The University Of Queensland
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Greenspace and health in the UK Biobank Cohort

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Over half a million participants across England, Wales and Scotland

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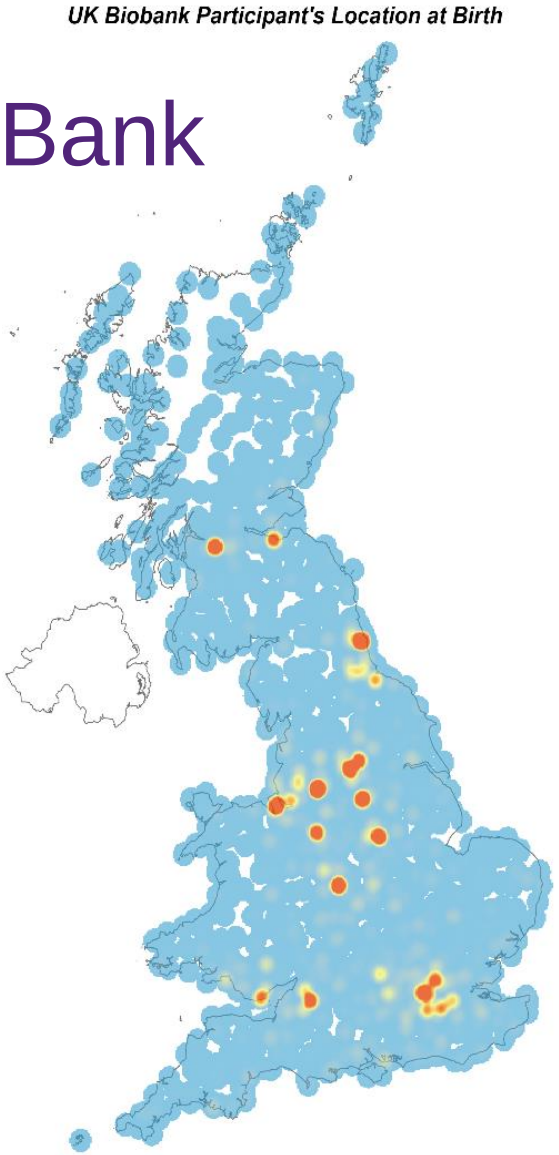
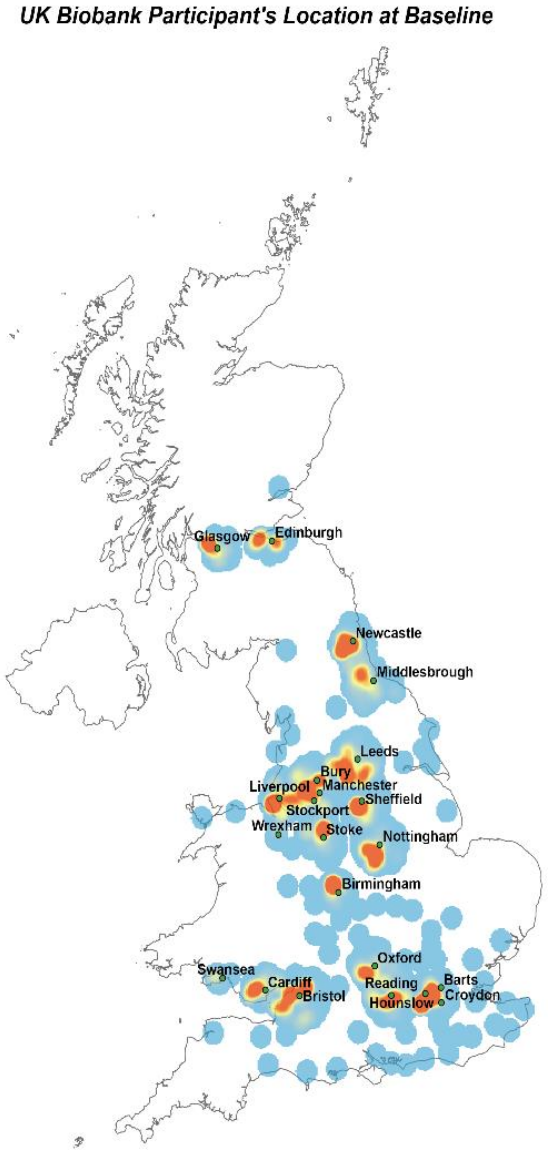
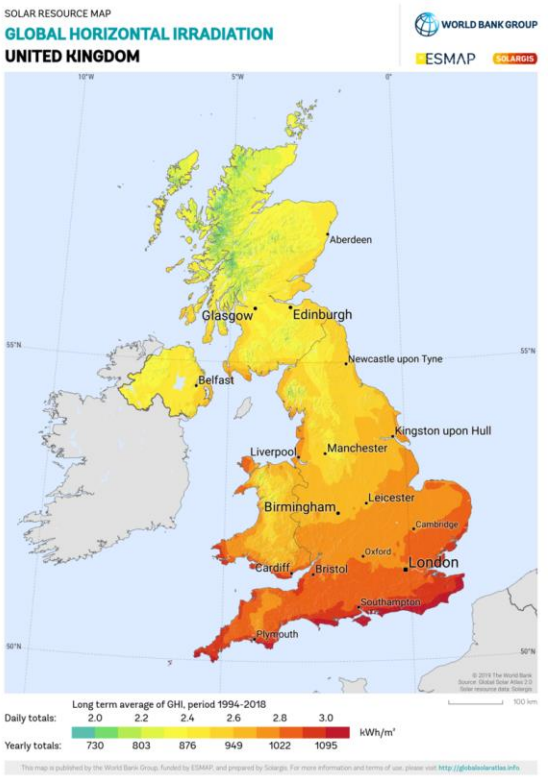
UK BioBank







