisocial behaviour and accidents were the overriding barriers to use, even in high quality spaces. Social and community influences both positively encouraged use (for example, positive social interactions, and practical support by others) and prevented use (antisocial or inappropriate behaviours experienced in greenspace).

The built environment was a key barrier to use. Problems related to unsuitable or unsafe playgrounds, no gardens or safe areas for children's play, poor accessibility, and lack of toilets were identified.

However, the value that parents and children placed on natural blue and green features was an enabler to use. Contextual influences included external time pressures, difficulties of transporting and caring for young children and poor weather.

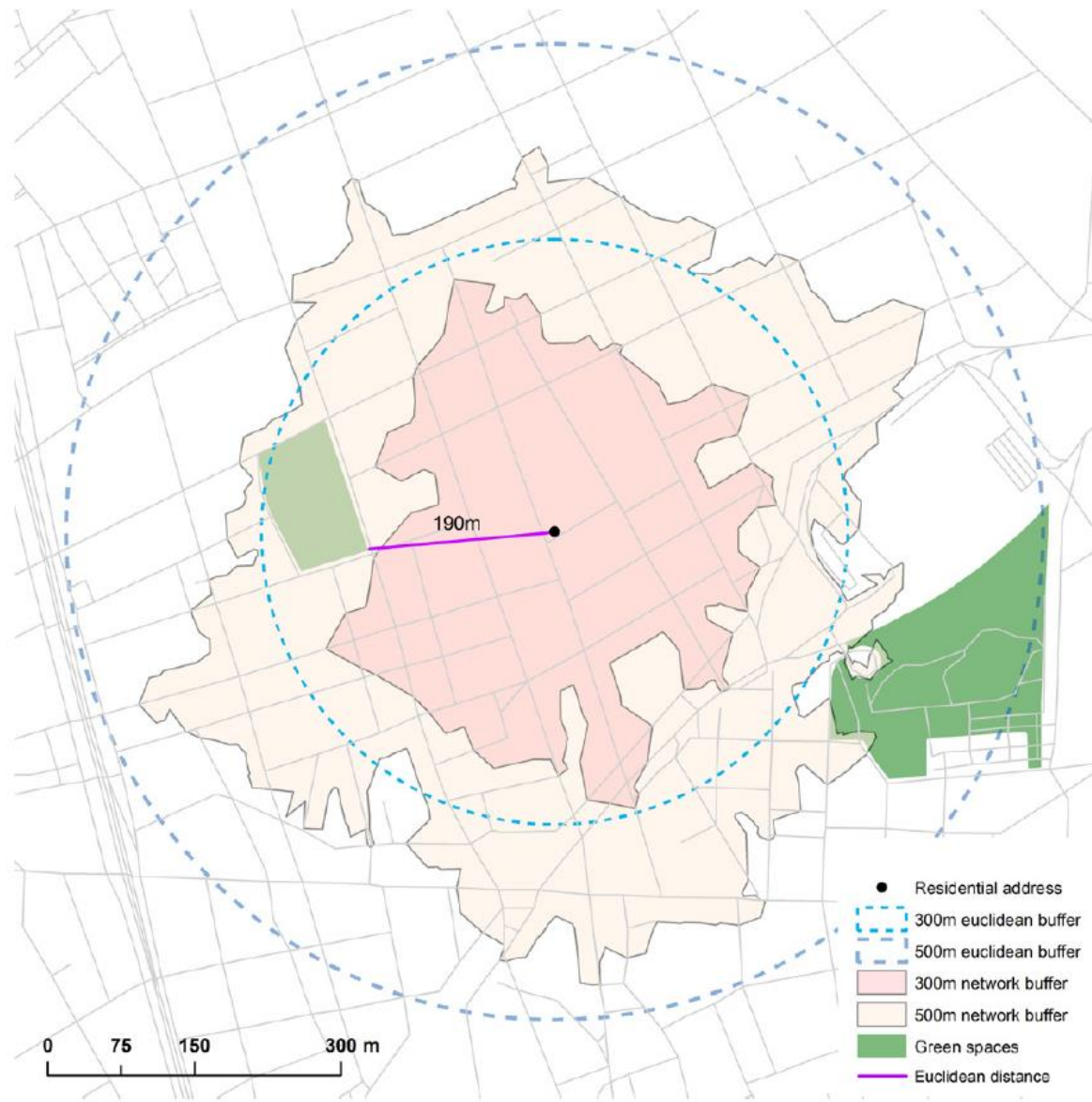


Figure 1 Example of different buffer types and the distance to natural outdoor environments from a residential address.

Zijlema, W.L., Christian, H., Triguero-Mas, M., Cirach, M., van den Berg, M., Maas, J., Gidlow, C.J et al. , 2019. Dog ownership, the natural outdoor environment and health: a cross-sectional study. *BMJ Open* 9. <https://doi.org/10.1136/bmjopen-2018-023000>

Socio-economic patterning in urban green space – premature all cause mortality for England

