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Associations of surrounding green space with cardio- metabolic disease

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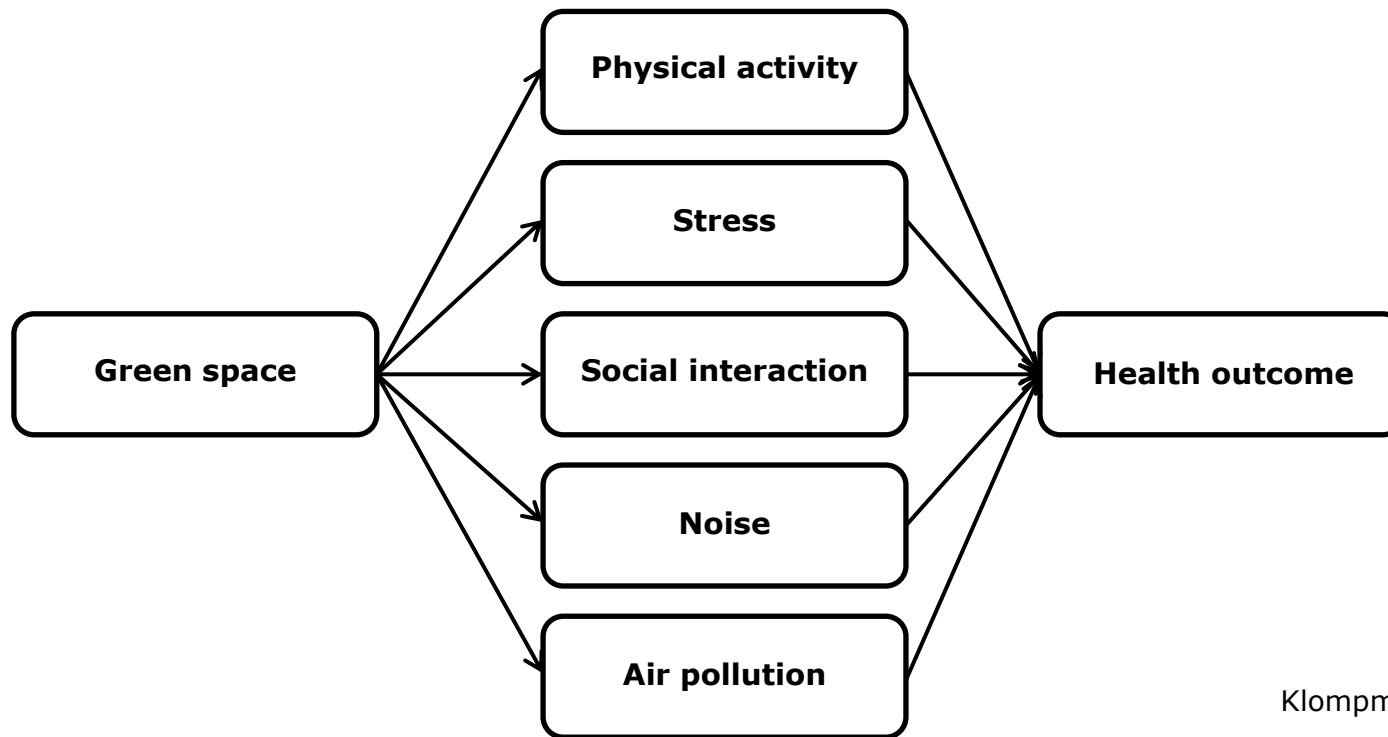
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Introduction

- There are multiple pathways through which green space may affect health:

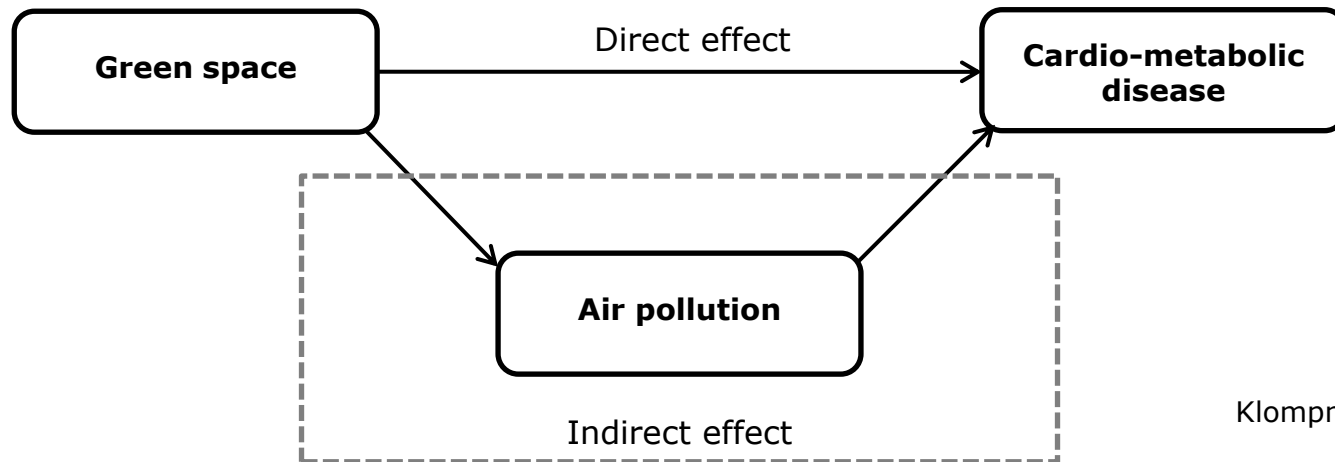


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Objective

- To evaluate whether surrounding green space is associated with cardio-metabolic diseases (diabetes, hypertension, heart attack and stroke morbidity)
- To evaluate whether decreased levels of air pollution is a potential pathway underlying the effects of surrounding green space on cardio-metabolic disease