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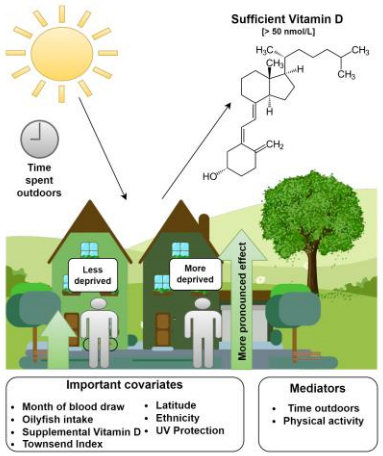
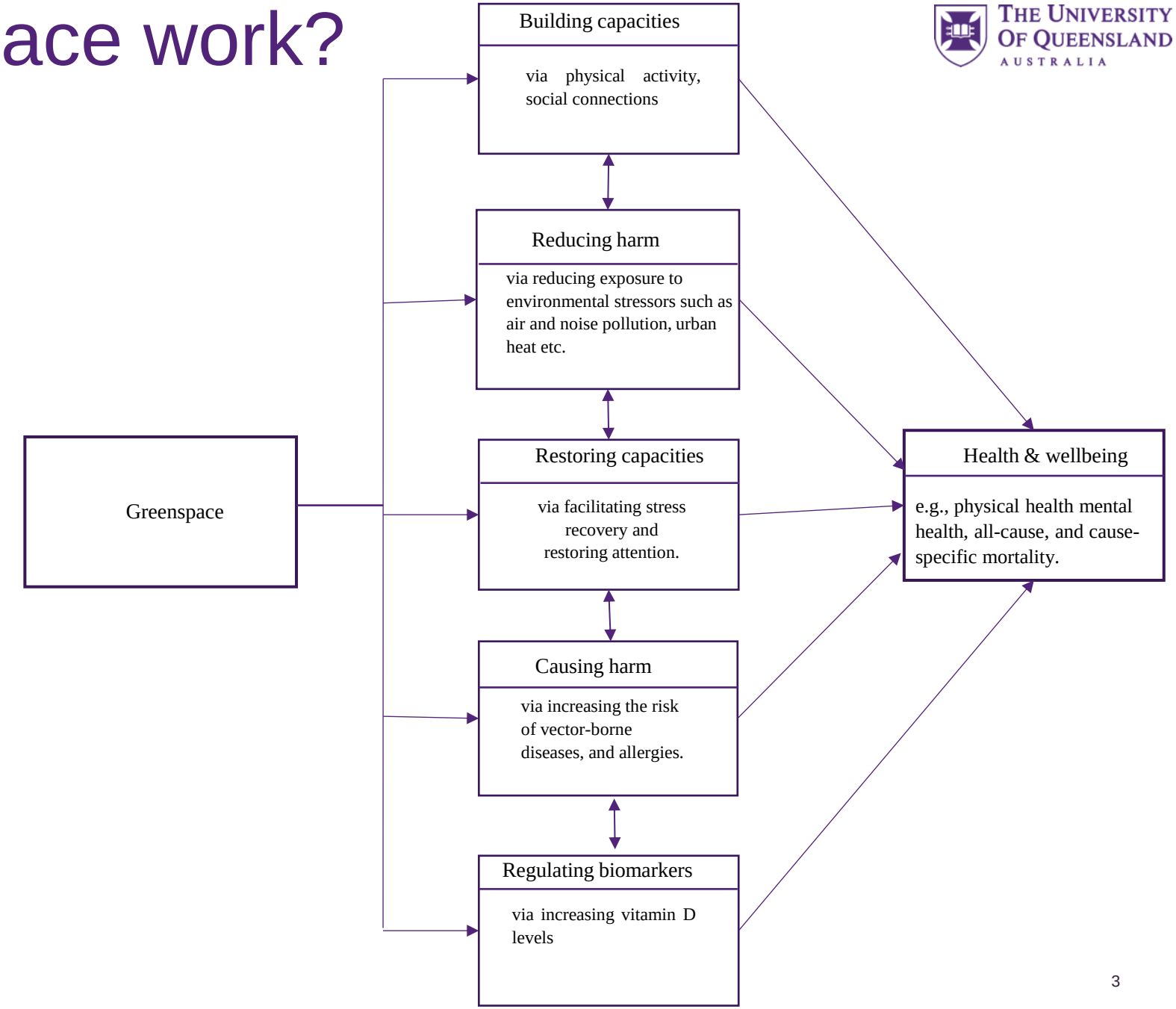
How does greenspace work?



- Greenspace and cancers
- Greenspace and vitamin D
- Greenspace and metabolic syndrome
- Shiftwork and vitamin D

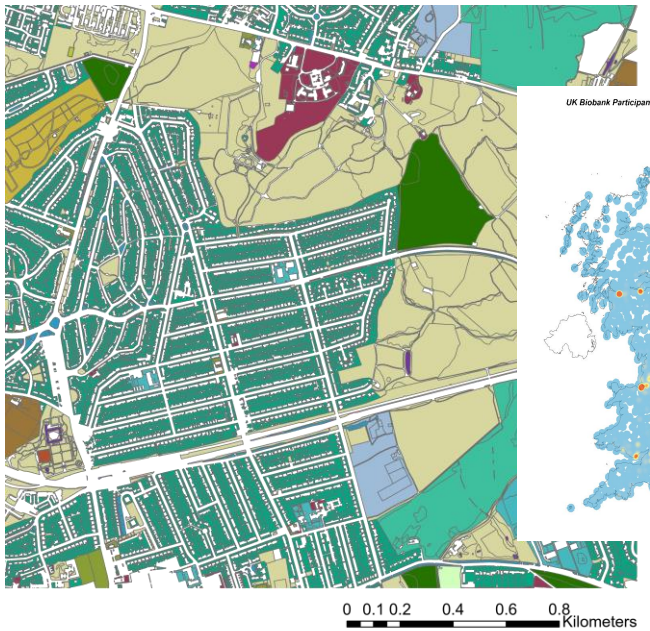


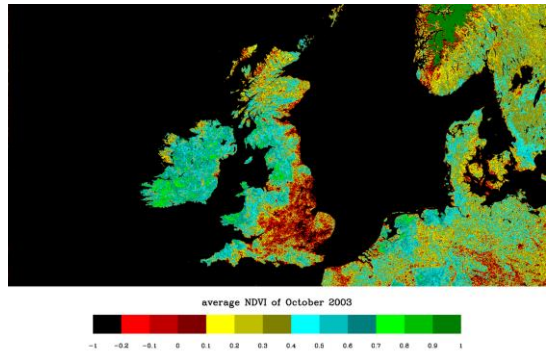
Exposures and outcomes

- **Expsoures**
  - NDVI – satellite derived
  - % greenspace
  - Distance to parks/greenspace
  - Type of greenspace, from land use mapping – including
    - Private garden
    - Public greenspace
    - Other……natural, camping, golf course, playing field