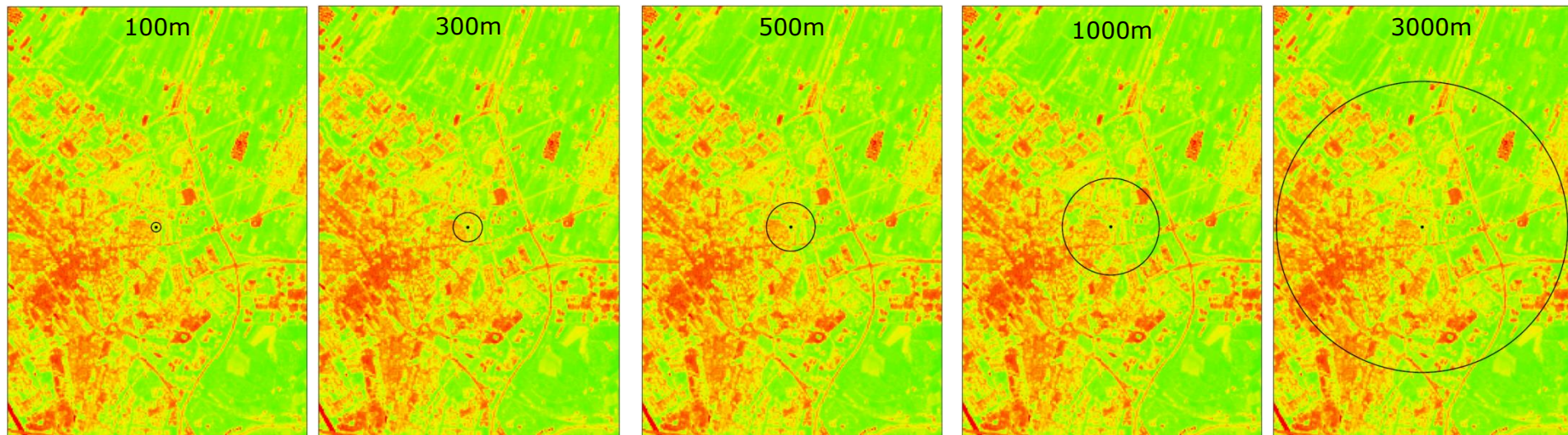


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Methods

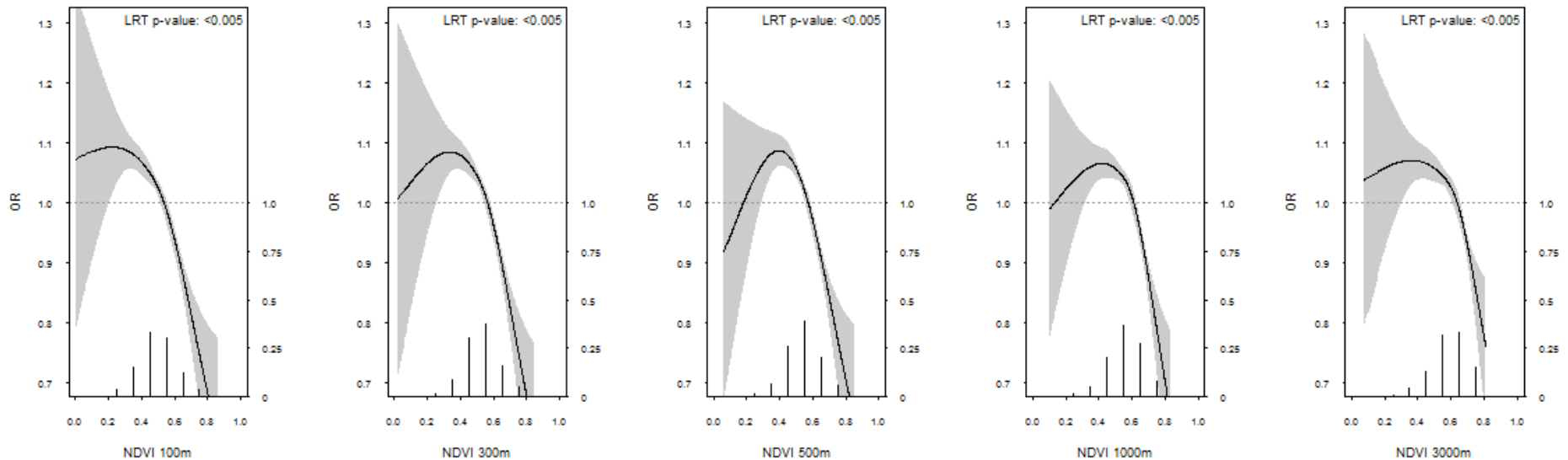
- 387,195 adults aged ≥ 19 (Gezondheidsmonitor 2012)
- Green space exposure assessment
 - Normalized Difference Vegetation Index (NDVI)





Exposure-response curve

- Surrounding green space -> diabetes



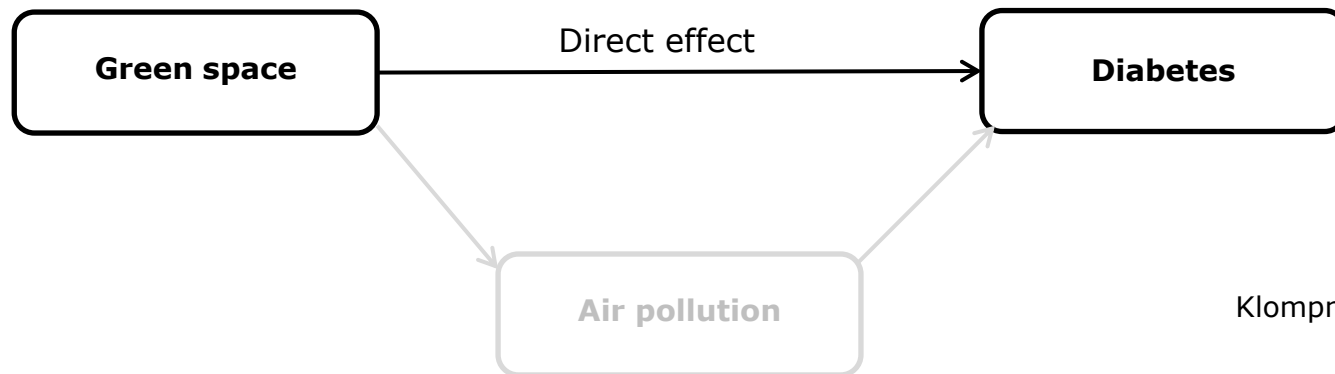
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Results

- Direct effect of exposure to surrounding green space on diabetes

Exposure	Quintile	OR
NDVI 300m	≤0.44	ref
	≤0.50	0.99 (0.94, 1.04)
	≤0.55	0.98 (0.94, 1.03)
	≤0.61	0.93 (0.88, 0.98)
	>0.61	0.82 (0.77, 0.88)



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Results

- Effect of exposure to air pollution on diabetes

Exposure	Quintile	OR
NO2	<19.1	ref
	≤22.0	1.08 (1.03, 1.13)
	≤25.0	1.10 (1.05, 1.15)
	≤28.9	1.11 (1.06, 1.16)
	>28.9	1.20 (1.15, 1.26)