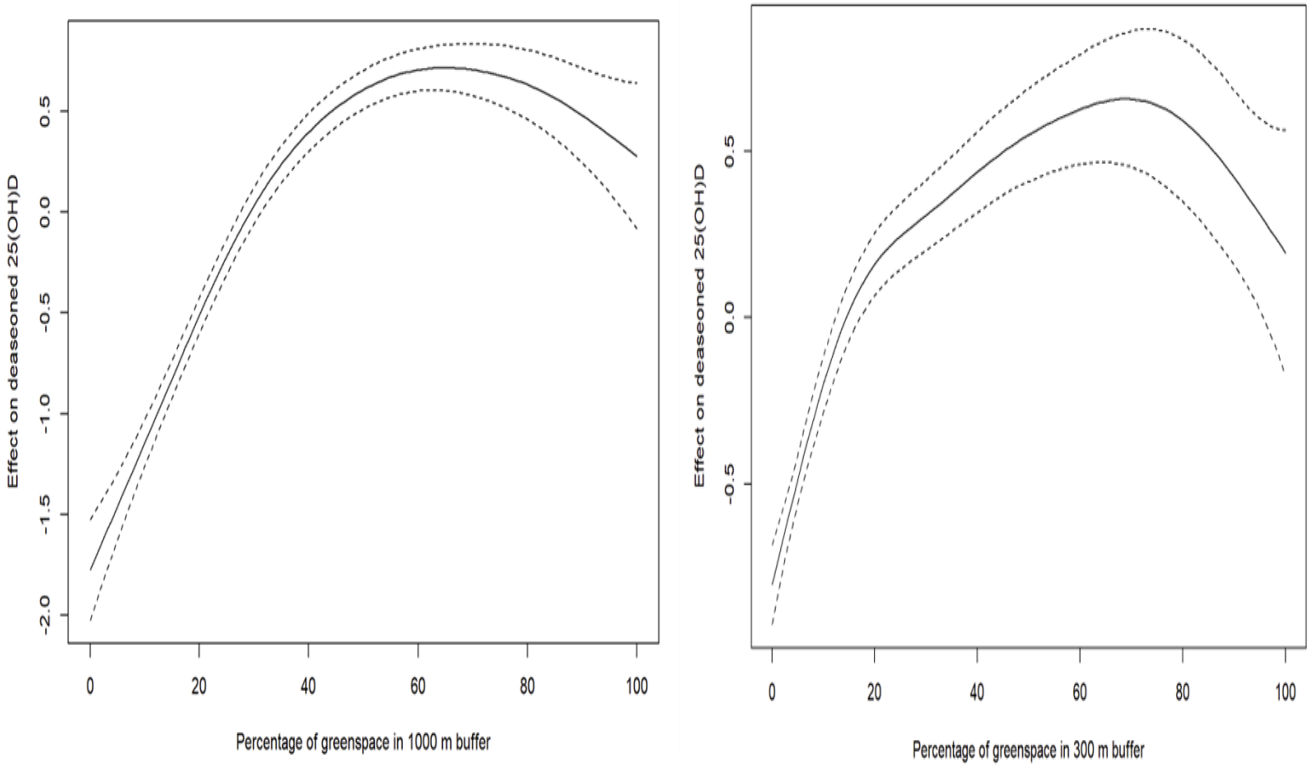
Outcomes

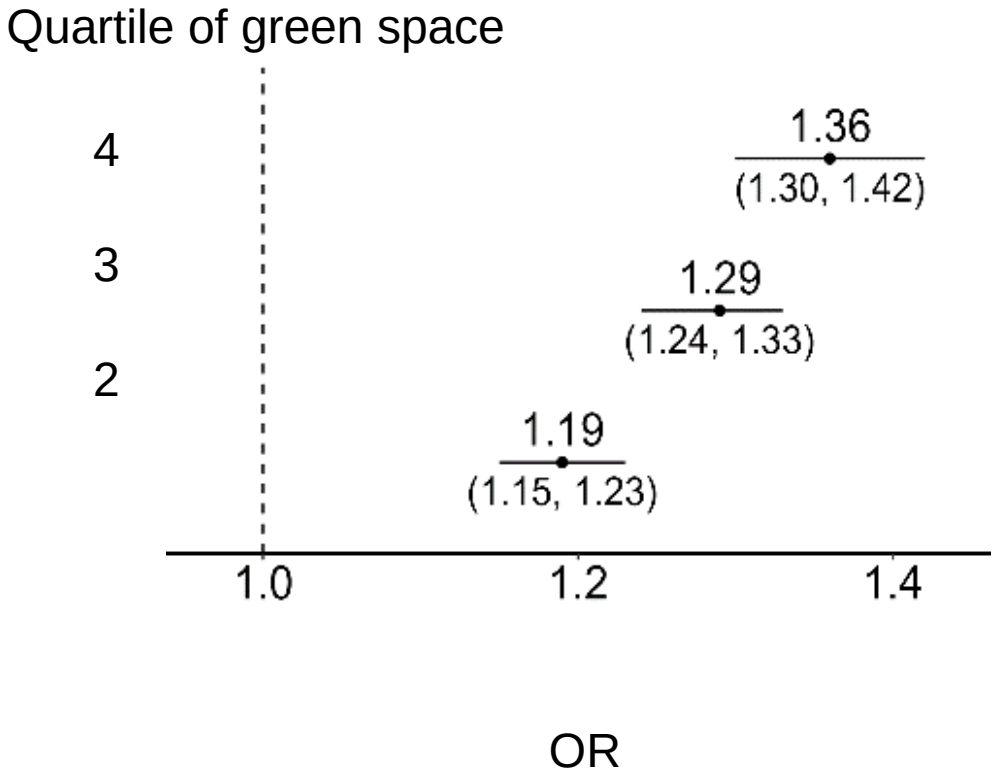
- Cancer outcomes from cancer registry
- Vitamin D
- Metabolic syndrome





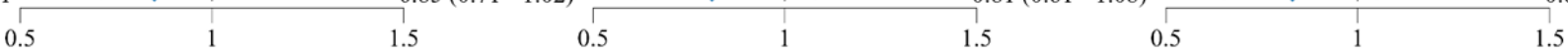
Increasing greenspace increased vitamin D – cross-sectional



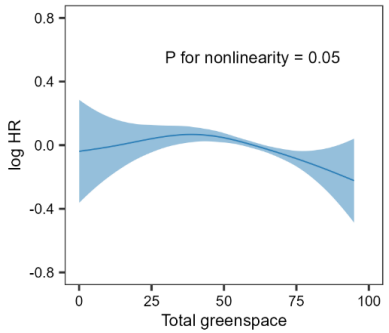


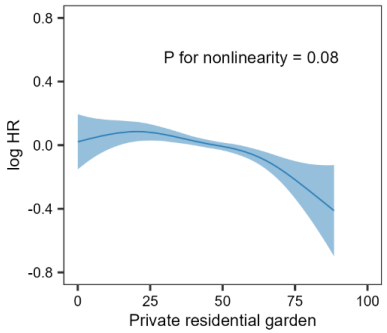
Association for overall obesity-related cancer (ORC) and site-specific ORC

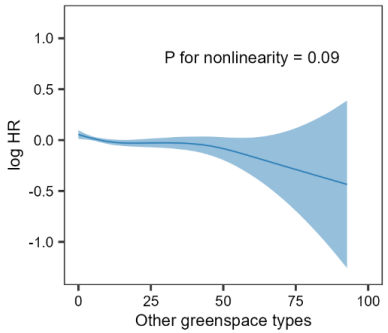
Cancer type	Cases	Total greenspace	HR (95% CI)	Private residential gardens	HR (95% CI)	Other greenspace types	HR (95% CI)
ORC with prostrate	13,681		0.96 (0.94 - 0.99)		0.93 (0.90 - 0.97)		0.97 (0.94 - 1.00)
ORC without prostrate	9,550		0.95 (0.92 - 0.98)		0.92 (0.88 - 0.96)		0.96 (0.92 - 1.00)
Prostate	4,130		0.98 (0.94 - 1.03)		0.95 (0.89 - 1.02)		1.00 (0.94 - 1.05)
Breast	3,793		0.95 (0.90 - 1.00)		0.91 (0.84 - 0.98)		0.96 (0.90 - 1.03)
Colorectum	2152		0.99 (0.93 - 1.06)		0.99 (0.89 - 1.09)		1.00 (0.92 - 1.08)
Uterus	637		0.86 (0.76 - 0.96)		0.80 (0.67 - 0.96)		0.85 (0.73 - 0.99)
Kidney	501		0.98 (0.86 - 1.12)		0.97 (0.79 - 1.19)		0.99 (0.84 - 1.16)
Pancreas	441		0.90 (0.78 - 1.03)		0.81 (0.66 - 1.00)		0.94 (0.80 - 1.11)
Oesophagus	411		1.01 (0.87 - 1.16)		1.05 (0.84 - 1.31)		0.97 (0.83 - 1.33)
Ovary	405		0.91 (0.78 - 1.06)		0.92 (0.72 - 1.17)		0.85 (0.70 - 1.05)
Multiple myeloma	385		0.94 (0.81 - 1.08)		0.84 (0.67 - 1.06)		0.99 (0.83 - 1.19)
Stomach	272		0.99 (0.83 - 1.18)		0.97 (0.73 - 1.27)		1.02 (0.82 - 1.26)
Liver	231		0.85 (0.71 - 1.02)		0.81 (0.61 - 1.08)		0.83 (0.65 - 1.05)



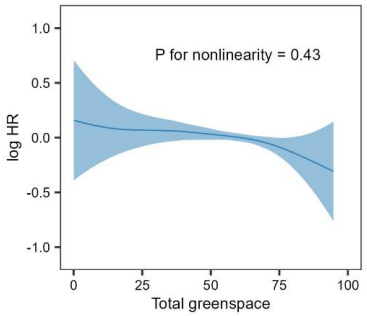
Exposure-response curve plots with restricted cubic spline (3 degree of freedom)