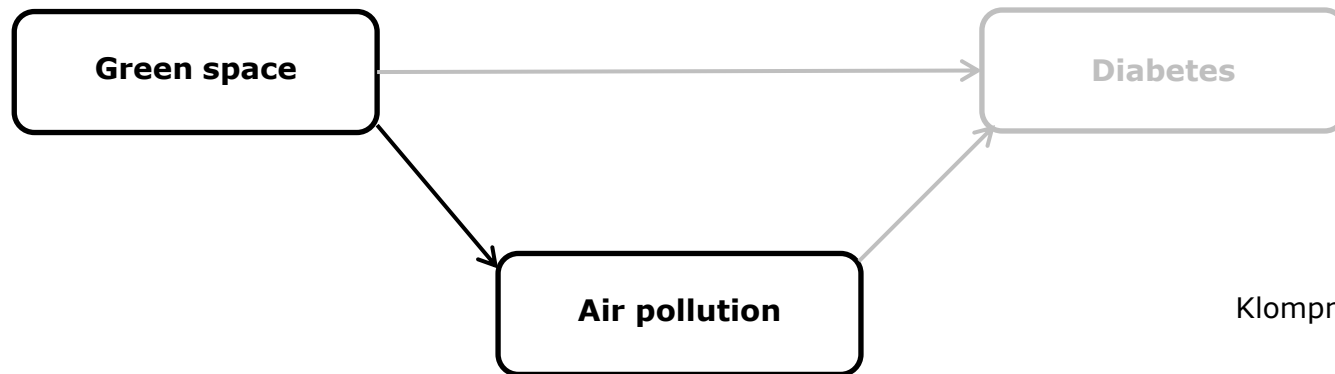
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Results

- Effect of green space exposure on air pollution concentration

green space	Quintile	NO2	
		Mean difference (95% CI)	Predicted concentration ($\mu\text{g}/\text{m}^3$)
NDVI 300m	1	ref	28.0
	2	-2.51 (-2.58, -2.45)	25.5
	3	-3.59 (-3.65, -3.53)	24.4
	4	-4.97 (-5.03, -4.91)	23.0
	5	-7.71 (-7.78, -7.65)	20.3

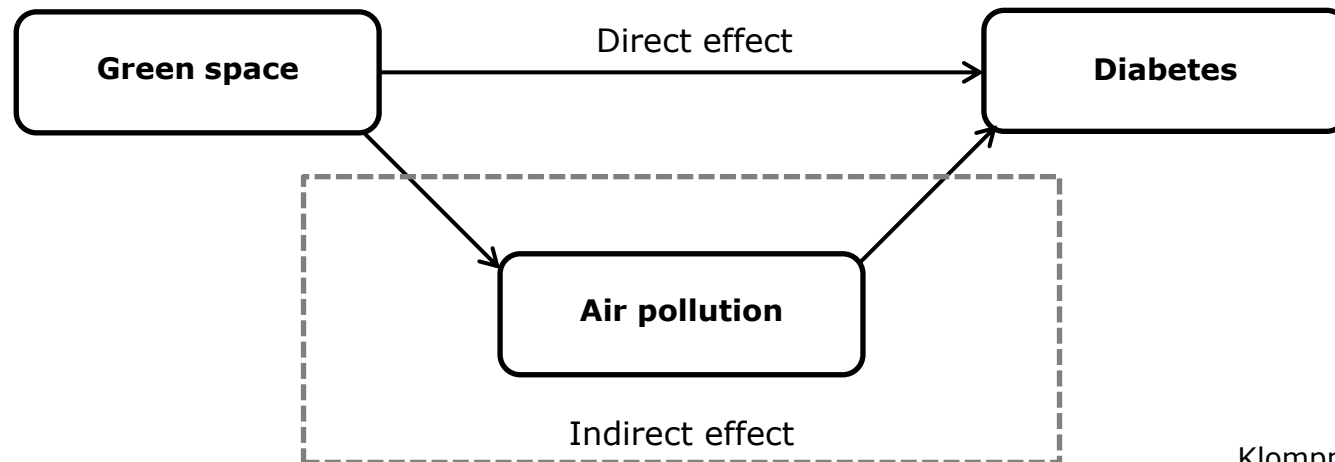


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Results

- Total effect = direct effect + indirect effect
- Proportion mediated = indirect effect / total effect
- Of the total effect of green space exposure on diabetes 10-40% can be explained by decreased levels of air pollution.



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Conclusion

- Surrounding green space was not associated with decreased prevalence of hypertension, stroke and heart attack
- Surrounding green space was associated with decreased prevalence of diabetes
- The effect of surrounding green space on diabetes can partly be explained by decreased levels of air pollution