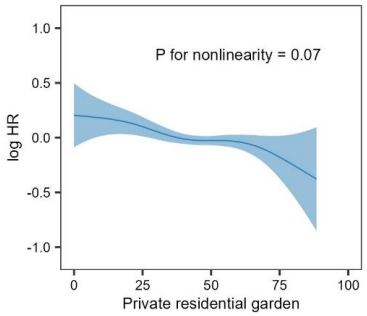


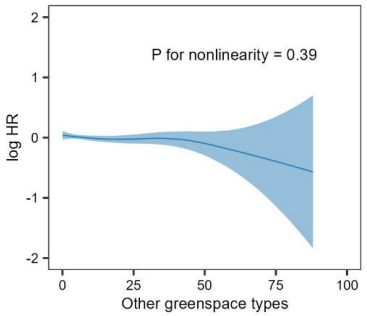




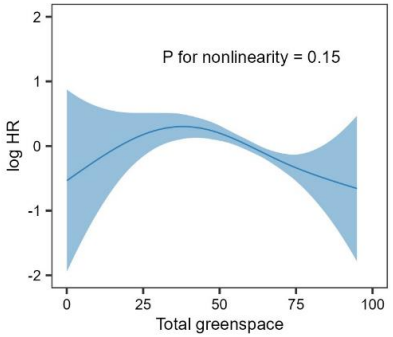
All obesity_related cancers

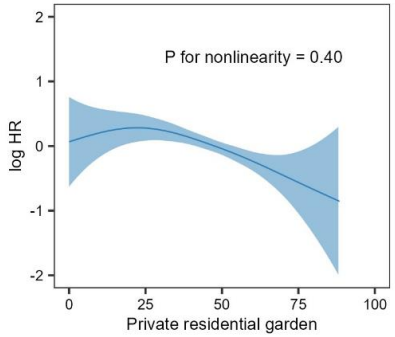


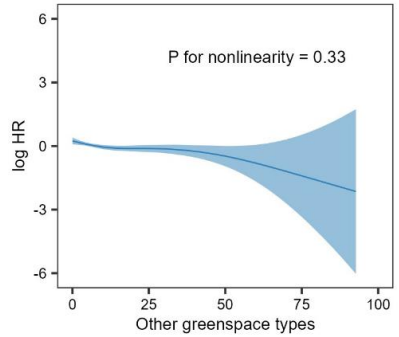




Breast cancer







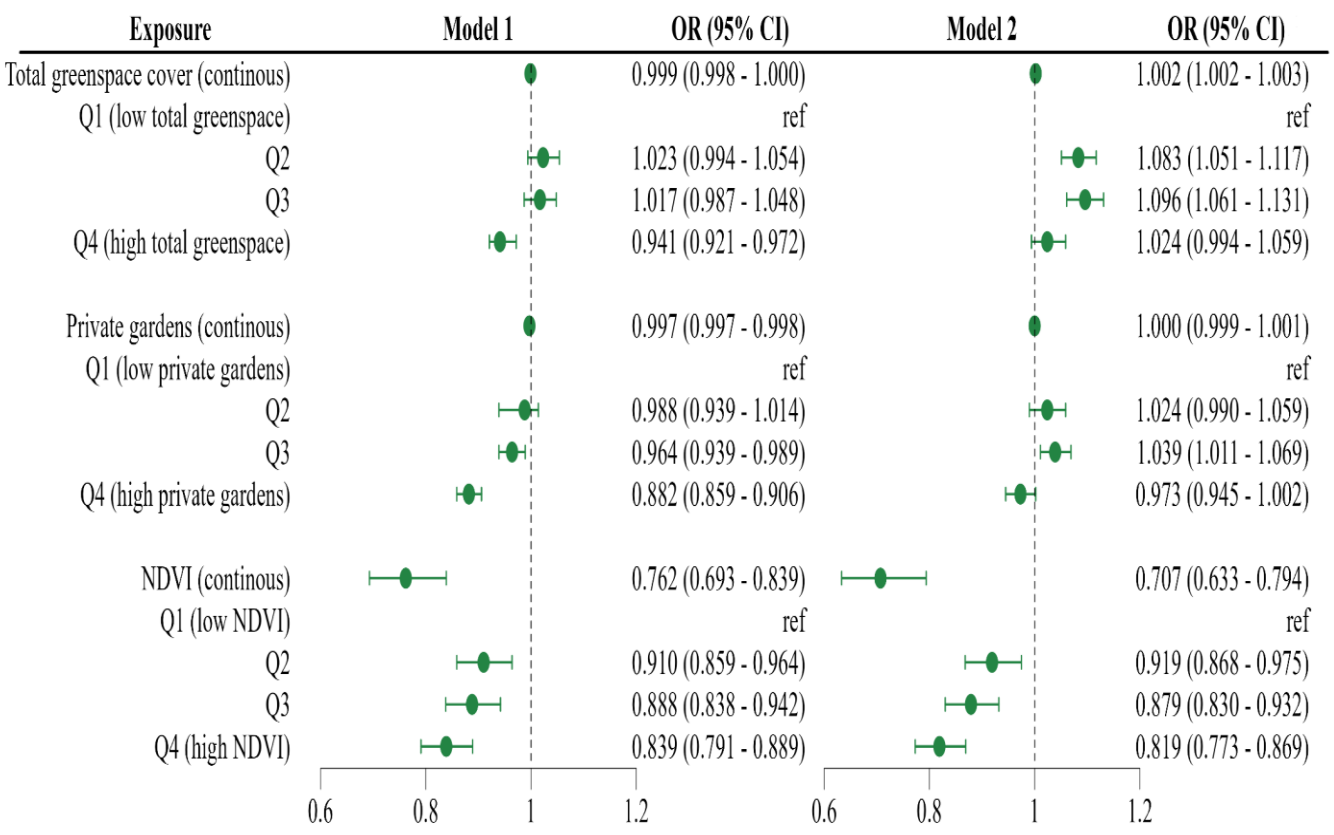
Uterus cancer

Mediation for Overall Obesity-related Cancer

Mediator	Total greenspace		Private residential gardens		Other greenspace types	
	Proportion mediated (95 % CI)	**P**	**Proportion mediated (95% CI)**	**P**	**Proportion mediated (95% CI)**	**P**
Physical activity	0.01 (-0.002, 0.017)	0.11	0.01 (-0.002, 0.014)	0.16	0.01 (-0.003, 0.022)	0.16
Deseasoned 25(OH)D	0.02 (-0.003, 0.052)	0.08	0.02 (-0.001, 0.043)	0.06	0.03 (-0.025, 0.090)	0.27
$PM_{2.5}$	0.08 (-0.236, 0.402)	0.61	0.07 (-0.242, 0.379)	0.66	0.07 (-0.259, 0.403)	0.67
NO_2	-0.41 (-0.756, -0.079)	0.01	-0.36 (-0.644, -0.078)	0.01	-0.52 (-1.073, 0.031)	0.06

- Greenspace within immediate vicinity of residential addresses may capture the mitigation of adverse impacts of air pollutants such as NO_2 (Kayyal-Tarabeia et al., 2022; Markevych et al., 2017)

Greenspace and Metabolic Syndrome



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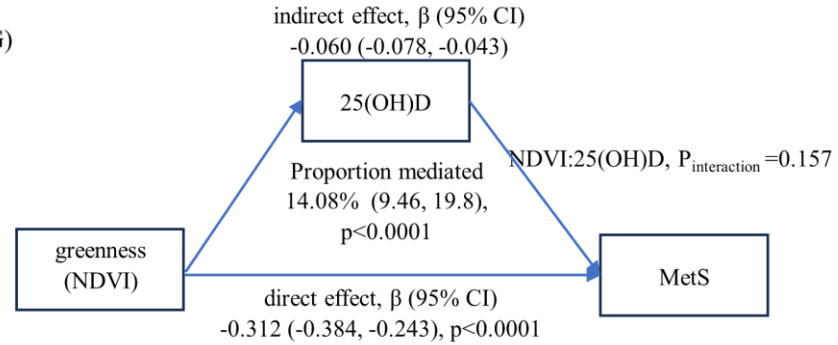

Shift workers (including nighttime shift workers had higher vitamin D levels than non-shift workers…….spend time outside in afternoons?